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November 9, 2001

U.S. Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406-1415

Attention: Ronald R. Bellamy, Chief
Decommissioning and Laboratory Branch
Division of Nuclear Material Safety

Subject: Submittal of Additional Information Concerning Remediation Activities at the
Westinghouse, Waltz Mill Site, Madison, Pennsylvania
License No., SNM-770, Docket No. 07000698

Reference: USNRC Letter dated August 10, 2001 from Ronald R. Bellamy to A. Joseph
Nardi, Westinghouse Electric Company, LLC

Dr. Bellamy:

Westinghouse Electric Company, LLC (Westinghouse) hereby submits this additional information in response to the letter referenced above concerning the remediation activities at the Westinghouse, Waltz Mill Site, Madison, Pennsylvania. Question number 1 of the letter also requested information regarding the responsibilities to cover the costs for successfully completing planned remediation activities and any anticipated long-term monitoring activities. This question has been adequately answered on page 2 of the letter from CBS (now Viacom) to the NRC dated September 28, 1998. A copy of this letter is attached for your convenience.

If you have any questions concerning this submittal, please contact me at the above address or by telephone at (412) 374-4652.

Sincerely,

A. Joseph Nardi, Supervisory Engineer
Environment, Health and Safety
Westinghouse Electric Company

Enclosures (2)

NMSS/RGNI MATERIALS-002

cc:

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LOUIS J. BRISKMAN
EXECUTIVE VICE PRESIDENT
AND GENERAL COUNSEL

September 28, 1998

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Application for Transfers and Amendments of Materials Licenses

Dear Sir or Madam:

CBS Corporation ("CBS") is filing an Application for the transfer and amendment (the "Application") of special nuclear materials license Nos. SNM-1460 (CBS Science and Technology Center, Churchill, PA) and SNM-770 (CBS Waltz Mill Service Center, Madison, PA) (collectively the "Licenses")¹. This letter is a part of the Application and informs the Nuclear Regulatory Commission ("NRC" or "Commission") of the intent of CBS to retain responsibility for certain decommissioning activities under such Licenses.

The transfer of the Licenses is necessitated by a transaction whereby CBS will sell the assets (with certain exceptions) of its nuclear and government operations businesses to a consortium comprised of Morrison Knudsen Corporation ("MK") and BNFL USA Group, Inc. ("BNFL USA"). The details of the requested License transfers and amendments, including information with respect to the proposed licensees, are more fully described in the Application.

Under the Asset Purchase Agreement (APA) that will effectuate the transaction, CBS has agreed with MK and BNFL USA to retain the following financial responsibility for decommissioning and/or decontaminating certain facilities associated with the Licenses. In connection with such responsibility, CBS also has agreed to provide the following NRC-required decommissioning financial assurance under the Licenses.

¹ The name of the licensee on the Licenses reads Westinghouse Electric Company, a division of CBS Corporation.

License No. SNM-1460 - CBS Science and Technology Center.

Under the APA, CBS retains financial responsibility for the cost of decommissioning and decontaminating the facilities at the Science and Technology Center associated with license No. SNM-1460, to the extent such facilities continue to be operated in the same manner after the date of the closing of the sale transaction (the "Closing Date") and the License transfer as such facilities have been operated prior to the Closing Date. To the extent of such responsibility, for the life of the license, CBS will be financially responsible for decommissioning and will provide the decommissioning financial assurance under license No. SNM-1460 required by NRC regulations, as may be determined pursuant to such regulations from time to time.

License No. SNM-770 - Waltz Mill Service Center.

Under the APA, CBS also retains certain, but not total, responsibility for decontaminating certain facilities at the Waltz Mill Service Center associated with license No. SNM-770. Specifically, CBS has agreed, at its sole cost and expense, to implement all remedial measures, including removal and decontamination activities, as may be required by and are in accordance with approvals it is currently seeking under plans submitted to the NRC, under the "Waltz Mill Facility SNM Remediation Plan, Revision 0," dated November 27, 1996 (the "Plans"), for those areas of the Waltz Mill Service Center identified in the Plans as "Retired Facilities."² The Retired Facilities are associated with certain identified facilities and structures at the Service Center not presently utilized in on-going operations. Accordingly, until such time as the specified remediation activities under the Plans are completed with respect to the Retired Facilities and the NRC approves completion of the Plans, CBS will be financially responsible for such remediation and will provide the decommissioning financial assurance associated with the Retired Facilities under license No. SNM-770 required by NRC regulations, as may be determined pursuant to such regulations from time to time.

Scope of CBS's Obligations

CBS will undertake the following arrangements, to be effective as of the date of the closing of the sale transaction, in order to effectuate its retained decommissioning financial assurance responsibilities under the Licenses as described above. (The following arrangements do not limit CBS's responsibility described above.)

² CBS will not transfer license No. TR-2 associated with the 10 CFR Part 50 test reactor located at the Waltz Mill site as part of the sale transaction. Therefore, CBS will remain responsible to provide all decommissioning financial assurance associated with this license. CBS will file a separate application to the NRC seeking amendment of license No. TR-2 to reflect the changes to the license necessitated by the sale transaction.

1. CBS will provide financial assurance for decommissioning acceptable to the NRC to satisfy its financial assurance responsibilities under the Licenses in amounts that may be required from time to time. Initially, CBS will arrange for or cause a letter of credit ("LOC") to be issued by a qualified bank to the NRC for CBS's account in the amount, respectively, of: (i) the decommissioning financial assurance requirements for license No. SNM-1460 being retained by CBS hereunder (currently \$4,705,000.) and (ii) the decommissioning financial assurance requirements to complete the remediation activities associated with the Retired Facilities as described in the Plans for license No. SNM-770 (currently \$10,401,000). CBS also will establish an associated Standby Trust Agreement with a qualified trustee concurrently with the issuance of the LOCs.
2. The LOCs and Associated Standby Trust Agreement to be provided by CBS for the Licenses will be in the form CBS currently is providing to the NRC for its licenses (prior to their transfers) that require the provision of such decommissioning financial assurance. CBS will submit executed versions of the LOCs and the Associated Standby Trust Agreement, in furtherance of the NRC's approval of the Applications, as soon as they are finalized.
3. CBS will continuously maintain the LOC for license No. SNM-1460 unless and until a replacement LOC is approved by the NRC, or until CBS provides an alternate mechanism for meeting its financial assurance responsibility as approved by the NRC, and in either case, until the NRC authorizes termination of CBS's decommissioning financial assurance under license No. SNM-1460.
4. CBS will continuously maintain the LOC for license No. SNM-770 unless and until a replacement LOC is approved by the NRC, or until CBS provides an alternate mechanism for meeting its financial assurance responsibility as approved by the NRC, and in either case, until the Plans are completed with respect to the Retired Facilities and the NRC approves the completion of the Plans.
5. CBS understands that the NRC shall be entitled to draw on the LOC issued for a specific License for, respectively, decommissioning activities associated with the STC facilities or remediation activities associated with the Waltz Mill Service Center Retired Facilities under the Plans, in accordance with its financial assurance regulations and the terms of the LOC. CBS also understands that the NRC will surrender a CBS provided LOC to the LOC bank for termination (or terminate any other form of NRC-approved financial assurance mechanism CBS may provide) with respect to a specific License when, to the satisfaction of the NRC, the decommissioning or decontamination activities under the License for which CBS has retained responsibility have been completed.

NRC Acknowledgment.

Given its on-going and active role in providing financial assurance under the Licenses, as provided herein, CBS requests that the NRC acknowledge the foregoing arrangements to be effective as of the date of the closing of the sale transaction. In connection therewith, CBS further requests that the NRC acknowledge the following:

1. CBS will remain an active participant in the decommissioning and decontamination activities under the Licenses as described herein. CBS will have primary responsibility and authority to negotiate with and respond to the NRC with respect to: (i) any issues that may arise in connection with its provision of the stated financial assurance under the Licenses; and (ii) the conduct of decommissioning activities under license No. SNM-1460 or the completion of remediation activities with respect to the Retired Facilities under the Plans under license No. SNM-770, and any issues that may arise in connection therewith.
2. Upon any failure under the Licenses, as transferred, to meet a material term, condition, requirement or deadline that may impact CBS's retained responsibilities, as described herein, unless immediate action is required to protect the public health and safety, the NRC will provide written notice of such failure to CBS (and the licensee), discuss the corrective actions required to remedy such failure with CBS (and the licensee) and allow CBS (and/or the licensee) a reasonable time to implement agreed upon corrective action. CBS understands that in no event will any time allowed to it (or the licensee) by the NRC for notice and corrective actions, or the holding of any discussions, act to limit the NRC's authority to draw on the LOCs to be provided by CBS under the Licenses or limit its enforcement authority under its regulations
3. With regard to license No. SNM 1460, for so long as its financial assurance responsibilities remain in effect as described herein, the NRC, to the extent of such responsibilities, will in the first instance rely on CBS under such License; and thereafter, any remaining responsibility for decontamination and decommissioning under the License will remain with the licensee.
4. With regard to license No. SNM 770, for so long as its financial assurance responsibilities remain in effect as described herein, the NRC, to the extent of such responsibilities, will in the first instance rely on CBS under such License; and thereafter, the licensee will have all remaining responsibility for decontamination and decommissioning under the License.

5. The NRC will condition its approval of the transfers of the Licenses requested in the Application, as evidenced in the writing formally approving such transfers, upon the assumption by CBS of the responsibilities for decommissioning and decommissioning financial assurance described herein.

CBS agrees that its undertakings described herein are enforceable by the NRC directly against CBS. CBS also intends that the NRC specifically rely upon this letter in reviewing the decommissioning financial assurance requirements associated with the transfers of the Licenses as requested in the Application.

Should the NRC have any questions regarding this matter please contact William Wall, Esq., Assistant General Counsel, CBS Corporation at 412-642-3580.

Very truly yours,



Louis J. Briskman
Executive Vice President and General Counsel

LJB/jmg

**Response to NRC Letter Dated August 10, 2001
Request for Additional Information
Concerning Remediation Activities**

**Waltz Mill Site
Madison, Pennsylvania**

**Westinghouse Electric Company, LLC
Pittsburgh, Pennsylvania**

**Project No. 5018
November 2001**



Earth Sciences Consultants, Inc.

Providing Environmental Consulting Services Since 1979

**Response to NRC Letter Dated August 10, 2001
Request for Additional Information
Concerning Remediation Activities**

**Waltz Mill Site
Madison, Pennsylvania**

**Westinghouse Electric Company, LLC
Pittsburgh, Pennsylvania**

**Project No. 5018
November 2001**

Earth Sciences Consultants, Inc.
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Export, PA 15632
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**Response to NRC Letter Dated August 10, 2001
Westinghouse Electric Company, LLC
Request for Additional Information
Concerning Remediation Activities at the
Westinghouse Waltz Mill Site
Madison, Pennsylvania**

Question No. 1: As a result of corporate changes that have affected administration of the SNM-770 and TR-2 licenses, please summarize the financial assurance mechanisms and responsibilities to cover the costs for successfully completing planned remediation activities and any anticipated long-term monitoring activities.

Response: With the sale of Westinghouse Electric Company LLC (Westinghouse) by CBS Corporation (now Viacom Inc. [Viacom]) to British Nuclear Fuel Limited, the SNM-770 license was transferred to Westinghouse, and Viacom retained the TR-2 license. Under the arrangements approved by the U.S. Nuclear Regulatory Commission (NRC), the responsibility for providing the financial assurance mechanisms for these two licenses was divided between Westinghouse and Viacom as follows:

Financial Assurance Provisions for Waltz Mill Site

Agency	Facility	License No.	Amount provided by Westinghouse	Amount provided by Viacom
NRC	Waltz Mill	SNM-770 Active Facilities	\$8,087,000	
NRC	Waltz Mill	SNM-770 Soil and Retired Facilities		\$10,401,000
NRC	Waltz Mill	TR-2		\$13,948,000
Subtotals			\$8,087,000	\$24,349,000

Grand Total	\$32,436,000
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The above cost estimates for the amounts provided by Viacom are those established at the beginning of the remediation and decommissioning projects, and no adjustments have been made to reflect the work that has now been completed. Viacom will soon request that the financial assurance mechanisms be adjusted downward based on cost estimates for the continuing operation of groundwater monitoring and treatment system and new financial assurance mechanisms will be established upon approval by the NRC.

Question No. 2: Describe any site-specific changes made to any input parameters for RESRAD computer code runs (and your justification for making the changes) that support site specific DCGL calculations for soil remediation. In particular, identify any site-specific soil-leaching studies or literature searches that may have been used to modify the parameters for soil leach rate constants and soil-water distribution coefficients in the water-related pathways.

Response: Table 1, RESRAD Parameter Descriptions, of the Waltz Mill Site Dose Assessment Report, July 1999, lists each input parameter, the default value, the value used for each of the four study areas of the site (Areas 1A, 1B, 2, and 3B), and backup information on the rationale for using the value including sensitivity analyses results. The selection of parameter values was consistent with guidance in the "Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD," Version 5.0. ANL/EAD/LD-2, September 1993. The dose assessment, including Table 1, was submitted to the NRC as an appendix to the "Waltz Mill Facility SNM-770 Remediation Plan, Revised Soil Plan," August 1999.

The soil leach rate is calculated by the model and is dependent on two other input parameters: Saturated Zone Distribution Coefficient and Contaminated Zone Distribution Coefficient. Calculations using the information in the RESRAD printout for Area 2 contained in the "Revised Soil Remediation Plan" and in the "Soil Survey Plan" show that strontium-90 (Sr-90) delivers the majority of the dose from groundwater pathways. The second most important isotope is uranium-238; however, it contributes two orders of magnitude less dose to the groundwater pathway than Sr-90. The distribution coefficients used for Sr-90 are presented below.

- Sr-90 Saturated Zone Distribution Coefficient – The default value of 30 was not used. A site-specific value of 1.45 was used based on the studies entitled "Bench Scale Study and Leaching Evaluation, Waltz Mill Site, Madison, Pennsylvania," ICF Kaiser Environment and Energy Group, October 27, 1995 and "Groundwater Modeling for Radiological Dose Assessment, Waltz Mill Site, Madison, Pennsylvania," ICF Kaiser Engineers, Inc., March 18, 1996, Revised May 1, 1996. Sensitivity analysis of this parameter shows that increasing or decreasing the distribution coefficient by a factor of 10 does not affect its dose contribution by more than 1 percent.
- Sr-90 Contaminated Zone Distribution Coefficient – The default value of 30 was not used. A site-specific value of 31 was used based on the studies entitled "Bench Scale Study and Leaching Evaluation, Waltz Mill Site, Madison, Pennsylvania," ICF Kaiser Environment and Energy Group, October 27, 1995 and "Groundwater Modeling for Radiological Dose Assessment, Waltz Mill Site, Madison, Pennsylvania," ICF Kaiser Engineers, Inc., March 18, 1996, Revised May 1, 1996. Sensitivity analysis of this parameter shows that increasing the coefficient by a factor of 10 increased its dose contribution by approximately 2 percent. Decreasing the parameter decreased its dose contribution by the same percent.

Question No. 3: Please confirm our understanding that excavated soil in excess of the site-specific DCGLs will not be used to refill excavated areas. If our understanding is incorrect, you will need to provide suitable calculations to demonstrate that the areas will meet the annual radiation dose and the ALARA criteria in 10 CFR 20, Subpart E, Radiological Criteria for License Termination. Also, the letter report from your consultant, Earth Sciences Consultants, Inc. (Letter Report, Groundwater Dose Analysis, Waltz Mill Site, Madison, Pennsylvania) states that the groundwater models are based on the assumption that potential sources of Sr-90 are removed during soil remediation. Please confirm that this assumption is compatible with backfill soils having concentrations with radionuclides at DCGLs.

Response: Regarding the first part of the comment, excavated soil in excess of the site-specific derived concentration guideline levels (DCGLs) was not used to refill excavated areas.

Regarding the second part of this comment, the soil remediation strategy for the study areas was designed to meet unrestricted release criteria (25 millirem per year [mrem/yr] and As Low As Reasonably Achievable [ALARA]) in 25 years. There are two components of dose associated with contaminated groundwater for Area 2: (1) existing groundwater contamination; and (2) future groundwater contamination from the potential leaching of radionuclides from soils into groundwater. The referenced groundwater dose analysis was included as an appendix in the "Revised Soil Remediation Plan," dated August 1999, prepared for the site. The analysis was performed to predict the contribution of dose over the next 25 years from existing groundwater contamination (Component 1). This was necessary since the RESRAD model only predicts dose from groundwater contamination that results from the leaching of radionuclides from soil to groundwater (Component 2), not from existing groundwater contamination, as is the case within Area 2. The groundwater dose analysis predicted that in 25 years the contribution of dose from existing groundwater contamination would be about 10 mrem/yr. Therefore, the allowable dose component from all pathways evaluated by the RESRAD model was 15 mrem/yr, in order to meet the unrestricted release limit of 25 mrem/yr. Using the RESRAD model, DCGLs for soil were established that would contribute a total maximum dose of 15 mrem/yr from all pathways including groundwater contamination resulting from the leaching of radionuclides from soils.

Question No. 4a: The current groundwater pump and treat system has resulted in several measurable groundwater cones of depression; however, there is no verification of containment of the plume. Please provide verification of groundwater containment, such as through particle tracking analysis, as we discussed during our meeting.

Response: A large amount of groundwater data has been developed since the early 1980's regarding the extent of the groundwater plume and the effects of implementing a pump-and-treat system in 1984. Following the implementation of the pump-and-treat system, the concentration of radionuclides and their extent were reduced significantly over the next 10 years and continued to be limited in extent and concentration in the recent past. The continued presence of radionuclides in groundwater indicated that potential source(s) in the subsurface within the plume area were still present, which were the focus of the soil remediation activities. Groundwater quality data from the extensive monitoring well network in place prior to soil remediation continuously illustrated that the existing groundwater pump-and-treat system had been effective in containing the quantity and spread of groundwater contamination within the Solid and Liquid Waste Processing (SLWP) area.

The above conclusion was consistent with the findings of the Center for Nuclear Waste Regulatory Analyses (CNWRA) contracted by the NRC and documented in a report entitled "Technical Evaluation Report: Adequacy of Groundwater Characterization for Westinghouse Waltz Mill Facility Remediation Plan," December 1997. In Chapter 3.0, Paragraph 2 of Section 3.2 of that report, the contractor notes, "If groundwater contamination at the SLWPA were allowed to reach the stream, it would be diluted considerably and transported rapidly offsite. Such offsite transport has been effectively controlled by pump and treat remediation methods." Also, in Paragraph 3 of the same section, the contractor notes, "although the pump and treat operation has been effective in containing the quantity and spread of groundwater contamination, ultimate restoration of the site is based on planned excavation and removal of potential sources of contamination as outlined in the RP." Both of these statements indicate that existing data provided conclusive evidence that the remediation system (prior to soil remediation activities) provided containment of the plume.

The following paragraphs provide a summary of the groundwater remediation system before and following soil remediation activities. Figure A-1 of Attachment A illustrates the groundwater pump-and-treat system that was in place before the implementation of soil remediation activities. The pumping wells consisted of OHE-1 through OHE-4 and MW-5. As outlined in the license amendment dated June 22, 1999, these wells were permanently removed during remediation since they were located in areas of soil contamination requiring excavation. Prior to remediation, two new wells were installed (MW-40 and MW-41) immediately hydraulically downgradient of this area (Figure A-1) for monitoring purposes and potentially as pumping wells, if they were required to contain the plume. To ensure the plume was contained during soil remediation activities, it was decided to use Well MW-41 as a pumping well during soil remediation activities.

Following the completion of soil remediation activities within the Liquid Waste Retention Basin (LWRB) area, a series of new monitoring and remediation wells were installed. The locations of the new wells and treatment system are presented in Figure A-2 (Attachment A). New wells installed included MW-42, MW-43, MW-44, MW-45, MW-46, RW-2, and RW-3. These wells were installed at similar locations and depths to those present prior to soil remediation activities.

In addition, Figure A-2 shows the location of a sump (RS-1) installed during backfilling of the LWRB area. Backfilling activities consisted of initially placing stone (about 5 feet in depth) followed by the placement of soil/fill material. During backfilling activities, perforated pipes were placed at the base and laterally along the eastern and southern edges of the excavation area. These lateral pipes were connected to a 16-inch-diameter vertical standpipe for removing the potential accumulation of groundwater within this zone in the future. This sump is also tied into the treatment system (Figure A-2).

Data from the newly installed groundwater remediation system and new monitoring wells are currently being collected. Initial groundwater quality data from the new well system are presented in Response 4c below. These data and other groundwater quality and flow data will be used to evaluate the effectiveness of the new remediation system relative to containing and reducing the degree and extent of the groundwater plume. This may be completed through either a particle tracking analysis or other field data collection methods such as pumping well tests or sampling data. This information will be presented in detail in a license amendment presenting a plan for future groundwater remediation and monitoring activities for the site.

Question No. 4b: Describe your plans to evaluate the effectiveness of your soil remediation efforts on groundwater concentrations.

Response: Collection of groundwater quality data from the new monitoring and remediation wells and from existing wells, initially and for some time in the future, will be used to evaluate the short- and long-term effectiveness of soil remediation activities on groundwater quality. Graphical presentations such as time trend plots will be used to examine water quality changes over time.

Groundwater quality data from future monitoring will be used to evaluate the total mrem/yr contribution from groundwater and these values will be compared to the total mrem/yr dose contribution predicted before soil remediation activities (about 10 mrem/yr). This will provide a means to evaluate the effectiveness of the soil remediation activities on groundwater concentrations. Additionally, consistent

with the remedial objective, the groundwater dose will be evaluated in conjunction with the total mrem/yr dose contribution from remaining soil contamination for all other exposure pathways relative to meeting the unrestricted release criteria of 25 mrem/yr and ALARA for this area.

Question No. 4c: In order to evaluate radiochemical data trends for your onsite monitoring wells, please provide radiochemical data obtained since 1999. If possible, please provide the most current map of the groundwater plume configuration, compared to plume configurations measured in the past. Also, please explain the rise in the Sr-90 concentration in Well MW-5 during 1999 from 330 to 575 pCi/liter.

Response: During soil remediation activities, an enhanced environmental groundwater monitoring program was implemented, as described in the license amendment dated June 22, 1999. In general, for areas undergoing active soil remediation, the program consisted of sampling at an increased frequency at existing monitoring points. These data were used to continuously evaluate potential impacts of soil remediation activities on groundwater quality. Groundwater quality data summaries through mid-August 2001 for each groundwater monitoring well described in the license are presented in Attachment B. This information includes data collected since 1996. Detailed water quality data are included in the quarterly groundwater monitoring reports and are available for review at the site. The locations of the wells are shown in Figure D-1 of Appendix D.

Initial groundwater quality data from the newly installed monitoring and remediation wells have been collected and evaluated. Updated groundwater radiochemistry maps were prepared and are included in Attachment C for comparing preremediation and postremediation groundwater plume conditions. Historical groundwater plume maps were presented in the June 22, 1999 license amendment. Figure C-1 and Figure C-2 illustrate the gross beta/gamma and Sr-90 groundwater plumes before the start of remediation activities (December 1996). Figures C-3 and C-4 illustrate the gross beta/gamma and Sr-90 groundwater plumes based on initial groundwater quality obtained following the completion of soil remediation activities within the liquid waste retention basin area (August 2001).

Historical data for Well MW-5 are presented in Attachment B. These data indicate that Sr-90 concentrations have fluctuated over time and that an increase in Sr-90 was observed on several sampling events. Well MW-5 was a remediation well. Because of low-flow conditions, the well was pumped periodically on a timer system. The reason for the fluctuation in concentration and, specifically, the rise in Sr-90 in 1999 could not be determined from the available data reviewed.

Question No. 5: There is an extensive network of groundwater monitoring wells on the site; however, all the wells are relatively shallow in nature. Based on data in the 1994 characterization report (Soil and Groundwater Characterization, Waltz Mill Site, Madison, Pennsylvania, Volumes 1 – 5, August, 1994) there may be a downward hydraulic gradient within the bedrock aquifer and thus a potential for contaminated groundwater to migrate into deeper water-bearing zones within the bedrock. Because there are no deep monitoring wells, please evaluate the potential for deep groundwater contamination and its radiological impact. Please describe plans for any additional wells, such as nested wells, to evaluate both deep and shallow groundwater contamination.

Response: During characterization activities, Piezometers PZ-3 and PZ-4 were installed to evaluate vertical hydraulic gradients and vertical distribution of radionuclides in groundwater within this area. The locations of these wells are shown in Attachment D, Figure D-1 and are presented on Geologic Cross Section C-C' (Figure D-2). The piezometers were sampled twice - once in 1994 and then a second time in September 2000 - prior to removing them to complete soil remediation activities. Groundwater elevation at these two locations indicated a vertical hydraulic gradient. The water quality data from the two sampling events were as follows:

Parameter (pCi/l)	PZ-3 (1994)	PZ-3 (2000)	PZ-4 (1994)	PZ-4 (2000)
Gross Beta/Gamma	331	174	10.5	31.8

These data illustrate an approximate order of magnitude decrease in gross beta/gamma concentration with depth on both occasions and indicate that the majority of the plume is contained within the upper portion of the uppermost water-bearing zone.

The locations of these piezometers were selected since they were hydraulically downgradient of the plume area, having the highest gross beta/gamma concentrations as identified by sample results from former Remediation Wells MW-5 and OHE-4 (Figure D-1). Therefore, the analytical results from the deeper piezometer in this area would provide strong evidence of the actual vertical migration of radionuclides associated with the plume.

