ENVIRONMENTAL ASSESSMENT OF PROPOSED REMEDIATION OF THE CHEMETRON FACILITIES AT THE HARVARD AVENUE SITE IN CUYAHOGA HEIGHTS, OHIO

LICENSE NUMBER SUB-1357 DOCKET NUMBER 040-08724

CHEMETRON CORPORATION

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FOREWORD

This Environmental Assessment (EA) reviews the environmental impacts of certain decommissioning actions proposed by Chemetron Corporation (Chemetron) at its facilities located on Harvard Avenue in Cuyahoga Heights, Ohio. In connection with the review of the proposed action, staff of the U.S. Nuclear Regulatory Commission (NRC) is also preparing a Safety Evaluation Report (SER), which evaluates conformance of the proposed action with NRC regulations and regulatory guidance. The SER may conclude that Chemetron's proposed action should be modified in one or more respects to more fully comply with NRC regulation and guidance. Such modifications to the proposed plan, should they come about and be implemented, would have no significant bearing on the overall environmental impact of the proposed decommissioning and would not change the conclusions of this EA. Upon issuance, the SER will be available for inspection and copying at the NRC Public Document Room, 2120 L Street. N.W., Washington, DC, and at the Local Public Document Room at the Garfield Heights Branch Library, 5409 Turney Road, Garfield Heights, Ohio (Docket Number 040-08724).

SUMMARY AND CONCLUSIONS

This Environmental Assessment (EA) was prepared by the U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Material Safety and Safeguards, and Region III (hereinafter referred to as the staff).

- 1. This action is administrative.
- 2. The proposed action is to approve plans by Chemetron Corporation (the licensee) to perform final decommissioning at its Harvard Avenue facilities located in Cuyahoga Heights, Ohio. The proposed decommissioning is part of a Chemetron decommissioning program that would remediate depleted uranium contamination in soils at the Harvard Avenue and Bert Avenue sites, and in the McGean-Rohco, Inc. (McGean-Rohco) complex adjacent to the Harvard Avenue site. The objective of the decommissioning actions is to terminate the license and release the Harvard Avenue site, the Bert Avenue site, and the McGean-Rohco complex for unrestricted use. On August 5, 1994, NRC staff published, in the Federal Register, a Finding of No Significant Impact and the associated EA for the remediation of the McGean-Rohco complex. A separate environmental assessment is being prepared for the Bert Avenue site in Newburgh Heights, Ohio.
- 3. The proposed decommissioning actions involve the disposal, under 10 CFR 20.2002, of the depleted uranium contaminated wastes, in a disposal cell, located at the Harvard Avenue site. This disposal would be limited to depleted uranium concentrations, acceptable under Option 2, of the NRC's Branch Technical Position on "Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations" (Reference 1).
- 4. Chemetron has identified, at the Harvard Avenue site, no solid wastes and hazardous wastes, as defined under the Resource, Conservation, and Recovery Act (RCRA) that will need to be managed in accordance with the requirements of the Ohio Environmental Protection Agency (OEPA).
- 5. In connection with the proposed decommissioning activity, the licensee intends to perform a final site radiation survey following the excavation of contaminated soils and the remediation. The final radiation survey would include residential and industrial areas adjacent to the Chemetron facilities.
- 6. Chemetron has identified, at the Harvard Avenue site, no decommissioning wastes, exceeding the Option 2 limits in the NRC's Branch Technical Position on "Disposal or Onsite Storage of Thorium or Uranium Wastes From Past Operations" (Reference 1) that require offsite shipment to a licensed low-level waste disposal facility.
- 7. This EA assesses the environmental impacts of the decommissioning proposed by the licensee. It also considers alternatives to the licensee's proposal. This EA has been prepared and issued pursuant to the National Environmental Policy Act of 1969 (NEPA) and 10 CFR Part 51 of the NRC's regulations.

- 8. The staff has reviewed the potential impacts of the proposed decommissioning, both beneficial and adverse. The staff's conclusions are summarized as follows:
 - a. Radiation exposures of persons living or traveling near the site due to onsite operations will be well within limits concained in NRC regulations and will be small in comparison to natural background radiation.
 - b. The potential offsite radiological impacts of potential onsite accidents are small in comparison to natural background radiation.
 - c. Nonradiological impacts of all kinds are negligible. RCRA solid wastes and hazardous wastes are not expected at the Harvard Avenue site. If such wastes are encountered, the wastes will be managed in accordance with OEPA requirements. Any impacts for handling RCRA solid and hazardous wastes, if identified, are expected to be small.
 - d. Radiation doses to the public during remediation operations at the Harvard Avenue site are expected to be less then 0.02 mSv (2 mrem). Assuming a worst-case situation, with no dispersion of airborne contamination over distance, the dose to a member of the public during remediation operations, was calculated to be less than 0.09 mSv (9 mrem). These predicted doses are less than NRC's limits for radiation doses to the public in 10 CFR Part 20.
 - e. Radiation doses to a hypothetical resident-farmer, who might establish a residence on the disposal site, grow on and consume food from the site, and consume drinking water from an onsite groundwater well, were calculated using the RESRAD computer code to be 0.132 mSv/yr (13.2 mrem/yr) at 1000 years and peak at 0.142 mSv/yr (14.2 mrem/yr) at 2150 years after construction of the disposal cell. These predicted doses are less than NRC's limits for radiation doses to the public in 10 CFR Part 20.
 - f. Radiation doses to Harvard Avenue site remediation workers from direct exposure are estimated to be less than 0.6 mSv (60 mrem) for a 2000 hour exposure period. Inhalation doses from a 2000 hour exposure, would be less than 0.03 mSv (3 mrem). These predicted doses are substantially less than the routine occupation exposure limit of 0.05 Sv/yr (5 rem/yr) in 10 CFR Part 20.
 - 9. No wastes that exceed the Option 2 limits in Reference 1 are expected at the Harvard Avenue site. However, if wastes that exceed the Option 2 limits in Reference 1 are discovered, these wastes will be packaged and shipped in accordance with NRC and Department of Transportation requirements. Wastes will be disposed of in accordance with the disposal site license conditions. Therefore, there are no expected impacts from the transportation or offsite disposal of radioactive materials.

- h. The licensee has a radiation protection program that will maintain radiation exposures and effluent releases within the limits of 10 CFR Part 20 and will maintain exposures as low as reasonably achievable.
- i. Based on the very low minority populations in Newburgh Heights and Cuyahoga Heights and income statistics that show no significant lowincome populations compared with those in Cuyahoga County and in the State of Ohio, there are no significant minorities and low-income households that will be exposed to impacts from the proposed activities in Newburgh Heights and Cuyahoga Heights. Because there are no significant impacts from the proposed activities, there will be no environmental justice impacts.
- j. No reasonably available alternative to the licensee's proposed plan is obviously superior.
- 9. On the basis of this Environmental Assessment, it is concluded that the proposed action will not result in any significant environmental impact and that the action called for under NEPA and 10 CFR Part 51, is the issuance of a license amendment authorizing the licensee to perform final remediation of the Harvard Avenue site as proposed by the licensee.

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1 INTRODUCTION

1.1 Background

Chemetron Corporation (Licensee) is the holder of Source Material License No. SUB-1357 (License) originally issued on June 12, 1979, by the Nuclear Regulatory Commission (NRC or Commission) pursuant to 10 CFR Part 40, for possession only of depleted uranium contamination in a facility located at 2910 Harvard Avenue, Newburgh Heights, Ohio (the Harvard Avenue site). The License was modified on October 1, 1987, to authorize the Licensee to possess the radioactive material at the McGean-Rohco site located between 28th and 29th Streets at Bert Avenue, Newburgh Heights, Ohio (the Bert Avenue site). The license was last renewed on January 10, 1990, and was due to expire on October 31, 1990. On October 1, 1990, Chemetron filed a license renewal application with NRC. Pursuant to 10 CFR 40.42(a), the License is continuing in effect.

In 1965, the Atomic Energy Commission issued License No. SUB-852 to Chemetron Corporation, which through its McGean Unit of the Inorganic Chemical Division, manufactured catalysts containing depleted uranium. These operations were carried out between 1965 and 1972 in facilities located at the Harvard Avenue site. By February 1972, manufacture of the catalysts had been terminated, and in December 1973, the License was amended to authorize storage only for the remaining depleted uranium. No activities involving source material, other than decontamination, have been conducted at the site since the termination of the catalyst production by Chemetron in 1972.

