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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
21st CENTURY TECHNOLOGIES, INC.) Docket No. 030-30266 - CIVP
)
(Fort Worth, Texas))

NRC STAFF MOTION FOR SUMMARY DISPOSITION OF AUTHORITY ISSUE

INTRODUCTION

Pursuant to the Atomic Safety and Licensing Board's (Board) September 24, 1997, Prehearing Conference Order and 10 C.F.R. § 2.749 of the Commission's regulations, the staff of the Nuclear Regulatory Commission (Staff) hereby moves the Board for summary disposition in its favor of the authority issue as framed by the Board in its Prehearing Conference Order. For the reasons set forth below, the Staff's motion should be granted.

BACKGROUND

On May 15, 1996, the Staff issued a "Notice of Violation and Proposed Imposition of Civil Penalty--\$7,500" (Notice of Violation) and a "Confirmatory Order Modifying License (Effective Immediately)" to the Licensee that set forth two violations of NRC requirements and assessed a civil penalty in the amount of \$7,500.¹ The Licensee responded to the Notice of Violation in a Reply and

¹ The violations were set forth as follows:

- A. License No. 30-23697-01E authorizes the licensee to distribute SRB Technologies, Inc., Model PRH-800/G/200 sealed light sources.

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an Answer, both dated October 1, 1996. On April 10, 1997, the Staff, taking into account the Licensee's responses to the Notice of Violation, issued its "Order Imposing a Civil Monetary Penalty" (Order) in the amount of \$2,500 to the Licensee. 62 Fed. Reg. 19,816 (1997). On April 25, 1997, the Licensee requested a hearing on the Order, and on June 23, 1997, a Board was established to preside in this proceeding. 62 Fed. Reg. 34,718 (1997).

On July 3, 1997, the Board issued a "Memorandum and Order (Initial Prehearing Order)" (Order), which, among other things, directed the parties to submit a joint prehearing report containing a statement outlining the central issues for litigation in the proceeding. Order at 6. The Board provided that "[i]f the parties cannot agree on the wording or inclusion of any issue, the statement should set forth that issue separately with a notation identifying the sponsoring party." Order at 6. On August 5, 1997, the parties submitted a "Joint Prehearing Report," setting forth their respective positions. In the Joint Prehearing Report, the Licensee specified seven issues, five of which concerned the alleged lack of the Commission's authority over the Licensee's activities, and two of which concerned the severity level and amount of the civil penalty assessed. Joint Prehearing Report at 1-3. The Staff did not agree with the five issues pertaining to the Commission's authority over the Licensee's activities.

On August 27, 1997, the Board held a prehearing conference to address the proposed issues

¹(...continued)

Contrary to the above, from June to August 1995, the licensee distributed tritium sealed light sources from a manufacturer not authorized in the license.

B. License Condition 10 of License No. 30-23697-01E authorizes the licensee to distribute sealed light sources in specified gunsights and in specified configurations.

Contrary to the above, from July to September 1995, the licensee distributed tritium sealed light sources in configurations not specified or otherwise authorized in the license.

set forth in the Joint Prehearing Report. At the Prehearing Conference, the Staff asserted that the issues concerning the agency's authority over the Licensee's activities were not appropriate for litigation in this enforcement proceeding. Tr. 32-33; Prehearing Conference Order at 3. On September 24, 1997, the Board issued a Prehearing Conference Order in which the Board, *inter alia*, combined the Licensee's five issues pertaining to the agency's authority over the Licensee's activities into a single issue and ordered the Staff to file a motion for summary disposition on that issue. Prehearing Conference Order at 3. The Board directed that the Staff brief fully the position that the NRC has authority over the Licensee's activities that the Staff asserted in the Appendix to the April 10, 1997, Order Imposing Civil Monetary Penalty. Prehearing Conference Order at 3-4. Further, the Board provided the Staff the opportunity to argue in its motion that the Licensee may not raise the issue of the agency's authority over the Licensee's activities in this proceeding.² Prehearing Conference Order at 3. The Board directed the Staff to file its motion for summary disposition on this issue by Friday, October 24, 1997.

DISCUSSION

I. Legal Standards for Summary Disposition

It is well settled that an agency may ordinarily dispense with an evidentiary hearing where no genuine issue of material fact exists. *Veg-Mix, Inc. v. U.S. Dep't of Agric.*, 832 F.2d 601, 607-08 (D.C. Cir. 1987). Summary disposition is favored by the Commission as "an efficacious means

² The Board provided, however, that should the Staff seek to pursue the argument that the Licensee may not challenge the Commission's jurisdiction in this enforcement proceeding, the Staff must explain why *American Nuclear Corp.*, CLI-86-23, 24 NRC 704 (1986), is applicable here. Prehearing Conference Order at n.1. Further, the Board stated that the Staff should detail all other agency cases that support its assertion that the issue of agency jurisdiction over the Licensee's activities can only be raised in the context of rulemaking. Prehearing Conference Order at n.1.

of avoiding unnecessary and possibly time-consuming hearings on demonstrably insubstantial issues.” *Wisconsin Elec. Power Co.* (Point Beach Nuclear Plant, Unit 1), ALAB-696, 16 NRC 1245, 1263 (1982), (citation omitted).

Section 2.749 of the Commission’s regulations provides that any party may move for a decision by the presiding officer in that party’s favor as to all or any part of the matters involved in the proceeding. 10 C.F.R. § 2.749(a). Summary disposition is appropriate if the filings in the proceeding, including depositions, statements of the parties, and affidavits, show that there is no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law. 10 C.F.R. § 2.749(d). In general, the Commission, when considering motions for summary disposition filed pursuant to 10 C.F.R. § 2.749, applies the same standards that the Federal courts use in determining motions for summary judgment under Rule 56 of the Federal Rules of Civil Procedure. *Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 102 (1993). Rule 56 is analogous to section 2.749 of the Commission’s regulations. *Id.*

The party seeking summary judgment has the burden of proving the absence of genuine issues of material fact. *Adickes v. S.H. Kress & Co.*, 398 U.S. 144, 157 (1970); *Advanced Medical Systems, Inc.*, 38 NRC at 102. In addition, the record is viewed in the light most favorable to the party opposing the motion. *Poller v. CBS, Inc.*, 368 U.S. 464, 473 (1962); *Kerr-McGee Chemical Corp.* (West Chicago Rare Earths Facility), ALAB-944, 33 NRC 81, 144 (1991). However, if the moving party makes a proper showing for summary disposition and the opposing party fails to show that there is a genuine issue of material fact, the Board may summarily dispose of all of the matters

before it on the basis of the filings in the proceeding, the statements of the parties, and affidavits.³ *Advanced Medical Systems, Inc.*, 38 NRC at 102; 10 C.F.R. § 2.749(d). In the instant proceeding, for the reasons set forth below, there exists no genuine issue of material fact with respect to the issue of the Commission's authority over the Licensee's activities, and, accordingly, the Staff is entitled to a decision in its favor on this issue as a matter of law.

II. The Issue of the NRC's Authority Over the Licensee's Activities Is Not Appropriate for Litigation in This Civil Penalty Proceeding

The Board framed the authority issue as:

whether the Atomic Energy Act of 1954, as amended, grants the NRC the authority to impose and enforce conditions in a 10 C.F.R. Part 30 license concerning the tritium source supplier and model of sealed light sources, the manufacturer and model of the weapons on which the gunsights will be mounted, and the sealed source configuration of the tritium luminous gunsights, authorized to be possessed and distributed under the byproduct license.

³ When the party moving for summary disposition has carried its burden, the party opposing the motion must set forth specific facts showing that there is a genuine issue of material fact. 10 C.F.R. § 2.749(b); *Cleveland Elec. Illuminating Co.* (Perry Nuclear Power Plant, Units 1 and 2), ALAB-841, 24 NRC 64, 93 (1986). General denials and bare assertions are not sufficient to preclude summary disposition when the proponent has met its burden. *Advanced Medical Systems, Inc.*, 38 NRC at 102. Although the opposing party does not need to demonstrate that it will succeed on the issues, it must at least demonstrate that a genuine issue of fact exists to be tried. *Id.*; *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-92-8, 35 NRC 145, 154 (1992) (to avoid summary disposition, opposing party had to present contrary evidence that was so significantly probative as to create a material issue of fact).

Section 2.749 of the Commission's regulations further requires that the moving party annex to its motion a statement of those facts with respect to which it contends there is no genuine issue to be heard. The opposing party must annex to its answer a statement of material facts as to which it contends there does exist a genuine issue to be heard. 10 C.F.R. § 2.749(a). If the opposing party fails to controvert the statement served by the moving party, all of the facts set forth in the statement of the moving party will be deemed admitted. *Id.*; *Advanced Medical Systems, Inc.*, 38 NRC at 102-03; *Rhodes-Sayre Associates, Inc.*, LBP-91-15, 33 NRC 268, 271 (1991). In addition, section 2.749 provides that when a movant for summary disposition has satisfied its burden and has supported its motion with affidavits, a party opposing the motion must proffer countering evidence or an affidavit explaining why it is impractical to do so. 10 C.F.R. § 2.749(b)-(c).

Prehearing Conference Order at 2. For the reasons set forth below, this issue is not appropriate for litigation in this enforcement proceeding.

A. Once a License is Issued, a Licensee is Not Free to Disregard its Terms

The Commission considers compliance with the terms of one's license to be a fundamental obligation on the part of its licensees. To this end, the Commission has long held that, "[o]ur regulations require meticulous attention to detail to assure adequate protection of the public health and safety." *X-Ray Engineering Co.*, 1 AEC 553, 555 (1960). See *Randall C. Orem, D.O.*, CLI-93-14, 37 NRC 423, 427 (1993) (Commission underscores the importance of a materials licensee providing accurate information to the Commission); *Hamlin Testing Laboratories, Inc.* 2 AEC 423, 428 (1964) (Commission insists on candor and compliance in order to discharge its own responsibility for public health and safety). Further, in *Atlantic Research Corp.*, the Commission stated that its licensee must accept and be held to "an extraordinary responsibility for safety," as reflected in the Commission's safety regulations and license conditions. *Atlantic Research Corp.* (Alexandria, Virginia), CLI-80-7, 11 NRC 413, 425 (1980) (regulations and license conditions "reflect the Commission's considered judgment as to what is required to protect the public as well as licensees' employees from the hazards inherent in the industrial use of radioactive byproduct material."). Thus, the Commission places primary importance on a licensee's compliance with the terms and conditions of its NRC license.

If a licensee does not agree to the terms or conditions in the license, the licensee is free to propose amendments to the license to change it. See 10 C.F.R. § 30.38 (applicant for amendment shall specify the respects in which the licensee desires its license to be amended and the grounds for the amendment). At that point, the staff may grant or deny the licensee's request based on its

consideration of applicable requirements. *See* 10 C.F.R. § 30.39. If the staff denies the licensee's request, in whole or in part, the licensee may challenge the staff's denial of its request in a hearing pertaining to the license amendment denial. *See* 10 C.F.R. § 2.1205(b). Thus, the Commission's regulatory structure provides a method for a byproduct materials licensee to change the conditions of its license. Nowhere in the Commission's regulations is it contemplated that a licensee may circumvent this review and approval process through the act of unilaterally disregarding a condition of its license in order to have it set aside in the context of an enforcement proceeding. In fact, the Commission's repeated emphasis on licensee compliance and the existence of a method for seeking a license amendment militate against the approval of such tactics. For this reason alone, the Licensee's proposed issue should not be litigated in this proceeding.

B. The Licensee's Challenge Collaterally Attacks the Commission's Regulations

It is also fundamental that the Commission's regulations are not subject to attack in administrative proceedings. *See Public Serv. Co. of New Hampshire* (Seabrook Station, Units 1 and 2), CLI-89-7, 29 NRC 395, 416 (1989) (adjudicatory licensing proceeding is not a permissible forum for challenge to Commission's regulations.). Rather, challenges of this sort are appropriately brought by means of a petition for rulemaking. *Id.*, *see also* 10 C.F.R. §§ 2.758 and 2.1239 (in licensing proceedings, matters regarding application of a rule may be certified to the Commission under certain conditions); "Restructuring of Facility License Applications Review and Hearing Process," 37 Fed. Reg. 15,127, 15,129 (1972) (Commission restricts challenges to regulations in licensing proceedings due to "the expanding opportunities for participation in Commission rule making proceedings and *increased emphasis on rule making proceedings as the appropriate forum for settling basic policy issues.*") (emphasis added).

The principle that the Commission's regulations are not subject to attack in adjudicatory proceedings has been extended beyond licensing cases. In *Advanced Medical Systems, Inc.*, an enforcement proceeding involving the issuance of a suspension order, the licensing board rejected the licensee's proposed issue, "whether or not 10 CFR Section 2.202(f), *et seq.*, is constitutional." This issue, the licensing board determined, was beyond the board's authority to decide because 10 C.F.R. § 2.758(a) precluded the board from "entertaining challenges of the type advanced by AMS." *Advanced Medical Systems, Inc.*, (One Factory Row, Geneva, Ohio 44041), LBP-89-11, 29 NRC 306, 316, 317 (1989), *aff'd on other grounds*, CLI-94-6, 39 NRC 285, 293-94 (1994). Further, as will be discussed more fully below, in *American Nuclear Corp.*, a proceeding involving the imposition of license conditions, the Commission rejected issues proposed by licensees because the proposed issues impermissibly attacked the Commission's mill tailing regulations. *American Nuclear Corp.* (Revision of Orders to Modify Source Materials Licenses), CLI-86-23, 24 NRC 704, 707 (1986) ("Commission adheres to the fundamental principle of administrative law that its rules are not subject to collateral attack in adjudicatory proceedings."). Therefore, the Licensee in the instant proceeding is prohibited from mounting a collateral attack against the Commission's regulations.

The issue of whether the Commission has the authority to impose and enforce license conditions in a Part 30 license which specify the tritium source supplier and model of sealed light sources, the manufacturer and model of the weapons on which the gunsights will be mounted, and the sealed source configuration of the tritium luminous gunsights, collaterally attacks 10 C.F.R. § 32.22 of the Commission's regulations. Section 32.22(a)(2) provides that "[a]n application for a specific license to manufacture, process, or produce self-luminous products

containing tritium, krypton-85, or promethium-147, or to initially transfer such products to persons exempt from licensing requirement as provided by § 30.19 . . . will be approved if . . . [t]he applicant submits sufficient information relating to the design, manufacture, prototype testing, quality control procedures, labeling or marking, and the conditions of handling, storage, use, and disposal of the self-luminous product to demonstrate that the product will meet the safety criteria set forth in § 32.23.” The regulations detail the information that should be included in an application for a distribution license. 10 C.F.R. § 32.22(a)(2)(i)-(xvi). This information includes, among other things, a description of the product and its intended use or uses, the type and quantity of byproduct material in each unit, the chemical and physical form of the byproduct material in the product, details of construction and design of the product, and results of prototype testing of the product. Thus, this regulation prescribes that an application for a distribution license will contain the type of information that is included as a condition to the licensee’s License. A challenge to the specific information provided and made part of the Licensee’s license constitutes a challenge to the regulations that require the submission of this information.⁴ Consequently, the Licensee’s challenge to the authority of the Commission to regulate these matters is an impermissible attack upon the Commission’s regulations under which the license was granted and the conditions of the license were determined.

⁴ Once this information is submitted to the Commission, the license issued can be conditioned by the information submitted. *See Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041) CLI-93-22, 38 NRC 98, 118 & n.77 (1993).

C. American Nuclear Corp., CLI-86-23, Is Applicable Precedent

In *American Nuclear Corp.*, the Commission refused to allow mill owner licensees to raise certain issues in a proceeding involving the imposition of license conditions because “the issues raised by the millers had been resolved by the Commission in its rulemaking conforming NRC requirements to some of the standards promulgated by EPA.” *American Nuclear Corp.*, 24 NRC at 706. The millers’ argument that they were not mounting a collateral attack was that the specific detection monitoring requirements imposed by the Staff were not specified in the NRC’s or EPA’s requirements. *Id.* at 708. Thus, the millers claimed, their challenge would be barred only if a regulation had established the very ground water detection requirements imposed by the orders. *Id.* at 709. The Commission disagreed, stating that “[i]n our view, the heading or title of the regulation is not important; what is important is what issues did the prior regulation address and resolve.” *Id.* at 709-710. In the instant proceeding, the issue regarding the authority of the Commission to establish requirements for the issuance of byproduct material distribution license was addressed and resolved in the rulemaking regarding the licensing scheme for the distribution of byproduct material to exempt entities. See “Tritium, Krypton-85 and Promethium-147 in Self-Luminous Products,” 33 Fed. Reg. 9198 (1968) (“The amendments of Part 32 establish in a new § 32.22, the framework in the Commission’s regulations for the issuance of specific licenses to distribute”). That the rulemaking did not specifically refer to gunsights is immaterial in light of the fact that these activities are encompassed by the scope of the matters addressed in rulemaking. Therefore, the issue regarding the Commission’s authority is not an appropriate issue for litigation in this proceeding and should not be entertained.

III. NRC Has Authority Under the AEA Over Licensee's Activities Set Forth in the Appendix to the Staff's April 10, 1997, Order Imposing Civil Monetary Penalty

The Board, in its Prehearing Conference Order, directed that the Staff address whether the NRC has authority over the Licensee's activities that the Staff asserted in the Appendix to its April 10, 1997, Order Imposing Civil Monetary Penalty. Prehearing Conference Order at 3-4.

Specifically, the issue is:

whether the Atomic Energy Act of 1954, as amended, grants the NRC the authority to impose and enforce conditions in a 10 C.F.R. Part 30 license concerning the tritium source supplier and model of sealed light sources, the manufacturer and model of the weapons on which the gunsights will be mounted, and the sealed source configuration of the tritium luminous gunsights, authorized to be possessed and distributed under the byproduct license.

Prehearing Conference Order at 2. The Staff's position that it does have the authority under the Atomic Energy Act (AEA) to impose and enforce such conditions in a Part 30 license is set forth below.

A. NRC's Authority to Regulate Byproduct Material Under the Atomic Energy Act.

The Commission's statutory authority to regulate all uses of byproduct material is contained in the AEA. Specifically, section 81 of the AEA prohibits the manufacture, production, transfer, acquisition, ownership, possession, import, or export of *any byproduct material*, except as authorized by the Commission.⁵ 42 U.S.C. 2111. Section 81 directs the Commission to not permit the distribution of byproduct material to any licensee or distribution from any licensee who: "is not

⁵ Section 11e of the AEA defines byproduct material as "any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material." 42 U.S.C. § 2014. Tritium is byproduct material as defined by section 11e of the AEA. See 10 C.F.R. § 30.71 (table of exempt quantities of byproduct material lists Hydrogen 3 (H³) as a byproduct material). See also, *Concise Dictionary of Atomics* 244 (A. Del Vecchio, ed. 1964) (Tritium is "[t]he radioisotope of hydrogen with mass number 3 (₁H³)."), attached hereto as Exhibit 1.

equipped to observe or who fails to observe such safety standards to protect health as may be established by the Commission,” or “who uses such material in violation of law or regulation of the Commission or in a manner other than as disclosed in the application therefore or approved by the Commission.” *Id.*

Section 81 of the AEA provides that “[t]he Commission is authorized to issue general or specific licenses to applicants seeking to use byproduct material” for a variety of useful purposes, as may be developed. *Id.* In addition, section 81 authorizes the Commission to exempt classes of byproduct material quantities and kinds of uses or users from “the requirements for a license set forth in this section when it makes a finding that the exemption . . . will not constitute an unreasonable risk to the common defense and security and to the health and safety of the public. *Id.* In addition, section 161 of the AEA provides that “[t]he Commission is authorized to establish by rule, regulation, or order, such standards and instructions to govern the possession and use of . . . byproduct material as the Commission may deem necessary or desirable to promote the common defense and security or to protect health or to minimize danger to life or property. 42 U.S.C. § 2201. Thus, the authority of the Commission to regulate byproduct material is unmistakably clear.

B. Regulations Promulgated Under the Atomic Energy Act

The Commission, pursuant to the authority provided in section 81 of the AEA, promulgated regulations setting forth the requirements for the issuance of specific licenses to distribute, to persons exempt from licensing requirements, self-luminous products meeting the Commission’s safety criteria. Specifically, the Commission’s regulations provide that any person is exempt from licensing requirements to the extent that the self-luminous product containing tritium, krypton-85, or promethium-147 was manufactured, produced, or initially transferred in accordance with a

specific license pursuant to 10 C.F.R. § 32.22, which authorizes the initial transfer of the product to exempt persons. 10 C.F.R. § 30.19. Section 32.22(a)(2) provides that “[a]n application for a specific license to manufacture, process, or produce self-luminous products containing tritium, krypton-85, or promethium-147, or to initially transfer such products to persons exempt from licensing requirement as provided by § 30.19 . . . will be approved if . . . [t]he applicant submits sufficient information relating to the design, manufacture, prototype testing, quality control procedures, labeling or marking, and conditions of handling, storage, use, and disposal of the self-luminous product to demonstrate that the product will meet the safety criteria set forth in § 32.23.”⁶

⁶ The Commission has set forth the information that should be included in an application as follows:

- (i) A description of the product and its intended use or uses.
- (ii) The type and quantity of byproduct material in each unit.
- (iii) Chemical and physical form of the byproduct material in the product and changes in chemical and physical form that may occur during the useful life of the product.
- (iv) Solubility in water and body fluids of the forms of the byproduct material identified in paragraph (a)(2)(iii) and (xii) of this section.
- (v) Details of construction and design of the product as related to containment and shielding of the byproduct material and other safety features under normal and severe conditions of handling, storage, use, and disposal of the product.
- (vi) Maximum external radiation levels at 5 and 25 centimeters from any external surface of the product, averaged over an area not to exceed 10 square centimeters, and the method of measurement.
- (vii) Degree of access of human beings to the product during normal handling and use.
- (viii) Total quantity of byproduct material expected to be distributed in the product annually.
- (ix) The expected useful life of the product.
- (x) The proposed method of labeling or marking each unit with identification of the manufacturer or initial transferor of the product and the byproduct material in the product.
- (xi) Procedures for prototype testing of the product to demonstrate the effectiveness of the containment, shielding, and other safety features under both normal and severe conditions of handling, storage, use, and disposal of the product.
- (xii) Results of the prototype testing of the product, including any change in the form of the byproduct material contained in the product, the extent to which the byproduct material may be released to the environment, any increase in external radiation levels, and any other changes in safety features.

