40-8724

CHEMETRON CORPORATION

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Monday, February 7, 1994

Mr. Timothy C. Johnson
Section Leader
Materials Decommissioning Section
Decommissioning and Regulatory Issues Branch
US Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Johnson:

Your letter of December 23, 1993 to Mr. David R. Sargent forwarded the NRC's comments on our "Site Remediation Plan - Harvard and Bert Avenue Sites" Revision 0, dated October, 1993. Your letter also included comments from Mr. Todd Brady of the Cuyahoga County Board of Health.

Attached are the Chemetron responses to the comments forwarded with your letter. In a few instances, we indicate that further review or calculation will be necessary to complete the response. After you have reviewed our responses and we have resolved any outstanding issues, we will revise the Site Remediation Plan as appropriate.

We are presently reviewing the comments on the Safety Analysis Report and Dose Assessment which you provided to us in separate correspondence. We expect to respond to these comments shortly.

If you have any questions, please contact me directly.

Sincerely yours,

Barry Koh, Ph.D.
Project Manager

BK/cmw

0300:5

NH01

Enclosure

cc: T. G. Adams
D. R. Sargent
M. J. Wetterhahn

CUYAHOGA COUNTY BOARD OF HEALTH COMMENTS
ON
SITE REMEDIATION PLAN CHEMETRON REMEDIATION
HARVARD AND BERT AVENUE SITES

1. Section 1.5.1.3, Bert Avenue Topography

"... onsite surface water drainage flows towards the eastern portion of the ravine, forms a marsh, and discharges through a culvert northwest to the Cuyahoga River and subsequently northwest to Lake Erie." Has the discharge point into the Cuyahoga River been identified, and tested for depleted uranium?

Response: The surface water from onsite and the combined sanitary/stormwater from offsite, flow through the Bert site via the Burke Brook and exit the site in the northeast corner through a culvert. This culvert flows through LTV Steel property to the Cuyahoga River. The water entering and leaving the site via Burke Brook has been extensively sampled for depleted uranium, as part of the quarterly groundwater and surface water sampling program. The average depleted uranium concentration to date, collected from the culvert exiting the site, is below the proposed EPA drinking water standards for uranium. Testing the discharge point into the Cuyahoga River is therefore not appear to be necessary.

2. Table 1-4

Harvard Avenue - "No vegetation available to sample" Based on what portion of the site?

Response: At the time vegetation sampling was performed, the Harvard Avenue site was devoid of any significant vegetation from which to collect samples. Thus, no significant vegetation was discovered.

3. Section 2.1.1.1.1.1.2.12 Sizing and Capacity

"The overall height of the containment cell will be 30 feet, of which the upper 13 feet will consist of clean fill and cap over the waste layer." Also from the groundwater control statements that material will be "25 feet above the existing elevation of the groundwater table." In comparing these two statements to Figure 2-3 and 2-6, and assuming that the water table elevation is at 650, the following comparison is made. 25 feet above goes to 675, a 10 foot drainage layer brings the level to 685, compacted selected backfill (no thickness given - assumed to be 3 feet) level to 688, 3 feet of compacted clay - 691, 1 foot of sand bedding - 692, 10 feet of compacted waste - 702, 8 feet of compacted selected fill -710, 2 feet of compacted clay -712, 1 foot drainage layer - 713, 2 feet of backfill and topsoil will make the top area 715. The overall height of the cell is 40 feet instead of 30 feet. Also, with surrounding topography measuring out at 690, there is a height difference of 25 feet. Is a 2 percent grade possible with this amount of difference?

Response: The elevation of the water table, following construction of the containment cell, is assumed to be approximately 640 feet above mean sea level (msl). However, for design purposes, a maximum water table elevation at 650 feet msl was considered. To ensure that this design elevation is not exceeded, an 18 foot thick underdrain layer will be constructed on which the base of the containment cell will be built. The underdrain layer will consist of perforated drain pipes placed within a granular fill at elevation 650. The granular fill layer will be approximately 10 feet thick and will be overlain by approximately 8 feet of backfill (USC Type ML-CL). The elevation of the top of the drainage layer will be at elevation 668 feet msl. The top of the drainage layer will provide a uniform base, graded to design elevation, on which the base of the containment cell will be constructed.

The base of the containment cell will be comprised of a 3-foot thick soil liner layer and a 1 foot thick stormwater control drainage layer. The waste layer will be placed above the stormwater drainage layer. The bottom elevation of the waste layer will be at approximately 672 feet msl. Thus the waste material will be approximately 32 feet above the nominal water table and 22 feet above the maximum design water table elevation. Thicknesses of the underdrain layer, soil liner, and stormwater control drainage layer were specified to maximize the distance between the maximum design water table elevation and the waste layer. After the additional hydrogeologic data has been collected and evaluated, thicknesses may change to provide a thicker cover and cap and a thinner underdrain.

The waste layer will be approximately 10-feet thick, and the elevation of the top of the waste layer will be approximately 682 feet msl. The final cover and cap will be constructed over the waste layer which will consist of 7 feet of clean fill; 4 feet of compacted clay; a 1-foot thick drainage layer; and 1-foot thick vegetative cover layer.

The total thickness of the cover and cap system will be approximately 13 feet. The final elevation at the top of the containment cell will be approximately 695 feet msl. The elevation of the surrounding topography is approximately 690 feet msl. The maximum resulting slope, assuming a cell width of 225 feet, will be less than 5 percent.

Figure 2-3, cross-sectional view of the containment cell, will be revised to clearly show the elevation at the top of each layer.

4. Page 2-13

Task 1 is to complete the hydrogeological data evaluation. Task 2 is to prepare the final cell design. Because this document is the site remediation plan, this information would be beneficial for a complete site review of the proposed disposal method.

Response: Additional hydrogeologic data needed is strictly for completing the design of the underdrain system which includes calculating volumes of backfill material, calculating piping requirements, and contingency planning in case the underdrain system fails. The additional data and design information will not alter the conceptual design, and cannot be obtained until the conceptual design is approved.

US NUCLEAR REGULATORY COMMISSION
COMMENTS ON CHEMETRON FINAL REMEDIATION PLAN

1. General

The remediation plan, as well as other health physics related documents, should be revised to reflect the revised 10 CFR Part 20 that goes into effect on January 1, 1994.

Response: The Remediation Plan will be updated to reflect the revised 10 CFR 20 requirements. The other health physics related documents (Radiological Control Plan, Radiation Worker Handbook and Training Manual, Airborne Radioactivity Program and related administrative and field procedures) have already been updated.

2. Page 1-4, Section 1.4.1, 4th Para., Last Sentence

This sentence discusses the interior decontamination in Building 21. Are the letter designations for Room 21 missing?

Response: The letter designations "A and B" should follow the words "Rooms 21." The addition of the phrase "including rooms A and B" after the words "Building 21" in the fifth paragraph, first sentence should provide further clarification.

3. Page 1-10, Section 1.5.2.1

"Paleozoic Age" should be "Paleozoic Era" and "Devonian Age" should be "Devonian Period." What is the "Woodfordian Age?"

Response: The remediation plan will be revised to read "Paleozoic Era", "Devonian Period", and "Woodfordian Substage". The Woodfordian Substage is a glacial period that correlates to the late Wisconsinian Stage (approximately 10,000 to 23,000 years ago). Originally, Pleistocene Period glaciations were categorized into 4 stages (Nebraskan, Kansan, Illinoian, and Wisconsinian, from oldest to youngest) and 3 Substages (Aftonian, Yarmouth, and Sangamon, from oldest to youngest). However, researchers discovered that the Wisconsinian Stage consisted of multiple glacial advances and retreats, and was subsequently divided into several substages including the Woodfordian Substage.

4. Page 1-10, Section 1.5.2.2

The description of the fill appears to be missing some words. Please provide corrections.

Response: The description of the fill will be revised to read, "Fill consists of dry to damp, asphalt, construction debris, and black sandy slag with layers of reddish-brown silt with clay. Fill

generally contains little gravel and is medium to stiff."

5. Page 1-16, Section 1.5.3.2., First Full Paragraph

This section indicates that the groundwater is approximately 24 feet below grade. However, Figure 1-7 shows the groundwater table to vary from about 2 feet to 12 feet below grade. Which set of data is correct?

In this paragraph, you state that cross section G-G' shows the water table. Should this refer to cross section F-F'?

Response: Figure 1-7 is incorrect regarding the water table elevation, and will be revised to show the correct water table.

The reference to section G-G' (Figure 1-8) is correct and will be revised to show the water table.

6. Page 1-18, Section 1.5.4

Please provide the groundwater data and hydrographs that support your temporal fluctuation conclusions.

The paragraph of this section provides groundwater elevation data. Although the description doesn't specify, we assume that these data apply to the Harvard Avenue site.

Response: Paragraph 2 presents the groundwater data for Harvard Avenue, and will be revised to specify that point. Groundwater hydrographs are included as Attachment 4 and will be included in the Remediation Plan to present the groundwater elevation trends.

7. Page 1-21, Section 1.7.2.2

In this section, you refer to waste disposal costs ranging from $35 to $300 per cubic foot. Please update these costs with the more recent quotes you received from Envirocare and other contractors for disposal at existing low-level waste disposal sites. We understand that Envirocare has quoted disposal costs less than $13 per cubic foot for Chemetron wastes, and $18,000,000 for excavation, transportation, and disposal of 1.1 Million cubic feet of Chemetron waste materials.

In this section, you state that it is contrary to NRC policies to dispose of large volumes of low activity wastes at commercial disposal sites. Please correct this inaccurate statement, as the NRC has no such policy.

Response: The most recent quote by Envirocare, dated May 12, 1993, presented prices for disposal that ranged from $13 to $21 per cubic foot, depending on quantity. Additional, unspecified charges would be assessed for material containing debris in excess of 3 percent. The

quote was valid for 30 days, and required that all disposal be completed by December 1, 1993. The quotation did not include, excavation, transportation or site restoration.

To our knowledge, Envirocare does not have a price list for disposal. Its practice with Chemetron has been to quote a price in response to a specific request. Therefore, Chemetron estimated the price for offsite disposal and include the additional costs for excavation, transportation, and the future disposal costs.

Chemetron will delete the quoted statement. Chemetron does believe however, that the NRC has for many years encouraged licensees to minimize the volume of radioactive waste shipped to commercial disposal sites. For example, the NRC issued IE Information Notice 83-05 to make licensees aware of the rarely used 10 CFR 20.302(a) as an alternative to commercial disposal of very low levels of contaminated materials. Chemetron also notes that in SECY 81-576, Mr. William J. Dirks, stated, "In many instances, packaging and transporting these wastes to a licensed disposal site would be too costly and not justified from the standpoints of risk to the public health and cost-benefit."

8. Page 1-23, Section 1.7.3.2

Please provide the cost data you reference in your discussion of soil washing.

Response: Chemetron investigated the costs of soil washing in 1991 while preparing the conceptual remediation plan. At that time, the quoted costs were comparable to offsite disposal at a commercial landfill.

9. Page 1-26, Section 1.8.2

This section indicates that the radiological assessment for the McGean-Rohco complex has been completed. However, Appendix D indicates that several buildings have not been characterized. In addition, the sanitary and stormwater drains and sewers, the roofs, and grounds have also not been fully characterized.

Response: The major buildings known to be contaminated or suspected to be contaminated have been characterized. The sanitary and stormwater drains and sewers, roofs, and grounds have not been fully characterized as stated in Appendix D. For consistency and clarification, the first bullet in Section 1.8.7 will be revised to read "Complete the radiological assessment of the McGean-Rohco, Inc. Buildings, sanitary and stormwater drains and sewers, rooftops and grounds"

10. Page 1-28, Section 1.10

We agree that minor changes to the Site Remediation Plan do not need to be submitted to the NRC for approval. However, Chemetron should develop a procedure for documenting minor changes and the applicable evaluations performed that demonstrate the changes do not result in unreviewed safety questions or changes to license conditions. This documentation should be available on-site

for NRC inspection.

The remediation plan does not indicate that major changes to the Site Remediation Plan will be submitted to the NRC for approval. We expect that changes, that result in unreviewed safety questions or changes to license conditions, will be submitted to the NRC for approval.

