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The facility covered under this license and the headquarters for CSM are located at the following address:

Cabot Supermetals  
County Line Road  
Boyertown, PA 19512

Authorized uses include receipt, possession, and processing by CSM at the Boyertown, Pennsylvania facility in accordance with the statements, representations, and conditions specified in this application for license renewal and attached supplements. Statements, representations, and conditions specified in this application replace in whole and supersede all prior submittals.

This license allows the receipt and possession of feed material containing uranium and thorium to be processed for tantalum and niobium, two non-radioactive products that are used in the electronics industry. CSM expects these operations to remain economically viable for the foreseeable future and requests this license to be issued for the maximum period of time allowed by the regulations.

Although CSM is licensed to handle source material under the NRC category for uranium mills, CSM's Boyertown plant is not a uranium operation and is of a much smaller scale than most uranium mills. The majority of the Boyertown plant is dedicated to chemical processing, so radioactive materials are handled in a very limited number of buildings and work areas. The quantities of licensed material that are received as feed material and processed or stored at the site are minimal compared to the massive quantities that are handled at uranium mills. Incoming ores are contained in drums until they are fed into the process, not exposed to the elements in large quantities while stored on open pad sites. None of the radioactive constituents of the ore are concentrated, unlike uranium mills that concentrate uranium as an end product. CSM's tantalum and niobium products do not contain any of the licensed radionuclides. Virtually all of the radionuclides in the feed material are retained in the presscake that is transferred to the bulk storage bins until it is ultimately disposed off-site.

## **7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE**

The individual responsible for the execution of the radiation safety program at the Boyertown facility is the Radiation Safety Officer (RSO). Duties and responsibilities of the Radiation Safety Officer are described in Section 10 of this application. CSM requires that the RSO will have the following training and experience as a minimum:

- BS degree in biology or a physical science
- Completion of a basic radiation safety course
- At least two years experience in the safe use and handling of radioactive material

The Radiation Safety Officer also attends a professional society meeting, seminar, or radiation safety training session at least once every two years as part of CSM's professional development program. The RSO for this license is Timothy Knapp. CSM will notify the NRC in writing in the event that Mr. Knapp vacates the RSO position. CSM will ensure that the duties of the RSO are assigned to and carried out by a responsible, qualified individual at all times during plant operation, and will implement a system to provide back-up, on-call support for the RSO to ensure that lapses do not occur.

## **8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS**

Training for individuals working with radioactive material is described in Section 10.6 as part of the Radiation Safety Program. Training for individuals working in or frequenting restricted areas will be commensurate with the individuals' duties and with the requirements of 10 CFR 19 and applicable sections of Regulatory Guide 8.31.

## **9. FACILITIES AND EQUIPMENT**

The description of facilities and equipment provided herein is accurate and current as of the date of this application. CSM may change facilities and equipment as required to meet its business needs with the stipulation that any changes expected to impact the handling, control, or monitoring of licensed radioactive material will be made in accordance with the conditions of this license and all applicable federal, state, and local rules and regulations. The U.S. Nuclear Regulatory Commission (NRC) will be informed in writing of any significant changes in facilities and operations.

### **9.1 PLANT FACILITIES AND PROCESS DESCRIPTION**

The Boyertown facility is sited on approximately 200 acres located along both sides of County Line Road about 1.5 miles (2.4 km) northeast of Boyertown, Pennsylvania. The population of Boyertown was determined to be 3759 during the 1990 census and has remained relatively constant since that time. The site resides in two counties, Berks and Montgomery, with County Line Road marking the boundary between the two. The topography is relatively flat with a slightly elevated knoll just northeast of the main plant area. There is a stream running along the western site boundary, and site drainage is generally south and west. There has been no significant change in the residential areas nearest to the site since the last license renewal. Figure 9-1 presents the layout of the operations, and includes a legend to identify pertinent features such as site buildings and structures, on-site roadways, points of vehicular and pedestrian access, and locations where licensed materials are present. The areas where radioactive materials are received, handled, stored, and processed represent a small fraction of the overall plant site. It is also important to note that ore is typically received and stored in containers such as drums, not in exposed bulk quantities as is common practice at uranium mills. The ore is emptied from the containers under controlled and monitored conditions in Building 73.