(continued...)

The Commission's safety criteria state that an applicant must demonstrate that the product is designed and will be manufactured so that the radiation doses resulting from the specified scenarios would not exceed the organ dose limits set forth in the appropriate columns of the table found in 10 C.F.R. § 32.24. 10 C.F.R. § 32.23. The safety criteria are the primary factors in controlling the radiation doses associated with persons exempt from the requirements for a license. See Affidavit of Larry W. Camper, Branch Chief for the Medical, Academic, & Commercial Use Safety Branch, Division of Industrial & Medical Nuclear Safety, Office of Nuclear Material Safety and Safeguards (Camper Affidavit) at ¶ 9, attached hereto as Exhibit 2. These safety criteria establish an upper limit on the amount of radioactive material in a given exempt unit and of establishing a need to provide a degree of containment for the material, even under accident conditions. See "Exemption of Tritium, Krypton-85 and Promethium-147 in Self-Luminous Products," 34 Fed. Reg. 9,025, 9,026 (1969); Camper Affidavit at ¶ 9. In addition, the probabilities associated with the radiation dose limits for accidental exposures ensure that the risk to individuals would be very small. 34 Fed. Reg. 9,025, 9,026 (the doses specified are considerably smaller than

⁶(...continued)

(xiii) The estimated external radiation doses and dose commitments relevant to the safety criteria in § 32.23 and the basis for such estimates.

(xiv) A determination that the probabilities with respect to the doses referred to in § 32.23(d) meet the criteria of that paragraph.

(xv) Quality control procedures to be followed in the fabrication of production lots of the product and the quality control standards the product will be required to meet.

(xvi) Any additional information, including experimental studies and tests, required by the Commission.

10 C.F.R. § 32.22(a)(2)(i)-(xvi).

those that would be likely to produce clinical symptoms of injury); Camper Affidavit at ¶ 9. Thus, the review and approval of products containing tritium, such as luminous gunsights or weapons containing luminous gunsights, is necessary to ensure that the dose limits of 10 C.F.R. § 32.23 are satisfied. Camper Affidavit at ¶¶ 3 and 9.

C. The Commission's Authority to Impose and Enforce License Conditions

Section 183 of the AEA provides that “[e]ach license shall be in such form and contain such terms and conditions as the Commission may, by rule or regulation, prescribe to effectuate the provisions of this Act.” 42 U.S.C. § 2233. Section 182(a) of the AEA provides that “[e]ach application for a license hereunder . . . shall specifically state such information as the Commission, by rule or regulation, may determine to be necessary to decide such of the technical and financial qualifications of the applicant, the character of the applicant, . . . or any other qualifications of the applicant as the Commission may deem appropriate for the license.” 42 U.S.C. § 2232. The Commission’s regulations provide that the Commission may incorporate into a Part 32 license, at the time the license is issued or thereafter, “such additional requirements and conditions with respect to the licensee’s receipt, possession, use and transfer of byproduct material as it deems appropriate” to, among other things, protect health or minimize danger to life or property. 10 C.F.R. § 30.34(e). The Commission has recognized that its “safety regulations and license conditions reflect the Commission’s considered judgment as to what is required to protect the public as well as licensees’ employees from the hazards inherent in the industrial use of radioactive byproduct material.” *Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-94-6, 39 NRC 285, 312 (1994) (citation omitted).

The Commission has the authority to impose a civil monetary penalty on any person who

violates any licensing provision of section 81 or any rule, regulation or order issued thereunder, or any term condition, or limitation of any license issued thereunder. AEA, section 81, 42 U.S.C. § 2282. Further, section 186a provides the Commission with the authority to revoke any license for any material false statement in the application or any statement of fact required under section 182, or “because of conditions revealed . . . which would warrant the Commission to refuse to grant a license on an original application,” or for violation of, or failure to observe any of the terms and provisions of the AEA or of any regulation of the Commission. 42 U.S.C. § 2236. Consequently, “[a] violation of requirements subjects the violator to the full range of sanctions authorized under the Atomic Energy Act, including revocation of a license.” *Advanced Medical Systems, Inc.*, 39 NRC at 312. The Commission’s authority to impose and enforce the conditions of the Licensee’s license is, therefore, abundantly clear.

D. The Issuance of a License Under 10 C.F.R. Parts 30 and 32

As part of the sealed source and device review of a product under 10 C.F.R. § 32.22, an applicant for a license to distribute tritium to exempt persons provides the Commission with the source models, designation of suppliers of tritium sources, and the specific configurations of gunsight models. Camper Affidavit at ¶ 12. Sight configurations and manufacturer(s) of sources are relevant to health and safety in that applicants base all product information submitted in the license application, such as prototype testing, dose estimates and commitments, on these specific configurations and sources. Camper Affidavit at ¶ 12. The decision to prototype test a gunsight mounted on a weapon (specific or otherwise) versus the gunsight by itself, generally considered a worst case scenario, is entirely up to the applicant. Camper Affidavit at ¶ 13. Likewise, whether the applicant chooses to utilize radioactive sources that have previously been reviewed and registered

versus sources that have not been reviewed by the NRC is strictly an applicant's choice. Camper Affidavit at ¶ 13. Whichever method the applicant chooses, the product will be evaluated and the decision regarding licensure based on the information submitted by the applicant. Camper Affidavit at ¶ 13. In this regard, the Commission has recognized that information submitted by a licensee may become conditions of its license. *Advanced Medical Systems, Inc.* (One Factory Row, Geneva, Ohio 44041), CLI-93-22, 38 NRC 98, 118 & n.77 (1993) (regulatory program and licensing practices make it clear that a final license could incorporate by reference the requirements in the application for that same license).

The registration process for sealed source product information provides that “[a]ny manufacturer or initial distributor of a sealed source or device containing a sealed source whose product is intended for use under a specific license may submit a request to NRC for evaluation of radiation safety information about its product and for its registration.” 10 C.F.R. § 32.210(a). The request for review of a sealed source or device must include sufficient information about “the design, manufacture, prototype testing, quality control program, labeling, proposed uses and leak testing and, for a device, the request must also include sufficient information about installation, service and maintenance, operating and safety instructions, and its potential hazards, to provide reasonable assurance that the radiation safety properties of the source or device are adequate to protect health and minimize danger to life and property.” 10 C.F.R. § 32.210(c). “After completion of the evaluation, the Commission issues a certificate of registration to the person making the request. The certificate of registration acknowledges the availability of the submitted information for inclusion in an application for a specific license proposing use of the product.” 10 C.F.R. § 32.210(e).

The Commission has recognized the practice of applicants for specific licenses of describing

information regarding the sealed sources of byproduct material and devices containing sealed sources by referring to information previously filed by the manufacturer of the sealed sources or devices. “Manufacturers’ Registration of Radiation Safety Information for Certain Devices and Sealed Sources,” 52 Fed. Reg. 27,782, 27,783 (1987). “This practice is administratively convenient to the NRC, manufacturers, and to applicants because it reduces and simplifies paperwork. A single submission by a manufacturer is evaluated by the NRC and the results of the evaluation are used in NRC’s review of multiple applications for specific licenses, thus avoiding repetitive submissions by applicants and reviews by the NRC.” *Id.* Thus, an applicant for a specific license must either provide the required information directly, or “must identify the source or device by manufacturer and model number as registered with the NRC or an Agreement State” 52 Fed. Reg. at 27,785.

For example, a vendor of a sealed source is issued a registration certificate by the NRC. This certificate is then referenced by a device vendor to demonstrate that the evaluation and registration criteria for the source when used in this specific device are met. Camper Affidavit at ¶ 18. This practice allows the NRC to more effectively expend resources in determining the adequacy of the radiation safety features of the final product (device) containing byproduct material. Camper Affidavit at ¶ 15. Approval of an application for a specific license, however, also requires that all other applicable regulatory requirements, such as 10 C.F.R. Part 30 training requirements, are met. Camper Affidavit at ¶ 16.

E. Conditions in a Distribution License Concerning Tritium Source Supplier and Model of Sealed Light Sources

The Commission does not direct which byproduct material supplier or model of tritium light source an applicant may reference in its application. Camper Affidavit at ¶ 17. However, for the purpose of authorizing a product for distribution to persons exempt from the requirements for a license, the applicant must demonstrate that the product meets the safety criteria contained in 10 C.F.R. 32.23, and the Commission will perform a safety evaluation on the product, such as a gunsight. Applicants may either reference manufacturers whose sources have previously undergone a review to satisfy the requirements of 10 C.F.R. § 32.210, *or* they may submit information pertaining to gunsights containing sources not previously evaluated. Camper Affidavit at ¶ 18. Therefore, the designation of the source supplier and model of sealed light sources serves to satisfy the Commission's requirements contained in 10 C.F.R. §§ 32.22 and 32.23. In this case, the Licensee referenced in its application manufacturers and model numbers of tritium sources that had previously been approved under 10 C.F.R. § 32.210. Camper Affidavit at ¶ 18; *See* Application, relevant pages attached hereto as Exhibit 3A (initial application and license) and Exhibit 3B (April, 1991 amendment application).

F. Conditions in a Distribution License Pertaining to the Manufacturer and Model of the Weapons on Which the Gunsights will be Mounted, and the Sealed Source Configuration of the Tritium Luminous Gunsights

The specifications in the license of the gunsight configuration or the weapons on which the gunsights will be mounted result from information provided by the applicant to satisfy 10 C.F.R. § 32.22. The manner in which the applicant satisfies these criteria is at the discretion of the applicant considering the design and engineering specifications of the product under review and

the requirement to address the prototype testing criteria set forth in 10 C.F.R. § 32.22.⁷ Applicants may choose to prototype test the gunsight configurations separately or mounted on specific weapons. Camper Affidavit at ¶ 19. If gunsights mounted on a specific weapon, such as “Model X rear sight mounted on Smith and Wesson pistols,” is specified in the application, then, ultimately, the license issued will reflect that the authority to distribute the gunsights is limited to the specific weapon reviewed. Camper Affidavit at ¶ 19. This is because the authorization is based on the fact that those approved products satisfy all of the safety criteria in 10 C.F.R. § 32.23. Camper Affidavit at ¶ 21. In this case, the Licensee chose to prototype test the gunsight configuration mounted on specific weapons. Camper Affidavit at ¶ 19; *See* Application, Exhibit 3B.

In summary, the Commission has the authority under the AEA to issue byproduct materials licenses containing such terms as it deems appropriate. The Commission’s regulations promulgated in connection with the distribution of byproduct material to persons exempt from the Commission’s regulations set forth a framework for the Commission to assure that individual licensees will distribute only those products that meet strict safety criteria, such that the exempt user is protected from the hazards of radiation. Applicants submitting information to the Commission for its review will be issued a license conditioning the activities on the information which has been reviewed by the NRC. Limitations placed in the license will be derived from the information submitted by the applicant. The AEA provides that the Commission may impose sanctions on licensees that violate

⁷ “Standard Review Plan for Applications for Licenses to Distribute Byproduct Material to Persons Exempt from the Requirements for an NRC License,” NUREG-1562, Draft Report for Public Comment, Appendix 11, “Standard Requirements for Tritium Illuminated Gunsights Containing Tritium Gas Sealed in Glass Vials,” contains a method acceptable to the Staff for satisfying the Commission’s requirements to conduct prototype testing of gunsights containing tritium. Appendix 11 is attached hereto as Exhibit 4.

the terms of their NRC licenses. Therefore, the Commission has the authority under the AEA to impose and enforce the conditions contained in the Licensee's license.

CONCLUSION

For the reasons set forth above, the Staff's motion for summary disposition should be granted.

Respectfully submitted,

Catherine L. Marco

Catherine L. Marco
Counsel for NRC Staff

Dated at Rockville, Maryland
this 24th day of October 1997

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
21st CENTURY TECHNOLOGIES, INC.) Docket No. 030-30266
)
(Fort Worth, Texas))

STATEMENT OF MATERIAL FACTS
ABOUT WHICH NO GENUINE ISSUE EXISTS

1. Tritium (Hydrogen 3) is byproduct material.
2. The Commission's safety criteria in 10 C.F.R. § 32.23 are the primary factors in controlling the radiation doses associated with persons exempt from the requirements for a license.
3. The safety criteria have the effect of establishing an upper limit on the amount of radioactive material in a given exempt unit and of establishing a need to provide a degree of containment for the material, even under accident conditions.
4. The NRC's review and approval of gunsights containing tritium is necessary to assure that the dose limits of 10 C.F.R. § 32.23 are satisfied.
5. Sight configurations and manufacturer(s) of sources are relevant to health and safety in that applicants base all product information submitted in the license application, such as prototype testing, dose estimates and commitments, on these certain configurations and sources.
6. The decision to prototype test a gunsight mounted on a weapon (specific or otherwise) versus the gunsight itself is entirely up to the applicant.
7. Whether a applicant chooses to reference in its application radioactive sources that have previously been reviewed and registered versus sources that have not been reviewed by the NRC is an applicant choice.

8. The applicant must demonstrate that the product meets the safety criteria contained in 10 C.F.R. § 32.23.

Respectfully submitted,

Catherine L. Marco

Catherine L. Marco
Counsel for NRC Staff

Dated at Rockville, Maryland
this 24th day of October, 1997

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772
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c.1

REFERENCE COPY

CONCISE
DICTIONARY
OF
ATOMICS,

edited by

ALFRED DEL VECCHIO

with an Introduction by

Wernher von Braun



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Library of Congress Catalog Card Number: 64-13328

Printed in the United States of America

Transition

See quantum jump.

Transition Probability

The probability of the decay of a radioactive atom within unit time.

Transmutation of Elements

The artificially induced change of the atoms of a sample of a given element into atoms of a different isotope by subjecting them to nuclear bombardment by sub-atomic particles.

Transport Theory

A theory based on the approximation to the Boltzmann equation for such conditions that Fick's law is not applicable.

Transuranic Elements

Those members of the actinide group of the extended periodic table which have an atomic number higher than 92. As in the other members of the actinide group, in the transuranic elements, too, the 5f electron sub-shell is filled step by step, and the outer shells remain unchanged. Transuranic elements do not occur in nature and have to be produced artificially from uranium, either directly or indirectly by successive steps of transmutation. Up to this date, four transuranic elements have been produced and named, but the discovery and production of further members of the group

is expected. The four known transuranic elements, with their atomic numbers, are: neptunium (93), plutonium (94), americium (95) and curium (96) (q.v.). Also, the discovery of berkelium (97), and californium (98), has been announced.

Trawsfynydd (G. B.)

A lakeside site in North Wales where a 500 MW nuclear power station is being built for the C.E.G.B. It is hoped to operate it at a high load factor in association with one of the largest pumped storage hydro-electric plants in the world.

Tributyl Phosphate

A solvent which can be used in the chemical processing of spent fuel or uranium concentrates.

Tritium

The radioisotope of hydrogen with mass number 3 (${}^3\text{H}$).

Tu

An alternative symbol for the element thulium.

Tungsten

See wolfram.

Tunnel Effect

Cf. potential barrier.

Turbulent Flow

Fluid flow in which the local velocity of the fluid medium varies erratically with time in both direction and magnitude.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
21st CENTURY TECHNOLOGIES, INC.)	Docket No. 030-30266
)	
(Fort Worth, Texas))	

AFFIDAVIT OF LARRY W. CAMPER IN SUPPORT OF NRC STAFF'S
MOTION FOR SUMMARY DISPOSITION OF AUTHORITY ISSUE

I, Larry W. Camper, first being duly sworn, depose and state:

1. I am currently employed by the Nuclear Regulatory Commission as the Branch Chief for the Medical, Academic, & Commercial Use Safety Branch (IMAB), Division of Industrial & Medical Nuclear Safety, Office of Nuclear Material Safety and Safeguards. A statement of my professional qualifications is attached hereto as Attachment 1.
2. The purpose of this affidavit is to address the issue concerning NRC's authority to impose and enforce conditions in a 10 CFR Part 30 license concerning the tritium source suppliers and model of sealed light sources; the manufacturer and model of the weapons on which the gunsights will be mounted; and the sealed source configuration of the tritium luminous gunsights, authorized to be possessed and distributed under the byproduct license. My comments focus on the review and approval of devices, *e.g.*, tritium luminous gunsights, for distribution to persons exempt from the requirements for a license.

Terms

3. This affidavit concerning the distribution of self-luminous products, specifically gunsights containing tritium, contains the following technical terms, as defined:

Device - an apparatus designed to hold, contain, and utilize the sealed source. In this case, the device is the ironworks of the gunsight without the tritium gas vial.

Exempt Distribution License - authorization pursuant to § 32.22 to distribute self-luminous products containing tritium to persons exempt from the requirements for a NRC license pursuant to § 30.19.

Luminous Gunsights - the apparatus used for aiming a weapon that contains tritium gas vials. Gunsights may be an integral part of the weapon or may be mounted onto the weapon by permanent or detachable means.

Product - the device containing the source that is reviewed and approved for distribution to persons exempt from licensing. In this case, the product may be luminous gunsights or weapons containing luminous gunsights. Sources by themselves are not considered products for distribution under § 32.22 to persons exempt from the requirements for a license pursuant to § 30.19.

Prototype testing - tests, such as temperature, vibration, and firing, performed on the first product of its kind to indicate the minimum performance requirements the product will be required to meet in order to demonstrate the effectiveness of the containment, shielding and other safety features of the product.

Sealed Source - any byproduct material that is encased in a capsule designed to prevent leakage or escape of the byproduct material. In this case the sealed source (source) is the

glass vial containing tritium gas.

Regulation of consumer products

4. The regulations controlling the use of radioactive materials are promulgated under the Act to protect public health and safety and minimize danger to life. With regard to consumer products, the NRC is authorized to exercise regulatory control over the manufacture, distribution, possession, use and transfer of products containing byproduct, source and special nuclear material. NRC's responsibility for consumer products can be briefly described as the following three major areas of concern: 1) the radiation safety of workers manufacturing the product, 2) the radiation safety of the general public, including both users and non-users of the product, and 3) the long term contamination of the environment as a result of disposal.
5. The regulations pertinent to luminous gunsights are found in 10 C.F.R. §§ 30.19, 32.22, 32.23 and 32.24. As part of this process, distribution of products containing byproduct material requires a license and review/approval of the device to be distributed. NRC issues guidance describing methods acceptable to the NRC for implementing specific parts of the regulations and clarifies techniques used by NRC in performing an evaluation of a product. Under 10 C.F.R. § 30.19, persons are exempt from requirements for a license to the extent that such persons receive, possess, use, transfer, own, or acquire tritium, krypton-85 or promethium-147 in self-luminous products, such as gunsights containing tritium sources, provided the products have been initially transferred or distributed in accordance with a license issued pursuant to § 32.22.

Information required by § 32.22

6. The regulations in § 32.22 require that sufficient information concerning the sources and the product be submitted prior to issuance of a license. For tritium luminous products, such as gunsights, the information to be submitted prior to the issuance of a license is outlined in §§ 32.22, 32.23, 32.24, and 32.25. Specifically, an application must contain a complete description of the product and its intended uses describing the radioactive material and the product for distribution.
7. Applicants wishing to distribute products pursuant to § 32.22 must submit sufficient information concerning the design, manufacture, and construction of the product; prototype testing and results; labeling or marking; quality control procedures; and conditions of handling, storage, use, and disposal of the product to demonstrate that the product will meet the safety criteria set forth in § 32.23. The information about the product must include information about the amount and type of byproduct material, its chemical and physical form in the product and any changes that may occur to the source during the useful life of the source and the solubility of the source in water and body fluids. The application must also contain complete information about the construction and design and safety features of the product relative to the containment and shielding of the source under normal and severe use conditions, the maximum external radiation levels at 5 and 25 centimeters from the surface of the product and the degree of access to the product during normal use and handling.
8. In order for NRC to determine that all criteria, as specified above, are satisfied, it is necessary for NRC staff to review and approve design configurations for all devices, authorized pursuant to § 32.22, to ensure that the products pose no threat to public health and safety and

are acceptable for distribution to persons exempt from the requirements for a license.

Safety Criteria of § 32.23

9. The safety criteria in § 32.23 are the primary factors in controlling the radiation doses associated with persons exempt from the requirements for a license. These safety criteria have the effect of establishing an upper limit on the amount of radioactive material in a given exempt unit and of establishing a need to provide some degree of containment for the material even under accident conditions. Furthermore, the probabilities associated with the radiation dose limits for accidental exposures ensure that the risk to individuals would be very small. The review and approval of gunsights containing tritium is necessary to ensure that these dose limits are satisfied.
10. In June 1968, as part of the proposed rulemaking on "Tritium, krypton-85, and promethium-147 in self-luminous products" (33 FR 9198) (06/21/68), the Agency established safety criteria limiting the average dose, or dose commitment, in any one year to members expected to receive the highest dose from normal use and disposal of a single exempt unit to no more than 0.2 percent of the limit for individuals in the population. The dose received by persons engaged in the distribution and servicing of exempt distribution products, as a result of exposure to the quantity of units likely to accumulate, was limited to about 2 percent of the dose limit for individuals in the population. These criteria were based on dose limits recommended by the Federal Radiation Council and International Commission on Radiological Protection and essentially mean that: the occupational doses and doses to members of the public are kept to levels as low as reasonably achievable.

11. This proposed rulemaking, based on keeping exposures as low as reasonably achievable, was considered consistent with the Commission's criteria for the approval of products containing byproduct material intended for use by the general public as published in the Federal Register in March 1965 (30 F.R. 3462), which indicated that it is unlikely that the total contribution to the exposure of the general public to radiation from the use of radioactivity in consumer products will exceed small fractions of limits recommended for exposure to radiation from all sources. This underlying principle was codified in the regulations with the establishment of the existing safety criteria in § 32.23 on June 6, 1969 (34 FR 9025).
12. The limitations concerning the specific source and gunsight models authorized in a license by the NRC results from the list of authorized source models, designation of suppliers of tritium sources, and the specific configurations of gunsight models submitted to the NRC by the applicant during the sealed source and device review of the product as part of the licensing process under §32.22. Sight configurations and manufacturer(s) of sources are relevant to health and safety in that applicants base all product information submitted in the license application, *i.e.* prototype testing, dose estimates and commitments, on these certain configurations and sources.

