

April 12, 2004

Mr. Bradley Okoniewski  
Manager of Safety, Health, and Environmental Programs  
Cabot Corporation  
County Line Road  
P.O. Box 1608  
Boyertown, PA 19512-1608

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR THE CABOT CORPORATION LICENSE  
RENEWAL, SMB-920 (L52514)

Dear Mr. Okoniewski:

My staff has completed the Environmental Assessment (EA) for the renewal of Source Material License No. SMB-920, issued to the Cabot Corporation for possession of a limited amount of source material at its facility in Boyertown, Pennsylvania. The facility operator, a subsidiary of Cabot Corporation, now known as Cabot Supermetals, requested on April 3, 2002, that the U.S. Nuclear Regulatory Commission (NRC) approve the application for license renewal, allowing continued operation at the Cabot facility in Boyertown. The revised application was submitted on March 24, 2004.

The draft EA for the proposed licensing action was provided to various stakeholders for comment on August 14, 2003, and a revised draft EA, referencing Cabot's decision to delete the recycle option for the filtercake, was issued on December 19, 2003. Based on the staff's review of the minor changes to the original application, the EA has been completed and a finding of no significant impact (FONSI) due to continued operation of the facility as proposed, was made. The final EA is enclosed and the FONSI notice will soon be submitted to the Federal Register.

If you have any questions, please contact Ms. Elaine Brummett, of my staff, at (301) 415-6606, or via electronic mail at [esb@nrc.gov](mailto:esb@nrc.gov).

In accordance with 10 CFR 2.390 of the NRC's Rules of Practice, a copy of this letter will be available electronically from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

**/RA/**

Gary S. Janosko, Chief  
Fuel Cycle Facilities Branch  
Division of Fuel Cycle Safety  
and Safeguards  
Office of Nuclear Material Safety  
and Safeguards

Docket No: 40-6940

License: SMB-920

Enclosure: Final EA for License Renewal

cc: T. Knapp, Cabot Supermetals  
D. Allard, PA DEP

B. Okoniewski

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D. Allard, PA DEP

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\*see previous concurrence

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<b>NAME</b>	E. Brummett*		B. Garrett*		R. Nelson*		G. Janosko*	
<b>DATE</b>	45/04		4/8/04		4/8/04		4/12/04	

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ENVIRONMENTAL ASSESSMENT  
FOR  
CABOT CORPORATION  
CABOT SUPERMETALS  
BOYERTOWN, PENNSYLVANIA

IN CONSIDERATION OF RENEWAL OF  
SOURCE MATERIAL LICENSE NO. SMB-920

PREPARED BY

THE U.S. NUCLEAR REGULATORY COMMISSION  
DIVISION OF FUEL CYCLE SAFETY AND SAFEGUARDS  
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

April 2004

Enclosure

ENVIRONMENTAL ASSESSMENT FOR  
RENEWAL OF SOURCE MATERIAL LICENSE NO. SMB-920  
AT THE CABOT FACILITY  
BOYERTOWN, PENNSYLVANIA

1.0 INTRODUCTION

1.1 Background

The Boyertown facility was first licensed to possess source material on January 21, 1963, (License Number STC-681). The current Source Material License Number SMB-920 was first issued to Cabot Corporation on March 17, 1967. The facility, located near Boyertown, Pennsylvania (PA), is owned and operated by a subsidiary of Cabot Corporation that was known as Cabot Performance Materials, but changed its name to Cabot Supermetals (CSM) in March 2003.

CSM processes tantalite and columbite ores to extract non-radioactive tantalum (Ta) and niobium (Nb) for use in several segments of U.S. industry. Other operations include fabrication of products, treatment of industrial liquid waste prior to release to the environment, and storage of the generated wastewater filtercake/sludge and ore residue presscake. The ore and presscake resulting from the initial ore processing contain, in addition to valuable rare earth components, uranium and thorium (in combination) in excess of 0.05 percent by weight and is source material as defined and regulated under Title 10 of the Code of Federal Regulations (CFR) Part 40, by the U.S. Nuclear Regulatory Commission (NRC).

The major site facilities related to source material processing and storage include Building 73, where the ore is digested and the Ta and Nb separated, the drum storage areas, the presscake (ore residue) storage area, and the wastewater treatment area. Liquid effluents are retained in on-site lagoons numbers 5 and 6 for final treatment prior to controlled release from the site. Figure 1.1 (Site Plan, October 11, 2002) shows a layout of the CSM facility.

On April 3, 2002, CSM submitted the application for renewal of the NRC License SMB-920 for the Boyertown facility. The staff requested additional information, dated June 25, 2002, and CSM provided the response on October 11, 2002. Additional information to support the review of the application for license renewal was provided on October 17, 2002. On January 10, 2003, the staff requested additional information, mostly addressing the ground water protection review and the decommissioning cost estimate. CSM provided the requested information on March 27, April 30, June 30, and July 15, 2003. The staff provided comments on these documents and CSM submitted responses or draft page changes for discussion on September 26, October 7 and 28, November 3 and 12, and December 15 and 30, 2003, as well as January 19 and February 26, 2004. A revised application incorporating all related components, including NRC Form 313, was submitted on March 24, 2004. The letter of transmittal was dated March 29, 2004.

The licensee indicated (phone call of December 17, 2003) that the request for approval of the beneficial reuse of wastewater filtercake will be withdrawn until a later date. Therefore, that aspect of the original application (April 30, 2003) is not addressed in this document.