The vertical distribution of radionuclides at this location is consistent with expectations for this hydrogeologic setting. The primary mechanisms controlling the maximum potential vertical migration of the radionuclides for this water table aquifer are differences in vertical and horizontal permeabilities.

Groundwater flow direction is from north to south across this area. Groundwater movement within this uppermost water-bearing zone is primarily along the fill/soil and weathered bedrock surface and/or along bedding planes (secondary porosity zone) within the underlying sandstone unit. These lateral flow paths represent much higher permeability pathways compared to existing vertical groundwater pathways. Rock coring data from previous investigations indicated that bedding planes were prevalent near the surface and at nearly all locations showed a decrease in number with depth (August 1994 Earth Sciences Consultants, Inc.'s report). Within the primary area of the plume, vertical migration would need to occur through the weathered shale zone beneath and immediately adjacent to the LWRB area. In areas where competent sandstone bedrock was encountered (either underlying the weathered shale or soil/fill zone), vertical migration may occur through primary porosity within the sandstone beds, which would be significantly less than lateral movement along bedding plane fractures. Although vertical fractures are expected to occur within the sandstone, available rock coring data indicated that, at most locations, they were absent or very limited in number.

In summary, radioactive contamination within the source area will primarily migrate laterally rather than vertically. Gross beta concentrations in groundwater at Piezometers PZ-3 and PZ-4 substantiate the movement of groundwater described above and suggest that the vertical migration of radionuclides is minimal. Plume migration hydraulically downgradient from the Piezometers PZ-3/PZ-4 area can be readily evaluated using the large number of monitoring points between the PZ-3/PZ-4 area and Calley's Run. Cross Section C-C' illustrates the relationship of several of these wells to the PZ-3/PZ-4 area. Groundwater quality at monitoring wells hydraulically downgradient of this location show a significant decrease in gross beta/gamma concentration to nearly background levels (Attachment B). Based on their communication zones relative to PZ-3 and PZ-4, gross beta/gamma concentrations, and vertical distribution of radionuclides at PZ-3 and PZ-4, radionuclide concentrations at depths beneath these hydraulically downgradient wells will be less than or similar to their current near background levels.

The above observations and discussion are consistent with the findings of the technical evaluation report prepared by CNWRA (see Chapter 3.0, Section 3.2, Paragraph 6). The estimate of contamination at depth was evaluated using conservative estimates of vertical transverse dispersivity and groundwater velocity. This evaluation indicated that at 12 meters (approximately 40 feet) below the source, contaminant concentration would have reached about 5 percent of the source concentration after 35 years. Based on this evaluation and the depth of monitoring wells along the path of contaminant migration, it was concluded that a bounding analysis of potential vertical migration of contamination indicate monitoring

wells in the SLWP area are sufficiently deep to prevent contamination from passing undetected beneath the existing monitoring wells.

In conclusion, based on the groundwater flow paths and water quality data collected from the extensive monitoring well network, it is not necessary to further evaluate the vertical migration of radiological contamination within this area.

Question No. 6: Underground coal mining east of the site has the potential to cause land subsidence and groundwater redirection/diversion. Have you identified the presence of any actual mines beneath the site, and if present, what potential impact do they have on groundwater?

Response: Attachment E contains information on subsurface mining activities within the vicinity of the Waltz Mill Site. Attachment E includes a U.S. Geological Survey (USGS) quadrangle map showing the coal crop lines and structure contours of the coal seams beneath the site. A similar map illustrates mined-out areas of the Upper Freeport Coal, which is the shallowest coal seam present beneath the study area. These maps indicate that the Upper Freeport Coal is approximately 115 feet (Calley's Run area) to 150 feet (former LWRB area) below ground surface. The structural dip of the coal seam is to the west at about 185 feet per mile or 2 degrees. Because of the changes in topography over the site and the dip of the coal, the Upper Freeport Coal is approximately 200 feet below ground surface within the former test reactor area.

Mined-out areas of the Upper Freeport Coal are not located directly beneath the SLWP area. As illustrated in the attached USGS map, deep mining of the Upper Freeport Coal has occurred east of this area and just east of Calley's Run. There is no field indication of subsidence nor is it expected to any great degree in the SLWP area, based on the relative depth and distance of the mined-out areas from the SLWP area. Deep-mining operations can result in increased fracturing of overlying bedrock units resulting in a dewatering of the overlying water-bearing zones. The presence of a continuous water-bearing zone beneath the SLWP area indicates that dewatering of this monitored zone is not occurring, which again is expected based on the depth and distance of the mined-out areas. In conclusion, deep mining has not occurred beneath the SLWP area and the data do not indicate that adjacent mining activities have had an effect on groundwater flow directions.

Question No. 7: Does your characterization of groundwater flow confirm that Calley's Run is the local discharge area for onsite groundwater flowing through the contaminated area west of Calley's

Run? What is the impact to offsite dose receptors from the groundwater pathway if contaminated groundwater flows under Calley's Run to an offsite receptor east of Calley's Run.

Response: Geologic Cross Section C-C' (Figure D-2) depicts subsurface conditions beneath and adjacent to Calley's Run. The stream bottom along this section is at an elevation of approximately 928.5 feet above mean sea level. The water depth within the stream can change relatively rapidly following precipitation events. However, based on observations during the soil remediation activities, typical water depth of the stream was observed to be less than 2 feet in wetter times of the year and in drier times of the year the water depth can decrease to several inches.

Historical groundwater elevations were reviewed for Wells OHE-17R, MW-1, and MW-3 and are summarized in Table F-1 (Attachment F). Based on the approximate depth of Calley's Run and assumed minimum/maximum stream water depths, these data indicate that the groundwater elevations in these two wells are higher-than-anticipated seasonal stream surface elevations. Based on these data, Calley's Run can be considered a local groundwater discharge zone for the uppermost water-bearing zone. This information is consistent with conclusions made by CNWRA in their technical report. In Section 3.2, Paragraph 2, CNWRA notes, "Migration of the contaminant plume to the southeast, the direction of groundwater flow, is limited by Calley's Run, a nearby stream that runs along the eastern boundary of the site. Surface water in Calley's Run is fed by local groundwater."

As a groundwater discharge zone, groundwater to some depth below the stream would discharge into the stream. However, at greater depths, some flow may continue beneath the stream toward the MW-1 area. Well MW-1 was installed historically to evaluate this potential pathway and groundwater results indicate it has not been impacted. Therefore, it can be concluded from this information, in conjunction with the data presented in the response to Question No. 5 (vertical depth of contamination), that Calley's Run does provide a hydraulic barrier to groundwater contaminant migration. Furthermore, groundwater contamination is only minimally reaching monitoring points along the western side of the stream and, therefore, a source of contaminated groundwater does not exist that could move off site east of Calley's Run.

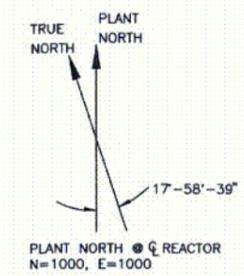
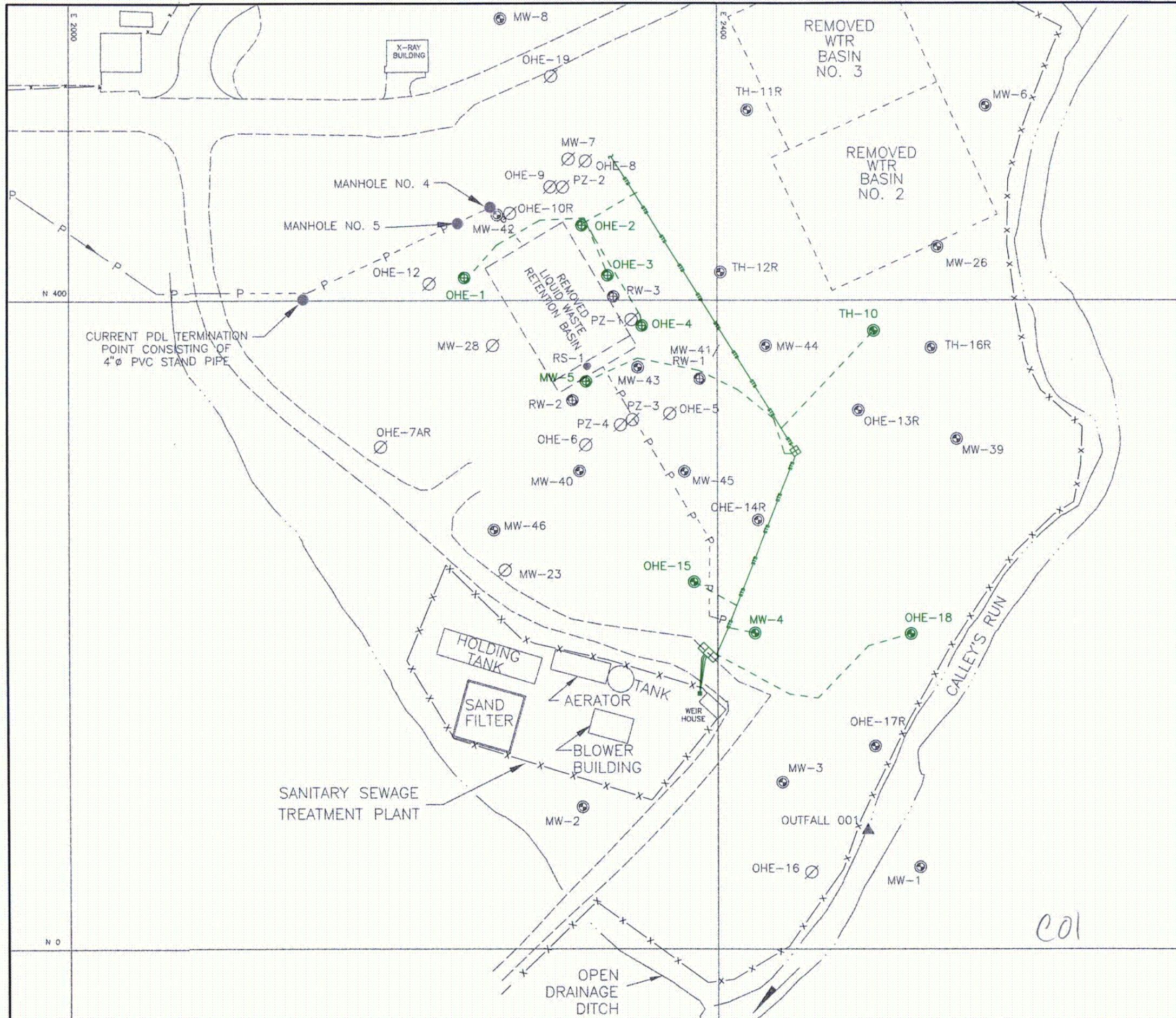
Question No. 12: Has the area of contamination found between the solid waste pad and Calley's Run been included in the site dose assessment and computation of the DCGLs for the site?

Response: The area of contamination between the solid waste pad and Calley's Run had been identified during characterization and is, therefore, part of the site dose assessment and the computation of the DCGLs. The extent of the contamination was found to be larger than original characterization indicated. However, the effect of this on the site dose assessment is nominal, i.e., the conservative assumptions and input parameters used in the dose assessment and calculation of DCGLs already bound the extent of contamination found in this area.

w:\5018\rpt\Response1.com

Attachment A

**Layouts of Former and Newly Installed
Pump-and-Treat Systems**

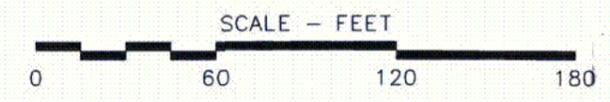


LEGEND

- x-x-x- SECURITY FENCE
- ⊙ GROUNDWATER MONITORING WELL
- ⊕ CURRENT GROUNDWATER REMEDIATION WELL
- ⊖ ABANDONED GROUNDWATER MONITORING WELL
- ▲ OUTFALL LOCATION
- GROUNDWATER REMEDIATION SUMP
- P - PROCESS WATERLINE
- - P - - REMOVED PROCESS WATERLINE
- ⊕ - - - FORMER GROUNDWATER PUMP AND TREAT SYSTEM LAYOUT

NOTES

1. PUMPING ACTIVITIES AT REMEDIATION WELLS MW-4, OHE-15, AND OHE-18 WERE CEASED IN 1995 TO ELIMINATE ANY UNNECESSARY DOWNGRADIENT MOVEMENT OF CONTAMINATED GROUNDWATER.
2. REMEDIATION WELLS OHE-1, OHE-2, OHE-3, OHE-4, AND MW-5 WERE ABANDONED IN JANUARY 2001 AS A RESULT OF THEIR POSITIONING RELATIVE TO THE PLANNED REMEDIAL ACTIVITIES FOR THE LWRB.
3. SITE LAYOUT AS SHOWN IN THE FIGURE REPRESENTS CURRENT SITE CONDITIONS.



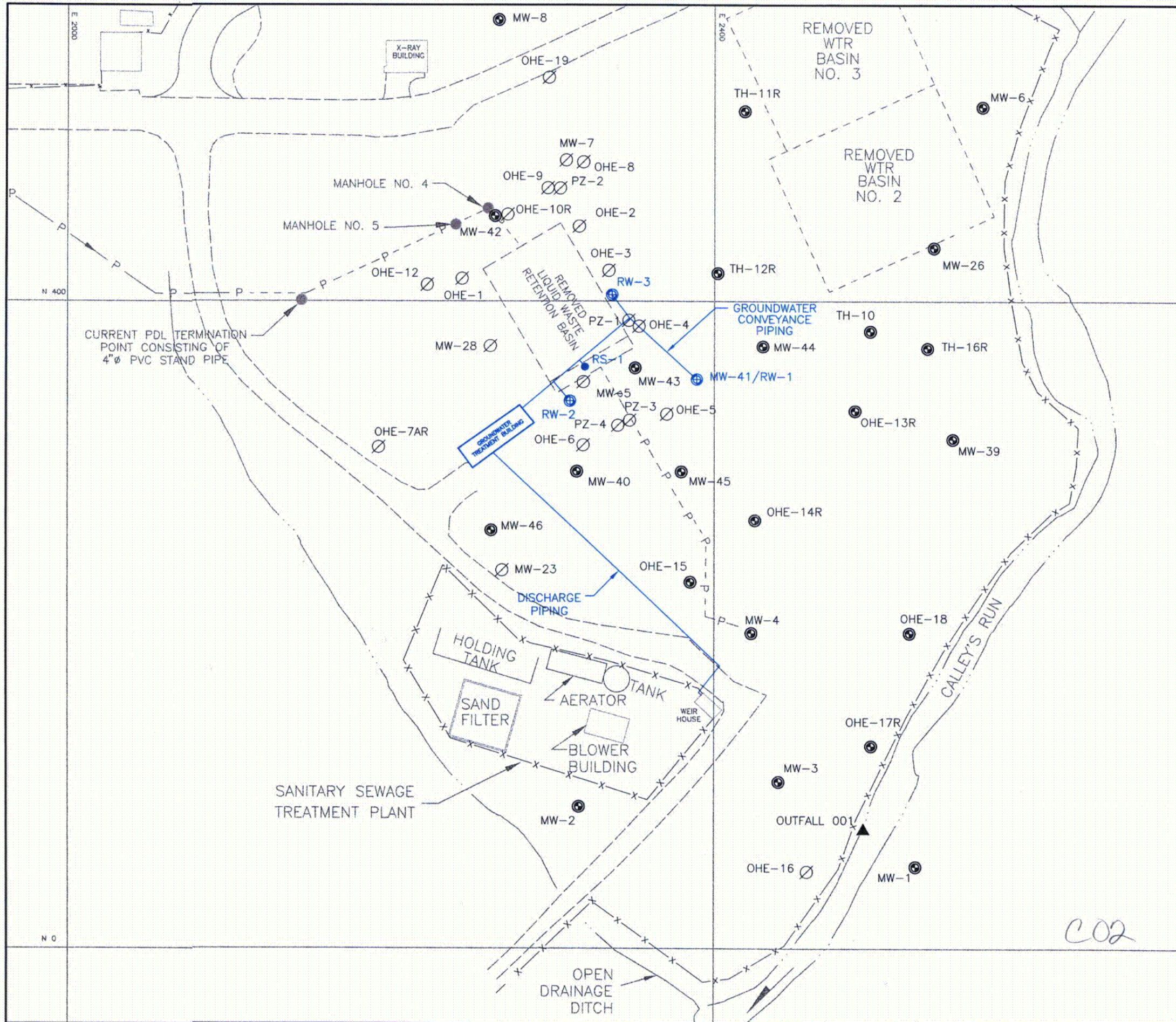
**FIGURE A-1
FORMER GROUNDWATER PUMP
AND TREAT SYSTEM LAYOUT
WALTZ MILL SITE
MADISON, PENNSYLVANIA**

PREPARED FOR
**WESTINGHOUSE ELECTRIC COMPANY, LLC
PITTSBURGH, PENNSYLVANIA**

APPROVED *RFD 9/01*
 CHECKED *RFA 9/01*
 DRAWN *GJA 9/25/01*
 DRAWING NUMBER
5018222



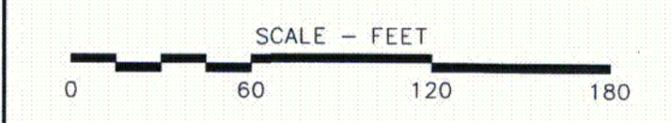
col



LEGEND

- x-x-x- SECURITY FENCE
- ⊙ GROUNDWATER MONITORING WELL
- ⊕ CURRENT GROUNDWATER REMEDIATION WELL
- ⊘ ABANDONED GROUNDWATER MONITORING WELL
- ▲ OUTFALL LOCATION
- GROUNDWATER REMEDIATION SUMP
- P- PROCESS WATERLINE
- P-- REMOVED PROCESS WATERLINE
- ⊕ NEWLY INSTALLED PUMP AND TREAT SYSTEM LAYOUT

NOTE
 1. SITE LAYOUT AS SHOWN IN THE FIGURE REPRESENTS CURRENT SITE CONDITIONS.



**FIGURE A-2
 NEWLY INSTALLED PUMP AND TREAT SYSTEM LAYOUT
 WALTZ MILL SITE
 MADISON, PENNSYLVANIA**

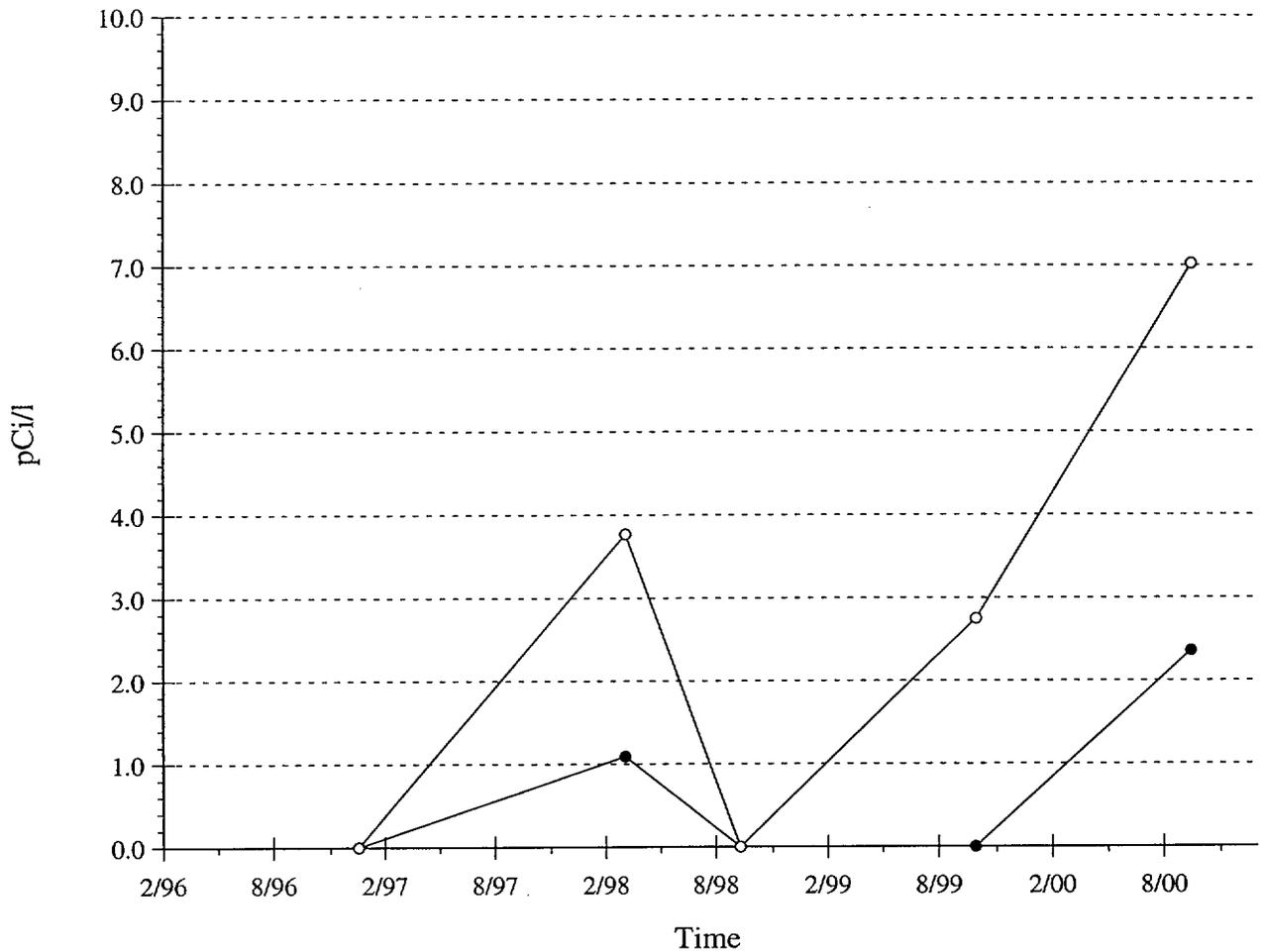
PREPARED FOR
**WESTINGHOUSE ELECTRIC COMPANY, LLC
 PITTSBURGH, PENNSYLVANIA**

APPROVED	RED 11/01
CHECKED	Red 11/01
DRAWN	GJA 9/25/01
DRAWING NUMBER	5018225

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C02

Attachment B
Time Trend Analysis
Environmental Groundwater Monitoring Program



Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

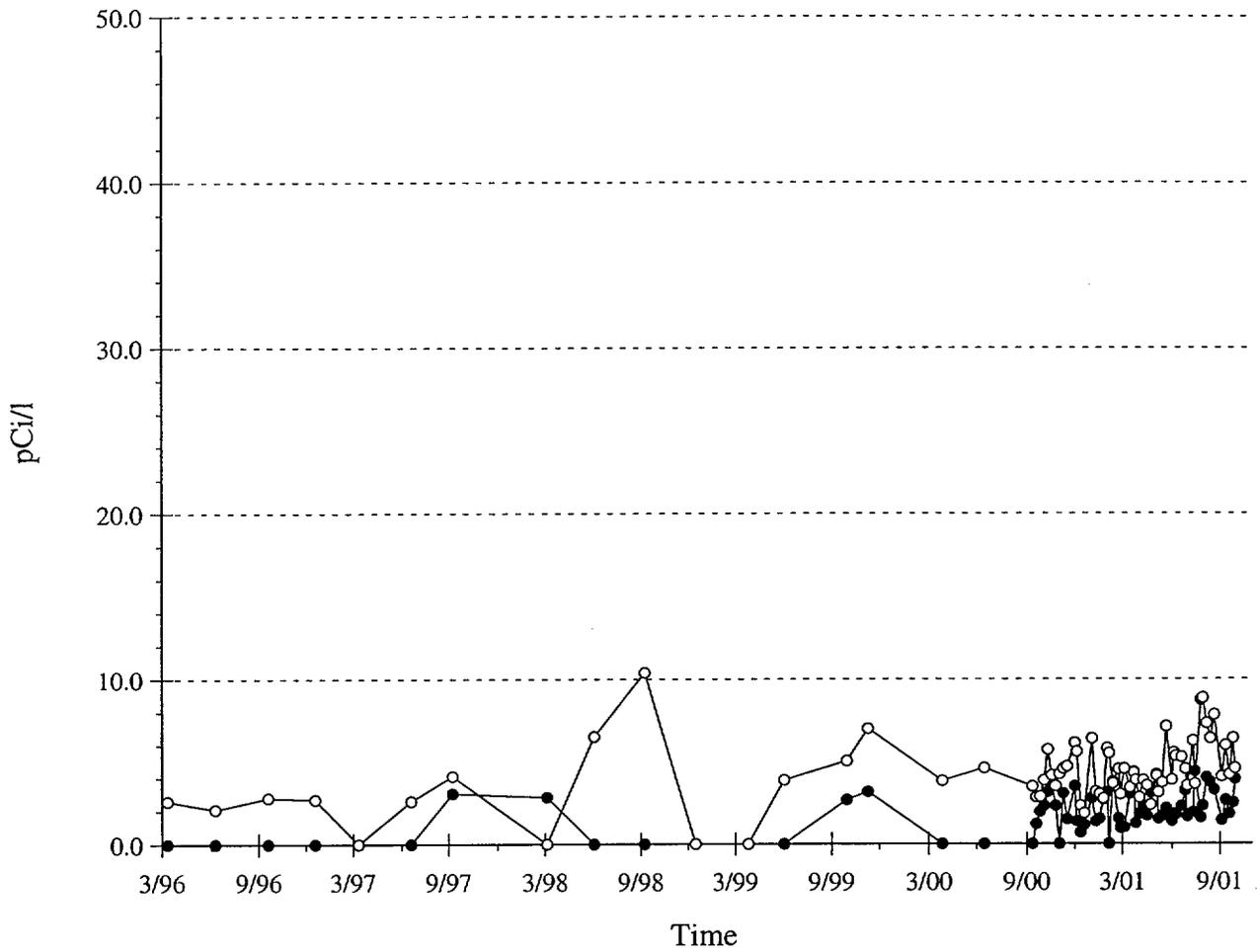
Figure B-1

Radiochemical Data
Versus Time
MW-1

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DRAWN	ZZZ 10/12/2001
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Legend