Referencing information previously approved to satisfy §§ 32.22 and 32.23

13. The decision to prototype test a gunsight mounted on a weapon (specific or otherwise) versus the gunsight by itself, generally considered a worst case scenario, is entirely up to the applicant. In either case, the device will be evaluated and licensed based on the information submitted by the licensee. Likewise, whether the licensee chooses to utilize radioactive

sources that have previously been reviewed and registered versus sources that are "unknown entities" is strictly a licensee choice. Whichever method the licensee chooses, the product will be evaluated and the decision regarding licensure based on the information submitted by the licensee.

14. An alternative regulatory pathway exists for sources or devices to be approved. This option allows approved sources or devices to be referenced by applicants seeking authorization for distribution of products under the requirements in § 32.22. Specifically, any manufacturer or initial distributor of sealed sources or devices whose products are intended for use under a specific license may submit radiation safety information about their product directly to NRC under § 32.210 in order for the product to be registered. The rule describes NRC's evaluation and registration criteria and clarifies the regulatory responsibility of manufacturers of products for which NRC evaluates and registers radiation safety information.
15. This system avoids multiple and time consuming submissions of the same detailed product information by each applicant for a specific license that proposes to obtain and use these products. This practice allows for information contained in previous approvals to be incorporated by reference for use by a specific licensee to demonstrate part of its licensing or other registration requirements. For example, a vendor of a sealed source is issued a registration certificate. This certificate is then referenced by a device vendor to demonstrate that the evaluation and registration criteria for the source when used in this specific device are met. An applicant seeking a license for distribution of products to persons exempt from the requirements for a license may cite the existing registration certificate to satisfy certain of the requirements set forth in § 32.22(2). This practice allows NRC to more effectively

expend resources in determining the adequacy of the radiation safety features of the final product (device) containing byproduct material. NRC regulations and radiation safety criteria set forth in industry standards are utilized in making this determination.

16. Although the certificate of registration is considered, in effect, a pre-marketing approval of the source and device, issuance of a registration certificate does not constitute a commitment to issue a specific license authorizing possession and use or distribution of the source or device. Approval of an application for a specific license also requires that all other applicable regulatory requirements, *e.g.*, Part 30 training requirements, be satisfied.

License conditions regarding source supplier

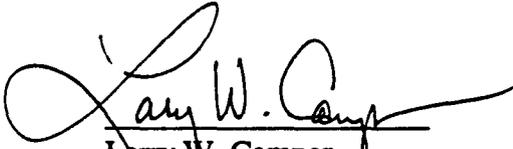
17. Regarding license conditions concerning the tritium source supplier and model of sealed light sources, NRC does not direct which byproduct material supplier or model of tritium light source an applicant may reference in its application. However, for the purpose of authorizing a product for distribution to persons exempt from the requirements for a license, the applicant must demonstrate that the product meets the safety criteria cited earlier and the NRC will perform a safety evaluation on the product, in this case a gunsight. As a result, only those manufacturers/suppliers whose gunsights containing tritium sources have been reviewed and approved may be distributed to persons exempt from licensing.
18. Applicants may either reference manufactures whose sources have already gone through a review to satisfy the requirements of § 32.210 or may submit information pertaining to gunsights containing sources not previously approved. Originally, the license application for 21st Century Technologies, Inc. (formerly known as Innovative Weaponry, Incorporated)

referenced by manufacturer and model number tritium sources that had previously been approved under § 32.210.

License conditions regarding gunsights

19. The specification in the license conditions of either the manufacturer and model of the tritium source, the gunsight configuration or the weapons on which the gunsights will be mounted is a result of the information provided by the applicant to satisfy § 32.22. The manner in which an applicant satisfies this criteria is at the discretion of the applicant considering the design and engineering specifications of the product under review and the requirement to address the prototype testing criteria set forth in 32.22. Applicants may choose to prototype test the gunsight configurations separately or mounted on specific weapons, as was the case with 21st Century Technologies, Inc. If gunsights mounted on specific weapons, such as Model XYZ rear sight mounted on Smith and Wesson pistols, are identified in the application, then ultimately, the authority to distribute the gunsights will be limited to the weapon(s) reviewed.
20. The prototype testing criteria for gunsights containing tritium gas are specified in NUREG-1562, "Standard Review Plan for Applications for Licenses to Distribute Byproduct Material to Persons Exempt from the Requirements for an NRC License," Appendix 11, "Standard Requirements for Tritium Illuminated Gunsights Containing Tritium Gas Sealed in Glass Vials." Licensees may submit alternative procedures than those specified in NUREG-1562 in order to address the prototype testing criteria, but the review and approval will still be based on the product information submitted.

21. In summary, only those products, in this case gunsights, which have been reviewed and approved are listed in an exempt distribution license. The authorization is based upon the fact that these approved products satisfy all of the safety criteria in 10 C.F.R. § 32.23. As a result, they do not pose a threat to public health and safety and, in fact, exposures to members of the public will be as low as reasonably achievable.
22. The foregoing is true and correct to the best of my knowledge and belief.


Larry W. Camper

Subscribed and sworn to before me
this 23rd day of October, 1997.


Notary Public

My commission expires:
EIVA BOWDEN BERRY
NOTARY PUBLIC STATE OF MARYLAND
My Commission Expires December 1, 1999

ATTACHMENT 1

STATEMENT OF PROFESSIONAL QUALIFICATIONS

for

Larry W. Camper, MBA, MS

Larry W. Camper has approximately 30 years of experience involving the use and management of radioactive material. Mr. Camper has been in his current position as Branch Chief of the Medical, Academic, & Commercial Use Safety Branch, Division of Industrial & Medical Nuclear Safety, Office of Nuclear Material Safety and Safeguards for approximately two and a half years and previously served as Section Leader for the Medical & Academic Section for five years. Prior to these positions, Mr. Camper served as a Project Manager/Health Physicist in the Division of Waste Management for approximately one year.

Prior to returning to NRC in 1989, Mr. Camper spent 8 years in private industry as a consultant in health and medical physics, environmental radiation safety, and technology/management interface for a large client base in excess of 300 clients. Mr. Camper served in increasingly responsible positions as Director of Technical Operations, Executive Vice-President and President of a rapidly growing consulting firm employing more than 30 full and part-time professional and administrative personnel.

Mr. Camper holds a Bachelor of Science degree in Radiological Science and Administration and a Master of Business Administration degree from George Washington University and a Master of Science degree in Radiological Health from Pacific Western University (in conjunction with Oak Ridge Associated Universities). Throughout his career, Mr. Camper has completed numerous technical training courses dealing with the use of ionizing radioactive material including the Applied Health Physics program at Oak Ridge Associated University. While in private industry, Mr. Camper was certified as a radiation safety expert by seven states. Mr. Camper has been or is presently a member of several professional societies associated with the use of ionizing radiation.

Innovative Weaponry, Inc.
715 San Mateo N.E.
Albuquerque, NM. 87108

October 8, 1987

30-3026
N/L + L 2369

Mr. Steven L. Baggett
U.S. Nuclear Regulatory Commission
Material Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D.C. 20555

Dear Mr. Baggett,

This is a letter of application for the request of a redistribution license for the by-product Tritium. This product will be used in a sealed insert that will be used in gun sights. The sealed inserts are manufactured and will be purchased from Armson, Inc., PO Box 2130, Farmington Heights, MI. 48018. These inserts have already been prototyped, tested and approved by the Nuclear Regulatory Commission.

A full set of installation instructions have been acquired from Armson, Inc. and are fully understood on my part. There are five basic insert diameters with proper diameter holes to be drilled into sights, and a product, Black Max, to be used to adhere and insulate the insert into the sight itself. My company has all the proper equipment for these installations, and insures all work will be performed to the best of standards.

LA 3003
88-206018
SECRET-01F FTR

015-5
1-274
31
APP
10/10/87
11/1/87
Referred #230;
applied ad hoc refund, \$60,
to 020652
and...

1340

A label provided by Armson, Inc. has been included with this letter to show that every gun that we do an installation on, will be labeled on the outside with one of these self-adhesive labels. Also an instruction letter will be included with each installation with a description, warning of product, and instructions for weapon cleaning: Warning customer not to use a prolonged vibrating dunk tank, as this will remove or eat away Black Max, causing insert to loosen.

The inserts will be stored in a locked vault in our shop. No one will have access to them except those employees doing the installations. All work will be inspected and approved by myself, and no improper installations will be delivered to a customer.

Thank you for all your help that you have already rendered to me, and for your consideration and license approval.

Sincerely,



Barry Mowry
President

P.S. New corporation recently formed. Application information was sent to Mowry Custom Handguns, now a division of I.W.I.

Enclosures:

Check

Label

Re: U.S. Nuclear Regulatory Commission Rules and Regulations
Part 170.31
Category 3 - By Product Material -
Section H
Cost: New License \$580.00
(As per instructed by Glinda Jackson)

INNOVATIVE WEAPONRY, INC.

715 San Mateo NE
Albuquerque, NM 87108

505-268-5558

Barry Mowry — President

March 24, 1988

J. Bruce Carrico
Medical, Academic and Commercial
Use Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Control No. 020340

Dear Mr. Carrico,

This refers to your letter dated March 16, 1988, requesting more information to complete our application concerning Tritium for sights.

Concerning number 1 in your letter- Enclosed is a copy of our State license.

Concerning number 2- Enclosed is a label (Armson) which we put on every gun we install sights into. Every gun varies, so we place it on whatever external surface it will fit.

Concerning number 3- We do not sell sight sets. We only install inserts into existing sights.

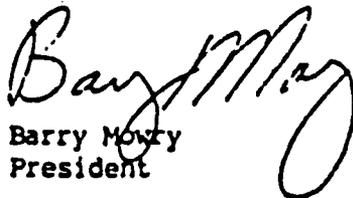
Concerning number 4- Since all mounting is done in our own shop, it is easy to keep strict control, and every installation is personally inspected and checked for perfection.

Concerning number 5- Enclosed is a copy of the Warning letter.

Concerning number 6- We fully understand section 32.23 of 10 CFR part 32 and will abide by the requirements therein.

We hope that this is all that you will require from us. If there is anything else you need, please let us know.

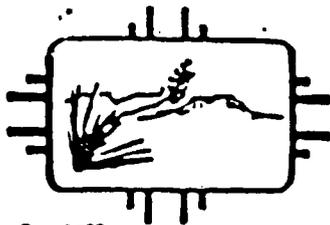
Sincerely,


Barry Mowry
President

Enclosures

BM/ts

~~CONFIDENTIAL~~



NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

ENVIRONMENTAL IMPROVEMENT DIVISION RADIOACTIVE MATERIAL LICENSE

Pursuant to the New Mexico Radiation Protection Act of 1971, and the Radiation Protection Regulations Part 3, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below, and to use such radioactive materials for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect, of the New Mexico MED Environmental Improvement Division and to any conditions specified below.

1. LICENSEE NAME Innovative Weaponry, Inc.		2. LICENSE NUMBER IM-IWI-GS-00	
3a. ADDRESS 715 San Mateo, NE Albuquerque, NM 87108		4. EXPIRATION DATE January 31, 1993	
		5. PREVIOUS/OTHER LICENSE NUMBER	
3b. TELEPHONE NO. (505) 268-5558	3c. ACTUAL LOCATION OF OPERATION 715 San Mateo, N.E., Albuquerque, New Mexico 87108.		
6. RADIOACTIVE MATERIALS (element and mass number)	7. CHEMICAL or PHYSICAL FORM	8. MAXIMUM QUANTITY LICENSEE MAY POSSESS at any one time	

- | | | |
|----------------|---|--|
| A. Hydrogen 3. | A. Sealed sources
(Saunders-Roe Model
1981-880/G/200 or MB
Microtec A.G. Model
400 series). | A. Not to exceed two
curies total. Not
to exceed 30
millicuries per
source or 90
millicuries per
weapon. |
|----------------|---|--|
- A. For possession and installation of sealed inserts to be used in gun sights.
- The licensee shall comply with the provisions of Parts 4 and 10, New Mexico Radiation Protection Regulations.
 - Licensed material shall be used by or under the supervision of Barry Mowry, President.
 - The Director of the Division or his authorized representatives shall be allowed to enter the premises and inspect the radiation related activities at all times. Failure of the licensee to admit the Director or his authorized representatives shall constitute grounds for issuance of an immediate cease and desist order.
 - Sealed sources containing licensed material shall not be opened.



ENVIRONMENTAL IMPROVEMENT DIVISION
RADIOACTIVE MATERIAL LICENSE

License Number NM-IWI-GS-00

14. The licensee shall conduct a physical inventory every six months to account for all sources received and possessed under this license. Records of such inventories shall be available for inspection by this Division.
15. Except as specifically provided otherwise in this license, the licensee shall possess and use licensed material described in Items 6., 7. and 8. of this license in accordance with statements, representations and procedures contained in application with attachments dated October 14, 1987, signed by Barry Mowry, President.

For the New Mexico HED Environmental Improvement Division

INNOVATIVE WEAPONRY, INC.

715 San Mateo NE
Albuquerque, NM 87108

505-268-5558

Barry Mowry — President

April 25, 1988

Contol # 020340

J. Bruce Carrico
Medical, Academic and Commercial
Use Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

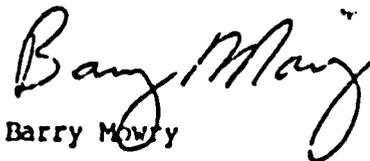
Dear Mr. Carrico,

This refers to your letter dated April 6, 1988, regarding additional information for our N.R.C. License.

1. Concerning label placement: Yes, the label is on a visible exterior surface. The placement varies because the area large enough to attach a label varies with each weapon.
2. Concerning installation procedures: The Tritium inserts 'A,B,C & D' are purchased intact from Armson. See Instruction sheet enclosed.

I hope this clarifies all points in question. If there is anything else needed, please let me know.

Sincerely,



Barry Mowry
President

BW/ts

30-23647-01E

FDC

INNOVATIVE WEAPONRY, INC.

715 San Mateo NE
Albuquerque, NM 87108

505-268-555

Barry Mowry — President

Tritium Night-Sight Installation

-Front Sight-

1. Find Center and drill to size and depth as follows:
 - Size 'B' Tube - .062 diameter, .200 depth
 - Size 'C' Tube - .070 diameter, .240 depth
 - Size 'D' Tube - .078 diameter, .240 depth
2. Apply Black Max Adhesive and insert tube.
3. Allow over night drying period.

-Rear Sight-

1. If the 2-Dot system is used, the procedures are the same as listed for the front sight installation.
2. If the Horizontal Bar system is used, the procedures are:
 - A. E.D.M. machine rectangle slot directly under sight notch to .050 depth.
 - B. Insert 'A' Tube, attached with Black Max Adhesive, horizontally parallel to notch. Allow to dry properly (Approx. 1 hour).
 - C. Apply light transmitting Epoxy over entire rectangle slot and allow to harden.
 - D. Trim Epoxy flush with sight face.

MATERIALS LICENSE

Amendment No. 01

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-418), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer by product, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below, to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

<p style="text-align: center;">Licensee</p> <p>1. Innovative Weaponry, Inc. P.O. Box 564 Angel Fire, New Mexico 87710</p> <p>2.</p>	<p>In accordance with letter dated September 28, 1988</p> <p>3. License number 30-23697-01E is amended in its entirety to read as follows:</p> <p>4. Expiration date June 30, 1993</p> <p>5. Docket or Reference No. 030-30266</p>
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<p>6. Byproduct, source, and/or special nuclear material</p> <p>A. Hydrogen 3</p>	<p>7. Chemical and/or physical form</p> <p>A. Sealed sources (Saunders-Roe Developments, Inc. Model PRH 880/G/200 for M.B. Microtec A.G. Model 400 Series)</p>	<p>8. Maximum amount that licensee may possess at any one time under this license</p> <p>A. Not to exceed 30 millicuries per source and 90 millicuries total, per weapon</p>
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9. Authorized use

A. For distribution of Triflcon Sights mounted onto weapons, to persons exempt from the requirements for a license pursuant to Section 30.19, 10 CFR Part 30, such devices have been manufactured pursuant to Section 32.22, 10 CFR Part 32.

- CONDITIONS
- 10. Licensed material shall be distributed from the licensee's facilities located at Highway 434 and County Road B15, Angel Fire, New Mexico.
 - 11. The licensee shall file periodic reports as specified in Section 32.25(c), 10 CFR 32.

Handwritten: MHC 10/21/88 sent to REGIONS II

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License number	35-23697-01E
Number of Reference numbers	030-30266
Amendment No. 01	

CONDITIONS

- 12. Inserts shall be installed, and weapons labeled in accordance with instructions provided by Amson.
- 13. This license does not authorize possession or use of licensed material.
- 14. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations and procedures in the licensee's application and correspondence, are more restrictive than the regulations.
 - A. Letter dated October 8, 1987
 - B. Letter dated March 24, 1988
 - C. Letter dated April 25, 1988
 - D. Letter dated September 28, 1988



FOR THE U.S. NUCLEAR REGULATORY COMMISSION

DATE Jul 13, 1989

BY [Signature]
 Medical, Academic, and Commercial Use
 Safety Branch
 Division of Industrial and Medical
 Nuclear Safety, IMSS
 Washington, D.C. 20555



3 EXHIBIT 3B
Albuquerque, New Mexico 87123
(505) 296-4845
Toll Free 1-800-334-3573

030-30266

U.S. Nuclear Regulatory Comm.
Commercial Section
Division Of Industrial Safety
Washington, D.C. 20555
Attn: Susan L. Green

Greetings: 4/17/91

In an endeavor to enlarge our scope of production and meet the current needs of government and law enforcement, concerning self luminous sighting aids, we are requesting amendment to our current material license #30-23697-01E.

Please find to follow our requests:

Authorized use: Pursuant to 10 CFR Section 32.22 the licensee is requesting authorization to distribute sealed light sources in gunsights to persons exempt from the requirements for a license as defined by 10 CFR 30.19. Maximum activity 30 millicuries per source and 90 millicuries per weapon.

Conditions:

- (1) Sealed light sources installed into iron sights manufactured by Innovative Weaponry Inc.
- (2) Sealed light sources installed into iron sights manufactured by major firearms manufacturer

RECEIVED
MAY 29 10 38 AM '91

A13

Lot	1049-2-488
Qty	100
Check No.	11/27
Amount	12.50
Gen. Company	
Tr. M. of Inc.	Asst.
Date Check Paid	5/15/91
Date Completed	4/4/91
By	M. Green

REC-7

MAY 29 1991

XA 2 RP
11200274

P.T.
NIGHT SIGHT

021159



337 Eubank NE, Suite 103
Albuquerque, New Mexico 87123
(505) 296-4645
Toll Free 1-800-334-3573

(3) Sealed light sources installed into archery sight pins.

(4) To be used for research and development as defined in 10 CFR 30.4(q).

Please find enclosed \$280.00 for amendment fee.

Please contact me for any additional information needed to implement this amendment.

Thank you for your help and prompt attention.

Sincerely,

A handwritten signature in black ink, appearing to read "Jim Hall", is written over a horizontal line.

Jim Hall

Vice President

P-T.
NIGHT SIGHT



P.T. NIGHT SIGHT

**Mowry Custom Handguns
Specialty Shotgun Systems**

Date: August 8, 1991

To: U.S. Nuclear Regulatory Commission

Attn: Susan Green

Fax #: (301) 492-0260

From: Barry Mowry, President, Innovative Weaponry, Inc.

Ref: 021159

For: License Amendment on License # 30-23697-01

Contents: Written Demonstration for Changes Applied For



P.T. NIGHT SIGHT

**Mowry Custom Handguns
Specialty Shotgun Systems**

Table of Contents

Section A - Sealed Sources and Installation
Procedures

Section B - Appendix # 1 - Sealed Source
Manufacturer

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Standards and Testing

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Tests and Evaluations

Section E - MSD Sheets of Materials Used
for Construction

Innovative Weaponry, Inc. receives Betalights (sealed sources) in sealed canisters from the manufacturer (see appendix 1). Inside the canister, the betalights are packed in styrofoam and in a plastic bag. The canister label notes the quantity of sealed sources, amount of gigabequerels and the radioactive group (VII).

When personnel open the canister and inspect the betalights, safety glasses and rubber gloves are worn. Inspection consists of a visual count, appearance check, dark room and dimensional checks. These sealed sources are then placed in an unlighted vault for a minimum of 24 hours before reinspection. Dimensionally unacceptable betalights are put aside in the original canister and placed in the vault.

All work is done with state-of-the-art equipment in super clean, laboratory-like conditions. I W I requires the highest in safety standards.

SIGHTS - INSTALLATION INTO EXISTING SIGHTS AND SIGHTS MANUFACTURED BY IWI

Construction method for handgun front sights, dot rear sights and shotgun sights are as follows:

Sealed sources are placed in PVC sleeves and injected with Dow Corning 734 Sealant. This sealant has shock absorbing and buffering properties as does the sleeve itself. After curing four hours, sealed sources are then sealed with Loctite Brand IMPRUV (tm) Optically Clear U.V. (ultra-violet) Adhesive which has non-shattering, shock absorbing and buffering properties also. This completely encases the sealed source (insert) which is now ready to install into the sight cavity. The cavity is the appropriate size for the finished insert. Black Max (tm) Tough Adhesive is applied to the cavity to bond the insert into the sight. Black Max is a tough bonding agent that also has shock absorbing and buffering properties.

Construction methods for bar rear sights and rifle front sights are as follows:

Sight cavities are the appropriate size to mount the sealed source. Black Max is applied to the cavity. The sealed source is placed into the cavity. After the Black Max is cured, IMPRUV is applied to fill recess and protect sealed source.

Construction methods for rifle rear sights are as follows:

Sight holes are appropriate diameter and length for mounting of sealed source. Black Max is applied to bottom and walls of hole, as to totally insulate the sealed source. IMPRUV is then applied to the exposed end for lensing and to complete the total encapsulation and protection of the sealed source.

These methods totally encase and seal the Tritium sources for maximum strength, shatter resistance and shock absorbency. These adhesives have been chosen expressly to insure the highest quality product possible.

