- PDR

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FORM NRC-2
(7-77)
10 CFR 40

RECEIVED SEP 28 1982 U.S. NUCLEAR REGULATORY COMMISSION

Approved by GAO B10203

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

1 (Check one)
- [X] (a) New license
- [ ] (b) Amendment to License No. ______
- [ ] (c) Renewal of License No. ______
- [ ] (d) Previous License No. ______

2. NAME OF APPLICANT
Target Research, Inc.
A Subsidiary of Ferrulmatic, Inc.

3. PRINCIPAL BUSINESS ADDRESS
40 Oak Street
Dover, New Jersey 07801

4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
40 Oak Street, Dover, New Jersey 07801

5. NAME OF PERSON TO BE CONTACTED CONCERNING THIS APPLICATION
Robert C. Cumming

6. TELEPHONE NO. OF INDIVIDUAL NAMED IN ITEM 5
201-361-1995

7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED
Depleted uranium cores of armor piercing projectiles will be supplied to the licensee by others. Licensee will assemble the cores to other components of the projectiles and ship the end product to the U.S. Department of Defense.

8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE

(a) TYPE	(b) CHEMICAL FORM	(c) PHYSICAL FORM (Including % U or Th.)	(d) MAXIMUM AMOUNT AT ANY ONE TIME (kilograms)
NATURAL URANIUM			
URANIUM DEPLETED IN THE U-235 ISOTOPE	Depleted uranium alloy	> 99.8% U-238	6000
THORIUM (ISOTOPE)			

(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (kilograms)
6000

9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL RADIATION HAZARDS ASSOCIATED WITH EACH STEP OF THOSE PROCESSES

RECEIVED BY LFMB
Date 9/21/82
Log Sept. PG2 N.C.
By Brown
Orig. To
Action Compl. 9/22/82

DOCKETED USNRC SEP 28 1982 NMSS MAIL SECT. DOCKET CLERK

See attached description.

10. LIST THE NAMES AND ATTACH A RESUME OF THE TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE OF APPLICANT'S SUPERVISORY PERSONNEL AND THE PERSON RESPONSIBLE FOR THE RADIATION SAFETY PROGRAM (OR OF APPLICANT IF AN INDIVIDUAL)

See attached description.

11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9. INCLUDE (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment as appropriate. The description of radiation detection instruments should include the instrument characteristics such as type of radiation detected, window thickness, and the range(s) of each instrument).

Applicant
Check No. 213
Amount/Fee $140 2D
Type of Fee Application
Date Check Rec'd 9/21/82
Received By Brown

See attached description.

(b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE, INCLUDING AIR SAMPLING EQUIPMENT (for film badges, specify method of calibrating and processing, or name supplier).

See attached description.

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11(c) VENTILATION EQUIPMENT WHICH WILL BE USED IN OPERATIONS WHICH PRODUCE DUST, FUMES, MISTS, OR GASES, INCLUDING PLAN VIEW SHOWING TYPE AND LOCATION OF HOOD AND FILTERS, MINIMUM VELOCITIES MAINTAINED AT HOOD OPENINGS AND PROCEDURES FOR TESTING SUCH EQUIPMENT

See attached description.

12 DESCRIBE PROPOSED PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND PROPERTY AND RELATE THESE PROCEDURES TO THE OPERATIONS LISTED IN ITEM 9. INCLUDE: (a) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS, SUCH AS FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS

See attached description.

(b) EMERGENCY PROCEDURES IN THE EVENT OF ACCIDENTS WHICH MIGHT INVOLVE SOURCE MATERIAL.

See attached description.

(c) DETAILED DESCRIPTION OF RADIATION SURVEY PROGRAM AND PROCEDURES.

See attached description.

13 WASTE PRODUCTS: *If none will be generated, state "None" opposite (a), below. If waste products will be generated, check here* [X] *and explain on a supplemental sheet:*

(*a*) Quantity and type of radioactive waste that will be generated.

(*b*) Detailed procedures for waste disposal.