Response: As part of the overall Chemetron Radiological Protection and Contamination Control Program, a system of management controls consisting of various plans and administrative and field procedures has been prepared to ensure that remediation activities can be performed in a safe manner. An administrative procedure will be developed for documenting major and minor changes, including the applicable evaluation that will be performed, to demonstrate the changes do not result in unreviewed safety questions or changes to the license conditions.

Major changes to the Site Remediation Plan will be submitted to the NRC for approval. These changes will be, at a minimum, changes that result in unreviewed safety questions or changes to license conditions. Words to this effect will be incorporated into this section of the Site Remediation Plan. Minor changes to the Remediation will be maintained as part of the Chemetron Remediation Project Files and will be available for NRC review onsite upon request. See response to Comment 54.

11. Page 2-1, Section 2.1.1

Provide a brief description of the land ownership of the Bert Avenue and Harvard Avenue properties to be used for the disposal cells. Are there land covenants or restrictions that would prohibit the proposed disposals? Provide written evidence that the property owners have no objection to the proposed disposals.

Response: Both the Harvard Avenue site and the Bert Avenue site are owned by McGean-Rohco, Inc. From discussions with the owner, we are unaware of any covenant or restriction that would prevent the remediation proposed by Chemetron. In the attached letter (Attachment 1), Mr. Randall L. Solomon, representing McGean-Rohco, Inc., states that McGean-Rohco, Inc. is committed to the remediation plan proposed by Chemetron.

12. Page 2-2, Section 2.1.1.1

In addition to 10 CFR Part 20.302, other applicable NRC regulatory criteria are 10 CFR Part 19 for worker training, the revised 10 CFR Part 20 for radiation protection, 10 CFR Part 40 for source material licensees, and Part 71 for transportation of radioactive materials. Other criteria should include Department of Transportation requirements for transporting radioactive materials and applicable State and disposal site requirements for offsite disposal of radioactive wastes.

Guidance documents should include the 1981 Branch Technical Position on Disposal or Onsite Storage of Thorium or Uranium Waste From Past Operations.

Response: Section 2.1.1.1 will be revised to incorporate: 10 CFR Part 19, revised 10 CFR 20, 10

CFR 40 and 10 CFR 71, as other applicable NRC criteria; Department of Transportation (49 CFR 173), as other federal criteria; and the Ohio State Senate Bill 130 and Midwest Compact, as applicable state disposal requirements; and Envirocare, Chem Nuclear (Barnwell) and US Ecology, as applicable offsite disposal requirements.

The 1981 Branch Technical Position of Disposal or Onsite Storage of Thorium or Uranium Waste from Past Operations will be included as one of the guidance documents.

13. Pages 2-4 through 2-11, Section 2.1.1.1.1.1

In this section your refer, in several places, to soil "permeability" using the units of cm/sec. Note that "permeability" has the units of cm^2 and "hydraulic conductivity" has the units of cm/sec. Based on the numerical values you cite, it appears that you mean "hydraulic conductivity." Please make the appropriate corrections.

Response: This section will be revised to use the term hydraulic conductivity instead of permeability.

14. Page 2-5, Section 2.1.1.1.1.1.1

This section indicates that the Harvard Avenue cell will be designed so that the cell base will be 10 feet above the groundwater table. Note that Figure 1-7 shows the groundwater table to be about 4 to 12 feet below grade over the proposed cell area. Please explain this inconsistency. Note also that the groundwater elevations on Figure 2-4 are inconsistent with Figure 1-7.

The writeup in this section suggests that only a fill and soil cap with a vegetative cover will be provided. Figure 2-5 shows typical cap layers for the Harvard Avenue site including a drainage layer and compacted clay layer. Will the drainage and clay layers be provided?

Response: Figure 1-7 will be revised to present correct groundwater elevations. Figure 2-5 is incorrect, and will be revised to show only a soil cap with a vegetative cover.

15. Page 2-5, Section 2.1.1.1.1.2

Note that this section does not discuss the 10 inch drainage layer and the compacted selected backfill layer, below the 3 ft recompacted soil layer, shown on Figure 2-5. Will these layers be used? Is the drainage layer the under-drain system described in Section 2.1.1.1.1.2.11?

Response: The drainage layer referred to in this comment is actually a 10 foot drainage layer that is referred to in Section 2.1.1.1.1.2.11, and will be used in the cell. This section will be revised to provide an expanded discussion of the drainage layer. The selected backfill is part of the underdrain system, and will be used to properly grade the underdrain system. Discussions of the compacted backfill will be included in Section 2.1.1.1.1.2.11.

16. Page 2-7, Section 2.1.1.1.1.2.3

This section discusses a leachate collection system. Explain how this system operates and to where the leachate drains. How has the drainage from this system been considered in your safety analysis and radiological assessment? Note that all releases to a sanitary sewerage system will need to meet 10 CFR 20.2003.

Note that a "hydraulic conductivity" of 1 x 10^3 cm/sec is very high for sand and gravel materials. Is this the correct value? This same value is also referenced in Section 2.1.1.1.1.2.8.

Response: The title of this section will be changed to Stormwater Control Drainage Layer.

The purpose of the stormwater control drainage layer is to convey stormwater run-off away from the containment cell during the construction of the cell. The minimum hydraulic conductivity of granular fill placed within the stormwater control drainage layer will be 1 x 10^{-3} cm/sec, which is typical for sands and gravels (Fetter, 1988).[1]

Since the waste material is soil (no putrescible waste will be placed in the cell), leachate generation following closure of the cell is not expected. Operation of the stormwater control drainage system is anticipated to be required only during construction of the cell to convey stormwater run-off away from the containment cell. This will occur until completion of the low permeability cap and cover. During placement of the cover and cap, stormwater will be removed from the stormwater control drainage layer and discharged to surface water (Burke Brook). The effluent will be analyzed prior to discharge to ensure that the release meets requirements set forth in 10 CFR 20.

Since potential discharge from the stormwater control drainage layer will meet 10 CFR 20 requirements, potential dose from the discharge will not be addressed in safety analyses and radiological assessments. In addition, Chemetron will not be discharging stormwater to a sanitary sewer. Therefore, 10 CFR 20.2003 does not apply.

17. Page 2-9, Section 2.1.1.1.1.2.10

Will the leachate collection system empty into the sewer system? If so, how will this connection be made? Provide a sketch showing these connections. Note that all releases to a sanitary sewage system will need to meet 10 CFR 20.2003.

Provide information on the radionuclide analysis program that will be used prior to discharging materials to the sewer system. These information should include frequency of sampling, your

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[1]Fetter, C.W. "Applied Hydrogeology, 2nd Ed." Merrill Publishing Company, Columbus, Ohio. 1988, pg. 80.

proposed allowable discharge levels, and analytical methods.

It appears that the Bert Avenue site ravine was created through erosion processes. Provide a detailed discussion of the long-term design provisions that will be incorporated to ensure that the waste cell will not undergo significant erosion over the 1000 year period being considered in the dose assessment. What are the dose consequences if the design provisions are ineffective over the long-term in controlling erosion?

Response: This section refers to a surface stormwater management system that will be operational after construction of the containment cell is completed. Surface stormwater will be conveyed by drainage swales to catch basins that will be tied into the Burke Brook. Therefore, no leachate will be generated from this system. Section 2.1.1.1.1.2.10 and Figure 2-6 will be revised to more clearly describe the surface stormwater drainage system.

As previously stated, stormwater will be discharged to Burke Brook; not a sanitary sewer. Therefore, 10 CFR 20.2003 does not apply. Stormwater sampling will occur only during construction due to the potential for stormwater to encounter waste material. Stormwater will subsequently be discharged to surface water if analytical results indicate that U-238 concentrations meet 10 CFR 20 requirements. Chemetron does not intend to sample surface stormwater after cell completion since stormwater will not encounter waste material.

The containment cell was designed in accordance with USEPA and Ohio EPA guidance documents for design and construction of landfills. These guidelines consider potential impacts of long-term erosion and stability of the containment cell. Design considerations which address these issues include stormwater control systems, slope of the cover, and selection of vegetation resistant to erosion. The cover will be designed to limit the average annual soil loss to less than 2.0 tons/acre in order to minimize the potential for gully development and future maintenance (EPA, December 1988, "Guide to Technical Resources for the Design of Land Disposal Facilities", EPA/625/6-88/018).

18. Page 2-10, Section 2.1.1.1.1.2.11

In the second paragraph of this section, you indicate that additional hydrogeological data will be obtained. Please provide the details of these planned tests. What will be tested? Where will the tests be made or samples taken? Will new groundwater wells be constructed?

The groundwater table, at the base of the ravine, shown on Figures 1-10 through 1-14, will rise to a level consistent with the level in surrounding area (about 665 ft above MSL). Provide detailed discussions of how the under-drain and compacted backfill will be sized, what materials will be used, the required material specifications, and how these layers will be installed, to minimize the potential for increasing the groundwater table into the waste cell. What design provisions have been incorporated to prevent plugging of the drains and to ensure that this system will be effective for the 1000 year timeframe we are using for performing the dose assessment for this site? What is the dose significance if the groundwater table, in the base of the ravine, rises to the level of the surrounding area?

Response: Additional data that will be collected during the design phase includes groundwater elevation data from surrounding areas and hydrogeologic properties of the backfill material within the former ravine. Data collection will be accomplished by the installation of piezometers and collection of subsurface soil samples. Piezometers will be installed along the northeast portion of the site, and will be used to collect water level data. Soil samples will be analyzed to collect physical soils data such as hydraulic conductivity, porosity, density, grain size, etc. No radiological or chemical analyses will be performed on the soil or groundwater. The hydrogeologic investigation plan will be developed prior to commencing the design phase.

The elevation of the groundwater table is currently controlled by topography, the stratified nature of the site geology, and the stormwater drainage system which causes the ravine to act as a groundwater sink. The drainage system (Burke Brook) is currently open where it passes through the northeast corner of the site. Based on review of local sewer design documents, it is assumed that the sewer pipe was placed within a granular backfill. This type of backfill material would typically exhibit a relatively high hydraulic conductivity. Although unknown at this time, it was assumed during the conceptual phase that groundwater would discharge only through the ravine. The hydraulic conductivity of the backfill within the ravine was estimated to range between 1×10^{-3} and 1×10^{-2} cm/sec. Using these assumptions, the transmissivity of the ravine was estimated to be sufficient to continually convey groundwater and control water levels should the existing stormwater system fail or become no longer available.

The specifications for the underdrain system will be developed during the final design phase. The system will be designed to continually convey groundwater to the stormwater system. The system will be sized based on the maximum expected flow rates and volumes as determined following the additional hydrogeologic investigation. The design will consider various failure scenarios including plugging of collection pipes.

The scenario of the water table rising 32 feet above the present day elevation, penetrating the clay liner, and saturating the waste material is unrealistic. Since Burke Brook will be enclosed in a culvert, flow from Burke Brook will not enter the containment cell. Furthermore, the cell design prevents surface water from entering the cell and collecting at the water table. Therefore, leakage into the cell would only originate from groundwater seeps. Presently, discharge from groundwater seeps is minimal, and would most likely equal the rate that groundwater would discharge from the backfill area surrounding the present day Burke Brook culvert.

Topography will also preclude groundwater from entering the containment cell. Groundwater mimics topography in humid regions (Fetter, 1988), and proposed construction will alter the topography of the Bert Avenue site (form a high point where the ravine was). The new topography will alter gradients which will most likely direct groundwater away from containment cell.

19. Page 2-15, Section 2.1.1.1.1.2., Last Paragraph

In this paragraph a temporary leachate collection system, on top of the compacted soil layer, is

described. Is this the same leachate collection system, on top of the compacted clay layer, described in Section 2.1.1.1.1.1.2.3? Evaluate the dose impacts of the releases to the sewer system in your safety analysis and radiological assessment. Note that all releases to a sanitary sewerage system will need to meet 10 CFR 20.2003.

Response: The leachate collection described in this paragraph is the same system previously described in Section 2.1.1.1.1.1.2.3. This system is now called the Stormwater Control Drainage Layer, and the text will be revised to clarify this point. Discharge from this layer will only occur by the manual removal of the stormwater from the system. Stormwater will be sampled prior to discharge to Burke Brook to ensure that U-238 concentrations meet 10 CFR 20 requirements. Since the discharge will meet 10 CFR 20 requirements, evaluation of the dose impacts is not necessary.