#### **9.1.1 General Plant Information**

The Boyertown Plant is operated by Cabot Supermetals, Inc (CSM) and receives and processes low-grade uranium ores to extract tantalum and niobium as product materials. The plant ore feed rate is approximately 4,350 kilograms per day (9,600 pounds per day), 5 days per week or 1,200 ton/yr. Based on analytical results from 207 samples collected throughout 2001, the ore averages 0.165% uranium and 0.057% thorium. Feed materials qualify as uranium and thorium ore, but those source materials are not processed by CSM with the intent of concentrating the source material. The uranium and thorium constituents of the ores would be contaminants in the product and remain in the residual ore materials stored on-site or transported and transferred to another source material licensee. Other significant differences that exist between typical uranium mills and the Boyertown plant operations include the following:

- Ores are generally received in drums, not in bulk shipments such as train cars or large capacity haul trucks.

In addition, the treatability studies have shown the resultant solids would not exhibit any hazardous waste characteristic, and the radiological constituents would be well below the filtercake release limit justified by the dose assessment provided referenced in Section 11 of this document, and the related license condition. Therefore, CSM believes that the solids generated by the proposed segregation and on-site treatment of this mixed hazardous waste stream would continue to qualify for ultimate disposal as a residual waste.

## **10. RADIATION SAFETY PROGRAM**

CSM has conducted operations at the Boyertown facility under license SMB-920 for more than 20 years, and has successfully completed renewals and amendments to that license on several occasions. The processes and facilities have not significantly changed other than to add capacity or improve the efficiency of the plant operations. In addition, license inspections have been completed at the facility on several occasions and the most recent inspection was conducted in September / October 2001 and resulted in only minor (Severity Level IV) violations. This application for renewal of the license summarizes the current conditions and ongoing programs at the facility, including the latest improvements that have been designed to address input from the on-site inspection.

### **10.1 COMMITMENT TO RADIATION SAFETY PROGRAM IMPLEMENTATION**

CSM is committed to establishing, implementing, and maintaining a Radiation Safety Program that meets or exceeds the regulatory requirements, including 10 CFR 20 Subpart B, and complies with accepted industry practices. It shall be the objective of the program to ensure that exposures to employees and members of the general public from radioactive materials used by CSM are kept as low as reasonably achievable (ALARA). The Radiation Safety Program is currently maintained by CSM at the Boyertown facility in accordance with the conditions defined in source material license SMB-920. It is worth noting that, beginning in calendar year 2000, CSM initiated changes in the organizational structure and management personnel in the Safety, Health, and Environment (SH&E) Department into which the RSO reports. The radiation safety programs have been improved under this revised structure and the following subsections describe the current programs. Changes from past programs are specifically identified throughout these subsections.

### **10.2 ORGANIZATION AND PERSONNEL QUALIFICATIONS**

This section describes the organizational structure of the Boyertown facility and the roles and responsibilities of managers and staff that are relevant to the radiation safety programs at the site. An organizational chart showing the individuals whose responsibilities may directly impact the success of the radiation safety programs is presented in Figure 10-1. CSM may revise its management structure in order to address the changing needs of its operations and business sector. A license revision or notification to the NRC is required only for changes that negatively impact the independent reporting path for the RSO, the authorities of the RSO, or the involvement of the RSO in the operational management of the facility. Additional information regarding those individuals is provided in the following subparts of Section 10.2.

#### **10.2.1 Corporate Management**

CSM corporate management is lead by the Vice President and General Manager (VP/GM) of the Boyertown facility. He has overall responsibility for the activities at the site, and profitability of the

operations. He is ultimately responsible for the health and safety of the site employees, and protection of the environment and members of the general public.