- Gross Alpha
- Gross Beta/Gamma

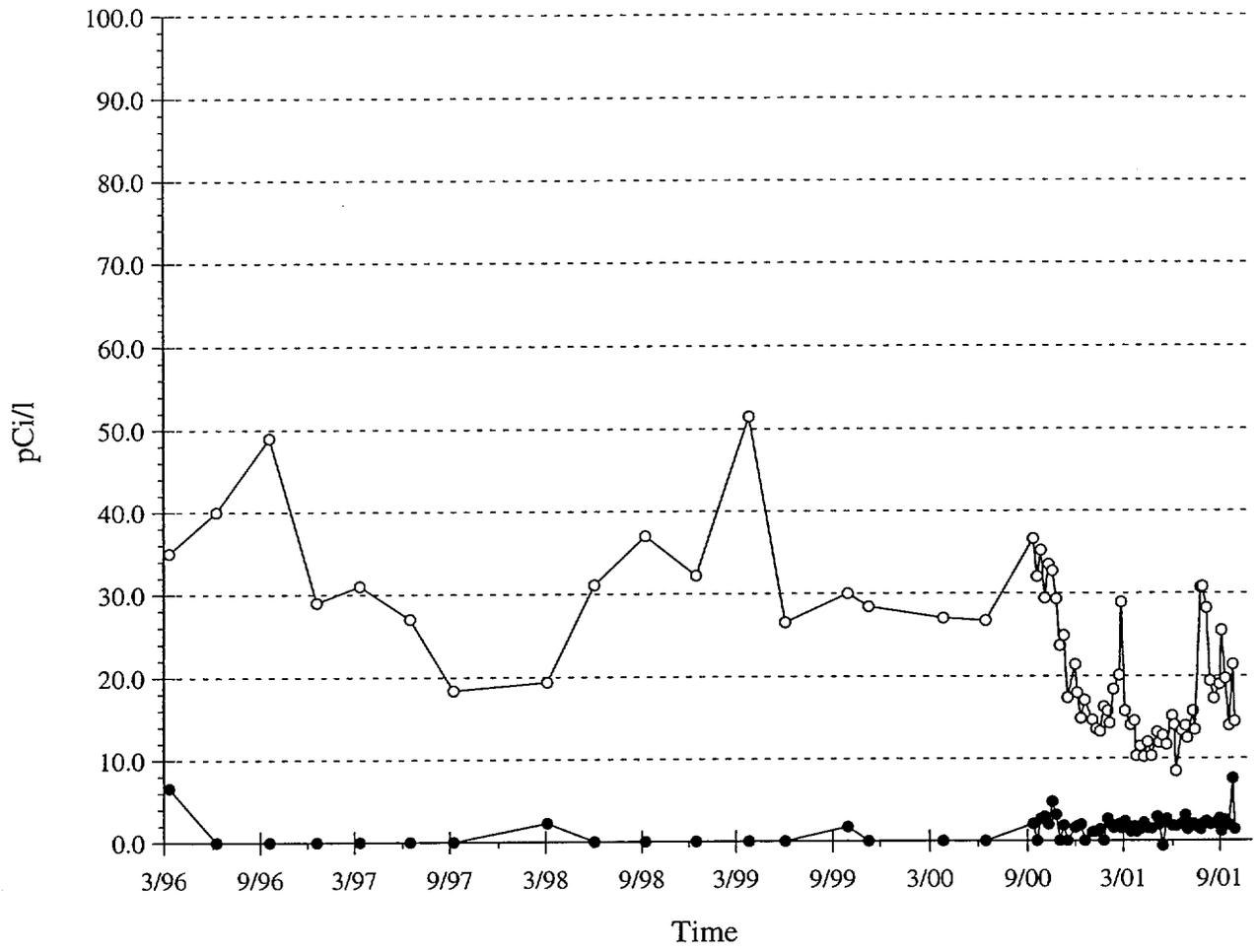
Figure B-2

Radiochemical Data
Versus Time
MW-2

PREPARED FOR
Waltz Mill Site
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Pittsburgh, Pennsylvania

APPROVED	RFD 11/01
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DRAWN	ZZZ 10/12/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma

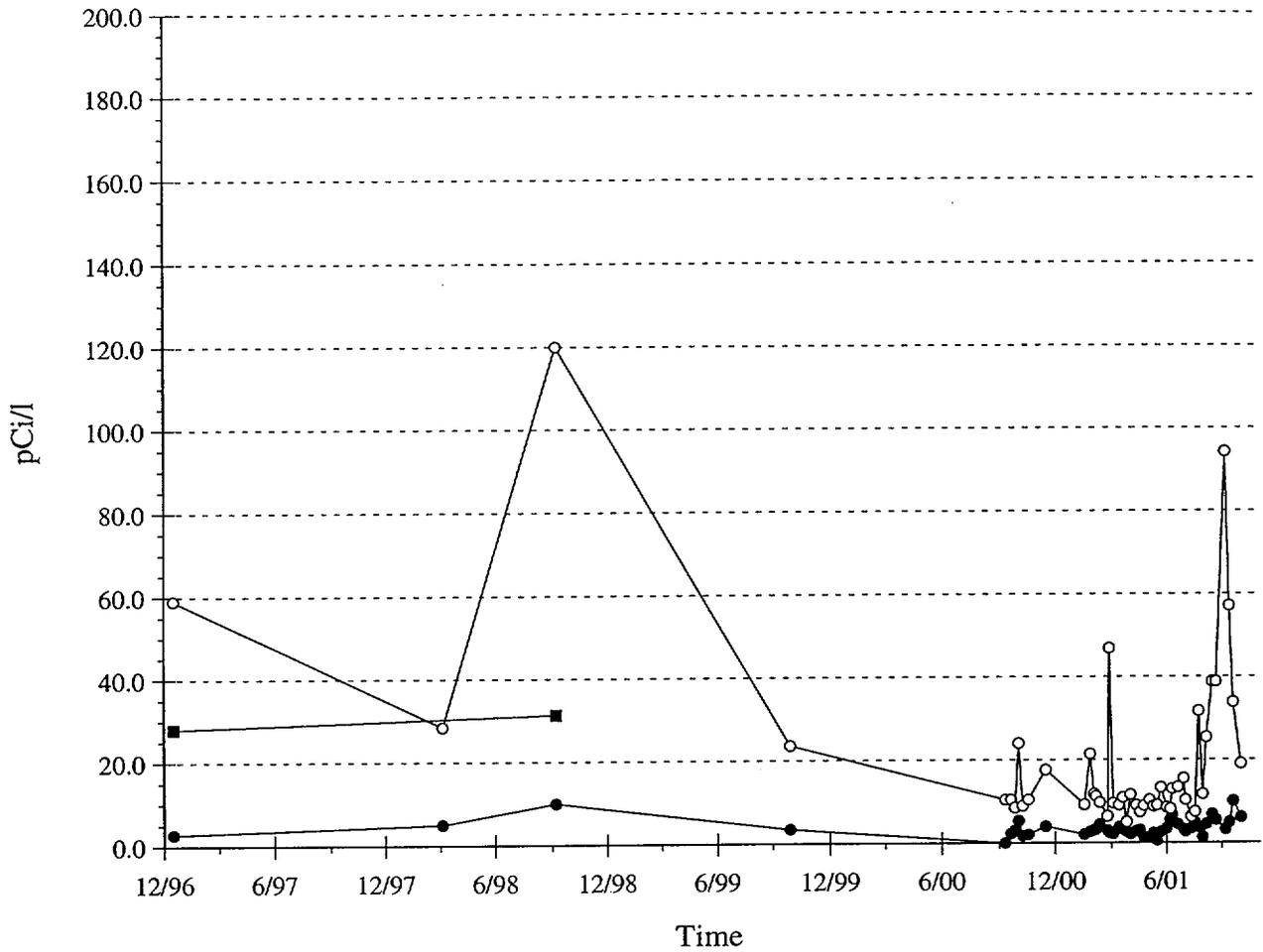
Figure B-3

Radiochemical Data
Versus Time
MW-3

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED *RFD 11/01*
CHECKED *BCH 11/01*
DRAWN *ZZZ 10/12/2001*
DRAWING NUMBER

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

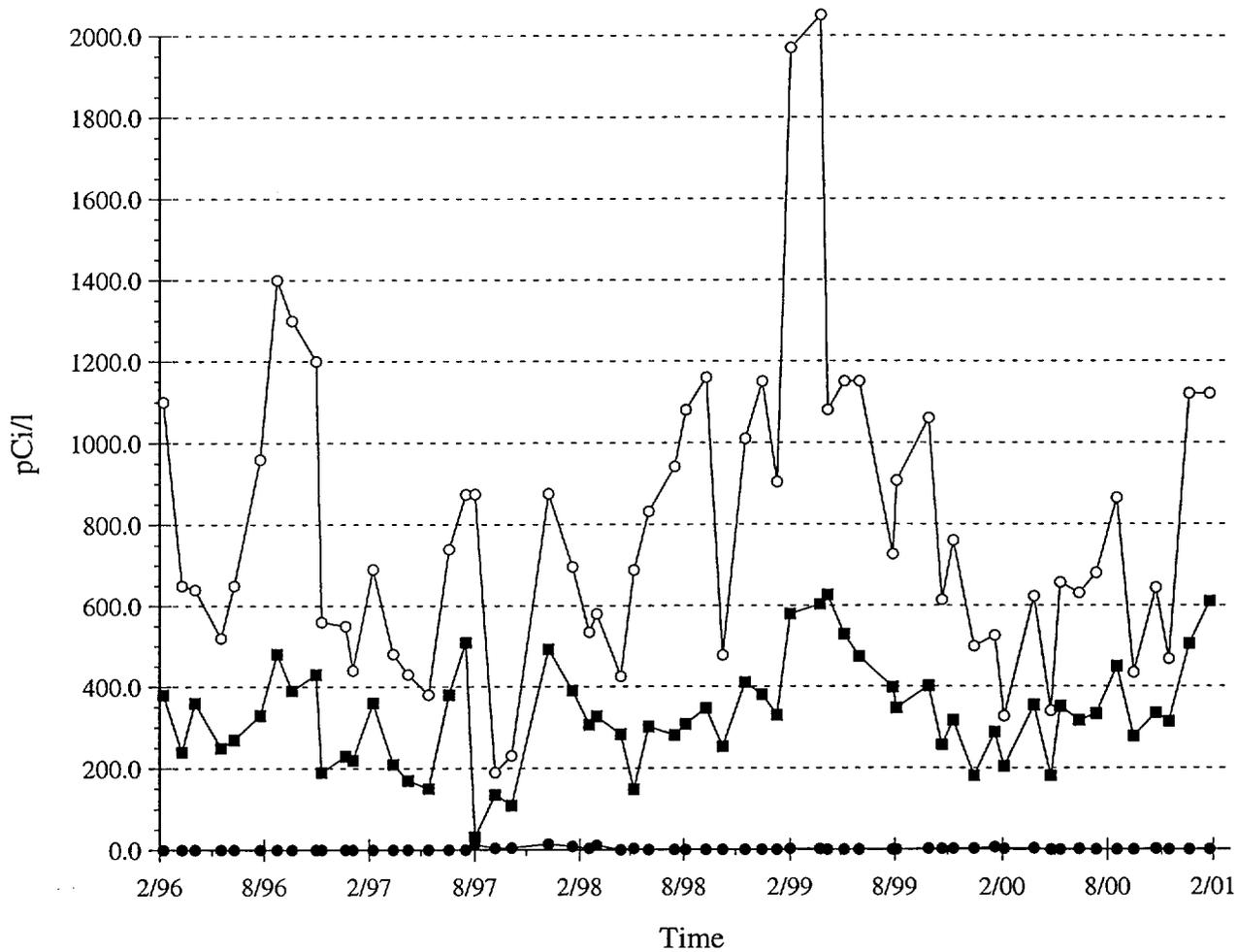
Figure B-4

Radiochemical Data
Versus Time
MW-4

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

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CHECKED	RCH 11/01
DRAWN	ZZZ 10/12/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

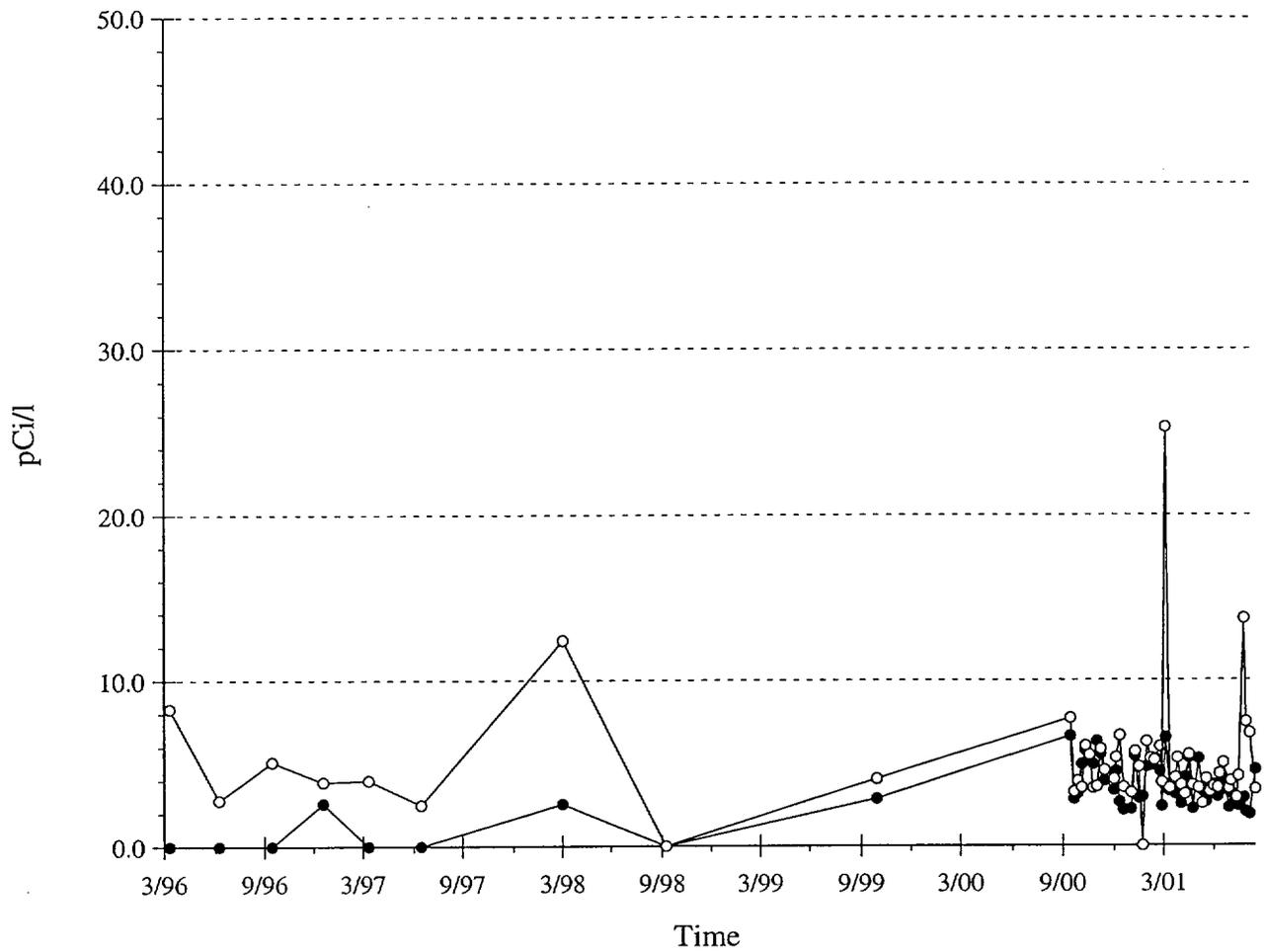
Figure B-5

Radiochemical Data
Versus Time
MW-5

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>RFO</i> <i>11/01</i>
CHECKED	<i>RCH</i> <i>11/01</i>
DRAWN	<i>ZZZ</i> <i>10/12/2001</i>
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma

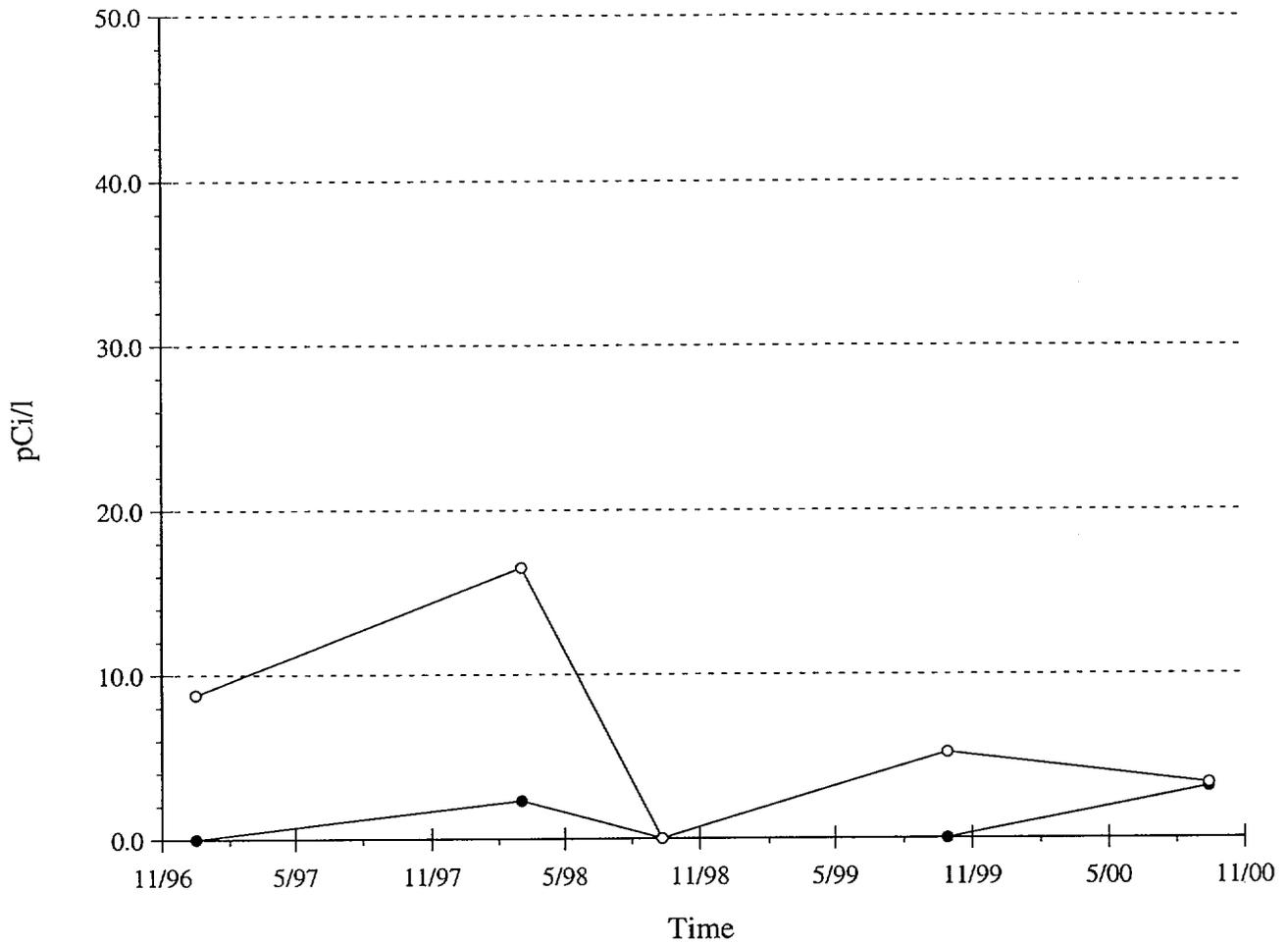
Figure B-6

Radiochemical Data
Versus Time
MW-6

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	RFQ	11/01
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DRAWN	ZZZ	10/08/2001
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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

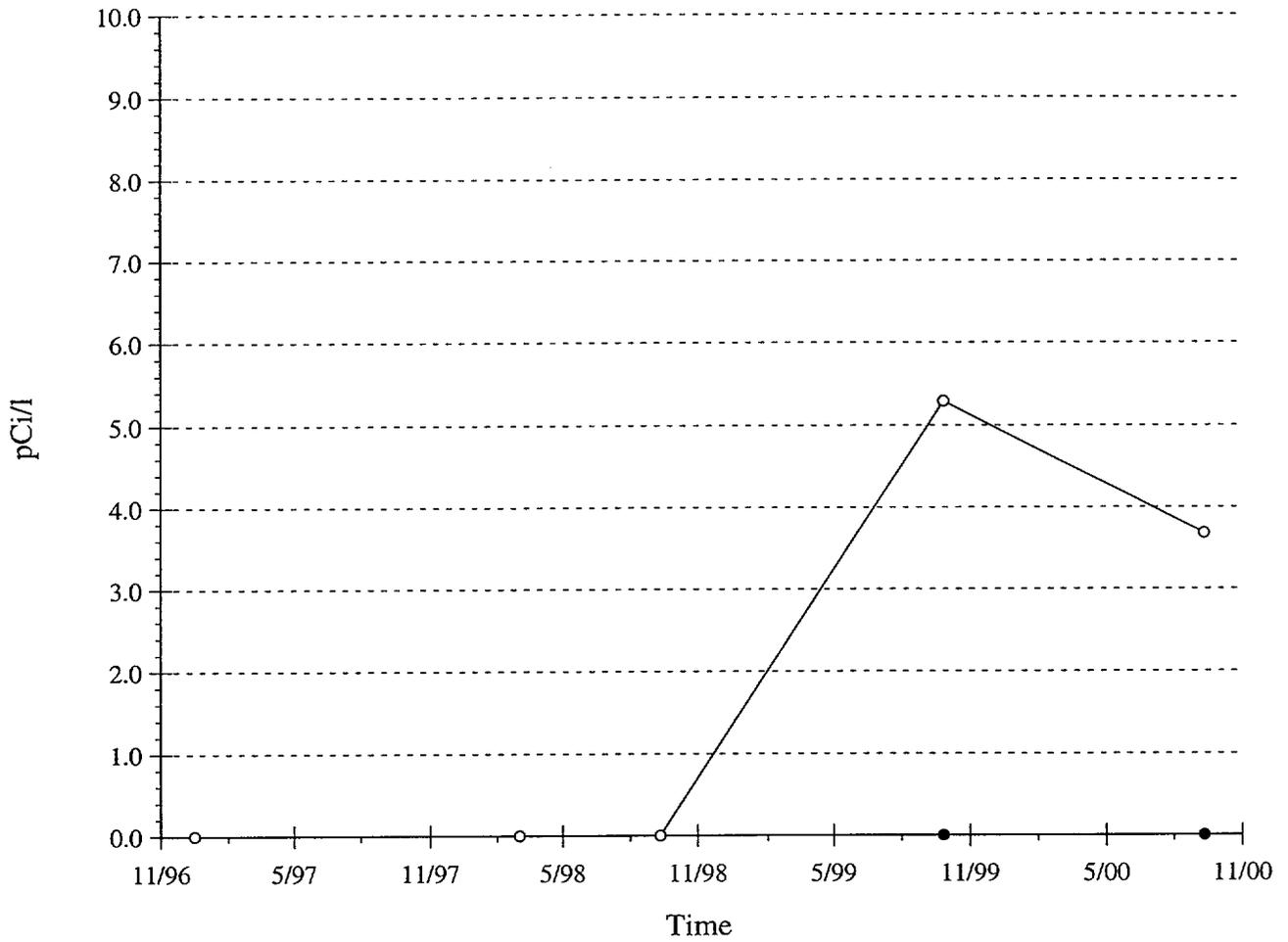
Figure B-7

Radiochemical Data
Versus Time
MW-7

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

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DRAWN	<i>ZZZ 10/12/2001</i>
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