20. Page 2-16, Section 2.1.1.1.1.2

a. Under Task 6B, the first activity will be to excavating, backfilling, and grading to the Bert Avenue design elevations and dimensions. In this task, contaminated material will need to be excavated. Where will these contaminated materials be stockpiled? How much material will be stockpiled? Will there be space onsite for storage of this material?

b. The section indicates a sequence of performing the confirmatory surveys of the cell bottom after the under-drain layer and backfill layer, to the base of the cell, is constructed. These confirmatory surveys should be performed prior to construction of the under-drain layer.

c. Provide a detailed discussion of the cell design and material specifications. How steep will the cell sides be? How will the compacted materials, below and to the side of the waste layer, be constructed to eliminate a rise in groundwater levels.?

d. Under Task 7, you state that only radioactive soils will be placed in the Harvard Avenue cell. Will wastes from the remediation of the McGean-Rohco complex, which will include possibly building rubble and equipment, also be placed in the Harvard Avenue cell or will the McGean-Rohco wastes be shipped offsite for disposal?

e. To minimize subsidence effects, what specifications will be applied to wastes, and the various other layered materials, for both the Harvard Avenue and Bert Avenue cells? Provide a detailed discussion of the testing program that will be used to ensure that design specifications are met.

f. Under Task 9, you indicate that post-closure requirements will be developed with OEPA. If these post-closure requirements include processing liquids from the leachate collection system, the dose impacts of these discharges should be analyzed.

Response: a. The maximum design capacity of the containment cell is approximately 647,000 cubic feet (ft^3). This is approximately 25-percent greater than the total anticipated volume of waste material calculated to be 514,000 ft^3. Construction of the containment cell will progress in phases starting from the east side and moving to the west. All excavated material will be kept within the

confines of the site boundaries and, to the extent possible, within the limits of the containment cell boundaries. It is currently envisioned that the cell can be constructed in halves starting with the east half. Excavated waste material will be placed on the west side while the east side is under construction.

The east side will be constructed first since the excavation requirements and volume of contaminated materials on this side are expected to be minimal. Based on preliminary estimates, approximately 100,000 ft^3 of contaminated material will be removed during construction of the east half of the containment cell. This material will be temporarily stockpiled on the west half while the east half is under construction.

The available stockpile capacity of the east half of the containment cell will be approximately 660,000 ft^3. This estimate assumes that material can be temporarily stockpiled to a height of approximately 19 feet which is at or below the elevation of the surrounding topography. Based on preliminary estimates, this temporary storage volume is sufficient to stockpile all waste material within the confines of the containment cell boundaries.

Waste material will be moved back to the east side of the containment cell once the stormwater control drainage layer is constructed. Construction of the west half of the containment cell will proceed in similar fashion as the east side. Excavated soil which is not contaminated will be stockpiled outside the cell boundaries but within the site boundaries. This soil will be used as cover material as soon as construction allows to minimize the volume stockpiles on site.

b. Final surveys and confirmatory surveys will be performed prior to the construction of the underdrain layer.

c. and e. The groundwater underdrain system will be constructed and connected to the stormwater system to prevent rises in the water table. The containment cell interior walls will be constructed with a 1:1 slope. All materials used for construction of the cell and placed within the cell will be compacted to minimize subsidence effects. General material specifications for each layer, where applicable, will be shown on Figure 2-5. Details of the cell design and complete material specifications, as well as a complete QA/QC plan, will be developed during the design phase of the project. The QA/QC plan will describe testing requirements to ensure that design specifications are met.

d. It is Chemetron's intent to dispose of Building rubble and debris, excluding roofing material, from remediation of the McGean Rohco Buildings in the Harvard Avenue containment cell. Equipment will be decontaminated and reused, recycled or disposed as standard solid waste.

f. As stated in the Response to Comment No. 16, there is no leachate collection system. A stormwater control drainage system will be installed below the waste layer to manage precipitation that enters the cell during construction. Since no putrescible wastes are being disposed in the cell, no leachate is expected to be generated. Furthermore, Chemetron does not intend to perform post closure care, and no leachate will be processed. Water collected in the stormwater control drainage layer during construction will be transferred to Burke Brook after sampling and analysis.

Concentration of U-238 in the stormwater will meet 10 CFR 20 requirements.

21. Page 2-19, Section 2.1.2.2.1

The Harvard Avenue site stormwater management system includes a drainage swale that runs along the eastern side of the site. How will this drainage swale be constructed? How is the sedimentation basin sized to ensure that there will be no unmonitored releases during remediation operations?

Response: The drainage swale will be a shallow (minimum 6 inches), narrow ditch (approximately 4 feet wide) on the eastern side of the site. The swale will be sloped approximately 2 percent to the south and gravel lined. Sedimentation basins will be sized during the design phase. The design will be based on stormwater run off sediment loading calculations and sized for the 25 year, 24 hour storm event to ensure that unmonitored releases do not occur during the construction phase.

22. Page 2-20, Section 2.1.2.2.2

How is the stormwater collection basin constructed and sized to ensure that there will be no unmonitored releases during remediation operations?

Response: Sedimentation basins will be sized during the design phase. The design will be based on stormwater run-off sediment loading calculations for the 25 year, 24 hour storm event and sized to ensure that unmonitored releases do not occur during the construction phase.

23. Page 2-24, Section 2.1.2.3.2.1

In the third line, a range of surface soil concentrations is given. Should 2.341 be 2,341?

Response: The range of surface soil concentrations were from the daily LLD (3-4 pCi/g) to 2,341 pCi/g. This sentence will be corrected.

24. Page 2-25, Section 2.1.2.3.2.2, First Paragraph

We assume the reference to Figure 3-12 should be Figure 3-13. Are words missing from the fourth sentence ("Three boreholes from the basis of Area A...")?

Response: The reference to Figure 3-12 will be revised to read Figure 3-13. The fourth sentence will be revised to read, "Three boreholes form the basis for Area A, as shown in Figure 3-13."

25. Pages 2-26 and 2-27, Section 2.1.2.3.2.2.2

Provide a detailed discussion of the methods you will use to excavate and segregate contaminated materials that exceed the Option 2 levels. This discussion should address what sampling, measurements, or observations will be performed, during the excavation, to isolate the contamination that exceeds the Option 2 level, what sampling or measurements will be performed, during the excavation, to ensure that all contaminated material exceeding the Option 2 level is excavated, and how the material will be excavated to minimized dilution with lower activity soils. Provide a detailed sketch to show the dimensions of the proposed excavated area.

Provide a detailed discussion of the sampling program to be undertaken for the stockpiled soil from Bert Avenue Area B. This discussion should address how the samples will be taken, how many samples will be taken, and how the statistical analysis, to demonstrate the 95 percent confidence level, will be performed.

Response: Chemetron is reviewing the results of the Site Characterization Plan to estimate the amount of material exceeding Option 2 levels, which must be excluded from the containment cell. The results of this evaluation will be provided to the NRC.

The sampling program for the stockpiled soil from Bert Avenue Area B will be the same as described in Appendix G of the Final Site Characterization Report.

26. Page 2-28, Section 2.1.2.3.2.4

The under cell survey program should be performed in accordance with the recommendations in NUREG/CR-5849, "Manual for Conducting Radiological Surveys in Support of License Termination." The proposed remediation schedule should consider the time required for the NRC to perform a confirmatory survey of this area.

Response: This section will be revised to state that "The under cell survey program will be performed in accordance with the recommendations in Draft NUREG/CR-5849, 'Manual for Conducting Radiological Surveys in Support of License Termination' (NRC, June 1992). The proposed remediation schedule will be reviewed and revised to take into consideration the time required to perform the final survey and for the NRC to perform a confirmatory survey of the area.

27. Page 2-28, Section 2.1.2.3.2.5

What percentage of the cell will the walkover scan cover? Will the scan be performed in accordance with NUREG/CR-5849? Will samples be taken at the locations of the highest scan results? Will samples be taken on a systematic or random basis? What grid size are you proposing to use to demonstrate that contaminated materials placed into the cell are less than the Option 2 limit? Is this sampling program intended to provide final survey data as well as demonstrate the activities are below the Option 2 limits?

Response: It is Chemetron's intent to perform the walkover scan of 100 percent of the cell. Yes, the scan will be performed in accordance with Draft NUREG/CR-5849. Samples will be collected

at the locations of the highest scan results, as well as the planned systematic locations. Samples will be collected on a systematic basis. We are proposing a 15m x 15m grid size to demonstrate that contaminated materials placed in the cell are less than the Option 2 limits at a 95% confidence level. This will not be the final survey. This proposed sampling program is intended only to demonstrate that the depleted uranium concentrations in the cell are below the Option 2 limits.

28. Page 2-29, Section 2.1.2.3.2.6

It is unclear, in the section, if you will also perform the confirmatory surveys of the cell in accordance with NUREG/CR-5849, or does this section apply only to the areas adjacent to the cell and the offsite areas?

Response: This section applies only to the areas adjacent to the containment cell, including offsite areas, as stated in the first sentence of this section.

29. Page 2-32, Section 2.1.2.4.3

Provide copies of the referenced BP Chemicals leach tests, and provide a discussion of the tests used, the applicability of the tests to the uranium solubility determination needed in conjunction with the Option 2 limits, and why these tests would represent conditions at the Harvard Avenue and Bert Avenue sites.

We are preparing an interim guidance document for determining uranium solubility. We suggest that this guidance be used for evaluating an acceptable depleted uranium concentration level for the Bert Avenue and Harvard Avenue sites.

Response: Chemetron will request the referenced leach data from BP Chemicals, Inc. and will provide a discussion of the tests used, the applicability of the tests to uranium solubility determination and why these tests represent conditions at the Harvard and Bert Avenue sites.

Chemetron will review the NRC interim guidance document for determining uranium solubility and evaluating an acceptable depleted uranium concentration level for the Bert Avenue and Harvard Avenue sites.

30. Page 2-33, Section 2.1.3

In this section you discuss several management documents applicable to the remediation at the Bert Avenue and Harvard Avenue sites. In your license renewal application, dated October 1, 1990, you included the "Radiation Worker Handbook and Training Manual" and the "Radiological Control Plan for Chemetron Corporation," prepared by your former contractor Nuclear Energy Services, and the "Health and Safety Plan," prepared by your contractor Dames and Moore. Are these documents the ones that will be used for the remediation, have they been superseded, or will they be modified? If these documents have been changed, or if substantial changes are planned to be made, provide updated versions to us for review.

This section refers to the Quality Assurance Project Plan, the Airborne Radioactivity Program, and the Surface Contamination Program. Have these documents been prepared? Please provide them for our review.

Response: The existing Radiation Worker Handbook and Training Manual, the Radiological Control Plan and related procedures have been revised to incorporate the new 10 CFR 20 requirements. The existing Quality Assurance Plan, Airborne Radioactivity Program and Surface Contamination Program are currently being revised to incorporate the new 10 CFR 20 requirements and/or to reflect current remediation planning. A Health and Safety Plan, specifically for the remediation of the Harvard Avenue and Bert Avenue sites, will be prepared, if required by 29 CFR 1910.120. Copies of these documents will be provided to the NRC for its review.

31. Page 2-32, Section 2.1.2.4.4

Note that your conclusions regarding the solubility of the depleted uranium may be premature. See Comment No. 29.

Response: See response to Comment 29.

32. Figure 2-12

Does the entry, "Perform Confirmatory Sampling," include both your final surveys and the NRC's confirmatory surveys? Note that the final survey schedules appear to be inconsistent with the schedules presented in Section 4.0, "Planned Final Radiation Survey." In Figure 2-12, the final surveys are estimated to take 3 months for the Harvard and Bert Avenue sites, and in Figures 3-2 and 3-3, in Section 4.0, the time estimates are about 6 months for the Harvard and Bert Avenue sites.

What are the post-closure care provisions you intend to perform for the Harvard Avenue and Bert Avenue sites?

Response: Yes. The entry "Perform Confirmatory Sampling" includes both Chemetron's final surveys and the NRC's confirmatory surveys. Final and confirmatory surveys will be performed in two steps: first an undercell survey and then an outside area survey. Both surveys will be performed in accordance with NUREG/CR-5849. Four months will be needed to perform the undercell and outside area surveys at the Harvard site, and 4.5 months will be required to perform the undercell and outside area surveys at the Bert site. Again, the undercell and outside area surveys will include both final and confirmatory surveys. Figure 2-12 and Section 2.1.4 will be revised to reflect these changes. Please note that these changes are consistent with Section 3.7 of the Final Survey Plan.