APPENDIX # 1

Purchase of Sealed Sources

Supplier/Manufacturer: Saunders-Roe Development Ltd.
Millington Road, Hayes
Middlesex UB3 4NB, England

Part Numbers: 251030-100 A
252050-150 A
252050-200 A
252050-250 A
252050-300 A



Ministry of Defence

Defence Standard

62-4/Issue 3

14 September 1976

LAMPS, NUCLEAR
(GASEOUS TRITIUM LIGHT SOURCES)

LAMPS, NUCLEAR
(GASEOUS TRITIUM LIGHT SOURCES)

This Defence Standard supersedes DEF STAN 62 - 4,
Issue 2, dated 29 March 1972

1. This Defence Standard specifies material, manufacturing and other requirements for gaseous tritium light sources for Ministry of Defence use.

This Defence Standard has been written to conform wherever possible with the OECD Nuclear Energy Agency document 'Radiation Protection Standards for Gaseous Tritium Light Devices'.

2. The title 'Lamps, Nuclear' has been used to conform to the NATO Supply System Approved Item Name for this type of light source. The term preferred by the member countries of the OECD is Gaseous Tritium Light Sources (GTLs). This term is now used throughout this Standard. See section 1 'Definition of Terms Used'.

3. Table IA lists the Standard Range of GTLs to be used in all future designs of equipment. Table IB lists GTLs which have been introduced for a specific purpose. They are not to be used for any other application without the approval of the DELSC Electric and Nuclear Lamps Sub-Committee.

4. Because new Service applications are constantly being developed for GTLs there are no Table II (Maintenance Range) or Table III (Obsolete) items.

5. This Standard contains all necessary technical information and it is the definitive specification for these items. It must be invoked for all tender and contract purposes.

6. Users of this Standard should note that these items may be claimed to be subject to patent rights in this and other countries.

7. This Standard has been prepared because there is no suitable national or any other standard acceptable to the Ministry of Defence available.

8. This Standard has been agreed by all authorities concerned who are to implement it from its date of issue.

9. If this Standard should be found unsuitable for a particular requirement the Director of Standardization shall be informed of the circumstances. Any enquiries regarding this Standard in relation to an invitation to tender or a contract in which it is invoked should be addressed to the Quality Assurance Authority named in that invitation to tender or contract.

THE ATTENTION OF DESIGNERS CONSIDERING USING GTLs IN SERVICE EQUIPMENT IS DRAWN TO SECTION 15 'SAFETY CONSIDERATIONS'

SPECIFICATION FOR
LAMPS, NUCLEAR,
(GASEOUS TRITIUM LIGHT SOURCES)

1. DEFINITION OF TERMS USED

- a. Gaseous tritium light source (GTLS): A GTLS consists of a sealed glass container filled with gaseous tritium and coated internally with a phosphor.
- b. Gaseous tritium light device (GTLD): A GTLD is an instrument, piece of equipment, article or sub-assembly containing one or more GTLS.

2. SCOPE

- a. This Standard covers the technical requirements for gaseous tritium light sources suitable for use over the temperature range of -60 to $+70^{\circ}\text{C}$. It is emphasized that tritium filled sources are the only light source of this type authorized for Service use.
- b. Lamps may be used at temperatures above 70°C , up to a maximum of 100°C , provided a shorter half life and lower luminance are accepted.
- c. Over a period of time the luminance of a GTLS decays irrespective of whether in use or storage. (See section 7d) A warning is therefore given against buying and storing excess quantities.
- d. Safety considerations governing production, storage, and use of GTLSs in Service equipments or installations are set out in Section 15 of this Standard.

3. RELATED DOCUMENTS

- a. Reference is made in this Standard to:
 - BS 3C100: Part 2, 'General requirements for equipment in aircraft'
 - BS 2011 'The environmental testing of electronic components and electronic equipment'
 - BS 1376 'Colours of light signals'
 - BS 3510 'A basic symbol to denote the actual or potential presence of ionizing radiation'
 - UK/AID/944 'Specification for metal foil labels for aircraft use'
 - Def Stan 05-30 'Sampling procedures and charts for inspection by variables'
 - Def Stan 05-34 'Marking of Service Materiel'
 - HQPO/56 'Specification for the packaging of instruments containing radioactive materials'

3. a. (CONTD)

Radio Active Substances (Luminous Articles) Exemption Order 1962 (SI2644)

Explanatory Memorandum to the Radioactive Substances Act, 1960.

Radiation Protection Standards for Gaseous Tritium Light Devices.

Code of Practice for the Carriage of Radioactive Material by Road.

b. Copies of these documents are available as follows:

British Standards

British Standards Institution
Newton House
101 Pentonville Road
London N1 9ND

UK/AID/944

Ministry of Defence (PE)
Materials Division AQD
Harefield
Uxbridge, Middlx, UB9BB

Defence Standards

Ministry of Defence
D Stan
First Avenue House
High Holborn
London WC1V 6HE

HQPO/56

Ministry of Defence (PE)
MQAD Central Packaging Unit,
Garland Road
Plumstead, SE18 2PW

Radiation Protection Standards
for Gaseous Tritium Light
Devices

National Radiological Protection
Board
Harwell, Didcot,
Oxfordshire OX11 0RQ

Explanatory Memorandum
to the Radioactive Substances
Act, 1960

HMSO

Radioactive Substances
(Luminous Articles) Exemption
Order 1962 (SI2644)

HMSO

Code of Practice for the
Carriage of Radioactive
Material by Road

HMSO

3. c. The Related documents listed above are those applicable at the date of publication of this Standard. Their current applicability must be confirmed by all users of the Standard. The Quality Assurance Authority will supply on request, information concerning any changes that may be necessary due to the cancellation, supersession or amendment of any related document.

Note: Any questions relating to 'approved' materials or processes should be referred to the Qualification Approval Authority.

4. DRAWINGS

a. Drawings giving dimensions of the standard range of GTLSs are reproduced in Figs 2 to 15. Special purpose lamps are reproduced in Fig 16.

b. These drawings are an integral part of this Standard.

5. PATENTS

Patent or design rights or copyright may subsist in connection with items defined as standard, and the issue of this Standard does not convey or imply any licence to use information which is the subject of such rights. Authority to use such rights, for UK Government purposes, must be obtained through the issue of an authorization in writing which will be incorporated in any contract placed by a Department of the said Government for such purposes.

6. MATERIALS

a. Capsule.

The capsule is to be of a clear borosilicate (hard) glass. The wall thickness is to be in accordance with the dimensions quoted in Figs 2 to 16.

b. Radioactive material.

(1) Only tritium in the form of $^3\text{H}_2$ or H^3H shall be allowed in a GTLS except for small amounts of tritiated water which may be present provided that, during the mission lifetime of the GTLS, the activity in the form of tritiated water does not exceed 2% of the total tritium activity and, for sources containing less than 50 mCi of tritium, does not exceed 1mCi. Purity of the tritium is essential particularly in respect of:

- (a) gamma emitting isotopes which would result in external radiation.
- (b) alpha emitting isotopes which would result in radiation damage to binder, phosphor, or glass.
- (c) chemical impurities which can damage the phosphor or accelerate radiation damage.

6. b. (2) In order to meet the above requirements the manufacturer must ensure that a certificate of purity from the supplier of the tritium used, in any batch of lamps submitted for inspection, is to be available to the Quality Assurance Authority.

c. Phosphor.

The zinc/cadmium sulphide phosphor is preferred.

d. Binder.

Any binder used to cement the phosphor to the wall of the capsule is to be unaffected by radiation, temperature (within the limits of -60 and + 70°C), and vibration.

7. MANUFACTURE

a. Gas pressure.

The nominal gas pressure inside the capsule is to be between 660 mbar (0.66 atm) and 2500 mbar (2.5 atm) as appropriate to the desired luminance.

b. Painting.

- (1) When a GTLS is to be viewed from one side only, the luminous intensity may be increased by externally painting the reverse side of the lamp as indicated on the appropriate lamp drawing (Figs 2 to 16).
- (2) One coat of high reflectance titanium dioxide base paint and one coat of semi-gloss air drying white paint shall be applied. Alternatively two coats of high reflectance titanium dioxide base paint may be applied.
- (3) The paint shall be of best commercial quality and shall remain unaffected by the temperature tests specified in sections 11g and 14. The paint shall not exceed a total thickness of 0.4 mm.

c. Luminance

The minimum initial luminance is to be in accordance with Table I.

d. Rate of luminance decay.

The rate of luminance decay is to be such that after six years from the date of manufacture of a GTLS luminance is to be not less than 50 per cent of its initial value.

Note: The rate of decay is to be taken into account when specifying minimum acceptable levels of illumination in the design of equipments incorporating GTLSs See Fig 1.

e. Sealing test.

During manufacture all GTLSs are to be heated to between 450 and 480°C for a period of five minutes after sealing.

7. f. Colour of light.

Colours are to be determined in terms of BS 1376 chromaticity co-ordinates. Table A gives the co-ordinates of the corners of the areas within which the chromaticity co-ordinates of the respective colours are to fall. Where these boundary points lie on the pure spectrum curve the corresponding dominant wave length in nanometers is indicated.

TABLE A

COLOUR	CO-ORDINATES		DOMINANT WAVELENGTH nm
	X	Y	
RED	0.688	0.312	618.5
	0.66	0.28	
	0.59	0.356	
	0.64	0.36	603.0
ORANGE	0.603	0.396	595.0
	0.566	0.388	
	0.508	0.45	
	0.532	0.467	583.0
YELLOW	0.5	0.5	578.0
	0.468	0.47	
	0.396	0.546	
	0.408	0.592	565.0
GREEN	0.302	0.692	550.0
	0.31	0.48	
	0.22	0.48	
	0.014	0.744	510.0
BLUE	To BS 1376, Signal Blue Class A		481.0 450.0
WHITE	To be determined		

8. MARKING AND LABELLING

To enable GTLD's subject to recovery or disposal requirements to be identified the Design Authority and Procurement Branch are to ensure that marking and labelling shall be carried out as described in section 7 of NEA document 'Radiation Protection Standards for Gaseous Tritium Light Devices'

Note: Para 7.3 of this document requires that individual GTLS's containing over 500mCi shall be marked with a spot of colour in international use to denote hazard. At the moment this colour has not been decided. The requirement can therefore, for the time being, be ignored.

9. PACKAGING

a. GTLSs are to be supplied in a transparent polyethylene envelope. Each GTLS is to be provided with sufficient individual protection to prevent damage to or from other GTLSs in the envelope. Each envelope is to contain and show the following labels:

- (1) an ungummed label giving the full NATO Stock Number (eg 6260-99-995-9769) and Defence Standard type number, (eg Def Stan 62-4/3 Type ZA2G), the quantity of GTLS's and the total radioactive content (curies).
- (2) an ungummed label marked with the Trefoil symbol in accordance with BS 3510 and Def Stan 05-34.

Each envelope is also to contain the equivalent number of approved self-adhesive labels of 9.5mm maximum diameter giving the month and year of manufacture of the GTLS in figures. The label is to comply with UK/AID/944 and is to be gold in colour with red markings.

b. When a military level of packaging is specified in the tender or contract packaging shall be in accordance with HQ/PO56 and the Services Packaging Instruction Sheet (Form 673)

c. To comply with the 'Code of Practice for the Carriage of Radioactive Material by Road,' the maximum number of lamps in one package is to be governed by the total radioactive content of that package.

- (1) A package, wherein the radioactive content does not exceed 200 curies may be classified as 'Exempt' from the more rigorous packaging and labelling requirements of the international regulations providing the applicable requirements listed in the 'Specification for the packaging of instruments containing radioactive materials', HQPO/56, are fulfilled.
- (2) Requirements for 'Exempt' packages containing tritium are detailed at paragraphs 3.4 and 4.1 to 4.4 of Specification HQPO/56.

10. QUALIFICATION APPROVAL PROCEDURE

a. The Qualification Approval Authority for GTLSs is the Defence Electrical and Electronics Standardization Committee, Electric and Nuclear Lamps Sub-Committee. Manufacturers are to apply to the Secretary of the Electric and Nuclear Lamps Sub-Committee Stan 3, First Avenue House, High Holborn, WC1V 6HE for Qualification Approval. Applications are to be accompanied by a statement that the manufacturer is satisfied that the articles comply with this specification.

b. After receipt of the application, the Secretary of the Qualification Approval Authority is to notify the manufacturer if it has been decided to accept the application, or give reasons for refusing it. If it has been decided to proceed with the Qualification Approval, the Secretary is to request the provision of samples. The manufacturer is to state whether or not the samples are from normal current production and, if requested, is to provide evidence that he has adequate facilities to produce, test, and inspect the articles in quantity.

10. c. Tenders for the supply of GTLSs to this Standard are to be accompanied by a quotation of the appropriate Qualification Approval certificate number and a statement that the articles offered conform in every detail to the sample Qualification Approved and that the place of manufacture is the same.

d. The Qualification Approval tests are to be carried out under standard atmospheric conditions of measurement (BS 2011).

- (1) at the manufacturer's premises under the supervision of the Quality Assurance Authority, or,
- (2) by a Government Quality Assurance Authority if the manufacturer is unable to provide or arrange for testing in the above way.
 - (a) If Qualification Approval tests are carried out by method 1, five copies of the test certificate are to be forwarded to the Secretary of the above Qualification Approval Authority.
 - (b) Initial and final measurements are to be carried out at any combination of temperature, and pressure within the following limits.

Temperature 15 to 35°C

Air Pressure 860 to 1060 mbar

Note 1: Where it is impracticable to carry out measurements under these conditions a note to this effect stating the actual conditions is to be added to the test report.

Note 2: The temperature is to be substantially constant during measurements carried out as part of one test on one batch of components:

e. If the Qualification Approval Authority decides that the testing of any of the articles which the manufacture wishes to submit for Qualification Approval is to be carried out at the manufacturer's premises, the manufacturer is to give to the representative of the Qualification Approval Authority full and free access to the said premises as and when required for that purpose and, at the manufacturer's expense, afford to such representative all such reasonable accommodation and facilities as may be required by him therefore and all appliances, materials, and labour required for testing purposes.

f. The manufacturer will be notified whether or not Qualification Approval has been granted and if successful a Qualification Approval certificate (normally for a period of five years) will be issued.

g. If, after receiving Qualification Approval, a manufacturer wishes to introduce any changes in the materials, construction, processes, finish, or place of manufacture of the Qualification Approved GTLSs he is first to notify the Qualification Approval Authority, who will decide whether a repetition of any or all of the Qualification Approval tests is necessary, and the number of samples to be tested before the change is approved.

10. h. Qualification Approval will be reviewed periodically by the Qualification Approval Authority and will also be reviewed when defects have been reported or other circumstances make this desirable. Should the result of repeat Qualification Approval tests be unsatisfactory, Qualification Approval may be withdrawn.
- i. The Qualification Approval Authority reserve the right to carry out any or all of the Qualification Approval Tests on any design of GTLS not in the standard range.

11. QUALIFICATION APPROVAL

The number of GTLSs to be submitted for Qualification Approval is to be a minimum of twenty six and shall include the GTLSs from each group as indicated in Table B. These lamps are to be supplied at the manufacturer's expense and are to be manufactured from materials and by methods similar to those adopted for production.

TABLE B

QUANTITY	SELECTED FROM	GROUP	REMARKS
5	MB2, UB2, UG2, UE2 or UH2	1	High Pressure Painted One of each colour quoted in Table A
7	Figs 4, 5, 8, 9, 10, 12.	2	Low Pressure, non painted
7	Figs 2, 3, 6, 7, 11.	3	High Pressure, non painted
7	Figs 2, 3, 6, 7, 8, 9, 10, 11, 12.	4	Low Pressure, Painted

GTLSs are to be subjected to the following tests in the order specified.

a. Visual inspection.

All GTLSs are to be visually inspected for defects and dimensions checked.

b. Luminance.

- (1) Initial luminance measurement is to be made 21 to 28 days after manufacture following a period of storage in total darkness for a minimum of 24 hours.
- (2) Each GTLS is to be inspected visually in darkness to ensure that the whole of the area, shown in the appropriate figures as coated with phosphor, is emitting light. The area appearing brightest and the area appearing dimmest to the eye are to be noted.

11. b. (3) The GTLS is to be mounted with the brightest area immediately behind a sharp edged aperture which for tubular lights is to be a slit 0.6 mm by 2.5 mm (approx), and for all other types is to be a circle 1.4 mm diameter (approx) (see note). When viewed from the front the whole of the aperture is to appear illuminated. Luminance of the aperture is to be measured by comparison with a calibrated light source of the same colour. Geometry of the measurement is to be such that the angle subtended by the sensing element at the source does not exceed 10 degrees. The luminance is to be not less than that specified.

Note: When measuring very small GTLSs eg Type CW, it may be necessary to reduce this diameter to 1.0 mm (approx).

- (4) The GTLS is to be mounted with the dimmest area behind the same aperture, and the luminance measured as before. If the luminance is not less than 90 per cent of that specified the GTLS is to be accepted. If the luminance is less than 75 per cent of that specified the GTLS is to be rejected.
- (5) If on test (4) the luminance is between 90 and 75 per cent of the specified luminance the GTLS is to be inspected thoroughly to determine the area below the 90 per cent level, if this area is more than 10 per cent of the total luminous area, the GTLS is to be rejected.

c. Colour.

The GTLS as indicated in group 1 of Table B shall be subjected to tests to demonstrate that the colour of the light emitted by the lamps fall within the limits given in clause 7f. For this any technique approved by the Quality Assurance Authority may be used.

d. Purity.

A certificate of purity for the gas is to be submitted to the Qualification Approval Authority at the time that Qualification Approval for the GTLS is sought.

e. Vibration.

- (1) Two samples from the groups 2, 3 and 4 (Table B) shall be selected at random and fixed to a suitable metal plate for attachment to a vertical thrust vibrator. The GTLSs are fixed into suitable grooves in the plate using silicon rubber cement.
- (2) The amplitude of vibration shall be measured on the plate. The vibration need be applied in one plane only.
- (3) The GTLS shall be subjected to three complete test cycles in the range of 25 to 500 Hz at 5g. The Test shall be conducted by sweeping through all the frequencies in the range at a uniform rate from the minimum to the maximum frequency and return to minimum frequency in 10 minutes or longer. In addition the tester shall dwell for 30 minutes at each resonance frequency found.
- (4) After the vibration period the luminance of each light shall be measured. The deterioration is not to have exceeded 10 per cent of the original value.

11. f. External pressure test.

- (1) An external pressure test is to be performed on three of the remaining GTLSs of each Group (2, 3 and 4).
- (2) The GTLSs shall be put into a test chamber and exposed to 0.25 and 2.0 bars for four periods of 15 minutes each, the pressure being returned to atmosphere between each period. The test shall be conducted in air.
- (3) After the pressure test the luminance of each light shall be measured. The deterioration is not to have exceeded 5 per cent of the original value.

g. Thermal cycling.

- (1) Three rapid thermal cycles are to be performed on the GTLSs used for the pressure test.
- (2) The GTLS shall be heated in air to + 80°C within 5 minutes, kept at this temperature for one hour, then cooled to - 30°C within 15 minutes and kept at this temperature for one hour.
- (3) After the thermal cycling the luminance of each light shall be measured. The deterioration is not to have exceeded 5 per cent of the original value.

h. Life.

- (1) The GTLSs from Group 1 together with three samples from the vibration tests and three samples from the thermal cycling tests shall be mounted behind apertures, or mounted in a suitable jig to align with an aperture for the measurement of luminance.
- (2) The luminance is to be measured after mounting and remeasured after three and six months storage at a temperature and pressure within the limits detailed in para 10d (b).
- (3) The rate of decay of luminance is to be not greater than that specified in clause 7d and figure 1.
- (4) Limited Qualification Approval may be granted pending the results of these decay measurements.

12. PRODUCTION INSPECTION

- a. (1) The provisions of Def Stan 05 - 30 (as applicable) are to apply. Batching is to be agreed between the manufacturer and the Quality Assurance Authority.
- (2) Measurements are to be at Standard atmospheric conditions in accordance with BS 2011. (See clause 10d (2) of this Standard).
- b. The following tests are to be applied in the order specified
 - (1) Visual (see clause 11a)
 - (2) Luminance (see clause 11b and Note below)
 - (3) Colour (see clause 11c)

Note: At the discretion of the user or the Quality Assurance Authority this requirement can be waived or confined to samples taken from the production batch.

DATE: 02-20-1991

PAGE 1 of 1

TEST NAME: Recoil Shock test METHOD: Firing Gun w/sights in place

SIGHT IDENT #: F: G-200 X.093-002/F R: G-100-001/R

SIGHT TYPE/CONFIG: Glock/BAR Dot COND: 60", Approx 27% R.H.

OBJECTIVES: Fire 2,000 Rounds ^{Note} EFFECT OTHER: American Eagle 115gr. FMJ Ammo.

<u>7:00 am</u>	<u>Start test</u>					
<u>8:45 am</u>	<u>250 Rounds fired,</u>	<u>visual insp.</u>	<u>finds</u>	<u>No</u>	<u>Changes</u>	
<u>10:20 am</u>	<u>500 Rounds fired,</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>
<u>2:00 pm</u>	<u>1,000 Rounds fired,</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>
<u>3:30 pm</u>	<u>1,500 Rounds fired,</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>
<u>5:00 pm</u>	<u>2,000 Rounds fired</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>	<u>"</u>

* Note Shots fired Both Rapid & slow fire.
Inspected visually in light & Dark conditions
found no change!

COMMENTS: Sights G-200 X.093"-002/F & G-100-001/R
were left on gun for approx 4 weeks after testing. Upon
visual Insp. found No evidence of failure of any kind.

TEST DONE BY: Fete Wright

DATE: 02-21-91

PAGE 1 of 1

TEST NAME: Chemical (Common) test METHOD: Immersion / Time

SIGHT IDENT #: F: G200X.093"-006/F R: G-100-007/R

SIGHT TYPE/CONFIG: Block / BAR Det COND: Room Temp Above 70°

OBJECTIVES: Test sigils & materials for Common Abruses OTHER: _____

Chemical	Duration	Pass/FAIL
Hepps #19	30 min	P
Outers Nitro Solvent	32 min	P
WD-40	30 min	P
BC-1 Bore Cleaner	30 min	P
Break Free CP	30 min	P
Accubore	31 min	P
Fantastic	34 min	P
Windex	30 min	P
LPS Engine degreaser	32 min	P
Lin-Speed	30 min	P
Oxpho-Blue	35 min	P

11/1/91
Completed

COMMENTS: I Feel these are the most common cleaning agents in the home & Gun Cleaning field, none of the products show any effect on the sigils or construction materials.