In 1975, the McGean Chemical Company, Inc., the predecessor to McGean-Rohco, Incorporated (McGean-Rohco), purchased the Harvard Avenue site. The Licensee, however, retained the License and responsibility for the depleted uranium remaining at the facility. In late 1977, the Licensee was acquired by Allegheny-Ludlum Industries, and merged into a wholly-owned subsidiary. In 1979, the Licensee obtained a new NRC License, No. SUB-1357, to remediate the Harvard Avenue site. License SUB-1357 superseded SUB-852.

Remediation activities under the License began in 1979, with the expectation that the project would be completed in about 6 months. In August 1980, NRC informed the Licensee that source material contamination discovered at the Bert Avenue site in May 1980 must also be remediated.

On October 26, 1984, Allegheny International, Inc., Chemetron's parent company, provided the results of its Bert Avenue site final surveys, indicating that depleted uranium concentrations were less than 1.3 Bq/gm (35 pCi/gm), the applicable NRC unrestricted release criteria provided in the 1981 Branch Technical Position (BTP), entitled, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (Reference 1). On January 11, 1985, Oak Ridge Associated Universities (ORAU) submitted, to NRC, a report of its confirmatory surveys (Reference 2). The ORAU confirmatory surveys indicated that contamination exceeding 1.3 Bq/gm (35 pCi/gm) was still present at the Bert Avenue site. Following additional remediation, on October 15, 1985, the Licensee requested that both the Harvard Avenue and Bert Avenue sites be released for unrestricted use. On January 29, 1986, ORAU submitted, to NRC a report of its confirmatory surveys at the Harvard Avenue site (Reference 3), showing that radioactive contamination was still present, in excess of applicable NRC unrestricted release criteria provided in the 1981 BTP. On March 27, 1986, ORAU submitted to the NRC, a report of its confirmatory surveys at the Bert Avenue site (Reference 4). Contamination exceeding the unrestricted release criteria was found.

On February 20, 1988, Allegheny International, Inc., filed a voluntary petition under Chapter 11 in the U.S. Bankruptcy Court. On August 31, 1990, Allegheny International, Inc., requested NRC consent to transfer control of Chemetron's license to Sunbeam/Oster Company, Incorporated. Under this corporate arrangement Montey Corporation would be the direct parent of Chemetron, and Sunbeam/Oster Company would be the direct parent of Montey Corporation. The Licensee indicated in its August 31, 1990, submittal that it would have completed a revised remediation plan for the Harvard Avenue site by March 1, 1991. The NRC staff confirmed this schedule with a provision of the consent of transfer dated September 11, 1990, requiring the submission of a revised remediation plan for the Harvard Avenue site by March 1, 1991.

On October 2, 1990, Chemetron submitted a request for license renewal to authorize possession of depleted uranium in the form of uranium oxide contamination at the Harvard Avenue and Bert Avenue sites for a 5-year term.

On January 3 and 4, 1991, NRC conducted a safety inspection of activities authorized by License No. SUB-1357 and transmitted to the Licensee its inspection findings in NRC letter dated January 28, 1991, which included a Notice of Violation for failure to adequately survey a portion of the restricted area at the Bert Avenue site before its release for unrestricted use. NRC also requested, in a letter dated January 28, 1991, that the Licensee address NRC's concerns over low-level uranium contamination found in Buildings 14 and 20 of the McGean-Rohco complex.

From March 19 through April 15, 1991, NRC conducted special safety inspections of survey activities being conducted at the McGean site. During the inspection, contamination of equipment and structures was found in several buildings at the McGean site. An apparent violation of NRC requirements was identified -- loss of control of licensed material in an unrestricted area and not in storage (10 CFR 20.207(b)). Based on these inspection findings, NRC requested that an expanded site survey be performed and a written report documenting the results of the survey be submitted to NRC by April 5, 1991. The Licensee submitted its report, in two letters dated April 5, 1991, and April 12, 1991, on the status of the McGean surveys, which indicated that 7 of 11 McGean buildings surveyed were contaminated with depleted uranium in excess of NRC limits.

On July 18, 1991, the licensee requested that license conditions be revised to establish a submittal date of August 16, 1991, for the Harvard Avenue and the Bert Avenue remediation plans.

A Notice of Violation and Proposed Imposition of Civil Penalty Notice was issued to the Licensee on August 14, 1991. The Notice addressed the Licensee's failure to secure licensed material in the form of depleted uranium from unauthorized removal and failure to maintain the material under constant surveillance and immediate control. The Notice was the result of a violation identified during an NRC inspection conducted from March 19 through April 15, 1991, which located depleted uranium on and in equipment and structures in Building Numbers 1, 3B, 3C, 4, 5B, 6, 9, 10, 11, 14, 16A, 16B, 17, 19, and 20 at 20'0 Harvard Avenue, Cuyahoga Heights, Ohio, which are unrestricted areas. Subsequently, an Order Imposing Civil Monetary Penalty in the amount of \$7,500 was served to the Licensee.

On June 28, 1991, Chemetron submitted, to the NRC, its "Site Characterization Report, Harvard and Bert Avenue Sites" (Reference 5). This report was also reviewed by the Ohio Department of Health (ODH) and the Ohio Environmental Protection Agency (OEPA). On August 15, 1991, comments were transmitted to Chemetron indicating that there were substantive deficiencies in the report.

On August 16, 1991, Chemetron submitted, to the NRC, the "Remediation Plan for the Harvard and Bert Avenue Sites" (Reference 6). Comments from the NRC, ODH, and OEPA were transmitted to Chemetron on December 18, 1991. The remediation plan was considered to be conceptual in nature and therefore lacked sufficient detail, and was based on an inadequate site characterization.

On May 5, 1992, Chemetron and NRC entered into a Consent Order that established, as a License Condition, June 15, 1992, as the submittal date for the Final Site Characterization Report for the Harvard Avenue and Bert Avenue sites. On June 15, 1992, Chemetron submitted, to NRC, the "Final Site Characterization Report, Harvard and Bert Avenue Sites" (Reference 7). On January 8, 1993, NRC approved the "Final Site Characterization Report, Harvard and Bert Avenue Sites."

On May 7, 1993, Chemetron requested an amendment to its License that would establish October 1, 1993, as the date for the submittal of the Site Remediation Plan for the Harvard Avenue and Bert Avenue Sites. On October 1, 1993, Chemetron submitted its "Site Remediation Plan, Chemetron Remediation Project, Harvard Avenue and Bert Avenue Sites" (Reference 8). However, the submittal did not contain the final radiation survey plan section, the safety analysis section, and the dose assessment section. On October 26, 1993, NRC issued a Confirmatory Order to Chemetron requiring that the final radiation survey plan section be submitted, to NRC, by November 1, 1993, and the safety analysis and dose assessment section be submitted, to NRC, by November 15, 1993. On November 1, 1993, Chemetron submitted the final radiation survey plan section, and on November 11, 1993, Chemetron submitted the safety analysis and the dose assessment sections. Also, on November 1, 1993, Chemetron submitted a remediation plan for the contamination at the McGean-Rohco complex. On March 24, 1994, Chemetron submitted a request to amend its License to authorize remediation in accordance with its "Site Remediation Plan."

On April 4, 1994, Chemetron requested NRC staff to separately review the remediation of the McGean-Rohco buildings so that remediation could began as

quickly as possible. After review of the portions of the Chemetron Final Remediation Plan for Harvard Avenue and Bert Avenue sites that addressed the McGean-Rohco building remediation, NRC staff published, in the <u>Federal</u> <u>Register</u>, on August 5, 1994, a Finding of No Significant Impact and an environmental assessment for the McGean-Rohco complex remediation (Reference 9). On August 9, 1994, NRC staff issued Amendment 4 to the Chemetron License authorizing Chemetron to conduct the McGean-Rohco building remediation. On August 9, 1994, NRC staff also issued a Safety Evaluation Report for the proposed remediation of the McGean-Rohco complex.

On December 5, 1994, Chemetron submitted its "Final Site Closure/Post-Closure Plan, Bert Avenue" (Reference 10) to OEPA. This submittal is intended to address the solid waste concerns that are under the jurisdiction of OEPA.

On February 28, 1995, Chemetron submitted Revision 1 to its "Site Remediation Plan, Chemetron Remediation Project, Harvard Avenue and Bert Avenue Sites" (Reference 11). This revision incorporated modifications to the originally submitted "Site Remediation Plan," from response letters to NRC comments, dated February 7, 1994, March 2, 1994, April 15, 1994, July 8, 1994, July 22, 1994, and December 19, 1994.