Additional corporate managers include the directors and managers who report to the VP/GM. As represented in Figure 10-1, there are four individuals reporting to the VP/GM who have responsibilities that may directly impact the license or the implementation of the radiation safety programs. The managers responsible for SH&E functions and Manufacturing operations report to the General Manager, North America (GM/NA). Those managers have the authority to halt operations that appear to be unsafe, and may be called upon to approve the restart of operations after such a shutdown. The Manager, SH&E and Facility Services is responsible for the development and implementation of the SH&E programs and is the direct supervisor of the Radiation Safety Officer (RSO). The Manager, SH&E and Facility Services has overall responsibility for the technical quality and adequacy of the radiation safety program. He ensures that the RSO has the support and resources necessary to conduct his work activities. He also provides routine feedback to corporate management regarding the status of his programs and interacts with the other directors as necessary to ensure they understand and implement the radiation safety programs. The SH&E functions and operations functions report independently to the GM/NA to provide objective audit, review, and control activities for the SH&E programs. In this independent role, the SH&E staff and managers provide a mechanism by which any employee can report potentially unsafe conditions or safety concerns. The SH&E managers promptly assess and resolve any reported concerns.

The remaining three key individuals that report to the VP/GM are the Chief Financial Officer, the Director, Tantalum Research and Development and ACM, and the Director, Raw Material Acquisition. They are responsible for individual aspects of the day-to-day operations of various CSM facilities. They ensure that the plant operations comply with the company's policies and procedures.

## **10.2.2 Site Management**

The Chemicals Manufacturing (CM) Manager reports to the Director, Boyertown Manufacturing and has responsibility on a day-to-day basis for ensuring that the Boyertown plant complies with the company's policies and procedures, including the site radiation safety programs. The CM Manager has the authority to immediately terminate any activity that is found to be an imminent threat to health, safety, or property and must approve startup of operations after any such shutdown.

The Radiation Safety Officer reports directly to CSM's Manager, SH&E and Facility Services and is responsible for monitoring compliance with the conditions of the radioactive materials license and relevant local, state and federal regulations. The RSO has access to all levels of operational management as necessary for the execution of his/her duties. The RSO has the authority to immediately terminate any activity that is found to be an imminent threat to health, safety, or property, or that is likely to violate the license conditions or radiation safety program requirements, and this authority cannot be revoked. A full-time employee fills the RSO position and the Manager, SH&E and Facility Services provide staff as necessary to support the position. Specific qualifications and training for the RSO are described above in Item 7 of this document.

Specific duties of the RSO include, but are not limited to the following:

- Membership on the ALARA committee
- Monitoring activities involving radioactive material, including conducting routine measurements and special surveys of areas where radioactive material is used.
- Determining compliance with rules and regulations and license conditions.

- Providing guidance on the proper shipping of all radioactive material from the CSM facility and ensuring compliance with applicable regulations of the U.S. Department of Transportation (DOT) and other appropriate agencies.
- Assuring that an accurate inventory of source material is maintained.
- Managing the radioactive waste program.
- Monitoring the storage of source material not in use.
- Performing and arranging for calibration of instruments.
- Assuring leak tests are performed on generally licensed gauging devices.
- Coordinating the radiation safety training of personnel before they are allowed to work independently in restricted areas, and ensuring that class information is current, correct, and appropriate.
- Training and supervising radiological technicians who conduct radiation monitoring program activities to ensure that procedures are followed and results are correct.
- Offering timely feedback on aspects of radiation safety to employees, management, and to the Director of Safety, Health, and Environment.
- Maintaining files of information relevant to future site decommissioning and managing radiological decontamination efforts.
- Maintaining files for records related to the Radiation Safety Program.
- Maintaining radiological contingency plans and overseeing and coordinating the response to any radiological emergency related to the Boyertown operations.

Detailed position descriptions for any of the positions listed above may be acquired from CSM upon request.

### **10.3 INTERNAL AUDITS AND INSPECTIONS**

CSM conducts various inspections and audits as part of its management oversight of plant operations. Among these, the RSO and the Health Physics Consultant conduct an annual review, consisting of a plant tour and review of records, to audit the radiation safety and monitoring program. The consultant prepares a written report to the RSO, who is responsible for follow-up action and maintaining records of the surveys.

