40-7102
PDR

SHIELDALLOY METALLURGICAL CORPORATION

WEST BOULEVARD
P.O. BOX 768
NEWFIELD, NJ 08344
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June 2, 1992

Mr. Yawar H. Faraz
Mail Stop 6H-3
Advanced Fuel & Special Facilities Section
Fuel Cycle Safety Branch
Division of Industrial & Medical Nuclear Safety
Office of Nuclear Material Safety & Safeguards
U. S. Nuclear Regulatory Commission, Region I
Washington, D.C. 20555

Certified Mail: P 040 188 486
Return Receipt Requested

Re: Application for Amendment and Renewal of Source Material License Number SMB-743

Dear Mr. Faraz:

As a result of a number of administrative and functional changes in the radiation protection program and your letter dated March 19, 1992, Shieldalloy Metallurgical Corporation (SMC) is requesting amendment and renewal of Source Material License Number SMB-743. Enclosed are two copies of NRC Form 313, "Application for Material License", plus attachments. This license renewal application supercedes previous license renewal applications dated June 19, 1985 and July 18, 1988.

In accordance with our telephone conversation of May 26, 1992, SMC understands that the renewal and amendment fee will be assessed and billed at a later date by the NRC.

If you have any questions, please contact me at the number shown above.

Sincerely,

for David R. Smith

Craig R. Rieman
Radiological Safety Manager

enclosures
cc (w/enc) Steven N. Rappaport
Michael A. Finn
Richard D. Way
David R. Smith
Jay E. Silberg, Esq.
Carol D. Berger
John Kinneman, USNRC-Reg. I

IFII

NRC FORM 313 (9-90)
10 CFR 30, 32, 33, 34, 35 and 40

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR MATERIAL LICENSE

APPROVED BY OMB NO. 3150-0120
EXPIRES 6-30-93

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 3.25 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0120), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATIONS FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY, NMSS
WASHINGTON, DC 20555

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS, IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIALS SAFETY SECTION B
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
NUCEAR MATERIALS SAFETY SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
NUCLEAR MATERIALS SAFETY SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTION.

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*

- [ ] A. NEW LICENSE
- [X] B. AMENDMENT TO LICENSE NUMBER SMB-743
- [X] C. RENEWAL OF LICENSE NUMBER SMB-743

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include Zip Code)*

Shieldalloy Metallurgical Corporation
West Boulevard
Post Office Box 768
Newfield, New Jersey 08344

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED.

Same as 2, above.

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Craig R. Rieman, Radiological Safety Manager

TELEPHONE NUMBER: (609) 692-4200

SUBMIT ITEMS 5 THROUGH 11 ON 8½ x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time. Attachment 1

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED. Attachment 1

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE. Attachment 2

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS. Attachment 3

9. FACILITIES AND EQUIPMENT. Attachment 4

10. RADIATION SAFETY PROGRAM. Attachment 5

11. WASTE MANAGEMENT. Attachment 6

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*
FEE CATEGORY: 2A
AMOUNT ENCLOSED: $

13. CERTIFICATION. *(Must be completed by applicant)* THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN, IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

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.

SIGNATURE–CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
Richard D. Smith	Richard D. Way	Sr. Vice President, Manufacturing	05/30/92

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS

AMOUNT RECEIVED	CHECK NUMBER

APPROVED BY

DATE

ATTACHMENTS TO APPLICATION FOR RADIOACTIVE MATERIAL LICENSE AMENDMENT AND LICENSE RENEWAL

Shieldalloy Metallurgical Corporation
West Boulevard
Post Office Box 768
Newfield, New Jersey 08344

USNRC License No. SMB-743
June 2, 1992

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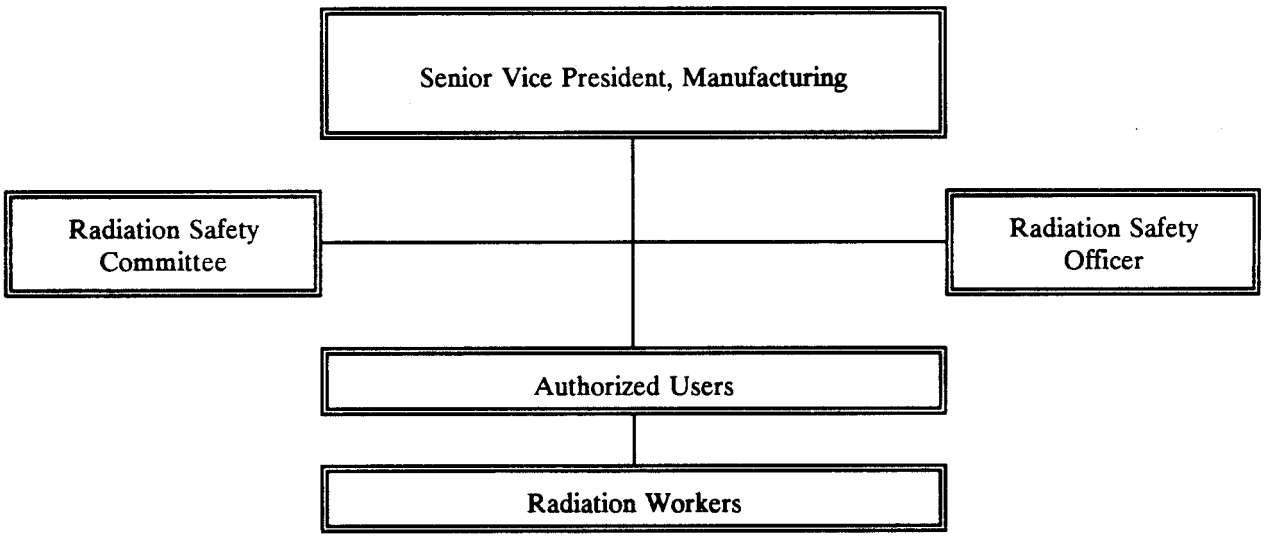
ATTACHMENT 2: RADIATION SAFETY PROGRAM ORGANIZATION (Item 7)

Figure 1, below, shows the radiation protection organization for SMC's Newfield, New Jersey facility:

FIGURE 1: RADIATION SAFETY ORGANIZATION



The Radiation Safety Officer (RSO) for SMC is Mr. Craig R. Rieman while the Alternate RSO is Mr. James P. Valenti. The RSO and ARSO have sufficient experience and training to implement the elements of the Radiation Protection Program described in Attachment 5. Current resumes for Mr. Rieman and Mr. Valenti showing their experience in working with various sources of radioactivity are found in Attachment 7. Table 2 contains a summary of Mr. Rieman's training and experience.

TABLE 2: TRAINING RECEIVED BY THE RSO FOR SMC

Where Trained	Year	Duration of Training	Type of Training
Susquehanna University	1977 - 1981	4 years	BS degree Business Administration
TMA/Eberline	1987 - 1989	2 years	On-the-job
ENSR Consulting and Engineering	1989 - 1991	2 years	On-the-job
SMC	1991 - Present	1 year	On-the-job
Salem Community College	1991 - Present	1 year	A.A.S. in Nuclear Engineering Technology/Radiation Protection

The types of training received by the RSO and ARSO includes, but is not limited to, the principles and practice of radiation protection, radioactivity measurement, standardization, monitoring techniques, instrumentation, mathematics basic to the use and measurement of radioactivity, and biological effects of radiation.

The Radiation Safety Committee (RSC) at SMC is responsible for reviewing and approving the elements of the radiation protection program and for assessing compliance with USNRC license requirements. The RSC also approves Standard Operating Procedures for implementation of the radiation protection program, approves all operations involving the use of radioactive materials, and confirms that all activities are performed safely and in a manner which protects health and minimizes hazards to life, property, and the environment. The RSO is a permanent member of the RSC. Table 3 shows the current make-up of the RSC which may change with personnel turnover.

TABLE 3: MEMBERS OF THE RADIATION SAFETY COMMITTEE

Position	Individual	Title
Chairman	David R. Smith	Director of Environmental Services
Secretary	Craig R. Rieman	Radiation Safety Officer
Member	Knud Clausen	Superintendent of Electric Smelting
Member	James P. Valenti	ARSO/Environmental Manager
Member	William J. Grabus	Safety, Training Personnel Manager

Licensed radioactive materials will only be used by, or under the direct supervision of an authorized user. Authorized users should have sufficient training to assure safe handling and continuous compliance with all regulations and USNRC license requirements. Attachment 5 contains a description of the training requirements for Authorized Users at SMC.