Chemetron will be preparing the property for unrestricted use. Therefore, no post-closure care will be needed at either site.

33. Figure 2-13

Provide the names of the individuals who fill the positions listed in the organization chart.

Response: Chemetron presently intends for Dr. Barry Koh to serve as Program Manager and Mr. Theodore G. Adams to serve as Project Manager/RSO. Other personnel will be assigned consistent with the project schedule and the qualifications described in Section 2.2.3.

34. Page 2-35, Section 2.2.1

a. This section refers to an organization chart on Figure 2-13. We assume that the project manager/RSO reports directly to the program manager, and the project manager/RSO is responsible for the activities of the project area leaders. Note that there are no lines connecting these positions.

b. We assume that B. Koh & Associates, Inc. is assigned as Program Manager and T. Adams is the Project Manager/RSO.

c. In this section, it states that the PJM has the authority to make changes in the remediation plan. See Comment No. 7 (10?) relating to remediation plan changes.

d. Who are the individuals assigned to be the Coordinator of Quality Assurance, the Environmental Safety and Health Coordinator, and the Laboratory Manager? Are their resumes attached in Appendix A?

Response: a. The Project Manager/RSO reports directly to the Program Manager and the area leaders report to the Project Manager. The project reporting lines will be included for clarification.

b. That is correct. See response to Comment No. 33.

c. See response to Comment 10. The text will be revised to state that the PJM has the authority to make changes in the Remediation Plan in accordance with the Chemetron "Field Changes" procedure.

d. Individuals have not yet been assigned to the other identified positions indicated on Figure 2-13, therefore there are no resumes for these positions included Appendix A.

35. Page 2-39, Section 2.3.1

Note that the "Radiation Worker Handbook and Training Manual" needs to be updated to reflect the revisions to 10 CFR Part 20, which goes into effect on January 1, 1994.

References to NES should be deleted from the training manual. For example, in Section 9.5, it

states that NES will conduct a search of lost radioactive material. If this statement is incorrect, it should be modified.

The training manual should discuss recognizing and response to emergency signals, the ALARA program, prenatal exposures, the airborne activity program, bioassay requirements, and radiation work permits.

Response: The Radiation Worker Handbook and Training Manual have been updated to reflect the revisions to 10 CFR 20. References to NES have been deleted. The Training Manual has been revised to incorporate recognizing and response to emergency signals, the Chemetron ALARA program, prenatal exposures, the Chemetron airborne activity program, bioassay requirements, and radiation work permits.

36. Page 3-12, Section 3.1.4.1.1.3, First Paragraph

This paragraph discusses an action level estimate of 35 pCi/gm. It appears your discussion is applying this level to U-238. Note that the Option 1 limit, for depleted uranium, is 35 pCi/gm total uranium.

Response: The action level of 35 pCi/gm (total uranium) will be revised to 23 pCi/gm which is the U^{238} action level based on total uranium and isotopic uranium analysis performed by ORAU, now ORISE. ORAU concluded that the ratio of total uranium to the U^{238} isotope was 1.5 to 1. Hence, a total uranium limit of 35 pCi/gm is equivalent to 23 pCi/gm U^{238}.

37. Page 3-37, Section 3.1.5.1.1(10)

Note that the 35 pCi/gm Option 1 limit applies to total uranium.

Response: See response to Comment 36.

37. Page 3-41, Section 3.1.5.3.1 (14)

Include the recent analytical results from the Ulmer & Berne surveys of the Fryer property.

Response: The recent analytical results from the Ulmer and Berne surveys of the Fryer property will be incorporated into this section.

38. Page 3-54, Section 3.3.3.2(1); and page 3-70, Section 3.3.6.5

In this section, you indicate that wear and removal of anticontamination clothing will be addressed

in the radiation safety training. The "Radiation Worker Handbook and Training Manual," however, does not appear to address this area. Include this subject in the radiation training manual.

Response: The donning and doffing of anticontamination clothing is addressed in Sections 5.3.3.2.3 and 5.3.3.2.5 of the revised Radiation Worker Handbook and Training Manual.

39. Page 3-56, Section 3.3.3.2(4)

You state that material and equipment, in controlled areas, that are released for unrestricted use, will be surveyed and compared with "Chemetron established release criteria." The appropriate reference is the NRC's "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material, " August 1987.

Response: Chemetron's intent is to use NRC's "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for By Product Source, or Special Nuclear Material," August 1987, as the"Chemetron established" release criteria. For clarification, this section will be revised to indicate that survey results will be compared to the release criteria established in the NRC's, August 1987 reference document.

40. Page 3-57, Section 3.3.4.1.1; and page 3-62, Section 3.3.5.1.4

The limits provided in Tables 3-5 and 3-6 should be revised to reflect the new 10 CFR Part 20 requirements that go into effect on January 1, 1994.

Response: Tables 3-5 and 3-6 will be revised to reflect the new 10 CFR Part 20 requirements.

41. Page 3-82, Section 3.5.1.1.3; Page 3-83, Section 3.5.1.2.2; and Page 3-87, Section 3.5.1.3.4

If liquids are released, how will this be accomplished? Note that releases to the sewerage system must meet 10 CFR 20.2003.

Response: During the remediation, water from these excavations will be sampled and discharged to drainage swales south of the Harvard site only if U-238 levels are below limits specified in 10 CFR 20. Previous monitoring of this surface water indicates that U-238 concentrations will not exceed the regulatory limits specified in 10 CFR 20. Since discharge is not going to a sanitary sewer, 10 CFR 20.2003 is not applicable.

42. Page 3-83, Section 3.5.1.2

Will the McGean-Rohco wastes be placed in the Harvard Avenue cell or be shipped offsite for licensed disposal?

Response: It is Chemetron's intent to decontaminate, to the extent practical, material generated as a result of the McGean-Rohco Building remediation. Clean material such as protective clothing, equipment, steel scrap, building material (roofing material, bricks, blocks, concrete) will be disposed of offsite as general solid waste, construction and demolition debris. Contaminated protective clothing, equipment, and roofing material will be disposed of offsite in a licensed disposal facility. Contaminated building material (i.e. bricks, blocks, concrete), excluding roofing material, will be placed in the Harvard Avenue containment cell.

43. Page 3-83, Section 3.5.1.2.1; and page 3-84, Section 3.5.1.2.3

Note that the reference to Regulatory Guide 1.86 should be "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," August 1987.

Response: This sentence will be revised to reflect the specific NRC August 1987 reference document.

44. Page 3-84, Section 3.5.1.2.4

Residual contamination criteria for soils may be used for loose pea gravel roofing material. The surface contamination criteria should be used for tar, tar paper, and insulation.

Response: This section will be revised to specify residual contamination criteria will be used for soils for loose pea gravel roofing and surface contamination criteria will be used for tar, tar paper and insulation.

45. Page 3-86, Section 3.5.1.3.3

Prior to the release of the scrap steel, NRC staff should be notified to schedule a confirmatory survey of this material.

Response: Prior to the release of the scrap steel collected at the Harvard Avenue and the Bert Avenue sites, the NRC will be notified to schedule a confirmatory survey of this material. This section will be revised to clarify this point.

46. Section 4.0, General

Draft NUREG/CR-5849 uses a statistical approach to determining a site's suitability for unrestricted use. To make a statistical determination regarding the residual contamination levels at a site, the methods outlined in NUREG/CR-5849 should be followed as closely as possible. Averaging, as described in NUREG/CR-5849 should be performed. If remediation continues as

the survey progresses, based on survey results, the statistical bases are compromised. Therefore, it is strongly recommended that the final survey be completed and the results evaluated as a whole before determining the need for additional remediation and that the averaging methods described in NUREG/CR-5849 be followed as applicable.

Response: The methods in Draft NUREG/CR-5849 will be followed as closely as possible as stated in Section 4.0. Averaging will be used as applicable. The final survey will be completed and the results evaluated as a whole before a determination of the need for additional remediation. Language to this affect will be incorporated into Section 4.0. See response to Comment 66.

47. Section 4.0, Subsections 1 and 2

These sections are repetitive of other information provided elsewhere in the remediation plan. We suggest that these sections be deleted.

Response: Subsection 1 and 2 of Section 4.0 will be deleted. The reader will be referred to Sections 1.4 and 1.5 of the main plan and Appendix D (McGean-Rohco Inc. Buildings) for specific details regarding the background of the Harvard Avenue and Bert Avenue sites and the McGean-Rohco Inc. Buildings, respectively.

48. Page 2-13, Section 4.0, Subsection 2.3

The concentration limits for contaminated soil to be placed into the containment cell have not yet been determined. The soil contamination limits will be set after the solubility of the material to be placed into the cell is determined.

Response: See response to Comment 29.

49. Page 2-13, Section 4.0, Subsection 2.3.1

The plan states that the maximum exposure rate for soil contamination may not exceed 10 uR/hr above background. Please clarify that the exposure rate limit applies to measurements performed at one meter above the soil surface. Also, NUREG/CR-5849 recommends a maximum exposure rate of two times the average limit. The average exposure rate limit for soil contamination is 10 uR/hr above background at one meter. Therefore, the maximum exposure rate limit for soil contamination is 20 uR/hr. Does Chemetron intend to limit maximum exposure rates to 10 uR/hr or 20 uR/hr?

The limit for soil contamination has not yet been determined. See Comment No. 48.

Response: Subsection 2.3.1 will be revised to clarify that the exposure rate limit applies to measurements performed at one meter "above the soil surface".

Chemetron intends to limit the average exposure rate to 10 uR/h above background at 1 meter

from the surface and to limit the maximum exposure rate to 2 times the average limit. Thus, Chemetron intends to limit the maximum exposure rate to 20 uR/h.

See response to Comment No. 48.

50. Page 2-14, Section 4.0, Subsection 2.3.2

Please clarify the first line; should "...of.." be replaced with "...or.."?

Please clarify the second line; should "...for..." be deleted

Response: In the first line, the word "of" should be "or". In the second line, the word "over" should be deleted. These corrections will be incorporated in the revision to the Site Remediation Plan.

51. Pages 3-1 through 3-5, Section 4.0, Subsections 3.1 and 3.2

These two sections are repetitive. We suggest editing these sections so that your proposed release limits are clearly presented.

Response: These sections will be edited so that the proposed release limits are presented in one section.

52. Pages 3-1 through 3-3, Section 4.0, Subsection 3.1

a. 40 CFR Part 192 is not listed in the SDMP Action Plan (57 FR 13389) as an acceptable cleanup criterion for SDMP sites. Reference to 40 CFR Part 192 should be deleted.

b. The soil contamination limit for subsurface depleted uranium is dependant on the solubility of the material to be placed in the containment cell which remains to be determined. See Comment Nos. 48 and 49.

c. The unrestricted use limit for thorium-232 is 5 pCi/g, assuming equilibrium with daughter products, not 30 pCi/g.

d. The unrestricted release limit for radium-226 is 5 pCi/g for all soil, both surface and subsurface. The subsurface limit of 15 pCi/g does not apply to SDMP sites.

e. The SDMP Action Plan lists the Environmental Protection Agency's "Interim Primary Drinking Water Regulations" (40 CFR Part 141) as the reference standard for the protection of groundwater and surface water. Please delete the reference to 10 CFR Part 20 limits and incorporate EPA's limits.

f. Please clarify the method for averaging areas of building surfaces that are contaminated at levels exceeding the average limit. Draft NUREG/CR-5849 allows averaging elevated areas larger than 100 cm^2 if the contamination levels are between one and three times the average limit and the weighted average over any contiguous 1 m^2 area is less than the average limit.

g. The exposure rate limit for building surfaces is 5 uR/hr above background at one meter, not 10 uR/hr.

h. Draft NUREG/CR-5849 allows maximum exposure rates up to two times the average limit if the weighted average over the surrounding 100 m^2 is less than the average limit. Therefore, it would be acceptable to use a maximum limit of 20 uR/hr above background at one meter from soil surfaces. Please clarify the maximum limit to be used.

i. Please clarify which unrestricted use criteria will be demonstrated at the 95 percent confidence level. Draft NUREG/CR-5849 only recommends that the average criteria be statistically tested.