On May 18, 1995, Chemetron requested NRC staff to expedite and separately review the remediation of the Harvard Avenue site so that remediation would not be delayed because of the required OEPA review of the solid waste issues at the Bert Avenue site, under the jurisdiction of OEPA.

1.2 Proposed Action

This Environmental Assessment (EA) concerns the proposed final remediation of the Chemetron facilities at Harvard Avenue. The purpose of this decommissioning is to remove radioactive contamination to levels such that the Harvard Avenue site can be released for unrestricted use.

In this action, Chemetron is proposing to use onsite disposal, under 10 CFR 20.2002, at the Harvard Avenue facility, for wastes from the remediation of the Harvard Avenue site, with concentrations up to the Option 2 limit in the 1981 BTP. Wastes that exceed the concentration Option 2 limits in the 1981 BTP would be shipped offsite, to a licensed low-leve laste disposal site for disposal.

1.3 Need for Action

The proposed action is necessary to remove the contamination that exists at the Chemetron facilities at the Harvard Avenue site. Decommissioning of these areas to a condition suitable for unrestricted release is an obligation that Chemetron must fulfill, either now or in the future. Chemetron has determined that it is to its advantage to proceed with the decommissioning, now, based on a weighing of many factors. These factors include, protection of those people occupying nearby residences, the present and future costs of performing the remediation and disposing of the radioactive wastes, the cost of maintaining control over the existing sites, and radiation exposure to workers and the public.

2 DESCRIPTION OF CHEMETRON FACILITY

This chapter provides descriptive information on the physical plant, including relevant portions of the facility's history.

2.1 General Facility Description

The decommissioning of the Chemetron facility will consist of remediation of three areas located in Newburgh Heights, Ohio and Cuyanoga Heights, Ohio (see Figure 2.1). These three areas are the Harvard Avenue site, the Bert Avenue site, and the McGean-Rohco complex.

The Harvard Avenue site, located at 2900 Harvard Avenue, in Cuyahoga Heights, Ohio, is the location of the former catalyst production operations. The site is located in an industrial area and is bounded on the north by Harvard Avenue, on the west by the Aluminum Company of America, on the south by the Newburgh and Southshore Railroad, and on the east by McGean-Rohco, Inc. From 1965 to 1972, Chemetron converted depleted uranium hexafluoride to U_3O_8 to be used in an antimony-silica based catalyst that was sold for use in the production of plastics. The catalyst production building, identified as Building 21, has been demolished, and the site now consists of an open area of 12,000 m² (3 acres).

In 1975, some of the demolition wastes from Building 21 were disposed of at the Bert Avenue site, an unregulated landfill located in a residential area, at the end of East 27th Street and Bert Avenue, in Newburgh Heights, Ohio. The landfill is a steep-sided ravine, having a depth of about 15 m (50 feet), and has an area of about 28,000 m² (7 acres). It is located approximately three blocks north of the Harvard Avenue site. The landfill has been used from the 1940's to 1977 for the disposal of construction rubble, industrial and household equipment, and miscellaneous industrial solid wastes.

The McGean-Rohco complex consists of 13 major buildings and several smaller buildings, located at 2910 Harvard Avenue in Cuyahoga Heights, Ohio. These buildings are owned by McGean-Rohco, Inc. and are contaminated from airborne emissions from the former Chemetron depleted uranium processing and have contaminated equipment previously used by Chemetron.

2.2 Facility Operating History

The Atomic Energy Commission issued Source Material License SUB-852 to Chemetron on October 8, 1965. This license authorized Chemetron to possess and chemically convert depleted uranium hexafluoride into an antimony-silica based catalyst containing U_3O_8 . These operations ended in 1972. In 1974 equipment used in the production of the catalyst was dismantled and transferred to a Chemetron subsidiary holding a State of Kentucky source material license. Between 1972 and 1984, decommissioning activities took place in Building 21, the catalyst production building. In 1984, Building 21 was dismantled. In 1975, some of the contaminated building rubble, wastes, and soils from the Building 21 remediation were disposed of at the Bert Avenue



Figure 2.1 Location of Chemetron Facilities.

landfill. In 1980, a member of the public notified NRC of these disposals, which were made by Chemetron without NRC approval. Chemetron was subsequently cited for violation of NRC disposal requirements.

From 1972 to the present time, Chemetron has been attempting, with little success, to decommission the Harvard Avenue and Bert Avenue sites. Between 1990 and 1992, Chemetron performed site characterization activities at the Harvard Avenue and Bert Avenue sites. Cn October 1, 1993, November 1, 1993, and November 15, 1993, Chemetron submitted, to NRC, a final Site Remediation Plan addressing the Harvard Avenue site, the Bert Avenue site, and the McGean-Rohco complex (Reference 8). The final Site Remediation Plan is intended to provide Chemetron's proposed decommissioning plan for remediating the remaining depleted uranium contamination to levels acceptable for unrestricted use. On February 28, 1995, Chemetron submitted a revised Site Remediation Plan (Reference 11).

2.3 Current Radiological Conditions

Current radiological conditions at the Harvard Avenue and Bert Avenue sites are described in detail in Chemetron's Final Site Characterization Report, dated June 15, 1992 (Reference 7). Current radiological conditions at the McGean-Rohco complex are described in Chemetron's revised Site Remediation Plan (Reference 11).

At the Harvard Avenue site, Chemetron performed radiological analyses on surface and subsurface soils, groundwater, surface water, and air. For soils it is estimated that approximately 75 percent of the site contains depleted uranium contamination at concentrations exceeding 1.3 Bq (35 pCi) of total uranium per gram of soil. The calculated average concentration is 1.3 Bq/gm (34 pCi/gm) of U-238 or 1.9 Bq/gm (51 pCi/gm) total uranium. Two discrete portions of the site have concentrations that exceed 2.6 Bq/gm (70 pCi/gm). Chemetron reported maximum surface concentrations of 3.9 Bq/gm (107 pCi/gm) of U-238 or 5.9 Bq/gm (160 pCi/gm) total uranium. Maximum subsurface concentrations were reported to be 3 Bq/gm (81 pCi/gm) of U-238 or 4.5 Bq/gm (122 pCi/gm) total uranium. Almost all of the contaminated material is located within the upper 0.6 m (2 ft) of soil.

Depleted uranium concentrations exceeding the unrestricted release limits were found along the railroad tracks south of the site (5.3 Bq/gm (144 pCi/gm)), on property owned by Ohio Crankshaft Company along the fence line to the east of the McGean-Rohco complex (5.4 Bq/gm (146 pCi/gm)), and on the ALCOA property to the west of the site (Reference 12) (up to 20,500 Bq/gm (554 pCi/gm)). Th-232 and Ra-226 analyses were also performed on soils and showed concentrations below the NRC unrestricted use limits for total thorium (0.37 Bq/gm (10 pCi/gm)) and below the EPA limits for radium contamination (0.19 Bq/gm (5 pCi/gm)) for surface soils and for subsurface soils (0.56 Bq/gm (15 pCi/gm)).

Chemetron estimates that, at the Harvard Avenue site, there are over 4,450 m³ (158,000 ft⁵) of radioactive contaminated soil that would need to be disposed of in the disposal cell. There is one pile of excavated soil having a volume

of 1500 m^3 (53,000 ft³). The average and maximum concentrations of U-238 in this soil pile are 1.26 Bq/gm (34 pCi/gm) and 2.63 Bq/gm (71 pCi/gm), respectively.

Based on analyses of Harvard Avenue site groundwater samples from existing upgradient and downgradient wells, Chemetron reported concentrations of U-238 and Ra-226 below the U.S. Environmental Protection Agency (EPA) proposed drinking water levels. Currently, there are no known drinking water wells near the site, as the local water source is a public drinking water system. Although there are no surface water streams running through the Harvard Avenue site, surface water samples were taken from standing water in the three excavations. Radiological analyses of the surface water samples indicated that concentrations were below NRC effluent release limits for unrestricted areas. in 10 CFR Part 20, Appendix B.

Chemetron has taken air samples from the Harvard Avenue site and from offsite locations. From these air samples, Chemetron measured gross alpha and beta concentrations. The air sample concentrations are below NRC airborne effluent limits in 10 CFR Part 20, Appendix B, Table II, Column I, and are consistent with offsite samples representative of background concentrations. NRC air sample results from the Harvard Avenue site support the Chemetron results.