ATTACHMENT 3: TRAINING FOR INDIVIDUALS WHO WORK IN OR FREQUENT THE CONTROLLED AREA

All personnel employed by SMC receive a basic radiation safety orientation. In addition, those personnel with the potential to receive greater than 100 millirem Total Effective Dose Equivalent (TEDE) in one calendar year are trained in the fundamentals of ionizing radiation, basic radiation control practices, applicable site health physics procedures, risks from exposure to ionizing radiation, and emergency procedures. Finally, those personnel who have been granted the authority to supervise the use of radioactive materials (e.g., Authorized Users) receive additional training to assure source material is used for its intended purpose and in a manner that protects health and minimizes danger to life and property. A description of the three radiation safety training programs is contained in the Radiation Protection Program Plan (Attachment 5).

ATTACHMENT 4: FACILITIES AND EQUIPMENT (Item 9)

SMC operates a manufacturing facility in Newfield, New Jersey. This facility manufactures or has manufactured additives for specialty steels and super alloys, primarily aluminum master alloys, refractory and metal carbides, powdered metals, and optical surfacing products. Raw materials currently used at the facility include oxides of columbium (niobium), aluminum metal, titanium metal, strontium metal, zirconium metal, vanadium metal, and fluoride (titanium and boron) salts.

SMC currently produces three types of metal alloy using source material. These alloys are produced from a metaliferous ore, called pyrochlore, by conventional electrolytical or aluminothermic smelting techniques. The ore contains natural uranium in the form or uranium oxide, U_3O_8 and natural thorium in the form of thorium oxide, ThO_2. The pyrochlore used in the process is received and temporarily stored in Warehouse D203(A) before being transferred to processing facilities D102 and/or D111, see Figure 2. Pyrochlore exists in the solid phase and is received at the facility in a powdered form contained in woven polypropylene bags referred to as supersacks. Pyrochlore ore is used for the production of three products, ferrocolumbium standard, ferrocolumbium high ratio, and columbium nickel technical grade. The processing activities of source material take place in the restricted areas of D102 and/or D111.

The ferrocolumbium production department, D111, is equipped with a dust collection system which is provided by the collaboration of two distinct filter systems. The American Air Filter (AAF) system, installed by SMC in 1966, is designed to draw 125,000 cfm in addition to the Flex-Kleen system, installed in 1987, which can draw 200,000 cfm. Pulsed air jets in the Flex-Kleen baghouse and reverse air jets in the AAF baghouse remove the dust from

the fabric, and the baghouse dust is conveyed via a series of screw conveyors and conveying ducts to a silo for temporary storage. Figure 3 is a schematic drawing of the dust collection system in the ferrocolumbium production department.

The slag material produced as part of the smelting operation, along with the collected dusts, are stored on-site in the Source Material Storage Yard. Greater than 99% of the radioactive species in the ores remain in the slag material and baghouse dusts. The following activities involving licensed materials may be performed by SMC:

- Acquisition of pyrochlore ores containing source material
- Storage of pyrochlore ores, bag-house dusts, slag, and other waste materials containing source material
- Transport of source materials within the SMC "controlled area"
- Production of ferrocolumbium alloys by a smelting process which requires the use of ores containing source materials
- Shipment off-site of pyrochlore ores, bag-house dusts, slag, and other waste materials containing source material
- Transfer of small quantities of pyrochlore ores, bag-house dusts, slag, and other waste materials containing source material to the SMC analytical laboratory (within the "controlled area") for performance of in-house quality control and testing procedures

Figure 2 shows the SMC site plan, wherein several buildings (departments) of the facility are designated for storage and/or use of source material. The intent is to use radioactive materials in any of these designated departments, as necessary, to accommodate the current workload. These areas are referred to as "restricted areas". The property boundaries are the limits of the "controlled area".

SMC is equipped with various types of portable radiation detection instruments. These presently include the instruments listed in Table 4. All radiation detection instrumentation in the active inventory are maintained and calibrated as specified in the Radiation Protection Program Plan (Attachment 5).