Response:

a. Reference to 40 CFR 192 will be deleted.

b. See response to Comment 29.

c. According to SECY-81-576 the maximum concentrations for Thorium 232, if all daughters are present and in equilibrium for Option 1 and Option 2 are 10 pCi/gm and 50 pCi/gm, respectively. These limits will be incorporated into this section.

d. The reference to 15 pCi/g for Radium 226 for subsurface soil will be deleted.

e. The reference to 10 CFR Part 20 limits will be deleted and the EPA "Interim Primary Drinking Water Regulation (40 CFR 141) will be referenced.

f. This section will be revised to clarify the method for averaging areas of building surfaces contaminated at levels exceeding the average limit. Specifically, the section will be revised to allow averaging elevated areas larger that 100 cm^2 if the contaminated levels are between one and three times the average limit and the weighted average over any contiguous 1 m^2 area is less than the average limit.

g. The exposure rate limit for building surfaces will be revised from "10 uR/hr" to "5 uR/hr" above background at one meter from the surface.

h. The maximum exposure rate of 20 mR/hr above background at one meter from soil surfaces will be used. (See comment 49). This section will be revised to reflect this limit.

i. This section will be revised to indicate that objectives 1 and 4 (average U^{238} concentration and average exposure rates, respectively) will be demonstrated at the 95% confidence level.

53. Page 3-4, Section 4.0, Subsection 3.2

The contamination guidelines are incorrect. See Comment Nos. 48, 49, and 52.

Response: The contamination guidelines will be revised. See responses to 48, 49 and 52.

54. Page 3-5, Section 4.0, Subsection 3.3

Describe the types of changes to the final survey plan that can be made without the approval of the NRC. See Comment No. 10.

Response: A procedure will be developed to control changes (major and minor) to major documents (i.e. Remediation Plans, Site Characterization Plans, Survey Plans). In general changes that would require NRC approval are changes in: release criteria (i.e. soil contamination, surface contamination, exposure rates); testing level (i.e. 95% to 90%); or sampling protocol different from that original approved in the Final Survey Plan (i.e., subsurface sampling). Changes that would not require NRC approval would be changes in administrative or field procedures, personnel (other than the RSO), and type of instruments used.

55. Page 3-8, Section 4.0, Subsection 3.7

Note that the final survey schedules are inconsistent with the schedules presented in Figure 2-12. See Comment No. 32.

Response: See Response to Comment No. 32.

56. Section 4.0, Table 3-1

Under the activity, "ORISE Confirmation Survey," item 3 should be deleted as ORISE will present, to the NRC, only their findings and not make a recommendation for terminating the license.

Response: Item 3 from the activity "ORISE Confirmation Survey" will be deleted. The statement "ORISE presents findings of confirmatory survey to NRC" will be inserted.

57. Section 4.0, Figure 3-1

The names of the individuals, if identified, in each of the specified positions should be shown on the organization chart.

Response: The names of the identified individuals in the specified positions will be shown on the organizational chart.

58. Page 4-1, Section 4.0, Subsection 4.1, 2nd Sentence

What does it mean to stratify the number of samples based on the potential for residual contamination?

Response: The sentence will be revised to read: The sampling protocol for the areas in and around the Harvard Avenue and Bert Avenue sites will be based on the potential for residual activity (see Subsection 4.3.1).

59. Page 4-1, Section 4.0, Subsection 4.2

The plan states that the detection sensitivities for the instrumentation to be used for determining building surface contamination levels are 25 percent or less of the guideline values. This is inconsistent with Table 4-1 which lists the scan sensitivity for beta as 70 percent of the limit, i.e., 3500 dpm/100^2. Also, Table 4-1 shows the same detection sensitivity for direct measurements and scanning surveys for beta. The sensitivity of direct measurements are typically less than the sensitivity of scan surveys. Please provide additional information regarding the sensitivity of the instrumentation to be used for scanning and direct beta measurements.

Response: The Table 4-1 inserted into the Remediation Plan was incorrect. The correct Table 4-1 identifying the radiation survey and monitoring instrumentation appropriate for the Chemetron Remediation Project (including sensitivities of 25% of the guideline limits) will be incorporated into the revised Remediation Plan).

60. Page 4-3, Section 4.0, Subsection 4.2

Provide details of how the instruments will be calibrated to reflect the alpha, beta, and gamma energies in the radionuclides present at the site.

Response: The calibration and maintenance of survey and monitoring instrumentation is addressed in Chemetron's Field Procedure entitled "Calibration and Maintenance of Survey Instruments". In general, survey and monitoring instrumentation will be calibrated semi-annually and after repair by the original manufacturer or a qualified vendor in accordance with ANSI N323. The calibration of all radiation survey and monitoring instrumentation will be conducted by the original manufacturer or qualified vendor using calibration standards traceable to NIST. The instrumentation will be source checked daily using a source traceable to NIST.

As an example, listed below are some survey instrumentation that will be used in the remediation

project and their respective calibration sources.

Instrument	Detector with Probe	Calibration Source
Alpha, Beta-gamma scaler	Ludlum-2929 with 43-10-1 probe	Th-230 (a) Tc-99 (b,g)
Portable scaler/rate meter (b,g)	Ludlum-2221 with 44-9 probe	Sr-90/Y-90
	Ludlum-2221 with 43-5 probe	Pu-239 (a)
Portable survey meter	Ludlum-3 with 44-9 probe	Sr-90/Y-90 (b,g)
Micro Rem (Bicron)		Cs-137
Micro Survey Meter	Ludlum-19	Cs-137

In addition, the following check sources will be used:

Tc-99
U-238

61. Page 4-3, Section 4.0, Subsection 4.3.1

This section states that a characterization survey was performed on the McGean-Rohco building. Note that not all buildings have been surveyed. See Comment No. 76.

Response: See Response to Comment 9. This section will be revised to reflect that not all buildings or areas have been surveyed.

62. Page 4-7, Section 4.0, Subsection 4.3.1.4.2.1

The plan states that if soil contamination exceeding 75 percent of the limit is identified in an unaffected area then the area will be reclassified as affected. The staff recommends that an investigation be conducted if contamination exceeding 25 percent of the limit is found in an unaffected area. Based on the findings of the investigation either a portion or all of the survey unit may require reclassification. Automatic reclassification of an entire survey unit is not required. However, the investigation should be documented in the final survey report.

Response: Draft NUREG/CR-5849 Section 4.2.3 "unaffected areas" p. 4-17, states that hot-spots or individual locations in excess of 75 percent of the guideline value requires reclassification of the area as "affected". Since the guideline value is 35 pCi/g total uranium (23 pCi/g U^{238}), samples

with concentrations of total uranium and U^{238} at 75 percent of the guide value (26.3 pCi/g and 17.3 pCi/g, respectively) would provide reasonable evidence of the potential for additional contamination. At 25 percent of the guideline (8.8 pCi/g and 5.8 pCi/g, respectively), difficulties would arise in distinguishing natural uranium in soils from depleted uranium at these concentrations. Thus, unnecessary and costly efforts to investigate would result , if the 25 percent value was used.

The text will be revised to incorporate that an investigation will be conducted if contamination exceeding 75 percent of the limit is found in an unaffected area. Based on the findings of the investigation, either a portion or all of the survey unit may require reclassification. The result of the investigation will be documented in the final survey report.

63. Page 4-8, Section 4.0, Subsection 4.3.1.4.2.2

See Comment No. 62.

Response: See response to Comment No. 62.

64. Page 4-8, section 4.0, Subsection 4.3.1.4.2.3

The investigation level for contamination identified on unaffected building surfaces is 25 percent of the guideline.

Response: The investigation level for contamination identified on unaffected building surfaces will be revised to 25 percent of the guideline.

65. Page 4-9, Section 4.0, Subsection 4.3.2

See Comment No. 62 and 64.

Response: See responses to Comments No. 62 and 64.

66. Page 4-10, Section 4.0, Subsection 4.3.3.3

The plan states that areas of elevated activity identified during scan surveys of structure or soil surfaces will be remediated and rescanned. Remediation should only be performed after all of the final survey data has been reviewed. The extent of remediation should be based on a review of all of the survey data, not isolated results. Also, all of the original, pre-remediated results should be reported in the final survey report along with the investigation performed to determine the extent of any additional remediation and any post-remediation results. Remediating during the final survey is inconsistent with the intent of Draft NUREG/CR-5849, which is based on a statistical approach using all of the survey data collected. Please provide additional information on the procedures for determining the need for additional remediation based on the results of the final survey.

How will you demonstrate that the results of the scan will satisfy the guideline at 95 percent confidence?

Response: See response to Comment No. 46. Procedures for determining the need for additional remediation based on the results of the final survey will be incorporated into that section of the revised remediation plan.

The statement that "The results of the scan will satisfy the guideline limit at the 95 percent confidence level" will be deleted.

67. Page 4-11, Section 4.0, Subsection 4.3.4.1

See Comment No. 59.

Response: See response to Comment No. 59.

68. Page 4-12, Section 4.0, Subsection 4.3.5.1

Draft NUREG/CR-5849 recommends at least one exposure rate measurement for each 10 m^2. Please provide the rationale for your proposal to perform 1 exposure measurement per 200 m^2.

Response: The affected area criteria will be revised to read "1 measurement per 10 m^2".

The unaffected area criteria will be revised, consistent with Draft NUREG/CR-5849, to read "1 measurement at each location where a surface activity measurement was performed".

69. Page 4-14, Section 4.0, Subsection 4.3.6.2

The plan states that subsurface sampling will not be performed at the Harvard Avenue site since, among other reasons, clean material will be used to fill and grade the site. No grading should be performed until the final and confirmatory surveys are complete and NRC approves grading with clean fill. Please confirm that no grading will be performed until the surveys are completed.

Response: This section will be revised to incorporate a statement confirming that "no grading with clean fill will be performed until the final and confirmatory surveys are completed and approval to backfill and grade the site is received from the NRC".

70. Page 4-15, Section 4.0, Subsection 4.4

Please include the background measurement results in the final survey report.

Response: Background exposure rate measurements will be included in the Final Radiological Survey Report.

71. Section 4.0, Appendix A

This appendix duplicates the information presented in Appendix D to the remediation plan. Suggest eliminating information that is already provided.

Response: Appendix A in Section 4.0 will be deleted. A statement that a description of the radiological conditions of the McGean-Rohco Inc. Buildings can be found in Appendix D will be incorporated into the text.

72. Section 4.0, Appendix B

This appendix duplicates the information provided in Appendix A to the remediation plan. Suggest eliminating information that is already provided.

Response: Appendix B in Section 4.0 will be deleted. A statement that a description of the qualifications and experience of project personnel can be found in Appendix A of the Remediation Plan will be incorporated into the text.

73. Section 4.0, Planned Final Radiation Survey Section, General

We understand that the "Planned Final Radiation Survey" section appears to have been prepared as a separate stand-alone document. However, the organization of this section, in terms of the numbering system you use for subsections, pages, tables, and figures, should be reconsidered to eliminate confusion with other subsections, page numbers, tables, and figures elsewhere in the document, that have the same designation. For example, there is a Table 3-1 in Section 3.0, "Description of Methods Used for Protection of Occupational and Public Health and Safety," and a Table 3-1 in Section 4.0, "Planned Final Radiation Survey."

Response: Section 4.0 Planned Final Radiation Survey will be revised as requested.

74. Page 5-1, Section 5.0

a. Provide the details of how the assumed quantities, you have used, and the lump sum entries were derived. Also, provide a brief description of each of the items you have listed.

b. Packaging, transporting and disposal costs of contaminated material, exceeding the Option 2 limits, should be included.

c. Provide justification for the unit costs for the items, "HP Monitoring" and "Onsite Lab."

d. It is unclear if the purchase and transport of the necessary clean fill material, for the Bert Avenue site, is included. Please clarify.

e. Does the item, "Perform confirmation sampling," represent the final surveys? If so, the estimates appear to be low for performing all of the surveys, soil sampling, analysis of data, and report preparation.

f. The use of a parent guarantee assumes that the licensee is an ongoing operation or has assets available to perform the remediation. In the discussions that took place prior to the transfer of the Allegheny International assets to the Japonica Partners, you provided balance sheets indicating that Chemetron and its direct parent, NMGM, Inc. (now Montey Corporation) had a positive net worth. Please confirm the current financial status of Chemetron Corporation as having positive net worth by providing the correct balance sheets for these companies.