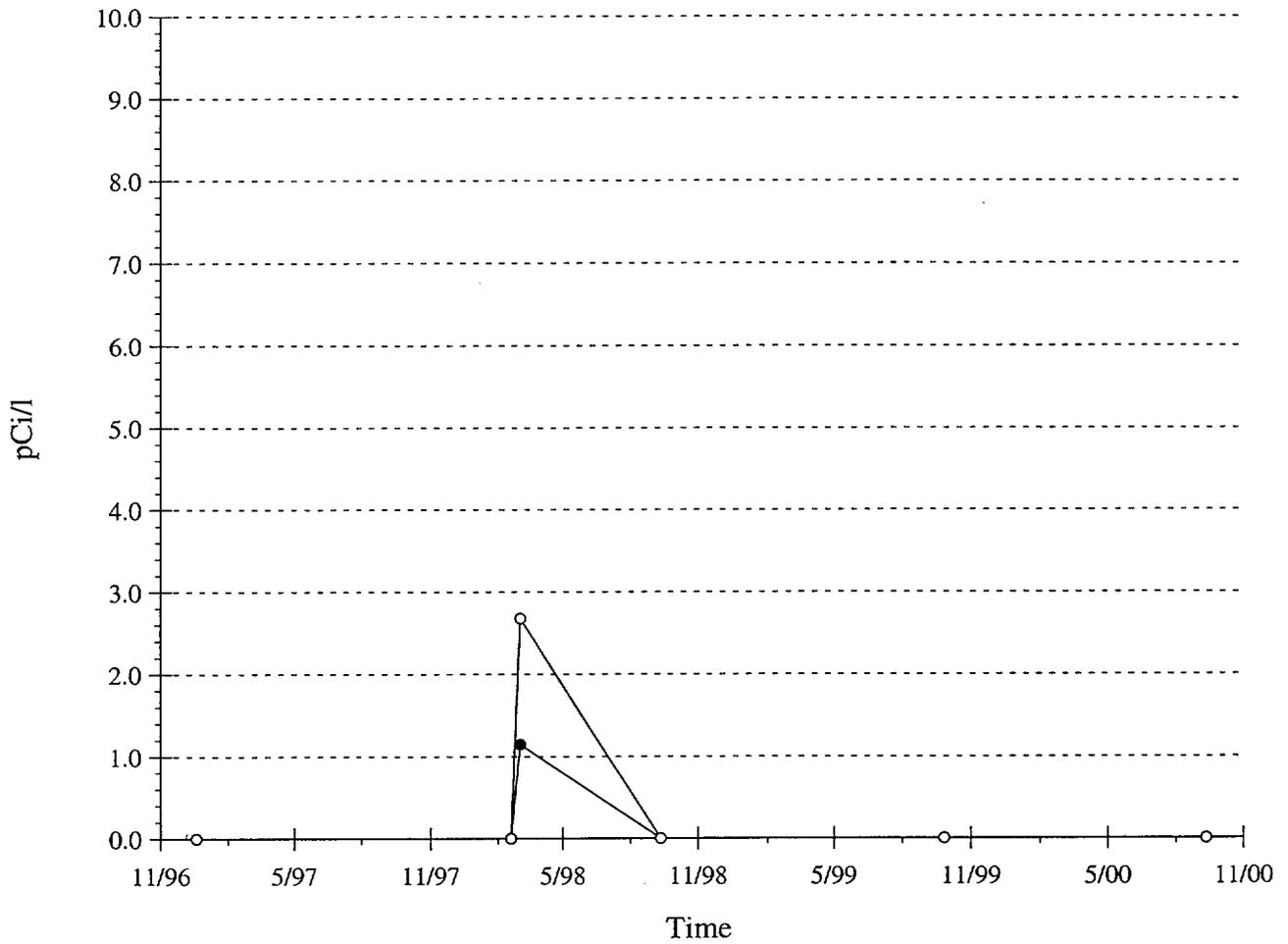
Figure B-8

Radiochemical Data
Versus Time
MW-10

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>RFO</i>	<i>11/01</i>
CHECKED	<i>RCH</i>	<i>11/01</i>
DRAWN	<i>ZZZ 10/12/2001</i>	
DRAWING NUMBER		

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

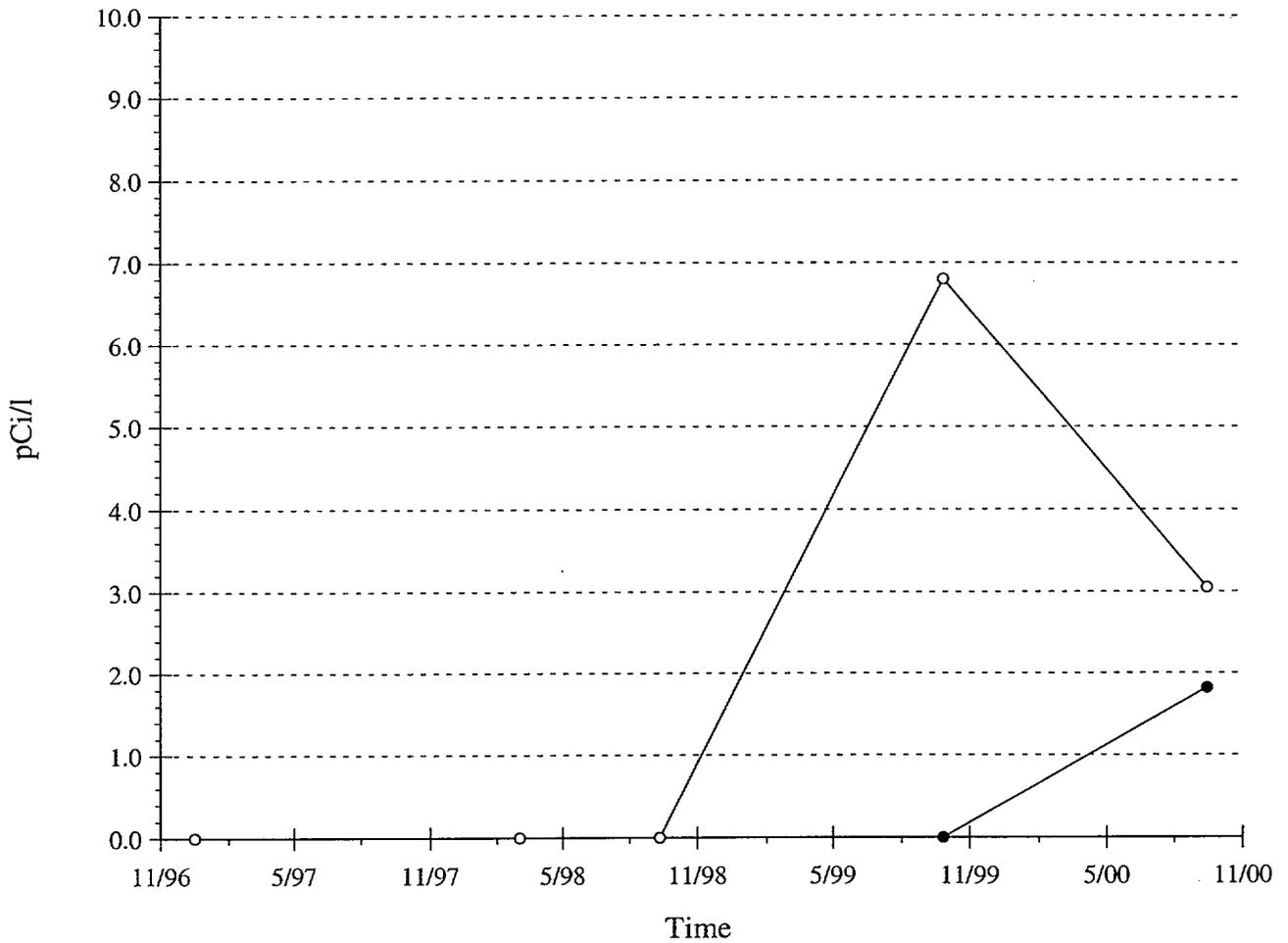
Figure B-9

Radiochemical Data
Versus Time
MW-11

PREPARED FOR
Waltz Mill Site
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Pittsburgh, Pennsylvania

APPROVED	<i>[Signature]</i> 11/01
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DRAWN	ZZZ 10/12/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

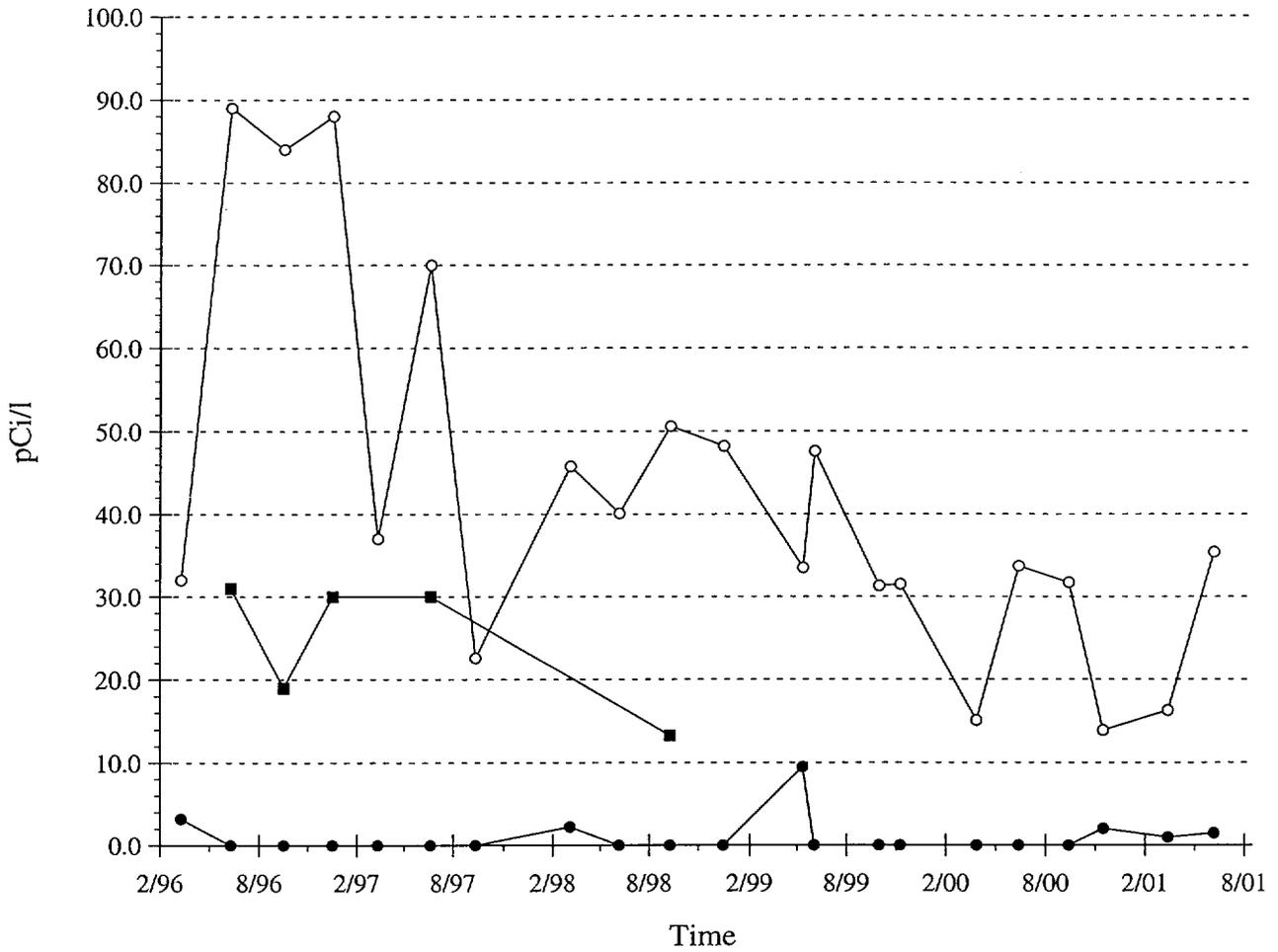
Figure B-10

Radiochemical Data
Versus Time
MW-24

PREPARED FOR
Waltz Mill Site
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Pittsburgh, Pennsylvania

APPROVED	KFO 11/01
CHECKED	PCF 11/01
DRAWN	ZZZ 10/12/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

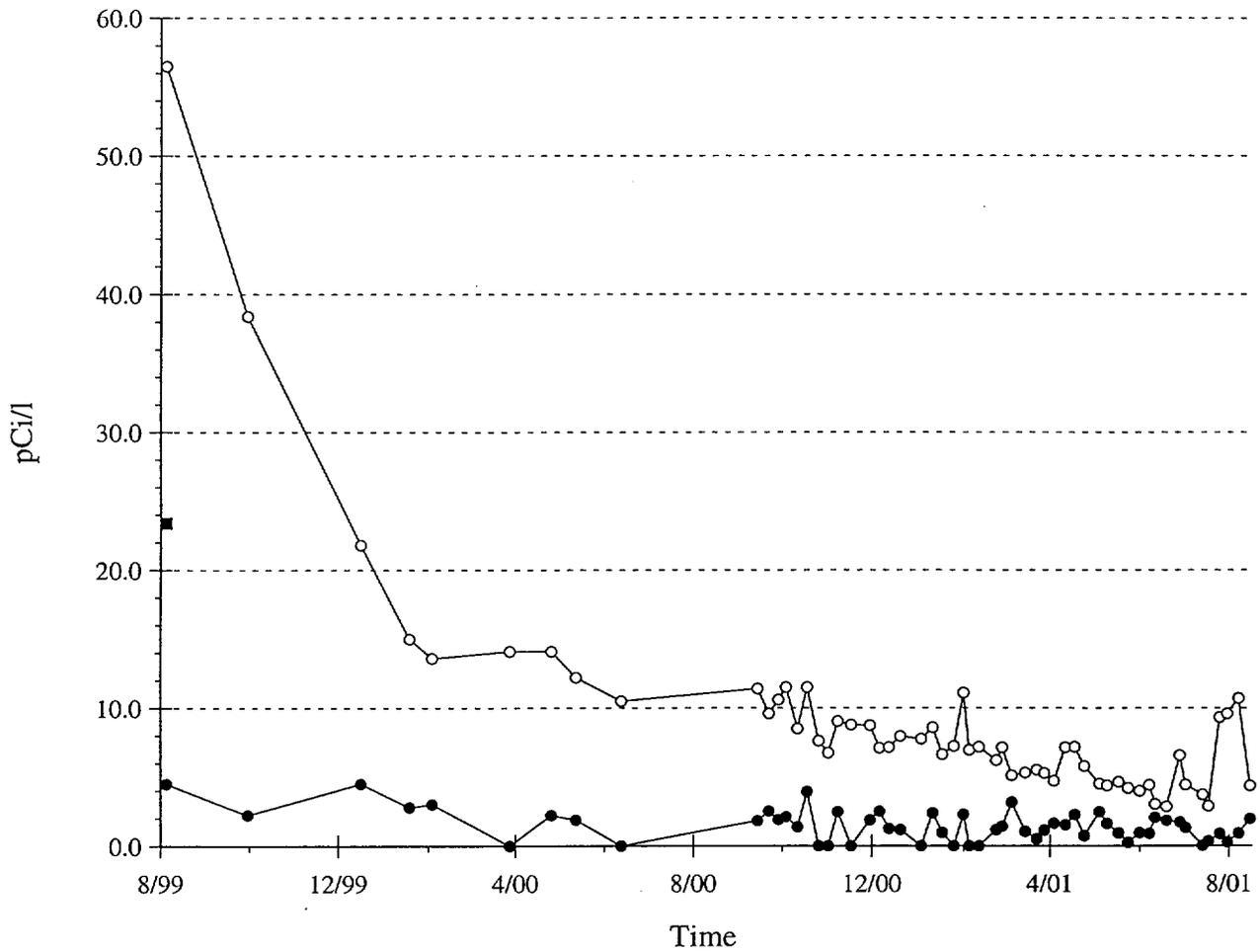
Figure B-11

Radiochemical Data
Versus Time
MW-26

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	RFD 11/01
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DRAWN	ZZZ 10/08/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

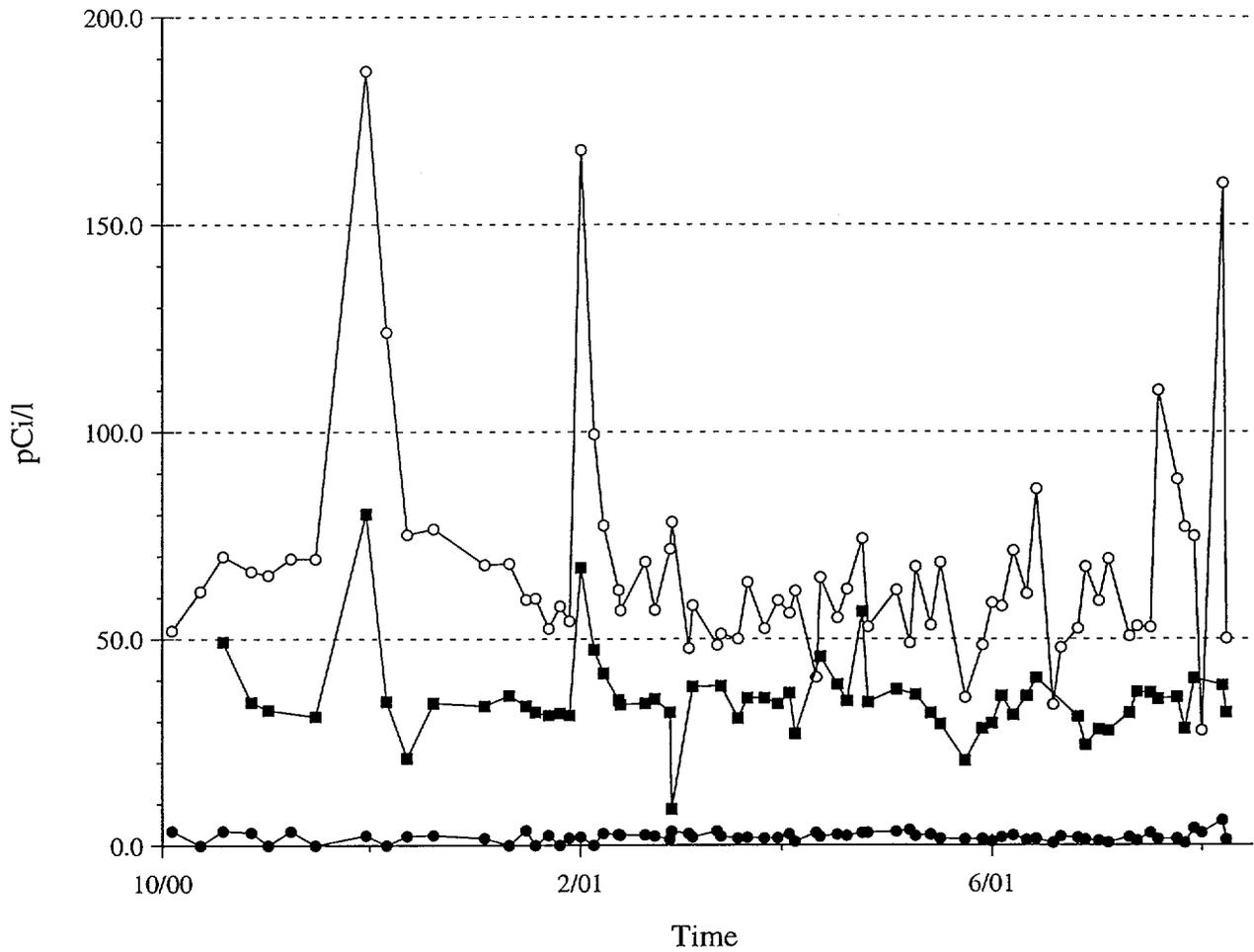
Figure B-12

Radiochemical Data
Versus Time
MW-39

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	RFD 11/01
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DRAWN	ZZZ 10/08/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

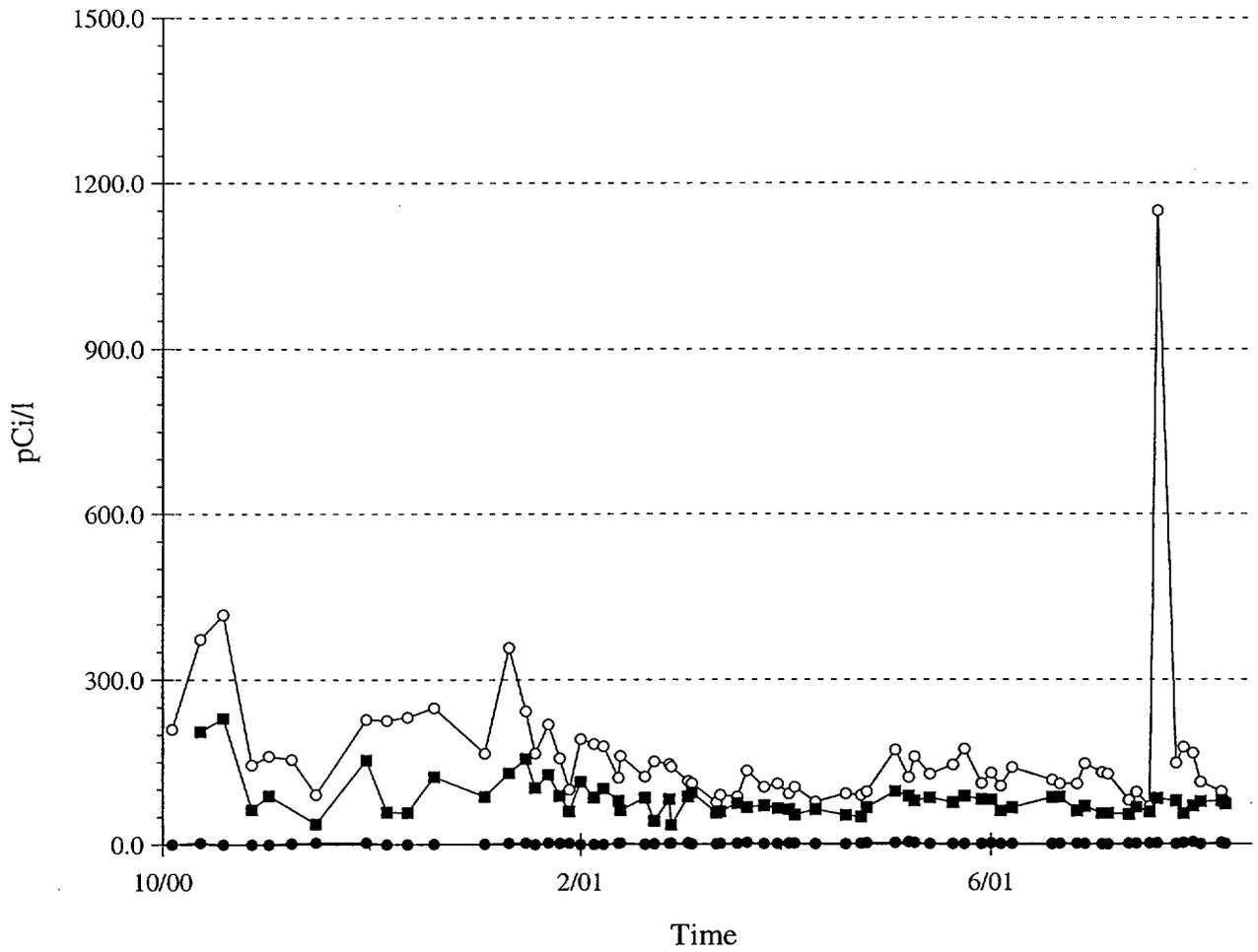
Figure B-13

**Radiochemical Data
Versus Time
MW-40**

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>RFD 11/01</i>
CHECKED	<i>RCH 11/01</i>
DRAWN	ZZZ 10/08/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

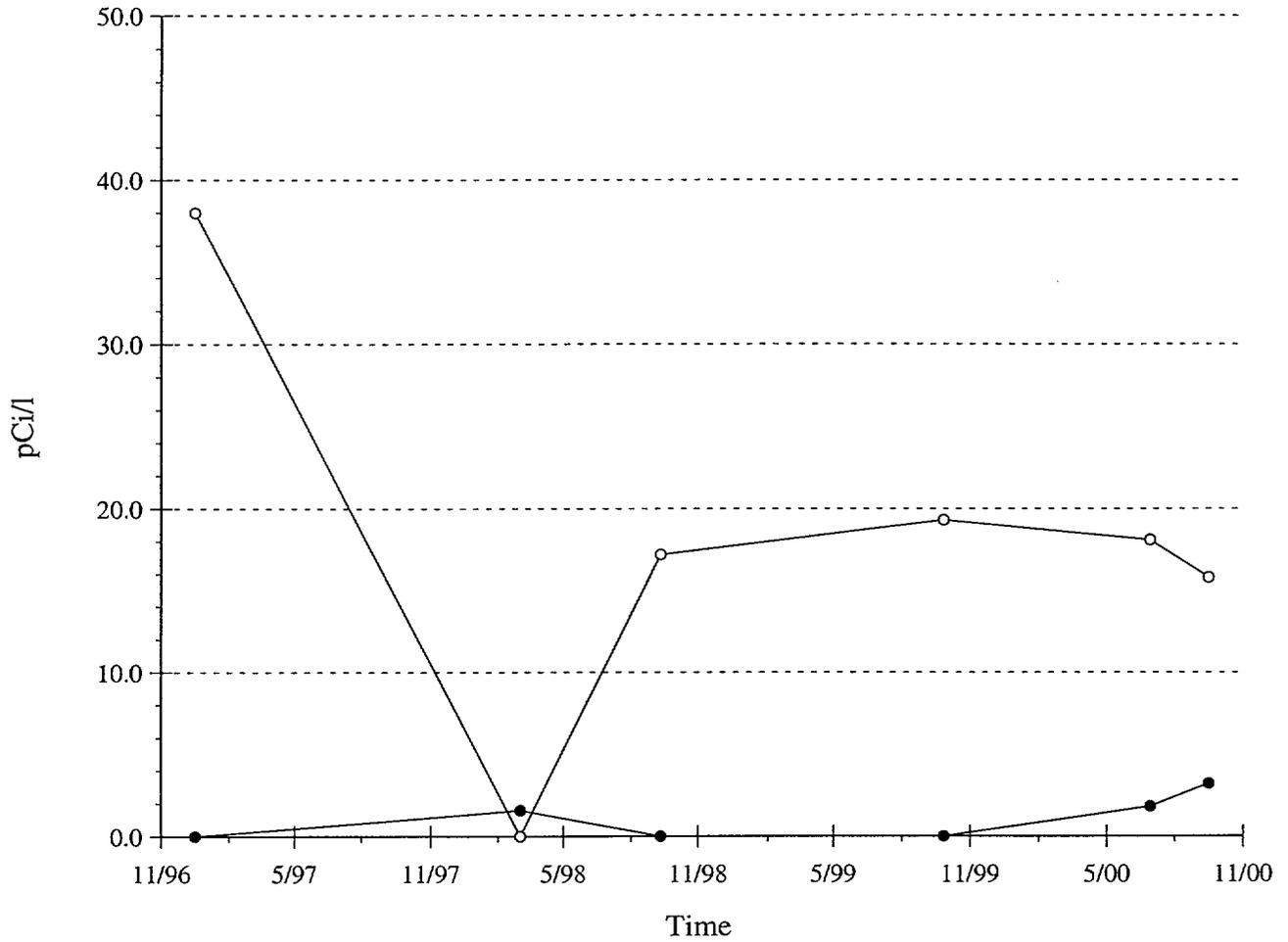
Figure B-14

Radiochemical Data
Versus Time
MW-41

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>RFD 11/01</i>
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DRAWN	<i>ZZZ 10/08/2001</i>
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