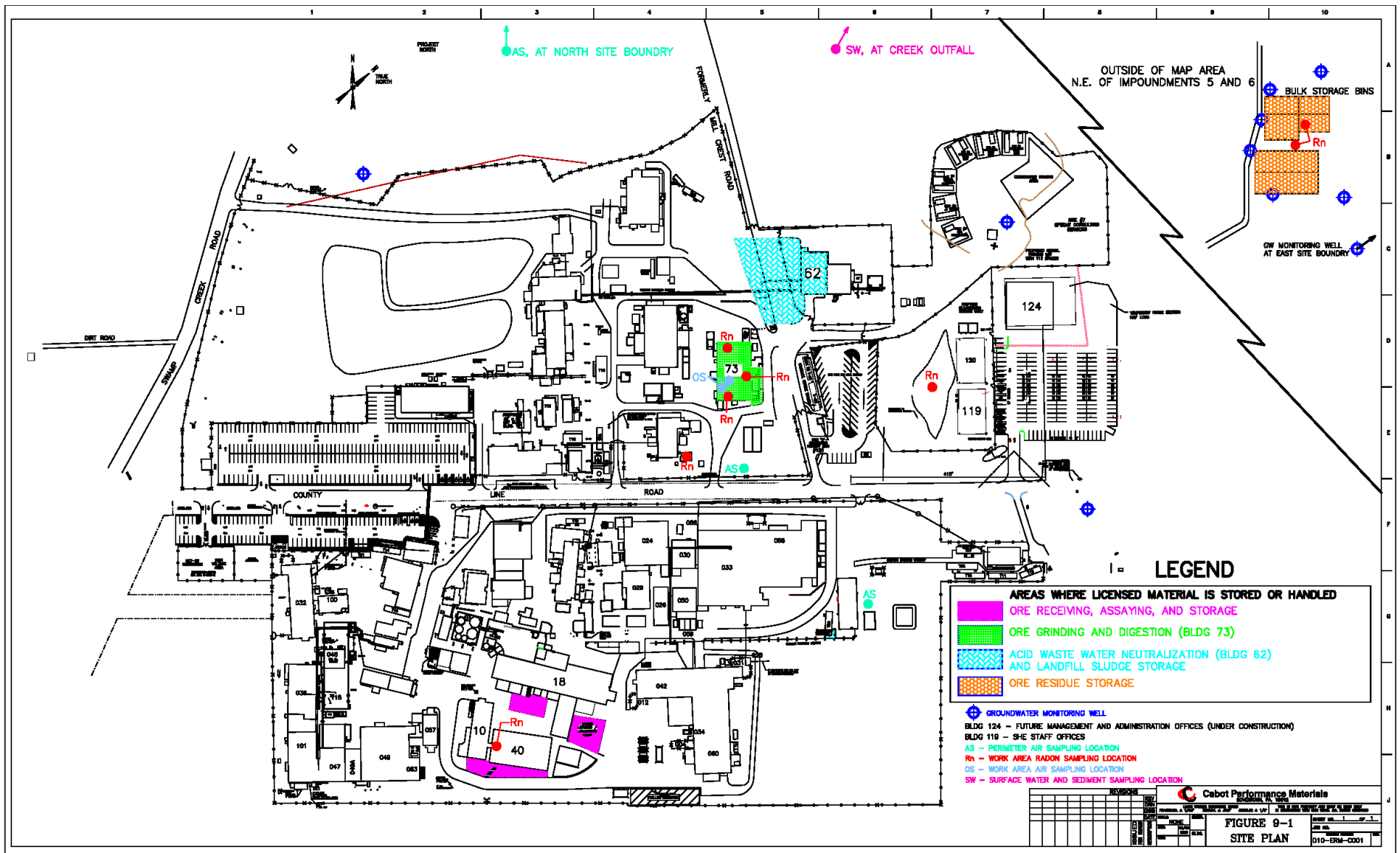


Figure 1.1 Site Plot Plan for Cabot Supermetals facility in Boyertown, Pennsylvania.

Pursuant to 10 CFR Part 51, the NRC prepared this environmental assessment (EA), which implements the requirements of the National Environmental Policy Act (NEPA) of 1969, and the Council of Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508). The purpose of the draft EA is to assess the environmental consequences of the proposed license renewal.

## 1.2 Description of Current Operation

The CSM facility is located in the southeastern part of PA. The facility is authorized under NRC Source Material License No. SMB-920 to possess a maximum of 360 metric tons (400 tons) of elemental uranium (U) and thorium (Th). Plant operation includes the receipt of feed material as ore, containing an average of 0.165 percent by weight of uranium oxide ( $U_3O_8$ ), and 0.057 percent by weight of thorium dioxide ( $ThO_2$ ). The plant ore feed rate is approximately 4,350 kilograms per day (9,600 pounds per day) five days per week, or 1,200 tons per year.

The facility stores feed material in 55-gallon drums, which is transferred to the grinding and sizing equipment. The sized material is dissolved in hydrofluoric acid (HF) in heated digesters, where Ta and Nb are converted to soluble fluoride compounds. The proposed second digestion stage (described in the 1996 license renewal EA) was never added to the process. Insoluble uranium and thorium fluoride compounds are formed during the feed material digestion. Prior to release to the atmosphere, a packed-bed scrubber removes fluorides from the vapors escaping the digester. The resulting stream is separated into a filtrate containing the dissolved Ta and Nb, and the presscake containing source material, and other insoluble feed impurities.

Ta and Nb are recovered in a two-stage extraction process. The first stage extracts Ta and Nb from the aqueous phase through contact with methyl isobutyl ketone (MIBK). In the second stage, the Ta and Nb are extracted from the organic phase into an aqueous stream.

The facility has six lagoons on site. Lagoons (basins) 1 and 2 collect storm water, non-contact cooling water, and steam condensate prior to release to West Swamp Creek. Lagoons (reservoirs) 3 and 4 contain process water pumped from the West Swamp Creek. Lagoons 5 and 6 collect treated wastewater before discharge to West Swamp Creek. As discussed in several following sections, this wastewater discharge and certain other site activities are regulated by the State and the licensee must obtain the required state permits.

CSM generates gaseous, liquid, and solid effluent streams. Potentially hazardous constituents include uranium, thorium, their decay daughters, radon gas, and HF. By letter dated August 1, 2002, the NRC's concurrence was requested on plans to upgrade the wastewater treatment system. The Pennsylvania Department of Environmental Protection (PA DEP) indicated by letter of July 8, 2002, that the changes had been reviewed. The NRC staff indicated on August 27, 2002, that there was no objection to the changes to the system. Modifications to the system will include segregation of the raffinated wastewater stream from its composite stream. CSM's wastewater treatability studies showed that this segregation and the combination of the lime and de-watered wastewater treatment sludge allows for effective treatment of both the remaining combined stream and the segregated raffinate stream. CSM is currently completing the necessary PA DEP permit process.

CSM produces approximately 19,000 tons per year of wastewater sludge (filtercake) which is shipped off site to a landfill as a residual waste. The wastewater is treated with lime, which is a contributor to the radioactivity in the filtercake. The filtercake is composite sampled and analyzed for uranium and thorium to ensure that the total concentration remains below the approved release limit of 10 pCi/g. Historically, the average concentrations of uranium and thorium residue released to a landfill have been 4.21 and 0.14 parts per million (2.85 and 0.015 pCi/g), respectively. From 1999 through September 2003, the uranium and thorium content averaged 3.0 and 0.2 pCi/g, respectively. A few monthly averages have been above 6 pCi/g (uranium plus thorium). Other radionuclides are mostly contained in the ore residue (presscake).

Since the last license renewal in 1996, three shipments of low-level radioactive materials have been sent off site for disposal. The shipment of waste in July 2002, went to RACE, LLC in Memphis, Tennessee, for consolidation and final disposition at Waste Control Specialists (WCS) in Andrews, Texas. This 370 cubic yards shipment of low-level waste was shipped as "Radioactive Material, Excepted Package-Limited Quantity of Material." The total calculated activity for uranium and thorium was 10.33 mCi. By letter dated October 13, 2002, the NRC approved additional shipments containing approximately 750 cubic yards of low-level waste material to WCS as unimportant quantity material as defined in 10 CFR 40.13. These shipments were made in October and November, 2002.

CSM estimates that about 1000 tons of presscake (source material) is produced each year. Stored presscake was removed in 1997 and 1998, (approximately 18,000 tons) for reprocessing as alternate feed material at a uranium recovery facility (mill) in Utah. The concentration of the entire shipped material was 2,800 pCi/g for a total calculated uranium and thorium activity of 45 Ci. The NRC indicated that such large amounts should be allowed to accumulate again. The currently stored presscake (4,000 tons) is scheduled for removal March through June 2004. Also, CSM has committed to store no more than 4,000 tons at any one time.

The facility has access restricted by fences and by gates with full-time security guards. Access to restricted areas is also controlled.

### 1.3 Review Scope

In preparing this EA, the staff used information submitted by the applicant and from the EA for the 1996 license renewal (NRC, 1996). In addition, internet sources, staff site visit, interviews, and inspection reports were used. In accordance with 10 CFR Part 51, this EA serves to: (1) present information and analysis for determining whether to issue a Finding of No Significant Impact (FONSI) or to prepare an Environmental Impact Statement (EIS); (2) fulfill the NRC's compliance with the National Environmental Policy Act when no EIS is necessary; and (3) facilitate the preparation of an EIS when one is necessary. Should the NRC issue a FONSI, no EIS would be prepared.