14 IF PRODUCTS FOR DISTRIBUTION TO THE GENERAL PUBLIC UNDER AN EXEMPTION CONTAINED IN 10 CFR 40 ARE TO BE MANUFACTURED, USE A SUPPLEMENTAL SHEET TO FURNISH A DETAILED DESCRIPTION OF THE PRODUCT, INCLUDING:

(*a*) PERCENT SOURCE MATERIAL IN THE PRODUCT AND ITS LOCATION IN THE PRODUCT.

(*b*) PHYSICAL DESCRIPTION OF THE PRODUCT INCLUDING CHARACTERISTICS, IF ANY, THAT WILL PREVENT INHALATION OR INGESTION OF SOURCE MATERIAL THAT MIGHT BE SEPARATED FROM THE PRODUCT.

(*c*) BETA AND BETA PLUS GAMMA RADIATION LEVELS (*Specify instrument used, date of calibration and calibration technique used*) AT THE SURFACE OF THE PRODUCT AND AT 12 INCHES.

(*d*) METHOD OF ASSURING THAT SOURCE MATERIAL CANNOT BE DISASSOCIATED FROM THE MANUFACTURED PRODUCT.

CERTIFICATE

(*This item must be completed by applicant*)

15 *The applicant, and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 40, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.*

BY [signature]
(Signature)

Dated September 14, 1982

Victor Guadagno
(*Print or type name*)

President, Target Research, Inc.
(*Title of certifying official authorized to act on behalf of the applicant*)

WARNING: 18 U.S.C. Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

Attachment to NRC-2 (September 17, 1982)

ITEM 9

General Description, Receipt to Disposal

Machined cores of armor-piercing projectiles weighing approximately 8-9 pounds each, will be received from our supplier. Pending assembly, they will be stored in one of two inner rooms in the Depleted Uranium (D.U.) Room which is itself a vault with a combination lock (see Exhibit A). Assembly of the cores with other components of the projectile will be accomplished in accordance with the procedures shown as Exhibit B to this attachment. During assembly and awaiting shipment the source material will be confined within the D.U. Room. The end product will be packaged and shipped in accordance with Title 10, Code of Federal Regulations, Part 71.

Hazard Evaluation

To the Public: Under credible circumstances the only hazard to the public that could occur from this operation would result from fire. Since uranium is pyrophoric, at high temperatures (greater than 2,000°F) a small fraction of uranium oxide, resulting from combustion, could become airborne in the event of a fire in or near the D.U. Room. The entire building, including the Target Research section, is protected by an overhead sprinkler system. The D.U. Room and the inner storage vaults are protected by a total of forty six (46) sprinkler heads. Instructions will be issued to the company staff and to the chief of the Dover Fire Company that in the event of a major fire involving the D.U. Room, any firefighter entering the D.U. area will wear a MSA Pressure Demand Air Mask, Model 401, a full facepiece, self-contained device which has NIOSH approval TC-13F-30, or equivalent. One of these devices will be stored at the D.U. Room entrance at all times for use in an emergency.

Experience has proven that this assembly operation results in no contamination hazard to the public. However to preclude the possibility of slightly contaminated paper used for table coverings and/or swipes reaching the public domain, movement of material from D.U. restricted area will be strictly controlled by adequate procedures, employee training, contamination surveys and supervisory follow-up. Radioactive waste receptacles will be provided; they will be distinctively painted yellow. Workers will be instructed to place all waste, known or suspected to be radioactively contaminated, into these receptacles. Radiation surveys of the area will include survey of the nonradioactive waste receptacles. Waste showing detectable activity at contact (open window GM survey meter having a wall thickness of $30 mg/cm^2$) will be placed in the radioactive waste receptacle and the offender(s) will be reinstructed in the required procedures. Radioactive waste will be collected and disposed of by a vendor licensed by the NRC.