TEST DONE BY: Tech Winda

DATE: 02-22-91

PAGE 1 of 1

TEST NAME: Drop test METHOD: Free drop onto Concrete

SIGHT IDENT #: F: G-200 X .093" - 005/F R: G-100 - 004/R

SIGHT TYPE/CONFIG: Block / Bar dot COND: Room temp 70° / unpainted concrete

OBJECTIVES: Subject sights to Abnormal ^{shock} OTHER: _____

- ① measured A distance from floor of 3 feet,
Dropped sights onto concrete from this distance
- ② Stored sights in dark vault for 1 week
- ③ Visually Inspected sights for damage & ILLUMINATION All OK.
- ④ Repeated steps ① thru ③ for heights of 6 & 10 feet

Note*

Unless the physical properties of the sights are
damaged (in a manner to crush or alter the dimensions
of the sight inserts) I feel that these sights
are not going to fracture under normal or even
upto and including severe treatment.

COMMENTS: _____

TEST DONE BY: Pete Wright

DATE: 02-25-91

PAGE 1 of 1

TEST NAME: Thermal Abuse METHOD: Oven / Pyrometer

SIGHT IDENT #: F: G-200X.093-006/F R: G-100-007/R

SIGHT TYPE/CONFIG: Glock / Bar dot COND: 70°F and up

OBJECTIVES: See Line (A) OTHER: _____

(A) To find out @ what temp. damage occurs to sights.

Sights are placed in cool oven, temp is set @ 150°F

Oven reaches 150°F, No visible effects

Set oven to 185° " " "

Set oven to 200° " " " let sights stay

at this temp for 15 min, Removed sights for Insp. All ok,

Place sights back in oven,

Set oven to 250°, No visible effects.

Set oven to 280°, " " "

Oven temp @ 295°, ImpRuv appears to separated
from sight. but is still in place.

COMMENTS: The sight set withstands far greater
temp. than will be incurred by Normal usage.

TEST DONE BY: *Pat Wright*

DATE: 02-28-91

PAGE 1 of 1

TEST NAME: Hot Acid Tank METHOD: Immersion

SIGHT IDENT #: F: G-200X.093"-009/E R: G-100-010/R

SIGHT TYPE/CONFIG: Block / Bar Det COND: 250°F for 20 min

OBJECTIVES: See Line (A) OTHER: Black Oxide Finish process

(A) Test construction materials for bending strength or break-down during "Bluing"

Chemical Bath At 250°F. Sights Are placed in hot chemicals, Allowed to soak for 20 min, then Removed. Surface coating of Impruv (R) A little cloudy, Allowed to cool, cleaned with Gun Scrubber (R), Inspected, All ok. No visible effects, ~~ALL~~ detected. Inspected by Illumination, All ok.

de * I feel that this process did not harm the Impruv, the stove material, the Black Max or the sealed source itself. However In some bluing tanks the temp may exceed 300°F & bluing duration can vary from 15 to 35 min. I feel we must advise the consumer to avoid this expense.

COMMENTS: chemicals used in this process are as follows. Sulfuric Acid, Hydrochloric Acid, Sodium Nitrate & Sodium Nitrite (Common to most bluing processes)

TEST DONE BY: Tate W. H. G.

MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Product Name: Black Max(TM) Black Tough Adhesive
 Item No.: 38061
 Product Type: Cyanoacrylate
 Formula NO.: LO-863B

II. COMPOSITION

Ingredients	CAS No.	Z
Ethyl cyanoacrylate	7085-85-0	85-90
Ethylene copolymer rubber	54545-50-5	7-12
CARBON BLACK	1333-86-4	1-3
PTHALIC ANHYDRIDE*	85-44-9	0.1-1
HYDROQUINONE	123-31-9	0.1-0.5

* This component is listed as a SARA Section 313 Toxic Chemical.

III. CHEMICAL AND PHYSICAL PROPERTIES

Vapor Pressure: Less than 0.2mm
 Vapor Density: Approximately 3
 Solubility in Water: Polymerized by water
 Specific Gravity: 1.1
 Boiling Point: More than 300°F
 Volatile Organic Compound (ASTM D2369): Not available
 Evaporation Rate (Ether = 1): Not available
 pH: Does not apply
 Appearance: Viscous, black liquid
 Odor: Sharp, irritating

IV. FLAMMABILITY AND EXPLOSIVE PROPERTIES

Flash Point: 150 - 200°F Method: Tag Closed Cup
 Estimated NFPA Code:
 Health Hazard: 2
 Fire Hazard: 2
 Reactivity Hazard: 2
 Specific Hazard: No water
 Estimated HMIS Code:
 Health Hazard: 2
 Flammability Hazard: 2
 Reactivity Hazard: 2
 Personal Protection: See Section X.
 Explosive Limits:
 (% by volume in air) Lower 1.7% Phthalic anhydride
 (% by volume in air) Upper 10.5% Phthalic anhydride
 Recommended Extinguishing Agents: Carbon dioxide, foam, dry chemical
 Hazardous Products Formed by Fire or Thermal Decomp: Irritating organic vapors
 Unusual Fire or Explosion Hazards: None
 Compressed Gases: None
 Pressure at Room Temp.: Does not apply

V. SPILL OR LEAK AND DISPOSAL PROCEDURES

Steps to be taken in case of spill or leak: Flood with water to polymerize completely. Solid polymer is non-hazardous.
 Recommended methods of disposal: After polymerization as above, incinerate following EPA and local regulations. Phthalic anhydride is listed by EPA as hazardous waste.

VI. STORAGE AND HANDLING PROCEDURES

Storage: Store below 75°F to maximize shelf life.
 Handling: Avoid contact with skin and eyes. Avoid breathing vapor.

VII. SHIPPING REGULATIONS

Type or Class DOT: Not restricted (Less than or = 1 pint);
 ORM-A (1 pint to 110 gallons);
 Combustible liquid (Greater than 110 gallons)
 Proper Shipping Name IATA: Unrestricted; DOT regulations apply in U.S.
 DOT: Not restricted (Less than or = 1 pint);
 ORM-A, n.o.s. (One pint to 110 gallons);
 Combustible liquid, n.o.s. (More than 110)

MATERIAL SAFETY DATA SHEET

Product Name: Black Max(TM) Black Tough Adhesive
 Item No.: 38061

VII. SHIPPING REGULATIONS

(continued)

Identification Number: gallons)(Ethyl Cyanoacrylate Solution)
 IATA: Unrestricted; DOT regulations apply in U.S.
 DOT: NONE NA 1693 >1pc; NA 1993 >110gals
 IATA: NONE ID8027 (NA1693 Domestic Air Only) >16oz

VIII. REACTIVITY DATA

Stability: Stable
 Hazardous Polymerization: Will Not Occur
 Hazardous Decomposition Products (non-thermal): None
 Incompatibility: Polymerized by contact with water, alcohols, amines, alkalies.

IX. EMERGENCY TREATMENT PROCEDURES

Ingestion: See supplemental page for emergency procedures. Obtain medical attention.
 Inhalation: Remove to fresh air. Treat symptomatically.
 Skin Contact: See supplemental page for emergency procedures.
 Eye Contact: See supplemental page for emergency procedures. Obtain medical attention.

X. PERSONAL PROTECTION

Eyes: Safety glasses or goggles.
 Skin: Polyethylene gloves recommended. Do not use cotton gloves.
 Ventilation: Positive down-draft exhaust ventilation should be provided to maintain vapor concentration below TLV.

XI. HEALTH HAZARD DATA

Toxicity: Bonds skin rapidly and strongly. Skin and eye irritant. Estimated oral LD 50 more than 5000 mg/kg. Estimated dermal LD50 more than 2000 mg/kg.
 Primary Routes of Entry: None known
 Signs and Symptoms of Exposure: Vapor is irritating to eyes and mucous membranes above TLV. Prolonged and repeated overexposure to vapors may produce allergic reactions with asthma-like symptoms in sensitive individuals.

Existing Conditions Aggravated by Exposure: None known

Exposure Limits Ingredients	ACGIH (TLV)	OSHA (TLV)	OTHER
Ethyl cyanoacrylate	None	None	2 ppm TWA
Ethylene copolymer rubber	None	None	None
CARBON BLACK	3.5 mg/m ³ TWA	3.5 mg/m ³ TWA	5ppm
PTHALIC ANHYDRIDE	1 ppm TWA	1 ppm TWA	None
	6.1 mg/m ³	6 mg/m ³	
HYDROQUINONE	2 mg/m ³ TWA	2 mg/m ³ TWA	None

Ingredients	Literature Referenced Target Organ and Other Health Effects	Carcinogen NTP IARC OSHA
Ethyl cyanoacrylate	LUN	NO NO NO
Ethylene copolymer rubber	No Data	NO NO NO
CARBON BLACK	No Data	NO N/A NO
PTHALIC ANHYDRIDE	IRR	NO NO NO
HYDROQUINONE	No Data	NO N/A NO

Abbreviations

N/A Not Applicable
 LUN Lung
 IRR Irritant

XII. PREPARATION INFORMATION

Prepared By: Stephen Repetto
 Title: Research Chemist, Environmental Health & Safety
 Company: Loctite Corp., 705 N. Mt. Rd, Newington, CT 06111
 (24hr.) Phone: (203) 278-1280
 Revision Date: January 28, 1991
 Revision: 0014

MATERIAL SAFETY DATA SHEET

Page 3 of 3

Product Name: Black Max(TM) Black Tough Adhesive
Item No.: 38061

Supplement

INFORMATION FOR FIRST AID AND CASUALTY ON TREATMENT FOR ADHESION OF HUMAN SKIN TO ITSELF IF CAUSED BY CYANOACRYLATE ADHESIVES

Cyanoacrylate adhesive is a very fast setting and strong adhesive. It bonds human tissue including skin in seconds. Experience has shown that accidents due to cyanoacrylates are handled best by passive, non-surgical first aid. Treatment of specific types of accidents are given below.

SKIN ADHESION

First immerse the bonded surfaces in warm soapy water. Peel or roll the surfaces apart with the aid of a blunt edge, e.g. a spatula or a teaspoon handle; then remove adhesive from the skin with soap and water. Do not try to pull surfaces apart with a direct opposing action.

EYELID TO EYELID OR EYEBALL ADHESION

In the event that eyelids are stuck together or bonded to the eyeball, wash thoroughly with warm water and apply a gauze patch. The eye will open without further action, typically in 1-4 days. There will be no residual damage. Do not try to open the eyes by manipulation.

ADHESIVE ON THE EYEBALL

Cyanoacrylate introduced into the eyes will attach itself to the eye protein and will disassociate from it over intermittent periods, generally covering several hours. This will cause periods of weeping until clearance is achieved. During the period of contamination, double vision may be experienced together with a lachrymatory effect, and it is important to understand the cause and realize that disassociation will normally occur within a matter of hours, even with gross contamination.

MOUTH

If lips are accidentally stuck together, apply lots of warm water to the lips and encourage maximum wetting and pressure from saliva inside the mouth. Peel or roll lips apart. Do not try to pull the lips with direct opposing action. It is almost impossible to swallow cyanoacrylate. The adhesive solidifies and adheres in the mouth. Saliva will lift the adhesive in 1/2 to 2 days. In case a lump forms in the mouth, position the patient to prevent ingestion of the lump when it detaches.

BURNS

Cyanoacrylates give off heat on solidification. In rare cases a large drop will increase in temperature enough to cause a burn. Burns should be treated normally after the lump of cyanoacrylate is released from the tissue as described above.

SURGERY

It should never be necessary to use such a drastic method to separate accidentally bonded skin.

MATERIAL SAFETY DATA SHEET

I. PRODUCT IDENTIFICATION

Product Name: Impruv(TM) Optically Clear UV Adhesive
 Item No.: 34931
 Product Type: UV Curing Adhesive
 Formula No.: FMD-21B

II. COMPOSITION

Ingredients	CAS No.	Z
Polyurethane methacrylate resin	Unknown	45-50
Hydroxyalkyl methacrylate	868-77-9	15-20
Higher boiling methacrylate	75662-22-5	20-25
Alkyl methacrylate	142-90-5	5-15
ACRYLIC ACID*	79-10-7	5-7
Alkyl methacrylate	2549-53-3	3-5
Substituted silane	2530-83-8	1-3
Photoinitiator	947-19-3	1-3

* This component is listed as a SARA Section 313 Toxic Chemical.

III. CHEMICAL AND PHYSICAL PROPERTIES

Vapor Pressure: Less than 10mm at 75°F
 Vapor Density: Not Available
 Solubility in Water: Slight
 Specific Gravity: 1.02 at 68°F
 Boiling Point: More than 300°F
 Volatile Organic Compound (ASTM D2369) 54.5%
 Evaporation Rate (Ether = 1) Not available
 pH: Not Applicable
 Appearance: Optically clear
 Odor: Sharp, irritating

IV. FLAMMABILITY AND EXPLOSIVE PROPERTIES

Flash Point: More than 200°F Method: Tag closed cup
 Estimated NFPA Code:
 Health Hazard: 2
 Fire Hazard: 1
 Reactivity Hazard: 1
 Specific Hazard: Does not apply
 Estimated HMIS Code:
 Health Hazard: 2
 Flammability Hazard: 1
 Reactivity Hazard: 1
 Personal Protection: See Section X.
 Explosive Limits:
 (% by volume in air) Lower 2.0% Acrylic acid
 (% by volume in air) Upper 8.0% Acrylic acid
 Recommended Extinguishing Agents: Carbon dioxide, foam, dry chemical
 Hazardous Products Formed by Fire or Thermal Decomposition: Irritating organic vapors.
 Unusual Fire or Explosion Hazards: None
 Compressed Gases: None
 Pressure at Room Temp.: Does not apply

V. SPILL OR LEAK AND DISPOSAL PROCEDURES

Steps to be taken in case of spill or leak: Soak up with an inert absorbent. Store in partly filled, closed container until disposal. Residue may be cleaned with solvent.
 Recommended methods of disposal: Incinerate following EPA and local regulations.

VI. STORAGE AND HANDLING PROCEDURES

Storage: Store below 110°F to preserve shelf life. Protect from light.
 Handling: Keep away from eyes. Avoid prolonged skin contact. Avoid prolonged breathing of vapors.

VII. SHIPPING REGULATIONS

Type or Class DQT: Unrestricted
 IATA: Unrestricted

MATERIAL SAFETY DATA SHEET

Product Name: Impruv(TM) Optically Clear UV Adhesive
 Item No.: 34931

VII. SHIPPING REGULATIONS (continued)

Proper Shipping Name DOT and IATA: Unrestricted
 Identification Number:
 DOT: None
 IATA: None

VIII. REACTIVITY DATA

Stability: Stable
 Hazardous Polymerization: Will Not Occur
 Hazardous Decomposition Products (non-thermal): None
 Incompatibility: None

IX. EMERGENCY TREATMENT PROCEDURES

Ingestion: Do not induce vomiting. Keep individual calm. Obtain medical attention.
 Inhalation: Remove to fresh air. If symptoms persist, obtain medical attention.
 Skin Contact: Flush with water.
 Eye Contact: Flush at least 15 minutes with water. Obtain medical attention.

X. PERSONAL PROTECTION

Eyes: Safety glasses or goggles mandatory.
 Skin: Rubber or plastic gloves recommended.
 Ventilation: Sufficient to maintain vapor concentration below TLV.

XI. HEALTH HAZARD DATA

Toxicity: Eye irritant. Possible skin irritant. Estimated Oral LD greater than 5000 mg/kg. Estimated Dermal LD50 greater than 2000 mg/kg. Not Available
 Primary Routes of Entry: Not Available
 Signs and Symptoms of Exposure: May cause dermatitis on prolonged contact in sensitive individuals.
 Existing Conditions Aggravated by Exposure: None known

Exposure Limits Ingredients	ACGIH (TLV)	OSHA (TLV)	OTHER
Polyurethane methacrylate resin	None	None	None
Hydroxyalkyl methacrylate	None	None	3 ppm ceiling
Higher boiling methacrylate	None	None	None
Alkyl methacrylate	None	None	50ppm
ACRYLIC ACID	2 ppm TWA 5.9 mg/m3	10 ppm TWA skin 30 mg/m3 skin	2ppm
Alkyl methacrylate	None	None	50 ppm
Substituted silane	None	None	None
Photoinitiator	None	None	None

Ingredients	Literature Referenced Target Organ and Other Health Effects	Carcinogen		
		NTP	IARC	OSHA
Polyurethane methacrylate resin	No Data	NO	NO	NO
Hydroxyalkyl methacrylate	No Data	NO	NO	NO
Higher boiling methacrylate	No Data	NO	NO	NO
Alkyl methacrylate	No Data	NO	NO	NO
ACRYLIC ACID	IRR REP	NO	N/A	NO
Alkyl methacrylate	No Data	NO	NO	NO
Substituted silane	No Data	NO	NO	NO
Photoinitiator	No Data	NO	NO	NO

Abbreviations

N/A Not Applicable
 REP Reproductive
 IRR Irritant

XII. PREPARATION INFORMATION

Prepared By: Stephen Repetto
 Title: Research Chemist, Environmental Health & Safety
 Company: Loctite Corp., 705 N. Mt. Rd, Newington, CT 06111

LOCTITE CORPORATION

705 NORTH MOUNTAIN ROAD
NEWINGTON, CONNECTICUT 06111
EMERGENCY PHONE: (203) 278-12

ISSUED 4/05/91
21:33:48
TELEX: 275207

MATERIAL SAFETY DATA SHEET

Page 3 of 3

Product Name:
Item No.:

Impruv(TM) Optically Clear UV Adhesive
34931

XII. PREPARATION INFORMATION

(continued)

(24hr.) Phone:
Revision Date:

(203) 278-1280
March 05, 1991

Revision: 0012



P-T. NIGHT SIGHT

**Mowry Custom Handguns
Specialty Shotgun Systems**

*Received
8/28/91*

ENCLOSED

**Innovative Weaponry Inc. response
to NRC question: #1 - #16.**

**Included: Attached Drawings
Attached Labels
Agreement State Licence
SRDL Supplement**

NCR-1 Describe the type (s) and model number(s) of the device(s) Innovative Weaponry is registering. (Are sealed sources being attached directly to permanent sights which are attached to weapons? Are sealed sources being attached to iron sights? etc.)

I.W.I. Reply-1 All I.W.I. devices are similar in that they all contain one or more sealed sources mounted into "iron sights" which are either OEM manufacture or are designed and manufactured by I.W.I. If OEM sights are capable of properly housing the sealed source, then installation is done directly into them. (see installation procedure sheet previously provided to NRC with initial application) If OEM sight are not compatible, I.W.I. manufactures a proper replacement type sight that will accept the sealed source installation. In certain situations "iron sights" are not separately attached to the weapon, but they are an integral part of the weapon itself. In this case, I.W.I. goes directly into the sight area of the weapon. All installations use the same procedures.

NRC-2 Explain how the device will be distributed to Innovative Weaponry's customers.

I.W.I. Reply-2 I.W.I. does several type of device systems (as described in reply #1) but the process of installation (description sent with initial application) is always the same. Distribution to the customer is done by (1) The customer sends his weapon to I.W.I. for direct installation into the existing sights. (2) I.W.I. manufactures replacement "Iron Sights" which are packaged for delivery to be properly installed by a competent gunsmith. This allows I.W.I. to manufacture and provide a night sighting system for virtually any small arms weapon of today's market. All proper labeling (see Reply #8) and instructions (see reply #11) are provided to the user.

NRC- 3 List all types of weapons onto which the sights will be attached

(handguns, shot guns, automatic weapons, etc.)

I.W.I. Reply- 3 I.W.I. will produce or install (refer to I.W.I. reply #1) Night sights for the small arms world of weapons and devices to include: Handguns, Shotguns, Rifles, Automatic Weapons, Gas Launching Devices, Grenade Launching Devices, other specialized and classified military arms and devices.

NRC-4 Submit drawings of the devices to be registered. The drawings must include all materials, dimensions and tolerances. If the light sources are being attached to permanently mounted sights, details of the mounting including dimensions must be submitted.

NRC-5 Provide drawings of how the sealed sources and sights are to be mounted.

I.W.I. Reply-4&5 Regardless of which system I.W.I. uses, the installation process is always the same. The following drawings(see Drawing enclosed) show in detail how the sealed sources are mounted:

All Handgun front sights, 3-dot rear sights, shotgun sight, All specialty sight large dot sights ... See Attached drawing #1

Bar Rear sight and Rifle front sight....

See Attached drawing #2

Rifle rear dot and all specialty sight small dot sights... see attached drawing #3

NRC-6 Provide verification that the sealed sources to be used in the devices are registered with the NRC an Agreement States. Submit the model numbers and drawings of the sources to be used in the devices.

I.W.I. Reply-6 New Mexico is an NRC Agreement State.

I.W.I. has a purchase and possession license from the New Mexico Health and Environment Dept. (copy Enclosed see attachment number). All records and registrations are kept in accordance with the requirements of this licence.

The SRDL model numbers of the sealed sources have been previously submitted with the original application. Their drawings and descriptions, along with their testing procedures are enclosed forthwith. (see Attachment to SRDL)

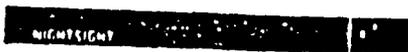
is it on Arizona?
Hess

230
NRC-7 State the maximum activity of the sealed sources to be used in the devices and the maximum combined activity of the sealed sources to be use on each weapon.

I.W.I. Reply-7 The maximum activity per single source should not exceed forty (40) millicuries. I.W.I. requests usage up to three(3) sources per weapon. This makes the total combined maximum activity one hundred-Twenty(120) Millicuries per weapon.

NRC-8 Provide an example showing how the sight and/or weapons will be labelled.

I.W.I.Reply-8 Our Chemical Resistant label (Attached Below) is self adhesive and attached externally on the weapon itself. A label is provided with each sight set for the customer.