FIGURE 2: SMC SITE PLAN

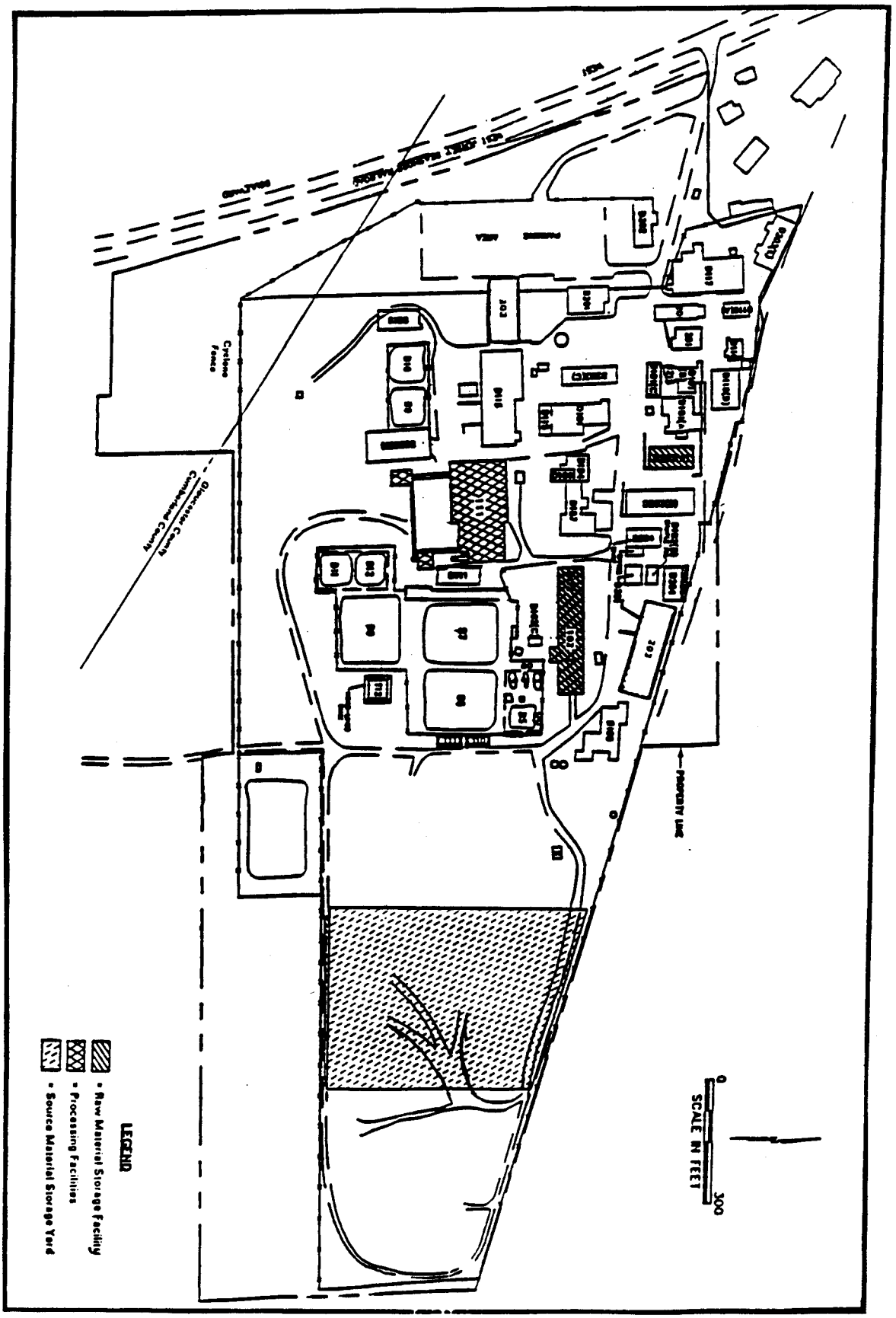


FIGURE 3: DUST COLLECTION SYSTEM FOR FERROCOLUMBIUM PRODUCTION

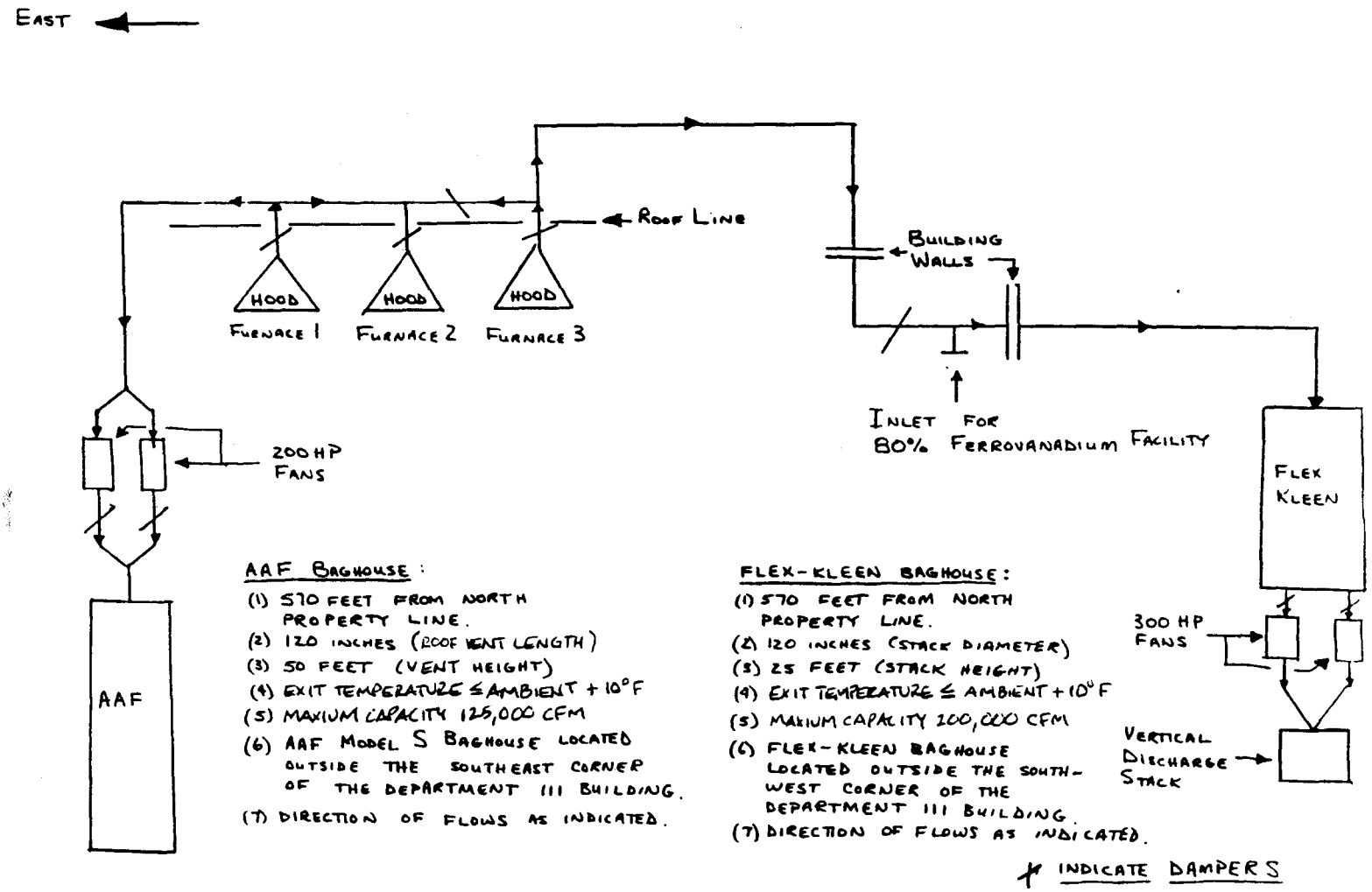


TABLE 4: SMC RADIATION DETECTION INSTRUMENTS

Detector Type	MFG	Model	SN
Rate Meter	Victoreen	492	4888
Survey Meter	Victoreen	490	5279
Ion Chamber	Victoreen	450P	195
Gamma Scint Probe	Victoreen	489-55	860428-3
Survey Meter	Bicron	Analyst	A004Q
Survey Meter	Bicron	Analyst	A605Q
Gamma Scint Probe	Bicron	G2	A119W
Alpha Scint Probe	Eberline	AC-3	407083(39)
Alpha Scint Probe	Eberline	AC-3	407083(37)
GM	Eberline	HP-210	705797
GM	Eberline	HP-210	705796
Gamma Scint Probe	Eberline	SPA-3	408462 #12
Survey Meter	Eberline	ESP-1	3047
Survey Meter	Eberline	ESP-1	3049
Rate/Scaler Meter	Eberline	SRM-100	314
Rate/Scaler Meter	Eberline	SRM-100	313
Alpha Scint Counter	Eberline	SAC-4	868
Pressurized Ion Chamber	Rueter Stokes	RSS-112-199mR	G-8250
Air Samplers	Eberline	RAS-1	1, 2, 3

ATTACHMENT 5: RADIATION PROTECTION PROGRAM PLAN (Item 10)

GLOSSARY

Airborne Radioactive Material	Radioactive material dispersed in the air in the form of dusts, fumes, particulates, mists, vapors, or gases.
ALARA	Acronym for "As Low As Is Reasonably Achievable"; a basic concept of radiation protection that specifies that radioactive exposures should be maintained as low as reasonable achievable (ALARA) taking into account technological, economical, and societed considerations.
Authorized User	Employees who supervise the use of source material and who supervise individuals who work with source materi al. Authorized users are qualified, by training and experience, to assure source material is used for its intended purpose in a manner that protects health and minimizes danger to life or property.
Committed Effective Dose Equivalent (CEDE)	The effective dose equivalent committed for a 50-year period following an acute intake or onset of chronic intake. It does not include contributions from external dose.
Contamination	The deposition of unwanted radioactive material on the surfaces of structures, areas, objects, or personnel.
Contamination Zone	Specific locations within restricted areas which have limited access due to the presence of contamination in excess of the release criteria.
Controlled Area	The area within the site (property) boundaries.

Dosimeter	A portable instrument or device for measuring and registering the total accumulated exposure to ionizing radiation.
General Employee	Any employee, visitor, or contractor who is permitted unescorted access to the controlled area.
Escorted personnel	Employees, visitors, or contractors who have not received training in radiation protection. These individuals are under the direct supervision of a trained employee while they are within the controlled area.
Health Physics	A science and profession devoted to the protection of man and his environment from unnecessary radiation exposure.
Health Physics Personnel	Personnel who perform radiation protection functions such as release surveys, personnel dosimeter distribution, radiation protection records maintenance, and quality assurance activities as they pertain to radiation protection. Health physics personnel includes the RSO and the assistant RSO.
Monitored Employee	An employee who has been issued a dosimeter for monitoring external radiation exposure, and/or who participates in the internal radiation monitoring program.
Restricted Area	Areas within the controlled area with limited access for purposes of controlling exposure of individuals to radiation and radioactive materials. Contamination zones are within restricted areas.

Radiation	Particles or photons emitted from the nucleus of a radioactive atom as a result of radioactive decay.
Radiation-producing Machine	A machine that generates radiation without the presence of radioactive material. Examples are medical x-ray machines and linear accelerators.
Radiation Safety Officer (RSO)	An individual who, by virtue of qualifications and experience, has been given the authority to implement the Radiation Protection Program Plan. The RSO is qualified to use source material for its intended purpose in a manner that protects health and minimizes danger to life or property. The RSO is responsible for recognizing potential radiological hazards, developing a radiation safety program to protect against these hazards, training workers in safe work practices, and supervising day-to-day radiation safety operations.
Radiation Worker	An employee, visitor or contractor with the potential to receive in excess of 100 millirem TEDE within one calendar year.
Radioactive Waste	Solid, liquid and gaseous materials from operations that are radioactive or become radioactive and for which there is no further use.
Radioactivity	The property of certain nuclides of spontaneously emitting particles or gamma radiation or of emitting X radiation following orbital electron capture or of undergoing spontaneous fission.

Release Limits	A limit on the amount of radioactive contamination that may be present on people or equipment leaving a controlled or restricted area.
Source Material	Uranium or thorium or any combination of uranium or thorium in any physical or chemical form; or ores that contain, by weight, 0.05 percent or more of uranium, thorium, or any combination of uranium and thorium. Source material does not include special nuclear material.
Total Effective Dose Equivalent (TEDE)	The sum of the deep dose equivalent for external exposures and the CEDE for internal exposures.
USNRC	Acronym for "United States Nuclear Regulatory Commission," a federal regulatory agency.