The environmental safety program is audited in accordance with CSM's Quality Department Procedure. This procedure assigns responsibility for the audits, describes the audit process, and contains a schedule to assure that audits are performed at least annually, results are documented in a written report, and corrective actions are implemented.

#### **10.3.1 Investigations and Reporting**

The RSO is responsible for recording, reporting, investigating, and tracking corrective actions for radiological incidents. An incident investigation program is in place to ensure that all incidents are investigated. Written procedures are in place to ensure thorough investigations of incidents and near-misses. These procedures address training, reporting, communication of the investigation results, and commitments for follow-up corrective actions. During the most recent license period there have been no events requiring reports to the NRC regarding exceedences of regulatory limits.

### **10.3.2 Records**

The RSO is responsible for maintaining CSM radiological records as described throughout this license application. Records of personnel radiation monitoring, radioisotope inventory, radiation surveys, instrument calibrations, training records, inspection records, licenses and registrations, and air, water, and smear analysis results are maintained.

### **10.4 ALARA COMMITTEE**

CSM maintains an ALARA Committee to ensure that its operations are conducted in a manner that meets the ALARA commitment. The primary responsibility for oversight and continuous improvement of the radiation safety program is assigned to the ALARA Committee. The objective of the committee is to ensure that exposures to, and releases of licensed radioactive materials are maintained at levels that are as low as reasonably achievable, that operations comply with license conditions, and that unexpected circumstances or changed conditions are appropriately considered and addressed. The members of the committee are selected according to their positions at the facility and are as follows:

- Chemicals Manufacturing Manager – Chairman
- Radiation Safety Officer – Senior Technical Support
- Maintenance Manager – Member
- Safety and Health Manager – Member
- Production Supervisor – alternating member, annually
- Manager, SH&E and Facility Services – invitee
- Director, Boyertown Manufacturing – invitee
- One representative from each of the union locals with workers at the plant

The committee membership and leadership have been modified to better develop interaction between operational management and radiation safety staff. Each year the committee will establish goals for the radiation safety program in support of the ALARA objectives.

The ALARA Committee shall meet at least quarterly to review the radiation monitoring results. Previously, the committee met only once each year. In addition, the Chairman shall call special meetings of the committee whenever a new process or procedure in production is initiated that he determines should be reviewed for ALARA considerations. Any employee at the site may submit to the Chairman a request for a special meeting to address processes, procedures, or program implementation that may impact compliance with the ALARA philosophy. The committee will conduct annual reviews of the radiation safety programs and monitoring results, and may commission independent third party reviews to meet this requirement. Written documentation of meetings and activities of the ALARA Committee are maintained by the Chairman.

Previous applications for license renewal have described additional safety-related committees, including the Preparedness, Prevention, and Contingency Plan Committee, the Health and Safety Committee, the Labor–Management Health and Safety Committee, the Safety Council, the Plant Safety Committee, and the Laboratory Safety Committee. Those committees will no longer have any direct role in the radiation safety programs. The members of the ALARA Committee will coordinate their actions with the other committees by contacting appropriate committee participants as necessary.

## 10.5 WRITTEN PROCEDURES

CSM develops and maintains procedures that reflect current plant practices and conditions, and are sufficiently detailed to be effective and useful. They are checked for content by technically competent personnel and approved by management, as demonstrated by the appropriate signatures.

CSM performs periodic reviews of the written procedures to ensure that they are consistent with regulations and the radiation protection needs of the employees. Any employee or safety committee may request that an operating procedure be changed; however, the RSO is responsible for reviewing and approving changes to operating procedures related to radiation protection.

A Document Change Notice (DCN) is used to revise an existing procedure and can be initiated by anyone in the division. The DCN must be approved by the department supervisor/manager and forwarded to the Quality System Manager or his designee, along with copies of the marked up pages (where appropriate) and any substantiating backup information. The Quality Systems “Document Change Notice” form is required to be completed for procedural changes.