The proposed action is consistent with activities and conditions analyzed in the EA for the previous renewal of Source Material License No. SMB-920, dated September 1996. In tiering off the 1996 EA, the staff has verified existing conditions, and addressed any changes that may have a public safety or environmental impact. The staff is preparing a Safety Evaluation Report (SER) to address technical and safety-related aspects of facility operations.



## 2.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is the renewal of NRC Source Material License No. SMB-920 to allow CSM to continue to process ore containing source material (uranium and thorium) to recover Ta and Nb. There have been no significant changes to NRC-authorized activities since the last license renewal. CSM indicated that no expansions or changes in the licensed areas of the facility are expected in the foreseeable future that might be reasonably expected to impact the radiological effluents or radiation safety programs at the site. However, CSM did request changes to the environmental monitoring program as discussed in Section 7.2.

Approval of the NRC license renewal request is necessary for CSM to continue current operations using source material to obtain Ta and Nb, two non-radioactive products used in the electronics industry. The CSM facility is one of the main extraction metallurgy facilities in the world that provides valuable metal products for a broad range of industrial applications. CSM's products have different global and industrial applications. The principal application for Ta is the electronic capacitor, and the main application for Nb is superconducting material. The operation is expected to remain economically viable for the long-term.

## 3.0 THE PROPOSED ACTION

The proposed action consists of the renewal of NRC License No. SMB-920 for ten (10) years for the possession and processing of source material at the Cabot facility in Boyertown. The 10-year licensing period is justified because of past performance (only a few severity level IV violations in the past 5 years, monitoring data usually well below criteria), and additional license conditions that require access to a radiation safety officer at all times, and a surety evaluation every 2 years.

The licensed activities will not change in the renewed license, except for some modifications to the environmental monitoring program. The impacts from the proposed action of "operation as requested in the renewal application" are discussed in subsequent sections. The details of the facility operation are in CSM's revised license renewal application, dated March 24, 2004.

## 4.0 ALTERNATIVES TO THE PROPOSED ACTION

### 4.1 Approve the License Renewal as Amended by NRC

The NRC could, by license condition, require modification of the process or operation if the health, safety, and protection of the public and environment could be significantly impacted. License condition changes beyond what are needed for the renewal, as requested, are not anticipated. Discussions concerning the proposed license changes to standardized wording (related to notification, monitoring, surety review) have already been held with the licensee. Impacts from this alternative would be the same or very similar to the proposed action (approve license renewal as requested) and are not distinguished in the following sections.

## 4.2 Denial of License Renewal

Another alternative is denial of the license renewal (i.e., the no-action alternative) which would require the licensee to terminate ore processing and metal manufacturing and, as a consequence, commence decontamination and decommissioning. CSM is a principal extraction metallurgy facility providing valuable metal products to the electronics industry. CSM's products have different global and industrial applications, such as electronic capacitors and superconducting materials. Consequently, denial of the license renewal would have an economic impact to CSM, the electronics industry, and the local community. The socioeconomic impacts of this alternative are discussed in Section 6.6. The environmental impacts of decontamination and decommissioning that would follow denial of the operational license renewal (or cessation of operation) will be considered in greater detail when the final decommissioning plan is submitted. The final plan would be submitted to the NRC pursuant to Title 10 of the Code of Federal Regulations, Section 40.42 (d).

## 5.0 AFFECTED ENVIRONMENT

### 5.1 Location and Land Use

The Boyertown site is approximately 200 acres (Figure 3.1 of the 1996 license renewal EA). The facility is located along both sides of County Line Road, about 2.4 kilometers (1.5 miles) northeast of Boyertown. The site is in two Counties, Berks and Montgomery. The facility is located in a valley between two ridges in a mostly rural area consisting of woods, hills, and farmlands.

The southwestern portion of the site is bordered by West Swamp Creek. The nominal river elevation near Lagoon 1 and Lagoon 2, located immediately adjacent to West Swamp Creek, is about 94 meters (310 feet) above sea level. A hill due north of the site rises to an elevation of about 210 meters (700 feet) above mean sea level. Forested areas are located north of the operating areas and along West Swamp Creek on the southwest part of the site. The land uses include primarily agriculture and farming to support the dairy herds. Also, residences can be found in the northeast, southwest, and southeast of the site. A new residential development has started within 3.2 kilometers (2 miles) southeast of the plant. This new development located several miles from the plant will consist of approximately 30 houses and is supplied with city water. CSM purchased real estate, including two residences, downgradient of the plant. The potable water source for these residences was ground water, but the buildings have been razed.

### 5.2 Historic and Cultural Resources

Section 106 of the National Historic Preservation Act requires Federal Agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. There are no sites, either eligible or listed, in the *National Register of Historic Places*, for Boyertown borough in PA. However, three sites have been listed within an approximate 8-kilometer (5-mile) radius of the CSM-Boyertown facility. Table 5.1 identifies the listed sites. The draft EA served as a request for consultation, as discussed with the State Historic Preservation Office representative in February 2003.

**Table 5.1 Places listed on the *National Register of Historic Places* within an 8-kilometers (5-mile) radius**

<b>Site Name</b>	<b>Location</b>	<b>Date Listed</b>
Johnson, Nicholas Mill	New Berlinville, PA	11/08/1990
Iron Stone Bridge	Morysville, PA	06/22/1988
Bahr Mill Complex	Gabelsville, PA	11/08/1990

Source: National Register Information System (NRIS, 2003)

The Department of Interior, Bureau of Indian Affairs, acknowledges no Indian tribe entities for the Boyertown borough.

### 5.3 Demography and Socioeconomic

The CSM facility is located on the border of Berks and Montgomery Counties in southeastern PA. The 2000 census reports a total population for Berks County of approximately 373,638 resulting in a 11.0 percent increase since the 1990 census. Berks County persons per square mile was 435.0 in 2000. Also, the total population recorded in the 2000 census for Montgomery County was 750,097, increasing by 10.6 percent since the 1990 census. Montgomery County's persons per square mile recorded in the 2000 census is 1552.6. Specifically, the 2000 census reports a total population equal to 3,940 for the Boyertown borough (U.S. Census Bureau, 2000).

The CSM facility in Boyertown employs approximately 450 workers, and is one of the top 20 major employers in the tri-county area of Berks, Montgomery, and Chester Counties (Tri-County Area Chamber of Commerce, 2000). Other major employers include agriculture, banking, light and manufacturing industry, and the school district.

### 5.4 Climatology and Meteorology

The climatology and meteorology information contained in this section is an update to the referenced data and information included in the 1996 license renewal EA. CSM collected weather data from September 1999 to June 2002 using a DAVIS-Weather Monitor II weather station unit. On June 28, 2002, CSM installed a Weather Log™ Weather Monitoring System, which monitors air temperature, relative humidity, dew point, barometric pressure, wind direction, wind speed, and precipitation. It is located in CSM's security and main communications center, and is equipped with real-time weather condition monitoring to be used during emergency response in the event of a spill or release. The new system is equipped with a signal output that is received by CSM's central environmental monitoring system.

The climate of the area is characterized as humid continental with humid summers and moderately cold winters dominated by continental air masses. The annual mean temperature for the period of record was 52.8°F (11.56°C). The maximum temperature recorded during the period of record was 100.2°F (37.89°C), and the minimum temperature recorded was 3.8°F (-15.67°C). Adverse climatic conditions, such as thunderstorms and heavy precipitation can be expected at the site.

Precipitation data from September 1999 to June 2002 were acquired through the National Climatic Data Center provided by the U.S. National Oceanic and Atmospheric Administration at the neighboring town of Bechtelsville, PA (40 degrees 23' N / 75 degrees 37' W). The annual precipitation was 45.5 inches.