To the Workers: There are two potential hazards to the worker; either may be effectively controlled by reasonable precautions. The first is excessive radiation exposure to the hands which can result if they are in direct contact with the alloy for too long a period. Since the beta radiation emitted by depleted uranium is easily attenuated by the non-radioactive assembly parts and since direct hand contact with the depleted uranium cores will be of short duration, hand exposure will be minimal. Experience in this assembly operation indicates the work can be conducted with no measureable hand exposure. The contact radiation dose rate for depleted uranium is reported to be 200 mrads/hour. However, until actual measurements prove otherwise, direct handling of the depleted uranium allow cores will be limited to 90 hours in any calendar quarters to ensure that the extremity limit of 18.75 rads is not exceeded.

The second potential hazard to the worker is ingestion. Some removable contamination may be present during the depleted uranium operation, therefore care must be taken to prevent ingestion. The wearing of protective apparel, coupled with hand washing before eating or smoking will prevent the possibility of ingesting depleted uranium. Experience has proven that very little removable contamination is associated with this depleted uranium assembly operation.

Inhalation of airborne depleted uranium contamination will not present a problem since there will be no physical (cutting-grinding) or chemical (welding-smelting) involved.

The uptake of depleted uranium by the body, either through inhalation or ingestion, is a hazard due to its chemical toxicity which is equivalent to lead.

Although the assembly operation will result in little contamination, levels will not be permitted to exceed 1,000 dpm/100 cm^2, fixed contamination, 500 dpm/100 cm^2 removable.

ITEM 10

Personnel who will be involved with this operation have had four years previous experience in handling depleted uranium (see resumes of the Radiation Safety Officer and his Deputy, shown as Exhibits C and D). The individuals involved as workers and supervisors are mature, intelligent, responsible people who have had extensive experience in the manufacture and assembly of quality, low-tolerance mechanoelectric products. Prior to receipt of the uranium, each employee authorized to enter the D.U. Room will have been given four hours of instruction and demonstration of radiation safety practices to be followed in the assembly operation described in this application. The training will be presented by a Certified Health Physicist. It will include the following subjects:

a) Chemotoxicity of uranium metal;
b) Physical and radiological characteristics of alpha, beta and gamma radiation (Transmission and Attenuation);
c) Mechanisms of biologic damage;
d) Limits of external and internal exposure of ALARA;
e) Units of radiation and radioactivity;
f) Radiological characteristics of uranium and its daughter products;
g) Demonstration and student participation in detection of radioactivity and measurement of radiation with a beta-gamma survey meter;
h) Contamination control procedures;
i) Decontamination of persons and equipment;
j) Disposal of radioactive waste;
k) Caution signs and labels;
l) Security of source material;
m) Emergency procedures (with emphasis on the pyrophoricity of uranium);
n) Provisions of Parts 19, 20 and 71;

ITEM 11

The Site

The operations described in this application will be confined to the D.U. Room shown in Exhibit A. The D.U. Room is a former storage vault having twelve-inch thick poured concrete walls and is located in the South-West corner of the basement of a large four-story brick and concrete factory building. The nearest homes are located approximately sixty feet away across a city street to the West. The room is bordered by a parking lot on the South, a loading bay on the East, and a basement corridor and general storage area on the North. The D.U. Room floor is located about six and one half feet below ground level and is adjoined by solid earth to this height on the East, South and West. Since it is not anticipated that D.U. will be stored or handled at greater than this height above the floor, this earth will provide shielding in addition to the twelve inch concrete walls. The floor immediately above the D.U. Room is occupied entirely by the offices and workshops of Target Research and separated by the five to eight-inch poured concrete ceiling of the D.U. Room.

The remainder of the building adjoining the Target Research area is occupied by a number of small businesses which primarily use the space for warehousing surplus electronic equipment and general merchandise.

Storage Facilities

As shown in Exhibit A.

General Safety Equipment

Gloves will be worn in all operations involving direct handling of the depleted uranium core. Cloth laboratory-type full-length smocks will be worn at all times by all occupants of the D.U. Room, except when all depleted uranium alloy is in storage and the room has been surveyed and determined to be free of contamination. If monitoring shows a beta-gamma count rate indicative of the presence of greater than 1000 dpm/100 cm^2, the contaminated smock(s) will be either discarded as radioactive waste or sent to an NRC licensed laundry.