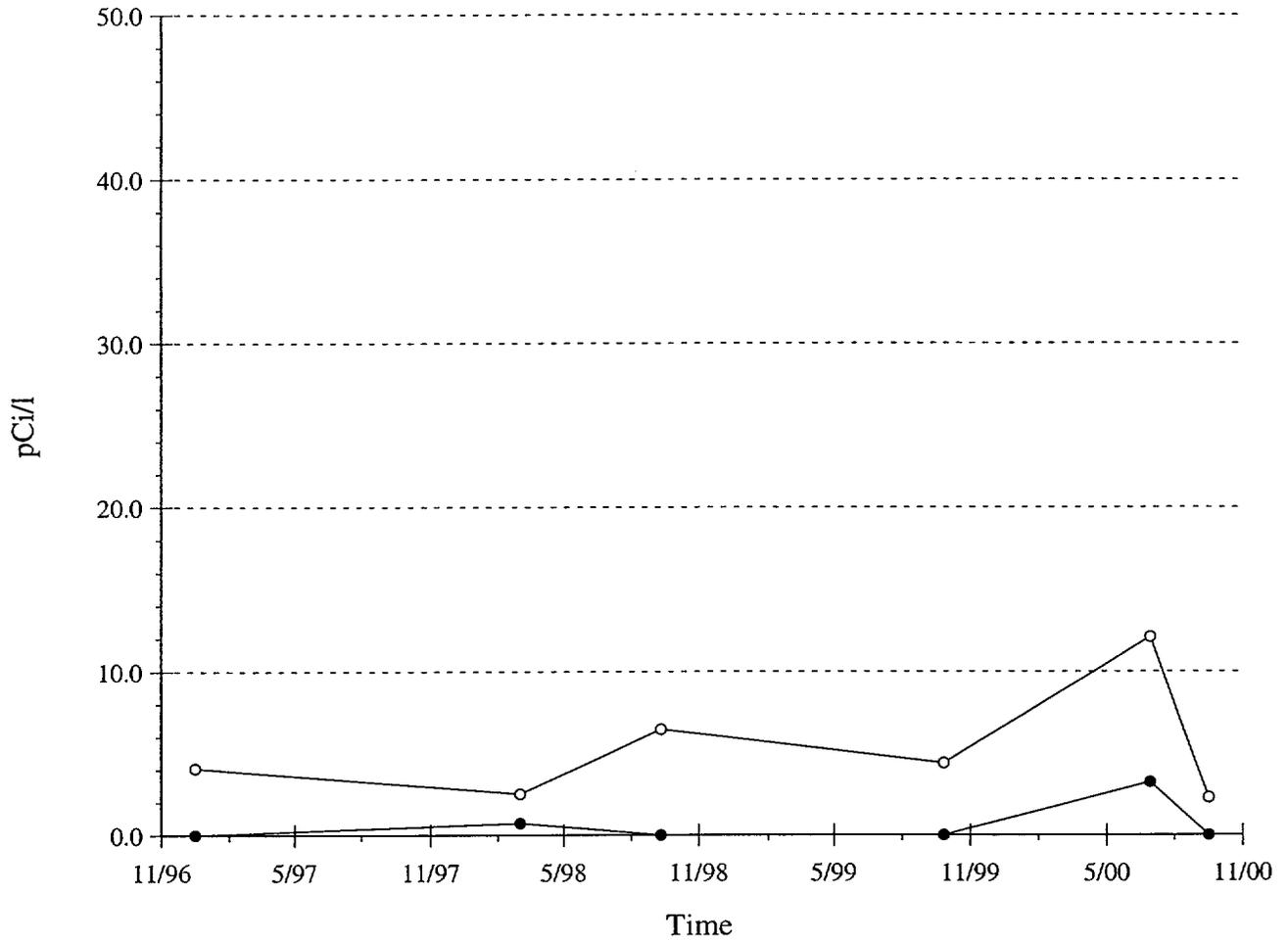
Figure B-15

**Radiochemical Data
Versus Time
TH-1R**

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>[Signature]</i> 11/01
CHECKED	<i>[Signature]</i> 11/01
DRAWN	ZZZ 10/12/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

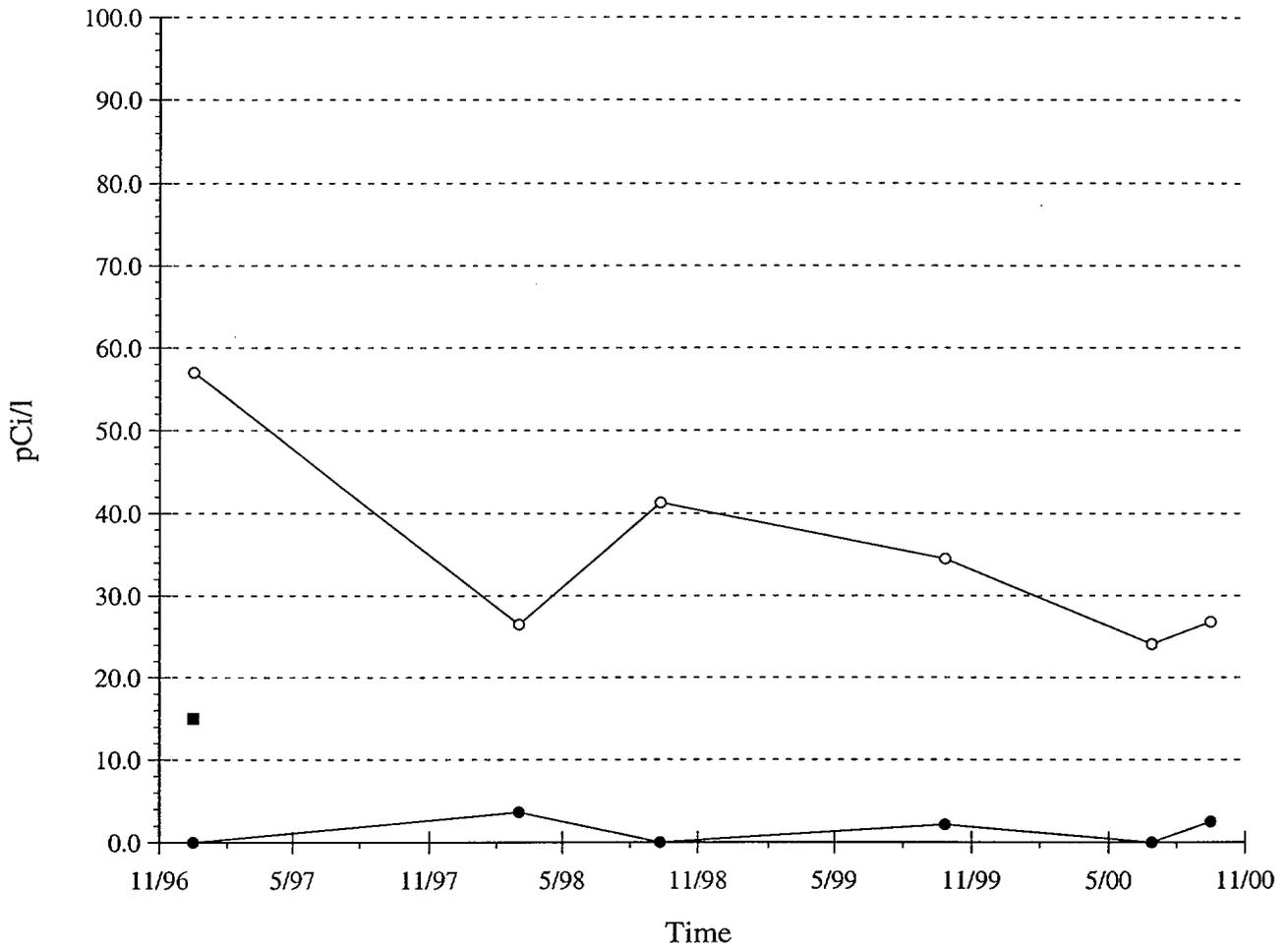
Figure B-16

Radiochemical Data
Versus Time
TH-2R

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>RFO WMA</i>
CHECKED	<i>RCH WMA</i>
DRAWN	<i>ZZZ 10/12/2001</i>
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

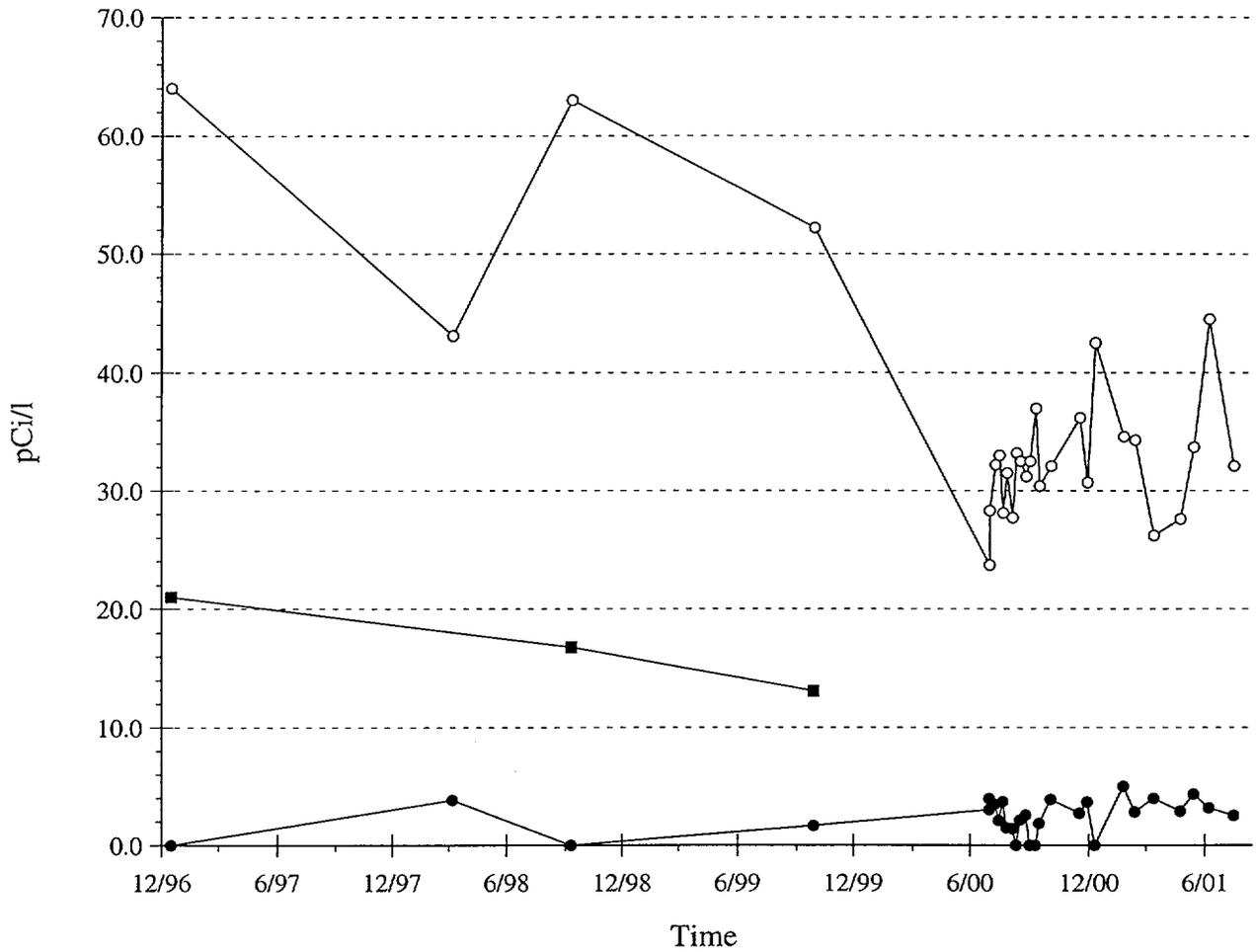
Figure B-17

Radiochemical Data
Versus Time
TH-4R

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	RFD 11/01
CHECKED	RCA 11/01
DRAWN	ZZZ 10/12/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

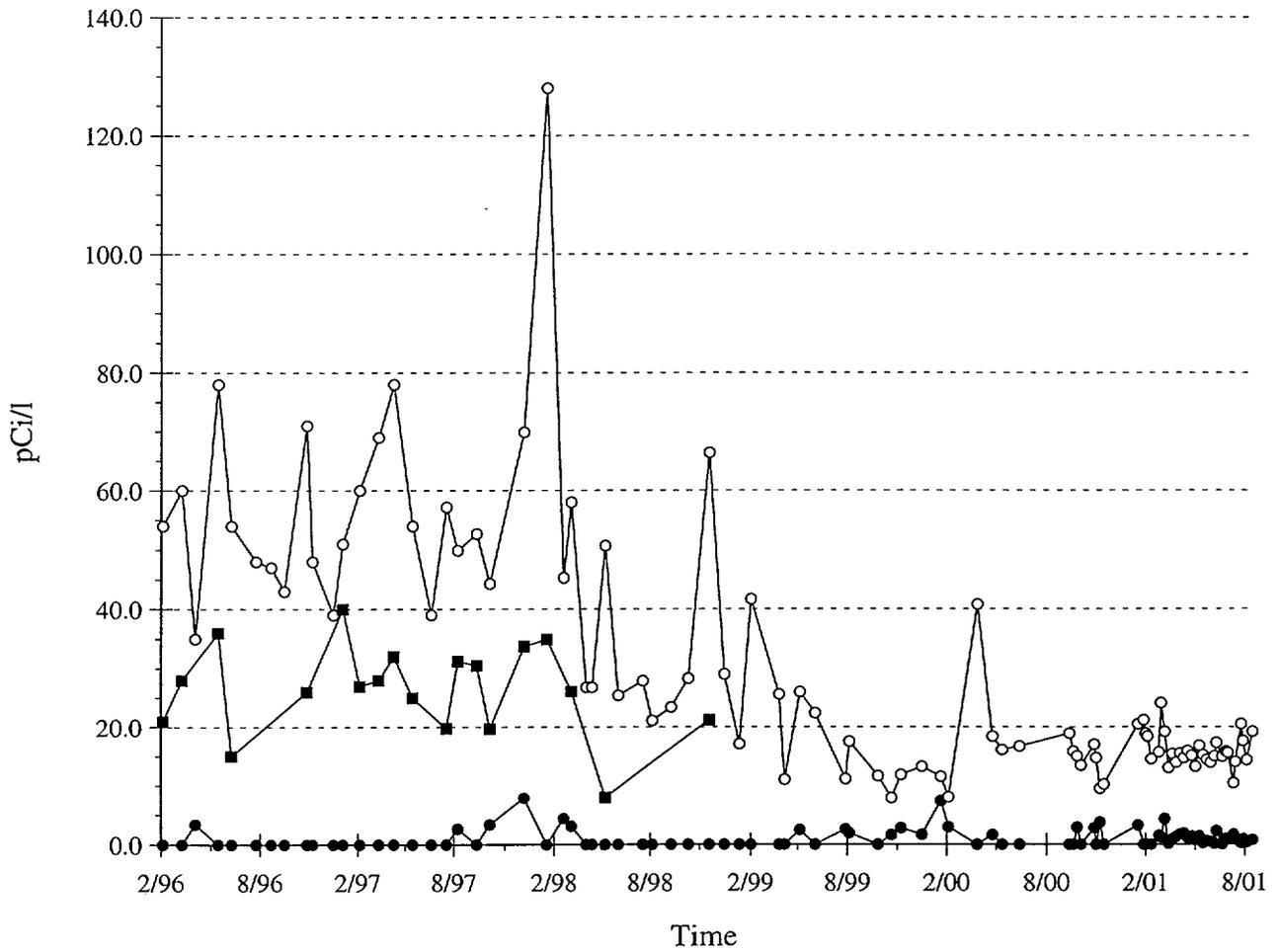
Figure B-18

Radiochemical Data
Versus Time
TH-6R

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>[Signature]</i>
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DRAWN	ZZZ 10/08/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

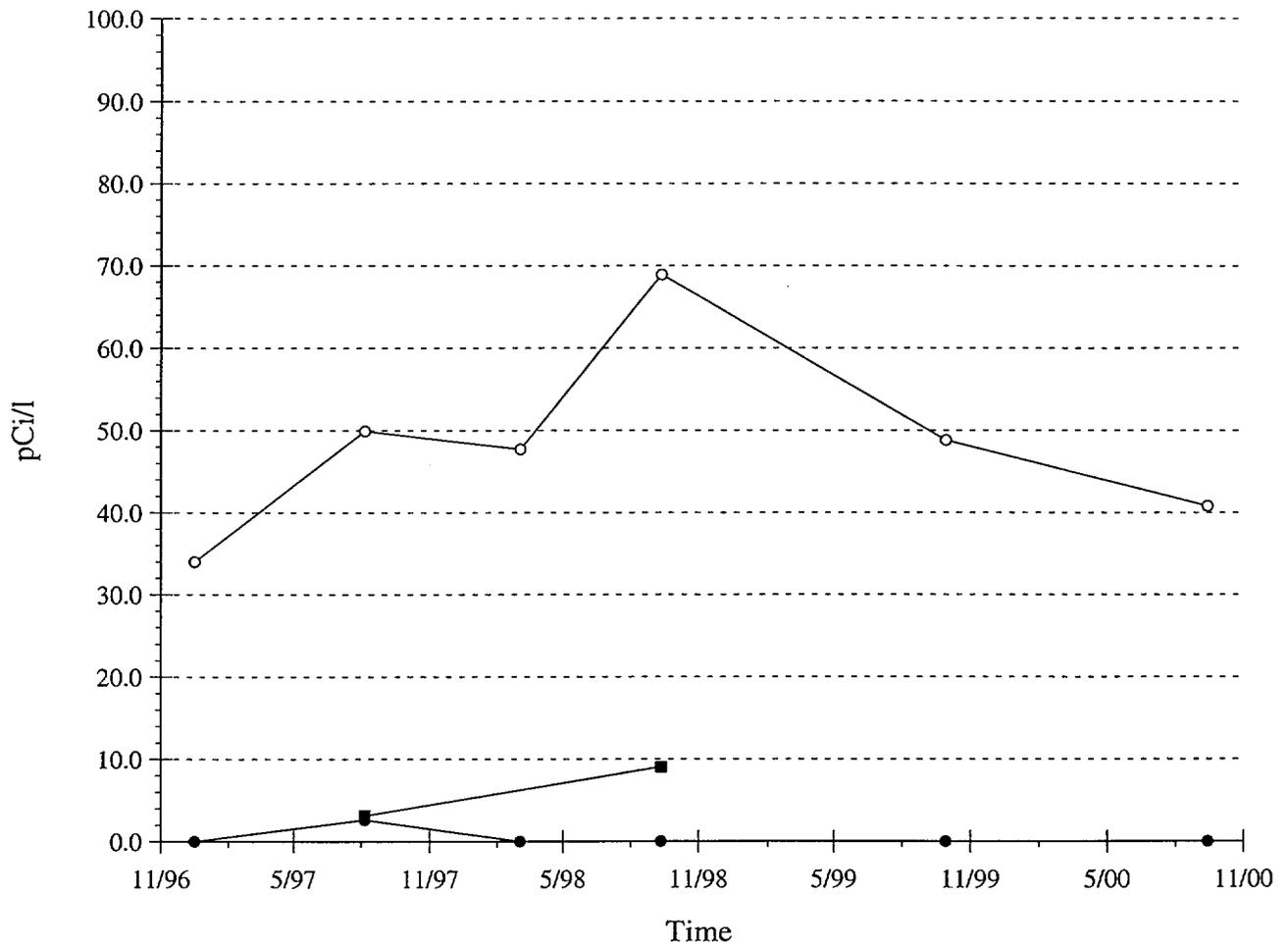
Figure B-19

Radiochemical Data
Versus Time
TH-10

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>[Signature]</i>
CHECKED	<i>[Signature]</i>
DRAWN	ZZZ 10/08/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

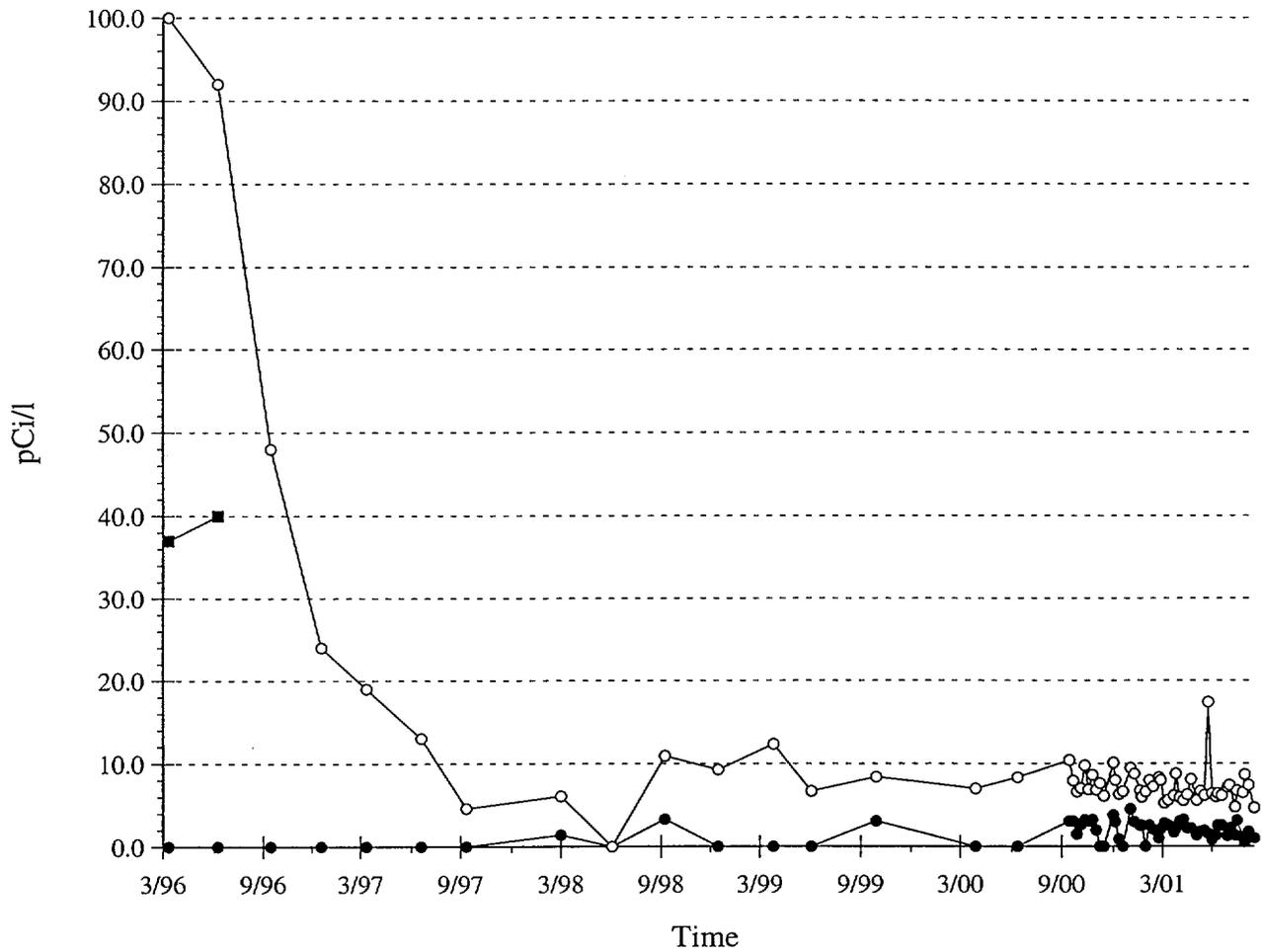
Figure B-20

**Radiochemical Data
Versus Time
TH-12R**

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>[Signature]</i>
CHECKED	<i>[Signature]</i>
DRAWN	ZZZ 10/12/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