Winds from the north to west-northwest were observed 45 percent of the time. Calm wind speed (resulting in a non-detectable wind direction) was observed approximately 30 percent of the total observed time. Hurricanes are rare at an inland site such as the CSM facility.

## 5.5 Geology

### Site Geology and Soils

The Cabot facility is situated in the Gettysburg-Newark Lowlands section of the Piedmont physiographic province. This province is bounded to the southeast by the Atlantic Coastal Plain and the Ridge and Valley to the northwest. Each of these provinces is characterized by a unique association of structural elements and geologic formations. The Gettysburg-Newark Lowlands are typically characterized by rolling lowlands, shallow valleys, and isolated hills. The underlying rock types in this physiographic section are mainly red shales, siltstones, and sandstones; with some conglomerates and diabase. The structural elements are half-graben (normal faulted) areas having low, monoclinical beds dipping to the northwest (Map 11, PA DCNR, 2000).

The shales, siltstones, and sandstones are Triassic in age and are collectively referred to as the Brunswick Formation. The conglomerates are also Triassic in age and typically occur near the margins of graben basins. No conglomerates have been observed at the Cabot site. The diabase is an igneous rock, which had been intruded into the surrounding Triassic aged rocks as dikes and sills in later Triassic or early Jurassic time. The diabase forms the low hills in the vicinity of the site.

The soils in the site area were formed from the weathering of the underlying siltstones and shales in the Brunswick Formation, and may contain some coarse fragments. Soil permeability and the moisture retention capacity are moderate. Surface runoff is low to medium, depending on the soil type (USDA, 1970).

### Seismicity

The Cabot facility is located in a region that has experienced a moderate amount of earthquake activity. A map of PA indicates that the facility is in a moderate earthquake hazard zone. The three earthquakes listed for Berks County occurred from January 1954 to January 1994, have been of magnitude 2.8 to 4.6, and no earthquakes are listed for Montgomery County (Millersville University website, 2003).

### Mineral Resources

No significant surface or underground mining occurs near the site. Some limestone and dolomite of economic importance occur near the site and to the northwest in the Great Valley section of the Ridge and Valley Province (Map 15, PA DCNR 1990). The southern anthracite coal field is situated more than 48 kilometers (30 miles) to the northwest of the site (Map 11,

PA DCNR 1992). No oil or gas fields occur near the site location (Map 10, PA DCNR 1993). A gravel pit is situated about 1.9 kilometers (1.2 miles) northwest of the Cabot facility.

## 5.6 Hydrology

### Surface Water

West Swamp Creek is a relatively small perennial stream that flows along the south-western portion of the Cabot site. It discharges into the Schuylkill River near Pottstown (about 20 lineal miles from the site), which in turn empties into the Delaware River near Philadelphia, approximately 30 lineal miles from the Cabot site. The estimated maximum, minimum, and average flow rates of the West Swamp Creek and the Schuylkill River are provided in Table 5.2.

**Table 5.2 Perennial Surface Water Flow Rates Near the Cabot Site**  
in cubic meters per second (ft<sup>3</sup>/s)

<b>Stream</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Average</b>
West Swamp Creek	48.6 (1,716)	0.0057 (0.2)	0.48 (17)
Schuylkill River*	181.4 (6410 )	2.5 (89 )	41.6 (1,471)

\* Based on 70-year period of record (USGS, 2003)

The Schuylkill River is an important source of drinking water for Pottstown and other downstream communities. The Cabot facility discharges treated wastewater to West Swamp Creek through discharge outfall 001, in accordance with National Pollutant Discharge Elimination System (NPDES) Permit No. 0011266 issued by the PA Department of Environmental Protection (DEP). The Cabot facility uses surface water from West Swamp Creek as a supply for sanitary water and process make-up water.

### Ground Water

Ground-water flow at the site is principally through soil, weathered bedrock, and the fractures and porous rock units of the Brunswick formation of Triassic age. Igneous diabase intrusions occur near the Cabot site, throughout the Triassic-aged units. The diabase forms hills (geomorphically resistant features) in the area surrounding the site, but does not directly influence ground-water flow within the site.

The water table occurs in the soil and shallow weathered bedrock zone within the upper 6 meters (20 feet) of the surface. The depth to the water table varies across the site and is seasonally influenced, but is generally encountered within a meter or so (a few feet) of the surface. Water levels in wells completed to a depth of about 16 meters (53 feet) in the bedrock generally rise to within about 3.3 meters (11 feet) of the ground surface. The horizontal hydraulic conductivity of the weathered bedrock is significantly lower than that of the underlying fractured bedrock, causing the weathered bedrock zone to function as a semi-confining layer for deeper ground-water flow. The water table provides a source of recharge for the underlying fractured bedrock system, even though horizontal ground-water flow in the weathered bedrock is less significant as a pathway.

Ground water within the bedrock flows to the southwest across the site, as demonstrated by data provided in the renewal application. The five monitoring wells in the vicinity of the bulk storage bins are completed to a total depth of 30.7 meters (101 feet). The replacement wells vary in depth from 11.6 to 28.6 meters (38 to 94 feet) plus the depth of well #2 is 161 meters (528 feet). The depth to water in these wells averages about 1 meter (3.5 feet) below the land surface. Studies indicate that ground water travel time from the bulk storage area to West Swamp Creek (the nearest surface water discharge point, 1900 feet down gradient) is 268 days. If contamination is ever detected in the monitoring wells, there should be adequate time for intervention to protect the creek.

The facility presently maintains 28 wells for monitoring ground water flow and quality and two deep wells, one of which is used for the water supply to the plant fire suppression system. The locations of these wells are provided in Figure 1 of this EA, and the construction information and purpose of these wells (assessment program, PA DEP residual waste program, NRC permit monitoring) are in the application.

## 5.7 Ecology

### General Description

The natural climax vegetation described in the 1996 license renewal EA classifies the region as Appalachian oak forest. The dominant species include white and red oak. Other common species include red maple, sugar maple, swamp hickory, and several other species of oak and hickory. The native vegetation has been impacted by farming and urban use over the past years. The open fields consist primarily of grasslands and crops. Montgomery County woodlands consist primarily of second and third growth stands of red oak, ash maple elm, eastern red cedar, sugar maple, beech, and yellow birch.

West Swamp Creek is a small creek which flows along the southwestern portion of the Boyertown facility. The creek has a fauna and flora characteristic of small warm-water streams. It discharges into the Schuylkill River, near Pottstown, PA, which in turn empties into the Delaware River near Philadelphia, PA. Twelve species of fish were identified, including shiners, dace, suckers, chubsuckers, killifish and sunfish. Major plant species identified in West Swamp Creek include duckweed, waterweed, mud plantain, arrowhead, and pondweed. Common field animals include the eastern cottontail rabbit and ring-necked pheasant. Woodland habitats are expected to contain gray squirrel, red squirrel, raccoons, opossums, and striped skunks. Waterfowl have been identified present within the on-site lagoons, including Canada geese, mallards, green-winged teal, and black ducks.

### Threatened and Endangered Species

Section 7 of the Endangered Species Act requires the NRC staff to ensure that the proposed licensing action is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of the habitat of such species. By letter dated July 25, 2002, the NRC requested a list of candidate, threatened, and endangered species or designated critical habitat in the vicinity of the CSM facility from the U.S. Fish and Wildlife Service (FWS). The FWS response dated October 29, 2002, provided the NRC with the requested information (see Section 6.4).