Environmental radiation measurements, using thermoluminescent dosimeters (TLDs), have been made at the Harvard Avenue site. The results are consistent with background measurements.

Chemetron performed chemical analyses on groundwater, surface water, and soil samples. Constituents in surface waters were generally below OEPA's quality standards for warm-water habitats, except for iron and lead, which slightly exceeded the water quality standards.

3 DESCRIPTION OF CHEMETRON SITE AND ENVIRONMENT

3.1 Chemetron Site and Location

The Chemetron site consists of three general areas, the Harvard Avenue site, the Bert Avenue site, and the McGean-Rohco complex (see Figure 2.1). The Harvard Avenue site, located at 2900 Harvard Avenue in Cuyahoga Heights, Ohio, was the location of the catalyst production plant operated by Chemetron from 1965 to 1972. The Bert Avenue site, located on East 27th, East 29th, and Bert Avenue, about three blocks north of Harvard Avenue, in Newburgh Heights, Ohio, was an uncontrolled industrial disposal area. The McGean-Rohco complex, located at 2910 Harvard Avenue, in Cuyahoga Heights, Ohio, is owned by the McGean-Rohco Company and lies immediately east of the Harvard Avenue site. The complex consists of 13 main buildings and several auxiliary buildings that are currently being used by the McGean-Rohco Company.

The Harvard Avenue site is now an open area of about $12,000 \text{ m}^2$ (3 acres). The Harvard Avenue site and the McGean-Rohco complex are bounded by private residences and businesses located on the north side of Harvard Avenue, the ALCOA Cleveland Works to the west, the Newburgh and Southshore Railroad to the south, and the Ohio Crankshaft Company to the east.

The Bert Avenue site is bounded to the south and east by private residences, to the west by a public park area, and to the north by light industrial buildings. The disposal area consists of a steep-sided ravine having a depth of about 15 m (50 ft). The site has an area of about 28,000 m² (7 acres).

3.2 Climate

Based on over 30 years of recorded data, the average annual temperature in Cleveland, Ohio, is 49.7F; the average annual rainfall is 89.9 cm (35.4 in); and the average annual snowfall is 136 cm (53.6 in).

January is the coldest month, having an average high temperature of 0.6C (33F) and an average low temperature of -7.2C (19F). July is the hottest month with an average high temperature of 28C (82F) and an average low temperature of 16C (61F). About 84 percent of the annual average snowfall occurs in the months of December, January, February, and March. The greatest monthly average snowfall occurs in January. February is the driest month, with an average normal precipitation of 5.6 cm (2.20 in). June is the wettest month, with an average normal precipitation of 8.9 cm (3.49 in).

The predominant wind direction is from the south. The wind velocity is less than 20.9 km/hr (13 mi/hr) 65 percent of the time and is greater than 54 km/hr (32 mi/hr) 0.1 percent of the time.

3.3 Demography and Socioeconomics

The Villages of Newburgh Heights and Cuyahoga Heights, Ohio, are suburbs of Cleveland in Cuyahoga County. Based on the 1990 census (References 13 and 14), the population of Newburgh Heights is 2310, Cuyahoga Heights is 682, the City of Cleveland is 505,616, and Cuyahoga County is 1,412,140. In Newburgh Heights, the population has a median age of 34.6 and is 99.3 percent white. The median value of owner-occupied housing units is \$47,300, and the median household income is \$24,621. In Cuyahoga Heights, the population has a median age of 40.6 and is 98.8 percent white. The median value of owner-occupied housing units is \$67,800, and the median household income is \$30,234. In the City of Cleveland, the population has a median age of 31.9 and is 49.5 percent white and 46.6 percent black. The median value of owner-occupied housing units is \$40,900, an the median household income is \$17,822. In Cuyahoga County, the population has a median age of 34.9 and is 72.5 percent white and 24.8 percent black. The median value of owner-occupied housing units is \$72,100, and the median household income is \$28,595.

3.4 Land

Newburgh Heights and Cuyahoga Heights are mixed residential and industrial communities. Based on the 1977 General Land Use Map for Cuyahoga County, Ohio, the land use is classified as predominantly industry, wholesale, and storage, with a small amount of commercial and office use.

The elevations of Newburgh Heights and Cuyahoga Heights are approximately 210 m (690 ft) above mean sea level near Harvard Avenue. The elevations decrease with a slope of 1 percent, to the northwest, toward the Cuyahoga River. Slopes range about 5 to 18 percent along the boundaries of the Cuyahoga River flood plain, which is located about 1.6 km (1 mile) to the south, east, and north of the Chemetron sites.

The Harvard Avenue site and the McGean-Rohco complex site lie on flat terrain having a elevation of about 213 m (698 ft) above mean sea level. There is a large excavation, approximately 3-m (10-ft) deep, on the Harvard Avenue site from previous remediation activities.

3.5 Surface Water

At the Harvard Avenue site, surface drainage and runoff are controlled by existing drainage swales and excavations. The open excavation, from previous remediation activities, will collect and pond rainwater.

3.6 Groundwater

The principal hydrogeologic units in the region are the Undifferentiated Unit and the Lacustrine Unit. The Undifferentiated Unit forms a confined water table above the Lacustrine Unit. This water table is occasionally used for industrial water supply. The Lacustrine Unit overlies a bedrock aquifer. The bedrock aquifer, considered to be a separate hydrologic system, is separated from the confined water table in the Undifferentiated Unit by about 180 m (600 ft) of clay. Wells in the area generally have low water production, except in cases where there are san Heights and Cuyahoga Heig system. There are no kno vicinity of the Harvard A

At the Harvard Avenue sit ft) below grade. This wa extends to the Undifferen thickness from 0.3 m (1 f slope of 0.4 percent towa testing produced conducti Undifferentiated Unit and

Chemetron analyzed season groundwater elevations we groundwater gradients was enses. Drinking water in Newburgh the Cleveland public water supply indwater for drinking purposes in the

ater table is approximately 7.3 m (24 ccurs in the Undifferentiated Unit and custrine Unit contact and varies in ft). The groundwater gradient has a Chemetron hydraulic conductivity 1 to 2.76 x 10⁻⁴ cm/sec in the the Lacustrine Unit.

s of the groundwater table. Changes in er time; however, no reversal of

4 PROPOSED DECOMMISSIONING ACTION

The proposed decommissioning scope of work in indes remediation of the Harvard Avenue site and construction of a disposal cerr for the wastes contaminated with depleted uranium.

4.1 Major Decommissioning Activities, Tasks, and Schedules

This section describes the specific work efforts necessary to accomplish the desired decommissioning of the Harvard Avenue. The general work activities necessary to achieve unrestricted use criteria are:

- 1. Site preparation;
- 2. Excavate, segregate, and stockpile contaminated materials;
- Construct disposal cells in excavated areas;
- Place contaminated materials in disposal cells;
- 5. Perform final radiation surveys to demonstrate compliance with unrestricted use criteria.
- 6. Construct disposal cell covers;
- Ship contaminated materials exceeding the unrestricted use criteria to a licensed low-level waste disposal site;

4.1.1 Site Preparation

Site preparation involves setting up construction zones, entry and exit points, and setting up personnel and radiological controls needed for the remediation.

4.1.2 Excavate, Segregate, and Stockpile Contaminated Materials

Before the disposal cells can be constructed, contaminated materials at the Harvard Avenue site will be excavated, segregated, and stockpiled. If contaminated materials having activity levels exceeding the unrestricted release limits are found, these wastes will be segregated for shipment to a licensed low-level waste disposal site. Stormwater and groundwater control systems will be constructed. All construction activities will use standard earth-moving equipment.

As the construction proceeds at the Harvard Avenue site, a temporary stormwater collection basin will be built at the north end. Stormwater will be sampled, to ensure that 10 CFR Part 20 effluent release limits are met, before being released to the existing stormwater system for the site. At the Harvard Avenue site, excavation will take place from the south end of the site to the north end. Stockpile areas will use liners and covers, and be located to the north of the disposal cell.

4.1.3 Construct Disposal Cells

Following the excavation and stockpiling of contaminated materials and before construction of the disposal cells, surveys will be performed to ensure that all contamination has been removed and that the areas below the cells meet NRC unrestricted use limits.