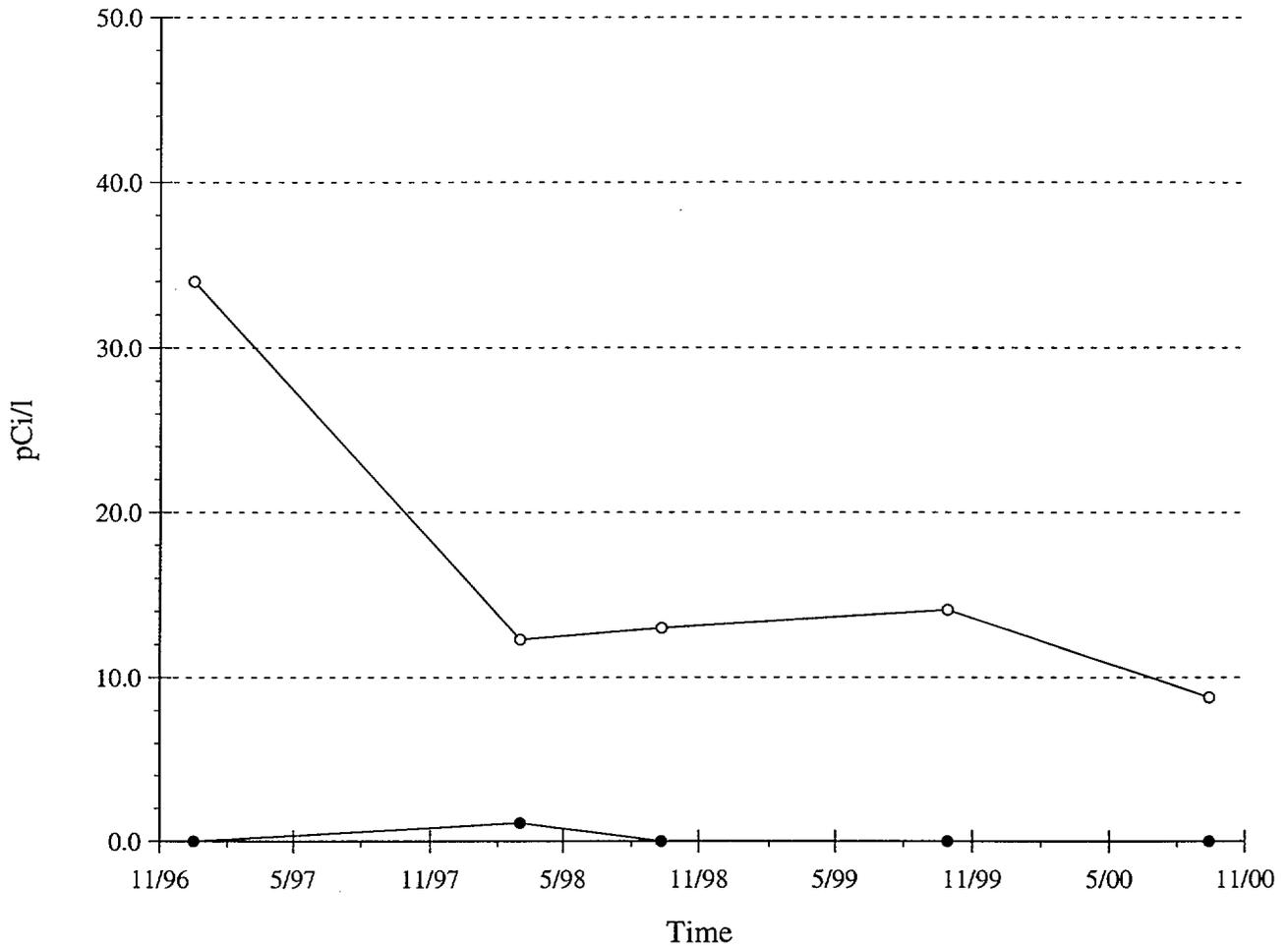
Figure B-21

Radiochemical Data
Versus Time
TH-16R

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	RFD 11/01
CHECKED	RCH 11/01
DRAWN	ZZZ 10/08/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

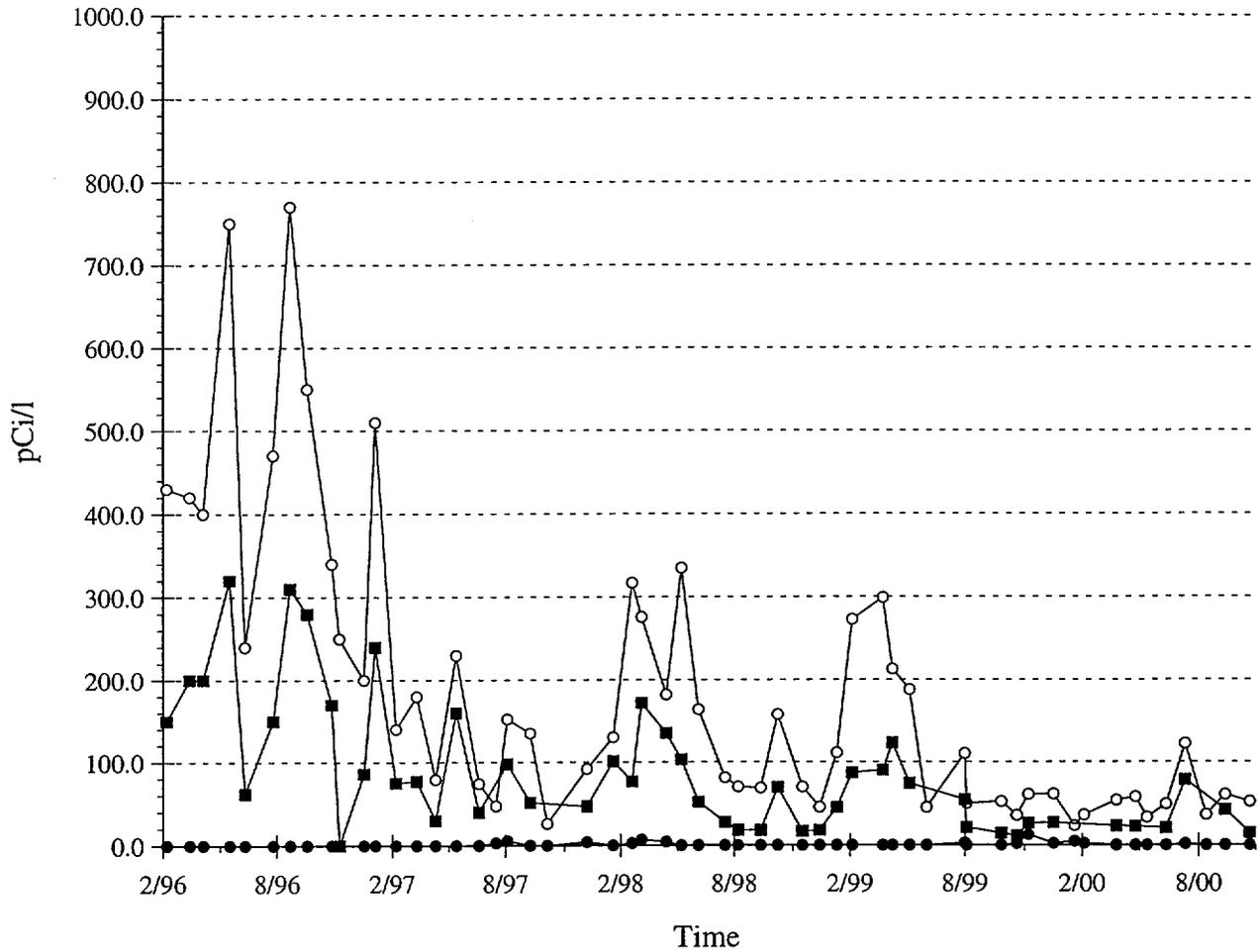
Figure B-22

Radiochemical Data
Versus Time
OHE-1

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>[Signature]</i> 11/01
CHECKED	<i>[Signature]</i> 11/01
DRAWN	ZZZ 10/12/2001
DRAWING NUMBER	

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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

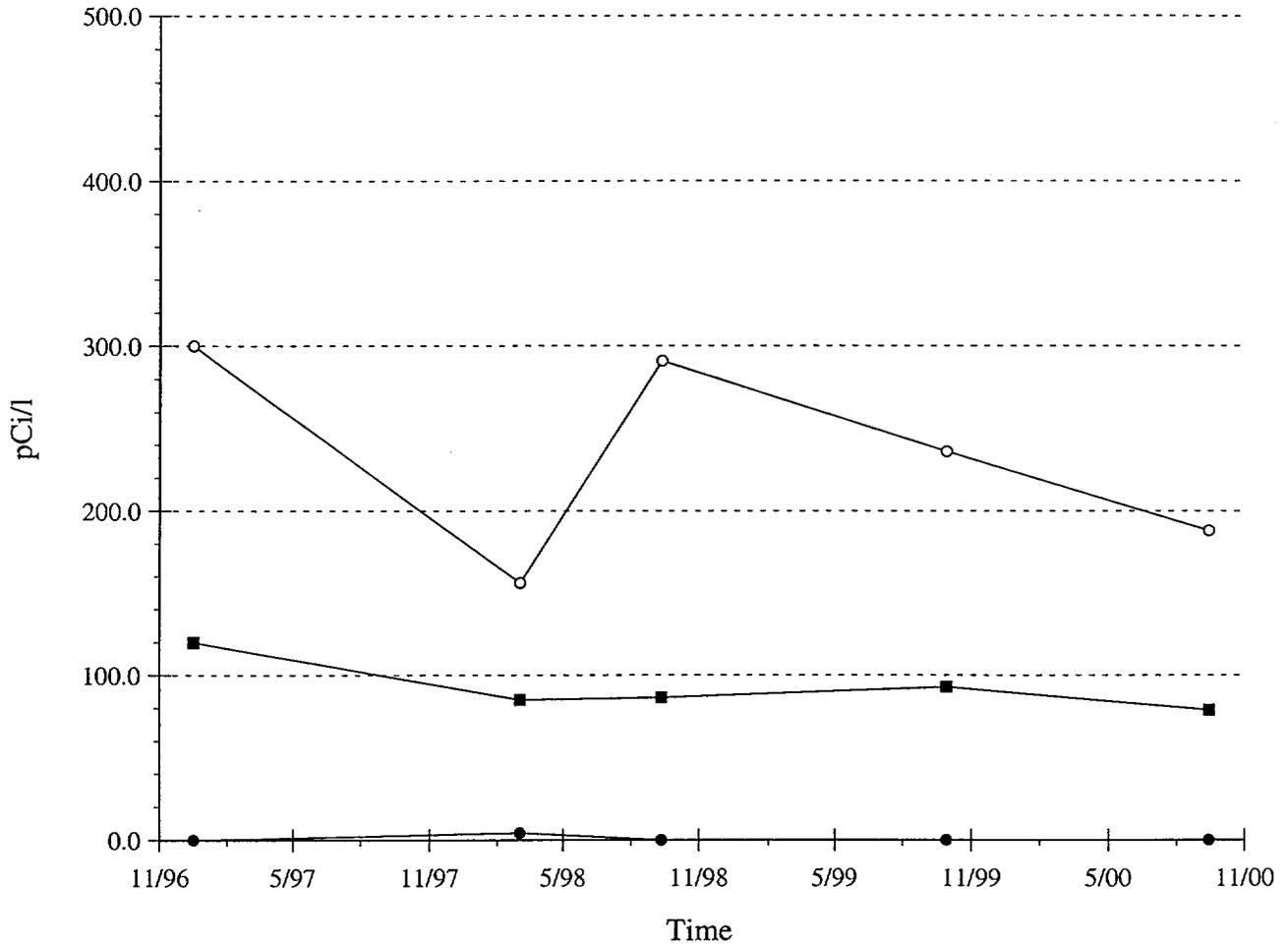
Figure B-23

Radiochemical Data
Versus Time
OHE-2

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>RFD 11/01</i>
CHECKED	<i>RCH 11/01</i>
DRAWN	ZZZ 10/12/2001
DRAWING NUMBER	

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Consultants, Inc.**



Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

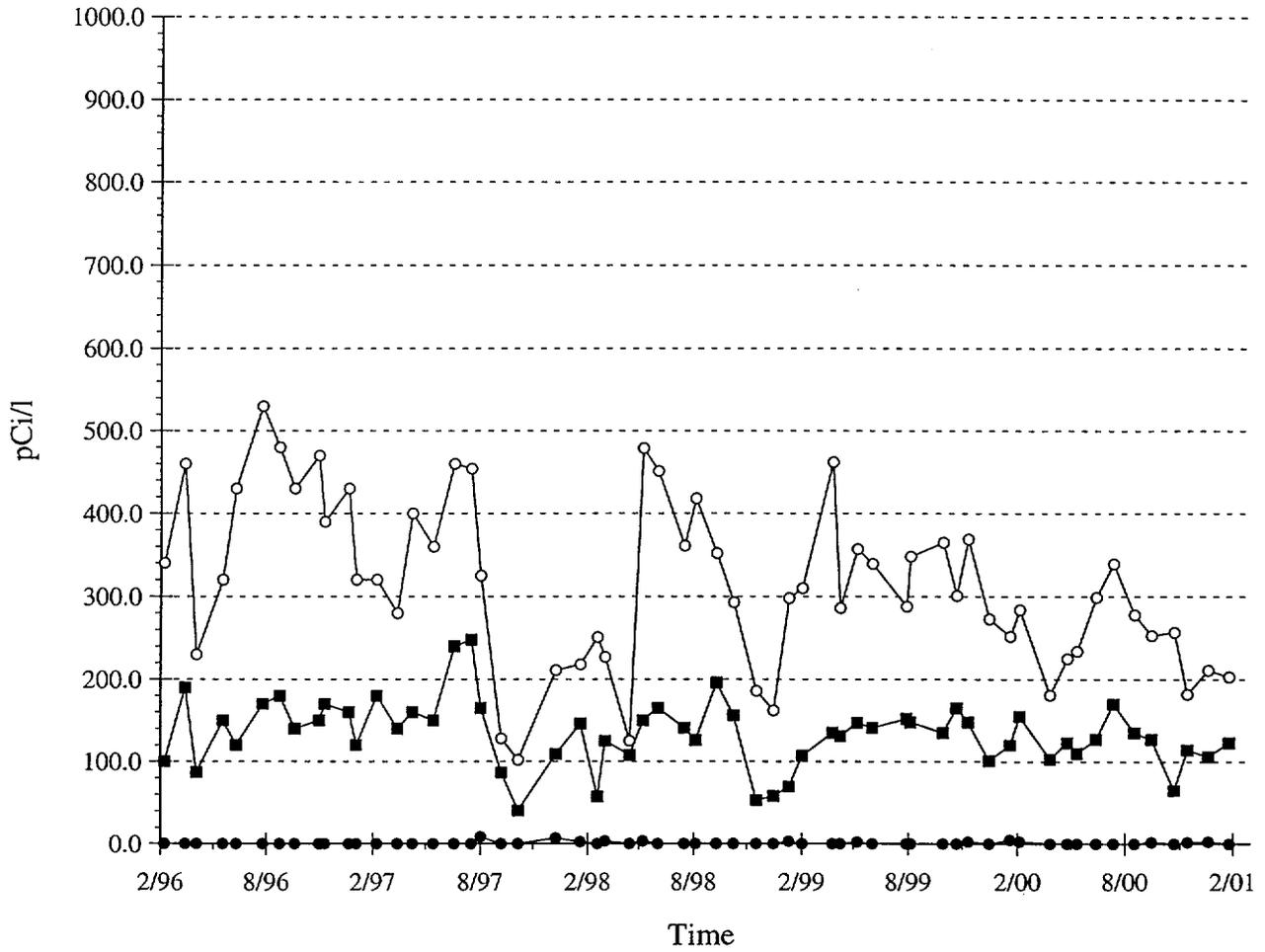
Figure B-24

Radiochemical Data
Versus Time
OHE-3

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>RFJ</i>	<i>11/01</i>
CHECKED	<i>ACH</i>	<i>11/01</i>
DRAWN	ZZZ 10/12/2001	
DRAWING NUMBER		

**Earth Sciences
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Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

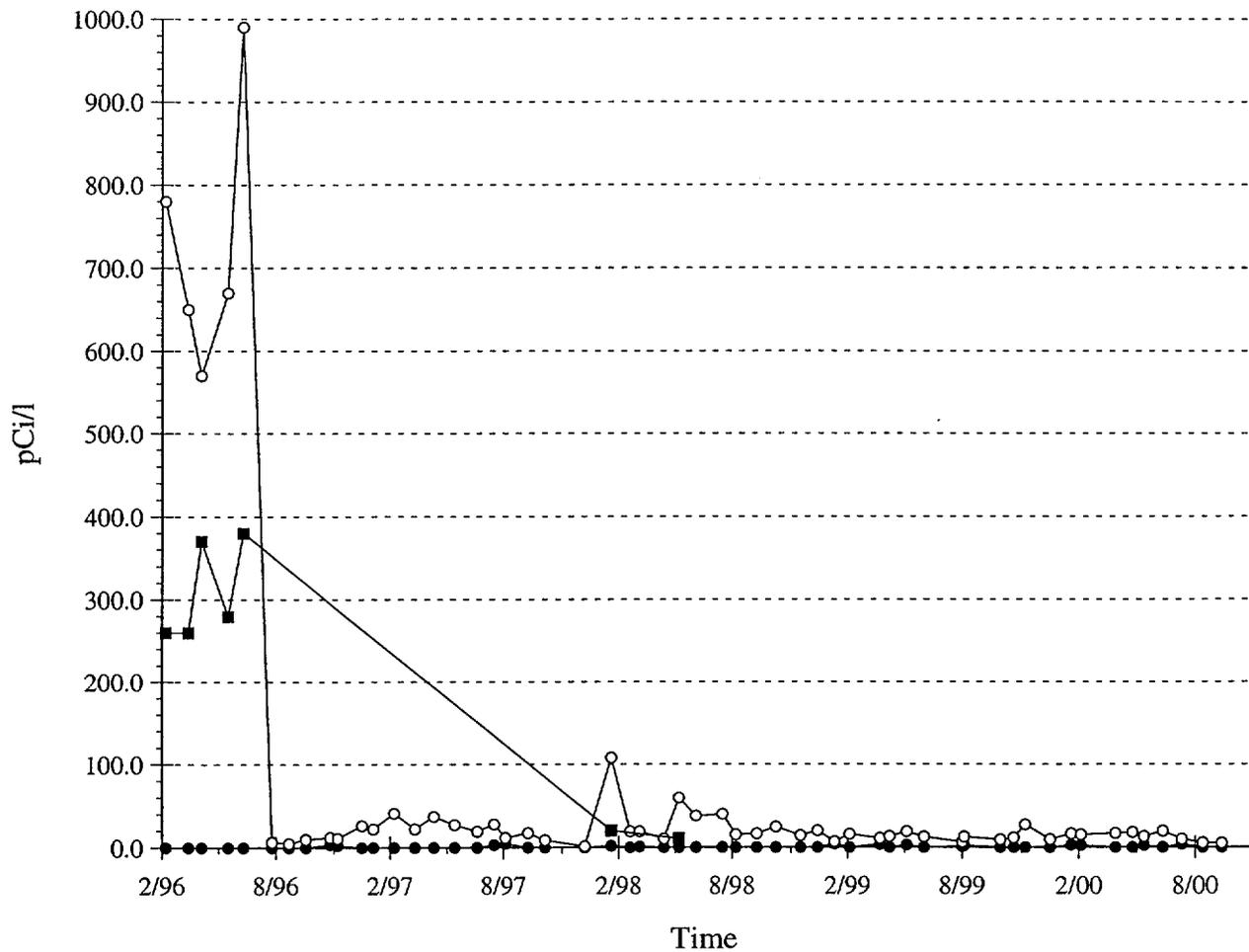
Figure B-25

Radiochemical Data
Versus Time
OHE-4

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>RFO</i>	<i>11/01</i>
CHECKED	<i>RCH</i>	<i>11/01</i>
DRAWN	ZZZ 10/12/2001	
DRAWING NUMBER		

**Earth Sciences
Consultants, Inc.**



Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

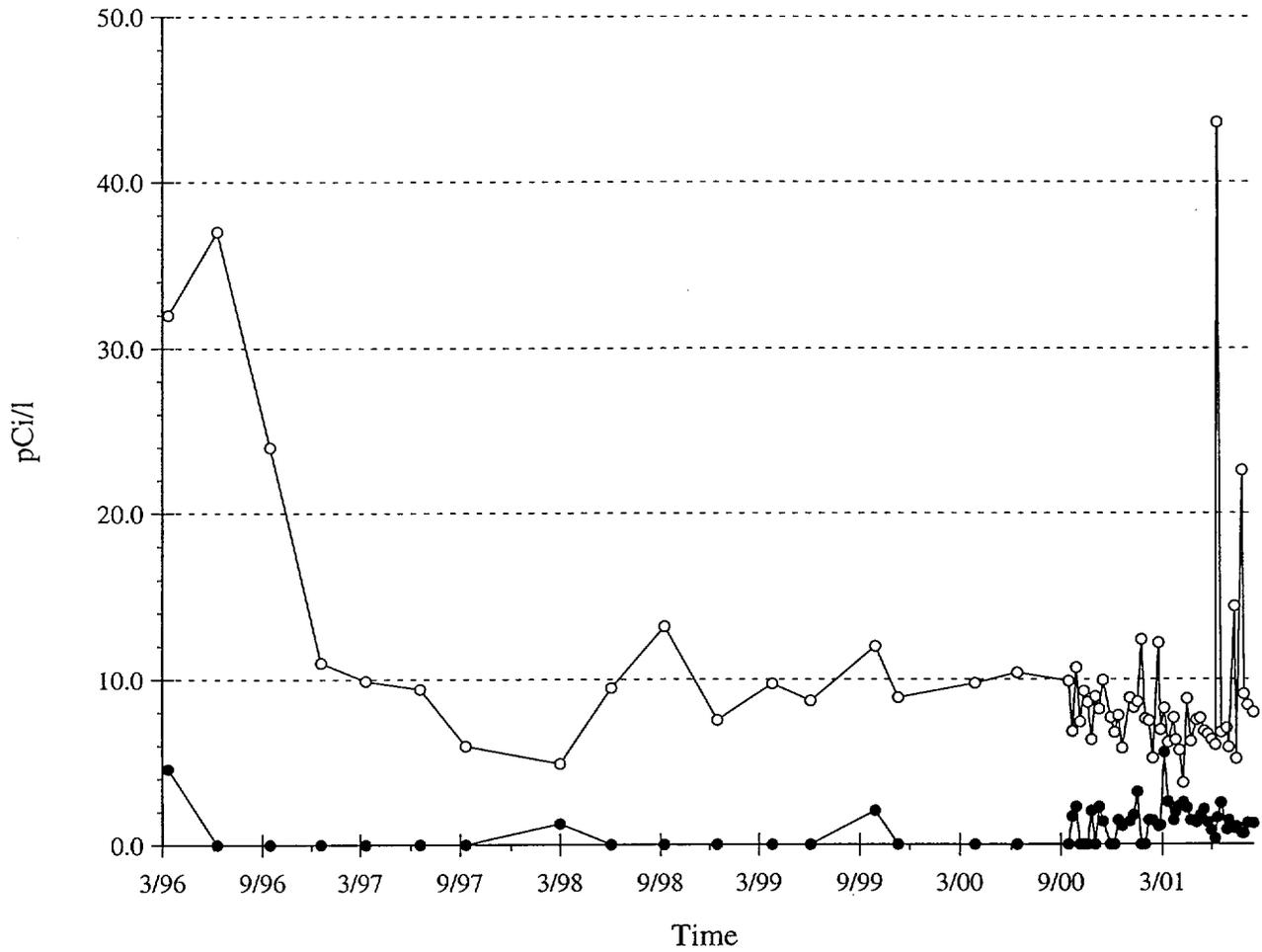
Figure B-26

Radiochemical Data
Versus Time
OHE-7AR

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>[Signature]</i> 11/01
CHECKED	<i>[Signature]</i> 11/01
DRAWN	ZZZ 10/12/2001
DRAWING NUMBER	

**Earth Sciences
Consultants, Inc.**



Legend

- Gross Alpha
- Gross Beta/Gamma

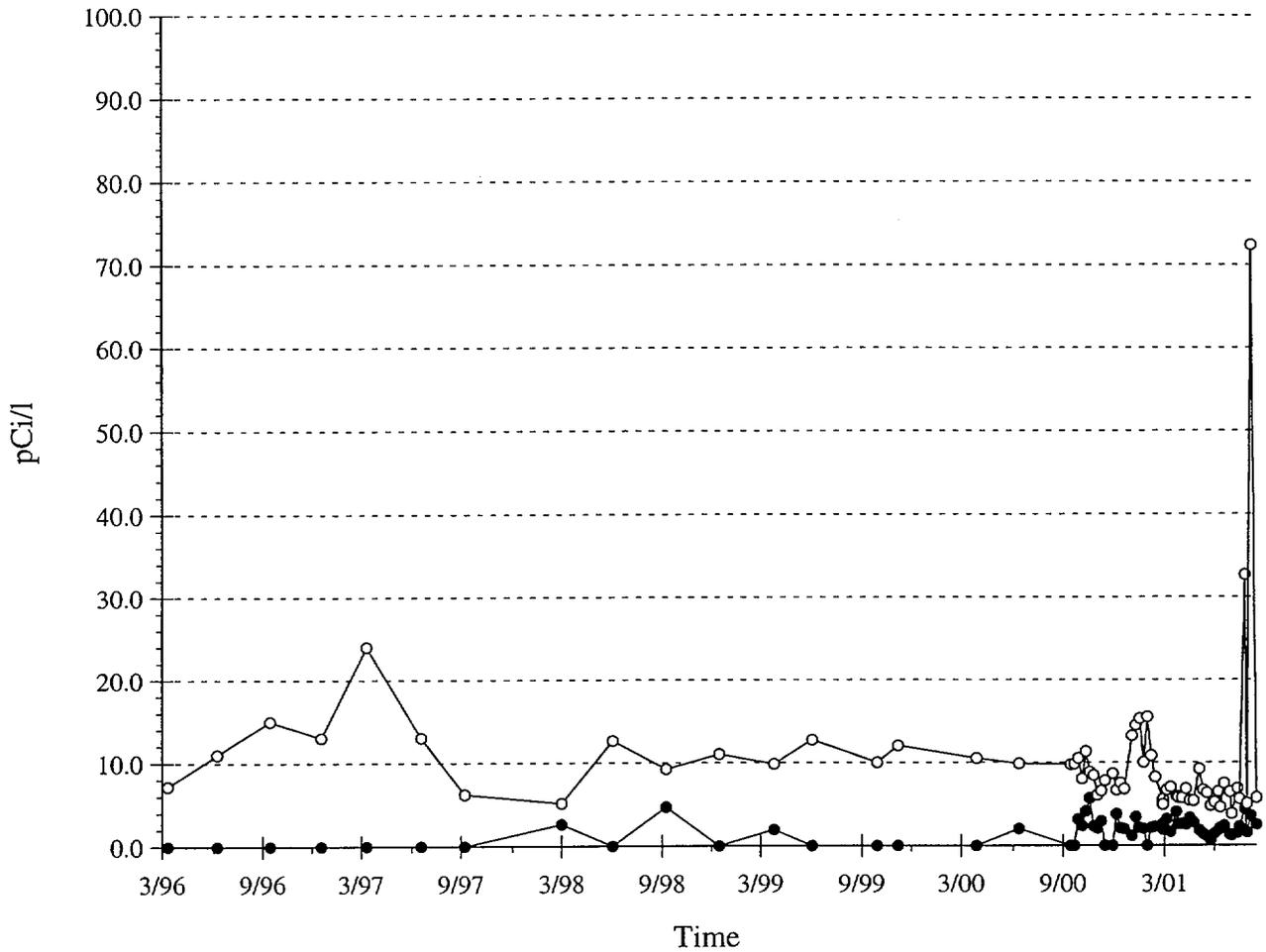
Figure B-27

**Radiochemical Data
Versus Time
OHE-13R**

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	RFD 1/01
CHECKED	RCH 1/01
DRAWN	ZZZ 10/08/2001
DRAWING NUMBER	

**Earth Sciences
Consultants, Inc.**



Legend

- Gross Alpha
- Gross Beta/Gamma

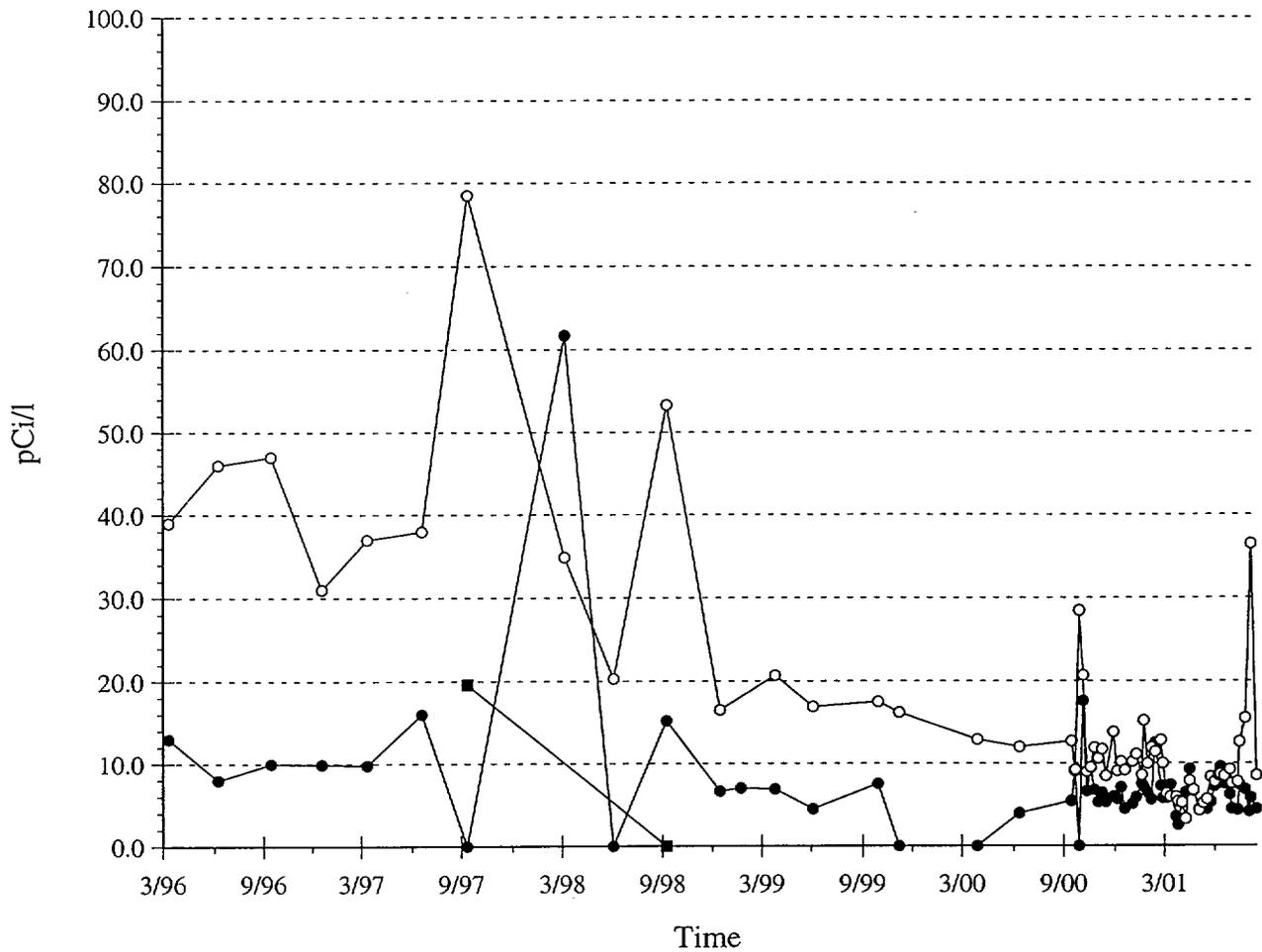
Figure B-28

Radiochemical Data
Versus Time
OHE-14R

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	RED IV/01
CHECKED	RCH IV/01
DRAWN	ZZZ 10/08/2001
DRAWING NUMBER	

**Earth Sciences
Consultants, Inc.**



Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

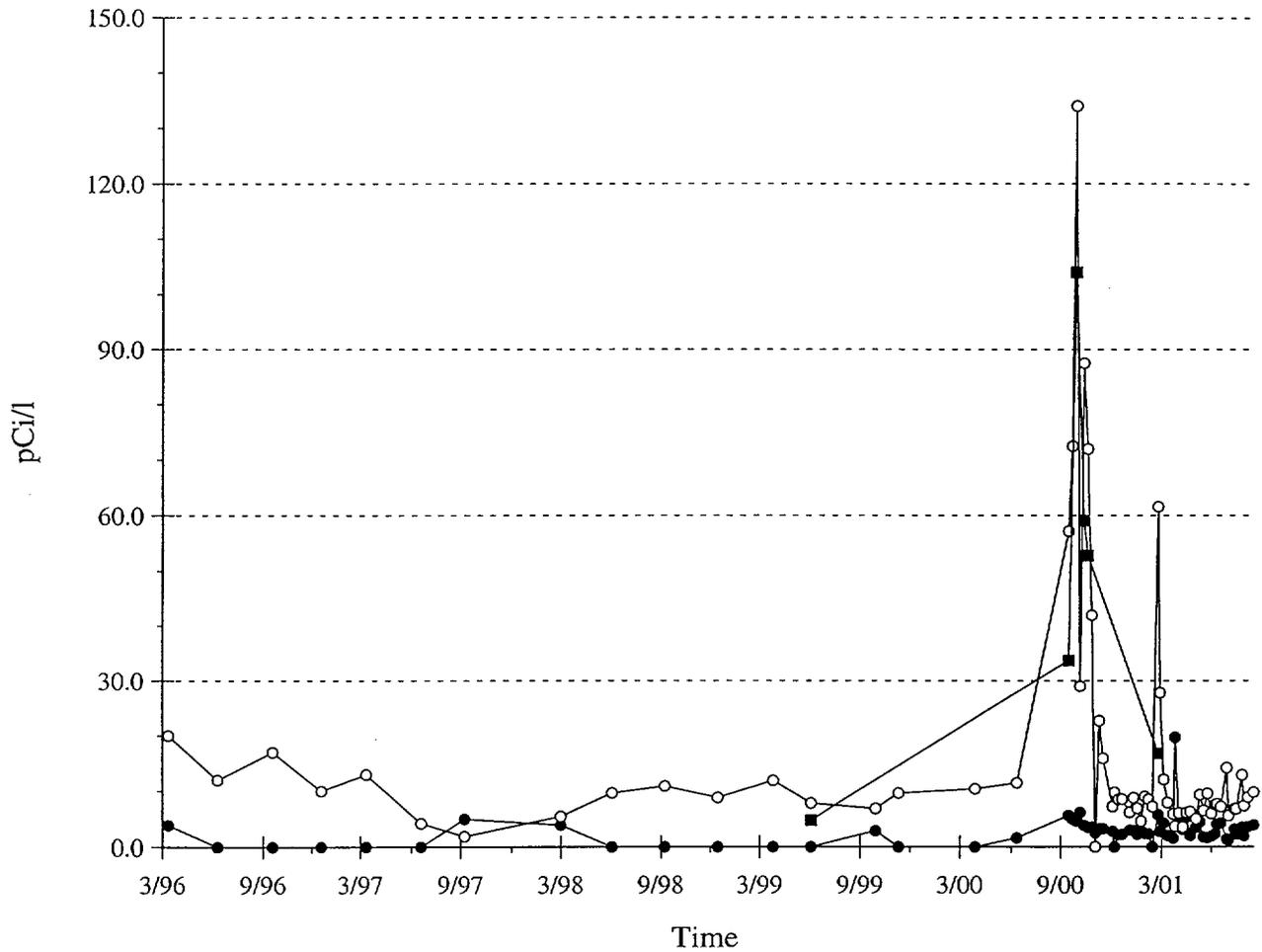
Figure B-29

Radiochemical Data
Versus Time
OHE-15

PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	RFD 11/01
CHECKED	RCH 11/01
DRAWN	ZZZ 10/08/2001
DRAWING NUMBER	

**Earth Sciences
Consultants, Inc.**



Legend

- Gross Alpha
- Gross Beta/Gamma
- Strontium 90

Figure B-30

Radiochemical Data
Versus Time
OHE-18

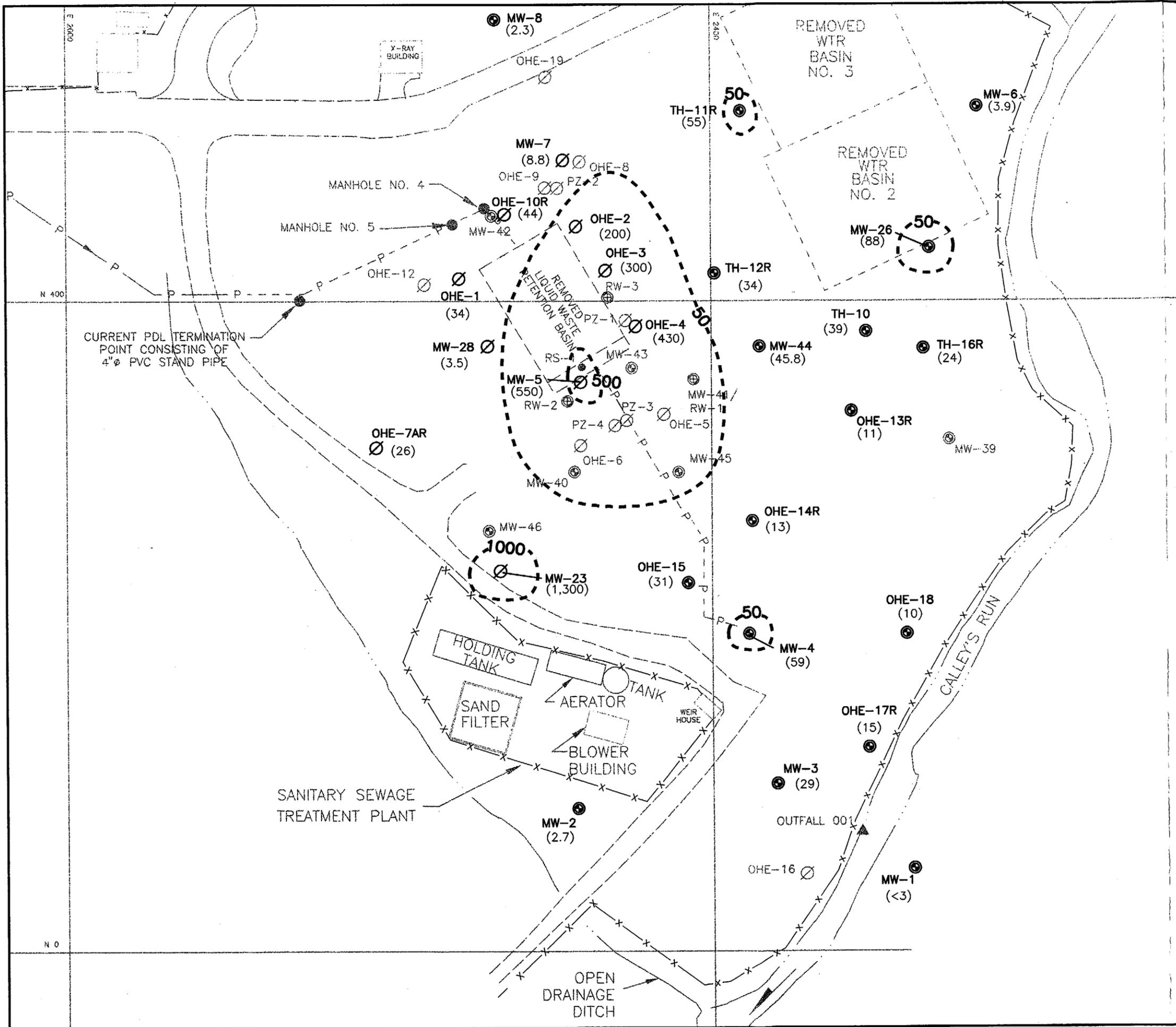
PREPARED FOR
Waltz Mill Site
Westinghouse Electric Company
Pittsburgh, Pennsylvania

APPROVED	<i>RFO</i>	<i>11/01</i>
CHECKED	<i>RCH</i>	<i>11/01</i>
DRAWN	ZZZ 10/08/2001	
DRAWING NUMBER		

**Earth Sciences
Consultants, Inc.**

Attachment C

Groundwater Radiochemistry Isoconcentration Maps



LEGEND

- x-x-x- SECURITY FENCE
- ⊙ GROUNDWATER MONITORING WELL
- ⊕ CURRENT GROUNDWATER REMEDIATION WELL
- ⊖ ABANDONED GROUNDWATER MONITORING WELL
- ▲ OUTFALL LOCATION
- GROUNDWATER REMEDIATION SUMP
- P- PROCESS WATERLINE
- P-- REMOVED PROCESS WATERLINE
- 50- CONTOUR LINE OF EQUAL GROSS BETA/GAMMA CONCENTRATION (DASHED WHERE INFERRED)
- (74.6) CONCENTRATION OF GROSS BETA/GAMMA IN pCi/l

NOTES

1. pCi/l = PICOCURIES PER LITER.
2. GROUNDWATER SAMPLES COLLECTED ON DECEMBER 16-19, 1996.
3. SITE LAYOUT AS SHOWN IN THE FIGURE REPRESENTS CURRENT SITE CONDITIONS.

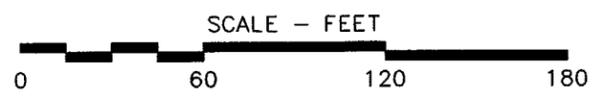
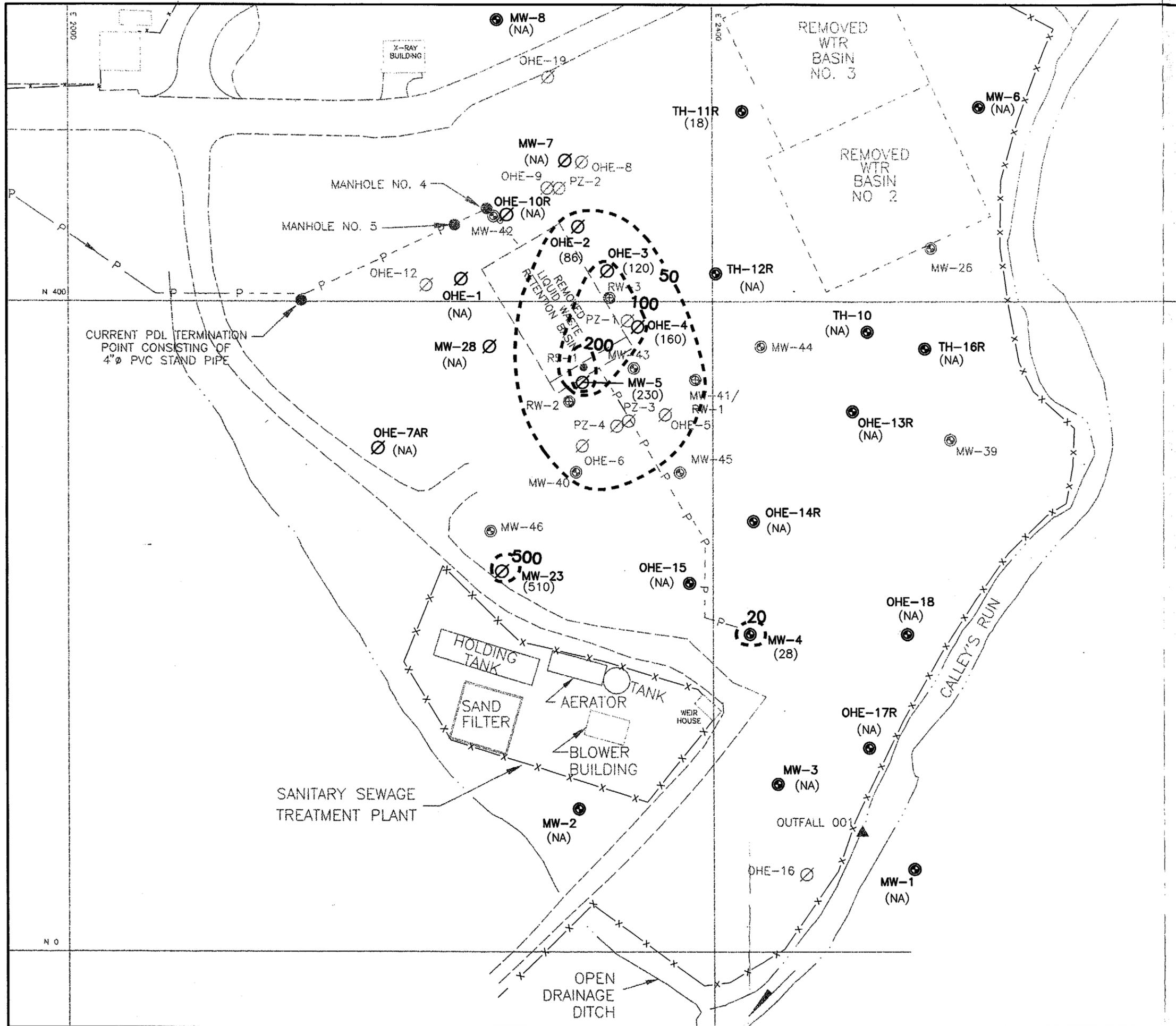


FIGURE C-1
GROSS BETA/GAMMA ISOCONCENTRATION MAP
DECEMBER 1996
WALTZ MILL SITE
MADISON, PENNSYLVANIA

PREPARED FOR
WESTINGHOUSE ELECTRIC COMPANY, LLC
PITTSBURGH, PENNSYLVANIA

APPROVED	RFD 11/6/01
CHECKED	RCH 11/6/01
DRAWN	GJA 10/17/01
DRAWING NUMBER	
5018228	





LEGEND

- x-x-x- SECURITY FENCE
- ⊙ GROUNDWATER MONITORING WELL
- ⊙ CURRENT GROUNDWATER REMEDIATION WELL
- ⊙/ ABANDONED GROUNDWATER MONITORING WELL
- ▲ OUTFALL LOCATION
- GROUNDWATER REMEDIATION SUMP
- P- PROCESS WATERLINE
- P- REMOVED PROCESS WATERLINE
- 50- CONTOUR LINE OF EQUAL Sr-90 CONCENTRATION (DASHED WHERE INFERRED)
- (11) CONCENTRATION OF Sr-90 IN pCi/l
- (NA) NOT ANALYZED FOR Sr-90

NOTES

1. pCi/l = PICOCURIES PER LITER.
2. GROUNDWATER SAMPLES COLLECTED ON DECEMBER 16-19, 1996.
3. SITE LAYOUT AS SHOWN IN THE FIGURE REPRESENTS CURRENT SITE CONDITIONS.

SCALE - FEET

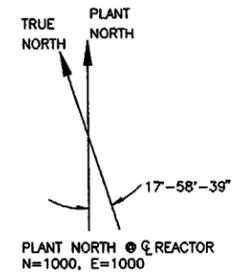
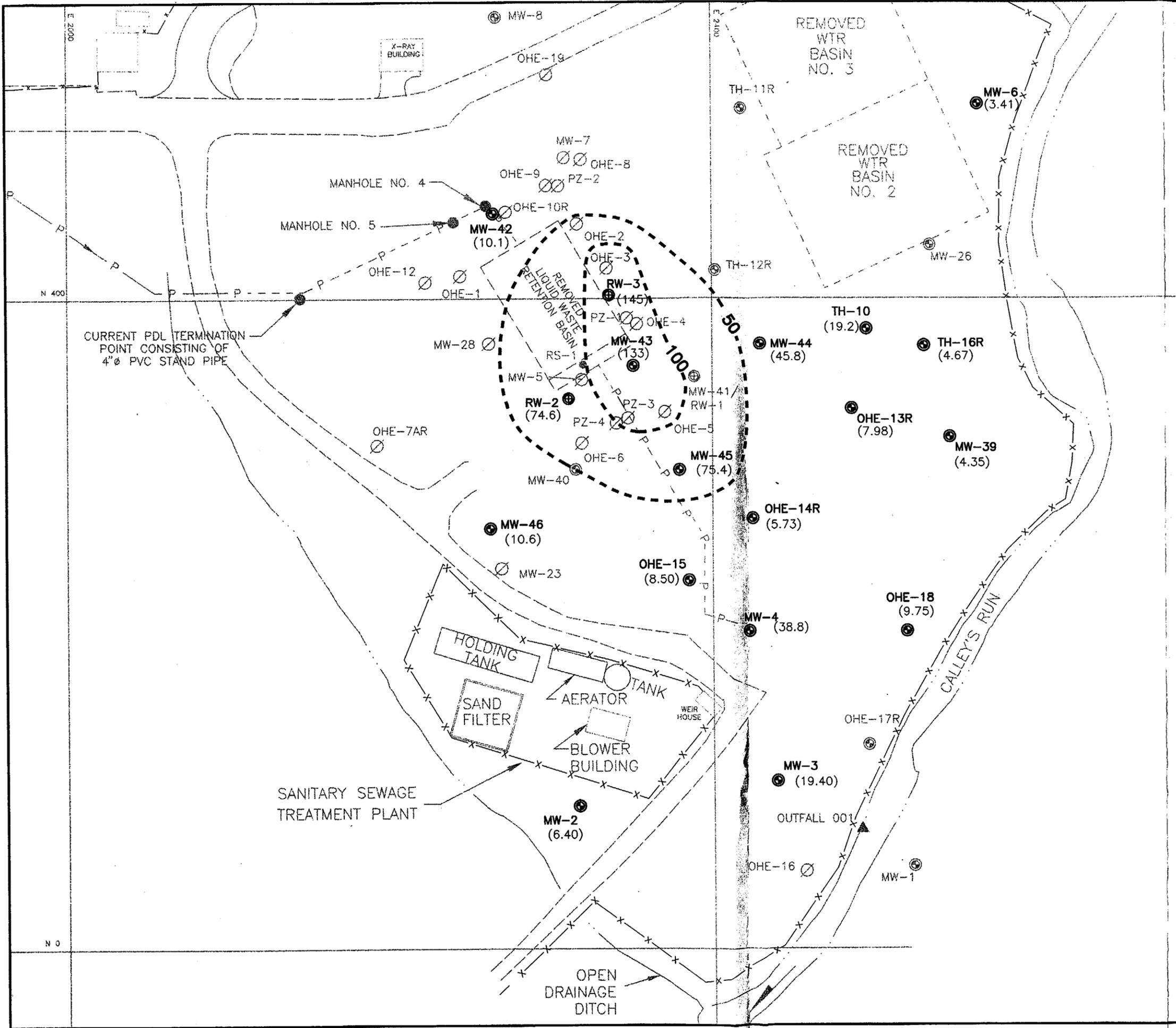
0 60 120 180

FIGURE C-2
Sr-90 ISOCONCENTRATION MAP
DECEMBER 1996
WALTZ MILL SITE
MADISON, PENNSYLVANIA

PREPARED FOR
WESTINGHOUSE ELECTRIC COMPANY, LLC
PITTSBURGH, PENNSYLVANIA

APPROVED *RFD 11/01*
 CHECKED *RCH 11/01*
 DRAWN *GJA 10/17/01*
 DRAWING NUMBER
5018228


Earth Sciences Consultants, Inc.



LEGEND

- x-x-x- SECURITY FENCE
- ⊙ GROUNDWATER MONITORING WELL
- ⊕ CURRENT GROUNDWATER REMEDIATION WELL
- ⊖ ABANDONED GROUNDWATER MONITORING WELL
- ▲ OUTFALL LOCATION
- GROUNDWATER REMEDIATION SUMP
- P- PROCESS WATERLINE
- P- REMOVED PROCESS WATERLINE
- 50- CONTOUR LINE OF EQUAL GROSS BETA/GAMMA CONCENTRATION (DASHED WHERE INFERRED)
- (74.6) CONCENTRATION OF GROSS BETA/GAMMA IN pCi/l

NOTES

1. pCi/l = PICOCURIES PER LITER.
2. GROUNDWATER SAMPLES COLLECTED ON AUGUST 15 AND 16, 2001.
3. SITE LAYOUT AS SHOWN IN THE FIGURE REPRESENTS CURRENT SITE CONDITIONS.

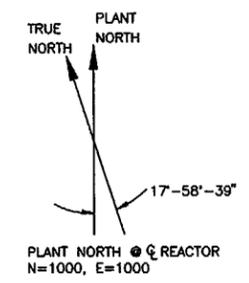
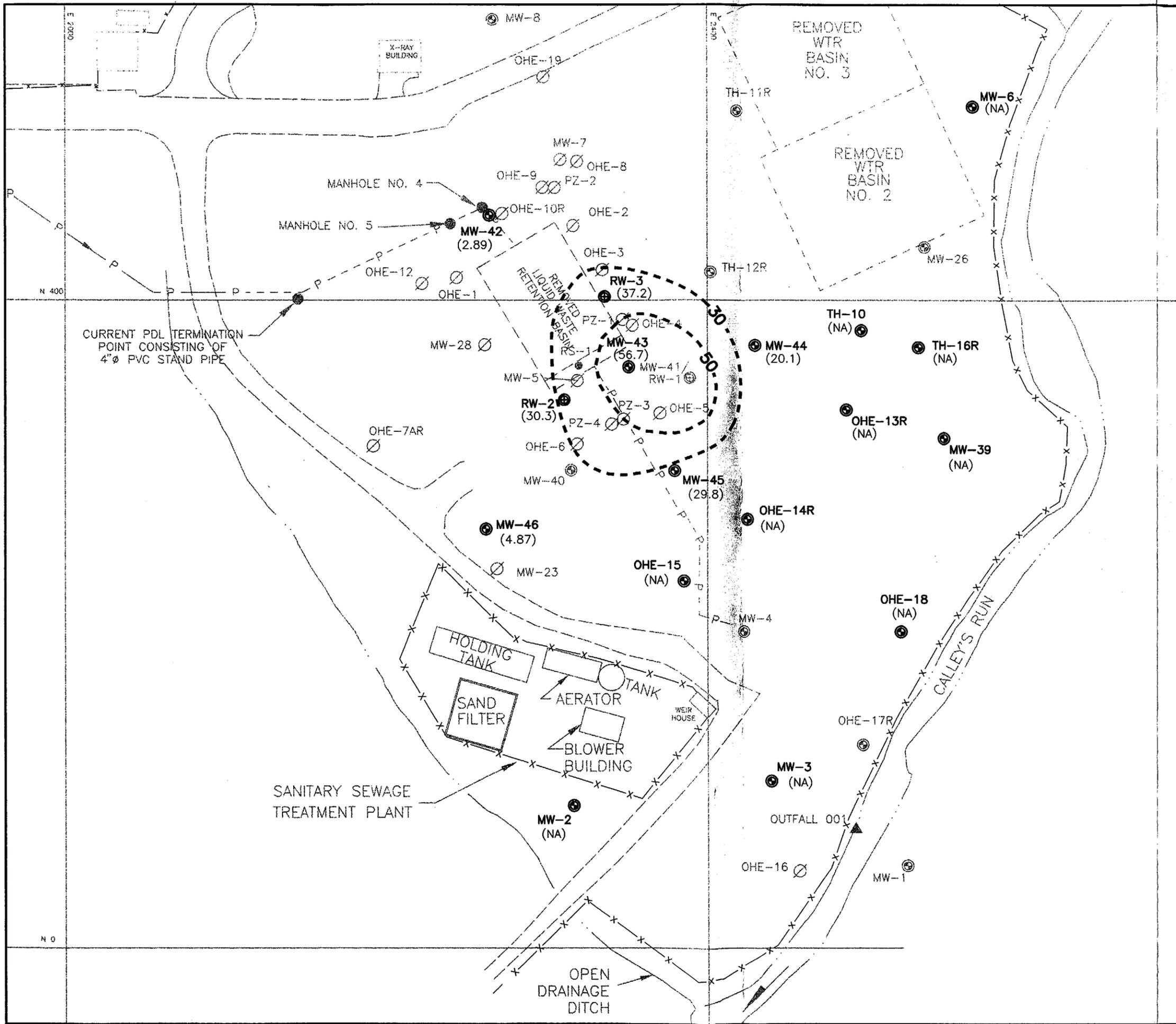


FIGURE C-3
GROSS BETA/GAMMA ISOCONCENTRATION MAP
AUGUST 2001
WALTZ MILL SITE
MADISON, PENNSYLVANIA

PREPARED FOR
WESTINGHOUSE ELECTRIC COMPANY, LLC
PITTSBURGH, PENNSYLVANIA

APPROVED	RFD 11/01
CHECKED	RCH 11/01
DRAWN	GJA 9/25/01
DRAWING NUMBER	
5018224	





LEGEND

- x-x-x- SECURITY FENCE
- ⊙ GROUNDWATER MONITORING WELL
- ⊕ CURRENT GROUNDWATER REMEDIATION WELL
- ⊘ ABANDONED GROUNDWATER MONITORING WELL
- ▲ OUTFALL LOCATION
- GROUNDWATER REMEDIATION SUMP
- P - PROCESS WATERLINE
- - P - - REMOVED PROCESS WATERLINE
- 50 - - CONTOUR LINE OF EQUAL Sr-90 CONCENTRATION (DASHED WHERE INFERRED)
- (56.7) CONCENTRATION OF Sr-90 IN pCi/l
- (NA) NOT ANALYZED FOR Sr-90

NOTES

1. pCi/l = PICOCURIES PER LITER.
2. GROUNDWATER SAMPLES COLLECTED ON AUGUST 15 AND 16, 2001.
3. SITE LAYOUT AS SHOWN IN THE FIGURE REPRESENTS CURRENT SITE CONDITIONS.



FIGURE C-4
Sr-90 ISOCONCENTRATION MAP
AUGUST 2001
WALTZ MILL SITE
MADISON, PENNSYLVANIA

PREPARED FOR
WESTINGHOUSE ELECTRIC COMPANY, LLC
PITTSBURGH, PENNSYLVANIA

APPROVED	RFO W/01
CHECKED	RCH W/01
DRAWN	GJA 9/25/01
DRAWING NUMBER	
5018223	



Attachment D

Geologic Cross Section Drawings

**THIS PAGE IS AN
OVERSIZED DRAWING OR
FIGURE,
THAT CAN BE VIEWED AT THE
RECORD TITLED:
DRAWING NO. 5018449
"FIGURE D-1
GEOLOGICAL CROSS SECTION
LOCATION
C-C'
WALTZ MILL SITE
MADISON, PENNSYLVANIA"**

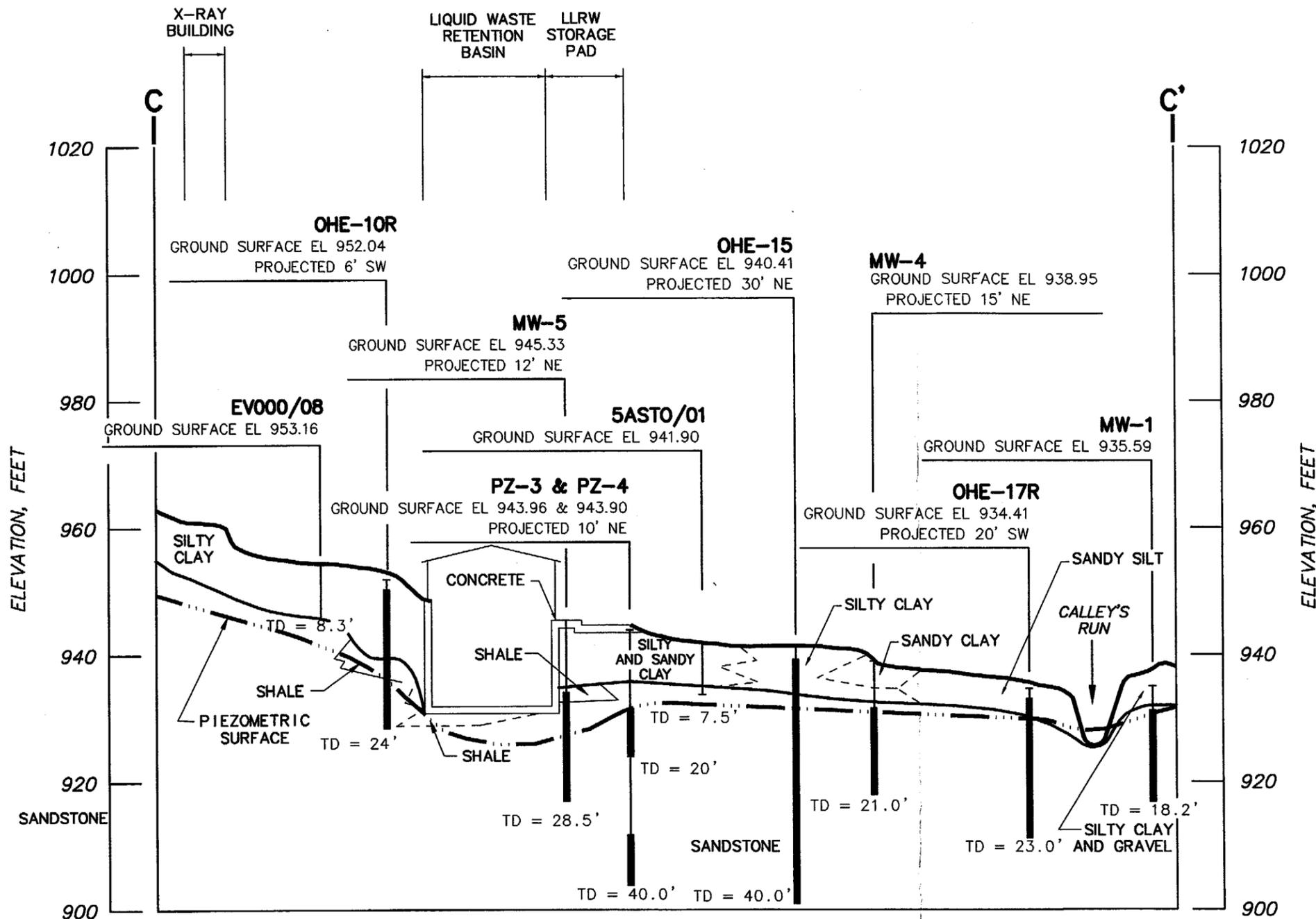
**WITHIN THIS PACKAGE... OR
BY SEARCHING USING THE
DRAWING NO. 5018449**

NOTE: Because of these page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

D-1

NOTES

1. REFER TO FIGURE C-1-1 FOR PLAN LOCATION OF CROSS SECTION.
2. THE FOLLOWING WELL LOCATIONS WERE DRILLED TO THE TOTAL DEPTHS SHOWN WITHOUT LOGGING: OHE-3, (16.0 TO 30.0 FEET); OHE-14, (11.5 TO 25.0 FEET); AND OHE-15 (11.5 TO 40.0 FEET).
3. THIS CROSS SECTION DEPICTS GEOLOGIC CONDITIONS AT SPECIFIC LOCATIONS SHOWN BASED UPON OBSERVATIONS OF MATERIALS ENCOUNTERED. GEOLOGIC STRATA AT OTHER LOCATIONS MAY DIFFER FROM CONDITIONS OCCURRING AT THESE SITES.



GEOLOGIC CROSS SECTION C-C'
(LOOKING EAST-NORTHEAST)

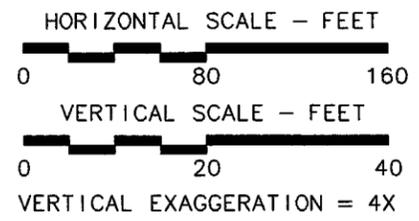


FIGURE D-2
GEOLOGIC CROSS SECTION C-C'

WALTZ MILL SITE
MADISON, PENNSYLVANIA

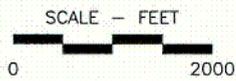
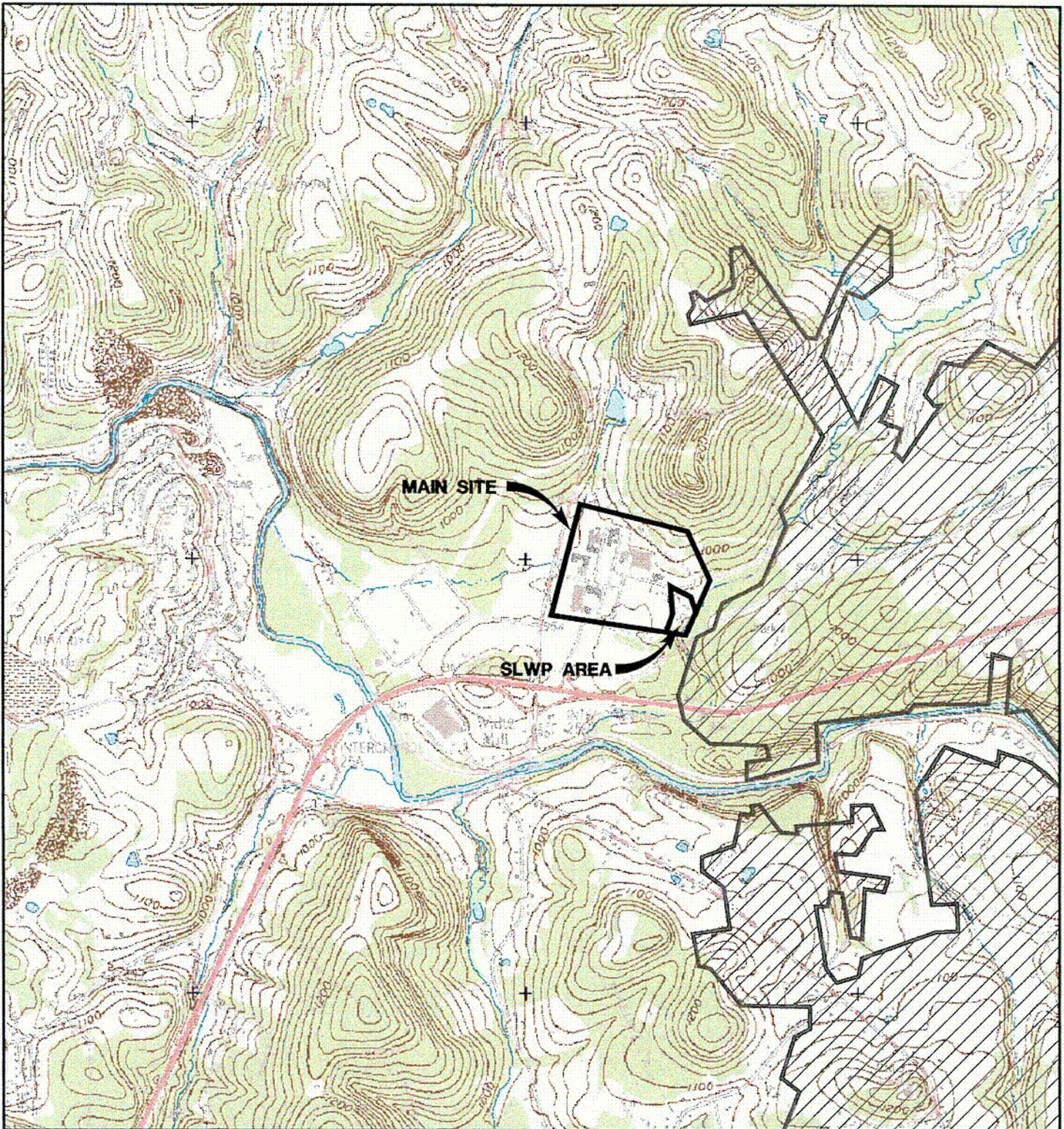
PREPARED FOR
WESTINGHOUSE ELECTRIC COMPANY, LLC
PITTSBURGH, PENNSYLVANIA

APPROVED	DEO 11/01
CHECKED	PCA 11/01
DRAWN	
DRAWING NUMBER	5018054

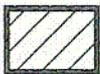
Earth Sciences Consultants, Inc.

Attachment E

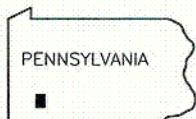
**USGS Smithton Quadrangle Maps
Coal Outcrops and Mined-Out Areas**



LEGEND



EXTENT OF KNOWN DEEP MINING



QUADRANGLE LOCATION



REFERENCE
 USGS 7.5-MIN TOPOGRAPHIC QUADRANGLE
 SMITHTON, PA DATED 1954
 PHOTOREVISED 1969, PHOTOINSPECTED 1977
 SCALE 1:24000, CONTOUR INTERVAL 20'

FIGURE E-1
 CROP LINE AND MINED-OUT AREAS
 OF THE UPPER FREEPORT COAL
 WALTZ MILL SITE
 MADISON, PENNSYLVANIA

PREPARED FOR
 WESTINGHOUSE ELECTRIC COMPANY, LLC
 PITTSBURGH, PENNSYLVANIA

APPROVED *RFD 11/21*
 CHECKED *RCH 11/21*
 DRAWN *GJA 8/25/01*

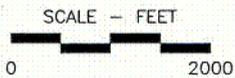
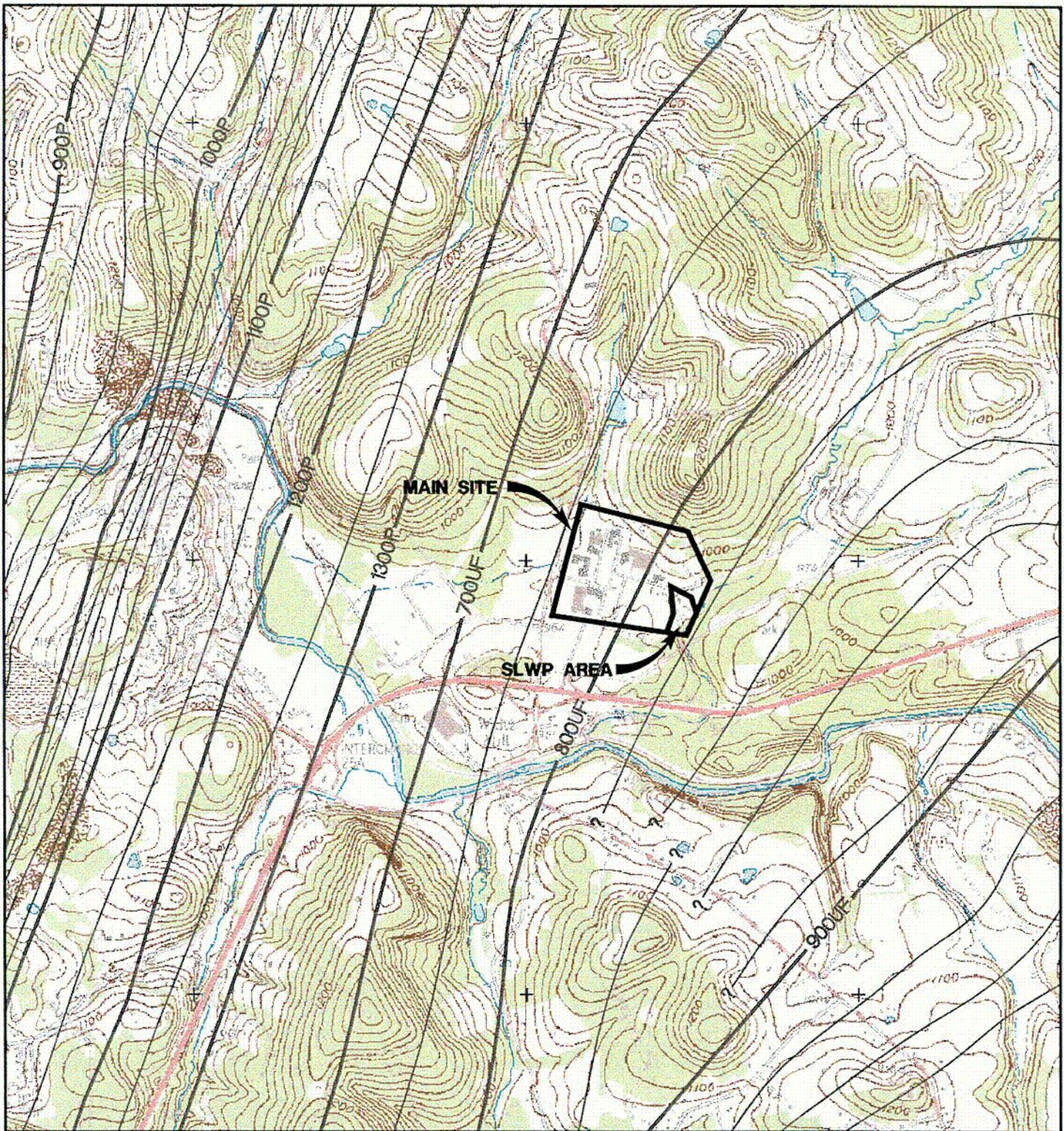
DRAWING NUMBER

5018081



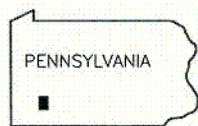
COB

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LEGEND

- P BASE OF PITTSBURGH COAL
- UF BASE OF UPPER FREEPORT COAL



QUADRANGLE LOCATION



**FIGURE E-2
COAL CROP LINES AND
STRUCTURE CONTOURS
WALTZ MILL SITE
MADISON, PENNSYLVANIA**

PREPARED FOR
**WESTINGHOUSE ELECTRIC COMPANY, LLC
PITTSBURGH, PENNSYLVANIA**

APPROVED *RFD 11/21*
CHECKED *RCH 11/21*
DRAWN *GJA 9/25/01*

DRAWING NUMBER

5018082



C04
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REFERENCE
USGS 7.5-MIN TOPOGRAPHIC QUADRANGLE
SMITHTON, PA DATED 1954
PHOTOREVISED 1969, PHOTOINSPECTED 1977
SCALE 1:24000, CONTOUR INTERVAL 20'

Attachment F

**Historical Groundwater Elevations
OHE-17R, MW-1, and MW-3**

Table F-1
Historical Groundwater Elevations
Monitoring Wells OHE-17R, MW-1, and MW-3
Westinghouse Electric Company
Waltz Mill Site
Madison, Pennsylvania

Sample Identification	Date Sampled											
	2/6/96	3/11/96	4/3/96	5/28/96	6/10/96	7/25/96	8/22/96	9/16/96	10/28/96	11/8/96	12/16/96	1/3/97
OHE-17R	.(1)	-	-	-	-	-	-	-	-	-	932.81	-
MW-1	-	-	-	-	-	-	-	-	-	-	933.54	-
MW-3	931.98	932.43	932.46	932.85	931.88	932.27	932.52	931.93	932.68	933.38	932.71	932.51

See footnotes at end of table.

Table F-1
(Continued)

Sample Identification	Date Sampled											
	2/6/97	3/11/97	4/9/97	5/14/97	6/17/97	7/16/97	8/1/97	8/4/97	9/8/97	10/6/97	11/1/97	12/9/97
OHE-17R	-	-	-	-	-	-	931.18	-	-	-	932.43	-
MW-1	-	-	-	-	-	-	-	-	-	-	931.99	-
MW-3	932.61	932.48	931.98	932.11	932.10	931.76	-	931.44	931.24	931.31	932.26	931.86

See footnotes at end of table.

**Table F-1
(Continued)**

Sample Identification	Date Sampled											
	1/19/98	2/16/98	3/5/98	4/14/98	5/7/98	6/2/98	7/1/98	8/1/98	9/8/98	10/8/98	11/16/98	12/14/98
OHE-17R	-	-	932.55	-	-	-	-	-	931.76	-	-	-
MW-1	-	-	933.14	-	-	-	-	-	931.18	-	-	-
MW-3	932.93	932.23	932.73	931.96	932.35	932.58	931.67	931.70	932.03	932.78	931.86	931.76

See footnotes at end of table.

Table F-1
(Continued)

Sample Identification	Date Sampled											
	1/11/99	2/3/99	3/25/99	4/8/99	5/5/99	6/2/99	7/30/99	8/4/99	9/27/99	10/20/99	11/8/99	12/16/99
OHE-17R	-	-	-	-	-	-	-	-	931.05	-	-	-
MW-1	-	-	-	-	-	-	-	-	930.36	-	-	-
MW-3	932.71	932.73	932.43	932.26	932.49	932.48	932.45	931.97	931.25	931.96	932.18	933.27

See footnotes at end of table.

**Table F-1
(Continued)**

Sample Identification	Date Sampled											
	1/19/00	2/4/00	3/27/00	4/26/00	5/12/00	6/12/00	7/11/00	8/16/00	9/11/00	10/24/00	11/16/00	12/20/00
OHE-17R	-	-	-	-	-	-	-	-	930.72	-	-	-
MW-1	-	-	-	-	-	-	-	-	930.91	-	-	-
MW-3	932.03	931.86	932.70	932.34	931.87	932.50	932.78	932.28	930.92	932.16	932.16	932.26

See footnotes at end of table.

Table F-1
(Continued)

Sample Identification	Date Sampled						
	1/26/01	2/23/01	3/14/01	4/24/01	5/24/01	6/7/01	8/22/01
OHE-17R	-	-	-	-	-	-	931.95
MW-1	-	-	-	-	-	-	930.97
MW-3	932.23	931.73	932.78	932.51	932.63	933.11	932.21

(1) Dash denotes not measured.