*OK for
fixer.*

*- PWShead
- Removable*

NRC-9 Demonstrate how the sights will meet the requirements of 10 CFR part 32, Section 32.32.

I.W.I. Reply-9 I.W.I. purchases Radioactive Material (Tritium in form $3H_2$ or H_3H) in sealed sources (laser sealed borosilicate glass). External radiation exposure or internal contamination is very unlikely. I.W.I. takes maximum precaution in handling during installation and distribution, no breakage or fracturing occurs to allow exposure. If during an uncontrollable situation exposure occurs, Tritium (H derivative) will dissipate into the upper atmosphere very quickly. I.W.I. has a specific area in which all storage and installation is performed. If exposure occurs, the area is immediately vacated and properly ventilated for a minimum of 30 minutes. (this is per Dept of Energy facilities requirements) Because of the low amount of activity contained in a single sealed source, exposure of or dose ingested is very minimal for any individual involved in production, marketing or user of said product. I.W.I. takes every precaution in installation, no exposure should occur to the individuals involved in distribution or user of our finished products, under normal circumstances.

*Bob (sic) ...
C... ..*

NRC-10 Provide a copy of Innovative Weaponry's quality assurance and control procedures and their leak test procedures.

I.W.I. Reply-10 I.W.I. assures the utmost quality products manufactured and work performed. In the production of our night sights, we have taken every step possible to assure the highest quality and the safest sight available to the market today. Our sealed sources are totally encased by a shock absorbing material. Every effort is taken to eliminate any possibility of a fracture under any usage normal to the weapon to which they are installed. We purchase the highest quality sealed sources available in the world. (See Specifications and Test-SRDL supplement).

*example of QA
if epoxy mixing*

NRC-11 Provide a copy of the product brochure to be supplied to the device users.

I.W.I. Reply-11 I.W.I. Product User Brochure
(Attached Below)

A NOTE TO OUR CUSTOMERS:

THANK YOU! for purchasing P-T NIGHT SIGHTS. You are now the owner of the most advanced night sight made today.

WARNING: Please observe the instructions below.

CAUTION: Do not immerse into cleaning solutions or dunk tank for a prolonged period of time. Prolonged exposure to cleaning solvents may effect adhesives. Also, prolonged exposure to ultra-sound cleaning is not recommended.

NORMAL GUN CLEANING SOLVENTS WILL NOT AFFECT THE SIGHTS.

Do not expose to extremely high temperatures encountered in finishing and plating procedures.

P-T Night Sights contain Tritium. Purchaser is exempt from any regulatory responsibility. TRITIUM EXEMPT
[Tritium has a relatively low biological hazard because of its low energy-level beta radiation and because, being a gas it is quickly dispersed should it be released.]
If a Tritium tube becomes accidentally broken, ventilate and leave the area for a minimum of 30 minutes.

This Package conforms to the conditions and limitations specified in 49 CFR 173.422 for excepted radioactive material, instruments and articles UN2911.

15 year warranty. Satisfaction Guaranteed

QUESTIONS? Please Call 800 334-3573 *JWT*

NRC-12 Provide verification that all prototype test are performed with the sights attached to the weapon which will have the most detrimental effects.

I.W.I. Reply-12 All of IWI's night sights are designed for a particular weapon type, and do not interchange with other weapon types. Thus, it is most effective to do the testing with the sight on the weapon that it was designed for. We feel the testing demonstrates that our sights withstand greater than normal, up to, and including extreme heavy abuse, which in most cases would render the weapon useless. As with any manufacturer we feel a product cannot be designed that will withstand all circumstances. However, our sights do withstand more abuse than will occur to any weapon during normal usage, up to and including extreme abuse.

NRC-13 Submit the details of evaluations performed after the prototype testing. Include the leak test which are performed.

I.W.I.Reply-13 Enclosed are the details (Refer to test Evaluation sheet #13A-E) for test evaluation of prototype testing. Also enclosed (see SRDL supplement Attached) are the sealed source manufacturer's tests performed before actual delivery of the sealed sources to our facility.

NCR-14 Describe for the chemical test how the chemicals submitted in your August 8, 1991 letter compare to trichloromethane. Why is 20 minutes of soaking considered a sufficient amount of time? *Alison*

I.W.I. Reply-14 The chemicals used in the test are common chemicals, as stated in the "test name" section. Since Trichloromethane (CHCL₃) is chloroform and is highly suspected carcinogenic, per N.T.P. and I.A.R.C., we feel this is not a common chemical and did not conduct testing on this chemical.

In normal testing we try to duplicate actual gun cleaning procedures with actual products for that purpose.

Initial guidelines were established at 24 hours for these product test. We there after established our test criteria to better typify actual cleaning procedures, which we felt 30 minutes would be a minimum acceptable level. Our conclusion was no notable difference between 30 minutes and 24 hours. *Alison*

NCR-15 For the thermal test, submit more detail of how the IMPRUV appears to separate from the sight.

I.W.I. reply- 15 Refer to Attachment sheet #13-C
(Test Evaluation-Thermal Abuse)

NRC-16 For the hot acid test, explain what would happen to the sight if it were subjected to temperatures of 300 degrees F for 35 minutes.

I.W.I. Reply-16 Although normal Black Oxide (common gun term, "bluing") finish process is done at the 260-265 degrees F For 20 minutes, temperature could possibly climb to 295-300 degrees F if care is not taken by the operator. Although no damage was detected in our test, we feel it is possible to damage the IMPRUV and/ or BLACK MAX adhesion if the sights are subjected to excessive temperatures for any length of time. This is why we strongly advise not to submit the sights to these conditions in our product user brochure (see I.W.I. Reply #11). Even though the bonding could become damaged, no damage will occur to the sealed source itself.

mt
...

ATTACHMENT SHEET #13-A

Chemical (common) test

TEST EVALUATION

After the testing was completed, the sights were visually inspected for illumination and any other form of destruction. None of the products show any effects on the construction materials, sights themselves, or to the sealed sources.

The object of this test is to ensure that the common cleaning solvents and/or chemicals that are likely to be used on our sights will not effect the function or appearance of our sights.

ATTACHMENT SHEET #13-B

* Recoil Shock Test*

TEST EVALUATION

After testing, the sights were left on the weapon for aprox, 4 weeks. The weapons were visually inspected on a daily basis with no evidence of failure of any kind detected. The sights were removed from the weapons, then placed in a labeled, sealed container, and they are still being shown as samples on a frequent basis.

ATTACHMENT SHEET # 13-C

* Thermal Abuse*

TEST EVALUATION

1. After the testing, the sights were allowed to cool. Then the IMPROV was probed to see if adhesion failed at that point. The conclusion was that it still had adhesion qualities. The surface, or skin, of the IMPROV appeared to distort or refract the light, causing a dark ring around the edge of the material.
2. The sights were then immersed in loctite flushing solvent #12121 (Methylene Chloride) to remove the IMPROV and BLACKMAX. This took aprox. 24 Hours, at which time we were able to inspect the sealed source for damage. No damage was detected.

ATTACHMENT SHEET # 13-D

* Drop Test*

TEST EVALUATION

After testing, the sights were inspected for damage and illumination. Tests conclude that no damage had occurred, and they were placed, in a labeled sealed, sealed container, and are still being shown as samples on a frequent basis.

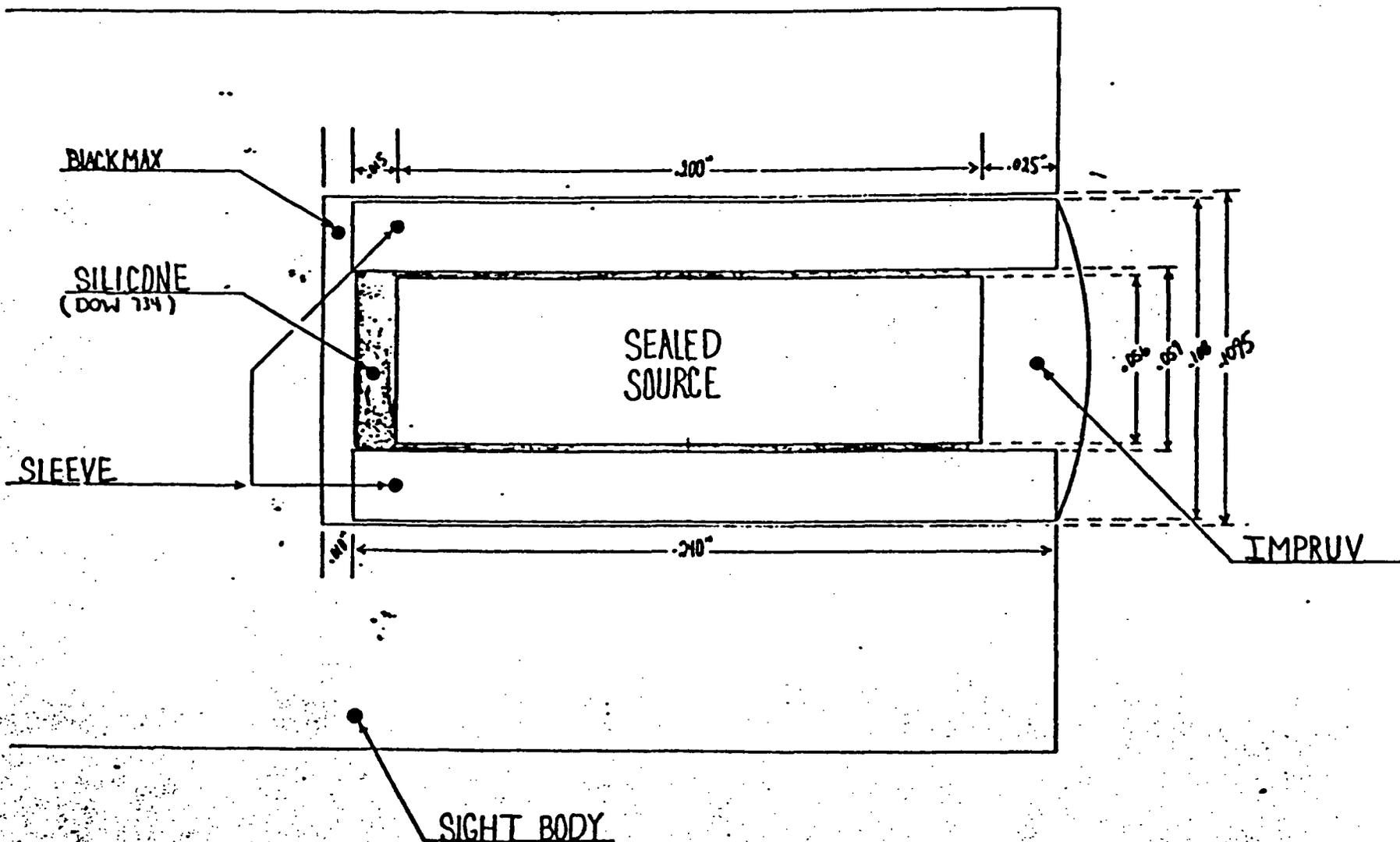
ATTACHMENT SHEET #13-E

* Hot Acid Tank*

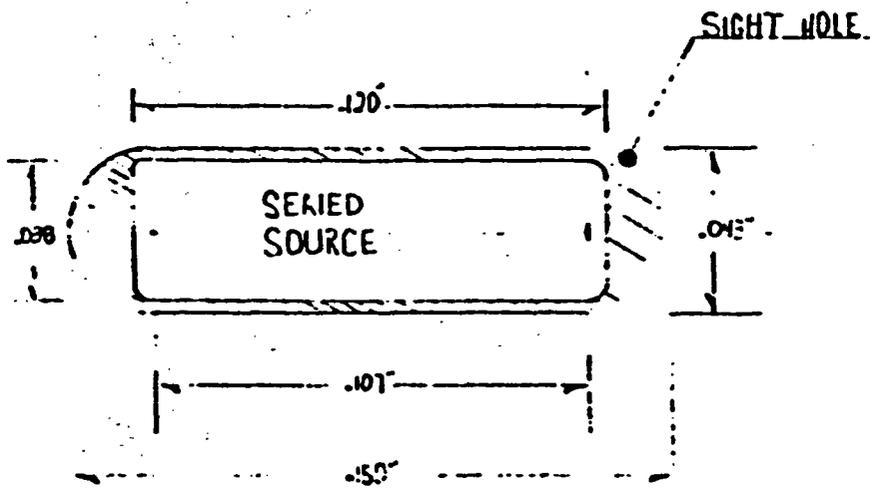
TEST EVALUATION

Once the testing had been completed, the sights were immersed in Loctite flushing solvent # 12121 (Methylene Chloride) to remove the Impruv And Blackmax. When the sealed sources were analyzed, using a visual magnification device, no deterioration or visual effects were detected to the sealed sources. The sealed sources were then placed in a labeled, sealed container for periodic inspection. Tests conclude no effect on sealed source or installation procedures.

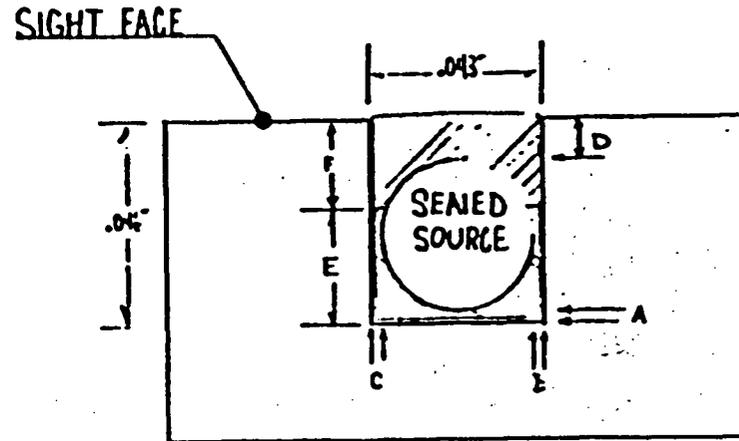
DRAWING #1



TOP VIEW



SIDE VIEW



- A = .0025
- B = .0025
- C = .0025
- D = .0025
- E = .020
- F = .020

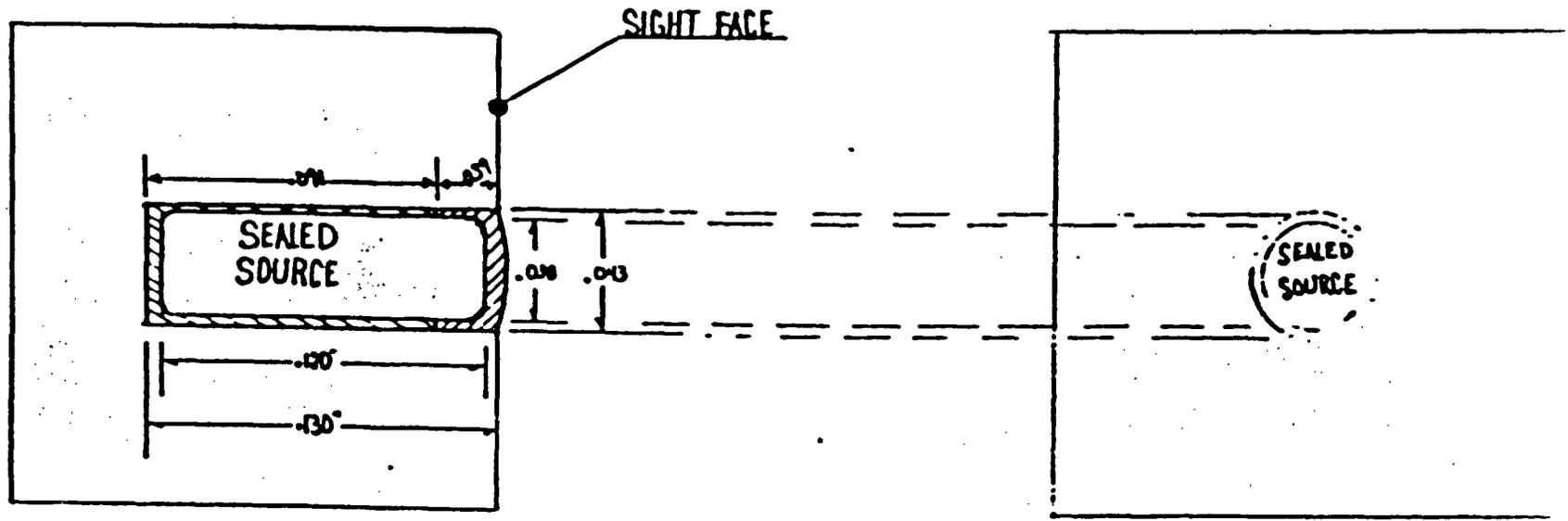
BACK MAX.

IMPRUV

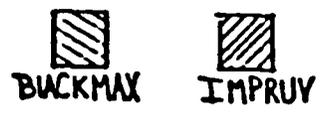
15

SIDE VIEW

FRONT VIEW



DRAWING #3





NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

ENVIRONMENTAL IMPROVEMENT DIVISION RADIOACTIVE MATERIAL LICENSE

Pursuant to the New Mexico Radiation Protection Act of 1971, and the Radiation Protection Regulations Part 3, and in reliance on statements and representations heretofore made by the licensee designated below, a license is hereby issued authorizing such licensee to transfer, receive, possess and use the radioactive material(s) designated below; and to use such radioactive materials for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect, of the New Mexico HED Environmental Improvement Division and to any conditions specified below.

1. LICENSEE NAME Innovative Weaperry, Inc.		2. LICENSE NUMBER NM-IMI-GS-03	
3a. ADDRESS 337 Eubank N.E. Suite 103 Albuquerque, NM 87123		4. EXPIRATION DATE January 31, 1993	
		5. PREVIOUS/OTHER LICENSE NUMBER NM-IMI-GS-00 through NM-IMI-GS-02	
2b. TELEPHONE NO. (505)296-4645	2c. ACTUAL LOCATION OF OPERATION 337 Eubank N.E. Suite 103, Albuquerque, NM 87123.		
6. RADIOACTIVE MATERIALS (element and mass number)	7. CHEMICAL or PHYSICAL FORM	8. MAXIMUM QUANTITY Licensee may possess at any one time	
A. Hydrogen 3.	A. Sealed sources (Saunders-Ree Model PRM-880/G/200 or M8 Microtec A.G. Model 400 series).	A. Not to exceed 250 curies total. Not to exceed <u>30</u> millicuries per source or <u>90</u> milli- curies per weapon.	
9. Authorized use.			
A. For possession and installation of sealed inserts to be used in gun sights.			
10. The licensee shall comply with the provisions of Parts 3, 4 and 10, New Mexico Radiation Protection Regulations.			
11. Licensed material shall be used by, or under the supervision of Barry Howry, President.			
12. The Director of the Division or his authorized representatives shall be allowed to enter the premises and inspect the radiation related activities at all times. Failure of the licensee to admit the Director or his authorized representatives shall constitute grounds for issuance of an immediate cease and desist order.			
13. Sealed sources containing licensed material shall not be opened.			



P.T. NIGHT SIGHT

Mowry Custom Handguns
Specialty Shotgun Systems

*Includes: Attachments 1-6
Response 32.22(A)(1)
32.22(A)(2)
October 24, 1991 32.23
32.24*

**Nuclear Regulatory Commission
Washington, D.C. 20555**

**ATTN: Susan L. Green
Commercial Section
Medical, Academic, and Commercial
Use Safety Branch
Division of Industrial and
Medical Nuclear Safety, NMSS**

Dear Ms Green,
Enclosed is our response to your letter dated October 4, 1991 requesting more information regarding our application for amendment of our license. In response to page one of your letter, you are correct in that we wish to both install our tritium system into existing (original) sights, and to manufacture our own replacement sights with our tritium insert system installed. Our fabrication and installation of the tritium sources is the same process for either system. You are correct in that we do not wish to distribute our tritium inserts to other specific licensees.

9208050277 911209
PDR FOIA PDR
BINDON91-520

337 Eubank NE • Albuquerque, N.M. 87123

Toll Free 1-800-334-2523 • (505) 296-4645 • FAX (505) 296-2622

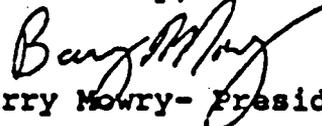
A/11

In regards to the archery sight pins, I would like to withdraw this request at the current time. At a later date, we will file a letter of request for amendment to distribute this product. At that time we will include all descriptions, drawings, tests, specifications, etc. for this product. At present, I would like all efforts concentrated on the gun sight license amendment.

The following pages include our response to the requirements set forth in 10 CFR 32.22 32.23, 32.24 and 32.25 along with response to your questions and requests in your letter.

Thank you for expediting this response of application for amendment, as it is of utmost importance to the welfare of our company. If you, or anyone, has a question concerning this response, Please contact me or Mr. Jim Hall at (505) 296-4645.

Sincerely,


Barry Mowry- President

NRC-#1

Your August 28, 1991, letter indicates that the tritium sources will be mounted in one of three configurations (drawings 1-3). It also indicates that the sources will either be mounted in permanently fixed sights on weapons or in removable type sights.

(A)

For sources mounted in permanently fixed sights. Please provide the model number classification for each type of mounting configuration and provide a detailed list of the types of weapons to which each mounting configuration applies and will be prototype tested against.

REPLY-#1(A)

In permanently fixed sights, one of three model numbers (see drawing number RBI010, RDI111, SIC123 Attachment Number One (1) will be installed. The installation must meet all requirements in dimensions and tolerances. If requirements are met, this installation process can, and will be used for all weapons including handguns, shotguns, rifles, and special classified military arms. For prototype tests, see Attachment Number Five.

*Hand on
mounting*



(B)

For removable sights, please provide drawings and model numbers for each sight you intend to manufacture. The drawings should specify model numbers, dimensions including tolerances, and mounting details. A detailed list of the types of weapons to which each sight model will be attached should also be submitted. In addition, you should specify the minimum sight material thickness surrounding the sealed source and identify the material from which the sights are made.

REPLY #1(B)

For removable sights and sights manufactured by IWI, one of three types of installations will be used. (see Drawing numbers RDI111, RDI010, SIC123 in attachment number one(1) The sights specifications, dimensions, and tolerances are shown on drawing numbers HFS100, HRS001 HRS002 (see Attachment number one (1) for drawings). All the sights mount in the normal procedure of gunsight installation(note-sight packaging card requesting gunsmith installation-attached

MRC-# 2 Provide detailed drawings, showing dimensions including tolerances, and model numbers of the tritium source to be used in the sights.