No general or personal air sampling equipment, fume hoods or auxiliary shielding will be used. Extensive experience with similar operations conducted at Picatinny Arsenal (inspected by Charles E. Coner during the 1950-1960 period) has amply demonstrated that the airborne hazard in this type operation is negligible.

With respect to whole body exposure, the penetrating radiation from depleted uranium is almost entirely beta which is effectively attenuated by self-absorption and distance.

Ventilation

Concentrations of radon and its daughter products will be effectively and innocuously dispersed by adequate general building ventilation. The D.U. Room will be under negative pressure.

Respiratory Protection Program

As stated previously, a respiratory protective device (MSA Pressure Demand Air Masks) will be provided for firefighters in the event of a fire involving the D.U. Room. This device will be inspected by the plant safety officer during each scheduled fire inspection. He will test the device in accordance with Regulatory Guide 8.15 and take such remedial action as may be warranted.

Radiation Detection Instruments to be Used

Two (2) Eberline Model E-400 beta-gamma survey meters with probe Model HP-1776, coaxial cable, and audio speaker will be available within the D.U. Room. The range is 0-200 mR/hour. The tube wall is 30 mg/cm^2 stainless steel. It will be used for monitoring and surveying. Performance will be checked before each use in a test jig containing a generally licensed Co-60 sealed source; the instrument, newly calibrated, having fresh batteries. Instrument calibration will be performed and certified by an NRC Licensed Vendor at six month intervals. Since the depleted uranium will be in equilibrium with its daughters, its beta emmissions will be used for detecting surface contamination.

Description of Personnel Monitoring

No personnel monitoring of whole body will be used. However, finger rings will be worn by employees directly handling the depleted uranium cores until it has been established that extremity exposures are not likely to exceed 25 percent of the quarterly limit.

Fire Prevention

No explosives will be stored in or near the D.U. Room. All flammable liquids used in the D.U. Room will be contained in sealed cans. Accumulation of oily rags or other material susceptible to spontaneous combustion will not be permitted.

ITEM 12

Loss or Theft

In the event of a loss or theft of licensed material, the Radiation Safety Officer will be notified immediately. He will evaluate the circumstance and take the necessary action to meet the notification requirements of the NRC.

Emergency Procedures

The only emergency that could result in a significant radiological exposure is fire. In a major fire in which the temperature of the uranium was raised above 2000°F, it would burn like charcoal. A small fraction, approximately 5 percent of the combustion product, uranium oxide, would become airborne and present a radiation hazard to the fire fighters. To protect against this hazard the fire fighters will use the respiratory protective device available at the entrance to the D.U. Room.

Furnishings and equipment in the assembly area will not be positioned in such locations that the effectiveness of the overhead sprinklers is diminished.

In the event of a major fire in the D.U. Room the following emergency procedures will be followed:

a) Immediately evacuate the D.U. Room and the building in which the D.U. Room is located. If possible close all doors and shut down all ventilation systems in the D.U. Room.

b) Immediately notify the local fire department and inform them of the possible toxic nature of the fire.

c) Immediately notify the Radiation Safety Officer.

d) Shut down all plant ventilation systems in addition to those in the D.U. Room.

Surveys

Initally radiation surveys will be conducted once during each assembly day to ensure that contamination control procedures are effective. However, it is anticipated that experience will establish that weekly surveys will be more than adequate. A TLD will be placed in the D.U. Room and the adjacent unrestricted area having the highest dose rate. This will document the beta-gamma exposure rate in both restricted and unrestricted areas. The TLDs will be processed monthly. Upon receipt of depleted uranium cores a radiation survey will be conducted during the assembly operation to determine the maximum dose rates to which workers will be exposed.

ITEM 13

Swipes and bench covering paper showing detectable activity will be collected by an NRC licensed vendor.

D.U. ASSEMBLY AND STORAGE AREA
TARGET RESEARCH INC.