INTRODUCTION

Employees of and visitors to Shieldalloy Metallurgical Corporation (SMC) face a number of potential hazards. While these hazards cannot be eliminated entirely, they can be minimized through development and implementation of prudent safety practices. Exposure to ionizing radiation is one such hazard.

The management of SMC is committed to assuring a safe work environment for all employees, and to protection of facilities, the environment, and members of the general public from the potentially-harmful effects of radiation. The basic policy of SMC, in regard to radiation exposure and to control of radioactive materials is summarized in the following four statements:

- Personnel will not be exposed to ionizing radiation without there being a demonstrable need for the activity that causes the exposure.
- Radiation exposures will be maintained as low as is reasonably achievable (ALARA) in light of economic impacts.
- Radiation exposure limits for personnel and members of the general public, as promulgated by the U. S. Nuclear Regulatory Commission (USNRC) in Title 10, Code of Federal Regulations, Part 20, *Standards for Protection Against Radiation*, will not be exceeded.
- Control measures instituted to maintain radiation exposures ALARA will not increase an individual's risk of harm from other non-radiological hazards.

The primary purpose of the SMC policy on radiological protection is to minimize the total risk of harm or injury incurred by personnel as a result of on-going operations. However, this goal is only achievable if each SMC employee, visitor, and contractor

assumes some responsibility for ensuring radiological safety at the facilities by integrating the four statements of basic policy into all aspects of SMC operations.

To aid in this action, this Radiation Protection Program Plan has been developed to guide generation and implementation of SMC Standard Operating Procedures for radiation protection. The following sections contain a description of the radiation protection program elements. These sections, along with the four statements of basic policy presented above, describe the SMC radiation protection program.

RADIATION PROTECTION ORGANIZATION AND ADMINISTRATION

Overall control and authority for radiological protection at SMC shall rest with the Senior Vice President of Manufacturing (Sr. Vice President). The responsibility of the Sr. Vice President with respect to radiation protection includes, but is not limited to, the following:

- Determine SMC policy and amend this Radiation Protection Program Plan accordingly;
- Assure that the capability of SMC radiation protection services are sufficient to meet programmatic requirements;
- Make the contents of this Radiation Protection Program Plan available to employees upon request; and
- Communicate the contents of this Radiation Protection Program Plan in formal training programs.

The Sr. Vice President has designated the authority for implementation of the radiation protection program described herein to a Radiation Safety Officer (RSO). The RSO is responsible for recommending the type and quantity of health physics staff and resources necessary for full implementation of the radiation protection program. All health physics personnel at SMC facilities shall report, administratively, to the RSO and shall perform radiation protection activities as assigned by the RSO.[1] Other responsibilities and authority of the RSO include the following, as necessary:

[1] In certain circumstances, functions may be performed by contractors to Shieldalloy or other properly trained/qualified technical personnel. However, the responsibility for ensuring that personnel at Shieldalloy facilities are protected from radiation hazards remains with the RSO.

- Maintain supervision and surveillance over all activities involving radioactive material and radiation-producing machines;
- Ascertain compliance with rules and regulations, license conditions, and the guidelines approved and specified by the SMC Radiation Safety Committee (RSC);
- Monitor and maintain equipment associated with the use, storage, and disposal of radioactive material and radiation-producing machines;
- Provide consultation on all aspects of radiation protection to personnel at all levels of responsibility;
- Monitor the receipt and opening of all shipments of radioactive materials received, as well as the packaging and shipping of radioactive materials;
- Administer and coordinate the distribution of personnel and area dosimeters and the bioassay program;
- Maintain personnel/area monitoring and bioassay records, notify personnel and management of exposures approaching maximum permissible limits, recommend appropriate corrective action, and evaluate exposures reported by contract dosimetry services;
- Perform an investigation in cases of apparent overexposure to radiation or radioactive materials;
- Coordinate or conduct training programs and instruction in the acceptable methods for the use of radioactive materials and radiation-producing machines;
- Provide refresher training as appropriate (e.g., changes in procedures, equipment, regulation);
- Monitor the storage of all radioactive materials, including wastes;
- Monitor and coordinate the disposal of radioactive waste; and
- Supervise the maintenance of the radioactive materials inventory to assure continued compliance with the possession limits specified in the USNRC licenses.

The SMC Radiation Safety Committee (RSC), comprised of the RSO, the Director of Environmental Services, and selected operational managers, provides oversight for the radiation protection program. The RSC is responsible for review and approval of all elements of the radiation protection program and for assessing compliance with USNRC license requirements. The RSC is also responsible for confirming that all activities are performed safely and in a manner that will protect health and minimize hazards to life, property, and the environment. Other responsibilities of the RSC include the following:

- Monitor compliance with Standard Operating Procedures for radiation protection;
- Review Standard Operating Procedures for currency and adequacy, recommending revisions as appropriate;
- Approve the procurement of licensable radioactive materials and radiation-producing machines;
- Review unusual incidents involving radioactive materials or radiation-producing machines and provide recommendations on how their recurrence shall be prevented; and
- Complete safety evaluations of all proposed uses of radioactive material or radiation-producing machines.

STOP WORK AUTHORITY

The RSO shall have the responsibility and authority to suspend any SMC work activities that do or may violate regulatory or SMC requirements for radiological protection. Specific work activities shall be permitted to proceed to a safe condition after issuance of the stop-work order. Stop-work orders shall be lifted by the RSO after the initiating conditions have been alleviated. A procedure for the use of stop-work orders shall be prepared and distributed to health physics and operations personnel.

TRAINING IN RADIATION PROTECTION

All personnel with unescorted access to the restricted areas of SMC facilities shall be trained in radiation protection in accordance with Title 10, Code of Federal Regulations, Part 19, "Notices, Instructions, and Reports to Workers; Inspections". Four types of training are conducted, General Employee Training (GET), Radiation Worker Training, Authorized User Training, and/or special briefings. The level of training required shall be determined by the RSO, with selection criteria contained in a Standard Operating Procedure.

All forms of training shall be updated on a planned and periodic basis. Training records shall be maintained by the SMC Department of Personnel. These records shall include attendance sheets, results of proficiency examinations, if required and course lesson plans.

General Employee Training

GET is designed to provide a general awareness of SMC radiation protection practices to all employees who are permitted unescorted access to the SMC controlled area, but who are not considered to be radiation workers. GET consists of classroom training in the following topics:

- The risk of low-level occupational radiation exposure;
- The risk of pre-natal radiation exposure;
- Basic radiation protection concepts;
- U. S. Nuclear Regulatory Commission and SMC radiation protection policies and procedures;

- Employee and management responsibilities for radiation safety;
- Identification of radiological postings, barriers, labels, boundary control stations, and monitors; and
- Emergency procedures.

Radiation Worker Training

Radiation Worker Training is intended to impart comprehensive knowledge of radiation protection activities at SMC. Radiation Worker Training shall be provided to any individual with the potential to receive in excess of 100 millirem Total Effective Dose Equivalent (TEDE) in one calendar year. Radiation worker training consists of classroom training in all or some combination of the following topics:

- Radioactivity and radioactive decay;
- Characteristics of ionizing radiation;
- Man-made radiation sources;
- Acute effects of exposure to radiation;
- Risks associated with occupational radiation exposures;
- Special considerations in the exposure of women of reproductive age;
- Dose equivalent limits;
- Modes of exposure (internal and external);
- Dose equivalent determinations;
- Basic protection measures (time, distance, shielding);
- Specific SMC procedures for maintaining exposures as low as is reasonably achievable;
- Radiation survey instrumentation, calibration, and limitations;

- Contamination control, including the use of protective clothing and equipment, and work place design;
- Personnel decontamination;
- Emergency procedures;
- Warning signs, labels, barriers, and alarms;
- Responsibilities of employees and management;
- Interactions with the RSO and other radiation protection personnel;
- Operational procedures associated with specific job assignments.

Authorized User Training

In addition to GET, advanced training in radiation protection shall be provided to Authorized Users of radioactive materials. Authorized User training consists of classroom, site-specific and on-the-job training, as well as a detailed briefing on the contents of all Standard Operating Procedures for radiation protection.

Special Briefings

Special briefings shall be required for those personnel involved in work activities associated with a significant radiological hazard and/or with non-standard operational conditions. The need for special briefings shall be specified on Radiation Work Permits or when determined by the RSO.