REPLY-# 2 Enclosed are drawings(see attachment #2) from the manufacturer(Saunders-Roe Developments Limited) of the sealed sources. Also enclosed in the attachment are the American Standards and UK Standards to which each sealed source must pass before delivery to us. In addition, each source must pass a final scintillation test before shipment.

MRC-# 3

In your letter of August 28, 1991, you indicate that the maximum activity of each tritium source is to be 40 millicuries and the maximum activity per weapon is to be 120 millicuries. We note that these activities are different from what you are currently authorized for. Please clarify.

Reply-# 3

Because our original license is for 30 millicuries per source and 90 millicuries per weapon, and our application for amendment dated April 17, 1991 states the same, I would like to withdraw the request for the increase stated in our reply letter dated August 28, 1991 as I feel the original request is sufficient for all our applications. I hope this simplifies this matter.

NRC- # 4

Paragraph 32.22 (a)(2)(x). 10 CFR Part 32, requires that the labels be durable and legible, contain the identification of the manufacturer or initial transferor, and the byproduct material in the product.

(A)

Show how you intend to meet these requirements for removable sights.

(B)

Indicate the locations where you will label weapons with permanently fixed sights and describe the durability characteristics of this label.

REPLY

We have chosen to permanently stamp our logo (registered Trademark) and Tritium symbol (H3) into all sights and/or weapons. (see sample attachment number six (6) on all sights manufactured by IWI, the stamping will be directly on an exposed surface. On permanently fixed sights either the sights (if possible) or the frame of the weapon will be stamped on an exposed surface.

MRC-# 5

You must demonstrate that the sights will meet the requirements of 10 CFR Part 32, Section 32.23. This must be accomplished by explaining all scenarios in which person may be in contact with the sights, such as loading of packages of sights warehousing of sights, persons using the sights, etc. Indicate, in detailed calculations, the doses which persons involved in each scenario may receive and show that the doses will not exceed those specified in section 32.23.

REPLY

Refer to our reply to 32.22(A)(2) part (xiii) and (xiv).

NRC- # 6 Submit quality assurance and quality control procedures which Innovative Weaponry will follow to ensure that all sights will continue to meet the appropriate specifications.

Reply # 6 See Quality Assurance and control (QA/QC) Department Manual.
(ATTACHMENT # 3)

NRC-# 7

Provide more complete information concerning prototype testing. Note that prototype test must be performed with each model sight attached to the weapon which will have the most detrimental effects.

(A)

Provide details of prototype testing performed. Why you believe this weapon would result in most detrimental impact, and the results as required in paragraph 32.22(A)(2)(xii), 10 CFR part 32.

(B)

Provide assurance that the prototype testing demonstrates the typical environments which the sights may experience. If the sights may experience environmental conditions which exceed those experienced during prototype testing explain the effects of these environments on the sights and why such environments will not risk the source or dislodge the source from the weapon.

REPLY

For all the details of the prototype test and results (see Attachment Number Five (5))

NRC-# 8 Explain how you arrived at the conclusion that the results after 30 minutes of chemical testing representative of 24 hours when also indicated that 24 hours of exposure to methylene chloride will remove the Improv and BLACKMAX.

Reply-# 8 We used 30 minutes as a basis for our tests, because if a chemical is going to attack a surface or a material, reaction would start within this time period. No commercial labeled gun cleaning solvent affected the installed source in any manner. However there are harsh chemicals (Methyl Ethyl Ketone, Methylene chloride, Acetone, Trichloroethylene) that if prolonged exposure (12 Hours or more) occurs could possibly damage the clarity of the lensing (Loctite Improv 349) or even attack the adhesive (Loctite Blake Max 386). In our product brochure (Refer to Q&A Number II) we warn against usage of said harsh chemicals.

NRC-# 9 Describe the effects of trichloroethylene, a popular cleaning solvent, on the sights.

Reply-# 9 Trichloroethylene is a highly toxic chemical and an extreme irritant to the skin. After acquiring MSDS information (see Attachment# 4) on cleaning solvents marketed for gun cleaning, we have found this chemical not to be used in any thing labeled for the weapons industry. The chemical Trichloroethane is commonly used in various cleaning solvents. This chemical reacts very quickly, usually in less than 5 minutes. Since our tests we performed were for approximately 30 minutes with no affects, I feel we surpassed any activity of chemical conduct during weapon cleaning.

We also acquired this chemical in pure form and tested our sights for the period of one hour with absolutely no effect in any manner.

(Note on Trichloroethylene: This product is no longer allowed to be used as a solvent by the Federal Government and its use is not permitted in most states.)

MRC- # 10 Describe the type of damage which may occur if the sights are subjected to temperatures of 300 degrees F for extended periods of time during the black oxide finishing process.

Reply-#10 The process of black oxide finishing on a fire arm normally consists of submersion of parts into the solution for a time period of 18 to 20 minutes. The normal temperature is 265 to 268 degrees F. Since this is an accelerated rust process, either increasing the heat or the time will create the steel to rust erode. In our test we went beyond both the normal time and temperature (See Attachment Sheet # 5). The metal did start to rust erode, but note that neither the sealed source device or the adhesion of the device was in any way effected. Because of the damage to the metal, this finish requires strict control. I feel that we went beyond any finisher's processing in our test.

NRC-# 11

The product brochure provided to the user of the sights should include clear instructions for care of the sights. Wording such as "... prolonged periods of time "and " normal cleaning fluids" must be clarified if the results of not following the instructions will be detrimental to the sights.

Reply# 11

Attached is a copy of our new product brochure. we have reworded it to be more specific.

ATTACHMENT

NUMBER

FIVE (5)

PROTOTYPE TESTING: Sight devices manufactured by Innovative Weaponry Inc. containing sealed source inserts.

PROTOTYPE TESTING: Sealed source inserts installed into original equipment manufacturers (OEM) sight devices.

- I. **PROTOTYPE TESTING:** Description
- II. **PROTOTYPE TESTING:** Criteria
- III. **PROTOTYPE TESTING:** Evaluations
- IV. **PROTOTYPE TESTING:** Summary

PROTOTYPE TESTING DESCRIPTION

P-T machined steel sight sets containing sealed source inserts in a Bar-Dot and 3-Dot arrangement were subjected to a battery of test procedures.

P-T application of sealed source inserts were installed into original manufacturers iron sights (OEM) in a Bar-Dot and 3-Dot configuration and were subjected to a battery of test procedures.

The purpose of these applications and test procedures was to evaluate the integrity of these devices for safe and sound distribution.

Prototype Tests:

- (A) Hot Acid
- (B) Thermal
- (C) Drop
- (E) Shock
- (F) Chemical

These particular prototype tests were selected because of their similarity to actual environmental conditions in which devices would be or could be subject to.

Special attention was paid to adherence criteria to better underscore safety requirements.

Prototype Testing Description: Continuation

HOT ACID TEST: [Common Hot Bluing (Black Oxide) procedure] This is a standard procedure used frequently and is applied to firearms and firearm related parts. This procedure is used to coat bare metals to protect against rust, wear etc. and also acts as an esthetic <synonym - finish>. The solution consists of water, Sodium Nitrate, Hydrochloric Acid and Sulfuric Acid. Ingredients are heated to 250 degrees F - 280 degrees F for a period not to exceed 25 minutes. Prototypes were subjected to this procedure in varying applications.

THERMAL: Prototypes were subjected to temperature variations to evaluate thermal influences. A battery of tests involving Refrigerant R-502 was introduced to prototypes to exemplify cold conditions.

In correlation with the hot acid test, prototypes were introduced to hot environments which typified normal to beyond normal conditions.

DROP: Prototypes mounted and unmounted to firearms were dropped from heights ranging from 3 feet to 10 feet onto a hard unfinished concrete surface. Inspections and evaluations were performed initially and after 1 week of elapsed time.

Shock: This battery of testing was indeed the most extensive. P-T manufactured sight set with sealed source inserts were mounted onto firearms for test fire and recoil evaluations. P-T sealed source inserts and applications were also applied to original manufacturers sights. P-T sealed source insert configurations, Bar-Dot and 3-Dot were evaluated for any evidence that these applications would not withstand shock and detrimental forces experienced in firearm usage both normal and excessive. Firearms and ammunitions that were selected, depict the highest degree of pressures and recoil that could be experienced.

Chemical: Prototype sight set were subjected to chemical solutions designated for firearm cleaning and maintenance. Evaluations were made to determine the effects if any to the sight device and the application of the sealed source insertions.

PROTOTYPE TESTING CRITERIA:

- (A) ADHERENCE**
- (B) ILLUMINATION**
- (C) LENSING**
- (D) SEALED SOURCE ENCLOSURES**
- (E) IRON SIGHT**
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST**

(A) ADHERENCE - This test is devised to provide information regarding adhesives (BlackMax, Dow Corning 734) used to bond sealed sources to iron sights. Sights are inspected under microscopic magnification (30X) for visual of bonding stress, adhesive deterioration or other signs of failure. Insert areas are then probed with dental pick or similar device, to check bonding qualities. Results are then classified as Positive or Negative.

Positive denoting acceptable results. Negative denoting unacceptable results.

(B) ILLUMINATION - Sights are inspected in lighting conditions that vary from normal room lighting to total darkness. Inserts are inspected with the naked eye and under 30X magnification. Inserts are compared with new sealed source inserts that have passed the QA/QC procedures for new sealed source inspection. Results are then classified as Positive or Negative. Positive

denoting acceptable results. Negative denoting unacceptable results.

(C) LENSING - This test is designed to offer data concerning the condition of sealed source lensing procedure. Lens area is inspected under 30X magnification for signs of discoloration, fatigue, surface pitting or any other visually detectable breakdown.

Results are then classified as Negative Effect or Positive Effect. Positive Effect denoting unfavorable or unacceptable results, Negative Effect denoting favorable or acceptable results.

(D) SEALED SOURCE ENCLOSURES - This procedure consists of inspection of sealed source enclosures. Visible area of enclosure is inspected under 30X magnification for signs of cracking, fatigue and any other visually detectable breakdown. Results are then classified as Negative Effect or Positive Effect. Positive Effect denoting unfavorable or unacceptable results, Negative Effect denoting favorable or acceptable results.

(E) IRON SIGHT - Sight set is inspected for any signs of defect. Articulations or mounting specifications are checked for correct tolerance. Tension of set screws are measured. Results are then classified as Negative Effect or Positive Effect. Positive Effect denoting unfavorable

or unacceptable results, Negative Effects denoting favorable or acceptable results.

(F) SEALED SOURCE INTEGRITY VERIFICATION TEST [SSIIVT]

Sights are placed in Acetone. This chemical removes the Impruv lensing material and the Loctite BlackMax so the sealed source may be removed for microscopic inspection.

The tube is immersed in water containing a high concentration of purple dye, the water & dye mixture is approximately 70 degrees F. The temperature of the tube, dye & water is then brought to approximately 34 degrees F.

If the integrity of the sealed source vile has been compromised then internal pressure of the vile will have equalized with atmospheric conditions. The cooling of the vile will cause a contraction of the molecules inside the vile i.e. drawing the tainted solution into the vile making readily visible under microscopic conditions.

Results are classified as PASS or FAIL.

PROTOTYPE TESTING: SEALED SOURCE INSTALLATIONS INTO ORIGINAL MANUFACTURERS STEEL SIGHT SETS [OEM].

DESCRIPTION OF SIGHT SET: OEM Smith & Wesson Model 4506

DATE OF TEST: 8-05-91

CATEGORY: Shock

DESCRIPTION OF TEST: The objective of this testing procedure is to evaluate our sealed source installations into original sight set which are delivered on firearms from major manufacturers. P-T "Bar-Dot" sealed source configuration was installed into front and rear sight set of the Smith & Wesson .45 ACP model 4506. 1000 rounds of factory loaded Winchester 230 grain Ball were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines.

INSPECTION:

- (A) ADHERENCE - Positive
- (B) ILLUMINATION - Positive
- (C) LENSING - Negative Effect
- (D) SEALED SOURCE ENCLOSURES - Negative effect
- (E) IRON SIGHT - Negative Effect
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST - Pass

CONCLUSIONS: Given the results of this test, we conclude that the "Bar-Dot" configuration sealed source insertion sustained no detrimental effects when installed into OEM Smith & Wesson sights. The sealed sources withstood shock forces during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING: SEALED SOURCE INSTALLATIONS INTO ORIGINAL MANUFACTURERS STEEL SIGHT SETS [OEM].

DESCRIPTION OF SIGHT SET: OEM Smith & Wesson Model 4506

DATE OF TEST: 8-05-91

CATEGORY: Shock

DESCRIPTION OF TEST: The objective of this testing procedure is to evaluate our sealed source installations into original sight set which are delivered on firearms from major manufacturers. P-T "J-Dot" sealed source configuration was installed into front and rear sight set of the Smith & Wesson .45 ACP model 4506. 1000 rounds of factory loaded Winchester 230 grain Ball were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines.

INSPECTION:

- (A) ADHERENCE - Positive
- (B) ILLUMINATION - Positive
- (C) LENSING - Negative Effect
- (D) SEALED SOURCE ENCLOSURES - Negative effect
- (E) IRON SIGHT - Negative Effect
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST - Pass

CONCLUSIONS: Given the results of this test, we conclude that the "J-Dot" configuration sealed source insertion sustained no detrimental effects when installed into OEM Smith & Wesson sights. The sealed sources withstood shock forces during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING: SEALED SOURCE INSTALLATIONS INTO ORIGINAL MANUFACTURERS STEEL SIGHT SETS [OEM].

DESCRIPTION OF SIGHT SET: OEM Smith & Wesson Model 1006

DATE OF TEST: 8-05-91

CATEGORY: Shock

DESCRIPTION OF TEST: The objective of this testing procedure is to evaluate our sealed source installations into original sight set which are delivered on firearms from major manufacturers. P-T "Bar Dot" sealed source configuration was installed into front and rear sight set of the Smith & Wesson 10MM Mod. 1006. 1000 rounds of factory loaded Federal 155 grain SJHP were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines.

INSPECTION:

- (A) ADHERENCE - Positive
- (B) ILLUMINATION - Positive
- (C) LENSING - Negative Effect
- (D) SEALED SOURCE ENCLOSURES - Negative effect
- (E) IRON SIGHT - Negative Effect
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST - Pass

CONCLUSIONS: Given the results of this test, we conclude that the "Bar-Dot" configuration sealed source insertion sustained no detrimental effects when installed into OEM Smith & Wesson sights. The sealed sources withstood shock forces during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING: SEALED SOURCE INSTALLATIONS INTO ORIGINAL MANUFACTURERS STEEL SIGHT SETS [OEM].

DESCRIPTION OF SIGHT SET: OEM Smith & Wesson Model 5906

DATE OF TEST: 8-06-91

CATEGORY: Shock

DESCRIPTION OF TEST: The objective of this testing procedure is to evaluate our sealed source installations into original sight set which are delivered on firearms from major manufacturers. P-T "Bar Dot" sealed source configuration was installed into front and rear sight set of the Smith & Wesson 9MM Model 5906. 1000 rounds of factory loaded Winchester 115 grain FMJ were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines.

INSPECTION:

- (A) ADHERENCE - Positive
- (B) ILLUMINATION - Positive
- (C) LENSING - Negative Effect
- (D) SEALED SOURCE ENCLOSURES - Negative effect
- (E) IRON SIGHT - Negative Effect
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST - Pass

CONCLUSIONS: Given the results of this test, we conclude that the "Bar-Dot" configuration sealed source insertion sustained no detrimental effects when installed into OEM Smith & Wesson sights. The sealed sources withstood shock forces during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING: SEALED SOURCE INSTALLATIONS INTO ORIGINAL MANUFACTURERS STEEL SIGHT SETS [OEM].

DESCRIPTION OF SIGHT SET: OEM Smith & Wesson Model 4006

DATE OF TEST: 8-06-91

CATEGORY: Shock

DESCRIPTION OF TEST: The objective of this testing procedure is to evaluate our sealed source installations into original sight set which are delivered on firearms from major manufacturers. P-T "Bar Dot" sealed source configuration was installed into front and rear sight set of the Smith & Wesson 40 S&W Model 4006. 1000 rounds of factory loaded Winchester 155 grain STHP were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines.

INSPECTION:

- (A) ADHERENCE - Positive
- (B) ILLUMINATION - Positive
- (C) LENSING - Negative Effect
- (D) SEALED SOURCE ENCLOSURES - Negative effect
- (E) IRON SIGHT - Negative Effect
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST - Pass

CONCLUSIONS: Given the results of this test, we conclude that the "Bar-Dot" configuration sealed source insertion sustained no detrimental effects when installed into OEM Smith & Wesson sights. The sealed sources withstood shock forces during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING: SEALED SOURCE INSTALLATIONS INTO ORIGINAL MANUFACTURERS STEEL SIGHT SETS (OEM).

DESCRIPTION OF SIGHT SET: OEM Smith & Wesson Model 629

DATE OF TEST: 8-06-91

CATEGORY: Shock

DESCRIPTION OF TEST: The objective of this testing procedure is to evaluate our sealed source installations into original sight set which are delivered on firearms from major manufacturers. P-T "Bar Dot" sealed source configuration was installed into front and rear sight set of the Smith & Wesson 44 Magnum Model 629 (Revolver). 1000 rounds of factory loaded Winchester 240 grain JHP were fired in a continuous process. Pauses were facilitated to reload.

INSPECTION:

- (A) ADHERENCE - Positive
- (B) ILLUMINATION - Positive
- (C) LENSING - Negative Effect
- (D) SEALED SOURCE ENCLOSURES - Negative effect
- (E) IRON SIGHT - Negative Effect
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST - Pass

CONCLUSIONS: Given the results of this test, we conclude that the "Bar-Dot" configuration sealed source insertion sustained no detrimental effects when installed into OEM Smith & Wesson sights. The sealed sources withstood shock forces during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage. Characteristic of .44 Magnums, severe recoil was displayed.

PROTOTYPE TESTING: SEALED SOURCE INSTALLATIONS INTO ORIGINAL MANUFACTURERS STEEL SIGHT SETS [OEM].

DESCRIPTION OF SIGHT SET: OEM Smith & Wesson Model 36-2

DATE OF TEST: 8-07-91

CATEGORY: Shock

DESCRIPTION OF TEST: The objective of this testing procedure is to evaluate our sealed source installations into original sight set which are delivered on firearms from major manufacturers. P-T "Bar Dot" sealed source configuration was installed into front and rear sight set of the Smith & Wesson Ladysmith .38 Special (Revolver). 1000 rounds of factory loaded Winchester 125 grain silvertip were fired in a continuous process. Pauses were facilitated to reload.

INSPECTION:

- (A) ADHERENCE - Positive
- (B) ILLUMINATION - Positive
- (C) LENSING - Negative Effect
- (D) SEALED SOURCE ENCLOSURES - Negative effect
- (E) IRON SIGHT - Negative Effect
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST - Pass

CONCLUSIONS: Given the results of this test, we conclude that the "Bar-Dot" configuration sealed source insertion sustained no detrimental effects when installed into OEM Smith & Wesson sights. The sealed sources withstood shock forces during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING: SEALED SOURCE INSTALLATIONS INTO ORIGINAL MANUFACTURERS STEEL SIGHT SETS [OEM].

DESCRIPTION OF SIGHT SET: OEM Colt Model 1911

DATE OF TEST: 8-09-91

CATEGORY: Shock

DESCRIPTION OF TEST: The objective of this testing procedure is to evaluate our sealed source installations into original sight set which are delivered on firearms from major manufacturers. P-T "Bar Dot" sealed source configuration was installed into front and rear sight set of the Colt Model 1911 .45 ACP semi-auto pistol. 1000 rounds of factory loaded Winchester 230 grain ball were fired in a continuous process. Pauses were facilitated to reload magazines.

INSPECTION:

- (A) ADHERENCE - Positive
- (B) ILLUMINATION - Positive
- (C) LENSING - Negative Effect.
- (D) SEALED SOURCE ENCLOSURES - Negative effect
- (E) IRON SIGHT - Negative Effect
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST - Pass

CONCLUSIONS: Given the results of this test, we conclude that the "Bar-Dot" configuration sealed source insertion sustained no detrimental effects when installed into OEM Colt sight sets. The sealed sources withstood shock forces during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING: SEALED SOURCE INSTALLATIONS INTO ORIGINAL MANUFACTURERS STEEL SIGHT SETS [OEM].

DESCRIPTION OF SIGHT SET: OEM Colt Python

DATE OF TEST: 8-09-91

CATEGORY: Shock

DESCRIPTION OF TEST: The objective of this testing procedure is to evaluate our sealed source installations into original sight set which are delivered on firearms from major manufacturers. P-T "Bar Dot" sealed source configuration was installed into front and rear sight set of the Colt Python .357 Revolver. 750 rounds of factory loaded Winchester 125 grain SJHP were fired in a continuous process. Pauses were facilitated to reload.

INSPECTION:

- (A) ADHERENCE - Positive
- (B) ILLUMINATION - Positive
- (C) LENSING - Negative Effect
- (D) SEALED SOURCE ENCLOSURES - Negative effect
- (E) IRON SIGHT - Negative Effect
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST - Pass

CONCLUSIONS: Given the results of this test, we conclude that the "Bar-Dot" configuration sealed source insertion sustained no detrimental effects when installed into OEM Colt. The sealed sources withstood shock forces during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING: SEALED SOURCE INSTALLATIONS INTO ORIGINAL MANUFACTURERS STEEL SIGHT SETS [OEM].

DESCRIPTION OF SIGHT SET: OEM Beretta 92F

DATE OF TEST: 8-09-91

CATEGORY: Shock

DESCRIPTION OF TEST: The objective of this testing procedure is to evaluate our sealed source installations into original sight set which are delivered on firearms from major manufacturers. P-T "Bar Dot" sealed source configuration was installed into front and rear sight set of the Beretta Model 92F, 9mm, semi-auto pistol. 1000 rounds of factory loaded Winchester 115 grain FMJ were fired in a continuous process. Pauses were facilitated to reload magazines.