Figures 4.1 and 4.2 show the plan and elevation views of the proposed Harvard Avenue cell. The cell will be constructed from the natural material that lies below the contaminated layer. The construction of the Harvard Avenue cell will proceed in two sequences because of space limitations on the site. The southern portion of the cell will be constructed first from the center to the south end and then from the center to the north end of the site. After wastes have been emplaced in the southern portion, the contaminated stockpile materials have been moved from the northern portion of the site to the cell, and surveys are performed to show that the area below the cell meets NRC unrestricted use limits, the northern portion of the cell will be constructed.

4.1.4 Place Wastes in Disposal Cells

Wastes will be placed in the Harvard Avenue cells in sections in 0.3-m (1-ft) lifts and compacted. The total waste layer in the Harvard Avenue cell will be 0.9 m. (3 ft.) in depth. Wastes will be placed in two sequenced operations, as discussed above.

4.1.5 Perform Final Radiation Surveys

Final radiation surveys will be performed in areas surrounding the disposal cell in accordance with NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination" (Reference 15). The objective of tnese procedures is to demonstrate, with a 95 percent confidence level, that there are no radioactive hot spots having levels that exceed the averaging criteria in NUREG/CR-5849.

Final radiation surveys will also be performed to ensure that wastes placed in the disposal cell are less than 7.4 Ba/gm (200 pCi/gm) when averaged over a 100 m² (1070 ft²) area and meet the averaging criteria in NUREG/CR-5849. The final surveys will consist of performing radiation scans over 100 percent of each 0.3 m (1 ft) lift and taking one sample for gamma spectroscopic analysis in every 10 m (33 ft) x 10 m (33 ft) area at every third lift. Chemetron will composite the samples over the three lifts. If scans or samples indicate activity that exceeds 7.4 Bq/gm (200 pCi/gm), Chemetron will take further samples and determine compliance with the averaging criteria in NUREG/CR-5849. These criteria address averaging concentrations over any 100 m² (1070 ft²) area and using the (100/A)^{1/2} elevated area criteria. Material that exceeds the averaging criteria in NUREG/CR-5849 shall be removed and shipped off-site to a licensed low-level waste disposal site.

NRC will perform confirmatory surveys to ensure that Chemetron's final surveys reflect the actual radiological conditions at the site.





4.1.6 Construct Disposal Cell Covers

After the final radiation surveys are performed, the cell covers will be constructed. At the Harvard Avenue site, the cover will consist of a fill layer, a compacted clay layer, a geotextile orainage layer, and select fill and topsoil covers. A vegetative cover will be grown over the cell to minimize the effects of erosion. The Harvard Avenue cover will have a thickness of at least 1.2 m (4 ft). The cover will be graded to promote drainage.

Following emplacement of the radioactive wastes and completion of the final surveys, compacted non-radioactive solid wastes will be placed on top of the radioactive materials. Compacted select fill will be added to bring the level of the cell up to the desired elevations.

4.1.7 Ship Wastes That Exceed the Onsite Cell Limits

Any contaminated materials that exceed the Option 2 limits in the BTP will be shipped to a licensed low-level waste disposal site. Chemetron proposed to ship wastes to the Envirocare facility in Clive, Utah.

4.1.8 Schedule

After NRC approval, Chemetron is proposing an 18-month schedule for the remediation of the Harvard Avenue site. This schedule includes site preparations, final design preparations, selection of contractors, excavation, waste emplacement, final and confirmatory surveys, and site grading. The disposal cell excavation and waste emplacement will take approximately 12 months for the Harvard Avenue site.

4.2 Radiological Controls

Radiological controls to be implemented include controls limiting effluent releases to the environment and radiation exposure to workers and the public. An environmental monitoring program will be implemented as an additional safeguard. The radiation controls are subject to the Chemetron Radiological Control Program (Reference 16) and the Chemetron Remediation Project Quality Assurance Program (Reference 17).

4.2.1 Effluent Release Controls and Environmental Monitoring

Airborne monitoring sampling stations will be established for the remediation operations. Four sampling stations will be placed at the perimeters of the Harvard Avenue site. Chemetron will collect samples at least weekly and measure gross alpha, gross beta, and isotopic uranium in each of the samples. Releases will meet 10 CFR Part 20 airborne effluent requirements. Environmental TLDs are placed along the perimeters of the Harvard Avenue site and will be assayed on a quarterly basis.

Liquid effluents will be collected in holding and sediment retention basins. Gross alpha, gross beta, and uranium assays will be performed whenever releases are made. Releases will meet 10 CFR Part 20 liquid effluent requirements. Since there is no surface water at the Harvard Avenue site, only quarterly groundwater samples will be taken.

4.2.2 Worker Exposure Controls

The radiation protection program will be implemented by qualified staff under the direction of the Radiation Safety Officer (RSO). The goal of the radiation protection program is to ensure that remediation activities are conducted in full compliance with all NRC regulations, and that all occupational radiation exposures are within the limits of 10 CFR Part 20 and are reduced to levels as low as is reasonably achievable (ALARA). The radiation protection program is described in the Radiological Control Plan (Reference 16) and will be implemented through written procedures.

To control occupational exposures, restricted areas will be identified, posted, and access to them will be controlled. A radiation work permit program will also be used to ensure workers understand: the tasks they are assigned, the radiation hazards in the work area, and the monitoring and personnel protection requirements for the task. Personnel external monitoring will be accomplished through the use of personnel dosimetry, using TLDs and radiation surveys. Surveys will be performed before persons work in radiation areas, and on persons exiting contaminated areas. All workers will have urine samples collected and analyzed before work begins and on termination. The bioassay program will be consistent with the recommendations in Regulatory Guide 8.9 (Reference 18).

Respiratory protection equipment will be available and will be used in compliance with 10 CFR 20.1703. Action levels have been developed and are presented in the Radiological Control Plan (Reference 16). Chemetron, in a letter dated February 13, 1995, notified NRC Region III that it planned to implement its respiratory protection program in evaluating exposure from the intake of radioactive materials. This notification, in accordance with 10 CFR 20.1703(d), allows Chemetron to take credit for its respiratory protection program in determining exposures.

A contamination control program will be implemented to minimize the spread of contamination. All personnel and equipment leaving the site will be surveyed and meet criteria in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source or Special Nuclear Material" (Reference 19).

An ALARA program will be implemented to ensure that exposures are reduced to ALARA levels. This program will encompass work task planning, control and monitoring of personnel and operations, radiation work permits, training, and tracking exposures.

4.2.3 Unrestricted Use Criteria

Chemetron proposed to use the unrestricted use criteria listed in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source or Special Nuclear Material" (Reference 19) for surfaces of buildings and equipment, and the Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (Reference 1) for soils. Specific values are given below --

Soils:	Depleted uranium on the surface	(total uranium)
	Depleted uranium in the disposal cell	7.4 Bq/gm (200 pCi/gm) (total uranium)
	Thorium on the surface	0.37 Bq/gm (10 pCi/gm) (total thorium)
	Radium-226 on the surface	0.18 Bq/gm (5 pCi/gm)
	Radium-226 subsurface	0.56 Bq/gm (15 pCi/gm)

Equipment and building surfaces:

5,000 dpm alpha/100 cm²; average over 1 m² 5,000 dpm beta-gamma/100 cm²; average over 1 m² 15,000 dpm alpha/100 cm²; maximum over 100 cm² 15,000 dpm beta-gamma/100 cm²; maximum over 100 cm² 1,000 dpm alpha/100 cm²; removable 1,000 dpm beta-gamma/100 cm²; removable

Exposure rate:

Soils

2.6 pC/kg/hr (10 μ R/hr) average above background at 1 meter;

5.2 pC/kg/hr (20 μ R/hr) maximum above background at 1 meter

Equipment and buildings

1.3 pC/kg/hr (5 μ R/hr) above background at 1 meter

The depleted uranium limits for the disposal cells were determined based on solubility data from uranium solubility tests using the Kalkwarf Method (Reference 20). Uranium solubility tests were performed on waste samples from the Harvard Avenue site. The solubility data were used to calculate disposal limits using the following equation:

Depleted Uranium Limit $(pCi/gm) = \frac{170}{[(F_1)(0.56) + (1 - F_1)(1.9)]}$

where F, is the insoluble fraction (i.e., the fraction of "Y" classified material if the Kalkwarf method is used).

Based on a "Y" fraction of 0.77 from the testing, the limit for depleted uranium was computed to be 7.4 Bq/gm (200 pCi/gm).