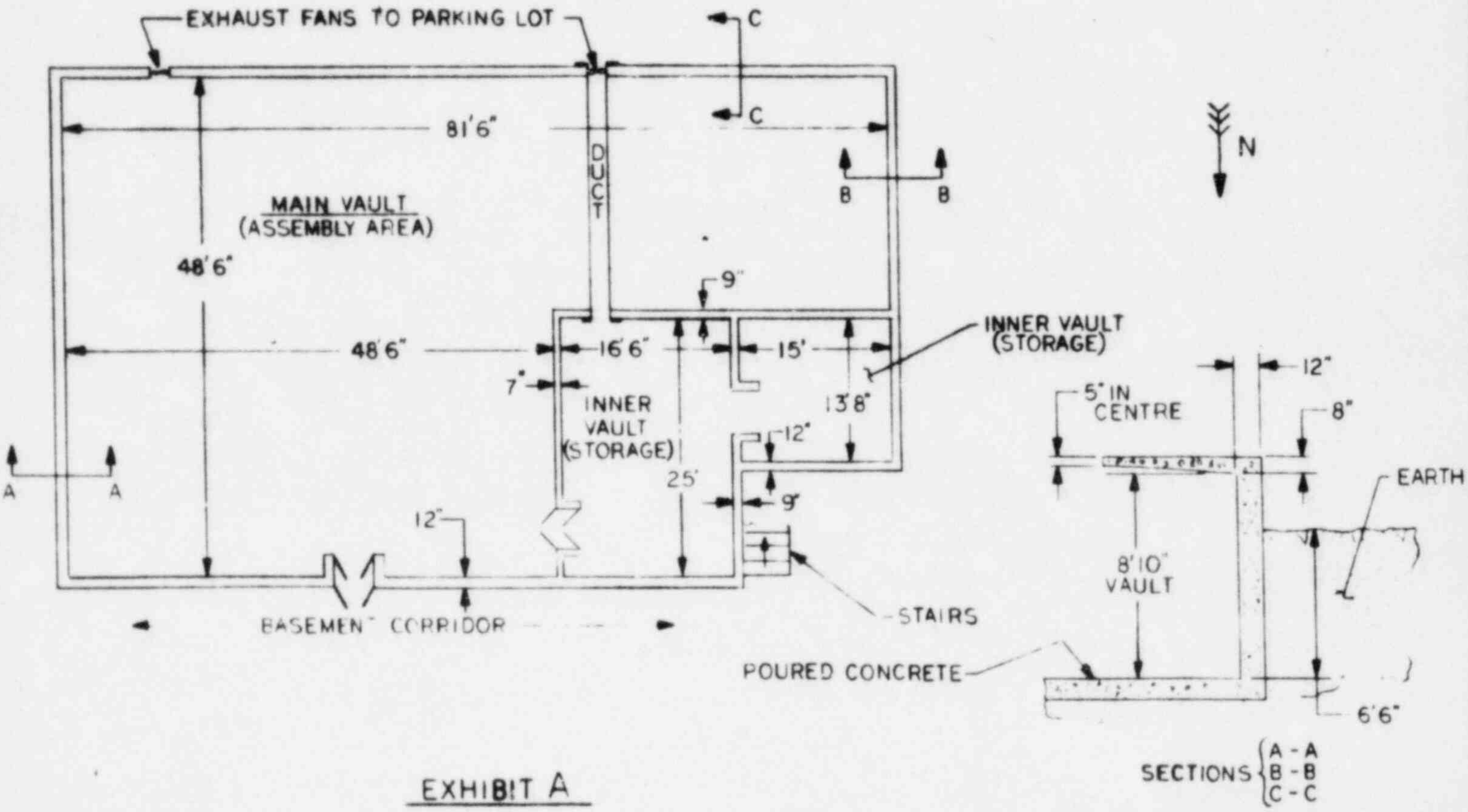

EXHIBIT A

EXHIBIT B

Assembly Procedures

for

Typical D.U. Core Projectiles

NOTE: This is a typical sequence of assembly for a discarding sabot projectile having a D.U. core. It is meant to present a general idea of the sort of handling the D.U. will undergo in the TRI operation. It is not intended to be an exact assembly procedure and does not go into exceptional detail as detailed procedures can and do change depending upon the particular projectile model being assembled.