INSPECTION:

- (A) ADHERENCE - Positive
- (B) ILLUMINATION - Positive
- (C) LENSING - Negative Effect
- (D) SEALED SOURCE ENCLOSURES - Negative effect
- (E) IRON SIGHT - Negative Effect
- (F) SEALED SOURCE INTEGRITY VERIFICATION TEST - Pass

CONCLUSIONS: Given the results of this test, we conclude that the "Bar-Dot" configuration sealed source insertion sustained no detrimental effects when installed into OEM Beretta sight sets. The sealed sources withstood shock forces during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

Note This weapon is used extensively by Law Enforcement and is the official side-arm of the U.S. Military.

PROTOTYPE TESTING SUMMARY

P-T Sealed Source Applications to Original Manufacturers Sight Sets [OKM].

Original manufacturers sight set prototypes used for evaluation were as followed: Smith & Wesson Model 4506, Smith & Wesson Model 1006, Smith & Wesson 5906, Smith & Wesson Model 4006, Smith & Wesson Model 629, Smith & Wesson Model 36-2, Colt Model 1911, Colt Python Revolver, Beretta 92F.

Summary: P-T sealed source applications in Bar-Dot and 3-dot configuration were applied to these common original manufacturers sight sets. Sight sets were subjected to a variety of conditions both normal and extreme. Conditions which were used best typify realities of actual exposure. Extreme conditions were also subjected to sight sets in order to detect any weakness in the area of application of sealed sources. In no instance did sealed source inserts ever become dislodged from sight devices in accordance with application to original manufacturers sights or devices manufactured by Innovative Weaponry Inc.

PROTOTYPE TESTING.

MODEL DESCRIPTION: Glock "Bar-Dot" / Sig 3-Dot / AR-15 / HK

DATE OF TEST: 8-26-91 - 8-27-91 - 8-28-91

CATEGORY: Thermal

DESCRIPTION OF TEST: Sights were placed in a insulated canister. Refrigerant R-502 (an azeotrope refrigerant which is a mixture of 48.8% R-22 (monochlorodifluoromethane) and 51.2% R-115 (chloropentafluoroethane). was introduced into canister. At 14.7 lbs. (Atmospheric pressure) this refrigerants temprature equals -50 degrees F. Sights were subjected to these conditions for a period of 8 hours. Sights were allowed to graduate to room temperature (approx. 70 degrees F)]. This test was repeated using 1 hour, 2 hour, 3 hour and 4 hour control period exposure.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative effect
- (D) Sealed Source Enclosures - Negative effect
- (E) Iron sight - Negative effect
- (F) Sealed Source Integrity Verification Test - Passed

CONCLUSIONS: Sight sets subjected to extreme cold temperatures sustained no detrimental effects. Sight sets were subjected to various duration control periods with no detrimental effects to sealed sources, application materials or iron sight housings. We do not expect products to be exposed to conditions exceeding the control of -50 degrees F. According to ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) tables of outside design conditions, the average winter Dry-Bulb temperature for United States and Canada does not range below -50 degrees F. If products are exposed to conditions and temperatures lower than control standard, we would suspect that no detrimental effects would occur.

Include
PROTOTYPE TESTING

MODEL DESCRIPTION: Sig Bar-Dot - Sig 3-Dot - HK NIGHTFIRE *OEM*

DATE OF TEST: 3-26-91

CATEGORY: Thermal Part II

DESCRIPTION OF TEST: Prototypes sight sets containing Bar-Dot and 3-Dot inserts were placed into oven to expose them to unusual heat ranges for varying durations of time. Sight sets were allowed to cool and initially inspected. Subsequent inspections were conducted 24 hours later.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Test temperatures ranged from 150 degrees F. to 295 degrees F. These control temperatures depict beyond normal exposures. There was absolutely no damage to any aspect of the prototype sight device.

PROTOTYPE TESTING

MODEL DESCRIPTION: Glock Bar-Dot - Glock 3-dot

DATE OF TEST: 3-22-91

CATEGORY: Chemical

*Test
Number*

DESCRIPTION OF TEST: Prototype sights were subjected to chemical solutions designated for firearm cleaning and maintenance to determine the effects of these common cleaning agents to sight device and to application of sealed source inserts.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Eleven of the most common commercial firearm cleaning agents were introduced to sight devices. These agents include: Hopps#9, Outers Nitro Solvent, WD-40, BC-1 Bore Cleaner, Break Free, Accubore, LPS Engine Degreaser, Oxpho-Blue, Gun Scrubber, AmsOil. The average exposure to these agents was approximately 30 minutes which exceeds normal exposure. No detrimental effect was noted upon inspection to the sight device, the sealed source inserts or any application procedures.

IUT
PROTOTYPE TESTING

*Gun &
sights*

MODEL DESCRIPTION: Glock Bar-Dot - Glock 3-Dot/OEM Sights

DATE OF TEST: 2-22-91

CATEGORY: Drop

DESCRIPTION OF TEST: Prototype sight devices containing sealed source inserts and also applications of sealed sources to original manufacturers sight sets were dropped from varying distances of 3 feet to 10 feet to a hard concrete surface. This test would depict a probable accidental event. Drop test was introduced to sight devices mounted and unmounted to firearms.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Sight device design would appear to shield sealed source insert from any external direct blow or force therefore sealed sources would not experience any damage. The only damage which would occur would be to the external characteristics (corners and edges) of the sight device. No effects to the sealed sources or the bonding of the sealed sources. Subsequential inspections 1 week later noted negative effect to integrity of device.

JWI
↑
PROTOTYPE TESTING

MODEL DESCRIPTION: Glock 3-Dot/Sig Sauer "Bar-Dot"/AR-15.

DATE OF TEST: 8-25-91

CATEGORY: Hot Acid Test (Common Hot Bluing Solution)

DESCRIPTION OF TEST: Sights are placed into hot acid bath. Temperature measured @300 degrees F. Duration of immersion 30 minutes. Remove and allow to cool. Clean with Trichloroethane and note effects.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Slight surface discoloration
- (D) Sealed Source Enclosures - Negative effect
- (E) Iron Sight - Major metal erosion noted
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: [Normal bluing (black oxide) process is not recommended to exceed 25 minutes @280 degrees F. Please note these requirements are optimum in obtaining uniform quality results]. To exceed these limits will severely damage the steel sight. Causing erosion of all exterior surfaces i.e. surface pitting, deterioration of exterior edges, shallowing of thread bearing surfaces and a general deterioration of sight. However, sealed sources and sealed source related applications were not affected by extended time and temperature. (Lensing showed a slight cloudy appearance. Light buffing with cotton cloth removed "hazy" condition). Please note: Due to the variations of bluing preparation procedures [sandblasting, buffing, sanding, polishing and burnishing] we do not recommend bluing process to finished sight product. (See Product User's Brochure).

PROTOTYPE TESTING

CEM
Positive
12/20/91

MODEL DESCRIPTION: P-T Colt AR-15/M16

DATE OF TEST: Reprint of previous test (09-09-91)

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Colt AR-15/M16 semi-automatic rifle. 2000 rounds of factory loaded Winchester 55 grain FMJ cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: We felt the need to increase the amount of test rounds fired due to the fact that this particular firearm is used extensively by the United States Government and Law-Enforcement, we feel these weapons may be subject to longer durations of sustained fire.

Note This is an extended evaluation of initial prototype sight test. There was no differentiation between the sights that endured 1000 rounds and the sights that were subjected to 2000 rounds. The SSIIVT showed no adverse effects.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Colt AR-15/M16

DATE OF TEST: Reprint of previous test (09-09-91)

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Colt AR-15/M16 semi-automatic rifle. 1000 rounds of factory loaded Winchester 55 grain FMJ cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

Note This is part one of a two part test.

PROTOTYPE TESTING

OEM

MODEL DESCRIPTION: P-T Heckler & Koch. "NightFire"

DATE OF TEST: Reprint of previous test (09-12-91)

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Heckler & Koch, SP-89 semi-automatic rifle. 1000 rounds of factory loaded Winchester 115 grain FMJ cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

Note - This is part one of a two part test.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Heckler & Koch "NightFire"

DATE OF TEST: Reprint of previous test (09-12-91)

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Heckler and Koch, SP-89 semi-automatic rifle. 2000 rounds of factory loaded Winchester 115 grain FMJ cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: We felt then need to increase the amount of test rounds fired due to the fact that this particular firearm is used extensively by the United States Government and Law-Enforcement, we feel these weapons may be subject to longer durations of sustained fire.

Note this is an extended evaluation if initial prototype sight test. There was no differentiation between the sights that endured 1000 rounds and the sights that were subjected to 2000 rounds. The SSIIVT showed no adverse effects.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Glock Steel 3-Dot

DATE OF TEST: 10-06-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Glock 19, 9MM semi-automatic pistol. 1000 rounds of factory loaded Winchester 115 grain FMJ cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set with "3-Dot" sealed source insert configuration withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Glock Steel "Bar-Dot"

DATE OF TEST: 10-06-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Glock 19, 9MM Semi-Automatic pistol. 1000 rounds of factory loaded Winchester 115 grain FMJ cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set with "Bar-Dot" sealed source insert configuration withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Glock Steel "Bar-Dot"

DATE OF TEST: 10-07-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Glock 21, 45 ACP semi-automatic pistol. 1000 rounds of factory loaded Winchester 230 grain ball cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set with "Bar-Dot" sealed source insert configuration withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

Note In this test we utilized a .45 caliber weapon because of its great degree of recoil. Extreme recoil had no detrimental effects to the sight sets.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Sig "Ultimate Combat" 3-Dot

DATE OF TEST: 10-07-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Sig-Sauer Model P-226, 9MM semi-automatic pistol. 1000 rounds of factory loaded Winchester 115 grain FMJ cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set with "3-Dot" sealed source insert configuration withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Glock Steel "3-Dot"

DATE OF TEST: 10-07-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Glock 21, 45 ACP semi-automatic pistol. 1000 rounds of factory loaded Winchester 230 grain ball cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set with "3-Dot" sealed source insert configuration withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

Note In this test we utilized a .45 caliber weapon because of its great degree of recoil. Extreme recoil had no detrimental effects to the sight set.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Sig "Ultimate Combat" Bar-Dot

DATE OF TEST: 10-07-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Sig-Sauer model P-226, 9MM semi-automatic pistol. 1000 rounds of factory loaded Winchester 115 grain FMJ cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set with "Bar-Dot" sealed source insert configuration withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Sig "Ultimate Combat" 3-Dot

DATE OF TEST: 10-08-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Sig-Sauer model P-220, 45 ACP semi-automatic pistol. 1000 rounds of factory loaded Winchester 230 grain ball cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set with "3-Dot" sealed source insert configuration withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

Note In this test we utilized a .45 caliber weapon because of its great degree of recoil. Extreme recoil had no detrimental effects to the sight set.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Sig "Ultimate Combat" Bar-Dot

DATE OF TEST: 10-08-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Sig-Sauer model P-220, .45 ACP semi-automatic pistol. 1000 rounds of factory loaded Winchester 230 grain ball cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set with "Bar-Dot" sealed source insert configuration withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

Note In this test we utilized a .45 caliber weapon because of its great degree of recoil. Extreme recoil had no detrimental effects to the sight set.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Colt 1911/2000 "3-Dot"

DATE OF TEST: 10-09-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Colt 1911, .45 ACP semi-automatic pistol. 1000 rounds of factory loaded Winchester 230 grain ball cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set with "3-Dot" sealed source insert configuration withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

Note In this test we utilized a .45 caliber weapon because of its great degree of recoil. Extreme recoil had no detrimental effects to the sight set.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T Colt 1911/2000 "Bar-Dot"

DATE OF TEST: 10-09-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Colt 1911, 45 ACP semi-automatic pistol. 1000 rounds of factory loaded Winchester 230 grain ball cartridges were fired in a continuous process. Pauses were facilitated to reload ammunition into magazines. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight set with "Bar-Dot" sealed source insert configuration withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage.

Note In this test we utilized a .45 caliber weapon because of its great degree of recoil. Extreme recoil had no detrimental effects to the sight set.

PROTOTYPE TESTING

MODEL DESCRIPTION: P-T "NIGHTLINER"

DATE OF TEST: 08-03-91

CATEGORY: Shock

DESCRIPTION OF TEST: Prototype was mounted onto Remington, model 1100 semi-automatic shotgun. 750 rounds of factory loaded Winchester 12 gauge 00 Buckshot were fired in a continuous process. Pauses were facilitated to reload ammunition into magazine tubes. The purpose of this test was to simulate normal to beyond normal firearm shooting and inspect the integrity of sealed source applications.

INSPECTION:

- (A) Adherence - Positive
- (B) Illumination - Positive
- (C) Lensing - Negative Effect
- (D) Sealed Source Enclosures - Negative Effect
- (E) Iron Sight - Negative Effect
- (F) Sealed Source Integrity Verification Test - Pass

CONCLUSIONS: Given the results of this test, we conclude that this prototype sight withstood shock forces incurred during normal and beyond normal up to and including excessive usage. Normal is termed relative in accordance with established standards and natural procedures i.e. natural or usual usage. Recoil experienced in this test procedure was rated at extreme.

PROTOTYPE TESTING SUMMARY

P-T Machined Steel Night Sight Sets:

Colt AR-15/M16

Heckler & Koch "NIGHTFIRE"

Glock "Steel" Bar-Dot

Glock "Steel" 3-Dot

Sig Sauer "ULTIMATE COMBAT" Bar-Dot

Sig Sauer "ULTIMATE COMBAT" 3-Dot

Colt 1911/2000 Bar-Dot

Colt 1999/2000 3-Dot

Shotgun "NIGHTLINER"

Summary: These particular machined steel, sealed source contained sight sets were subjected to a variety of conditions both normal and extreme. Conditions which were used best typify realities of actual exposure. Also extreme conditions were subjected to prototype sight sets in order to detect any weakness in any area of application. These devices were taken to the threshold and beyond in testing. The integrity of the design and construction of the sight set devices, the application and bonding of the sealed sources to the sights and the overall procedures associated with this product exemplifies the highest of quality.

Standard Review Plan for Applications for Licenses to Distribute Byproduct Material to Persons Exempt from the Requirements for an NRC License

10 CFR Parts 30.14, 30.15, 30.16, 30.18, 30.19, and 30.20

Draft Report for Comment

U.S. Nuclear Regulatory Commission

Office of Nuclear Material Safety and Safeguards

L. Camper, T. Rich, S. Greene



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Appendix 11

Standard Requirements for Tritium Illuminated Gun Sights Containing Tritium Gas Sealed in Glass Vials

1 PURPOSE

To set minimum performance requirements for gun sights containing tritium gas in glass vials for the purpose of producing light.

2 APPLICABILITY

All tritium illuminated gun sights registered after the date of this document are required to adhere to the requirements of this document.

Furthermore, all tritium illuminated gun sights licensed, after the date of this document, for manufacture or distribution, are required to adhere to the requirements of this document.

New gun sights which can be shown, by engineering evaluation, to meet these criteria, because of similarity in design and assembly to gun sights passing this criteria, need not be subject to the prototype testing described in this document.

3 REQUIREMENTS

An applicant for a license to manufacture, process, or distribute gun sights containing tritium gas in vials for the purpose of producing light shall submit the information required in 10 CFR 32.22. The labeling requirements and prototype testing procedures in this document are considered sufficient to meet the requirements described in 10 CFR 32.22(a)(2)(x) and 32.22(a)(2)(xi), respectively.

3.1 DESIGN

Each gun sight is required to be designed so that:

- 3.1.1 In normal use and disposal of a single gun sight, it is unlikely the external radiation dose in any one year, or the dose commitment resulting from the intake of radioactive material in any one year, to a suitable sample of the group of individuals expected to be most highly exposed to radiation or radioactive material from the gun sight will exceed the dose to the appropriate organ as specified in Column I of Table 1.
- 3.1.2 In normal handling and storage of the quantities of gun sights likely to accumulate in one location during marketing, distribution, installation, and servicing of the gun sights, it is unlikely that the external radiation dose in any one year, or the dose commitment resulting from the intake of radioactive material in any one year, to a suitable sample of the group of individuals expected to be most highly exposed to radiation or radioactive material from the gun sight will exceed the dose to the appropriate organ as specified in Column II of Table 1.
- 3.1.3 It is unlikely that there will be a significant reduction in the effectiveness of the containment, shielding, or other safety features of the gun sight from wear and abuse likely to occur in normal handling and use of the gun sight during its useful life.
- 3.1.4 In use and disposal of a single gun sight, or in handling and storage of the quantities of gun sights likely to accumulate in one location during marketing, distribution, installation, and

servicing of the gun sight, the probability is low that the containment, shielding, or other safety features of the gun sight would fail under such circumstances that a person would receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ in Column III of Table 1, and the probability is negligible that a person would receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ in Column IV of Table 1.

TABLE 1

Part of Body	Col. I (rem)	Col. II (rem)	Col. III (rem)	Col. IV (rem)
Whole body; head and trunk; active blood-forming organs; gonads; or lens of eye	0.001	0.01	0.5	15
Hands and forearms; feet and ankles; localized areas of skin averaged over areas no larger than 1 square centimeter	0.015	0.15	7.5	200
Other organs	0.003	0.03	1.5	50

3.1.5 It is engraved with H3 and the name, registered trademark, or license number of the manufacturer, processor, producer, or initial transferor of the gun sight.

The gun sight may be labeled using paint or a durable metal foil label. However, the applicant must provide adequate information that the labeling will remain legible after being subject to the prototype testing described in this document.

3.2 PROTOTYPE TESTING

At least five (5) gun sights of each model are to be subject to each of the tests described below. The same gun sight is to be used for each test. Order of the testing is not significant. Between each test the gun sights are to be visually inspected to ensure there have been no detrimental effects to the gun sights. The gun sights must not become loosened or detached from the guns (tests 3.2.7 & 3.2.8) and the light sources must not become loosened or detached from the gun sights as a result of any of the tests. Once all tests are completed, the gun sights are to be subject to the evaluation in section 3.2.9.

3.2.1 CHEMICAL

The gun sight is to be immersed for 48 hours at room temperature in each of the following:

- gun oil
- trichloroethane
- cleaning compound according to MIL-C-372B

3.2.2 TEMPERATURE

High Temperature: The temperature of the gun sight is to be raised from ambient to 120°C and held at this temperature for one hour.

Low Temperature: The temperature of the gun sight is to be lowered from ambient to -46°C and held at this temperature for 48 hours.

Relative Humidity: The gun sight is to be placed in an environment of 100% relative humidity and a temperature of 42°C and held in this environment for 48 hours.

3.2.3 TEMPERATURE SHOCK

The gun sight is to be heated to 80C and held at this temperature for 15 minutes. The gun sight is to be transferred, within 15 seconds, to a cold chamber having a temperature of -46°C and held in this chamber for 15 minutes. If water is used as the cold chamber, it is to be flowing at a rate of at least 10 times the gun sight volume per minute. If the water is stationary, the water volume is to be at least 20 times the volume of the gun sight.

3.2.4 VIBRATION

The gun sight is to be subject to simple harmonic motion having an amplitude of 0.075 cm. The vibration cycle is to go from 10 Hz to 50 Hz and back again in approximately one (1) minute. This is to be carried out for 10 cycles. Afterwards, the gun sight is to be subject to 30 minutes of vibration at resonance frequency.

This test is to be carried out in each of the three principal axes of the gun sight.

3.2.5 PRESSURE

The gun sight is to be placed in a test chamber and exposed to 0.25 and 2.0 bars for four (4) periods of 15 minutes each, the pressure being returned to atmosphere between each period.

3.2.6 PENETRATION

A hammer with a small point and weighing 10 g is to be dropped from a height of one (1) meter onto the exposed surface of the light source.

3.2.7 MECHANICAL SHOCK

This test is to be performed with the gun sight attached to the gun which would have the most detrimental effects on the gun sight.

The gun is to be dropped from two (2) meters onto a hard surface (at least 1" thick 85 durometer rubber backed by concrete). The gun is to be dropped 60 times in such a manner that it strikes the surface ten times in each of the following attitudes:

- a. Barrel vertical, muzzle down.
- b. Barrel vertical, muzzle up.
- c. Barrel horizontal, bottom up.
- d. Barrel horizontal, bottom down.
- e. Barrel horizontal, left side up.

- f. Barrel horizontal, right side up.

3.2.8 FIRING

This test is to be performed with the gun sight attached to the gun which would have the most detrimental effects on the gun sight. The gun is to sequentially fire 5000 rounds of ammunition with lapses only sufficient to allow reloading (only one of each model site needs to be subjected to the firing test).

3.2.9 EVALUATION

After each test the gun sight is to be immersed in water for 24 hours at ambient temperature. The volume of the water is to be about equal to 10 times that of the volume of the gun sight. After the gun sight is removed, the activity of the solution is to be measured. The activity of the solution is to be less than or equal 50 nanocuries.

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Author, Title, (state pub:publisher,year)

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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ADJUDICATIONS STAFF

In the Matter of)
)

21st CENTURY TECHNOLOGIES, INC.)
)

(Fort Worth, Texas))
)

Docket No. 030-30266

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF MOTION FOR SUMMARY DISPOSITION OF AUTHORITY ISSUE" in the above-captioned matter have been served on the following by deposit in the United States mail, first class, as indicated by asterisk or through deposit in the Nuclear Regulatory Commission's internal mail system this 24th day of October, 1997.

Thomas S. Moore, Chairman
Atomic Safety and Licensing Board Panel
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dr. Jerry R. Kline
Administrative Judge
Atomic Safety and Licensing Panel
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Office of the Secretary
Attn.: Rulemakings and Adjudications
Staff
Mail Stop: 16-G-15 OWFN
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Lester S. Rubenstein*
Administrative Judge
4760 East Country Villa Drive
Tucson, AZ 85718

James R. Tourtellotte, Esq.*
1200 N. Nash #1141
Arlington, Virginia 22209

Adjudicatory File (2)
Atomic Safety and Licensing Board
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Atomic Safety and Licensing Board
Panel
Mail Stop: T-3F23
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Office of the Commission Appellate
Adjudication
Mail Stop: 16-G-15 OWFN
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Catherine L. Marco

Catherine L. Marco
Counsel for NRC Staff