TRAINING AND QUALIFICATIONS OF RADIATION PROTECTION PERSONNEL

Health physics personnel at SMC facilities shall be qualified by training and experience to use radioactive material and radiation-producing machines in a manner that protects health and minimizes danger to life or property. The RSO shall be qualified to recognize potential hazards, develop a radiation safety program to protect against these hazards, train workers in safe work practices and supervise day-to-day radiation safety operations. The RSO shall have an Associates degree (or equivalent) in a scientific field, and shall have completed course work and/or have experience with the following:

- Principles and practices of radiation protection;
- Radioactivity measurements, monitoring techniques, and the use of instruments;
- Mathematics and calculations basic to the use and measurement of radioactivity;
- Biological effects of radiation;
- Safety practices applicable to protection from the radiation, chemical toxicity, and other properties of the radioactive materials in use at SMC facilities;
- Conducting radiological surveys and evaluating results;
- Evaluating radioactive material processing facilities for proper operations from a radiological safety standpoint; and
- Familiarity with applicable USNRC, U. S. Environmental Protection Agency (USEPA), and State regulations, as well as the terms and conditions of licenses and permits issued to SMC by these agencies.

Training of other health physics personnel shall be conducted by the RSO through practical demonstration, classroom instruction, and/or on-the-job training in the items listed on a Performance Verification Sheet (PVS). When the RSO is confident that the employee is knowledgeable of a subject/task, he/she will sign the PVS for the appropriate subject.

Standard Operating Procedures in radiation protection shall be reviewed by health physics personnel on a planned and periodic basis. Documentation of the procedure review shall be maintained for each individual.

RADIATION EXPOSURE CONTROL

External Exposure Limits

External exposure limits for SMC employees, visitors and contractors shall be consistent with those established by the USNRC in 10 CFR 20.1201. Administrative exposure limits for SMC employees, visitors, and contractors shall be 10% of the applicable regulatory limit. Annual external exposure limits for minors shall not exceed the limits shown in 10 CFR 20.1207.

Exposure of the Unborn

Exposure limits for the unborn child shall not exceed those established by the USNRC in 10 CFR 20.1208 for the entire gestation period.[2] All employees shall be informed of the potential effects that may result to an embryo-fetus at low exposure levels. Employees shall be encouraged to notify the Human Resources Director regarding suspected or confirmed pregnancies. An evaluation shall be performed by the RSO to determine the potential for the employee to exceed the regulatory exposure limit during the nine month gestation period. Employees may request a transfer to a different job assignment during the pregnancy pursuant to the SMC Employee Guidelines.

External Exposure Monitoring

All individuals permitted unescorted access to controlled areas at SMC and with the potential to receive greater than 25 percent of the limits specified in 10 CFR 20.1201, shall be assigned a whole body personnel dosimeter to wear while on site. Operators of x-ray-producing machines at the Newfield, New Jersey site shall wear extremity dosimeters while

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[2] The dose to an embryo or fetus shall be taken as the sum of the deep-dose equivalent to the declared pregnant woman, and the dose to the embryo or fetus from radionuclides incorporated in the embryo or fetus.

operating these devices, as required in New Jersey Administrative Code 7:28-21.6 (3). Processors of personnel dosimeters shall be accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).[3]

Internal Exposure Limits

Internal exposure limits for SMC employees, visitors and contractors shall be consistent with those established by the U. S. Nuclear Regulatory Commission in 10 CFR 20.1201. Administrative limits for intakes by SMC employees, visitors, and contractors shall not exceed 10% of the regulatory limits, however the basic policy of SMC is that all internal exposures are preventable.

Internal Exposure Monitoring

SMC personnel shall participate in a program of internal radiation monitoring whenever required by radiological conditions or by the provisions of 10 CFR 20.1502. Internal radiation monitoring, consisting of indirect and/or direct bioassay, shall also be performed whenever an administrative limit may have been exceeded, a nasal smear reveals the presence of detectable radioactivity, on a random basis to verify the adequacy of exposure control methods, and whenever requested by a SMC employee who has been assigned to a routine internal radiation monitoring program. Monitoring methodologies and frequencies shall be appropriate for detecting the types and quantities of radioactive materials in use by the employee, and shall be determined by the RSO.

Dose Assessment

Total Effective Dose Equivalent (TEDE), which is the sum of the effective dose equivalent from external sources and the committed effective dose equivalent (CEDE), shall be assessed at least annually for each SMC employee or visitor who participates in an

[3] NVLAP Performance Criteria are not provided for extremity dosimeters.

internal or external radiation monitoring program. Internal radiation doses shall be reported as CEDE, and shall be assigned in the year in which the dose was received.[4]

Airborne Radiation Monitoring

An airborne radiation monitoring program shall be maintained if required by radiological conditions. The airborne radiation monitoring program shall be administered by the RSO, who shall also determine the extent and type of sampling required for each radiological condition. Results of the air monitoring program may be used for assignment of CEDE in place of or in addition to internal radiation monitoring.

Ambient Radiation Monitoring

Area dosimeters shall be deployed, at the discretion of the RSO, for purposes of characterizing the ambient radiological hazard. Area dosimeters shall be exchanged on a planned and periodic basis, with results reviewed by the RSO. Processors of area dosimeters shall be accredited by NVLAP. The results of the area dosimetry program may be used for assignment of external effective dose equivalent in place of, or in addition to personnel dosimeters.

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[4] Committed doses to individual organs and/or annual doses may also be maintained, at the discretion of the RSO.

ALARA PROGRAM

While occupational radiation exposures incurred by employees of or visitors to SMC facilities are historically low, all exposures shall be assumed to entail some risk. Therefore, the following three principles to govern all work activities with the potential for exposure to radiation or radioactive materials shall be adopted:

- No activity or operation shall be conducted at SMC facilities unless its performance will produce a net positive benefit.
- All radiation exposures shall be maintained as low as reasonable (ALARA) taking into account technological, economic and societal considerations.
- No individual shall receive radiation doses in excess of federal or administrative limits.

This ALARA principal is the basis for much of SMC's radiation protection program, particularly for the following program elements:

- Policy and management commitment
- Organization and responsibilities
- Administrative exposure control levels
- Training
- Plans and procedures
- Internal audits
- Methodology for cost/benefit optimization

- Radiological design review
- Radiological work planning
- Records

Periodically, the RSC shall establish radiological goals to direct all levels of management and workers at SMC toward improvement in radiological performance. Typical quantitative goals may include, as applicable:

- Annual collective dose for all SMC personnel;
- Annual collective dose for radiation workers;
- Maximum individual dose;
- Number of individuals with confirmed intakes of radioactive material;
- Number of individuals that became externally contaminated;
- Number of contamination incidents;
- Square footage of contaminated areas; and/or
- Number of radiological incident reports;

The following steps for establishing a goal shall be included in the goal setting process:

- The RSC, with assistance from the RSO, decides which areas need improvement;
- The RSC evaluates the existing condition(s), root cause(s), and corrective action(s);
- The RSC determines the improvement needed and proposes the goal;

- The RSC presents the goal to the Sr. Vice President for approval and assigns responsibility to an appropriate operations manager or supervisor to develop and implement action plans; and

- The RSC periodically reviews performance in achieving the goal and modifies the action plan, if necessary.

The RSO shall document radiological goals, their status, and performance.

CONTAMINATION CONTROL

SMC shall adopt specific contamination limits for source materials which may exist on equipment and surfaces located in the controlled area, and in "contamination zones". Contamination surveys shall be performed periodically to confirm that concentrations of source materials in unrestricted areas satisfy the contamination limits shown below.

The extent of contamination zones shall be clearly defined and may include, but are not limited to, source material storage areas, certain process areas, or hood areas. Contamination zones shall be located inside restricted areas. Temporary contamination zones may be established by the RSO in order to minimize the spread of contamination.

Loose Contamination Limits

Loose radioactive contamination shall be maintained at concentrations that are as low as reasonably achievable (ALARA). Areas where loose contamination is detected shall be classified as follows:

- Unrestricted Areas: Less than 200 dpm per 100 cm^2 above background.
- Contamination Zones within Restricted Areas: Greater than 200 dpm per 100 cm^2 above background.

Loose contamination shall be measured with dry disc smears wiped over a suspect surface area of at least 100 cm^2 and counted in an appropriate counting device.