Response:

a. The volume of the amount of material to be excavated and stockpiled is based on the estimate of the total amount of potentially contaminated material at each site. The method and calculation used to derive this estimate is found in the attached paper, "Estimating the Volume of Contaminated Materials at the Bert Avenue and Harvard Avenue Sites" (Attachment 2).

b. The amount of material that will require offsite disposal cannot be estimated at this time. As shown in the calculations accompanying the attached paper (Attachment 2) and in the analysis included in Appendix B and Appendix C of the Site Remediation Plan, the average concentration of the contaminated material is well below the Option 2 limit. A contingency was included in the estimate presented in Section 5.0 which can be used to defray costs for offsite disposal.

c. B. Koh & Associates, Inc., recently supervised a remediation project in the same general area of the Chemetron Sites. The HP staffing for that project was similar to that contemplated in preparing the Site Remediation Plan. The estimate of $1000 per day is compatible with the actual costs incurred at the other site. The estimate for "on-site lab" was based on a quote received from a vendor who would set up and rent the mobile lab for $60,000/year. This would be approximately $5,000/month for two sites or $2,500/month for each site.

d. Details regarding lump sum items are as follows:

1. Site preparation is an estimate based on site preparation costs for similar projects;

2. Under cell sampling costs are estimates based on costs for similar projects;

3. Construct and evaluate test fill costs are based on estimates from consultants;

4. Construct stormwater and groundwater controls costs are based on estimates from

consultants;

5. Confirmation sampling costs are estimates based on costs for similar projects; and

6. Engineering & Management costs are based on approximately 25% of the costs of construction (except the 20% contingency costs).

e. Final survey sample analysis and report preparation costs are included in the Engineering and Management category.

The balance sheets for the Montey Corporation and Subsidiaries and Chemetron Corporation, Inc., and Subsidiaries are presented in Attachment 3.

75. Appendix A

Under the current projects listed for B. Koh & Associates, Inc., M. Lederman is listed as a reference for the Chemetron site. We understand that Mr. Lederman has left Chemetron. Is this a current reference for this project?

Response: Mr. David R. Sargent is the current reference for this project.

76. Appendix D. General

a. Provide a description of the characterization program used for the McGean-Rohco buildings. Not all the buildings have been fully characterized. Therefore, describe your plans for further characterization work.

b. State the specific criteria that you will use to remediate the McGean-Rohco buildings. Will the worker training program, radiation control plan, and health and safety plan, to be used for the Harvard Avenue and Bert Avenue site remediation, be used for the McGean-Rohco complex remediation?

c. You are proposing to vacuum most areas prior to performing additional surveys and remediation. What controls will be placed on the vacuuming? How will vacuum wastes be handled?

d. Provide information on your plans for surveying the land areas adjacent to the buildings. What criteria will be used in implementing "reverse" contamination control to preclude contaminated material from entering clean buildings?

e. One of the proposed decontamination methods is the use of high pressure water or steam. If this method is used, how will the waste water be processed and disposed?

Response:

a. See Response to Comment 9. In general, random surveys and samples will be used to characterize selected areas within the buildings or the total building, including drainlines and sewers. Following evaluation of the results, remediation of the areas will be performed, followed by a final survey.

b. The specific criteria that will be used to determine clean levels of surface contamination for unrestricted use in the McGean-Rohco buildings and equipment are those specified in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for By-Product, Source, or Special Nuclear Material Policy and Guidance Directive FC 83-23, Division of Industrial and Medical Nuclear Safety," August 1987.

Soils around the buildings and roof materials will meet the levels established in Option 1 of the Branch Technical Position, "Disposal or Onsite Storage of Thorium or Uranium Waste from Past Disposals (46 FR 52061, October 23, 1981).

Exposure rates will comply with Draft NUREG/CR-5849 recommendations and the above listed branch technical position.

Yes, The Chemetron Workers Training Program, Radiation Control Plan and Health and Safety Plan (to the extent it applies) will be used for remediation of the Harvard Avenue and Bert Avenue sites and the McGean-Rohco buildings complex.

c. The vacuuming will be performed using a high volume industrial vacuum outfitted with a HEPA filtration system (e.g. Nortech or Nilfisk)

Air samples will be conducted within the work area. Lapel air samples may be used to monitor the air at the breathing zone at the discretion of the RSO.

Vacuumed wastes will be placed in the containment cell with the other building rubble (per OEPA approval) or disposed offsite at a licensed disposal facility.

d. The initial approach will be to consider the land areas immediately adjacent to the buildings as unaffected. therefore, at least 30 surface samples (6") and 30 subsurface (1 - 2') will be collected and analyzed for U-238 for each area, if practical. If the area reveals U-238 contamination greater than 75 percent of the guideline limit 35 pCi/g total (26 pCi/g U-238) the area will be reevaluated for consideration as an affected area. If the area is deemed an affected area, the survey and sampling and statistical application of the guideline contained in Draft NUREG/CR-5849 for an affected area will be followed.

Any material being brought into a "clean" or released area will need to meet the unrestricted release contamination limits.

e. The use of high pressure water or steam will be used as a last resort, for decontamination. The

waste water or waste steam condensate will be collected and sampled and analyzed for U-238. If the water is clean or less than the 10 CFR 20 limits for discharge to sewer, it will be released to the local sewer network.

If the waste water is above the limit, the water will be treated onsite (i.e. dewatered or immobilized). Dewatered residue will be placed into the containment cell. Solidified waste will be sent offsite to a licensed disposal facility.

77. Page D-26, Appendix D, Section 2.7.5

It appears that radiological characterization data sheets for Building 10G are missing. Are data sheets available for this building?

Response: The radiological characterization data sheet for Building 10G will be incorporated into the Revised Remediation Plan.

78. Page D-32, Appendix D, Section 2.9.5

It appears that radiologic characterization data sheets for Building 14B and 14C are missing. Are data sheets available for these buildings?

Response: The radiologic characterization data sheets for Building 14B and 14D will be incorporated into the Revised Remediation Plan. Radiologic characterization was performed on Building 14 D, however, no contamination was found. Hence, there is no data sheet available.

79. Page D-40, Appendix D, Section 2.12

Provide the survey data showing that Building 19 meets unrestricted use criteria. Was the Building 19 survey performed in accordance with NUREG/CR-5849? If not, will additional surveys be performed in this building as part of the final survey report?

Response: The radiological characterization for Building 19 will be incorporated into the Revised Remediation Plan. Building 19 survey was not performed in accordance with Draft NUREG/CR-5849. Additional surveys of Building 19 will be performed and incorporated as part of the Final survey report. The text will be revised accordingly.

80. Page D-40, Appendix D, Section 2.13.1

Are any survey data available for the former Building 20D structure that was previously dismantled? Is there any information of the disposition of the wastes from this building?

Response: Survey data for the former Building 20 structure that was previously dismantled could not be located in the Chemetron files and therefore is not available. Likewise, no information

regarding the disposition of the waste from this building could be found.

81. Page D-50, Appendix D, Section 2.16

Contamination, above NRC's unrestricted use limits, from Chemetron operations was found on the roof of ALCOA Building 65, which was adjacent to the Chemetron processing building. Have all roofs and roof drains in the McGean-Rohco complex been surveyed? If not, these areas should be included in the survey program. All locker room and laundry room drains in Building 4, 5A, 9, and 10A should be also included in the drain surveys.

Response: Not all building roofs and drains within the McGean Rohco, Inc. complex have been surveyed. Some survey work has been performed on roofs and roof drains on Building 19 and 20. Building roofs and roof drains will be included in the survey program. All locker room and laundry room drains in Building 4, 5A, 9 and 10 will be included in the drain surveys.

82. Page D-53, Appendix, Section 3.0

It appears that the schedules presented in Figure D-4 do not include the final surveys and confirmatory surveys. Will the final surveys be conducted following remediation of all the McGean-Rohco buildings and areas? The overall schedule should be consistent with the schedules provided in Section 4, "Final Radiological Survey Plan."

Response: Final surveys will be conducted following remediation of each building or area. This will facilitate maintaining control over the buildings to minimize the potential for cross contamination. Figure D-4 will be reviewed and revised, if necessary, to be consistent with the schedules provided in Section 4.0 "Final Radiological Survey Plan".

ATTACHMENT 1

BAKER
&
HOSTETLER
COUNSELLORS AT LAW

Attachment 1

3200 NATIONAL CITY CENTER • 1900 EAST 9TH STREET • CLEVELAND, OHIO 44114-3485 • (216) 621-0200 • FAX (216) 696-0740
WRITER'S DIRECT DIAL NUMBER (216) 861-7327

June 16, 1993

VIA TELECOPY/REGULAR U.S. MAIL

The Honorable Martin R. Hoke
Congress of the United States
House of Representatives
Washington, D.C. 20515-3510

Re: McGean-Rohco, Inc.
Bert Avenue Site Remediation

Dear Congressman Hoke:

On behalf of our client, McGean-Rohco, Inc., we wish to reconfirm commitments that McGean-Rohco has made in connection with the remediation of the Bert Avenue site in Newburgh Heights, Ohio. If the remediation plan as currently proposed is approved and the proposed closure cell is constructed, it is the intent of McGean-Rohco to make the Bert Avenue site available to the Village of Newburgh Heights for its use as a community facility.

In addition, McGean-Rohco has given its approval for and fully supports the construction of a culvert to contain the Newburgh Heights storm sewer as it crosses the Bert Avenue site. It is our understanding that Chemetron has included such a culvert in its current proposed remediation plan and has committed sufficient funds to cover its construction.

As you know, we believe that the current proposed remediation plan developed by Chemetron, together with the commitments from McGean-Rohco and Chemetron, represent a program that is in the overall best interests of the citizens of Newburgh Heights. We appreciate any help that you can provide in seeing this program through. If we can provide any additional information or assistance in this matter, please let me know.

Respectfully,

Randall L. Solomon

cc: D.L. Whitney

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ds 06/16/93

ATTACHMENT 2

Estimating the Volume of Contaminated Materials at the Bert Avenue and Harvard Avenue Sites

The NRC 1981 Branch Technical Position permits unrestricted release of properties contaminated with uranium if the licensee can demonstrate that the average concentration of uranium in the soil is less than 35 picoCuries per gram. Additional guidance for conducting radiological surveys and calculating average concentrations is given in NUREG 5849 (Draft). In particular, NUREG 5849 indicates that if the average concentration within a specified volume is below the regulatory guidelines, no single measurement can exceed three times the guideline value. Applying the guidelines of the Branch Technical Position and NUREG 5849 to the Chemetron sites, the limits for free release become average concentration of U-238 less than 22 picoCuries per gram with no measurement in excess of 66 picoCuries per gram.

The Chemetron sites have three distinct volumes of material to be considered for remediation: the surface soil, the subsurface soil, and the excavated soil piles. Each volume was characterized separately and the results reported in the Final Site Characterization Report (FSCR). With the assistance of Dames & Moore, B. Koh & Associates analyzed the data to estimate the amount of material that could potentially exceed the NRC guidelines. The results of the analyses are presented below.

Subsurface soils

At the Harvard Avenue site, Dames & Moore analyzed approximately 300 subsurface soil samples. The FSCR describes the location of each sample. Of the 300 samples, 12 exceeded the guideline value and only one exceeded the maximum concentration, 66 picoCuries per gram. The average value of all of the samples is 5 picoCuries per gram, well below the guideline. We conclude that none of the subsurface soil needs to be disposed offsite, although some localized removal of soil may be required to insure that all guidelines values are met.

The situation at the Bert Avenue site is considerably different. A review of over 900 subsurface samples revealed two areas of the site where subsurface contamination is in excess of the guidelines. Overall, 216 samples exceeded the guideline value, 22 picoCuries per gram. Of these, 204 exceeded the maximum sample criteria, 66 picoCuries per gram. The samples that exceeded the maximum allowable value were located in 14 bore holes. Three bore holes form the basis for Area A shown on Figure 7.1-4 of the FSCR, the remaining 11 bore holes constituting Area B of the same figure.

The average concentration of 739 subsurface samples taken from the part of the Bert Avenue site outside areas A and B is less than 3.23 picoCuries per gram. No sample exceeds the maximum value and only 12 exceed the Option I guideline. As a result of our review of the data, B. Koh & Associates is confident that only the material located below areas A and B must be excavated for disposal.