CSM maintains written procedures and a Radiation Safety Officer’s Operations Manual that describe the routine practices of the program. These documents are available at the site for review during inspections by NRC staff. The procedures reflect current 10 CFR Part 20 regulations and provide descriptions of the technical bases for existing programs. Past NRC inspections have noted no deficiencies in these written procedures.

CSM establishes and maintains written procedures to address the routine activities of its radiation safety program. The current list of written procedures includes, but is not limited to, the following topics:

- Source material inventory
- Personal dosimetry
- Air sampling
- Sludge sampling and storage

- Filter cake sampling
- Ground water sampling
- Surface water sampling
- Sediment sampling
- Incoming ore surveys
- Contamination surveys using wipe samples
- Radiation surveys of roll mil thickness gauges
- Instrument calibration and use
- Radiation safety orientation.

Existing procedures are reviewed during the annual radiation safety program reviews and revised as necessary to keep them current and accurate. New procedures are developed, reviewed, authorized, and implemented as necessary to document new processes. Procedures are tracked and maintained in compliance with ISO-9000 requirements. Official copies of procedures are maintained in electronic format and the RSO keeps a current set of procedures for the radiation safety programs available for review during on-site inspections by the NRC.

## **10.6 TRAINING IN THE USE OF RADIOACTIVE MATERIAL**

CSM is committed to ensuring that radiation safety and emergency personnel, and other personnel whose duties involve working with or around licensed materials, receive timely and appropriate training in potential hazards, corresponding safety and health rules, and procedures. CSM also commits to providing refresher training, as needed, and the individual managers are responsible for ensuring that employees who may be near radiation sources are trained. CSM commits to providing initial safety indoctrination for all new employees, followed by additional monthly training sessions. The initial and ongoing safety training covers general OSHA requirements, plant safety rules, fire safety, and chemical safety.

Employees are also trained in the processes with which they work and are informed of the hazards associated with materials and chemicals used in the plant. Equipment and process operators receive training in safety and operational aspects such as hazardous chemicals and operations, work procedures, emergency shutdown procedures, emergency reporting and response procedures, evacuation procedures, incipient fire extinguishment, incidental spill response, personnel protective equipment, and respirator use. Plant-wide training follows new developments or changes in safety procedures. On-the-job and classroom training are provided by various qualified individuals. Operator qualification is based on satisfactory supervisory evaluations, with refresher training that is conducted on an as-needed basis. CSM maintains files that document new employee indoctrination and training provided to contractors and visitors. This training includes a safety orientation to review appropriate material safety data sheets (MSDSs) and to heighten awareness of the hazards where they will be working.

CSM has developed and implemented a radiation protection-training program for its employees and visitors to the facility. This program was designed to meet the requirements of Parts 19 and 20 of Title 10

- Storage, control, and disposal of licensed material; and
  - The requirements of pertinent Federal regulations.
- Ancillary Personnel – Ancillary personnel such as clerical, security, and administrative staff whose routine work activities at the Boyertown plant do not require their presence in restricted areas will not normally have access to the areas where radioactive materials are stored and handled. However, they will be provided basic hazard recognition and emergency notification training that addresses the radiological hazards at the site. Topics that are typically covered in the class include hazard recognition, locations of radioactive materials, and procedures to follow in case a radiological release is encountered.
  - Non-employees – Appropriately trained Cabot employees will accompany non-employees such as visitors and subcontracted workers who are expected to require access to restricted areas while on-site. The plant is enclosed by a security fence and staffed by full-time guards who ensure that visitors are logged in, provided safety equipment, and accompanied by a Cabot escort prior to accessing the plant site. The Cabot escort provides basic hazard recognition information, determines if the visitor will need to access restricted areas, and is responsible for the safety of the non-employee while on-site. If non-employees need to access restricted areas of the site without a Cabot escort they will first receive the Restricted Area Worker training required for Cabot employees.