Fixed Contamination Limits

Fixed radioactive contamination shall be maintained at concentrations that are as low as reasonably achievable (ALARA). Areas where fixed contamination is detected shall be classified as follows:

- Unrestricted Areas: Less than 3000 dpm per 100 cm^2 detected by direct survey.
- Contamination Zones within Restricted Areas: Greater than 3000 dpm per 100 cm^2 above background.

Fixed contamination shall be measured by direct survey with portable radiation survey instruments sensitive to the applicable radiation type.

Decontamination

Contamination found in excess of the stated limits for unrestricted areas shall be decontaminated to acceptable limits. Access to the area shall be restricted until the decontamination can be completed. Decontamination methods and correct area postings shall be determined and implemented by the RSO. Material and/or equipment that cannot be decontaminated below the specified limits shall be properly protected and stored.

Control of Work in Contamination Zones

Work with radioactive materials shall be planned in advance to minimize the potential for spread of contamination. Work personnel shall assure that all necessary materials and equipment are readily and easily available prior to the start of an operation. All work areas in temporary contamination zones shall be cleaned and surveyed following the operation. Protective clothing (PCs), step-off pads, and other contamination control equipment, including friskers, shall be instituted at the discretion of the RSO and documented on a Radiation Work Permit. No eating, drinking, smoking, or chewing (e.g., tobacco, gum, etc.) shall be permitted within restricted areas.

INSTRUMENTATION AND SURVEILLANCE

Instrumentation

Instrumentation used by health physics personnel shall be of sufficient sensitivity and accuracy to assess the radiation exposure levels which may be found at SMC facilities; detect the presence of contamination on tools, equipment, clothing, and personnel at all levels which may be found at SMC; and of sufficient quantity to support on-going or planned operations. Instrumentation shall be tested and calibrated as recommended in ANSI N323.[5] The calibration schedules of the equipment shall be cycled so that a minimum of one exposure rate instrument and one contamination survey instrument is in current calibration at each SMC facility. Calibration and repair records shall be maintained by the RSO.

Fixed laboratory instrumentation used for analysis of samples shall be checked for satisfactory performance pursuant to vendor instruction manuals. Acceptable performance shall be demonstrated by measurement of background counting rates and by the response of the instruments to appropriate calibration sources and/or check sources.

Surveillance

Radiation and swipe surveys in restricted areas shall be performed on a planned and periodic basis. Non-routine surveys, or surveys in unrestricted areas, shall be performed at the discretion of the RSO, or any time there is reason to suspect that radiation levels may have changed or that contamination is present. Periodic surveys of x-ray machines shall be performed as required in applicable State regulations (e.g., New Jersey Administrative Code 7:28-21.6(4)).

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[5] American National Standards Institute, ANSI N323-1978, "Radiation Protection Instrumentation Test and Calibration".

ENVIRONMENTAL SURVEILLANCE

A surveillance program for radiation or radioactive materials which may be released from the SMC controlled area shall be maintained. The objectives of this program shall include:

- Estimation of maximum potential radiation doses to the general public in the vicinity of SMC facilities as a result of SMC operations;
- Determination of whether the regulatory requirements of 10 CFR 20.1301 have been met; and
- Establishment of baseline data to aid in evaluation of decommissioning options.

The program may consist of stack sampling, air sampling, surface and ground water sampling, ambient exposure rate measurements, soil/sediment sampling, or some combination thereof. Measurements shall be performed on a planned and periodic basis. The type, frequency, and location of the measurements/sampling shall be specified in a Standard Operating Procedure.

RADIOLOGICAL AREAS AND POSTING

Radiological area definitions and posting/labeling requirements throughout SMC facilities shall be as described in 10 CFR 20, Subpart J. All personnel permitted unescorted access to the controlled areas of SMC facilities shall be trained in recognition of posting/labeling.

The controlled area at SMC consists of the entire area within the property boundaries.[6] Restricted areas, which are established by the RSO based upon radiological conditions, exist within controlled areas. The entrance requirements for restricted areas shall be clearly posted at each access point.

A radiation area at SMC facilities shall be defined as any area accessible to personnel, where radiation levels exist such that a major portion of the body could receive a dose equivalent in excess of five (5) millirem in any one hour at 30 cm from the radiation source or from any surface that the radiations penetrate. A radiation area shall be posted with signs that are magenta (purple) and yellow in color, and bearing the words "CAUTION - RADIATION AREA" along with the three-blade radiation symbol. If deemed necessary by the RSO, personnel entering a radiation area may be assigned a personnel dosimeter.

A contamination zone shall be defined as an area accessible to personnel where there exists fixed and/or removable source material contamination in excess of the limits established for unrestricted access. Contamination zones may exist anywhere within a restricted area, and shall be posted with a magenta and yellow sign and/or tape bearing the words

[6] Source material storage areas at the Newfield, New Jersey facility include Department 111, the Department 111 bag house, Department 102, Warehouse A, and the Source Material Storage Yard.

"CONTAMINATION ZONE", "CONTAMINATED" or "INTERNAL CONTAMINATION". The boundaries of contamination zones shall be clearly visible. The RSO shall approve all work in contamination zones prior to its start.

Each area, building, or room in which licensed radioactive materials are stored in quantities that exceed 10 times the quantity of such materials shown in 10 CFR Appendix C of 20.1001-2401 shall be posted with the magenta and yellow symbol and the words "CAUTION - RADIOACTIVE MATERIAL(S)" at each entrance point. Caution signs may not be necessary in areas/rooms containing source materials for a period of less than eight (8) hours, provided that the materials are attended throughout the temporary storage period by an individual who has been trained in the precautions for radiation exposure of personnel.

Form NRC-3, "Notice to Employees" shall be posted in prominent locations within the SMC controlled area, including but not limited to break rooms and employee bulletin boards. Radiation Work Permits shall be posted at the entrance to restricted areas or radiation areas where work is being performed under a Radiation Work Permit.

CONTROL OF RADIOLOGICAL WORK

Control of work involving source materials or radiation-producing machines shall be accomplished by establishing radiological standards and responsibilities, using first-line supervisors and health physics personnel to monitor performance of radiological work, training workers in recognition of radiation hazards and their responsibility to prevent their occurrence, and providing personnel with either Standard Operating Procedures and/or Radiation Work Permits that include the radiological protection measures and controls necessary for safe completion of a specific job.

Radiation Work Permits shall be initiated and approved by the RSO and the applicable operations supervisor. Prior to performing work under a Radiation Work Permit, workers shall sign a statement signifying they have read the Radiation Work Permit, fully understand all requirements and radiological conditions, and agree to comply with the requirements. Radiation Work Permits and associated records shall be maintained in a retrievable, legible form. Changes in the manner of work performance shall require a review of the Radiation Work Permit by the RSO.

As required in 10 CFR 20, Subpart H, engineered controls shall be the primarily means whereby intake of airborne radioactivity by workers and/or external exposure to radiation is minimized. Workers shall not be subject to the increased physical stress and loss of work efficiency by wearing respirators unless engineered controls or administrative controls are determined to be ineffective. In the event that respirator usage is required by the RSO, the following conditions shall apply:[7]

[7] The USNRC shall be notified 30 days in advance of the first use of respiratory protection for radiation protection purposes.

- Users shall receive a medical examination within the last year which indicates that the user is medically fit to wear a respirator.

- Users shall receive training on the topics of respiratory protection and respirators.

- Users shall pass an acceptable quantitative fit test for all types of negative pressure masks in use at SMC facilities.

- Users shall be clean-shaven on all sealing surface areas under the respirator.

RECEIPT, HANDING, AND IDENTIFICATION OF RADIOACTIVE MATERIALS

Incoming packages that are known or suspected to contain radioactivity at levels significantly higher than background, shall be monitored for exposure rate and removable external contamination, pursuant to 10 CFR 20.1906. As necessary, these packages shall be marked as such to ensure proper handling and storage. Markings may include tags or stickers (in yellow and magenta) indicating "INTERNAL CONTAMINATION" or "RADIOACTIVE MATERIALS".

Items identified as radioactive materials shall be maintained in a storage area established for this purpose. Radioactive material received by SMC that meets the 10 CFR 40 definition of source material shall be entered in the radioactive material inventory log. The log shall be maintained by the RSO to assure compliance with maximum possession limits established in the USNRC licenses. The material inventory shall be updated at least quarterly to reflect usage and new acquisitions.