1. Receive core from storage area. Check each core for unit identification number and maintain unit serial number at all times.

2. Receive wind shield and assemble to core. In some cases wind shield will be machined (turned) to a finished outside diameter after assembly to core but under no circumstances will the cutting tool be allowed to come in contact with the core.

3. Core and wind shield will be cleaned with acetone using a clean cloth wipe. Sabot segments will then be positioned around core ensuring that buttress grooves are engaged and the segments held in place with clamps.

4. A bourrelet ring, if required will be assembled to the front of the sabot. (Note: at this point about 75 to 80 percent of the core is encased in either the aluminum sabot or the wind shield. Thus from here on in the assembly procedure direct hand contact with the D.U. is minimal to nil).

5. The rear face of the sabot is cleaned with acetone and a cloth wipe in preparation for molding the JRTV silicone rubber aft seal. This area is then coated with a primer compound. The rubber-catalyst mix is

either made up and applied by hand or applied from a specially designed mixer-dispenser machine. A male mold is placed over the rear of the sabot and clamped over the seal using a nut which is torqued on to the rear fin thread on the core. At this point the projectile assembly is placed in a low temperature oven for a period of approximately two hours at a temperature of 250°F to cure the JRTV seal. It is then removed, allowed to cool, the mold is removed and the seal is trimmed with a razor if need be.

6. A sealing band and obturator which consist of two plastic (nylon) rings are preheated and snapped into an external groove in the sabot. In some cases the round is placed in a lathe for special grooving in the exterior of the obturator, however, in no case does the tool contact or even come near the D.U.

7. A fin is then assembled to the after thread on the core using a thread locking compound (at this point the core is 80 to 95 percent covered by aluminum components and molded rubber and the exposed D.U. is in areas which are normally not contacted in handling).

8. At this point the wind shield is painted black, lot numbers, etc. are applied to the sabot, final inspection is done and the round packed for shipment.

R E S U M E

ROBERT C. CUMMING

57 Union Street
Rockaway, New Jersey
07866

EXPERIENCE: Manager, Concepts and Analysis, Target Research, Inc. Dover, NJ

Development Engineer, Flinchbaugh Products, Wharton, NJ

Project Engineer, U.S. Army ARRADCOM, Dover, NJ

Experience consists of design, testing, development, and evaluation of anti-armor munitions, both tank and artillery fired fo the U.S. Army. Responsible for design and evaluation of both shaped charge and kinetic energy munitions in calibers ranging from 60mm to 155mm, including extensive experience with computer-aided design. Involved in development of ammunition for various systems including the M60 tank, Sheridan vehicle, XM1 tank, M109 Howitzer and the warhead for the Copperhead system. Current responsibilities include development of a new 105mm training projectile; stress analysis studies for various product development items, including the XM833, XM829 and a number of in-house programs acting as advisor to the Computer Numerical Control Machine Tool Department of the Flinchbaugh Product Development Center; and interior/terminal ballistics studies for various projectiles. Recently developed and put into use at Flinchbaugh Products a computer aided design program in the BASIC language for calculating physical properties of projectiles and projectile components. This included training other engineering personnel in the programs use. Also, some experience in Computerized Data Base Management and in test and evaluation procedures of K.E. and H.E.A.T ammunition. Kenetic Energy ammunition design included both tungsten and Depleted Uranium.

RADIOLOGICAL EXPERIENCE: As a product development engineer for Flinchbaugh, responsible for final assembly operations on XM833 and XM829 depleted uranium (D.U.) core projectiles, Mr. Cumming has had four years experience in the same sort of D.U. assembly to be conducted at Target Research. As an engineer on the above mentioned programs he worked closely with the company Radiation Safety Officer to ensure that all company safety and monitoring procedures for D.U. were strickly followed. In this capacity he attended an intensive radiological safety course given by radiation Management Corp. Philadelphia, Pa.