CSM requested written impact reviews from the FWS, PA Fish and Boat Commission, PA Natural Diversity Inventory, Berks County Conservation District, and Montgomery County Conservation District. Based on the information provided to CSM by the above mentioned agencies, no threatened or endangered species have been identified at the Boyertown facility or no impacts are expected. However, the site lies within the known range of the Bog Turtle (*Clemmys muhlenbergii*), recognized as a threatened species existing in PA (U.S. Department of Interior, 2002).

## Wetlands

As described in the 1996 license renewal EA, the National Wetlands Inventory lists several wetland areas located on site. These wetlands have been classified as "Inland Forested Wetlands" (referenced in the application as FWS, June 2003). There are two poorly drained open areas on the southeast part of the site that have been mapped as wetlands. Several portions of the site are located within the 100-year floodplain. The base flood level next to the facility ranges from 95 to 96 meters (313 to 315 feet) above sea level.

CSM referenced the report prepared for Cabot in November 2002 by Soil Services Company, Inc., titled, *Wetland Jurisdictional Determination Report*. This report was prepared in support of a proposed office development at the subject site in accordance with the U.S. Army Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1). This report summarizes wetland delineation activities completed for the area in the vicinity of this office expansion project, not the entire project site. As noted in this report, limits of delineated jurisdictional wetlands and waters of the Commonwealth of Pennsylvania and the United States of America appear to have been accurately defined and no impacts to these wetland areas have been identified from the recent office development project.

## 5.8 Air and Water Quality

The PA DEP Bureau of Air Quality has information on air quality in the *2000 Ambient Air Quality Report*, that is available on its website (PA DEP, 2003). The Bureau also has issued a Clean Air Act Amendments (CAAA) Title V permit for all emission sources at the Cabot facility. In addition to CSM being subject to Title V, the facility is subject to Title VI (Stratospheric Ozone) and Title III of the CAAA (Risk Management Program). CSM is in compliance with the requirements under Title VI. Title III of the CAAA required CSM to implement a Risk Management Program (RMP) to prevent/reduce the release of a listed RMP chemical. It also requires a preventative program, hazard assessment, emergency response program, record keeping requirements, an audit program, and submission of an RMP Plan. CSM is in compliance with the requirements under Title III.

A parameter of concern for the CSM facility is the maximum 24-hour ambient fluoride (as HF). The Commonwealth of PA, under the National Ambient Air Quality Standards established by the U.S. Environmental Protection Agency (EPA), has adopted the  $5 \mu\text{g}/\text{m}^3$  standard for fluoride emissions. CSM's airborne releases are discussed in Section 6.2.

The PA DEP has a surface waters assessment program and has issued a *Water Quality Assessment 305(b) Report* on its website (PA DEP, 2003). West Swamp Creek is not listed, but Swamp Creek is in Drainage List F. The PA DEP has also issued a permit for the Cabot

facility for treatment of acid wastewater and for hazardous waste. CSM's releases to water are described in Section 6.3. and its air and water monitoring programs under the NRC jurisdiction are described in Section 7.2.

## 5.9 Noise

The Noise Control Act of 1972, along with its subsequent amendments, establishes basis for State and local governments' judgement in setting noise standards to protect the public health and welfare. The EPA recommends a 24-hour exposure limit level of 70 decibels of environmental noise to prevent hearing loss over a lifetime. Levels of 55 decibels outdoors, and 45 decibels indoors are identified for preventing interference and annoyance. The major sources of noise in the site area include the current operation of the CSM facility, and the road traffic.

## 6.0 ENVIRONMENTAL IMPACTS

### 6.1 Land and Water Use

There are no new processes or facilities proposed in the license renewal application. There have been no major expansions to the licensed portion of the facility and none are expected. CSM does take process water from the stream, treats to remove impurities, uses in plant processes, treats, tests, and returns the water to the stream under the NPDES permit. The licensed activities will not change, and will remain consistent with the current land and water use. Therefore, no significant impact on land or water use will result from license renewal.

### 6.2 Air Quality

The monitored air pollutant emissions associated with the licensed activities include radiological and nonradiological releases. Potentially hazardous constituents include uranium, thorium, their decay products, and HF. Results for the environmental monitoring program for radiological constituents have been within the NRC standards (Part 20, Appendix B, Table 2) since the 1996 renewal. Monitoring for fluoride between January 1999 and November 2003 are summarized in the revised renewal application, and in Section 7.2 of this EA. During this time period, there were no excursions that exceeded the fluoride standard for the Commonwealth of PA of  $5 \mu\text{g}/\text{m}^3$ . Continued operation at the facility is not expected to result in a significant environmental impact.

### 6.3 Water Quality

Process water is taken from the stream that flows along the plant site boundary, treated to remove impurities, used in the plant process, sent to the wastewater treatment plant to adjust the pH, and returned to the stream in accordance with the site NPDES permit. Surface water sampling locations in the stream are monitored to ensure that effluent does not exceed regulatory limits. The removal, use, treatment, and return of the surface water imparts no significant impact to the environment because the effluent is treated to ensure that its pH, temperature, and particulate content do not alter conditions in the stream.



The monitoring performed since the beginning of operations has not indicated any NRC licensed constituent in surface or ground water that is above the allowable limit. Continued operations are expected to have no significant environmental impact on surface or ground water.

#### 6.4 Ecological Resources

The FWS letter dated October 29, 2002, stated that, "Except for occasional transient species, no Federally listed and proposed threatened and endangered species under our jurisdiction are known to occur within the project impact area. Therefore, no biological assessment nor further consultation under the Endangered Species Act are required with the Fish and Wildlife Service." However, no recent field inspections by the FWS have been conducted in the area (U.S. Department of Interior, 2002).

The letters from several agencies, provided in the revised application, are summarized as follows. The FWS stated that the site lies within the known range of the Bog turtle but no impacts to this potential species have been identified associated with the proposed action. The PA Fish and Boat Commission indicated that no fishes, amphibians, or reptiles listed by that agency were known to exist within the project area. The PA Natural Diversity Inventory response indicated that no occurrences of species of special concern were known to exist within the project area. Both the Berks County Conservation District and the Montgomery County Conservation District said that no potential conflicts with ecological resources of special concern were encountered during the review.

CSM indicated that no expansions or changes in the licensed areas of the facility are expected in the foreseeable future that might be reasonably expected to impact the radiological effluents or radiation safety programs at the site. CSM has identified no impacts to this potential species associated with license renewal.

The staff reviewed CSM's effluent and environmental monitoring programs, and finds that the air, sediment, surface water, and ground water monitoring programs should protect the environment (See Section 7.0). After a review of the potential impacts of the proposed action, the staff has concluded that continued operation at the facility is not likely to adversely affect any threatened, candidate, or endangered species.

Potential wetlands are known to occur within or near the site. Any disturbances should be minimal because no change or expansion to the current operation have been proposed or are expected. The environmental and effluent monitoring programs have been assessed as adequate and protective of the environment.

#### 6.5 Historic and Cultural Resources

The *National Register of Historic Places* lists no sites in the Boyertown borough of PA. However, the *National Register* lists three sites within an 8-kilometers (5 mile) radius from the facility (listed in Section 5.6). The continued operation of the facility will not affect any of the historic properties identified. Also, there are no Indian tribe entities in the area registered with the Bureau of Indian Affairs.

CSM has committed to do a cultural resource inventory before engaging in any developmental activity in an area of the site not previously assessed for cultural and historic resources. CSM also will halt any work that results in the discovery of unknown cultural artifacts. All disturbances associated with a proposed development will be completed in compliance with Section 106 of the National Historic Preservation Act. Continued operation of the facility is anticipated to have no impact on historic or cultural resources.