PACKAGING AND TRANSPORTATION OF RADIOACTIVE MATERIALS

Radioactive material which is shipped by SMC shall be packaged and transported in a manner which minimizes radiation exposure to the shippers, the general public, and to the environment. Shipments shall be packaged, surveyed, and labeled in accordance with Department of Transportation (DOT) regulations, 49 CFR 173.400, Subpart I.

CONTROL OF RADIOACTIVE WASTE

Control of radioactive waste materials shall be accomplished by the following:

- Preventing materials from becoming unnecessarily and/or excessively contaminated;
- Decontaminating and reusing radioactive materials such as tools and equipment;
- Identifying, controlling, and promptly repairing leaks from radioactive systems;
- Monitoring materials for radioactivity and removing non-radioactive materials prior to disposal; and
- Using waste volume reduction techniques when practical.

Waste segregation practices shall be implemented in order to assure separation of radioactive materials from non-radioactive materials, exclusion of liquids from the solid waste stream, and reduction in the volume of mixed (hazardous/radioactive) wastes generated.

All radioactive waste shall be disposed of in containers deemed appropriate for solid or liquid waste. All radioactive waste containers and requisite materials shall be supplied by the transporting vendor and shall comply with Department of Transportation (DOT) specifications. Plastic liners and absorbent material shall be routinely used. The isotope(s), activities, and volumes of all materials placed in the waste containers should be recorded in the radioisotope inventory log at the time of the addition. Waste containers shall be labeled and maintained in an area established for that purpose.

Radioactive waste shall be disposed of by one of the following means:

- Transfer to a waste disposal service which is licensed to receive such waste in accordance with 10 CFR 20.2001;
- Transfer to the original supplier which is properly licensed to receive radioactive materials;
- Other means specifically approved in advance by the USNRC pursuant to 10 CFR 20.2002.

RADIATION PROTECTION RECORDS

Records shall be maintained in order to document implementation of this Radiation Protection Program Plan and the Standard Operating Procedures for radiation protection, and to demonstrate compliance with the USNRC and State license requirements. Records relating to the radiation protection program shall be maintained for the duration of the applicable USNRC or State license, or disposed of as authorized by the applicable agency. Personnel exposure records shall be maintained by SMC, or its parent company, indefinitely.

The following records pertaining to radiological protection activities shall be maintained:

- Training records for each worker indicating time of training, test results, instructor name/company name, test used and course lesson plans;
- Radiation Work Permits and associated records;
- Radiation exposure records for each worker including both internal and external exposure results in accordance with 10 CFR 20, Subpart L;
- Source material inventory log;
- Site monitoring data (i.e., ambient surveys, contamination surveys, airborne radioactivity surveys, environmental monitoring surveys, etc.) collected by SMC personnel or contractors; and
- Waste disposal records.

Employees, visitors and contractors shall have the right to review their own personnel exposure record upon request. Each employee who is monitored for internal or external exposure shall be advised annually of the dose incurred for the current monitoring year. Exposure records shall be generated by the RSO and provided to each monitored employee at the time of employment termination. If the most recent monitoring results are not available at that time, a written estimate of the dose shall be provided, together with a clear indication that it is an "estimate" rather than a "dose of record".

DOCUMENTATION

Implementing procedures for this Radiation Protection Program Plan shall be reviewed by the RSO, the Sr. Vice President, and the RSC. Standard Operating Procedures for radiation protection shall be maintained under revision and distribution control, with copies distributed to the Sr. Vice President, the RSO, and other members of the RSC.

Since the Standard Operating Procedures for radiation protection are the supporting elements for this Radiation Protection Program Plan, changes to any procedure shall be reviewed and approved by the RSO prior to implementation. As needed, Standard Operating procedures for the following representative listing of subject areas may be issued:

- Radiation Protection Organization and Administration
- Training in Radiation Protection
- ALARA Program
- Standard Operating Procedure Control
- Radiation Protection Records
- External Exposure Control
- Internal Exposure Control
- Area Surveys and Monitoring
- Contamination Surveys and Monitoring
- Decontamination
- Radiation Work Permits

- Sampling for Airborne Radioactive Materials
- Calibration and Maintenance of Survey Equipment
- Radioactive Waste Management
- Effluent Monitoring
- Radiological Areas and Posting
- Storage and Receipt of Radioactive Materials
- Shipment of Radioactive Materials
- Accountability of Licensable Radioactive Materials
- Licensing and Notifications
- Emergency Response

EMERGENCY RESPONSE AND NOTIFICATIONS

For emergencies where radioactive materials may be involved, consideration shall be given to exposure to radioactive materials and ionizing radiation, in addition to the other hazards present. Advance planning and preparation for potential emergencies shall be stressed to SMC personnel in order to ensure that the initial response to an emergency is proper and not hampered by lack of facilities or equipment. The SMC Emergency Plan shall describe the appropriate responses for incidents or emergencies as they pertain to the safe use of radioactive materials.

Injuries or illnesses occurring on the job will be handled in a routine manner, in that medical or hospital assistance will be enlisted from nearby facilities. Injuries or illnesses involving radioactive materials and warranting emergency professional medical care will be handled in a manner commensurate with their severity. The RSO will provide consultation for such emergencies by direct involvement.

Radiological incidents may also include lost or damaged personnel dosimeters. Employees shall promptly notify the RSO of lost or damaged dosimeters. The RSO shall issue a new dosimeter for that monitoring period, evaluate/estimate the radiation exposure incurred from the beginning of the monitoring period until the time of loss or damage, and record all pertinent information in the employee's dosimetry records. It may be necessary to limit additional exposure of the individual involved until the investigation is completed.

If it is known or suspected that radioactive material has been taken into the body, the RSO shall be notified immediately. The RSO shall evaluate the amount of material ingested/inhaled and the resulting exposure. This investigation may include air sampling and analysis, bioassays, or whole body counting, as needed.

The RSO or Sr. Vice President shall notify the USNRC of any incident involving licensed material which has caused or threatens to cause certain delineated conditions or effects. The limits and the associated reporting requirements shall be completed in accordance with 10 CFR 20.2201, 20.2202, 20.2203, and 10 CFR 21. Reports of personnel overexposure shall be retained as permanent records, with copies forwarded to the employee. Additional exposure of an individual involved in an overexposure incident shall be restricted to ensure that the individual does not exceed any applicable regulatory limits. The health aspects of the specific exposure received shall be presented by the RSO to the involved individual.

QUALITY ASSURANCE IN RADIOLOGICAL PROTECTION

All activities conducted as part of the radiation protection program shall be subject to quality assurance requirements. The quality assurance provisions for radiological protection shall ensure consistency/accuracy of results and documentation/verification of the effectiveness of the radiation protection program. These provisions shall include the following:

- Procedures shall be developed to implement this Radiation Protection Program Plan.
- Audits/assessments shall be conducted to determine compliance with USNRC and State regulations and this Radiation Protection Program Plan.
- Periodically, analytical and survey measurements shall be verified through processes such as split sample measurements, duplicate or replicate measurements, and inter-facility intercomparisons.

Written documentation of corrective actions that are instituted in the event of a non-conformance or non-confirming item, shall be maintained by the RSO.

ATTACHMENT 6: WASTE MANAGEMENT (Item 11)

Waste management activities at SMC are described in Attachment 5. In general, radioactive waste generated at the facility is stored on site. However, alternate disposal methods may include the following:

- Transfer to a waste disposal service, which is licensed to receive such waste in accordance with 10 CFR 20.2001;
- Transfer to the original supplier which is licensed to receive radioactive materials; or
- Other means specifically approved in advance by the USNRC pursuant to 10 CFR 20.2002.

Examples of types of radiological waste which may be generated at SMC are described in Table 5, below.