## **10.7 METHODS OF EXPOSURE CONTROL**

CSM has established routine work practices and procedures designed to minimize exposures to radioactive materials for employees and members of the general public. Detailed procedures are available for review as described in Section 10.5, and a general description of methods used at the site is provided in the following subsections.

### **10.7.1 Administrative Controls**

CSM employs administrative controls such as designating restricted access areas, requiring training courses for workers, prohibiting undesirable activities in designated work areas, and displaying signs, postings, and labeling as required. Work areas in Building 73 where ore containers are opened and fed into the circuit, and the highest potential exists for airborne radioactive particulates are restricted from access by employees whose duties do not involve the grinding process. Workers are prohibited from eating, drinking, smoking, or chewing in the plant processing areas, and they are informed of these restrictions during training sessions and by signs in the work areas. Work areas are posted with signs and informational postings as required by the regulations and consistent with their conditions.

### **10.7.2 Engineering Controls**

CSM incorporates engineering controls such as general and local ventilation in enclosed work areas to control radioactive contaminant levels at their sources and reduce the need for respirators in work areas where levels may approach or exceed occupational derived air concentrations specified in 10 CFR Part 20, Appendix B, Table 1. Ore grinding equipment is enclosed within rooms to isolate potential releases from the general work areas in Building 73. Ventilation systems are designed, installed and tested by a qualified engineer, and included in routine plant maintenance plans. Concentrations of contaminants in exhaust are controlled to ensure that occupational and environmental releases do not exceed regulatory limits. Atmospheric releases from the ore handling area are controlled with scrubbers and a baghouse. Particles collected in the baghouse are recycled into the process. The performance of these systems is monitored as described in Section 10.9.2.

Liquid effluents are retained in on-site lagoons to control their release from the site. They are only discharged when stream flow conditions are adequate to ensure compliance with regulatory limits. No additional control of the effluent is required at this time; however, CSM monitors the effluent to detect conditions that might indicate a need for additional control. Alternate methods of disposal in compliance with regulatory requirements may be implemented in the event that stream flow is inadequate to keep up with site effluent requirements. CSM will ensure that liquid effluents are released from the site only in a manner that complies with regulatory release limits.

### **10.7.3 Personal Protective Equipment**

Respirators are used in work areas where airborne concentrations are expected to exceed the occupational derived air concentration specified in 10 CFR Part 20, Appendix B, Table 1 for the radionuclides of concern. The SH&E Department maintains a respiratory protection program in compliance with OSHA and NRC requirements that incorporates the following components to ensure that respirators are properly fitted, used, and maintained to prevent excessive employee exposures:

- Employee training
- Medical evaluations, including pulmonary function tests prior to respirator use and annually for routine respirator users
- Fit-tests to ensure adequate face to facepiece seal
- Air monitoring to determine when conditions warrant respirator use and to ensure that respirator protection factors are not exceeded

Protective clothing, such as disposable or washable coveralls, gloves, and shoe covers may also be used to minimize the potential for surface contamination of clothing and skin surfaces where transferable contamination may be present.

### **10.7.4 Hazard Monitoring Systems**

Activities involving hydrogen and HF pose the most significant chemical hazards in Building 073. Hydrogen is sometimes generated during ore digestion due to the carry-over of metallic iron from the ball milling operation. To detect the presence of hydrogen, each digestion tank utilized in the digestion process is outfitted with a hydrogen monitor. If hydrogen is present in the digester off-gasses at a level above 2% but less than 3%, a warning light and audible alarm are activated. The operator would then reduce or stop the feed rate of ore into the digester. If the hydrogen concentration in the digester off-gases exceeds 3%, the ore feed and steam heat to the digester are automatically shut down.

Hydrogen monitors are checked at the start of each batch digestion. A certified calibration gas is piped to each hydrogen detector. If the instrument does not analyze the calibration gas within a specified range, the operator is instructed not to begin digestion, and an area supervisor is then contacted to direct investigation and/or repair. If HF is detected, by smell, Draeger tubes are used to quantify the level, and to determine the appropriate response.