4.3 Waste Management and Disposal

4.3.1 Waste Generation

Harvard Avenue remediation activities are expected to generate 4450 m³ (158,000 ft³) of wastes that would be disposed of in the Harvard Avenue disposal cell. The maximum concentration of depleted uranium found at the Harvard Avenue site during site characterization was 3.96 Bq/gm (107 pCi/gm) total uranium. This concentration is below the Option 2 limit for the Harvard Avenue site of 7.4 Bq/gm (200 pCi/gm). Therefore, no wastes are expected to require disposal at an offsite licensed low-level radioactive waste disposal facility.

4.3.2 Waste Handling and Packaging

No wastes, from the Harvard Avenue site, are expected to exceed the Option 2 limits in the Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (Reference 1), and require offsite shipment.

4.3.3 Waste Transportation and Disposal

No wastes, from the Harvard Avenue site, are expected to exceed the Option 2 limits in the Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (Reference 1), and require offsite shipment.

4.4 Organization and Responsibilities

The Chemetron decommissioning project organization is headed by the Program Manager, who is responsible for overall project control. The Program Manager is also responsible for meeting environmental, health and safety, quality assurance, and technical requirements. Reporting to the Program Manager is the Project Manager/RSO, who is responsible for site safety operations, licensing, and radiation protection. Reporting to the Project Manager is the Quality Assurance (QA) Coordinator, Environmental Safety and Health Coordinator, the Laboratory Manager, Field Operations Supervisor, Engineering Design Coordinator, and the Excavation and Construction Subcontractors. The QA Coordinator can report directly to the Program Manager to ensure independence of the QA program. The Program Manager and the Project Manager/RSO have sufficient nuclear program management experience and technical qualifications to manage the remediation activities.

4.5 Employee Staffing and Training

4.5.1 Employee Staffing

Chemetron intends to perform the remediation primarily through the use of contractor personnel. B. Koh & Associates will provide the Program Manager, the Project Manager/RSO, the QA Coordinator, and the Environmental Safety and Health Coordinator. Contractor support from Dames & Moore will be responsible for engineering and design. Other contractor support will be provided for laboratory services, excavation and construction, decontamination, and radiation protection.

4.5.2 Training

Chemetron's worker training program is described in the "Radiation Worker Handbook and Training Manual" (Reference 21). The program includes site orientation training, radiation safety training, and industrial safety training. The training program is consistent with the requirements in 10 CFR Part 19.

Site orientation training is required of all who enter controlled areas and addresses chemical and radioactive material labeling and posting, the need to limit exposures to workers and the public, and recognition of emergency signals.

Radiation safety training includes basic radiation safety principles and practices, biological effects of radiation, public and worker dose limits, radiological controls, radiation safety responsibilities, emergency procedures, rights of workers, airborne radiation controls, bioassay requirements, prenatal exposures, dosimetry, radiation work permits, waste minimization, and the ALARA program. Workers must pass a written examination before being allowed unescorted access to the sites.

Industrial training presents information of industrial hazards that may be encountered during the remediation, proper safety procedures for using specialized equipment (including construction equipment), and emergency procedures.

4.6 Quality Assurance

The Chemetron QA program is documented in the Chemetron Remediation Project Quality Assurance Program and in the Quality Assurance Project Plan (Reference 17). These documents address management controls and requirements for ensuring quality in remediation activities. The plan includes requirements of management audits and radiation protection program controls. The QA Coordinator reports directly to the Project Manager/RSO, but can also independently raise quality issues directly with the Program Manager.

4.7 Financial Assurance

Chemetron has a decommaissioning funding plan in place that includes a parent guarantee, submitted by the Sunbeam-Oster Company, of \$7,465,000. This amount is based on a decommaissioning cost estimate that reflects the use of onsite disposal cells it the Harvard Avenue and Bert Avenue sites, and is a reasonable estimate of the decommissioning cost for both sites. The estimated cost for remediating the Harvard Avenue site is \$2,120,000. Decommissioning will be funded from existing Chemetron assets or assets from its parent company, Montey Corporation. In the Chemetron and Montey Corporation balance sheets, liabilities substantially exceed the listed assets. The stated liabilities are substantially comprised of the Chemetron decommissioning costs. The Chemetron liabilities are also reflected in the Montey Corporation balance sheets. If Chemetron and Montey Corporation assets are insufficient to carry out the decommissioning, NRC staff will request Chemetron to draw on the parent guarantee from Sunbeam-Oster Company.

4.8 Emergency Planning

Emergency procedures are provided in the Chemetron Health and Safety Procedures, Emergency Procedures, and "Radiological Control Plan" (Reference 16), and McGean-Rohco complex procedures documents. These procedures address specific actions to be taken by Chemetron staff in case of an emergency. Potential emergencies include accidents, accidental releases, fires, explosions, and natural disasters. Emergency procedure training is addressed in the "Radiation Worker Handbook and Training Manual" (Reference 21).

Offsite assistance can be provided, if necessary, by the police and fire departments in Cuyahoga Heights and Newburgh Beights and from local hospitals. The Program Manager will ensure that local fire, police, and medical emergency units are aware of the decommissioning activities and emergency procedures. A list of personnel to be contacted in the event of an emergency will be provided to Chemetron remediation staff and security officers.

5 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

5.1 Radiological Impacts on the Public and Workers

Radiological impacts on members of the public will result from inhalation and ingestion of releases of radioactivity in air and in water during the remediation operations and direct exposure to radiation from radioactive materials at the site during remediation operations. The public will also be exposed to radiation as a result of the onsite disposals. Decommissioning workers will receive doses primarily by inhalation and direct exposure during the remediation activities. In addition to impacts from routine operations, the potential radiological consequences of accidents are considered.

5.1.1 Radiological Impacts on the Public

The licensee provided an estimate of dose to the public from airborne effluents to be generated during the excavation activities associated with the decommissioning of Harvard Avenue site. The estimation was performed using the CAP88PC computer code (a program developed by EPA to demonstrate compliance with the "National Emission Standards for Hazardous Air Pollutants," 40 CFR Part 61) (Reference 21) and predicted a maximum public dose from airborne effluents of 0.02 mSv (2 mrem) for the Harvard Avenue site. The licensee assumed that the nearest receptor is 50 m (164 ft) away from the release point.

The staff performed a conservative, independent analysis of the potential for public exposure from airborne effluents. The staff did not use dispersion modeling to estimate the public dose from airborne effluents. Instead, the airborne concentration in the immediate excavation area was estimated and that concentration was used to estimate the maximum public dose, assuming no dispersion between the excavation area and the location of the closest offsite resident. The staff assumed the following:

- 1. 200 $\mu g/m^3$ mass loading factor
- 1.9 Bq/gm (51 pCi/g) (total depleted uranium)
- no dispersion from the point of generation to the location of the nearest offsite resident

The estimated airborne concentration of uranium in the immediate area of the excavation is 3.7E-22 Bq/ml (1.0E-14 μ Ci/ml), approximately 18 percent of the 10 CFR Part 20, Appendix B, Table 2, Column 1, limit for unrestricted areas. The limit that applies in this case is a weighted average of the limits for U-238 and U-234 assuming that the U-234 activity concentration is 50 percent of the U-238 concentration in the uranium at the Chemetron site. The weighted limit is 2.11E-21 Bq/ml ($5.7E-14 \mu$ Ci/ml). Using the weighted limit, and assuming that continuous exposure at the limit results in 0.5 mSv (50 mrem) (the 10 CFR Part 20 airborne dose limits to members of the public are based on an individual receiving 0.5 mSv (50 mrem) when exposed to a concentration equal to the limit), the estimated dose to the nearest resident during excavation of soil at the Chemetron Harvard Avenue site is approximately 0.09 mSv (9 mrem).

Since the estimated maximum dose from potential airborne effluents is a significant fraction of the 10 CFR Part 20 limits, the staff is applying a license condition to require an air sampling program at the site perimeter, and, when airborne concentrations exceed 1.1E-21 Bq/ml (3.0E-14 μ Ci/ml), to require that dust suppression measures be used during the excavation of the contaminated soil at the Harvard Avenue site.