TABLE 5: RADIOACTIVE WASTE STREAMS GENERATED AT SMC

Definition	Description
Bag-house dusts	Dry solids which may contain licensable quantities of radioactive materials
Bag-house Bags	Combustible dry solids which may be contaminated with licensable quantities of radioactive materials
Pyrochlore Super-sacks	Combustible dry solids used to contain pyrochlore ores which may be contaminated with licensable quantities of radioactive materials
Ferrocolumbium slag	Dry solids known to contain licensable quantities of radioactive materials

Spent Refractory	Dry solids which may contain licensable quantities of radioactive materials
Radioactive dry combustible waste	Combustible, dry solids including plastic bags, absorbent paper and protective equipment used to prevent the spread of contamination

ATTACHMENT 7: RESUMES

Craig R. Rieman RSO

James P. Valenti Alternate RSO

CRAIG R. RIEMAN
Shieldalloy Metallurgical Corporation
Radiological Safety Manager

EMPLOYER

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EDUCATION AND TRAINING

B.S. (Business Administration) Susquehanna University (1981)

A.A.S. Nuclear Engineering Technology/Radiation Protection (1991 to present)

"Air Sampling for Radioactive Materials" Oak Ridge Associated Universities (1992)

Safe Air Environmental Group (U.S. EPA and NYS Certified Asbestos Supervisor/Contractor)

Niagara County Community College (U.S. EPA and NYS Certified Asbestos Inspector and Management Planner)

OSHA Hazardous Waste Training (40 Hours)

First Aid Certified

PROFESSIONAL AFFILIATION

Health Physics Society

Delaware Valley Society for Radiation Protection

New Jersey Chapter of Health Physics Society

REPRESENTATIVE EXPERIENCE

- Shieldalloy Metallurgical Corp. (New Jersey), Site Radiological Characterization - Coordinated and arranged subcontracts for health physics and surveying services. On-site manager of characterization activities including sub-contractor oversight. Compiled data for preparation of the characterization report.

- Shieldalloy Metallurgical Corp. (Ohio), Site Decommissioning - Conducted oversight of radiological surveys for verification and release reports of the site. Supervised radon flux measurements of radioactive slag piles. Audited data compiled by radiological subcontractor for preparation of final decommissioning report of the facility.

- IBM (New York), Mixed Waste Remedial Action - Task manager of radiological issues concerning the excavation and treatment of 200 cubic yards of thorium and VOC contaminated waste. Excavation activities included the removal of over 30 drums and 150 laboratory packages of unknown contents. On-site manager of health physics and labor subcontractors during the excavation, treatment, and disposal activities. Prepared release reports for submittal to state agencies.

- Amerada Hess Corp. (U.S. Virgin Islands), Emergency Response Asbestos Abatement - Conducted operational safety, and regulatory compliance audits of the abatement contractor procedures at the client's St. Croix oil refinery. Provided personnel air monitoring for asbestos exposure during abatement activities resulting from Hurricane Hugo damage. Managed the quantitative respirator fit testing of more than 130 individuals. Provided the on- and off-site area air sampling for asbestos fibers.

- Allstate Insurance (Texas), Abestos Abatement - Supervised and monitored the removal of a 35,000 sq. ft. of asbestos-containing roof. Provided area air sampling to verify airborne asbestos concentrations. Interfaced with U.S. EPA and Texas Air Control Board concerning acceptance of engineering removal techniques. Coordinated the replacement of the new roof between the abatement, electrical, and roofing contractors. Prepared post-abatement report for publication.

- Yellow Freight System, Inc. (Illinois), Abestos Abatement - Provided abatement contractor oversight during the removal of 3,500 sq. ft. of asbestos-containing spray-on insulation. Conducted area air monitoring for airborne asbestos fibers. Coordinated re-insulation, electrical, and mechanical contractors during restoration activities. Prepared post-abatement report for publication.

- Quantum Chemical (Illinois), Radon Flux Measurement Survey - Designed, implemented and supervised the radon flux measurements of phosphogypsum piles as regulated by EPA/NESHAP. Coordinated the laboratory analysis of over 700 radon samples using 10-inch radon canisters. Interfaced with EPA for notification of sampling, regulatory compliance, and measurement reportings.

- U.S. Department of Energy - FUSRAP (Missouri), Radiological Characterization - Provided industrial hygiene/health physics monitoring of personnel during sampling and drilling activities. Prepared gamma ray measurement reports for various local properties and haul roads. Calibrated radiation detection and measurement instruments.

- U.S. Department of Energy - FUSRAP (Massachusetts), Radiological Remedial Action - Supervised removal and containment of uranium and asbestos-contaminated roof. Responsible for air monitoring, personnel monitoring, sample collection, and interim storage of waste. Collected and reported radiation measurements for equipment and building release surveys. Determined site personnel radiological and asbestos exposure.

- U.S. Department of Energy - FUSRAP (Oregon), Radiological Characterization - Conducted radiological surveys of U.S. Bureau of Mines laboratories. Conducted radon surveys for building releases. Assisted engineering contractor in developing remediation procedures.

- Confidential Project (Vermont), Radiological Source Leak Audit - Conducted radiation survey to determine extent of polomium-210 source leak in customer products at various sites in Vermont. Designed, implemented, and verified remedial action. Supervised contained waste storage and shipment off-site. Coordinated client's release of decontaminated products for unrestricted use.

- U.S. Department of Energy - FUSRAP (New York), Radiological Characterization - Provided industrial hygiene and health physics monitoring support during drilling of monitoring wells and sample boreholes at radioactive waste storage site. Supervised field data collection of subsurface gamma measurements. Conducted surface water sampling for chemical analysis. Directed complete building surveys to determine radiological, chemical, asbestos, and safety hazards.

- U.S. Department of Energy - FUSRAP (Tennessee), Initial Decontamination Demonstration - Supervised the monitoring of a shotblast decontamination system for airborne contaminants, noise level, and worker heat stress. Compiled radiation measurement data for release report. Assisted in preparing report to DOE recommending operational improvements and applications of new decontamination unit.

- Dunkirk Power Station, Niagara Mohawk Power Corp. (New York), Various Outages - Coordinated procurement of safety equipment with department supervisors for outage projects. Fitted personnel with proper protection equipment. Supervised waste removal for reclamation or disposal.

PUBLICATIONS AND PRESENTATIONS

Rieman, C.R., Leichtweis, C.P. 1989. Clean Atmosphere Approach to Radiological Decontamination of Concrete Surfaces. American Nuclear Society Transactions 60:539. Presented at 1989 Winter Meeting of the American Nuclear Society, San Francisco, November 30, 1989.

JAMES PAUL VALENTI
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EDUCATION AND TRAINING

Lafayette College, Geology

Syracuse University, Advanced Soil Mechanics and Foundations

Radiation Safety Associates, Inc., Radiation Safety Officer
Training (40 hours)

IT Corporation Hazardous Waste Operations and Emergency Response
(OSHA 29 CFR 1910.1200, 40 hours)

REGISTRATION

Certified Professional Geologist No. 664,
State of Indiana

N-2 Industrial Wastewater Treatment System Operator
License #N1343 (NJDEPE)

PROFESSIONAL AFFILIATION

Society of Mining Engineers

National Ground Water Association

REPRESENTATIVE EXPERIENCE

Currently, as Environmental Manager, Mr. Valenti is responsible for managing a Remedial Investigation/Feasibility Study, Treatability Study, Risk Assessment, Ground Water Monitoring Program, Interim Ground Water Remediation, RCRA Closure and UST Removal Program. He is also involved in a Radiological Characterization for NRC License Renewal Application. He is the Alternate Radiological Safety Officer and manages the Right-to-Know Program including EPA Toxic Release Inventories and State inventories/ emergency planning. Mr. Valenti manages the Material Safety Data Sheets and label programs. He is also responsible for all air permits at the facility.

Previously, (1986-1989), Mr. Valenti was employed by the Northern Division, Naval Facilities Engineering Command as a Project Manager in the Environmental Division conducting Remedial Investigations/ Feasibility Studies, RCRA Facility Investigations and UST Closures. He was a member of slate and selection committees, prepared Government estimates, negotiated and awarded contracts then managed projects with consultants performing work at Naval Facilities in Rhode Island, New Jersey, Pennsylvania, and Indiana under the Navy Installation Restoration Program. He was responsible for coordinating the projects with State and Federal Agencies.

From 1979 to 1986, Mr. Valenti was employed by Stone & Webster Engineering Corporation as a Geologist and Construction Engineer. He was assigned to various nuclear and fossil fuel power plant projects, office and industrial site projects, transportation projects and nuclear waste site investigations. His responsibilities included supervision of excavation and backfilling, blast monitoring, geologic mapping, structural geology studies boring/well logging, exploratory well log interpretation and geologic photographic documentation.

Prior to joining Stone & Webster Engineering Corporation, he performed inspection and testing of soils in the field and laboratory, inspection of concrete placement and compressive strength testing, inspection of structural steel erection and inspection of pile installation. Mr. Valenti also has mud logging experience from exploratory wells in the Gulf of Mexico.