EXHIBIT C

ROBERT C. CUMMING

EDUCATION: B.E. Mechanical Engineering, Stevens Institute of Technology, Hoboken, NJ (Graduated June 1969); X-ray Diffraction Metallography Course, Ordnance Engineering (Propellants and Explosives), Stevens Institute of Technology, Hoboken, NJ; Metals Joining Technology Course, Brooklyn Polytechnic Institute, Brooklyn, NY; Computer Aided Design for Engineers, U.S. Army ARRADCOM, Dover, NJ; Tank Weaponry Course, Ft. Knox, KY; CNC Programming Course, Morris County Community College, Randolph, NJ; Course in Finite Element Computer Programs, Stevens Institute, Hoboken, NJ; Basic Radiological Safety, Radiation Management Corp., Philadelphia, PA.

R E S U M E

VICTOR GUADAGNO

440 West Shore Trail
Sparta, New Jersey
07871

EXPERIENCE:

Jan 1982 - Present	President, Target Research, Inc., Dover, NJ Responsible for overall management of Company, including engineering, analysis, design, manufacture, quality control and cost. Principle products are kinetic energy, chemical energy and target practice munitions, including XM829, XM833, XM815, M650, XM753 and similar programs.
Dec 1978 - Dec 1981	Vice President, Product Development Division, Flinchbaugh Products, Wharton, NJ Responsible for overall management of Product Development Division (reporting to the President) including design, engineering, program management, quality control and manufacturing of kinetic energy and target practice ammunition for U.S. Army and friendly foreign countries. Programs included 120mm XM827, XM829 and XM866; 105mm XM774, XM833, XM797, M489E1 and M735. Responsible for managing D.U. program within the Division.
Dec 1977 - Dec 1978	Manager, Product Development Division, Flinchbaugh Products, Wharton, NJ Responsibilities as listed above. Increased sales and the exceptional development of the group warranted the elevation from Manager to Vice President.
June 1957 - Dec 1977	Employed by the U.S. Army Research and Development Command (ARRADCOM), Dover, NJ Positions held in ascending order: - Engineering Aide - Project Engineer - Technical Liaison to U.S. Air Force - Program Management - Engineer Supervisor Experience consisted of management, design, development, testing and evaluation of major artillery and tank fired munitions including guided projectiles for the U.S. Army.

EXHIBIT D

EXPERIENCE: (Cont'd)

Programs included investigation of kinetic energy, high explosives, rocket assisted and shaped charge ammunition for the following calibers: 60mm, 75mm, 76mm, 90mm, 105mm, 120mm, 152mm, 155mm and 8 inch.

Responsibilities included overall management, coordination of various activities and directing the course of action of various development programs.

RADIOLOGICAL EXPERIENCE: As Vice President of Product Development at Flinchbaugh Products, Mr. Guadagno, for a period of four years, was responsible for the overall conduct of assembly operations in the D.U. room including being thouroughly familiar with, and enforcing radiation safety procedures in conjunction with the Radiation Safety Officer. The fact that extensive assembly operations were conducted at Flinchbaugh for four years under Mr. Guadagno's supervision without any serious radiological health or contamination incidents occurring, attests to his care and competence in this type of operation. Mr. Guadagno also, of course, received training in radiological safety from the Radiation Management Corp. in Philadelphia, Pa.

EDUCATION:

B.S., Industrial Engineering, New Jersey Institute of Technology, Newark, NJ

National Security Management, Industrial College of the Army

Field Artillery Course for Design Engineers, Ft. Sill, OK

Workshop for Middle Management, U.S. Army ARRADCOM, Dover, NJ

Tank Weaponry School, Ft. Knox, KY

Basic Radiological Safety, Radiation Management Corp. Philadelphia, PA

SPECIAL ACHIEVEMENTS:

Receipient of Picatinny Arsenal Research and Development Award for the development of an unique fuzing system for chemical energy projectiles.

Recipient of U.S. Army Research and Development Award for the development of a novel Sabot System for kinetic energy projectiles.

PERSONAL:

Married, 3 Children
Excellent Health