The licensee performed dose assessments for the Harvard Avenue disposal cell using the RESRAD computer code, Version 5.05 (Reference 22). The RESRAD code calculates dose impacts assuming a resident-farmer scenario, where an individual would construct a residence, live there, grow food, and consume all drinking water from a conservatively located groundwater well. For the Harvard Avenue disposal cell, a waste volume of 5800 m³ (206,000 ft³), at an average concentration of 1.26 Bq/gm (34 pCi/gm) U-238, 0.0126 Bq/gm (0.34 pCi/gm) U-235, and 0.618 Bq/gm (16.7 pCi/gm) U-234, was assumed. The distance from the top of the water table to the bottom of the disposal cell was assumed to be 3.7 m (12.1 ft). Calculations were performed using a 1.5-m (4.9-ft) cover and no cover. The results of the calculations are shown on Figures 5.1 and 5.2. The peak dose, assuming a cover, was computed to be 0.183 mSv/yr (18.3 mrem/yr) at 2160 years after disposal. At 1000 years after disposal, the dose would be 0.162 mSv/yr (16.2 mrem/yr). These doses are from the groundwater-related pathways. The groundwater independent pathways, such as inhalation, ingestion, and direct exposure, result in doses less than 0.01 mSv/yr (1 mrem/yr).

Assuming no cover, the peak dose was computed to be 0.142 mSv/yr (14.2 mrem/yr) 2150 years after disposal. At 1000 years, the dose would be 0.132 mSv/yr (13.2 mrem/yr). With no cover, doses during the period from 0 to about 400 years are caused by the groundwater independent pathways (inhalation, ingestion, and direct exposure) and peak at 0.106 mSv/yr (10.6 mrem/yr) at 0 years. Groundwater pathway effects begin at about 400 years and peak at 0.142 mSv/yr (14.2 mrem/yr) at 2150 years. Peak doses are greater in the cover case than in the no-cover case because some of the depleted uranium migrates from the site because of erosion processes, and this fraction will, therefore, not contribute to the groundwater doses. In the case that assumes a cover, the cover remains intact for a longer period of time, depleted uranium is not removed from the site because of erosion processes, and, therefore, contributes a larger fraction of the disposed depleted uranium to the groundwater dose.

NRC staff verified Chemetron's RESRAD code analyses, using Version 5.05, and obtained the same results as Chemetron. NRC staff also ran the calculations using an individual groundwater consumption rate of 730 l/yr (193 gal/yr), as recommended in NRC guidance (Reference 23). Chemetron assumed a consumption rate of 510 l/yr (135 gal/yr), recommended in Reference 24. The peak dose, assuming a cover, was computed to be 0.26 mSv/yr (26 mrem/yr) at 2160 years after disposal. At 1000 years after disposal, the dose would be 0.22 mSv/yr (22 mrem/yr). The peak dose, assuming no cover, was computed to be 0.20 mSv/yr (20 mrem/yr) at 2150 years after disposal. At 1000 years after disposal, the dose would be 0.185 mSv/yr (18.5 mrem/yr). The above doses estimated for the public are substantially less than the 1 mSv/yr (100 mrem/yr) limit for exposures to the public in 10 CFR Part 20.



Figure 5.1 Resident-farmer scenario doses for the Harvard Avenue disposal cell with cover.

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Figure 5.2 Resident-farmer scenario doses for the Harvard Avenue disposal cell with no cover.

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5.1.2 Radiological Impacts on Workers

During the remediation of the contaminated materials, workers will receive doses from direct exposure and from the inhalation of dusts containing depleted uranium. From direct exposure, assuming the maximum measured background radiation levels at the Harvard Avenue site of 0.2 mSv/month (20 mrem/month) and a 2000-hr exposure, Chemetron computed the direct exposure dose to be 0.55 mSv (55 mrem). Assuming an average total uranium concentration of 1.9 Bq/gm (51 pCi/gm), a dust loading of 200 μ g (4.4E-7 lb) of soil per m³ (35.3 ft³) of air, a respiratory rate of 1.2 m³ (42.4 ft³) of air per hour, a 2000-hr exposure, and dose conversion factors from Federal Guidance Report No. 11 (Reference 25), Chemetron computed the inhalation dose to be 0.03 mSv (3 mrem). The NRC staff reviewed and agrees with these calculations. The above doses are substantially below the 10 CFR Part 20 limit of 0.05 Sv/yr (5 rem/yr) for routine occupational exposure.

5.1.3 Waste Transportation Impacts

No wastes from the Harvard Avenue site are expected to exceed the Option 2 limits in the Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (Reference 1), and require offsite shipment. If wastes exceeding the Option 2 limit are discovered, Chemetron will ship these wastes to a licensed low-level waste disposal site using containers or covered railcars or trucks. Shipments will be made in accordance with NRC and Department of Transportation requirements. Therefore, no waste transportation impacts are expected from the Harvard Avenue remediation.

5.1.4 Impacts of Potential Accidents

The staff reviewed the licensee's estimated potential consequences of postulated accidents. The licensee evaluated two worst-case accident scenarios -- a truck tipping over, releasing its contents, and a truck fire causing radioactivity to be dispersed into the air. The scenarios assumed the maximum total uranium concentration of 507 Bq/gm (13,700 pCi/gm) total uranium found at the Bert Avenue site in Chemetron's site characterization. This concentration is substantially higher than the maximum total uranium concentration of 5.9 Bq/gm (160 pCi/gm) at the Harvard Avenue site. Receptors ten meters (32.8 ft) away would receive a dose of 4.3E-4 mSv (4.3E-2 mrem) from the truck spill accident and 0.04 mSv (4 mrem) from the truck fire accident. These postulated accidents do not have the potential for onsite or offsite radiation doses that exceed the minimum Protective Action Guide level of 0.01 Sv (1 rem), recommended by EPA (Reference 26), or above 10 CFR Part 20 limit of 0.05 Sv (5 rem/yr) for routine occupational exposure.

5.1.5 Impacts on Low-Level Waste Disposal Site Operations

No wastes from the Harvard Avenue site are expected to exceed the Option 2 limits in the Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (Reference 1), and require offsite shipment. Therefore, no waste disposal impacts are expected from the Harvard Avenue remediation.

5.2 Nonradiological Impacts

5.2.1 Socioeconomic Impacts

The decommissioning project will require heightened construction activities over a 9-month to 1 1/2-year period. Most of the workers are expected to be drawn from the local labor market. As a short-term project, the decommissioning is not expected to significantly create or eliminate jobs in the local area. Through the use of local labor and purchases of locally provided equipment and supplies, the project is expected to have a minor, but positive, impact on the local economy. Assuming that 40 percent of the total cost of the \$2.12 million project is spent locally, and assuming a total impact multiplier of 1.2 to 1.3 for a site on the fringe of a metropolitan area (Reference 27), the project income impact in the local area will be about \$1.0 to \$1.1 million.

5.2.2 Air Quality Impacts

Air quality impacts will result from dust and equipment exhaust from construction and waste emplacement operations. These impacts will be of short duration and are expected to be minor.

5.2.3 Land and Water Use

No new land will be used for the Harvard Avenue remediation project. The disposal cell will be constructed on land that is currently contaminated.

Construction operations may require the use of additional domestic water. This additional water use should be minimal and have no significant impact.

5.2.4 Environmental Justice

The NRC staff evaluated impacts associated with the proposed activities on minority and low-income communities. Section 3.3 discusses the demographics of the Newburgh Heights and Cuyahoga Heights areas. Within Newburgh Heights, the minority population is 0.7 percent of the village population. Within Cuyahoga Heights the minority population is 1.2 percent of the village population. Therefore, there is no significant minority population in these communities.

The median income level in Newburgh Heights is \$24,621 and in Cuyahoga Heights is \$30,234. These median income levels are higher than in the City of Cleveland (\$17,822) and similar to the median income levels in Cuyahoga County (\$28,595) and the State of Ohio (\$28,706). The median income levels are also substantially higher than the 1992 poverty income level (\$14,335) for a nonfarm family of four (Reference 28).

Within the Village of Newburgh Heights, 237 (24 percent) of 970 households have income levels less than the poverty level. All minority households have incomes between \$25,000 and \$34,999. Within the Village of Cuyahoga Heights,

43 (17 percent) of 259 households have income levels less than the poverty level. All minority households have income levels between \$15,000 and \$24,999.

Within Cuyahoga County, 150,548 (27 percent) of 563,303 households have income levels less than the poverty level. There are 64,226 minority households (11 percent) with income levels below the poverty level.

Within the State of Ohio, 1,026,292 (25 percent) of 4,089,312 households have income levels less than the poverty level. There are 212,552 minority households (5.2 percent) with income levels below the poverty level.