Liquid waste storage tanks are equipped with level indicators and high level alarms. The wastewater treatment plant operators continuously monitor the level indicators, as these tanks supply the primary feedstock to the treatment plant. The high level alarms sound at both the Security Office and the Wastewater Treatment Plant. Various other tests are performed to ensure proper operation of the scrubber, condenser, filter presses, and cooling system for the condenser.

CSM has installed various controls on the process tanks in Building 73 since the last renewal application. These control devices are outlined below:

- **Level monitoring of the digester and reslurry tanks.** Each tank is continuously monitored using Krohne radar level gauges with local displays and connections to the Building 073 PLC system. The PLC logic includes programmed high level and high-high level alarms that trigger audible and visual alarms. These alarms are also interlocked through the logic to halt transfers of material into the vessels in the case of such alarm conditions. These devices were installed in 1999.
- **Scrubber monitoring.** The scrubber pressure drop and make-up water flows are continuously monitored to verify proper operation of the scrubber system that ventilates the operation. These devices have local displays and are connected to the building PLC system. The operators monitor these readings on a routine basis.
- **HF tank monitoring.** The HF bulk tank and weigh tank are each mounted on Weigh-Tronix load cells with local displays and connections to the PLC system. In addition, both tanks have Ametek Drexelbrook high-level capacitance probes connected to the PLC system.

For all of these systems, extensive interlock logic halts transfers in the event of unexpected weight and/or level loss, overweight and/or high level, and high-high level conditions, as well as in the case of scrubber malfunction. This logic is also programmed to prevent certain concurrent transfers if such transfer would compromise the ability to detect fault conditions.

### **10.7.5 Chemical/Process Safety**

CSM does not segregate its chemical safety program to separately address only those chemical hazards that could possibly affect radiological safety. Various acids, bases, and other potentially hazardous chemicals are used in industrial operations at the CSM facility. Chemicals stored in large quantities include hydrofluoric acid (HF), sulfuric acid (H<sub>2</sub>SO<sub>4</sub>), nitric acid (HNO<sub>3</sub>), anhydrous ammonia (NH<sub>3</sub>), methyl iso-butyl ketone (MIBK), chlorines (Cl<sub>2</sub>), fuel oil, and propane. Fuel oil, MIBK, and acids are stored in tanks as liquids at ambient conditions while NH<sub>3</sub>, Cl<sub>2</sub>, and propane are stored as liquids under pressure at ambient temperature. Storage areas are bermed, monitored, or provided with absorbent materials as appropriate. The site Preparedness, Prevention, and Contingency (PPC) Plan provides procedures to prevent spills and to respond to unplanned releases of hazardous materials, and is available for review during NRC inspections.

#### **10.7.5.1 Process Safety Information (PSI)**

CSM maintains a listing of materials consumed and produced in the process along with their locations. There are no incompatible materials stored or used in such a way that inadvertent mixing could occur. Material Safety Data Sheets (MSDSs) are available to all employees for all potentially hazardous materials and controlled copies are in several locations throughout the plant. For operations in Building 073, CSM maintains simplified process flow diagrams and information concerning process chemistry.

The corrosive characteristics of the HF and other materials used in the process are addressed in procedures and safety programs. Various corrosion-resistant systems are in place for digesters, digester components, piping, condensers, scrubbers, and ductwork. It is the responsibility of the engineering and maintenance departments to ensure that good engineering practices are followed with respect to compatible materials of construction and corrosion resistance when new or replacement equipment is installed. To provide assurance of this, and to assure that other safety issues are addressed, a process Hazard Review is conducted, prior to process start-up, to evaluate risks and any potential harm to employee and public health and safety. CSM performs these hazard assessments for all new projects and

process modifications. CSM maintains a Hazard Identification and Assessment (HIA) Program and has the necessary organization and controls in place to implement and maintain the program.