To determine the volumes of material likely to be excavated from areas A and B we proceeded in the following manner. Dames & Moore used a planimeter to determine the surface areas of A and B. Then, B. Koh & Associates examined the data from each of the bore holes within the areas A and B to determine the depth at which the contamination was less than 22 picoCuries per gram. These depths were averaged and the result

multiplied by the areas to get the volumes associated with A and B. The attached tables show the data from for each bore hole used in the calculation. The resulting areas and volumes are:

Area A = 3,714.4 ft^2
Average depth = 7.7 ft
Volume A = 28,600 ft^3

Area B = 22,772 ft^2
Average depth = 17.3 ft
Volume B = 393,956 ft^3

Surface soils

While no significant concentration of contaminants remain below the surface at the Harvard Avenue site, almost all of the surface exceeds the NRC guidelines, albeit by a small amount. While each hot spot could be individually remedied, it is more efficient to remove a 1 foot layer of soil from the surface for disposal. The resulting areas and volumes are:

Area = 104,949 ft^2
Depth = 1 ft
Volume = 104,949 ft^3

B. Koh & Associates used a different approach to calculate the volume of soil associated with the surface of the Bert Avenue site. The remediation will involve only the grids that exceed the NRC guidelines and will consist of excavating the soil to a depth on one foot. The area of the grids and resulting volume are shown below:

Area = 38,750 ft^2
Depth = 1 ft
Volume = 38,750 ft^3

Excavated Soil Piles

The Harvard Avenue site contains a single large pile of contaminated soil excavated during previous remediations. Dames & Moore sampled forty random locations within the pile, finding only one sample that exceeded the maximum allowable value. The volume of the excavated soil pile is:

Volume = 53,000 ft^3

There are four excavated soil piles at the Bert Avenue site. The concentrations in two of the piles are so low (no sample exceeds the allowable average value) that they do not need to be considered as radioactive waste. Dames & Moore analyzed 105 samples from the other two piles and found that only 7 exceeded the maximum value, 66 picoCuries per gram. Listed below is the combined volume of the two piles:

Volume = 53,000 ft^3

Summary

The estimated volume of contaminated soil that must be accommodated for in disposal cell is shown in the table below.

	Bert Ave. ft^3	Harvard Ave ft^3	Total ft^3
Subsurface	422,556	0	422,556
Surface	38,750	104,949	143699
Soil Pile	53,000	53,000	106,000
Total	514,306	157,949	672,255

Area A Bore Holes - Concentration and Depth of Contaminated Soil

Bore Hole	Interval	Conc.	Logarithm
BB13	0-2'	2.04E+01	3.0155349
BB13	2-4'	5.02E+02	6.2186001
BB13	4-6'	1.14E+02	4.7361984
BB13	6-8'	2.60E+01	3.2580965
BB72	0-2'	1.00E+02	4.6051702
BB72	2-4'	1.11E+01	2.4069451
BB73	0-2'	1.88E+00	0.6312718
BB73	2-4'	1.18E+02	4.7706846
BB73	4-6'	2.67E+02	5.5872487
BB73	6-8'	4.51E+01	3.8088822
BB73	8-10'	5.94E+00	1.7817091
Average		1.10E+02	4.09E+01
Stdev		1.52E+02	5.39E+00

Area B Bore Holes - Concentration and Depth of Contaminated Soil

Bore Hole	Interval	Conc.	Logarithm
BB2	2-4'	4.00E+00	1.3862944
BB2	4-6'	1.02E+02	4.6249728
BB2	6-8'	3.64E+01	3.5945688
BB2	8-10'	7.65E+02	6.6398758
BB2	10-12'	2.88E+02	5.6629605
BB2	12-14'	1.14E+01	2.4336134
BB2	14-16'	8.32E+01	4.4212473
BB2	16-18'	8.27E+01	4.4152196
BB2	18-20'	1.23E+00	0.2070142
BB14	0-2'	1.38E+02	4.9272537
BB14	2-4'	2.68E+02	5.590987
BB14	4-6'	8.28E+01	4.4164281
BB14	6-8'	6.22E+00	1.8277699
BB19	0-2'	1.20E+03	7.0900768
BB19	2-4'	2.66E+02	5.5834963
BB19	4-6'	1.94E+01	2.9652731
BB19	6-8'	5.12E+01	3.9357395
BB19	8-10'	4.51E+00	1.5062972
BB59	0-2'	8.13E+01	4.398146
BB59	4-6'	2.46E+02	5.5053315
BB59	14-16'	9.13E+03	9.119321
BB59	16-18'	1.86E+03	7.5283318
BB59	18-20'	7.84E+01	4.3618239
BB59	20-22'	1.64E+01	2.7972813
BB60	0-2'	1.89E+01	2.9391619
BB60	8-10'	2.54E+01	3.2347492
BB60	10-12'	1.32E+01	2.5802168
BB60	14-16'	8.36E+01	4.4260435
BB60	18-20'	9.14E+01	4.5152455
BB60	22-24'	4.18E+03	8.3380665
BB60	24-26'	1.66E+03	7.4145729
BB60	26-28'	8.52E+01	4.4450014
BB60	28-30'	3.15E+01	3.4499875
BB60	30-32'	6.25E+01	4.1351666
BB60	32-34'	1.49E+01	2.7013612
BB70	0-2'	5.09E+01	3.9298629
BB70	2-4'	1.85E+01	2.9177707
BB70	4-6'	1.59E+02	5.0689042
BB70	6-8'	4.84E+01	3.8794998
BB70	8-10'	1.09E+01	2.3887628
BB71	0-2'	4.77E+01	3.8649314
BB71	2-4'	4.17E+01	3.7305011
BB71	4-6'	8.76E+00	2.1701959
BB71	6-8'	1.30E+00	0.2623643
BB71	8-10'	1.04E+01	2.3418058
BB71	12-14'	1.24E+02	4.8202816
BB71	14-16'	1.34E+02	4.8978398
BB71	16-18'	6.22E+01	4.130355

Area B Bore Holes - Concentration and Depth of Contaminated Soil

BB71	18-20'	4.65E+02	6.1420374
BB71	20-22'	3.05E+02	5.7203118
BB71	22-24'	1.61E+02	5.0814044
BB71	24-26'	3.25E+00	1.178655
BB74	0-2'	4.31E+01	3.763523
BB74	2-4'	3.18E+01	3.4594663
BB74	6-8'	5.91E+01	4.0792309
BB74	8-10'	3.93E+00	1.3686394
BB74	10-12'	1.61E+02	5.0814044
BB74	12-14'	7.81E+01	4.3579901
BB74	14-16'	3.40E+01	3.5263605
BB74	16-18'	2.38E+00	0.8671005
BB75	0-2'	3.54E+01	3.5667118
BB75	2-4'	3.00E+00	1.0986123
BB75	4-6'	2.84E+01	3.3463891
BB75	6-8'	3.25E+01	3.4812401
BB75	8-10'	2.49E+01	3.2148678
BB75	10-12'	6.82E+01	4.2224446
BB75	12-14'	2.55E+03	7.8438486
BB75	14-16'	6.73E+02	6.5117453
BB75	16-18'	1.70E+02	5.1357984
BB75	18-20'	8.91E+01	4.4897593
BB75	22-24'	1.17E+01	2.4595888
BB76	0-2'	1.54E+02	5.0369526
BB76	2-4'	1.10E+02	4.7004804
BB76	4-6'	1.06E+02	4.6634391
BB76	6-8'	5.49E+01	4.0055133
BB76	8-10'	1.54E+01	2.7343675
BB78	0-2'	1.37E+02	4.9199809
BB78	2-4'	2.13E+02	5.3612922
Average		3.54E+02	5.97E+01
Stdev		1.18E+03	5.93E+00

ATTACHMENT 3

Attachment 3

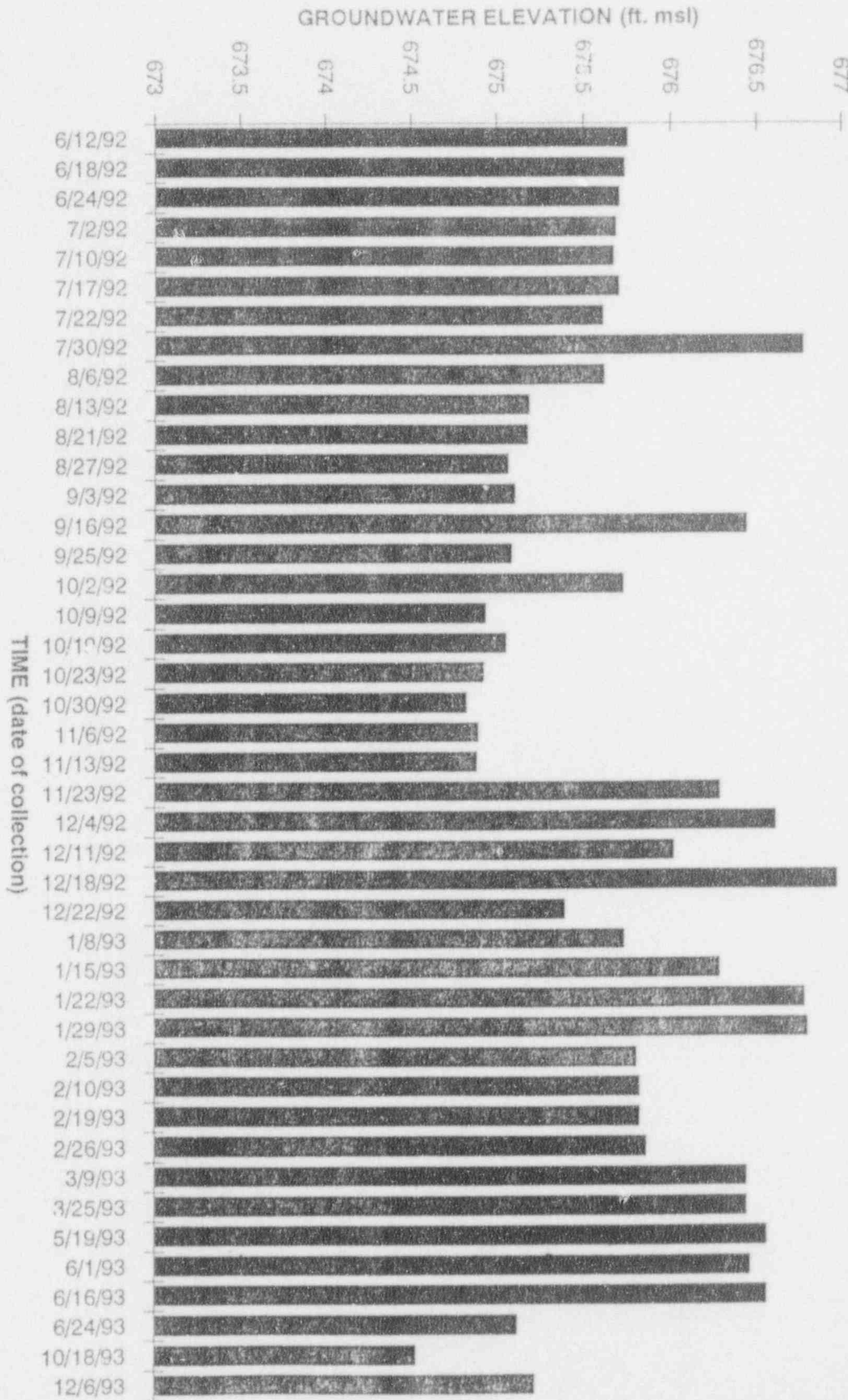
Montey Corporation and Subsidiaries
Condensed Consolidated Balance Sheet
October 3, 1993
(Dollars in Thousands)

Assets	Unaudited
Cash & Cash Equivalents	5,257
Net Receivables	110
Net Inventory	32
Prepaid Expenses	64
Net Current Assets of Discontinued Operations	2,037
Total Current Assets	7,500
Net PP&E	11
Other Non-Current Assets	9,115
Net Non-Current Assets of Discontinued Operations	23
Total Assets	16,649
Liabilities & Net Worth	
Accounts Payable - Trade	1,735
Accrued Payroll & Benefits	45
Other Accrued Liabilities	5,908
Accrued Income Tax	1,232
Current Liabilities	8,920
Other Long-Term Liabilities	25,468
Total Liabilities	34,388
Total Shareholder's Equity	(17,744)
Total Liabilities & Net Worth	16,644

Chemetron Corporation and Subsidiaries
Condensed Consolidated Balance Sheet
October 3, 1993
(Dollars in Thousands)