## 6.6 Socioeconomic Factors

CSM is one of the major employers in the tri-county area of Berks, Montgomery, and Chester Counties. Continued operation of the plant will have a positive, direct impact on the local economy. Denial of the license renewal for operation would force CSM into decommissioning and have a profound negative economic effect on the company and the local community (loss of 450 jobs and tax revenues). The extent of economic effect on the industries that the CSM facility supplies is difficult to estimate but competition would be reduced and buyer costs would likely increase.

## 6.7 Radiological Dose and Safety

### Control of Radioactive Material

CSM has emergency response procedures for protection of the operations, such as control of the radioactive material, during extreme weather conditions. Adverse weather conditions were taken into account when the plant was designed, and are considered when changes are planned in the site grading, process buildings, or materials storage configurations on-site. Wind-loading, snow-loading, and precipitation run-off calculations are part of any design plans for structures and site configuration. There is minimal potential for adverse weather to impact the control of licensed material at the site in a manner that would disperse significant quantities of the material into the environment. This is due to the small quantities of material that are present at the site, and because virtually all of the material is contained throughout the process.

The bulk storage bins for ore filtercake are designed to contain the material in a secure manner that isolates it from the environment. In 2002, CSM initiated a project to maintain and improve the bins to eliminate the potential for surface water and precipitation intrusion into the bins. CSM has placed rubber liners across the concrete floors and up the walls to further ensure that potential freestanding liquids would be retained in the bins. Also, CSM has extended the upper sidewalls to meet with the roof to prevent windblown precipitation from entering the bins, and repaired and improved the rain gutters and grading around the bins to prevent runoff from entering the bins.

An additional structural improvement was made to Building 73, where the drums of ore are temporarily stored prior to emptying them into the circuit. A roof extension and sidewalls were added to the northwest end of the building to provide a more secure and weather-protected ore storage location.

## Potential Radiation Doses

Potential radiological impacts from the proposed license renewal include release of small quantities of radioactive material, including the following radionuclides: uranium-238, uranium-235, thorium-232, and their decay daughters, including radon-222. Other potential impacts include the particulate releases from Building 73 and the ore storage pile. The licensee conducts personnel and site dosimetry to monitor these releases in order to protect plant workers and the public. The doses estimated from the monitoring results are within regulatory limits. For example, the potential dose at the site boundary is 0.6 to 1.1 mrem/yr. The staff has reviewed the monitoring program, and has determined it meets the regulations and is protective of the public and the environment. This topic is also discussed in the SER.

To confirm that the current wastewater filtercake disposal practice is acceptable, the staff reviewed CSM's dose modeling results for potential exposures for waste handlers and assuming that the landfill area is eventually occupied by a resident farmer. Data from filtercake analyses reflecting the isotopic ratios found in the waste, were used in the modeling. The estimated annual dose was a few millirem to the critical group for the maximum concentrations anticipated for disposal. In addition, scans of the loaded trucks indicated background readings. Therefore, no impact is expected to result from release of this filtercake.

## Hazardous Materials

CSM uses potentially hazardous chemicals in the main operations. Chemicals such as HF, sulfuric acid, nitric acid, anhydrous ammonia, methyl isobutyl ketone, are stored on site. The chemicals of most concern at the site are hydrogen and HF. Hydrogen is sometimes generated during ore digestion. On February 28, 2003, the NRC performed a chemical safety inspection at the CSM-Boyertown facility. The inspection concluded that CSM had an acceptable plan for managing chemical safety (NRC, March 20, 2003). Also, CSM's fluoride air concentration data between the period of January 1999 and November 2003, have been within regulatory limits.

The 1996 license renewal EA identified three hazard identification issues for plant operation. The issues were addressed in the CSM response of October 11, 2002. The first type of hazard identification control installed is to monitor the level of material in the digester and reslurry tanks. Each tank is continuously monitored using Krohne radar level gauges with local displays and connections to the Building 73 programmable logic control (PLC) system. This system includes programmed audible and visual, high level and high-high level alarms. In case of such alarm conditions, the alarms are interlocked through the logic to halt transfers of material into the vessels. Secondly, scrubber monitors have been installed to ensure proper operation of the scrubber system that ventilates the operation. The scrubber control device monitors the pressure drop and make-up water flow on a continuous basis. The scrubber monitors have local displays and are connected to the PLC system. The third type of control device installed is an HF tank monitor. The HF bulk tank and weigh tank are each mounted on Weigh-Tronix load cells with local displays. Each tank is connected to the PLC system with Ametek Drexelbrook high-high level capacitance probes.

Since the last license renewal, several safety inspections were conducted to evaluate activities related to radiation safety and compliance with the regulations, and license conditions. The inspections were conducted on November 10, 13, 14, and December 5, 1997; April 8, 13, and

December 14 and 15, 1998; and August 15 and 16, 2001. The enforcement process categorized the identified violations as severity level IV, addressed within the non-escalated process. All of these violations have been addressed and closed. A chemical safety inspection was conducted on February 28, 2003 (NRC, 2003). No violations were identified during this last inspection.

## 6.8 Cumulative Effects

The staff has reviewed the potential impacts from the proposed action to determine if there might be any significant cumulative impacts to the environment from past, current, or reasonably foreseeable future actions. Past and current area activities include the gravel pit 1.9 kilometers (1.2 miles) away from the CSM site. Minor contributions to area dust levels are expected from such activities. The only known future regional land disturbance is the housing project being developed 3.2 kilometers (2 miles) southeast of the plant. The residential development, with the construction of 30 houses, will add vehicles on the roadways. The additional traffic volume is anticipated to be minimal, and to not have a significant impact. Also, typical suburban growth in the general area is foreseeable in the future with the impacts assumed to be mitigated by local authorities.

Currently, no noise monitoring data are available. Additional ambient noise is expected at the new residential development. Noise generated during operation of the licensed activities at the plant is expected to have only minimal impact off-site.

## 7.0 MONITORING

In addition to occupational monitoring (personnel and work area), CSM conducts effluent and environmental monitoring programs to provide a basis for evaluating potential public health and safety impacts, for compliance with the NRC license and environmental regulations, and for development of mitigation measures as appropriate. Liquid and solid waste streams are monitored as part of the effluent monitoring program. Air, surface water, sediment and ground water are monitored as part of the environmental monitoring program.

As required by license condition, if the concentration of a radionuclide specified in the licensee's monitoring plan exceeds 30 percent of the corresponding value in 10 CFR Part 20, Appendix B, Table II, the licensee shall implement a response that consists of internal notification of management and investigation of potential causes of the elevated readings. If the concentration of a radionuclide specified in the licensee's monitoring plan exceeds 30 percent of the corresponding value in 10 CFR Part 20, Appendix B, Table II, the licensee shall implement a response that consists of internal notification of management and investigation of potential causes of the elevated readings. If the concentration exceeds 80 percent, the licensee shall include reporting the incident to the NRC Region I Administrator with proposed corrective actions if warranted, within 30 days after the analysis is received by the licensee.

### 7.1 Effluent Monitoring

The CSM facility generates gaseous, liquid, and solid effluent streams potentially containing radioactive material. CSM monitors and controls the effluents to detect unusual conditions. Gaseous effluent streams are not monitored at the source, either for flow rate or radioactive material content. Instead, the licensee relies on air monitoring at the site boundary to determine its unrestricted area air effluents.

The wastewater treatment system is described in the renewal application. The system generates liquid and solid streams containing radioactive material. The liquid stream is routed to Lagoon 5, then to Lagoon 6 for final pH adjustment, and released through the Outfall 001 to West Swamp Creek. The water flow rate through the Outfall is monitored continuously under the State NPDES program. Outfall 001 is monitored quarterly and analyzed for uranium, thorium, and gross beta activity. Action levels for uranium and thorium are 15 and 1.5 pCi/L, respectively. Actions may include re-analysis, investigation and correction of cause, and verification of correction. Minimum detection levels are reported as 1.0 pCi/L or better for uranium and thorium.

The solid residue from the liquid waste treatment system was sampled each week for three consecutive weeks at the beginning of each quarter, but sampling will increase and analysis performed at least monthly under the renewed license. If the analysis indicates a combined uranium and thorium content of less than the 10 pCi/g release limit, the material is cleared for release to a landfill. From 1999 through September 2003, the uranium and thorium content averaged 3.0 pCi/g and 0.2 pCi/g, respectively. The highest annual concentration was in 2001 with 4.7 pCi/g uranium and 0.5 pCi/g thorium. The filtercake is sent to three different landfills so that when averaged with the other materials, the radioactivity levels would be less than levels in local soils (1.6 pCi/g uranium and 1.7 pCi/g thorium).

## 7.2 Environmental Monitoring Program

The Environmental Monitoring Program measures radiological conditions in air, surface water, sediment, and ground water. Sampling frequency and analysis have been selected to determine if CSM is in compliance with license or permit conditions, and to identify trends that could eventually result in non-compliance if not corrected. The revised program is summarized in Table 7.1

**Table 7.1 Summary of Proposed Environmental Monitoring Program**

Sample Medium	Number of Stations	Analytical Frequency	Sample Type	Type of Analysis
Air	4	Semi-monthly	Continuous	fluoride
Air	4	Quarterly	Continuous	radon (track-etch)
Air	3	Quarterly	Continuous	isotopic U and Th
Sediment	2	Quarterly	Grab	U-nat, Ra-226, Ra-228
Surface water	2	Quarterly	Grab	U-nat, Ra-226, Ra-228
Ground water	7	Quarterly	Grab	U-nat, Ra-226, Ra-228

The proposed changes to frequency of sampling and the constituents sampled as part of this program are discussed below and in the application. Ambient air is sampled continuously at seven locations, either downwind of the plant or at or near the site boundary. Four of these

locations are monitored semi-monthly for ambient fluoride, and the other three locations are currently monitored weekly for gross alpha activity. The concentrations of fluoride monitored are compared against the Commonwealth of PA standard of  $5\mu\text{g}/\text{m}^3$ . The gross alpha activity is compared to the effective concentration limits established by the "Constraint Rule" (Regulatory Guide 4.20, *Constraint on the Release of Airborne Radioactive Material to the Environment for Licensees Other Than Production Reactors*, December 1996). These concentrations comply with 10 CFR 20.1101(d) which requires that licensees keep doses low enough so that the individual member of the public likely to receive the highest dose would not receive an annual dose greater than 10 mrem from airborne effluents. CSM data indicate that the air sample results are well within the dose constraint limit of 10 mrem/yr.

Thorium isotopes were not included in the ground water, surface water, and sediment monitoring programs because most of the thorium forms insoluble fluorides during the ore extraction process and those insoluble fractions remain in the presscake (ore residue) and would not be transported via water-related paths. The small amounts of thorium that are not in the ore residues are removed from the wastewater and are present in the filtercake, thus are not released locally and do not need to be included in the environmental monitoring program.

Two locations in West Swamp Creek are sampled for surface water and sediment. One is located 3.6 meters (12 feet) downstream of Outfall 001, and the second is located about 76 meters (260 feet) upstream from Outfall 001. The water samples are collected quarterly and analyzed for gross alpha and beta emitters. Also, individual radioactive constituents will be identified if the gross beta particle activity exceeds 50 pCi/L. Surface water sample data indicate that alpha emitters are usually not detectable. The beta levels have varied but are within acceptable limits for an indicator parameter. The water samples are also analyzed for several non-radioactive constituents, under NPDES permit requirements. The sediment samples are also collected quarterly from upstream and downstream locations, and analyzed for gross alpha and beta emitters. The results for sediment monitoring at the CSM facility are not significantly different from background values.

CSM proposed changes to the sediment and water monitoring that include replacing measurement of gross alpha and beta with specific analysis for uranium and radium (Ra-226 and Ra-228). In addition, CSM established two action levels for the air and water sampling data. If the radioactive measurements exceeds 30 percent of the limit from 10 CFR Part 20, Appendix B, Table 2, appropriate actions will be taken. These actions include the investigation of potential causes and, if appropriate, modifications to the processes or equipment. If results exceed 80 percent of the concentration limits, the licensee will implement timely corrective actions to ensure that regulatory limits are not exceeded and will report results to the NRC. The staff has determined that these changes are justified.

The current NRC-approved ground water monitoring program (Amendment 1, License Condition 14, June 25, 1997) consists of analyzing samples from four wells near the bulk storage bins. CSM also monitors other wells for substances regulated by the PA DEP. To improve the NRC-licensed program, CSM has proposed using seven other wells instead of the current wells that may not be optimally placed to detect potential effects on ground water quality in the vicinity of the bins. The staff has evaluated the data and intends to modify License Condition 14 to incorporate the proposed ground water monitoring program, as it will adequately protect the public health and environment from exposure to licensed material. In

addition, the drains under Lagoons 5 and 6 collect ground water which is tested to determine if there is a failure in the liners of either of the storage lagoons. No failures have been detected to date. The NRC staff has reviewed the Environmental Monitoring Program and has determined that the Program is acceptable.

### 7.3 Forage Crop Sampling

With NRC approval, dated August 29, 1996, CSM no longer performs forage crop sampling. CSM is required to perform perimeter monitoring for ambient air fluoride, under the State of PA's regulations. Fluoride concentration data between the period of January 1999 and June 2003, have been within regulatory limits.

## 8.0 CONCLUSIONS

This EA has been prepared to evaluate the environmental impacts associated with CSM's proposal to renew NRC Source Material License SMB-920 to continue operation at the Boyertown facility. Based upon the technical review (documented in a safety evaluation report) and impact evaluations, the NRC is considering approval of CSM's request to renew License SMB-920. The alternatives available to the NRC are the following:

- Approve the license renewal as requested;
- Approve the license renewal as amended by the NRC; or
- Deny the request.

Based on its review, the NRC staff has concluded that the environmental impacts associated with the proposed action (approve license renewal as requested) will not have a significant effect on the human environment, and therefore no basis was found for denial of the license renewal request. In addition, denial of the request would have significant economic impacts on CSM and the local community.

Based upon the above assessment, the staff concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the staff has determined that preparation of an environmental impact statement is not warranted, and is preparing a FONSI.

## 9.0 CONSULTATIONS

On August 18, 2003, the NRC staff provided the draft EA to, and requested comments of, various agencies and stakeholders. Additional calls were made to PA DEP requesting comments. After discussions with the PA DEP Bureau of Radiation Protection and the CSM withdrawal of the request for the recycle option for filtercake, a slightly revised draft EA was provided to the PA DEP Bureau of Radiation Protection on December 19, 2003. The following table provides a summary of the contacts to date.