Based on the very low minority populations in Newburgh Heights and Cuyahoga Heights and income statistics that show no significant low-income populations compared with those in Cuyahoga County and in the State of Ohio, there are no significant minorities and low-income households that will be exposed to impacts from the proposed activities in Newburgh Heights and Cuyahoga Heights. Because there are no significant impacts from the proposed activities, there will be no environmental justice impacts.

5.2.5 Other Impacts

The relatively small scale of the proposed construction activities will produce no significant impact of local traffic patterns. Construction noise impacts from the Harvard Avenue site remediation are not expected to be significant for nearby residents and businesses. These activities will routinely be performed only during daytime hours.

There are no known species of plants or animals of concern on the Harvard Avenue site that will be adversely affected by the proposed activities.

There are no known historical or archeological sites at the Harvard Avenue site or in the local area. The NRC staff requested a review by the Ohio Historic Preservation Office (OHPO) of the Harvard Avenue property. The OHPO concluded that the project, if completed as proposed, would have no effect on properties listed on or eligible for the National Register of Historical Places.

6 ALTERNATIVES TO PROPOSED ACTION

6.1 No Action

The no-action alternative would leave the contamination at the Harvard Avenue site as it currently is, without remediation. Because of the presence of depleted uranium in concentrations that exceed the current criteria for unrestricted use, it would be unacceptable to allow the contamination to be left in its current condition without remediation, and to terminate the license and release the site for unrestricted use. Because of the 4.5 x 10^{9} year half-life of U-238, radioactive decay can not be relied upon to reduce existing contamination to levels acceptable for unrestricted use.

6.2 Delayed Action

The delayed-action alternative would not result in significant radioactive decay, or lower doses to workers or the public. It would result in limited migration of radionuclides, higher costs for maintaining control of the site, higher costs for future remediation and waste disposal, and a substantially increased level of frustration from local residents and the owners of the McGean-Rohco Company, who own the Harvard Avenue site.

- 6.3 Alternative Decommissioning Methods
- 6.3.1 Disposal at an Existing Low-Level Waste Disposal Site

Under this alternative, all contamination exceeding 1.3 Bq/gm (35 pCi/gm) would be excavated and shipped to a licensed disposal site. This alternative would allow the site to be released for unrestricted use. However, assuming disposal of the wastes at the Envirocare facility in Clive, Utah, with an estimated excavation, transportation, and disposal cost of \$1060 to $1420/m^3$ (\$30 to $40/ft^3$), the estimated remediation cost would be about \$4,740,000 to 6,320,000 for the offsite shipment of 4450 m³ (158,000 ft³) of wastes. Appropriate radiological controls would be implemented to control doses to workers and the public. No significant radiological nor non-radiological impacts would be expected in this alternative.

6.3.2 Waste Volume Reduction

Under this alternative, contaminated soils and rubble would be treated using physical separation and chemical separation techniques to remove depleted uranium. These techniques have been used in limited, site-specific cases that depend on the chemistry and physical nature of the contamination. It is assumed that both physical and chemical separation techniques would be needed to process contaminated soils and building rubble wastes from the Harvard Avenue site, that the costs would be in the range of \$355 to $530/m^3$ (\$10 to \$15/ft³), and the total volume of wastes could be reduced by 75 percent. It is also assumed that the remaining 25 percent of the total waste volume would be shipped offsite for disposal to the Envirocare facility in Clive, Utah. The estimated cost for this option would be \$2,760,000 to \$3,950,000.

Appropriate radiological controls would be implemented to control doses to workers and the public. No significant radiological nor non-radiological impacts would be expected in this alternative.

6.3.3 Onsite Disposal

Under this option, contaminated materials less than the Option 2 limits in the 1981 Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (Reference 1) would be disposed of onsite under 10 CFR 20.2002. Contaminated materials exceeding the Option 2 limit would be disposed of at a licensed low-level waste disposal site. This alternative is the approach proposed by Chemetron. The estimated cost of this remediation approach would be approximately \$2,120,000. Appropriate radiological controls would be implemented to control doses to workers and the public. No significant radiological nor non-radiological impacts would be expected in this alternative.

6.4 Alternative Waste Transportation Methods

Waste shipments to the licensed low-level waste disposal facility in Clive, Utah, could be made by either rail or by truck. These shipments would be made in accordance with NRC and Department of Transportation (DOT) transport requirements. Doses to vehicle operators and the public were computed from exposure rate levels calculated using the MICROSHIELD computer code (Reference 29) for a total depleted uranium concentration of 7.4 Bq/gm (200 pCi/gm). This concentration exceeds the maximum total uranium concentration of 3.9 Bq/gm (107 pCi/gm) found at the Harvard Avenue site during the site characterization. For the offsite disposal alternative, transportation impacts are estimated to be 0.346 person-mSv (34.6 person-mrem) for truck operators making 293 shipments and 0.0186 person-mSv (1.86 person-mrem) for train operators making one shipment of 71 railcars. For the volume-reduction case, transportation impacts are estimated to be 0.0873 person-mSv (8.73 person-mrem) for truck operators making 74 shipments and 0.0186 person-mSv (1.86 person-mrem) for train operators making one shipment of 18 railcars. Doses to the public were conservatively estimated to be 4.23E-5 mSv (4.22E-3 mrem) to a driver of a vehicle following 2 m (6.6 ft) behind the truck for a 10-hour period, and 5.08E-5 mSv (5.08E-3 mrem) to a person residing 2 m (6.6 ft) from a train stopped for a 5-hour period. These exposure levels are similar to natural background levels. These impacts are not significant and are well within NRC and DOT limits. For the proposed onsite disposal alternative, no offsite shipments would be made, with no radiologic impact.

6.5 Analysis of Alternatives

Review of alternatives to the proposed action reasonably available to the licensee has not identified any obviously superior courses of action. Chemetron's proposed action appears to be environmentally sound and acceptable.

7 AGENCIES AND PERSONS CONSULTED, AND SOURCES USED

This environmental assessment was prepared by NRC staff, Office of Nuclear Material Safety and Safeguards, Rockville, MD, and Region III, Lisle, IL. During the review of Chemetron's Final Site Remediation Plan, NRC requested comments from ODH, OEPA, and the Cuyahoga County Board of Health (CCBH).

NRC received formal comments from ODH and CCBH, and informal comments from OEPA. The principal comments received from ODH and OEPA were that NRC should require post-closure controls and monitoring, for the radiologic components in the waste, after completion of the onsite disposal cells. These controls would be consistent with the post-closure controls required by OEPA for solid waste landfills. NRC staff indicated that under the conditions of onsite disposal under the Option 2 limits of the 1981 Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations" (Reference 1) the Harvard Avenue site could be released for unrestricted use, and doses to hypothetical intruders who might construct homes and consume groundwater and foodstuffs grown in the wastes would be acceptable.

The principal comments made by CCBH were technical comments related to the design of the proposed Bert Avenue disposal cell.

A draft of this environmental assessment was transmitted to the ODH, OEPA, CCBH, and the Mayor of the Village of Newburgh Heights, Ohio. The Mayor of Newburgh Heights and CCBH had no comments on the draft environmental assessment. The ODH indicated that it reviewed the dose modeling results and concurs that the proposed action yields results that protect public health and safety. The ODH also reiterated that it desired a mechanism to detect cell failure coupled with long-term deed restrictions that limit any type of activities which may jeopardize cell integrity. NRC staff continues to support the position that under the conditions of onsite disposal, using the Option 2 limits of the 1981 BTP, the site can be released for unrestricted use without placing post-closure controls on the site to include monitoring, mechanisms to detect cell failure, or deed restrictions. The OEPA did not review the document because no waste materials under its jurisdiction have been discovered at the Harvard Avenue site.

The NRC staff requested a review by OHPO of the Harvard Avenue property. The OHPO concluded that the project, if completed as proposed, would have no effect on properties listed on or eligible for the National Register of Historical Places.

No other sources of information were used beyond those referenced in the report.

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MEMORANDUM TO:	David L. Meyer, Chief Rules Review and Directives Branch Division of Freedom of Information and Publications Services Office of Administration				
FROM:	Robert Nelson, Acting Chief Low-Level Waste and Decommissioning Projects Branch				
	Division of Waste Management Office of Nuclear Material Safety and Safeguards				
SUBJECT:	NOTICE OF RECEIPT OF SITE DECOMMISSIONING PLAN FOR				

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