#### **10.7.5.2 Maintenance and Inspection**

The licensee has a maintenance and inspection program that is designed to minimize the potential for accidental release of hazardous materials, ensure the reliability of safety devices, maintain the operational integrity of critical pieces of equipment, and comply with all applicable laws and codes. The departments responsible for performing the check maintain the associated records and schedules. Some examples of maintenance activities include quarterly inspection of fume scrubbers, annual pressure relief valve tests, biannual pressure vessel certification, weekly safety shower and eyewash inspections, and annual inspection of bulk storage tanks that contain corrosive materials.

There are a number of preventive maintenance (PM) programs in place to maintain and ensure the ongoing mechanical integrity of the equipment in Building 073. For example, all parts and equipment are either replaced in-kind by maintenance, or reviewed by maintenance management for suitability of purpose with manufacturers' recommendations and in process service requirements.

#### **10.7.6 Fire Safety**

The facility has an underground fire main with an adequate number of hydrants installed in it to support fire suppression in facility areas. Hydrants exist in the vicinity of Buildings 010, 040, 111, and 073. Additionally, portable fire extinguishers are provided in each building.

The uranium- and thorium-bearing residues are deposited in concrete storage bins located at a significant distance from the process buildings, thus ensuring that a hypothetical site fire would not impact this large quantity of radioactive material. The concrete storage bins contain very little combustible material and are supplied with portable fire extinguishers.

CSM has a Labor-Management Health and Safety Committee that inspects work areas on a monthly basis. Any deficiency noted by the committee is tracked and corrected. The facility has an organized Emergency Response Team, whose members are certified HAZMAT technicians and receive a full day of interior fire fighting training each year. CSM maintains a working relationship with several fire departments from nearby communities and can request their assistance. Offsite fire department members participate in some of the training sessions and are given familiarization tours of the facility. Furthermore, the facility provides hands-on portable fire extinguisher training to the general workforce on an annual basis.

## 10.8 RADIATION MONITORING INSTRUMENTS

The RSO maintains various radiation-monitoring instruments for conducting surveys and measurements and analyzing samples. A qualified, licensed contractor calibrates the instruments on at least an annual frequency. The following types of instruments, or their functional equivalents, are maintained at the site, at a minimum.

TYPE	PURPOSE
Micro-R meter (NaI)	General area surveys
Geiger-Mueller tube	General area surveys
	Dose assessment, area monitoring
Geiger – Mueller pancake probe	Contamination surveys, fixed and removable
Dual scaler (alpha – beta)	Sample counting (air particulates, smears)
Alpha/beta surface probe	Contamination surveys (100 sq. cm.)

Instruments used to show compliance with applicable regulations are calibrated before first use and after repair. Each instrument that is available for use is calibrated at least annually thereafter. Calibration records are retained for each instrument for at least the two most recent periods to establish documentation that the annual frequency is being maintained.

Hand-held survey instruments used for the estimation of contamination will be calibrated by determining the detection efficiency of the system using a reference source appropriate to the use of the instrument. The efficiency and reference radionuclide will be noted on the calibration label.

The RSO maintains on-site offices and facilities to support the radiation safety programs. These facilities are used to maintain and source-check the radiation-monitoring instruments, count samples such as airborne particulate filters that are analyzed on-site, provide office space for the RSO and his staff, and maintain files for the records that document compliance with the conditions of the radioactive materials license.

The RSO's office is located in an area that is not significantly affected by elevated levels of radiation from site operations and is separate from other work areas associated with daily site operations. Records are kept in lockable file cabinets. The sample counting area is cleaned and monitored at least monthly to ensure that contaminated material does not accumulate and negatively impact the work environment or the sample counting statistics.

## 10.9 RADIATION SURVEYS AND MONITORING PROGRAMS

### 10.9.1 Occupational Monitoring

Occupational monitoring programs are designed in compliance with the requirements of 10 CFR 20 to measure concentrations of radioactive material and radiation levels in the work environment, and evaluate personnel dose equivalents when those concentrations or levels exceed administrative limits. The RSO is responsible for the technical oversight and implementation of the monitoring programs. He oversees activities performed by technicians, reviews the data, evaluates potential changes in the programs or procedures, determines if follow-up actions are required, and maintains files of the results.