**Table 9.1 Consultations**

<b>Agency</b>	<b>Point of Contact</b>	<b>Date</b>	<b>Purpose of Consultation</b>
NRC/State and Tribal Program	Osiris Siurano, Health Physicist	December 2002, January 2003	Archaeological and Cultural Resources, and Indian Tribe Entities
U.S. Fish and Wildlife Service	David Densmore, Director, PA Field Office	July 25, 2002	Threatened and Endangered Species
U.S. Fish and Wildlife Service	Mike Schmaus	October 29, 2002	Threatened and Endangered Species
PA Bureau of Historic Preservation	Susan Zacher	February 26 and March 4, 2003	Historical properties listed or eligible for <i>National Register of Historic Places</i>
PA Department of Environmental Protection (PA DEP)	Francine Carlini, Air Quality Program Manager	December 12, 2002	Impact on air quality by HF emissions
PA DEP, Water Quality	Jennifer Fields, Program Manager	December 3, 2002	Water quality
PA DEP, Bureau of Radiation Protection	Robert Maiers, Health Physicist	November 7, 2002, and October 30, 2003	Decommissioning , Radiation Protection
PA DEP, Radiation Protection	Ivna Shanbaky, Director	June 27, 2002	Radiation Protection
PA DEP, Bureau of Radiation Protection	Jeff Whitehead, Health Physicist	November 12, 2002	Operation Radiation Protection
PA DEP, Waste Management	Kalvin Ligons	September 26, 2003	Co-product program, waste disposal
PA DEP Bureau of Radiation Protection	David Allard, Director	December 19, 2003	Revised draft EA

Mr. David J. Allard, Director of the Pennsylvania Department of Environmental Protection (PA DEP), Bureau of Radiation Protection, provided comments on the revised draft EA by letter dated January 16, 2004. The comments are summarized and addressed as follows:

1. Section 3.0 states that the licensed activities will not change except for some modifications to the environmental monitoring program, however, Section 3.1 indicates that CSM plans to upgrade its wastewater treatment system. This is inconsistent. Also, Section 3.0 and following sections do not address the impacts from the proposed action on the PA DEP permits.

RESPONSE: The proposed upgrade to the wastewater treatment system is not part of the renewal application but approval was requested separately, that is why it is described under "current operation." Section 3.1 has been moved and designated as Section 1.2. The section



has been revised to indicate that operation of the facility, including the wastewater treatment upgrade, relies on CSM obtaining the necessary State permits. It is our understanding that the PA DEP permitting process for the upgrade is nearing completion. Impacts of continued facility operation on PA DEP permits were not mentioned in the conversations with various PA DEP staff. It is assumed that any potential impacts would be within the scope of past practices, and would be minor.

2. Section 6.7 indicates that estimated doses are “within regulatory limits.” Numerical doses, ranges, or percentages of the limits should be specified. Also, it is not clear that radium and radon are part of the landfill dose modeling.

RESPONSE: Section 6.7 has been revised to state that details of the monitoring program are discussed in the SER that will be part of the license amendment package. The Cabot/CSM revised application can be consulted for details. In addition, the revised license requires that if the concentration of a radionuclide specified in the licensee’s monitoring plan exceeds 30 percent of the corresponding value in 10 CFR Part 20, Appendix B, Table II, the licensee shall implement a response that consists of internal notification of management and investigation of potential causes of the elevated readings. If the concentration exceeds 80 percent, the licensee shall include reporting the incident to the NRC Region I Administrator with proposed corrective actions if warranted, within 30 days after the analysis is received by the licensee.

The dose calculations for the landfill disposal of filtercake resulted in a few mrem/year to the critical group, which addressed current NRC guidance. Empirical data from wastewater filtercake analyses were used as the basis for the dose calculations, which accounted for contributions from the entire decay series, including radium and radon. However, the vast majority of the radionuclides, including virtually all of the radium and resulting radon, are retained in the ore residues (presscake) that are placed in the Bulk Storage Bins until licensed disposal.

3. The release limit for wastewater treatment residue (filtercake) of 10 pCi/g is unnecessarily high and not prudent. Also, Section 6.7 does not address the impact of the release of this material on the State’s municipal and residual waste programs, such as tripping a portal monitor alarm.

RESPONSE: While annual average concentrations of uranium plus thorium-232/228 have been well below 10 pCi/g (3-5 pCi/g), a few monthly averages have been higher than 6 pCi/g. A release limit at 10 pCi/g is consistent with past practices, is based on an appropriate dose assessment, will ensure regulatory compliance, and allow the plant to operate without interruption. The licensee is aware of the consequences of the filtercake triggering a landfill portal alarm. However, thousands of truckloads of this waste have routinely been shipped for more than 10 years to landfills, and no portal alarms have been triggered. CSM has performed spot checks of the dose rates from truckloads of filtercake and found only background levels of radioactivity. In addition, the dose assessment in the license application provides limits for the amount of waste that can go to the various regional landfills in a year. These limits are intended to further control the quantities of waste in any given landfill. Also, the recent landfill dose assessment demonstrated that concentrations at the release limit will maintain potential doses at levels that meet current NRC guidance of a few mrem/year. Therefore, no impact is expected to the State’s municipal and residual waste programs.

CSM has extensive data on the composition of incoming ore lots and has a procedure for isolating any high activity ore lots to ensure that special handling procedures are implemented and wastes comply with release limits before leaving the site. Any filtercake that cannot meet the release limits will be disposed according to other procedures in the license that address higher level wastes.

4. CSM proposes to change the environmental monitoring program to include analysis of uranium and radium. A detailed analysis of the other radioisotopes such as thorium-232, as well as thorium-230, if it is not in equilibrium with uranium-238, is mandatory. It is not clear that the detailed isotopic analysis applies to the filtercake as it should for license renewal.

RESPONSE: Section 7.2 has been revised to indicate that thorium isotopes were not included in the ground water, surface water, and sediment monitoring programs because most of the thorium forms insoluble fluorides during the ore extraction process and those insoluble fractions remain in the presscake (ore residue) and would not be transported via water-related paths. The small amounts of thorium that are present in the filtercake, are not released and do not need to be included in the environmental monitoring program.

Thorium and uranium concentrations in filtercake are measured, and compliance with the release limit is determined using the specific activity of Th-nat and U-nat. CSM performed extensive evaluations of the isotopic concentrations and equilibrium ratios of thorium and uranium chain radionuclides contained in the filtercake in its dose assessment for landfill disposal. The results indicated that the chemical processing on-site disturbs the isotopic ratios in the waste so that, on average, it contains considerably less radium-226 and radon than uranium-238 and almost no thorium-232 chain isotopes. The dose assessment includes all applicable radionuclides by taking into account the actual average degree of equilibrium of the decay chains in the filtercake for given concentrations of Th-nat and U-nat. Thus, the proposed filtercake release limits and monitoring methods account for the decay chains.

5. In Table 9.1, for Jeff Whitehead, the "Purpose for Consultation" column lists "Operation Radiation Protection" but there is no PA DEP program with this title. Other minor errors are mentioned.

RESPONSE: The "Purpose for Consultation" column lists the topic of the discussion not the person's program office. Since Mr. Whitehead accompanied the NRC site tour as a PA DEP health physicist, discussions focused on operational health physics (i.e. radiation protection aspects of the facility operation). The table has been revised to incorporate the correct information indicated in the comment.

## 10.0 PREPARERS

Elaine Brummett, Project Manager and Health Physicist, Division of Fuel Cycle Safety and Safeguards, Office of Nuclear Material Safety and Safeguards, NRC.

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Michael Layton, Senior Hydrogeologist, Division of Fuel Cycle Safety and Safeguards, Office of Nuclear Material Safety and Safeguards, NRC.

Diana Díaz-Toro, Intern, Division of Fuel Cycle Safety and Safeguards, Office of Nuclear Material Safety and Safeguards, NRC.

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