Assets	Unaudited
Cash & Cash Equivalents	
Net Current Assets of Discontinued Operations	2,037
Total Current Assets	2,037
Other Assets	
Net Non–Current Assets of Discontinued Operations	23
Total Assets	2,060
Liabilities & Net Worth	
Accrued Liabilities	1,344
Current Liabilities	1,344
Other Long–Term Liabilities	3,761
Total Liabilities	5,105
Total Shareholder's Equity	(3,045)
Total Liabilities & Net Worth	2,060

ATTACHMENT 4



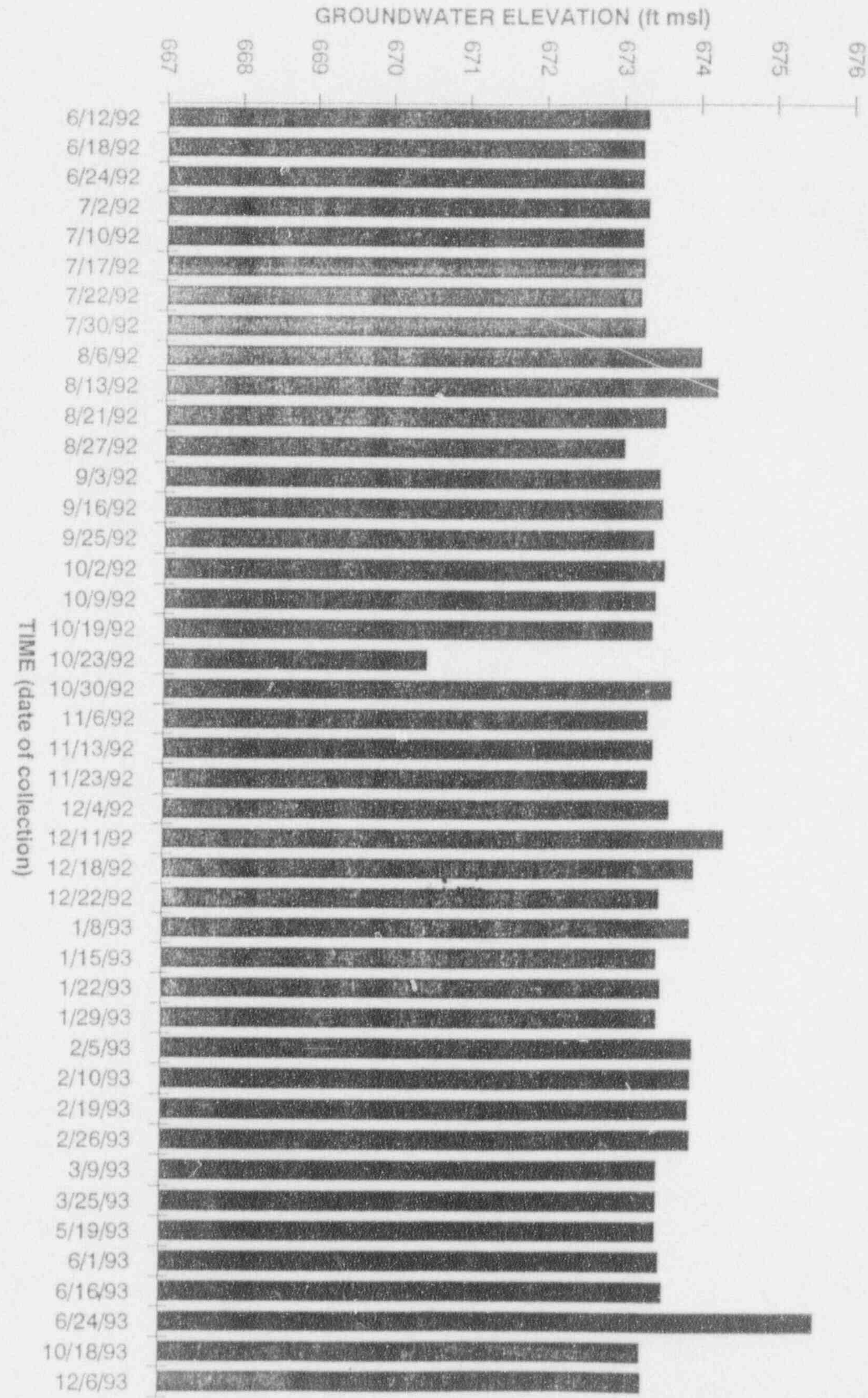
GROUNDWATER HYDROGRAPH - HW-1

DATE: 6/92 - 12/93

SOURCE:

B. Koh & Associates, Inc.

B. Koh & Associates, Inc.



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DATE: 6/92 - 12/93

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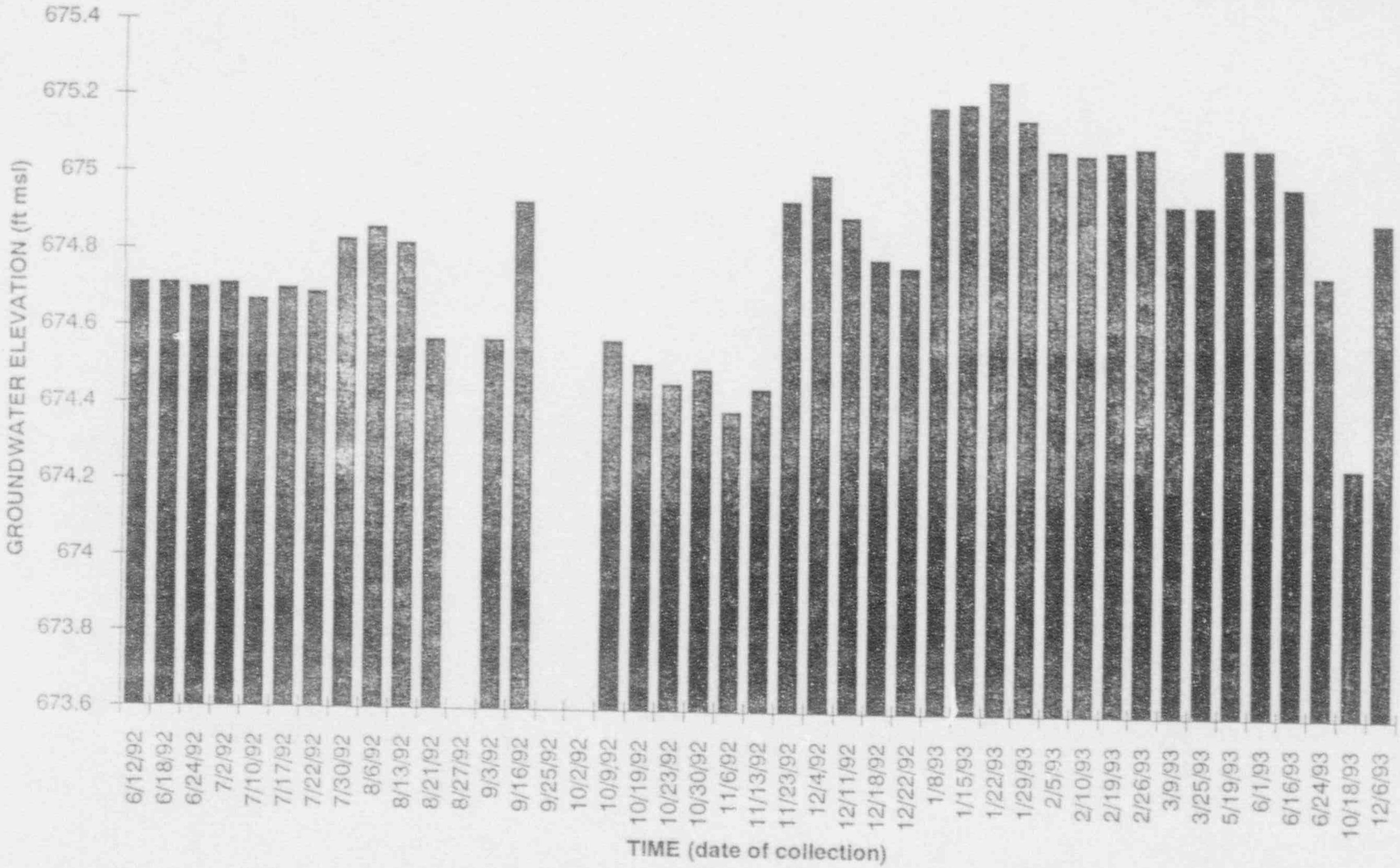

B. Koh & Associates, Inc.

GROUNDWATER HYDROGRAPH - HW-3M
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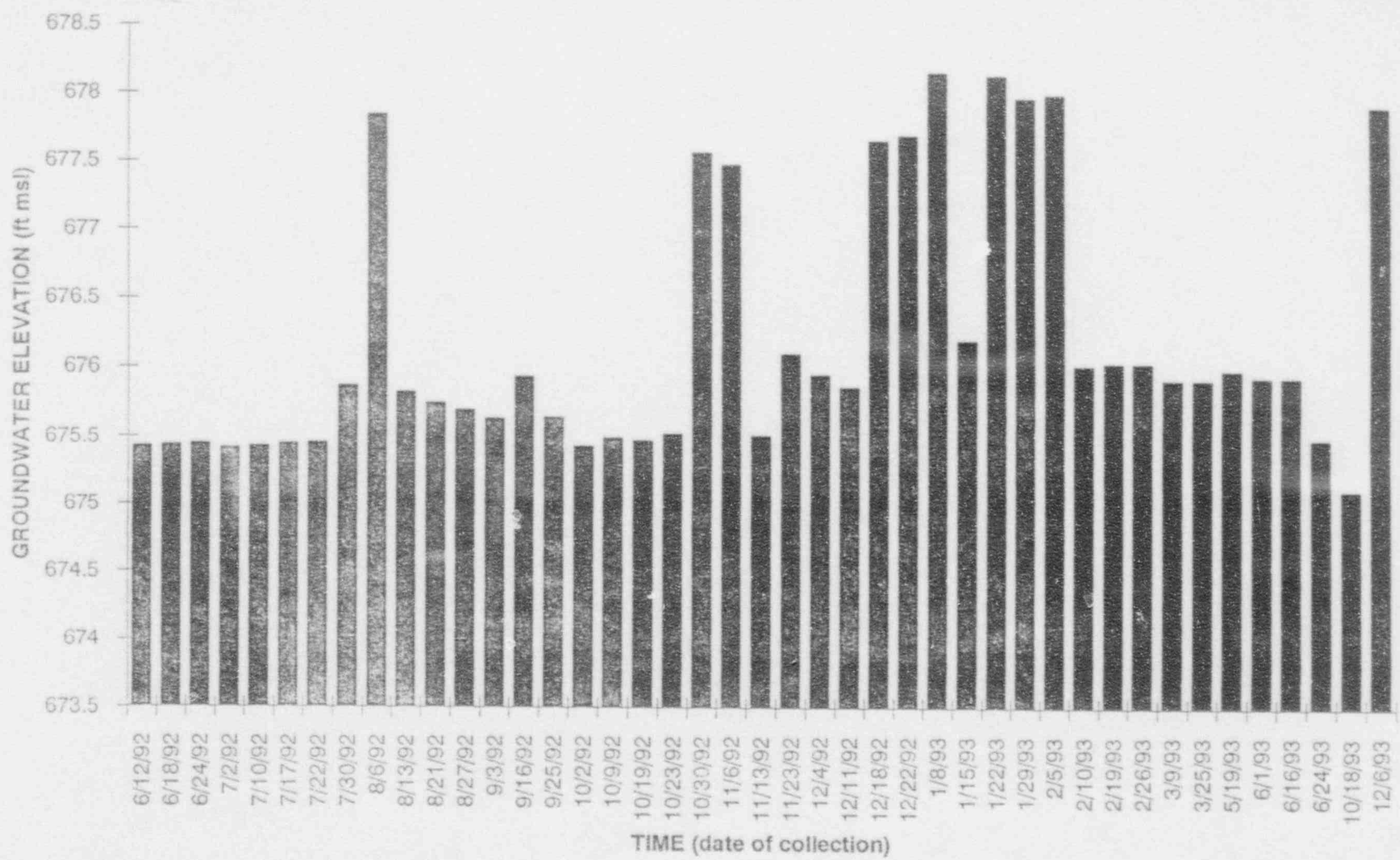

B. Koh & Associates, Inc.

GROUNDWATER HYDROGRAPH - HW-3D

DATE: 6/92 - 12/93

SOURCE: