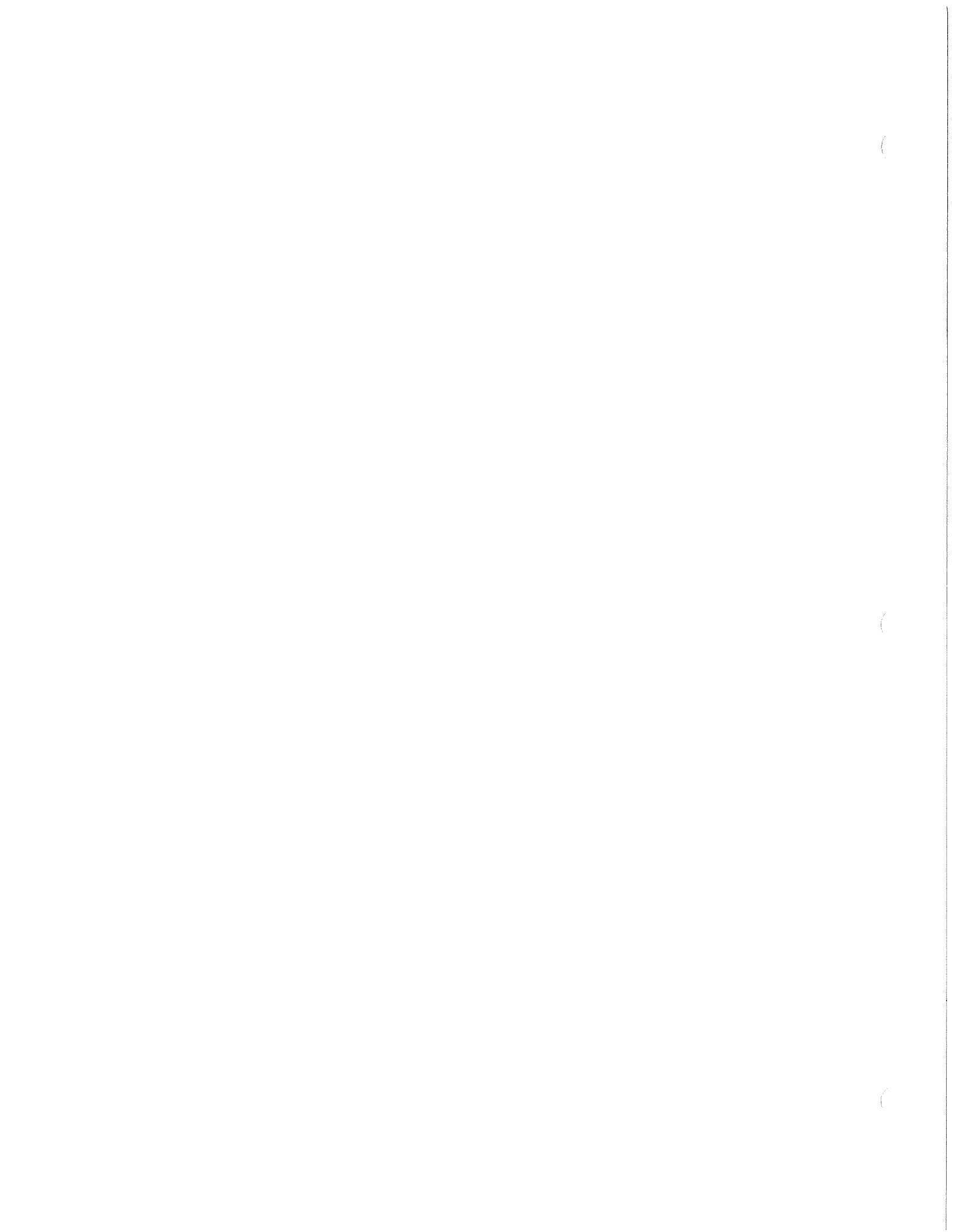


because it is unable to procure the services of an approved trustee within that time period (which shall include inability to finalize the terms of the Trust Agreement with the trustee), the Commonwealth shall promptly notify the United States, and shall include in that notification a summary of the steps the Commonwealth has taken to attempt to obtain a trustee. If the United States determines that the Commonwealth has been unable to obtain a trustee within this time period and has made reasonable efforts to do so, the United States may grant an appropriate extension of time to the Commonwealth to allow it to obtain a trustee. Whether or not the United States grants an extension to the Commonwealth to obtain a trustee, if the Trust Agreement is not established within 180 days after entry of this Consent Decree, the Commonwealth shall establish the Emergency Account and the Capital Account with the balances required in subparagraph 79.d.(1), plus interest on the balances that shall begin to accrue 180 days after entry of this Consent Decree and stop accruing on the date the accounts are funded, at the rate specified for investments of the Hazardous Substances Superfund established pursuant to Section 107 of CERCLA, 42 U.S.C. § 9607.

(3) Beginning July 1, 1996, the Commonwealth shall add \$500,000, adjusted for inflation, per fiscal year to the Emergency Account (or \$1 million, adjusted for inflation, per Commonwealth legislative session), until a total of \$7 million, adjusted for inflation (see Subparagraph 79.m below), has been placed into the Emergency Account by the Commonwealth. The



Commonwealth may pay these amounts into the Emergency Account in advance of this schedule.

e. In the event of the occurrence of one of the Circumstances, the Commonwealth shall use the balance of the Emergency Account to fund the additional work before DOE and DOD are obligated to provide any financial assistance under this Section. If the Commonwealth performs the Work, then the Commonwealth may be reimbursed from the Emergency Account for costs, including in-kind services. In-kind services must be documented in accordance with federally approved audit procedures and approved by DOE and DOD.

f. After the Commonwealth has expended either the amounts in the Emergency Account, or \$2 million, adjusted for inflation, whichever sum is greater, and after any other funding which might be available to the Commonwealth for such purposes has been expended (such as federal emergency relief funds or other grants), then DOE and DOD agree to provide up to \$10 million, adjusted for inflation, per Event, to fund additional activities performed by the Commonwealth as the result of an occurrence of the Circumstances. If the Commonwealth performs work required as a result of the occurrence of one of the Circumstances, documented costs incurred in performing the work may be credited toward the Commonwealth's \$2 million share. If DOD and DOE expend \$10 million, adjusted for inflation, per Event as provided hereunder, any remaining costs will be borne by the Commonwealth. An "Event" shall mean that body of additional work





required as the result of an occurrence of the Circumstances. If a single body of work is required to respond to one or more of the Circumstances, that body of work shall be considered one Event.

g. The Commonwealth shall be required to perform any activities required as the result of the occurrence of the Circumstances and neither DOD or DOE nor the Settling Private Parties shall have an affirmative obligation to perform or fund such activities, except as expressly required of DOD or DOE in this Paragraph.

h. DOE and DOD shall share in any payments required of them under this Paragraph in proportion to their respective shares under Attachment 1 of the Settlement Agreement. Any such assistance is subject to the availability of appropriated funds, and is subject to the Anti-Deficiency Act. In the event either DOE or DOD is unable to provide assistance because of a lack of appropriated funds, the other shall not be obliged to fund the share of such assistance that would otherwise be required of the Party unable to provide the funds.

i. If the Commonwealth and DOE or DOD have any dispute about the interpretation or application of the terms of this Paragraph, including but not limited to whether one of the Circumstances has occurred, then the disputing parties shall enter into the following dispute resolution process:

(1) The disputing party shall serve a written statement of the disputed issue on the other party to the



dispute. The other party shall serve a written response to the disputing party within five days after actual receipt of the disputing party's written statement.

(2) The parties to the dispute shall enter into a good-faith informal negotiation period for at least five days, which may be extended by agreement of the disputing parties.

(3) At the expiration of the informal negotiation period, one or more of the disputing parties may move the Court to resolve the dispute. The disputing parties shall request that the Court give expedited consideration of the dispute. The parties shall provide the Court with written submissions, and the parties may request an evidentiary hearing. Discovery shall be strictly limited to the specific issues in dispute and shall be expedited pursuant to Court order. A decision of the Court shall be appealable to the extent provided by law.

(4) Neither DOE nor DOD shall be required to expend funds pursuant to this Section during the dispute resolution period.

j. The purpose of the Capital Account is to assure adequate funding for capital construction projects that may be required by EPA during the BoRP. The Commonwealth shall not use the Capital Account for routine maintenance and monitoring activities. The Commonwealth shall maintain a minimum of \$3 million, adjusted for inflation, in the Capital Account at all times until the completion of the IMP.



k. The Trust Agreement may provide that the balance of the Emergency Account and the Capital Account may be used by the Commonwealth to perform its obligations to implement the FCP. The use of the Emergency Account for funding the implementation of the FCP shall discharge all of the obligations of DOE and DOD under this Paragraph. Monies remaining in the accounts after Certification of Completion of the BoRP shall revert to the Commonwealth.

l. In the event EPA determines that the Commonwealth has substantively failed to perform any portion of the BoRP, unless otherwise excused or modified by EPA, the Commonwealth agrees that any funds provided by DOE or DOD pursuant to this Paragraph shall be subject to repayment by the Commonwealth to the United States, and DOE and DOD reserve their rights to seek such repayment from the Commonwealth.

m. The phrase "adjusted for inflation" as used in this Section shall mean increased by the amount of the annual increase in the "Consumer Price Index, All Items, All Cities," ("Index") as published by the United States Department of Labor, beginning upon the date of the first revision of the Index following entry of this Consent Decree. If the Index ceases to exist, the most similar official index in effect at the time the adjustment for inflation is calculated shall be used.

n. The Commonwealth's inability to demonstrate financial ability to complete the Work shall not excuse performance of any activities required under this Consent Decree.



XVII. CERTIFICATION OF COMPLETION

80. Completion of the IRP.

a. Within 90 days after Settling Private Parties and Settling Federal Agencies conclude that the IRP Activities have been fully performed, the Construction Standards and Performance Standards have been achieved, and the design and implementation of the IRP Activities is such that the Performance Standards are expected, under then existing conditions, to be attained in the future, Settling Private Parties shall schedule and conduct a pre-certification inspection to be attended by Settling Private Parties, Settling Federal Agencies, EPA, and the Commonwealth. If, after the pre-certification inspection, the Settling Private Parties and Settling Federal Agencies believe that the IRP Activities have been fully performed, the Construction Standards and Performance Standards have been achieved, and that the design and implementation of the IRP Activities is such that the Performance Standards are expected, under then existing conditions, to be attained in the future, the Settling Private Parties shall submit a written report requesting certification to EPA for approval, with a copy to the Commonwealth, pursuant to Section XIV (Submissions Requiring Agency Approval) within 30 days of the inspection. In the report, a registered professional engineer and the Settling Private Parties' Project Coordinator or Supervising Contractor shall state that the IRP Activities have been completed in full satisfaction of the requirements of this Consent Decree as





reflected in the SOW. The written report shall include as-built drawings signed and stamped by a professional engineer. The report shall contain the following statement, signed by a responsible corporate official of a Settling Private Party, the Settling Private Parties' Project Coordinator, or the Settling Private Parties' Supervising Contractor:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If EPA fails to respond to the report within 120 days, the request for Certification of Completion shall be deemed to have been rejected and the Settling Private Parties may challenge such rejection under Section XXII (Dispute Resolution); and the Settling Federal Agencies may challenge such rejection pursuant to the Memorandum of Understanding between EPA and the Settling Federal Agencies that governs disputes related to this Consent Decree (the "MOU"). If, after completion of the pre-certification inspection and receipt and review of the written report, EPA, after reasonable opportunity for review and comment by the Commonwealth, determines that the IRP Activities or any portion thereof have not been completed in accordance with this Consent Decree, that the Construction Standards and Performance



Standards have not been achieved, or that the design and implementation of the IRP Activities is such that the Performance Standards are not expected, under then existing conditions, to be attained in the future, EPA will notify Settling Private Parties, the Commonwealth, and Settling Federal Agencies in writing of the activities that must be undertaken to qualify for Certification of Completion of the IRP. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require the Settling Private Parties to submit a schedule to EPA for approval pursuant to Section XIV (Submissions Requiring Agency Approval). Settling Private Parties shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to their right to invoke the dispute resolution procedures set forth in Section XXII (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion, and after a reasonable opportunity for review and comment by the Commonwealth, that the IRP Activities have been fully performed in accordance with this Consent Decree, that the Construction Standards and Performance Standards have been achieved, and that the Performance Standards are expected, under then existing conditions, to be attained in the future, EPA will so certify in writing to Settling Private Parties and Settling Federal Agencies. This certification shall constitute Certification of



Completion of the IRP for purposes of this Consent Decree, including, but not limited to, Section XXIV (Covenants Not to Sue by Plaintiff). Certification of Completion of the IRP shall not change Settling Private Parties' and Settling Federal Agencies' remaining obligations under this Consent Decree.

81. Completion of the Remedial Action.

a. Within 90 days after the Commonwealth concludes that the BoRP Activities have been fully performed and the Construction Standards and Performance Standards have been achieved, the Commonwealth shall schedule and conduct a pre-certification inspection to be attended by EPA and the Commonwealth. If, after the pre-certification inspection, the Commonwealth believes that the BoRP Activities have been fully performed and the Construction Standards and Performance Standards have been achieved, it shall submit a written report requesting certification to EPA for approval, pursuant to Section XIV (Submissions Requiring Agency Approval) within 30 days of the inspection. In the report, a registered professional engineer and the Commonwealth's Project Coordinator or Supervising Contractor shall state that the BoRP Activities have been completed in full satisfaction of the requirements of this Consent Decree as reflected in the SOW. The written report shall include as-built drawings signed and stamped by a professional engineer. The report shall contain the following statement, signed by a responsible official of the Commonwealth or the Commonwealth's Project Coordinator or Supervising Contractor:

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I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If EPA fails to respond to the report within 120 days, the request for Certification of Completion shall be deemed to have been rejected and the Commonwealth may challenge such rejection under Section XXII (Dispute Resolution). If, after completion of the pre-certification inspection and receipt and review of the written report, EPA determines that the BoRP Activities or any portion thereof have not been completed in accordance with this Consent Decree or that the Construction Standards and Performance Standards have not been achieved, EPA will notify the Commonwealth in writing of the activities that must be undertaken to complete the BoRP Activities and achieve the Construction Standards and Performance Standards. EPA will set forth in the notice a schedule for performance of such activities consistent with the Consent Decree and the SOW or require the Commonwealth to submit a schedule to EPA for approval pursuant to Section XIV (Submissions Requiring Agency Approval). The Commonwealth shall perform all activities described in the notice in accordance with the specifications and schedules established pursuant to this Paragraph, subject to the Commonwealth's right to invoke the





dispute resolution procedures set forth in Section XXII (Dispute Resolution).

b. If EPA concludes, based on the initial or any subsequent report requesting Certification of Completion, that the BoRP Activities have been fully performed in accordance with this Consent Decree and that the Construction Standards and Performance Standards have been achieved, EPA will so certify in writing to the Commonwealth. This certification shall constitute the Certification of Completion of the Remedial Action for purposes of this Consent Decree, including, but not limited to, Section XXIV (Covenants Not to Sue by Plaintiff). Certification of Completion of the Remedial Action shall not affect the Commonwealth's remaining obligations under this Consent Decree.

XVIII. EMERGENCY RESPONSE

82. a. Settling Private Parties. In the event of any action or occurrence prior to Certification of Completion of the IRP which causes or threatens a release of Waste Material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, Settling Private Parties shall, subject to the provisions of Paragraph 83, immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately notify EPA's Project Coordinator or, if the Project Coordinator is unavailable, EPA's Alternate Project Coordinator. If neither of these persons is available, the Settling Private Parties shall notify the EPA Emergency

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Response Section, Region IV. Settling Private Parties shall take such actions in consultation with EPA's Project Coordinator or other available authorized EPA officer in accordance with all applicable provisions of applicable health and safety plans, contingency plans, and any other applicable plans or documents developed pursuant to the SOW. In the event that Settling Private Parties fail to take appropriate response action as required by this Section, and EPA takes such action instead, Settling Private Parties and Settling Federal Agencies shall reimburse EPA for all costs of the response action which are not inconsistent with the NCP pursuant to the procedures set forth in Paragraph 84.c of Section XIX (Reimbursement of Response Costs) within 90 days after being billed by EPA for such costs.

b. Commonwealth. In the event of any action or occurrence after Certification of Completion of the IRP which causes or threatens a release of Waste Material from the Site that constitutes an emergency situation or may present an immediate threat to public health or welfare or the environment, the Commonwealth shall, subject to the provisions of Paragraph 83, immediately take all appropriate action to prevent, abate, or minimize such release or threat of release, and shall immediately notify EPA's Project Coordinator or, if the Project Coordinator is unavailable, EPA's Alternate Project Coordinator. If neither of these persons is available, the Commonwealth shall notify the EPA Emergency Response Section, Region IV. The Commonwealth shall take such actions in consultation with EPA's Project

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Coordinator or other available authorized EPA officer and in accordance with all applicable provisions of the applicable health and safety plans, contingency plans, and any other applicable plans or documents developed pursuant to the SOW. In the event that the Commonwealth fails to take appropriate response action as required by this Section, and EPA takes such action, the Commonwealth shall reimburse EPA for all costs of the response action which are not inconsistent with the NCP pursuant to the procedures set forth in Paragraph 84.c of Section XIX (Reimbursement of Response Costs) within 90 days after being billed by EPA for such costs.

83. Except as provided in Section XXIV (Covenants Not to Sue by Plaintiff), nothing in the preceding Paragraphs or in this Consent Decree shall be deemed to limit any authority of Plaintiff and EPA to take, direct, or order all appropriate action or to seek an order from the Court to protect human health and the environment or to prevent, abate, respond to, or minimize an actual or threatened release of Waste Material on, at, or from the Site. In the event that Plaintiff sues the Settling Defendants or EPA takes administrative action against Settling Parties other than to enforce this Consent Decree, the Settling Parties reserve all their rights, causes of action, or defenses arising under CERCLA or any other law.

XIX. REIMBURSEMENT OF RESPONSE COSTS

84. a. Within 120 days after entry of this Consent Decree, Settling Private Parties and Settling Federal Agencies

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shall cause to be paid to the United States an amount equal to the volumetric percentage attributable to the De Minimis Settlers, as set forth in Exhibits 1 and 4 of the De Minimis Consent Decree, times \$5.8 million (EPA's estimated past response costs as of the June 30, 1992 special notice letter), plus \$5 million dollars. Settling Private Parties and Settling Federal Agencies shall also cause to be paid to the United States an amount equal to any additional volumetric percentage attributed to De Minimis Settlers for which payment is made to the Maxey Flats De Minimis Trust pursuant to Paragraph 26 of the De Minimis Consent Decree, times \$5.8 million dollars, within 120 days after such payment is made to the Maxey Flats De Minimis Trust. The payments made under this Paragraph shall be in full satisfaction of Settling Private Parties' and Settling Federal Agencies' obligation to reimburse Past Response Costs and pay Future Response Costs.

b. Payment shall be made by Electronic Funds Transfer ("EFT" or wire transfer) to the U.S. Department of Justice lockbox bank, referencing United States Attorney's Office (U.S.A.O.) file number \_\_\_\_\_, EPA Region IV Site/Spill ID number "G1", and DOJ case number 90-11-2-211A. Payment shall be made in accordance with instructions provided by EPA to the Settling Private Parties and Settling Federal Agencies upon execution of the Consent Decree. Any EFTs received at the U.S. Department of Justice lockbox bank after 4:00 p.m. (eastern time) will be credited on the next business day. The Settling Private





Parties shall send a record of the EFT to the United States as specified in Section XXIX (Notices and Submissions).

c. For costs incurred by the United States pursuant to Sections XVIII and XII (Emergency Response and Access) and Paragraph 126 of Section XXIV (Covenants Not to Sue or Take Administrative Action by Plaintiff), EPA will invoice the Settling Parties who are liable for such costs under this Consent Decree. The invoice will include a summary of the costs prepared by EPA, including direct and indirect costs incurred by EPA and its contractors in the form of an EPA "SCORES" report or its equivalent. Settling Parties may request documentation which supports items listed in the cost summary. A request for supporting documents must be made within 30 days of receipt of an invoice from EPA. Settling Parties shall make all payments within 90 days of Settling Parties' receipt of each invoice, except as otherwise provided in Paragraph 84.d. However, if Settling Parties request documents supporting the SCORES report, payment shall be made within 60 days after receipt of the documents from EPA or 90 days after receipt of the invoice, whichever is later. Settling Private Parties shall make all payments required by this Paragraph in the form of a certified check or checks made payable to "EPA Hazardous Substance Superfund" and referencing Site/Spill ID # G1 and DOJ case number 90-11-2-211A. The requirement to use a certified check for payment shall not apply to the Settling Federal Agencies or the Commonwealth. Settling Parties shall forward payment to the

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United States Environmental Protection Agency, Region IV,  
Attention: Superfund Accounting, P.O. Box 100142, Atlanta,  
Georgia 30384 and shall send copies of the checks for payment to  
the United States as specified to Section XXIX (Notices and  
Submissions).

d. Settling Parties may contest payment of any  
cost under Paragraph 84.c if they determine that EPA has made an  
accounting error or if they allege that a cost item that is  
included represents costs that are inconsistent with the NCP.  
Such objection shall be made in writing within 30 days of receipt  
of the invoice or any requested supporting documents and must be  
sent to the United States pursuant to Section XXIX (Notices and  
Submissions). Any such objection shall specifically identify the  
contested costs and the basis for objection. In the event of an  
objection, the Settling Parties shall, within the 90-day period,  
pay all uncontested costs to EPA in the manner described in  
Paragraph 84.c. Simultaneously, Settling Defendants shall  
establish an interest bearing escrow account in a federally-  
insured bank duly chartered in the Commonwealth of Kentucky and  
remit to that escrow account funds equivalent to the amount of  
the contested cost. The requirement to deposit funds in an  
escrow account shall not apply to the share of the contested  
costs payable by the Settling Federal Agencies. Settling  
Defendants shall send to the United States, as provided in  
Section XXIX (Notices and Submissions), a copy of the transmittal  
letter and check paying the uncontested costs, and a copy of the



correspondence that establishes and funds the escrow account, including, but not limited to, information containing the identity of the bank and bank account under which the escrow account is established, as well as a bank statement showing the initial balance of the escrow account. Simultaneously with establishment of the escrow account, Settling Defendants shall initiate the dispute resolution procedures in Section XXII. If the United States prevails in the dispute, within 5 days of the resolution of the dispute, Settling Parties shall pay the sums due (with accrued interest) to EPA in the manner described in Paragraph 84.c. If Settling Defendants prevail concerning any aspect of the contested costs, the Settling Parties shall pay that portion of the costs (plus associated accrued interest) for which they did not prevail to EPA in the manner described in Paragraph 84.c, and Settling Defendants shall be disbursed any balance of the escrow account. The dispute resolution procedures set forth in this Paragraph in conjunction with the procedures set forth in Section XXII (Dispute Resolution) shall be the exclusive mechanisms for resolving disputes regarding the Settling Defendants' obligation to reimburse the United States for these costs.

e. In the event that the Settling Parties do not make the payments required by Paragraph 84.a within 120 days of the effective date of this Consent Decree or the payments required by Paragraph 84.c are not made within 90 days of the Settling Parties' receipt of the invoice, or 60 days after

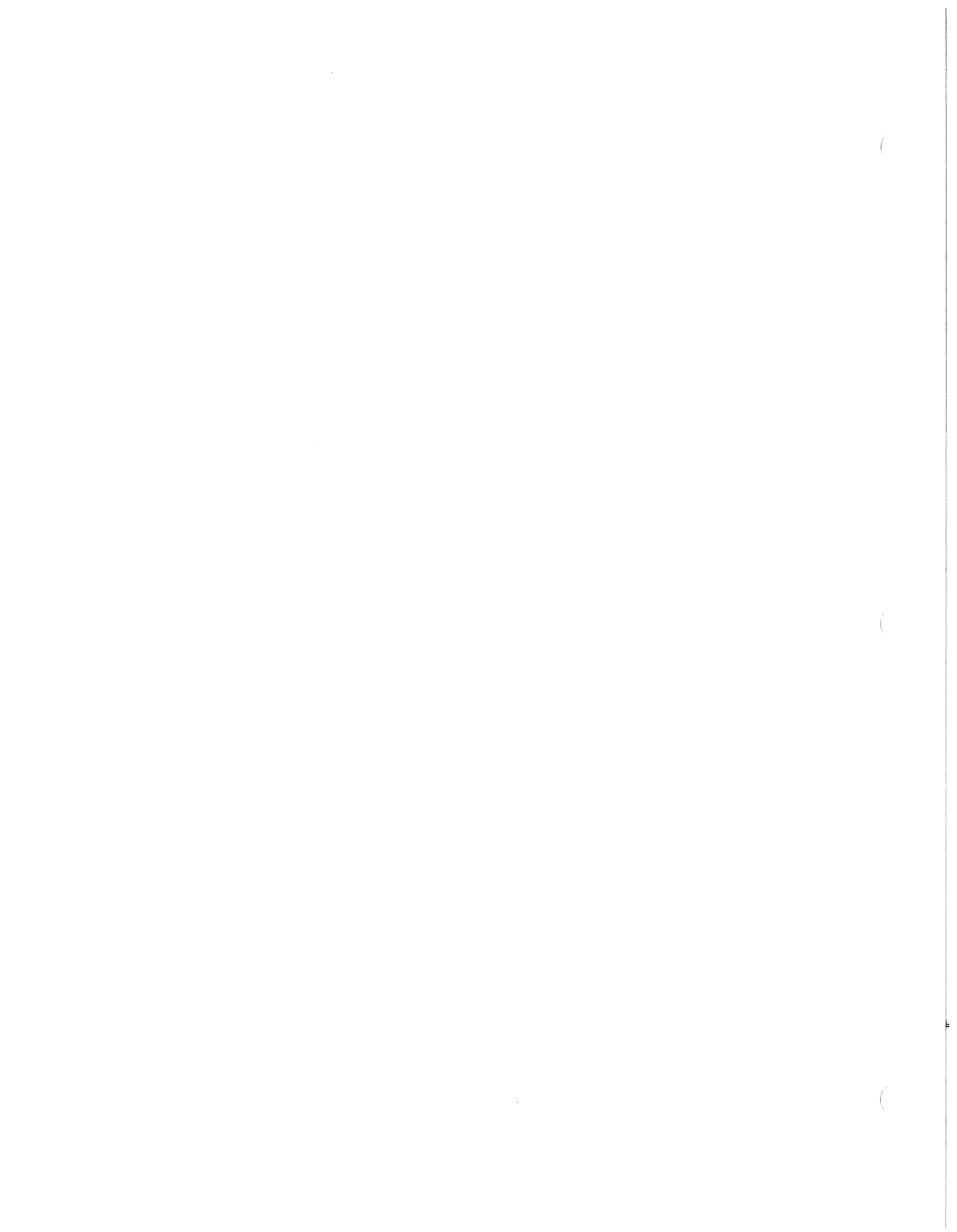


receipt of supporting documentation that has been requested pursuant to Paragraph 84.c, whichever is later, Settling Parties which are liable for such costs shall pay interest on the unpaid balance at the rate established pursuant to Section 107(a) of CERCLA, 42 U.S.C. § 9607. The interest to be paid on the costs required in Paragraph 84.a shall begin to accrue on the effective date of the Consent Decree. The interest on costs required by Paragraph 84.c shall begin to accrue on the date of the Settling Parties' receipt of the bill. Interest shall accrue at the rate specified through the date of payment. Payments of interest made under this Paragraph shall be in addition to such other remedies or sanctions available to Plaintiff by virtue of Settling Parties' failure to make timely payments under this Section.

XX. INDEMNIFICATION AND INSURANCE

Settling Private Parties.

85. The United States does not assume any liability by entering into this agreement or by virtue of any designation of Settling Private Parties as EPA's authorized representatives under Section 104(e) of CERCLA. Settling Private Parties hereby indemnify, save and hold harmless the United States and its officials, agents, employees, contractors, subcontractors, or representatives for or from any and all claims or causes of action arising from, or on account of, acts or omissions of Settling Private Parties, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities





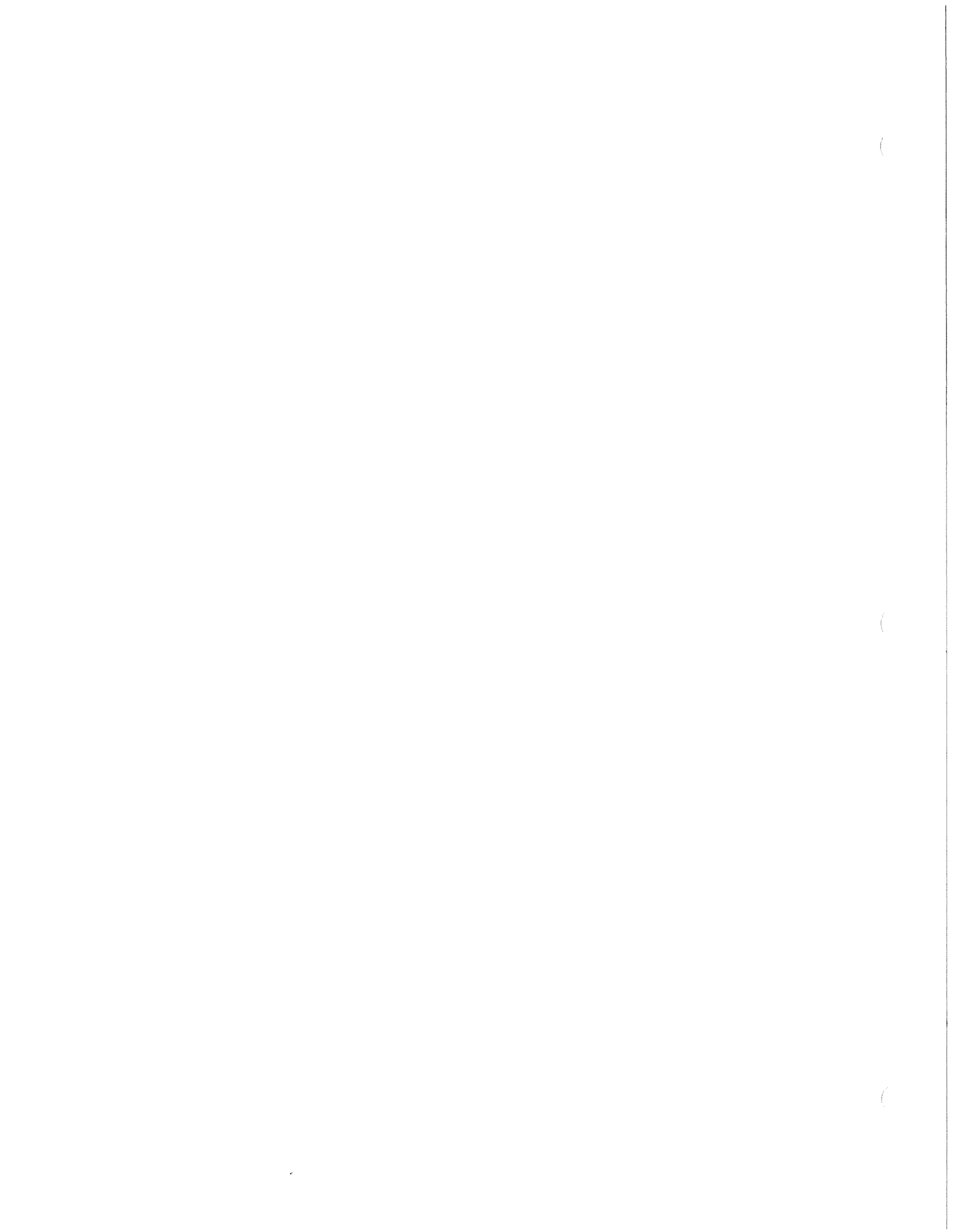
pursuant to this Consent Decree, including, but not limited to, any claims arising from any designation of Settling Private Parties as EPA's authorized representatives under Section 104(e) of CERCLA. Further, the Settling Private Parties agree to pay the United States all costs the United States incurs including, but not limited to, attorneys fees and other expenses of litigation and settlement arising from, or on account of, claims made against the United States based on acts or omissions of Settling Private Parties, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on their behalf or under their control, in carrying out activities pursuant to this Consent Decree. The United States, including the Settling Federal Agencies, shall not be held out as a party to any contract entered into by or on behalf of Settling Private Parties in carrying out activities pursuant to this Consent Decree. Neither the Settling Private Parties nor any such contractor shall be considered an agent of the United States, including the Settling Federal Agencies.

86. Settling Private Parties waive all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States arising from or on account of any contract, agreement, or arrangement between any one or more of the Settling Private Parties and any person for performance of IRP Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, Settling Private Parties shall indemnify



and hold harmless the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement between any one or more of Settling Private Parties and any person for performance of IRP Work on or relating to the Site, including, but not limited to, claims on account of construction delays.

87. No later than 15 days before commencing any on-site Work, Settling Private Parties shall secure, and shall maintain until the completion of the IRP Work, comprehensive general liability, occurrence-based, insurance with limits of ten million dollars, combined single limit, naming as additional insured the United States. No later than 15 days before commencing any on-site IRP Work, Settling Private Parties shall secure, and shall maintain until EPA's Certification of Completion of the Initial Remedial Phase pursuant to Paragraph 80 of Section XVII (Certification of Completion), automobile liability insurance with limits of \$500,000, naming as additional insured the United States. In addition, for the duration of the IRP Work performed by Settling Private Parties, Settling Private Parties shall satisfy, or shall ensure that their contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of worker's compensation insurance for all persons performing the IRP Work on behalf of Settling Private Parties in furtherance of this Consent Decree. Prior to commencement of the IRP Work under this Consent Decree, Settling Private Parties shall provide to EPA certificates of such



insurance and a copy of each insurance policy. Settling Private Parties shall resubmit such certificates and copies of policies during each year of their performance of the IRP Work on the anniversary of the effective date of this Consent Decree. If Settling Private Parties demonstrate by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance equivalent to that described above, or insurance covering the same risks but in a lesser amount, then, with respect to matters so insured by that contractor or subcontractor, Settling Private Parties need provide only that portion of the insurance described above which is not maintained by the contractor or subcontractor.

Commonwealth.

88. The United States does not assume any liability by entering into this agreement or by virtue of any designation of the Commonwealth as EPA's authorized representative under Section 104(e) of CERCLA. The Commonwealth hereby indemnifies, saves and holds harmless, to the extent not prohibited by law, the United States and its officials, agents, employees, contractors, subcontractors, or representatives for or from any and all claims or causes of action arising from, or on account of, acts or omissions of the Commonwealth, its employees, agents, contractors, subcontractors, and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Consent Decree, including, but not limited to, any claims arising from any designation of the Commonwealth as EPA's authorized representative under Section 104(e) of CERCLA. Further, the

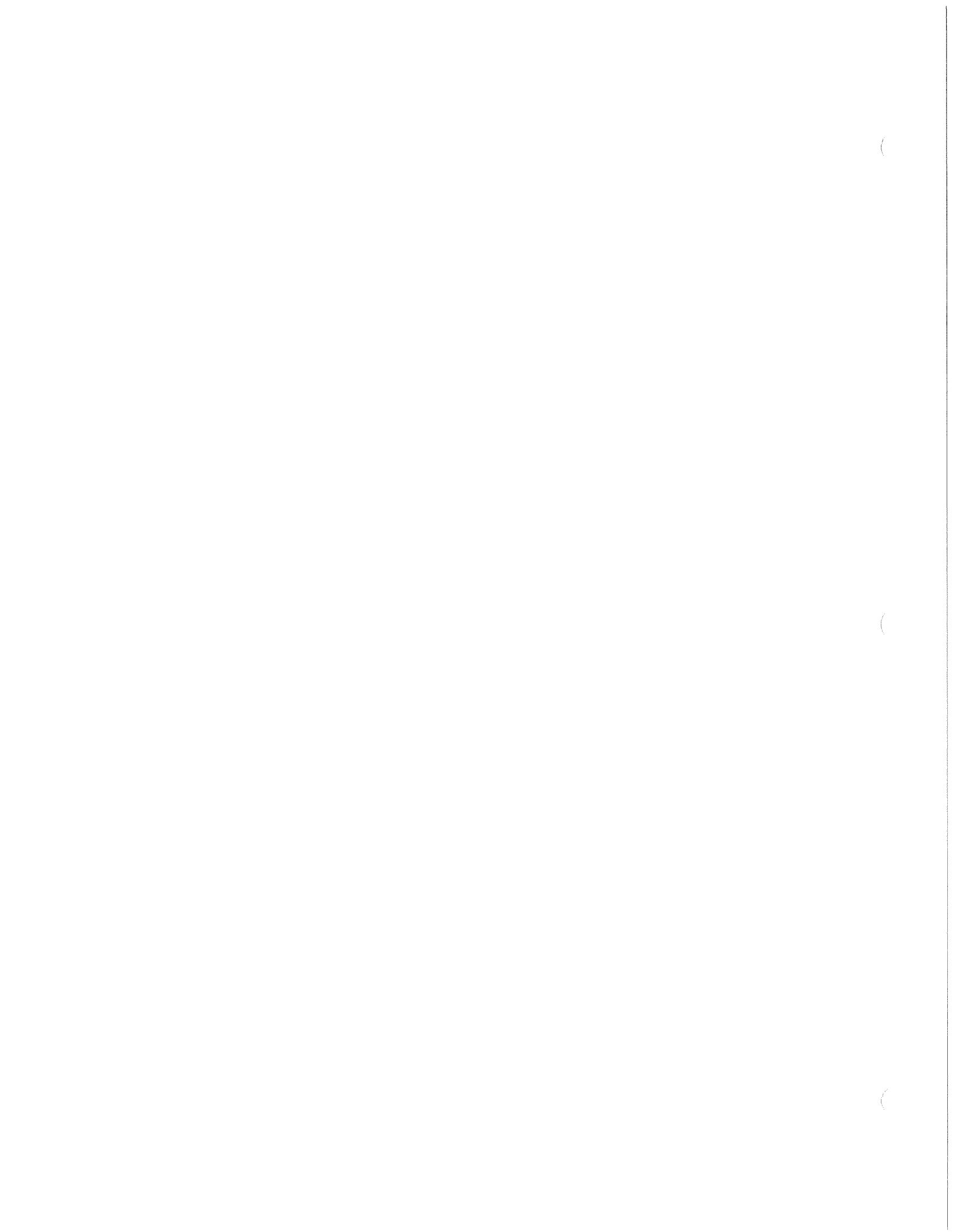
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Commonwealth agrees to pay the United States all costs the United States incurs including, but not limited to, attorneys fees and other expenses of litigation and settlement arising from, or on account of, claims made against the United States based on acts or omissions of the Commonwealth, its employees, agents, contractors, subcontractors, and any persons acting on its behalf or under its control, in carrying out activities pursuant to this Consent Decree. The United States shall not be held out as a party to any contract entered into by or on behalf of the Commonwealth carrying out activities pursuant to this Consent Decree. Neither the Commonwealth nor any such contractor shall be considered an agent of the United States.

89. The Commonwealth waives all claims against the United States for damages or reimbursement or for set-off of any payments made or to be made to the United States arising from or on account of any contract, agreement, or arrangement between the Commonwealth and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays. In addition, the Commonwealth shall indemnify and hold harmless, to the extent not prohibited by law, the United States with respect to any and all claims for damages or reimbursement arising from or on account of any contract, agreement, or arrangement with the Commonwealth and any person for performance of Work on or relating to the Site, including, but not limited to, claims on account of construction delays.





90. For the duration of the Work performed by the Commonwealth, the Commonwealth shall satisfy, or shall ensure that its contractors or subcontractors satisfy, all applicable laws and regulations regarding the provision of workers' compensation insurance for all persons performing the Work on behalf of the Commonwealth in furtherance of this Consent Decree.

XXI. FORCE MAJEURE

91. "Force majeure," for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of the Settling Parties or of any entity controlled by such Settling Parties whose performance is delayed, including, but not limited to, their contractors and subcontractors, that delays or prevents the performance of any obligation under this Consent Decree, despite such Settling Parties' best efforts to fulfill the obligation. The requirement that such Settling Parties exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any potential force majeure event (1) as it is occurring and (2) following the potential force majeure event, such that the delay is minimized to the greatest extent possible. "Force Majeure" does not include financial inability to complete the Work or a failure to achieve the Performance Standards, or increased costs.

92. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a force majeure event, the Settling

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Party whose performance is delayed shall notify orally EPA's Project Coordinator or, in his or her absence, EPA's Alternate Project Coordinator or, in the event both of EPA's designated representatives are unavailable, the Director of the Waste Management Division, EPA Region IV, within 48 hours of when the Settling Party first knew or should have known that the event might cause a delay. Within five business days thereafter, the Settling Party shall provide in writing to EPA an explanation and description of the reasons for the delay; the obligations and deadlines the Settling Party claims are affected by the delay; the anticipated duration of the delay; actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; the Settling Party's rationale for attributing such delay to a force majeure event if it intends to assert such a claim; and a statement as to whether, in the opinion of the Settling Party, such event may cause or contribute to an endangerment to public health, welfare or the environment. The Settling Party shall include with any notice all available documentation supporting its claim that the delay was attributable to a force majeure. The Settling Party shall supplement this written statement with new information, statements, or plans as they become available. Failure to comply with the above requirements shall preclude the Settling Party from asserting any claim of force majeure for that event. Settling Defendants shall be deemed to have notice of a



circumstance of which their contractors or subcontractors had or should have had notice.

93. If EPA agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Decree that are affected by the force majeure event will be extended by EPA for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure event shall not, of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, EPA will notify the Settling Party in writing of its decision. If EPA agrees that the delay is attributable to a force majeure event, EPA will notify the Settling Party in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure event.

94. A Settling Defendant which invokes the dispute resolution procedures set forth in Section XXII to dispute EPA's determination under Paragraph 93 shall do so no later than 15 days after receipt of EPA's notice. In any such proceeding, the Settling Defendant shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were



exercised to avoid and mitigate the effects of the delay, and that the Settling Defendant complied with the requirements of Paragraphs 91 and 92, above. If the Settling Defendant carries this burden, the delay at issue shall be deemed not to be a violation by the Settling Defendant of the affected obligation of this Consent Decree identified to EPA and the Court.

XXII. DISPUTE RESOLUTION

95. a. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism available to Settling Defendants to resolve disputes arising under or with respect to this Consent Decree between the United States (excluding the Settling Federal Agencies) and the Settling Defendants. The provisions of the MOU shall govern disputes between EPA and the Settling Federal Agencies under or with respect to this Consent Decree.

Notwithstanding the provisions of CERCLA §§ 121 and 122, 42 U.S.C. §§ 9621 and 9622, Settling Defendants agree that the dispute resolution procedures of this Section shall be the exclusive mechanism for resolving disputes concerning the scope of the obligations under this Consent Decree or the implementation of this Consent Decree, and the standards, requirements, criteria or limitations to which the remedial action must conform, and that the only relief which will be sought by the Settling Defendants in dispute resolution will be a determination of the obligation in dispute and not the recovery of civil or stipulated penalties. However, the procedures set





forth in this Section shall not apply to actions by the United States to enforce obligations of the Settling Defendants that have not been disputed in accordance with this Section.

b. Notwithstanding any provision in this Consent Decree, the following governs the serving of a Notice of Dispute (as described in Paragraph 96) or filing a motion for judicial review (as described in Paragraph 98.c or 99.a):

(1) A Settling Defendant may not serve a Notice of Dispute or file a motion for judicial review concerning the performance of ongoing, on-site Work if it is not obligated to perform the Work in dispute, except that any Settling Defendant may dispute EPA's Certification of Completion of the IRP and Certification of Completion of the Remedial Action. This provision shall not affect the Commonwealth's ability to raise disputes regarding its access obligations under Section XII or regarding EPA's determination concerning the need for a horizontal flow barrier.

(2) A Settling Defendant may not serve a Notice of Dispute or file a motion for judicial review concerning a plan, report, or other item that it is not obligated to submit to EPA under this Consent Decree, except to dispute EPA approval of the following deliverables or modifications thereof:

- (a) IRP RD Work Plan or a portion thereof;
- (b) IRP Sampling and Analysis Plan;
- (c) IRP Health and Safety Plan;
- (d) IRP Quality Assurance Project Plan;



- (e) IRP Prefinal and Final Remedial Design reports;
- (f) IRP RA Work Plan or a portion thereof;
- (g) IRP Construction Health and Safety Plan;
- (h) IRP Construction Quality Assurance Plan;
- (i) IRP Construction Management Plan;
- (j) Deliverables associated with the horizontal flow barrier that are required within the ten years after Certification of Completion of the IRP;
- (k) IMP Work Plan;
- (l) IMP Sampling and Analysis Plan;
- (m) IMP Quality Assurance Plan;
- (n) IMP Health and Safety Plan;
- (o) FCP Work Plan;
- (p) FCP Sampling and Analysis Plan;
- (q) FCP Health and Safety Plan;
- (r) FCP Quality Assurance Project Plan;
- (s) FCP Prefinal and Final Remedial Design reports;
- (t) FCP RA Work Plan;
- (u) FCP Construction Health and Safety Plan/Contingency Plan;
- (v) FCP Construction Management Plan;
- (w) FCP Construction Quality Assurance Plan.

96. Any dispute which arises under or with respect to this Consent Decree shall in the first instance be the subject of informal negotiations between the parties to the dispute, including any affected Settling Defendant. The dispute shall be

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considered to have arisen when one Settling Defendant sends the other Parties written notice of the dispute (Notice of Dispute). The Settling Defendant who serves the Notice of Dispute shall be called the "disputing Settling Defendant." The period for informal negotiations shall not exceed 20 days from the time the dispute arises, unless EPA and the disputing Settling Defendant agree in writing to extend the time period. A Settling Defendant may not serve a Notice of Dispute contesting EPA approval of a deliverable listed in Paragraph 95.b, or a modification thereof, unless the Notice of Dispute is served within 15 days of EPA approval.

97. a. In the event that the disputing Settling Defendant and EPA cannot resolve a dispute by informal negotiations under the preceding Paragraph, then the position advanced by EPA shall be considered binding unless, within 10 days after the conclusion of the informal negotiation period, the disputing Settling Defendant invokes the formal dispute resolution procedures of this Section by serving on EPA and the other Settling Parties a written Statement of Position on the matter in dispute, including, but not limited to, any factual data, analysis, argument, or opinion supporting that position and any supporting documentation relied upon by the disputing Settling Defendant. The Statement of Position shall specify the disputing Settling Defendant's position as to whether formal dispute resolution should proceed under Paragraph 98 or 99.



b. Within 14 days after receipt of the disputing Settling Defendant's Statement of Position, EPA will serve on the disputing Settling Defendant and all other Settling Parties its Statement of Position, including, but not limited to, any factual data, analysis, argument, or opinion supporting that position and all supporting documentation relied upon by EPA. EPA's Statement of Position shall include a statement as to whether formal dispute resolution should proceed under Paragraph 98 or 99. Within 14 days after receipt of the disputing Settling Defendant's Statement of Position, any other Settling Defendant may serve on EPA and the disputing Settling Defendant a Statement of Position, including but not limited to any factual data, analysis, argument, or opinion supporting its position, and all supporting documentation.

c. If there is disagreement between EPA and the disputing Settling Defendant as to whether dispute resolution should proceed under Paragraph 98 or 99, the parties to the dispute shall follow the procedures set forth in the Paragraph determined by EPA to be applicable. However, if a Settling Defendant ultimately appeals to the Court to resolve the dispute, the Court shall determine which paragraph is applicable in accordance with the standards of applicability set forth in Paragraphs 98 and 99.

98. Formal dispute resolution for disputes pertaining to the selection or adequacy of any response action and all other disputes that are accorded review on the administrative record





under applicable principles of administrative law shall be conducted pursuant to the procedures set forth in this Paragraph. For purposes of this Paragraph, the adequacy of any response action includes, without limitation: (1) the adequacy or appropriateness of plans, procedures to implement plans, or any other items requiring approval by EPA under this Consent Decree; and (2) the adequacy of the performance of response actions taken pursuant to this Consent Decree. Nothing in this Consent Decree shall be construed to allow any dispute under this Consent Decree by Settling Parties regarding the validity of the ROD's provisions.

a. An administrative record of the dispute shall be maintained by EPA and shall contain all Statements of Position, including supporting documentation, submitted pursuant to this Paragraph. When appropriate, EPA may allow a Settling Defendant to submit a supplemental Statement of Position or the Settling Federal Agencies to submit statements or other documents.

b. The Director of the Waste Management Division, EPA Region IV, will issue a final administrative decision resolving the dispute based on the administrative record described in Paragraph 98.a. This decision shall be binding upon the Settling Defendants, subject only to the right to seek judicial review pursuant to Paragraph 98.c and 98.d.

c. Any administrative decision made by EPA pursuant to Paragraph 98.b shall be reviewable by this Court,



provided that a motion for judicial review is filed by a Settling Defendant with the Court and served on all Settling Parties and EPA within 10 days of receipt of EPA's decision. The motion for judicial review shall include a description of the matter in dispute, the efforts made by the Parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of this Consent Decree. The United States and any other Settling Defendant may file a response to the motion for judicial review.

d. In proceedings on any dispute governed by this Paragraph, the Settling Defendant(s) disputing EPA's decision shall have the burden of demonstrating that the decision of the Waste Management Division Director is arbitrary and capricious or otherwise not in accordance with law. Judicial review of EPA's decision shall be on the administrative record compiled pursuant to Paragraph 98.a.

99. Formal dispute resolution for disputes that neither pertain to the selection or adequacy of any response action nor are otherwise accorded review on the administrative record under applicable principles of administrative law shall be governed by this Paragraph.

a. Following receipt of the Settling Defendants' Statement of Position submitted pursuant to Paragraph 97, the Director of the Waste Management Division, EPA Region IV, will issue a final decision resolving the dispute. The Waste Management Division Director's decision shall be binding on the

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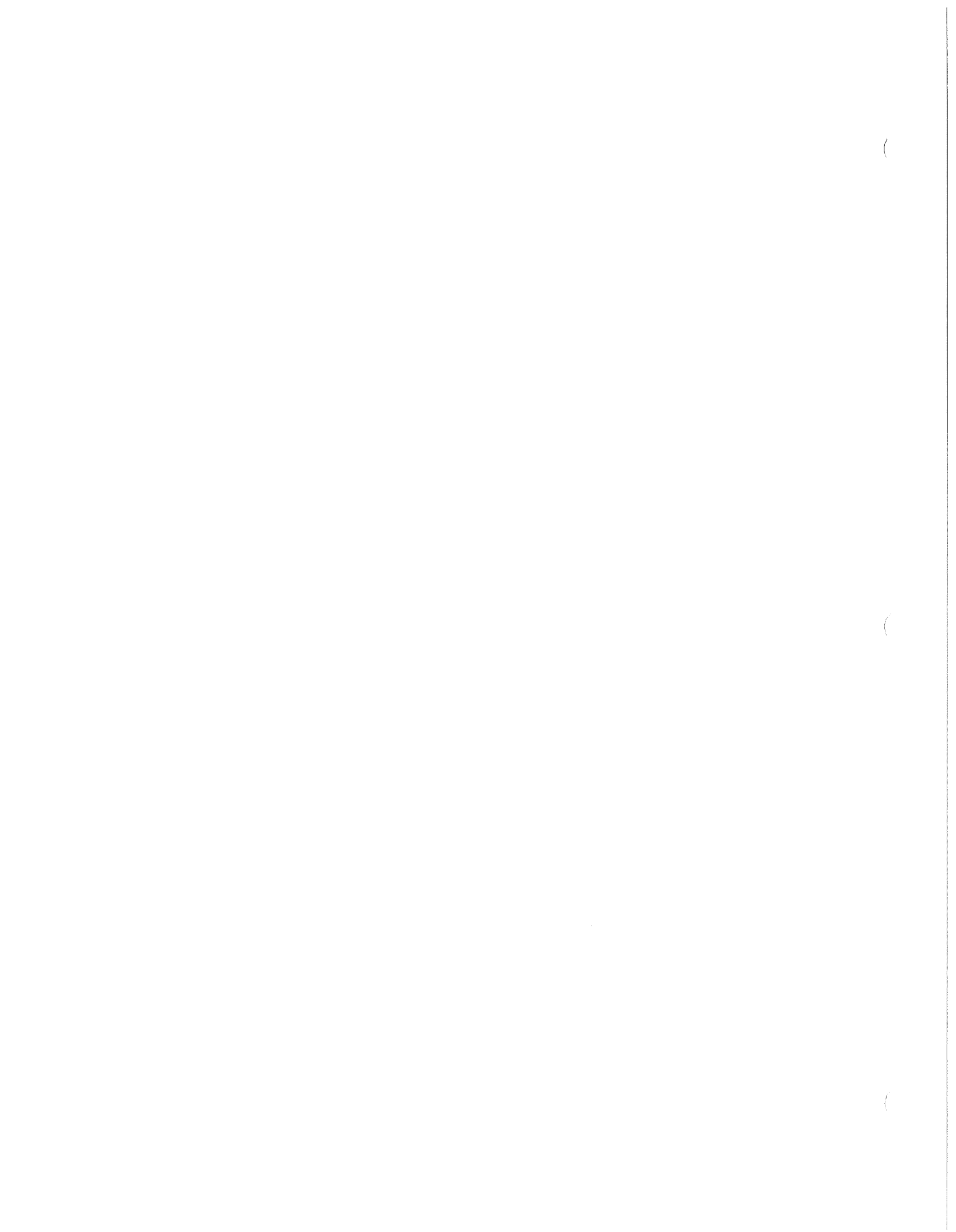
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Settling Defendants unless, within ten days of receipt of the decision, a Settling Defendant files with the Court and serves on the Parties a motion for judicial review setting forth the matter in dispute, the efforts made by the Parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of the Consent Decree. The United States or any other Settling Defendant may file a response to the Settling Defendant's motion for judicial review.

b. Notwithstanding Paragraph M of Section I (Background) of this Consent Decree, judicial review of any dispute governed by this Paragraph shall be governed by applicable provisions of law.

100. a. The invocation of the dispute resolution procedures of this Section shall not extend, postpone, or affect in any way any obligation of the Settling Parties under this Consent Decree not directly in dispute, unless EPA or the Court agrees otherwise. Stipulated penalties related to the disputed obligation shall continue to accrue but payment shall be stayed pending resolution of the dispute as provided in Paragraph 117. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of the Consent Decree, except as provided in Paragraphs 67, 74, or 100.b.



b. When a Settling Defendant serves a Notice of Dispute or files a motion for judicial review contesting EPA approval of a deliverable listed in Paragraph 95 or a modification thereof that the Settling Defendant is not obligated to submit to EPA, EPA shall extend by the length of the dispute any deadline that depends on approval of the disputed portions of the deliverable or modification. Unless such Settling Defendant prevails in the dispute, such Settling Defendant shall be liable for stipulated penalties applying to the disputed deliverable or modification as set forth in Section XXIII as if it were obligated to submit the deliverable or modification and had failed to do so, except that stipulated penalties shall begin to accrue on the date such Settling Defendant served the Notice of Dispute or filed the motion for judicial review, whichever is earlier, and stop accruing on the date the dispute is withdrawn or otherwise concluded.

101. The sole procedures for determining the relative responsibility of the Settling Parties to pay for additional response actions performed under Section IX (Additional Response Actions) during the first 10 years after Certification of Completion of the IRP are found at Paragraph 34 of Section IX.

102. The sole procedures for determining the responsibility of the United States Department of Energy and the United States Department of Defense to provide certain financial assistance to the Commonwealth under Section XVI (Assurance of





Ability to Complete Work) are found at Paragraph 79.i of Section XVI.

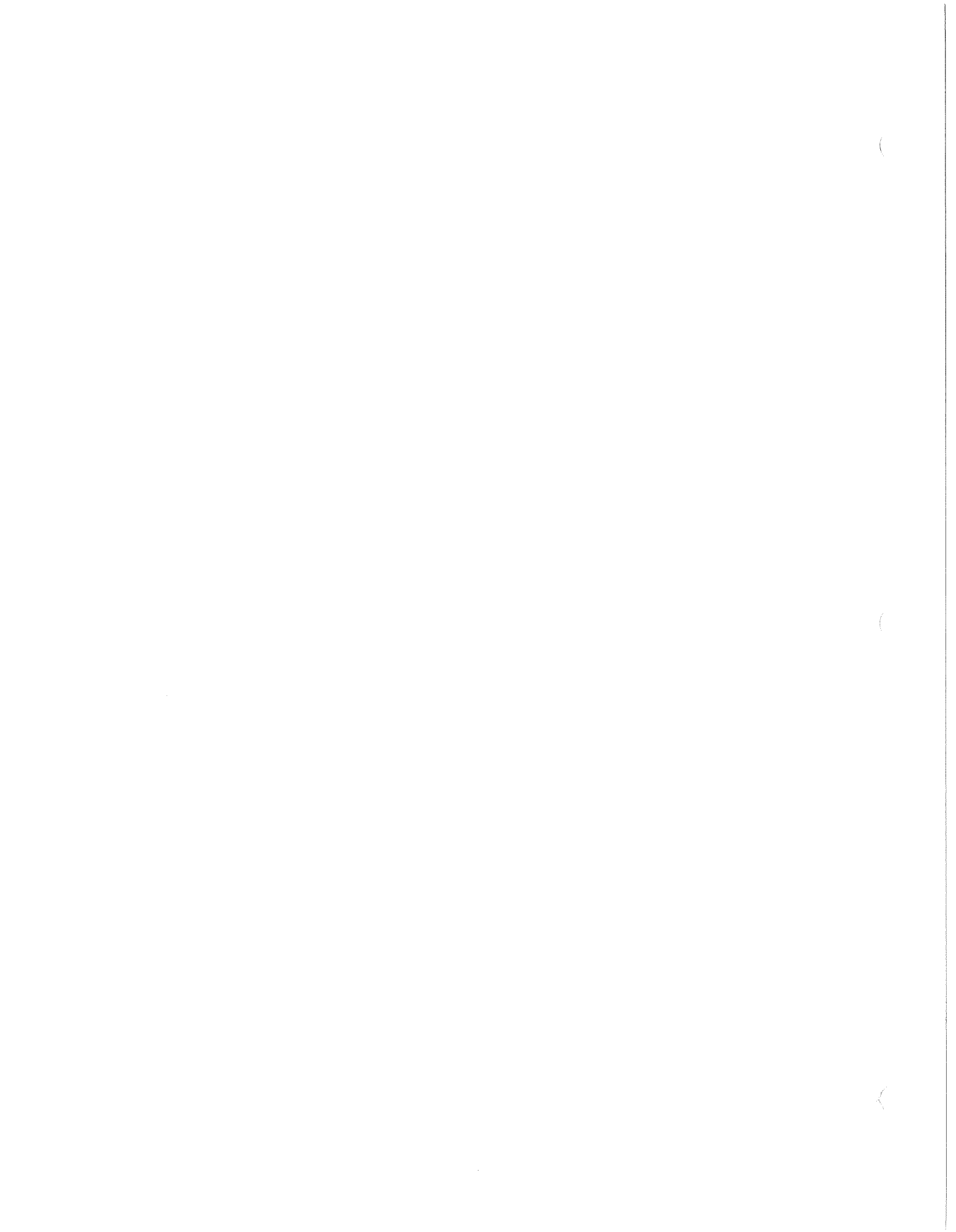
103. Except as otherwise provided in Paragraphs 101 and 102, enforcement of the Consent Decree by a Settling Party against another Settling Party or resolution of a dispute between one or more Settling Parties regarding their respective obligations under the Consent Decree are governed by Section XXXI (Retention of Jurisdiction) and general principles of law.

XXIII. STIPULATED PENALTIES

Settling Private Parties.

104. Settling Private Parties shall be liable for stipulated penalties in the amounts set forth in Paragraphs 105-107 to the United States for failure to comply with the requirements of this Consent Decree specified below, unless excused under Section XXI (Force Majeure). The Commonwealth may instead be liable to the United States for the stipulated penalties set forth in Paragraphs 105-107 as provided in Paragraph 100.b of Section XXII (Dispute Resolution).

"Compliance" by Settling Private Parties shall include completion of the IRP Work under this Consent Decree or any work plan or other plan approved under this Consent Decree for IRP Work identified below in accordance with all applicable requirements of law, this Consent Decree, the SOW, and any plans or other documents approved by EPA pursuant to this Consent Decree and within the specified time schedules established by and approved under this Consent Decree.



105. a. The following stipulated penalties shall be payable per violation per day by the Settling Private Parties or the Commonwealth to the United States for any noncompliance identified in subparagraph 105.b below:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$1,000	1st through 14th day
\$3,000	15th through 30th day
\$5,000	31st day and beyond

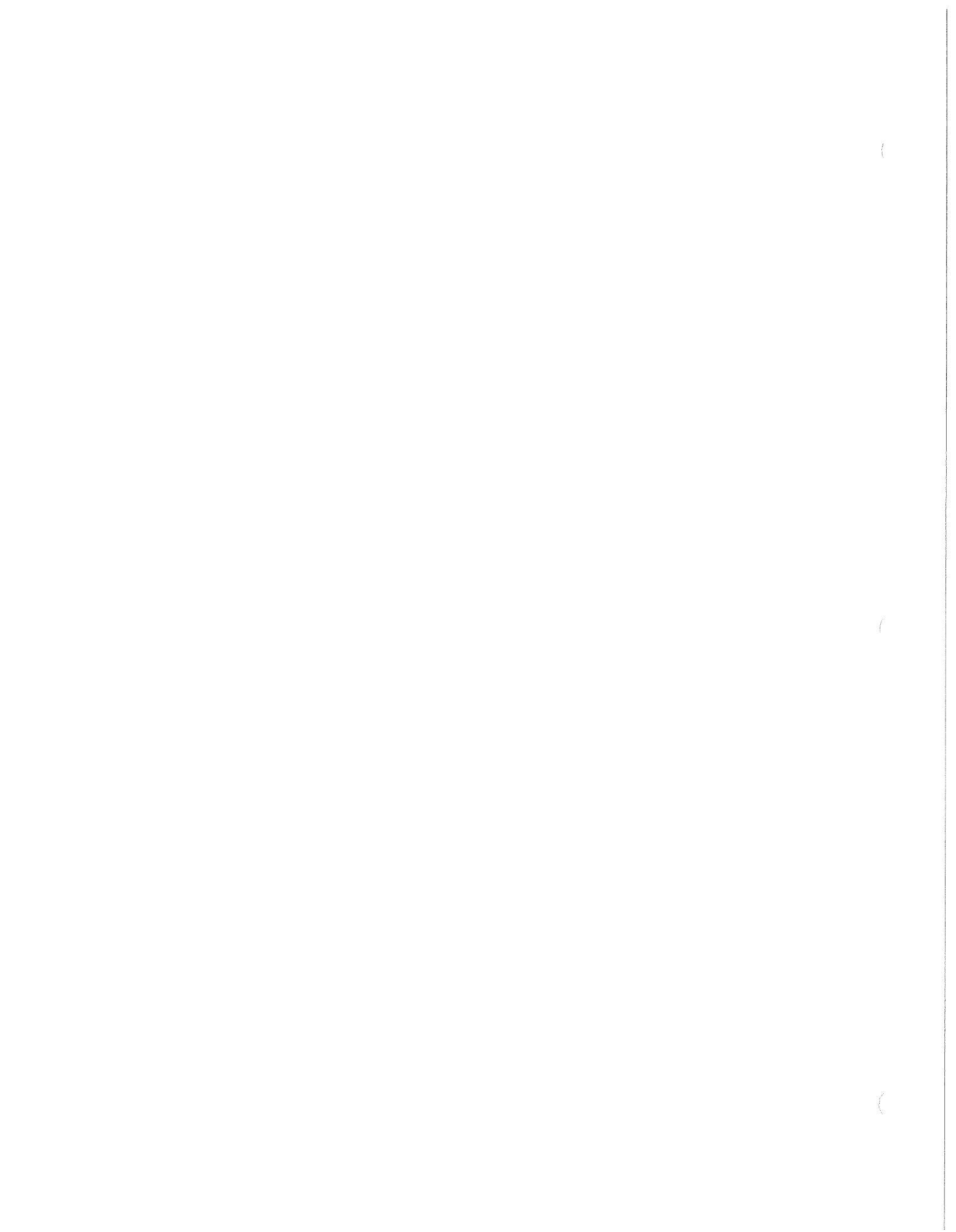
b. Failure to timely or adequately comply with the following requirements of this Consent Decree:

- (1) Submittal and, if necessary, modification of any and all draft and final IRP RD and RA Work Plans;
- (2) Submittal and, if necessary, modification of the final IRP Remedial Design report;
- (3) Hiring a Supervising Contractor.

106. a. The following stipulated penalties shall be payable per violation per day by Settling Private Parties or the Commonwealth to the United States for any noncompliance identified in subparagraph 106.b, below:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$500	1st through 14th day
\$1,000	15th through 30th day
\$2,500	31st day and beyond

b. Failure to timely or adequately comply with the following requirements of this Consent Decree:



(1) Submittal of and, if necessary, modification of, any IRP RD and RA deliverables not identified in Paragraph 105.b;

(2) Payment of all monies required to be paid pursuant to Section XIX (Reimbursement of Response Costs);

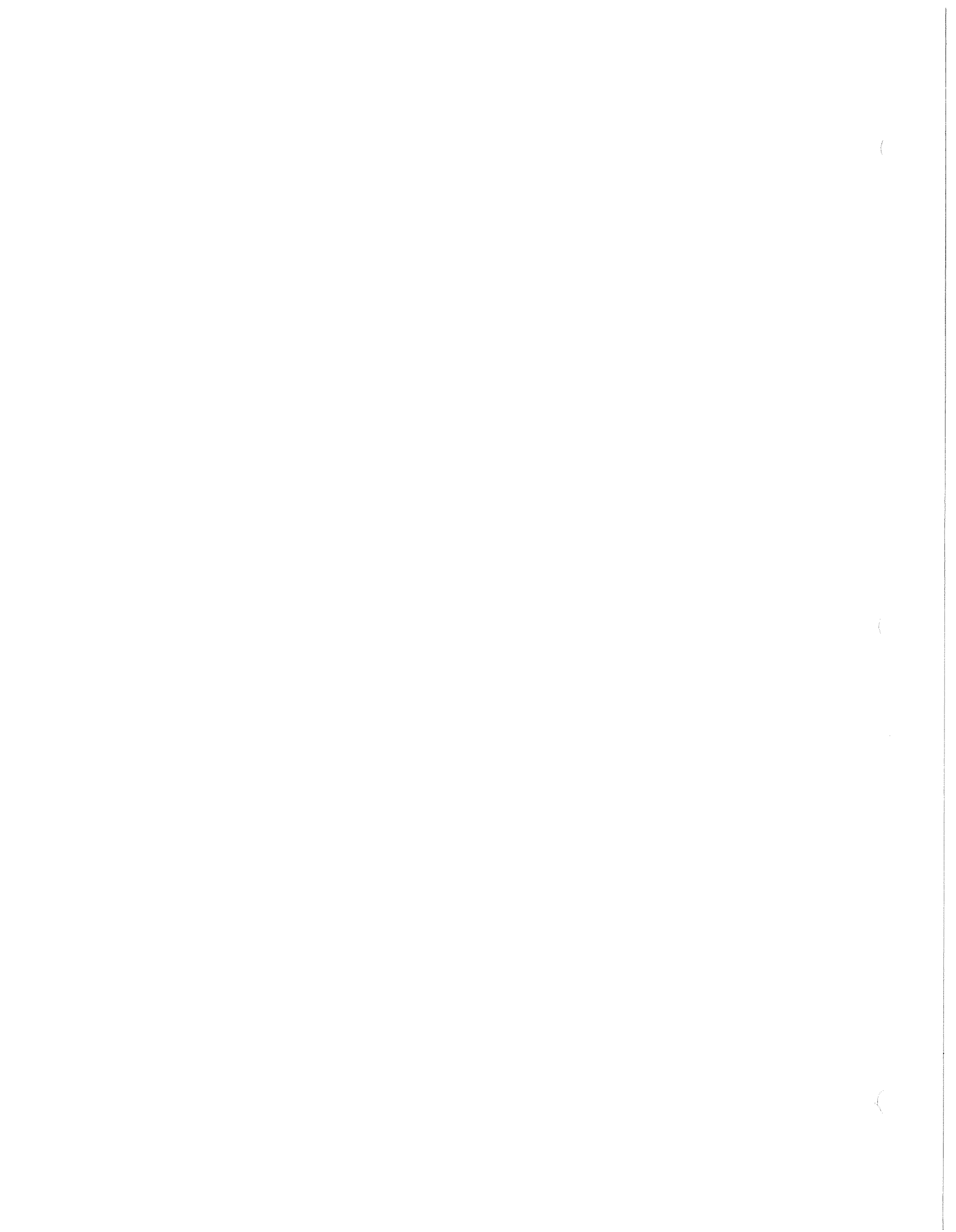
(3) Submittal and, if necessary, modification of any Work Plans for further response actions pursuant to Sections IX and X (Additional Response Actions and EPA Periodic Review), hereof;

(4) Failure to achieve any other major scheduled milestones identified under the approved IRP RA Work Plan.

107. Settling Private Parties or the Commonwealth shall be liable for stipulated penalties of \$250 per violation for each day of non-compliance with requirements of this Consent Decree or the SOW, other than those specified in the prior subparagraphs, which are due by a deadline approved by EPA.

Commonwealth.

108. The Commonwealth shall be liable for stipulated penalties in the amounts set forth in Paragraphs 109-111 to the United States for failure to comply with the requirements of this Consent Decree specified below, unless excused under Section XXI (Force Majeure). Settling Private Parties may instead be liable to the United States for the stipulated penalties set forth in Paragraphs 109-111 as provided in Paragraph 100.b of Section XXII (Dispute Resolution). "Compliance" by the Commonwealth shall



include completion of the BoRP Work and Commonwealth IRP Obligations under this Consent Decree or any work plan or other plan approved under this Consent Decree for BoRP Work or Commonwealth IRP Obligations identified below in accordance with all applicable requirements of law, this Consent Decree, the SOW, and any plans or other documents approved by EPA pursuant to this Consent Decree and within the specified time schedules established by and approved under this Consent Decree.

109. a. The following stipulated penalties shall be payable per violation per day by the Commonwealth or the Settling Private Parties to the United States for any noncompliance identified in Subparagraph 109.b below:

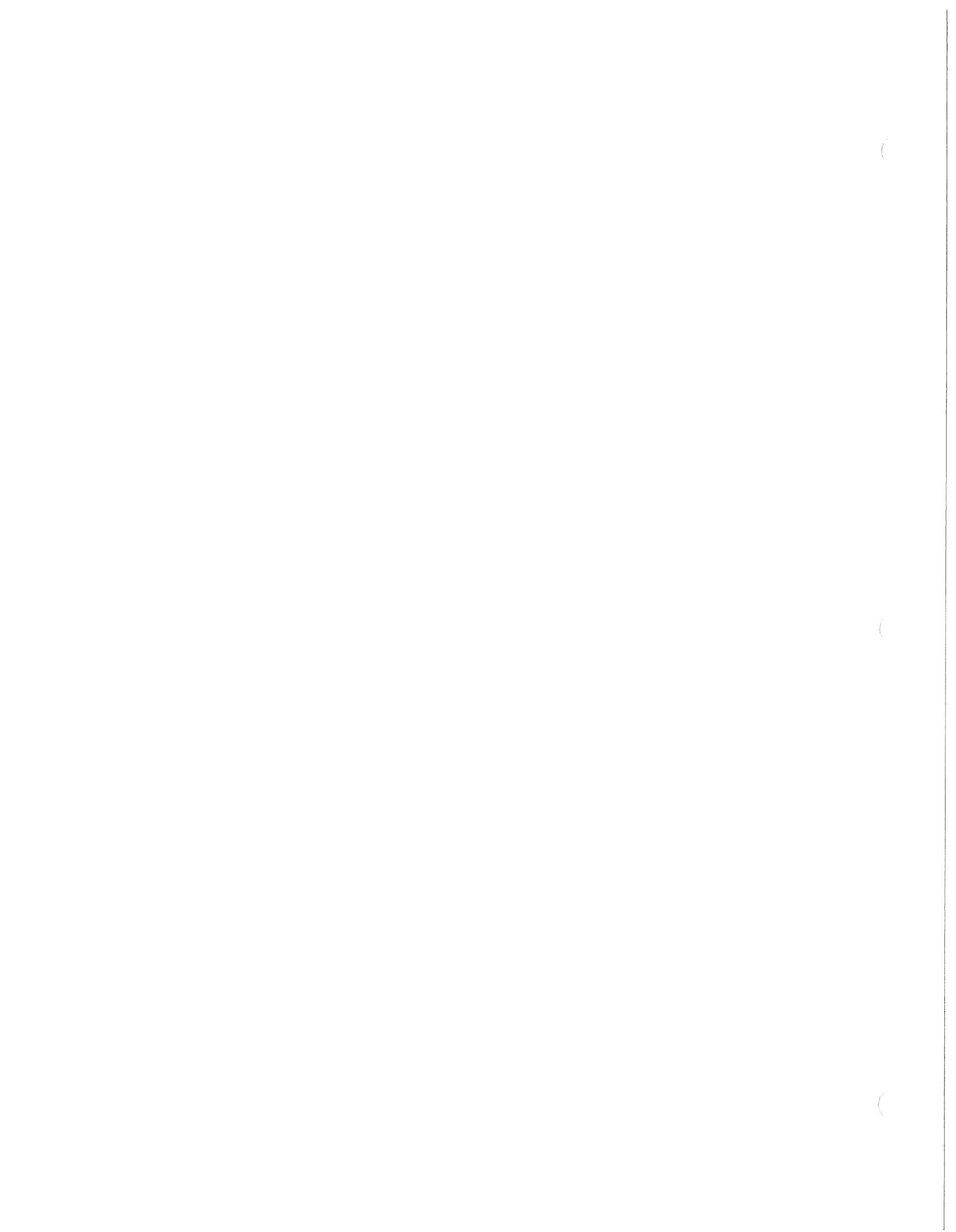
<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$1,000	1st through 14th day
\$3,000	15th through 30th day
\$5,000	31st day and beyond

b. Failure to timely or adequately comply with the following requirements of this Consent Decree:

(1) Submittal and, if necessary, modification of any and all draft and final BoRP work plans;

(2) Hiring of a Supervising Contractor or designating an agency or employee(s) to serve the equivalent function;

(3) Providing access as required by Section XII.





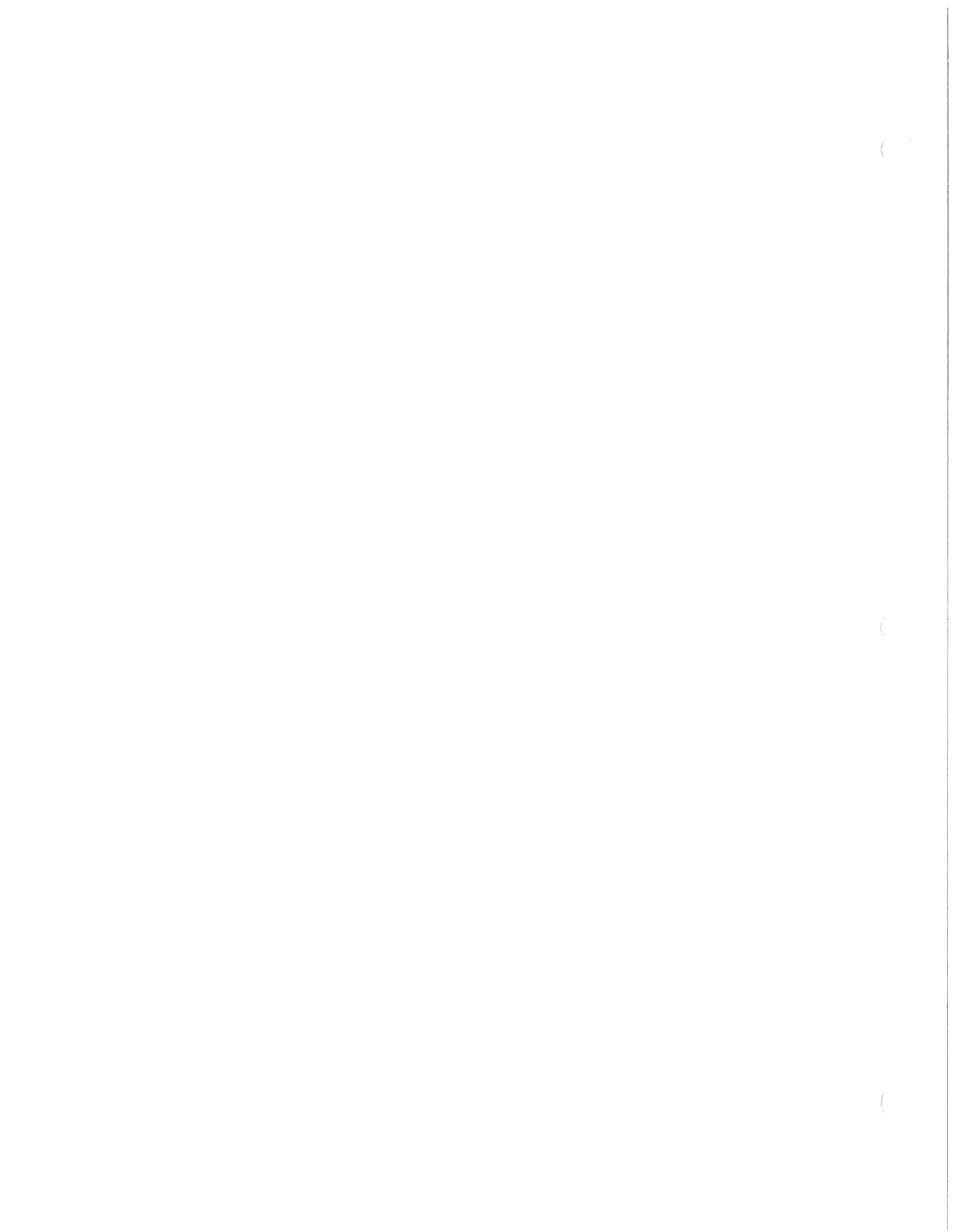
110. a. The following stipulated penalties shall be payable per violation per day by the Commonwealth or the Settling Private Parties to the United States for any noncompliance identified in subparagraph 110.b, below:

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$500	1st through 14th day
\$1,000	15th through 30th day
\$2,500	31st day and beyond

b. Failure to timely or adequately comply with the following requirements of this Consent Decree:

- (1) Submittal of and, if necessary, modification of, any deliverables identified in the EPA-approved BoRP work plans;
- (2) Recording of Consent Decree and Notice in Registry of Deeds and notifying EPA of property transfers;
- (3) Submittal ~~and~~, if necessary, modification of any work plans for further response actions pursuant to Sections IX and X (Additional Response Actions and EPA Periodic Review), hereof.
- (4) Failure to achieve any other major scheduled milestones identified under the approved BoRP work plans.
- (5) Timely establishment of the Trust Fund required by Paragraph 79.

111. The Commonwealth or the Settling Private Parties shall be liable for stipulated penalties of \$250 per violation



for each day of non-compliance with requirements of this Consent Decree or the SOW, other than those specified in the prior subparagraphs, which are due by a deadline approved by EPA.

112. The penalty amounts set forth in paragraphs 109 - 111 above shall be increased annually, beginning in January of the year following entry of the Consent Decree, by the amount of annual increase in the "Consumer Price Index, All Items, All Cities," as published by the United States Department of Labor, or, if the Consumer Price Index does not exist, the most similar official index in effect at the time the penalties are imposed.

Settling Defendants

113. All penalties imposed by this Section shall begin to accrue on the day after complete performance is due or the day a violation occurs, and shall continue to accrue through the final day of the correction of the noncompliance. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Consent Decree.

114. Following EPA's determination that a Settling Defendant has failed to comply with a requirement of this Consent Decree, EPA may give the Settling Defendant written notification of the same and describe the noncompliance. EPA may send the Settling Defendant a written demand for the payment of the penalties. However, penalties shall accrue as provided in the preceding Paragraph regardless of whether EPA has notified the Settling Defendant of a violation.



115. All penalties owed to the United States under this Section shall be due and payable within 30 days of a Settling Defendant's receipt from EPA of a demand for payment of the penalties, unless the Settling Defendant invokes the Dispute Resolution procedures under Section XXII (Dispute Resolution). All payments under this Section shall be paid by certified check made payable to "EPA Hazardous Substances Superfund," shall be mailed to

U.S. Environmental Protection Agency  
Region IV  
Attention: Superfund Accounting  
P.O. Box 100142  
Atlanta, Georgia 30384

and shall reference the EPA Region IV Site/Spill ID number (which is "G1" for this Site) and DOJ Case Number 90-11-2-211A. Copies of checks paid pursuant to this Section, and any accompanying transmittal letters, shall be sent to the United States as provided in Section XXIX (Notices and Submissions).

116. The payment of penalties shall not alter in any way Settling Defendants' respective obligations to complete the performance of the Work required under this Consent Decree.

117. Penalties shall continue to accrue as provided in Paragraph 113 during any dispute resolution period, but need not be paid until the following:

a. If the dispute is resolved by agreement or by a decision of EPA that is not appealed to this Court, accrued penalties determined to be owing shall be paid to EPA within 15 days of the agreement or the receipt of EPA's decision or order;



b. If the dispute is appealed to this Court and the United States prevails in whole or in part, Settling Defendants shall pay all accrued penalties determined by the Court to be owed to EPA within 60 days of receipt of the Court's decision or order, except as provided in subparagraph c below.

c. If the District Court's decision is appealed by any Party, Settling Defendants shall pay all accrued penalties determined by the District Court to be owing to the United States into an interest-bearing escrow account within 60 days of receipt of the Court's decision or order. Penalties shall be paid into this account as they continue to accrue, at least every 60 days. Within 15 days of receipt of the final appellate court decision, the escrow agent shall pay the balance of the account to EPA or to Settling Defendants to the extent that they prevail.

118. a. If Settling Defendants fail to pay stipulated penalties when due, the United States may institute proceedings to collect the penalties, as well as interest. Settling Defendants shall pay interest on the unpaid balance, which shall begin to accrue on the date of demand made pursuant to Paragraph 114 at the rate established pursuant to Section 107(a) of CERCLA, 42 U.S.C. § 9607.

b. Nothing in this Consent Decree shall be construed as prohibiting, altering, or in any way limiting the ability of the United States to seek any other remedies or sanctions available by virtue of Settling Defendants' violation of this Decree or of the statutes and regulations upon which it





is based, including, but not limited to, penalties pursuant to Section 122(1) of CERCLA.

c. EPA may, in its unreviewable discretion, forgive all or a portion of any stipulated penalties which accrue pursuant to this Section, considering the good faith efforts of the respective Settling Parties to comply, or such other factors as EPA deems appropriate.

119. No payments made under this Section which are penalties under Section 169 of the Internal Revenue Code shall be tax deductible for federal tax purposes.

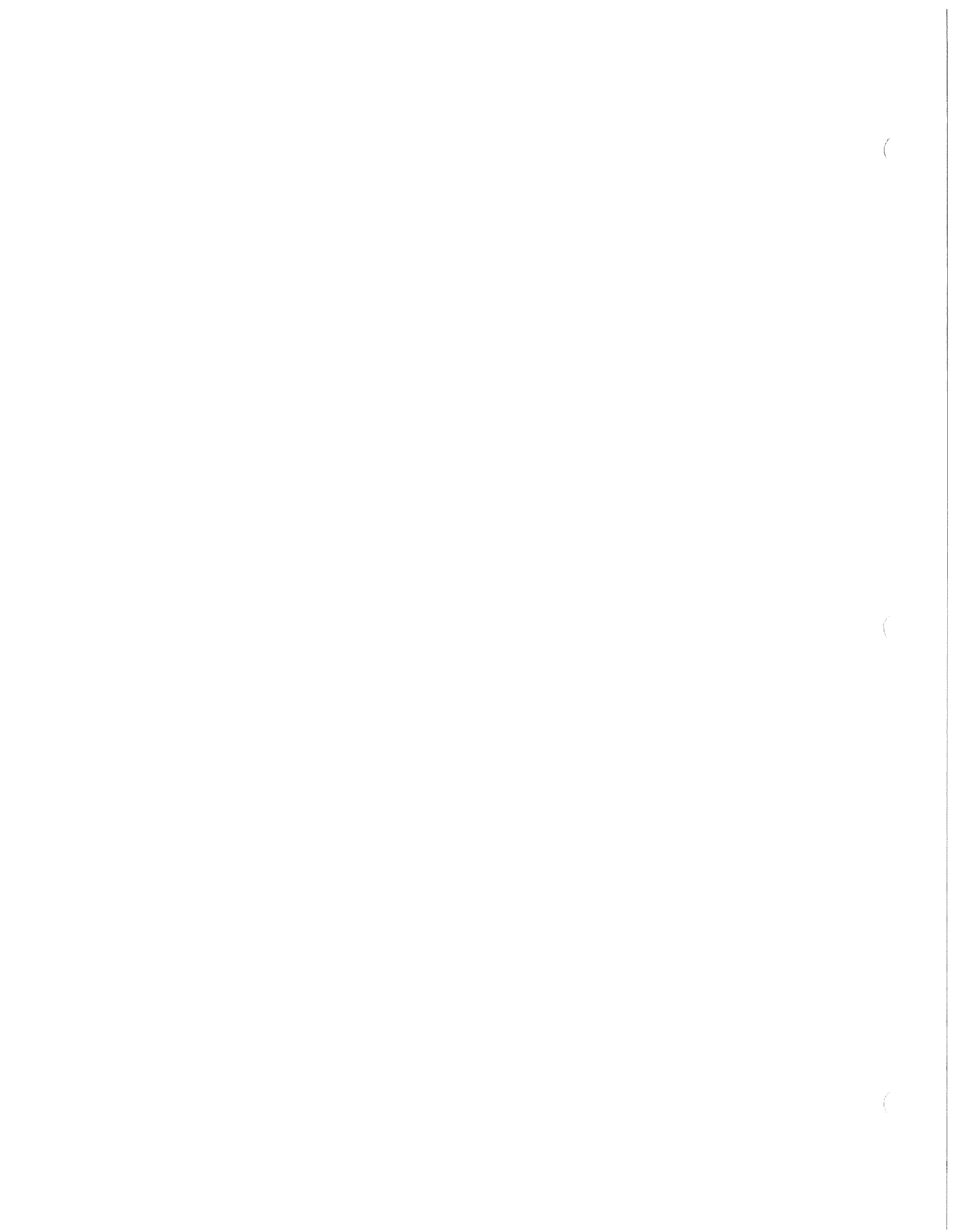
XXIV. COVENANTS NOT TO SUE OR TAKE ADMINISTRATIVE ACTION BY PLAINTIFF

120. a. Settling Private Parties and Settling Federal Agencies. In consideration of the actions that will be performed and the payments that will be made by the Settling Private Parties and Settling Federal Agencies under the terms of the Consent Decree, and except as specifically provided in Paragraphs 122 and 124 of this Section, the United States covenants not to sue or to take administrative action against Settling Private Parties, and EPA covenants not to take administrative action against Settling Federal Agencies, pursuant to Sections 106 and 107(a) of CERCLA relating to the Site. With respect to liability for Past Response Costs, Future Response Costs, IRP Remedial Design, IRP Activities, additional response actions required pursuant to Sections IX and XII (Additional Response Actions and Access), BoRP Remedial Design, BoRP Activities, Commonwealth IRP Obligations, and O & M, these covenants not to sue or take



administrative action shall take effect upon receipt by EPA of the payments required by Section XIX (Reimbursement of Response Costs). With respect to all other liability under Sections 106 and 107(a) of CERCLA relating to the Site, these covenants not to sue or take administrative action shall take effect upon Certification of Completion of Remedial Action pursuant to Paragraph 81 of Section XVII. These covenants not to sue or take administrative action are conditioned upon the complete and satisfactory performance by Settling Private Parties and Settling Federal Agencies of their obligations under this Consent Decree. These covenants not to sue or take administrative action extend only to the Settling Private Parties and Settling Federal Agencies and do not extend to any other person.

b. Commonwealth. In consideration of the actions that will be performed by the Commonwealth under the terms of the Consent Decree, and except as specifically provided in Paragraphs 122 and 124 of this Section, the United States covenants not to sue or to take administrative action against the Commonwealth pursuant to section 106 of CERCLA relating to the Site for performance of IRP Work and BoRP Work upon Certification of Completion of the Remedial Action. These covenants not to sue are conditioned upon the complete and satisfactory performance by the Commonwealth of its obligations under this Consent Decree. These covenants not to sue extend only to the Commonwealth and do not extend to any other person.



121. United States' Pre-Certification Reservations.

Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action or to issue an administrative order seeking to compel Settling Private Parties or Settling Federal Agencies (1) to perform further response actions relating to the Site or (2) to reimburse the United States for additional costs of response if, prior to Certification of Completion of the IRP:

(1) conditions at the Site, previously unknown to EPA are discovered, or

(2) information, previously unknown to EPA, is received, in whole or in part,

and these previously unknown conditions or information, together with any other relevant information, indicate that performance of the IRP Work is not protective of human health or the environment.

122. United States' Post-Certification Reservations.

a. Settling Private Parties and Settling Federal Agencies. Notwithstanding any other provision of this Consent Decree, the United States reserves, and this Consent Decree is without prejudice to, the right to institute proceedings in this action or in a new action or to issue an administrative order seeking to compel Settling Private Parties and Settling Federal Agencies (1) to perform further response actions relating to the Site or (2) to reimburse the United States for additional costs

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of response if, subsequent to Certification of Completion of the  
IRP:

(1) conditions at the Site, previously unknown to EPA  
are discovered, or

(2) information, previously unknown to EPA, is  
received, in whole or in part,

and these previously unknown conditions or information, together  
with other relevant information, indicate that performance of the  
IRP Work is not protective of human health or the environment.

b. Commonwealth. Notwithstanding any other  
provision of this Consent Decree, the United States reserves, and  
this Consent Decree is without prejudice to, the right to  
institute proceedings in this action or in a new action or to  
issue an administrative order seeking to compel the Commonwealth  
to perform further response actions relating to the Site if,  
subsequent to Certification of Completion of the Remedial Action:

(1) conditions at the Site, previously unknown to EPA  
are discovered, or

(2) information, previously unknown to EPA, is  
received, in whole or in part,

and these previously unknown conditions or this information  
together with other relevant information indicate that  
performance of the Work is not protective of human health or the  
environment.

123. For purposes of Paragraph 121, the information  
and the conditions known to EPA shall include only that

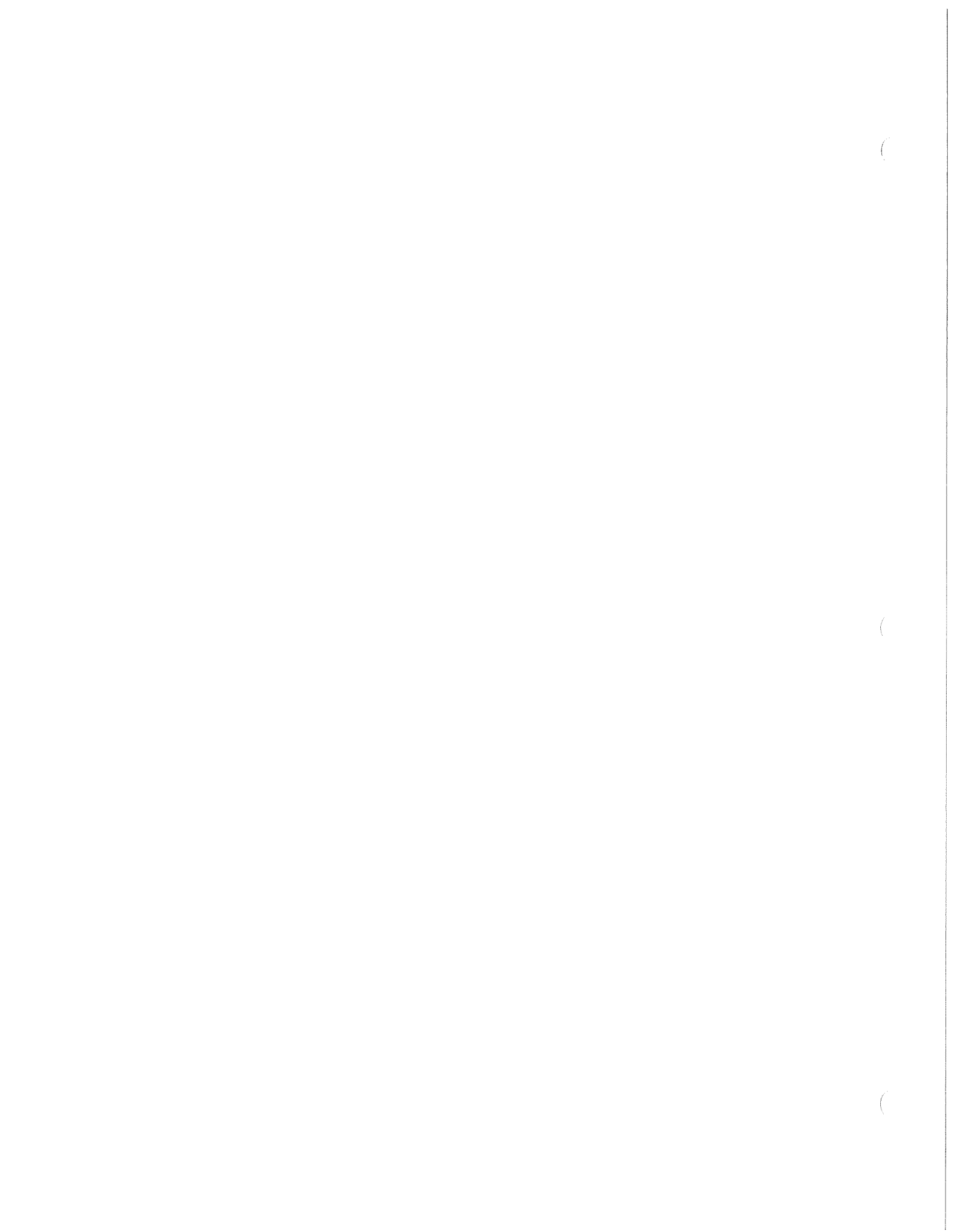




information and those conditions set forth in the Record of Decision for the Site and the administrative record which serves as a basis for the Record of Decision. For purposes of Paragraph 122.a, the information and the conditions known to EPA shall include only that information and those conditions set forth in the Record of Decision, the administrative record which serves as the basis for the Record of Decision, and any information received by EPA pursuant to the requirements of this Consent Decree prior to Certification of Completion of the IRP. For purposes of Paragraph 122.b, the information and the conditions known to EPA shall include only that information and those conditions set forth in the Record of Decision, the administrative record which serves as the basis for the Record of Decision, and any information received by EPA pursuant to the requirements of this Consent Decree prior to Certification of Completion of Remedial Action.

124. General Reservations of Rights. The covenants not to sue or take administrative action set forth above do not pertain to any matters other than those expressly specified in Paragraph 120.a and 120.b. The United States reserves, and this Consent Decree is without prejudice to, all rights against Settling Parties with respect to all other matters, including but not limited to, the following:

a. claims based on a failure by Settling Parties to meet a requirement of this Consent Decree;



b. liability arising from the past, present, or future disposal, release, or threat of release of Waste Materials outside of the combined area of the Site and the contiguous area within which Site-derived contaminants exist as evidenced in the administrative record which serves as a basis for the remedy selection decision for the Site;

c. liability for damages for injury to, destruction of, or loss of natural resources for which there are United States natural resources trustees;

d. liability for response costs that have been or may be incurred by the United States Department of the Interior or the United States Department of Agriculture in their role as a natural resources trustee;

e. criminal liability; and

f. liability for violations of federal or state law which occur during or after the implementation of the Remedial Activities.

125. The United States reserves, and this Consent Decree is without prejudice to, all rights against the Commonwealth for recovery of response costs related to the Site that the United States has incurred and will incur in the future.

126. In the event EPA determines that Settling Defendants have failed to implement any provisions of the Work in an adequate or timely manner, EPA may perform any and all portions of the Work as EPA determines necessary. Settling Defendants may invoke the procedures set forth in Section XXII



(Dispute Resolution) to dispute EPA's determination that the Settling Defendants failed to implement a provision of the Work in an adequate or timely manner as arbitrary and capricious or otherwise not in accordance with law. Such disputes shall be resolved on the administrative record. If EPA performs the IRP Work or any portion thereof, the Settling Private Parties and Settling Federal Agencies shall reimburse the United States for costs incurred by the United States in performing the IRP Work pursuant to this Paragraph in accordance with the payment procedures set forth in Paragraph 84.c of Section XIX (Reimbursement of Response Costs). If EPA performs the BoRP Work or any portion thereof, the Commonwealth shall reimburse the United States for costs incurred by the United States in performing the BoRP Work pursuant to this Paragraph in accordance with the payment procedures set forth in Paragraph 84.c of Section XIX (Reimbursement of Response Costs).

127. Notwithstanding any other provision of this Consent Decree, the United States retains all authority and reserves all rights to take any and all response actions authorized by law.

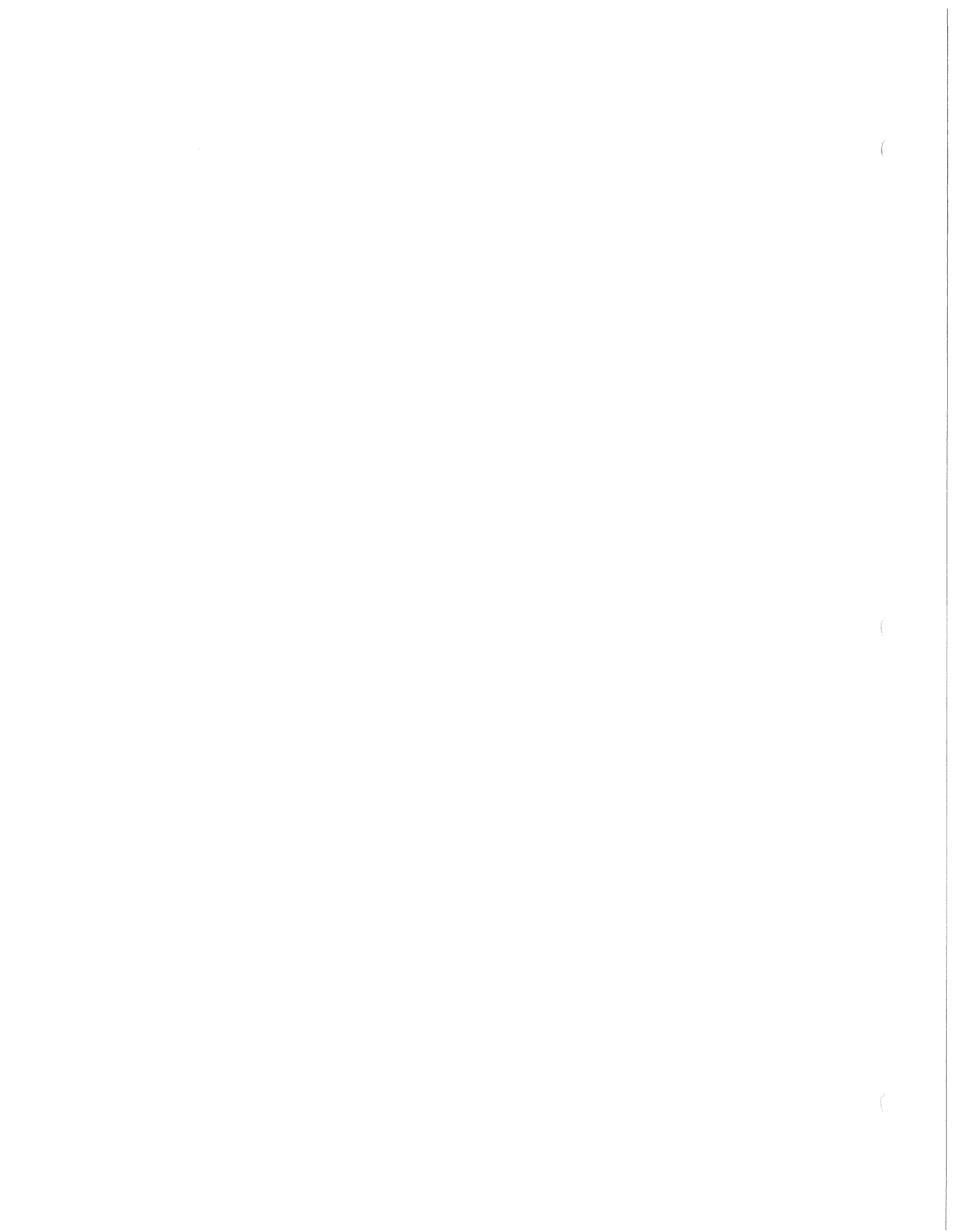
XXV. COVENANTS BY SETTLING DEFENDANTS

128. a. Settling Defendants hereby covenant not to sue and agree not to assert any claims or causes of action against the United States with respect to the Site or this Consent Decree, including, but not limited to, any direct or indirect claim for reimbursement from the Hazardous Substance Superfund



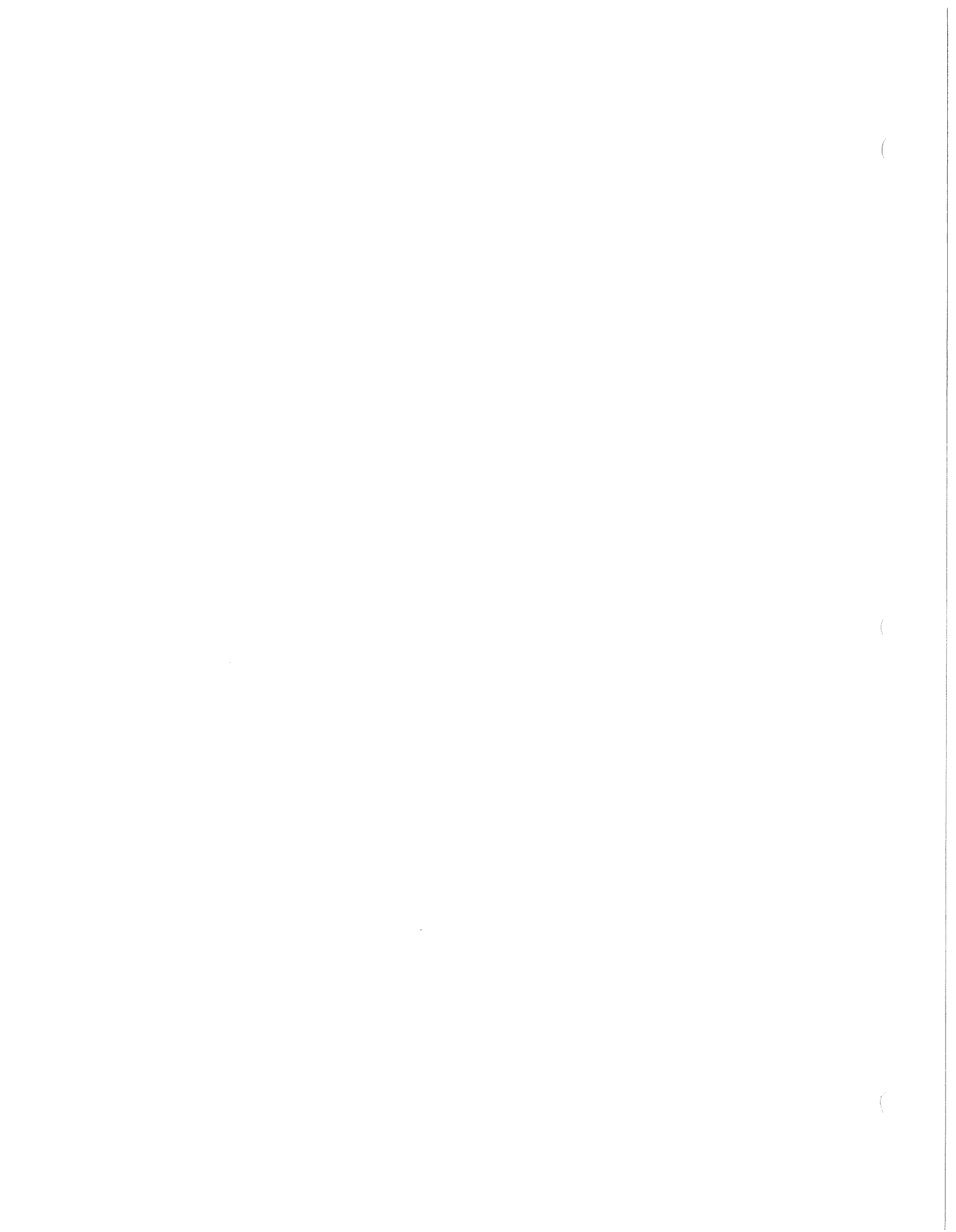
(established pursuant to the Internal Revenue Code, 26 U.S.C. §9507) through CERCLA Sections 106(b)(2), 111, 112, 113 or any other provision of law or any claims arising out of response activities at the Site. The Settling Defendants reserve, and this Consent Decree is without prejudice to, actions against the United States based on negligent actions taken directly by the United States (not including oversight or approval of the Settling Defendants' plans or activities) after entry of this Consent Decree that are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign immunity is found in any statute other than CERCLA. Settling Defendants also reserve, and this Consent Decree is without prejudice to, actions against the Hazardous Substances Superfund for reimbursement of costs incurred by the Settling Defendants as a result of performing obligations not imposed on them by the terms of this Consent Decree, if those obligations have been performed in compliance with an administrative order issued under Section 106 of CERCLA after entry of this Consent Decree. Nothing in this Consent Decree shall be deemed to constitute preauthorization of a claim within the meaning of Section 111 of CERCLA, 42 U.S.C. § 9611, or 40 C.F.R. § 300.700(d).

b. The covenants not to sue and reservations between Settling Private Parties and Settling Federal Agencies contained in Sections 5 and 7 of the Settlement Agreement are incorporated by reference herein and are made an enforceable part of this Consent Decree.



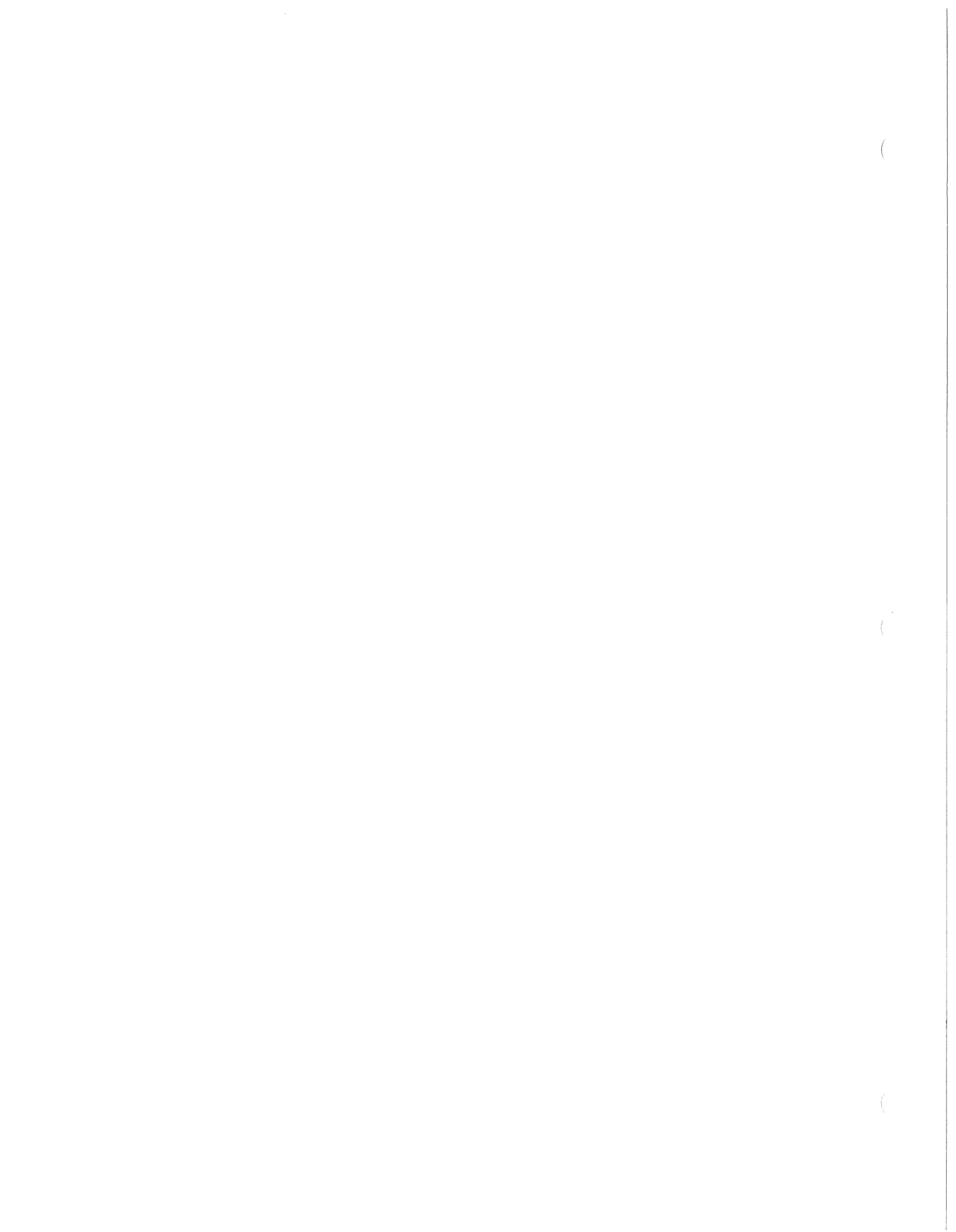


c. In consideration of the payments made, obligations undertaken, and covenants provided by the Settling Private Parties and Settling Federal Agencies under this Consent Decree, the Commonwealth covenants not to sue Settling Private Parties and Settling Federal Agencies for any and all civil liability pursuant to CERCLA, state law, and common law relating to the Site, including any liability for Past Response Costs, Future Response Costs, BORP Work, response costs previously incurred by the Commonwealth, natural resource damage claims of the Commonwealth (which shall not affect any rights the United States may have as a natural resource trustee), and response costs which are incurred by the Commonwealth to perform its obligations under Sections IX, X, XII, XVII, XVIII, XX, XXVIII, and XXXIII (Additional Response Actions, EPA Periodic Review, Access, Certification of Completion, Emergency Response, Indemnification and Insurance, Retention of Records, and Community Relations). The Commonwealth further covenants not to sue the Settling Private Parties or Settling Federal Agencies for civil liability, if any, arising from their conduct prior to entry of the Consent Decree relative to the Site under the AEA, the Resource Conservation and Recovery Act, the Safe Drinking Water Act, the Solid Waste Disposal Act, the Clean Water Act, the Clean Air Act (all as amended) or any state law or regulation implementing such federal statutes or covering the same Waste Materials or media as such federal statutes. The covenant by the Commonwealth is subject to the following reservations: (1) any



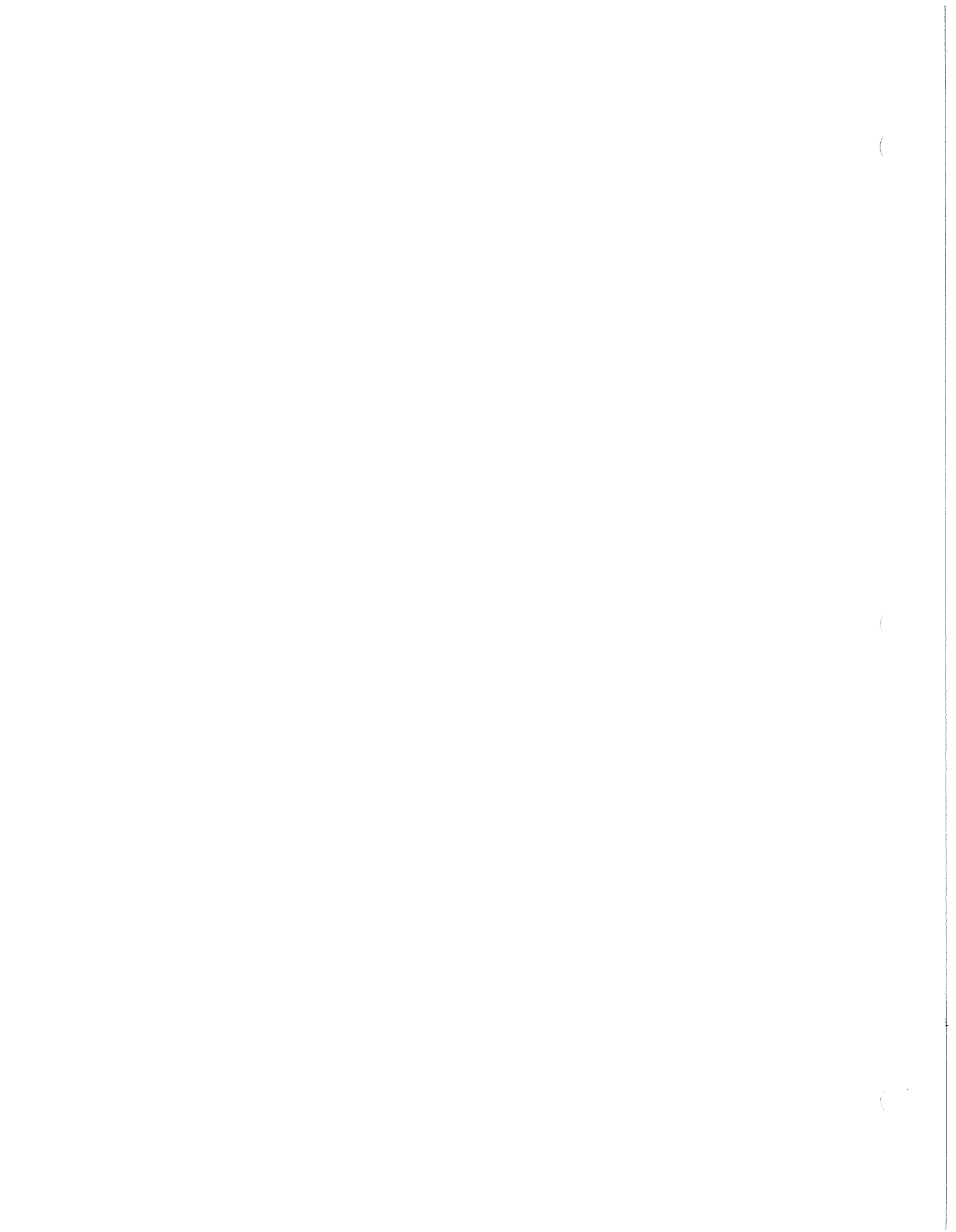
disputes raised under Paragraphs 101, 102 or 103 of this Consent Decree or raised in any of the procedures referred to in those Paragraphs; (2) actions against the Settling Private Parties or Settling Federal Agencies as a result of paying for or performing obligations not imposed on the Commonwealth by the terms of this Consent Decree (other than payment of Past Response Costs or Future Response Costs); and (3) actions by the Commonwealth against U.S. Ecology specifically to resolve disputes under or to enforce the Agreed Order of Settlement dated July 7, 1994 in U.S. Ecology, Inc. v. Bradley, Case No. 88-72, and entered in the United States District Court for the Eastern District of Kentucky, Frankfort Division, on July 14, 1994. This covenant not to sue is conditioned upon compliance by Settling Private Parties and Settling Federal Agencies with their respective obligations under this Consent Decree.

d. In consideration of the obligations undertaken and covenants provided by the Commonwealth under this Consent Decree, the Settling Private Parties and Settling Federal Agencies covenant not to sue the Commonwealth for any and all civil liability under Sections 107 or 113 of CERCLA, state law, and common law relating to the Site, including any liability for Past Response Costs, Future Response Costs, IRP Work, response costs previously incurred by the Settling Private Parties or Settling Federal Agencies, and response costs which are incurred by the Settling Private Parties or Settling Federal Agencies to perform their respective obligations under Sections IX, X, XII,



XVII, XVIII, XX, XXVIII, and XXXIII (Additional Response Actions, Periodic Review, Access, Certification of Completion, Emergency Response, Indemnification and Insurance, Retention of Records, and Community Relations). The covenants by Settling Private Parties and Settling Federal Agencies are subject to the following reservations: (1) any disputes raised under Paragraph 101, 102 or 103 of this Consent Decree, or raised in any of the procedures referred to in those Paragraphs; (2) actions against the Commonwealth as a result of the Settling Private Parties or the Settling Federal Agencies paying for or performing obligations not imposed on them by the terms of this Consent Decree; (3) actions against the Commonwealth by the United States on behalf of DOE and DOD to recover amounts expended by them pursuant to Paragraph 79; and (4) actions by U.S. Ecology against the Commonwealth specifically to resolve disputes under or to enforce the Agreed Order of Settlement dated July 7, 1994 in U.S. Ecology, Inc. v. Bradley, Case No. 88-72, and entered in the United States District Court for the Eastern District of Kentucky, Frankfort Division, on July 14, 1994. This covenant not to sue is conditioned upon compliance by the Commonwealth with its obligations under this Consent Decree.

e. With respect to any of the claims reserved in this Paragraph, in the Settlement Agreement, or in Section XXIV (Covenants Not to Sue or Take Administrative Action by Plaintiff), each Settling Party agrees not to assert the running of any statute of limitations, laches, or similar bars or



defenses to any action arising out of or related to the Site filed against it by another Settling Party or by EPA; provided, however, that any Settling Party may assert such a defense that was available to it on the date of lodging of this Consent Decree and has not been tolled by agreement of the Parties.

XXVI. EFFECT OF SETTLEMENT; CONTRIBUTION PROTECTION

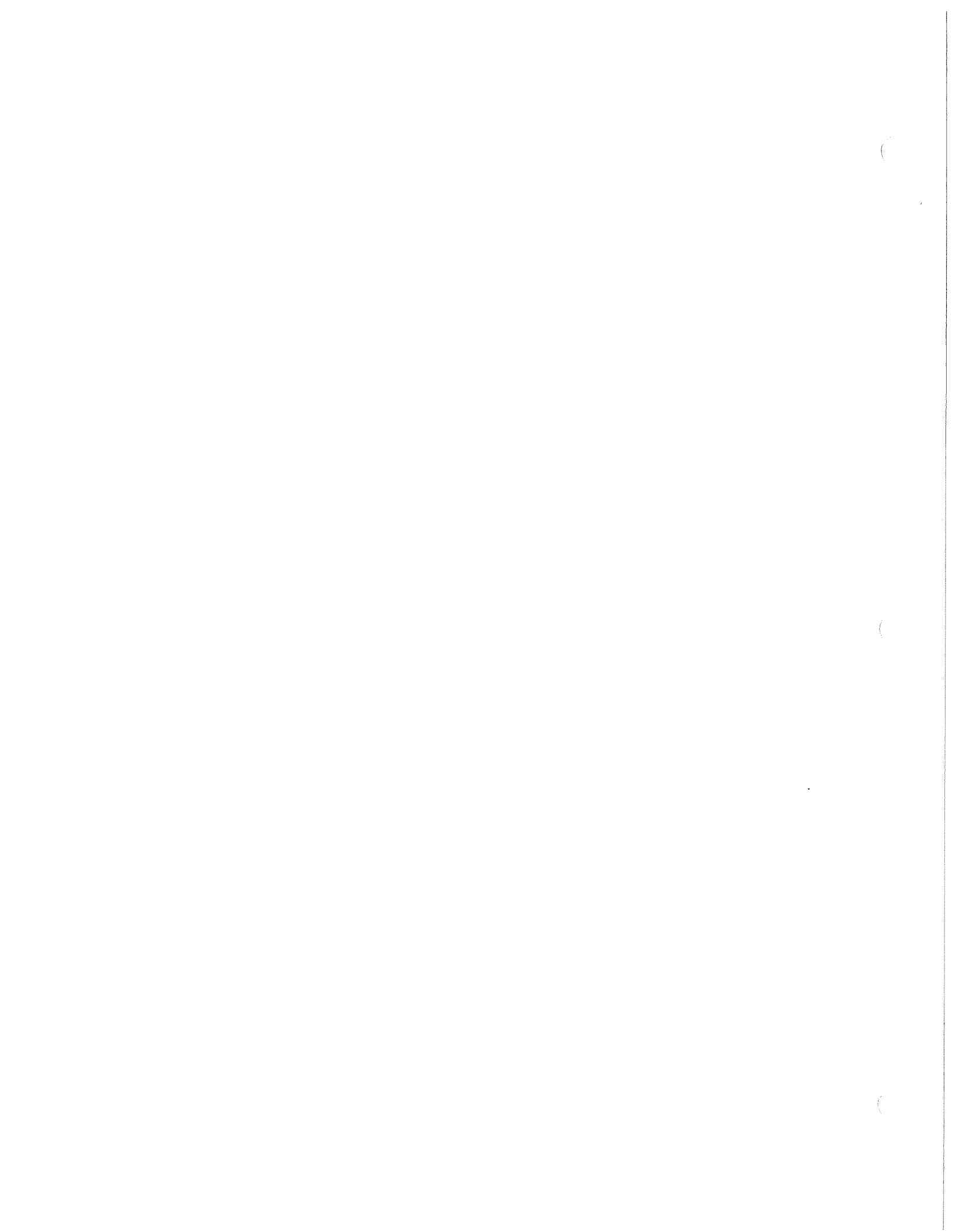
129. Nothing in this Consent Decree shall be construed to create any rights in, or grant any cause of action to, any person not a Party to this Consent Decree. The preceding sentence shall not be construed to waive or nullify any rights that any person not a signatory to this decree may have under applicable law. Each of the Parties expressly reserves any and all rights (including, but not limited to, any right to contribution), defenses, claims, demands, and causes of action which each Party may have with respect to any matter, transaction, or occurrence relating in any way to the Site against any person not a Party hereto except for the claims by the Commonwealth against the De Minimis Settlers that are subject to the Commonwealth's covenant not to sue set forth in Section VI of this Consent Decree.

130. With regard to claims for contribution against Settling Parties for matters addressed in this Consent Decree, the Parties hereto agree that the Settling Parties are entitled to such protection from contribution actions or claims as provided by CERCLA Sections 113(f)(2), 42 U.S.C. § 9613(f)(2). As to all Settling Parties except for the Commonwealth, the





matters addressed in this Consent Decree are liability arising under Sections 106, 107(a), and 113 of CERCLA, 42 U.S.C. §§ 9606, 9607(a) and 9613, relating to the Site, including liability for Past Response Costs; Future Response Costs; IRP Work and BoRP Work; response costs previously incurred by the Settling Private Parties Settling Federal Agencies, or the Commonwealth; natural resource damage claims of the Commonwealth; and response costs incurred by the Settling Private Parties, Settling Federal Agencies, or the Commonwealth to perform their respective obligations under Sections IX, X, XII, XVII, XVIII, XX, XXVIII, and XXXIII (Additional Response Actions, Periodic Review, Access, Certification of Completion, Emergency Response, Indemnification and Insurance, Retention of Records, and Community Relations). As to the Commonwealth, the matters addressed in this Consent Decree are liability arising under Sections 106, 107(a), and 113 of CERCLA, 42 U.S.C. §§ 9606, 9607(a) and 9613, relating to the Site for IRP Work and BoRP Work; response costs previously incurred by the Settling Private Parties, Settling Federal Agencies, and the Commonwealth; and response costs incurred by the Settling Private Parties, Settling Federal Agencies, and the Commonwealth to perform their respective obligations under Sections IX, X, XII, XVII, XVIII, XX, XXVIII, and XXXIII (Additional Response Actions, Periodic Review, Access, Certification of Completion, Emergency Response, Indemnification and Insurance, Retention of Records, and Community Relations), but not including liability for any response costs incurred by

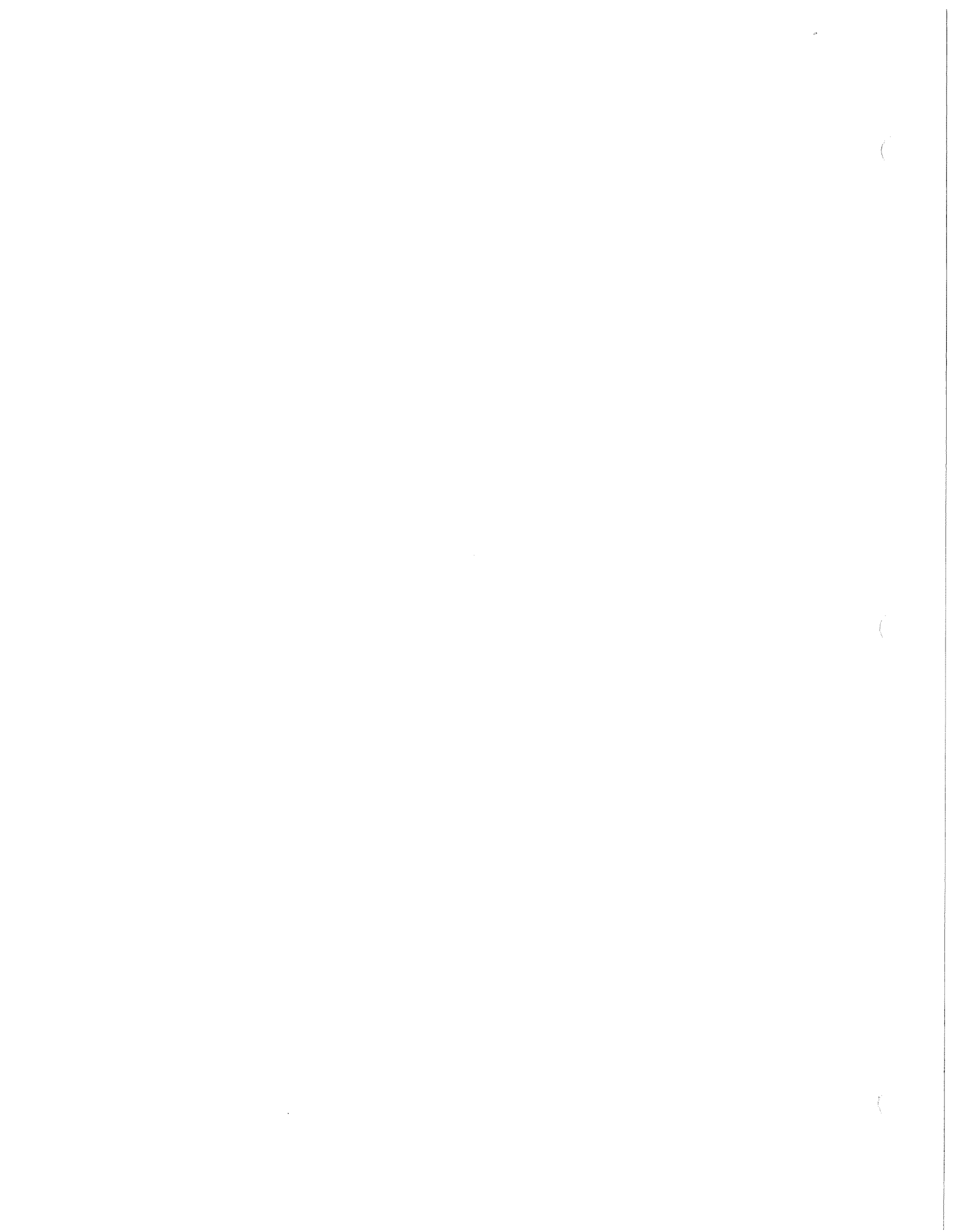


EPA or the United States Department of Justice which the Commonwealth is not specifically required to reimburse under this Consent Decree. Notwithstanding the provisions of this Section or CERCLA, a Settling Party is not entitled to and will not claim contribution protection on behalf of itself or its indemnitees for the claims reserved in Sections XXIV, XXV, or XVI ("Covenants Not to Sue or Take Administrative Action by Plaintiff", "Covenants by Settling Defendants", and "Assurance of Ability to Complete Work") and the Settlement Agreement or in the event that a Settling Party is not in compliance with its obligations under this Consent Decree.

131. Settling Defendants agree that with respect to any suit or claim for contribution brought by them for matters related to this Consent Decree they will notify the United States in writing no later than 60 days prior to the initiation of such suit or claim.

132. Settling Defendants also agree that with respect to any suit or claim for contribution brought against them for matters related to this Consent Decree, they will notify in writing the United States within 10 days of service of the complaint on them. In addition, Settling Defendants shall notify the United States within 10 days of service or receipt of any Motion for Summary Judgment and within 10 days of receipt of any order from a court setting a case for trial.

133. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive relief,

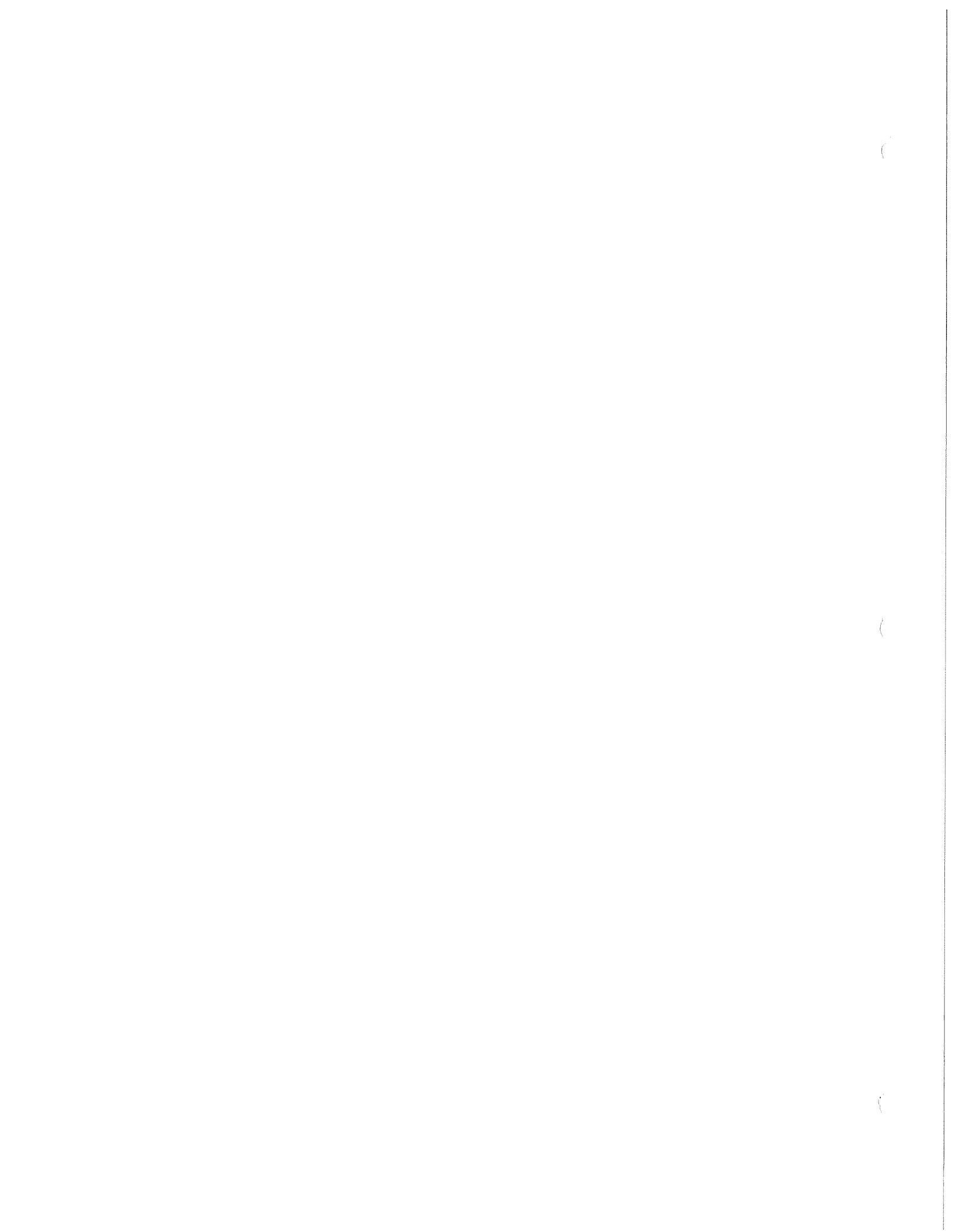


recovery of response costs, or other appropriate relief relating to the Site, Settling Defendants shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States in the subsequent proceeding were or should have been brought in the instant case; provided, however, that nothing in this Paragraph affects the enforceability of the covenants not to sue set forth in Section XXIV (Covenants Not to Sue or Take Administrative Action by Plaintiff).

XXVII. ACCESS TO INFORMATION

134. Settling Parties shall provide to EPA, upon request, copies of all documents and information within their possession or control or that of their contractors or agents relating to activities at the Site or to the implementation of this Consent Decree, including, but not limited to, validated sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Work. Settling Parties shall also make available to EPA, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

135. a. Settling Defendants may assert business confidentiality claims covering part or all of the documents or



information submitted to Plaintiff under this Consent Decree to the extent permitted by and in accordance with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7), and 40 C.F.R. § 2.203(b). Documents or information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no claim of confidentiality accompanies documents or information when they are submitted to EPA, or if EPA has notified Settling Parties that the documents or information are not confidential under the standards of Section 104(e)(7) of CERCLA, the public may be given access to such documents or information without further notice to Settling Parties.

b. Settling Parties may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Settling Parties assert such a privilege in lieu of providing documents, they shall provide the Plaintiff with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the contents of the document, record, or information; and (6) the privilege asserted by Settling Parties. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are privileged.



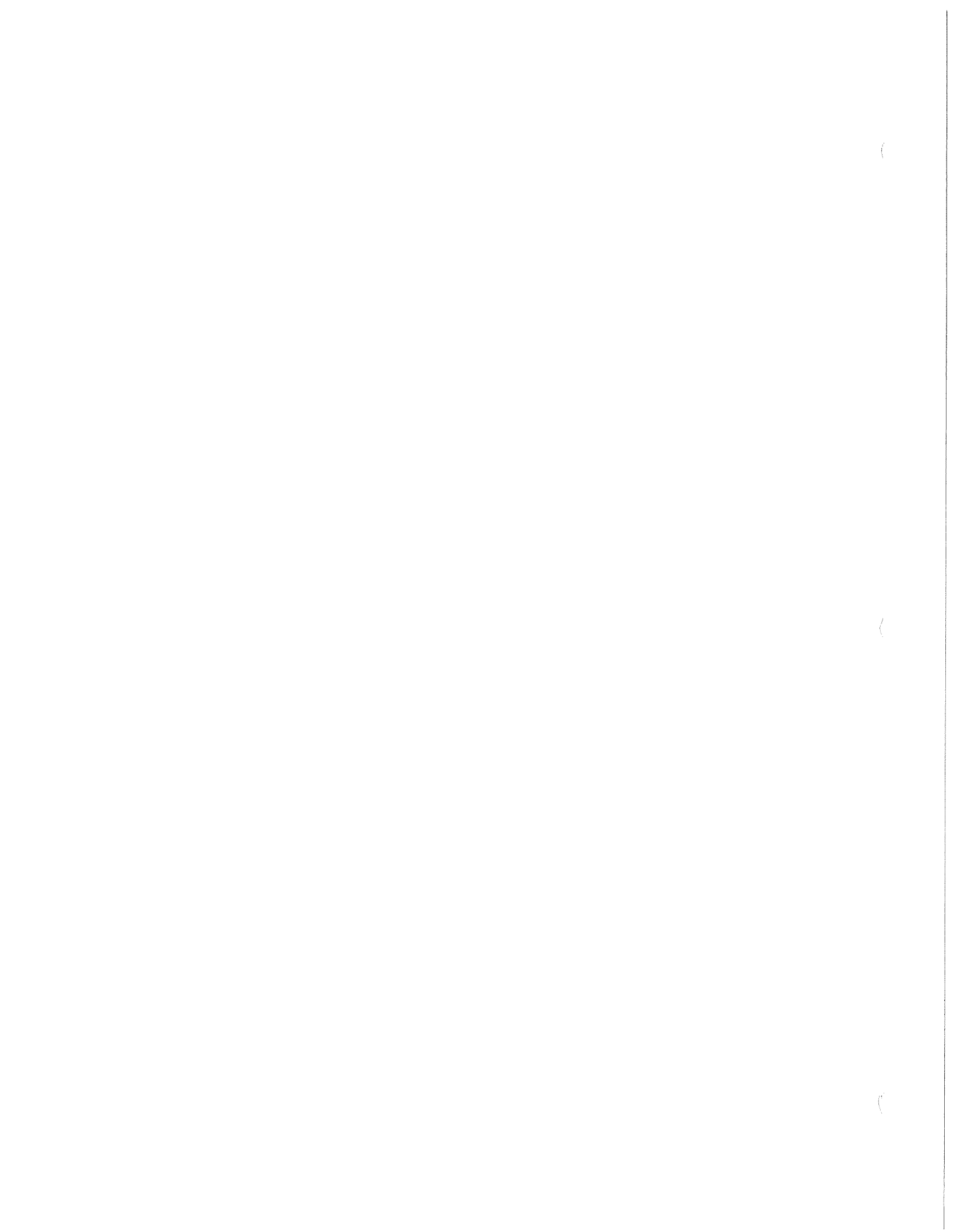


136. No claim of confidentiality shall be made with respect to any data, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, or engineering data, or any other documents or information evidencing conditions at or around the Site.

XXVIII. RETENTION OF RECORDS

137. Until 10 years after the Settling Private Parties' receipt of EPA's notification pursuant to Paragraph 80.b of Section XVII (Certification of Completion), each Settling Party shall preserve and retain all records and documents now in its possession or control or which come into its possession or control that relate in any manner to the performance of the Work or liability of any person for response actions conducted and to be conducted at the Site, regardless of any corporate retention policy to the contrary. Settling Parties shall also instruct their contractors and agents to preserve all documents, records, and information of whatever kind, nature or description relating to the performance of the Work for the same period of time.

138. At the conclusion of this document retention period, Settling Parties shall notify the United States and the Commonwealth at least 90 days prior to the destruction of any such records or documents, and, upon request by the United States or the Commonwealth, Settling Parties shall deliver any such records or documents to EPA or the Commonwealth. The Commonwealth shall continue to preserve any or all such documents if requested to do so by the United States. The Settling Parties

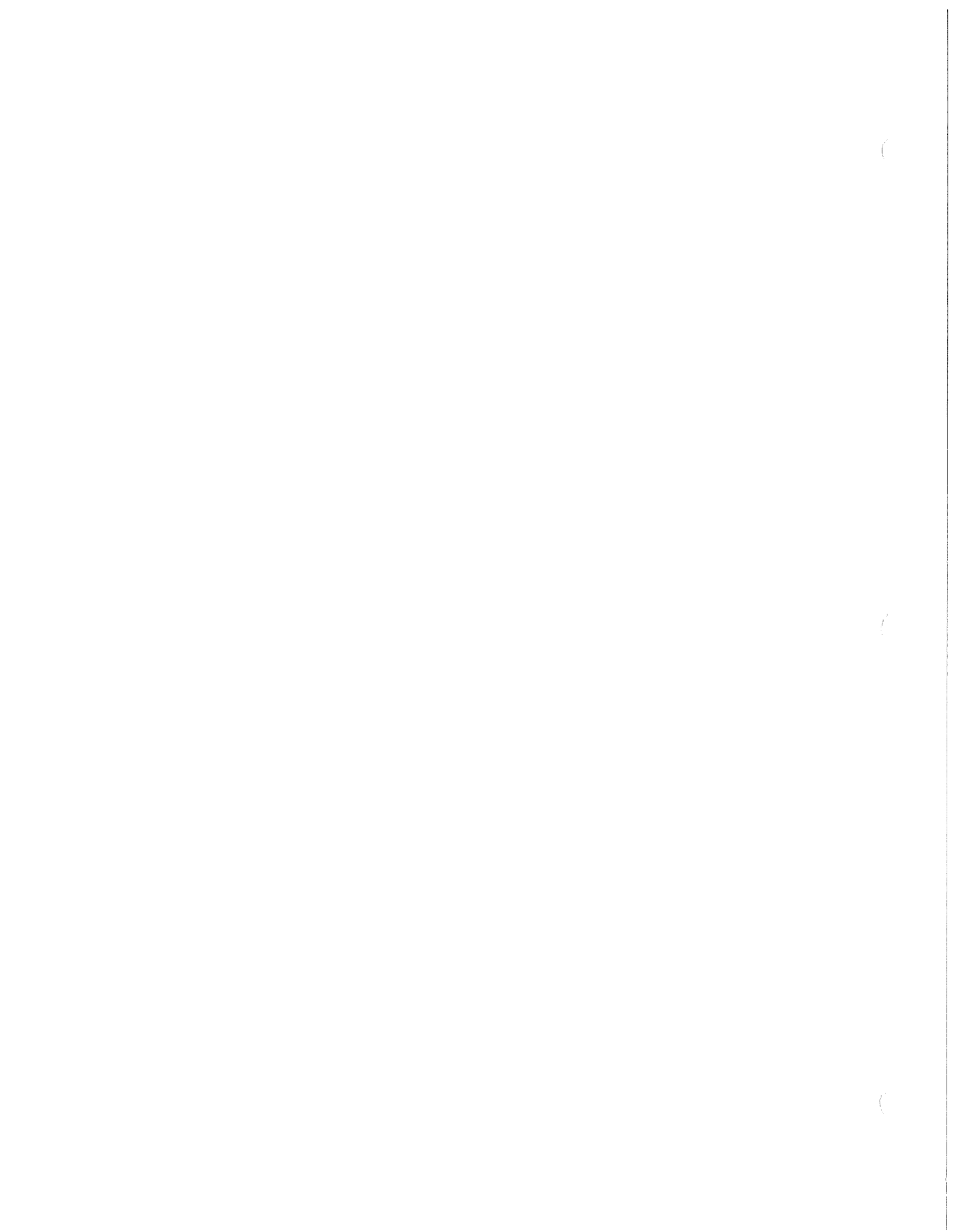


may assert that certain documents, records and other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If the Settling Parties assert such a privilege, they shall provide the Plaintiff with the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of the author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the subject of the document, record, or information; and (6) the privilege asserted by Settling Parties. However, no documents, reports or other information created or generated pursuant to the requirements of the Consent Decree shall be withheld on the grounds that they are privileged.

139. Each Settling Party hereby certifies, individually, that it has not knowingly altered, mutilated, discarded, destroyed, or otherwise disposed of any records, documents or other information relating to its potential liability regarding the Site since notification of potential liability by the United States or the Commonwealth or the filing of suit against it regarding the Site and that it has fully complied with any and all EPA requests for information pursuant to Sections 104(e) and 122(e) of CERCLA and Section 3007 of RCRA.

#### XXIX. NOTICES AND SUBMISSIONS

140. Whenever, under the terms of this Consent Decree, written notice is required to be given or a report or other



document is required to be sent by one Party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or their successors give notice of a change to the other Parties in writing. All notices and submissions shall be considered effective upon receipt, unless otherwise provided in this Consent Decree. Written notice as specified herein shall constitute complete satisfaction of any written notice requirement of the Consent Decree with respect to the United States, EPA and the Settling Parties, respectively.

As to the United States, on behalf of EPA:

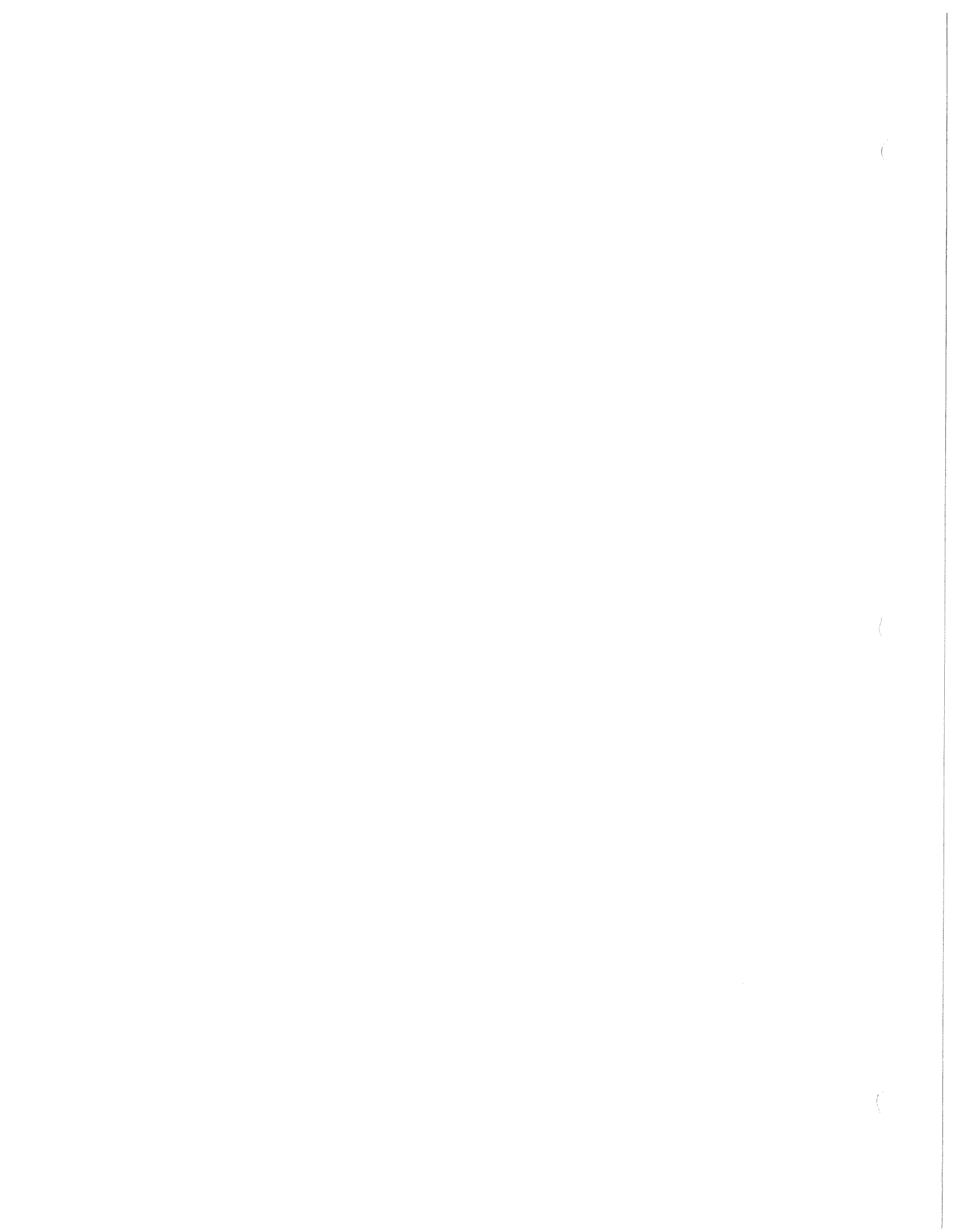
Chief, Environmental Enforcement Section  
Environment and Natural Resources Division  
U.S. Department of Justice  
P.O. Box 7611  
Ben Franklin Station  
Washington, D.C. 20044  
Re: DOJ # 90-11-2-211A

and

Director, Waste Management Division  
United States Environmental Protection Agency  
Region IV  
345 Courtland Street, N.E.  
Atlanta, Georgia 30365  
Re: EPA ID # G1

As to EPA:

Felicia Barnett  
Maxey Flats Project Coordinator  
United States Environmental Protection Agency  
Region IV  
345 Courtland Street, N.E.  
Atlanta, Georgia 30365  
Re: EPA ID # G1



As to the Settling Private Parties:

Lee B. Zeugin  
2000 Pennsylvania Avenue, N.W.  
Ninth Floor  
Washington, D.C. 20006

and

Gary E. Parker  
De Maximus, Incorporated  
Cedar Avenue Business Center  
103 North 11th Avenue  
Suite 210  
Saint Charles, Illinois 60174

As to the Settling Federal Agencies:

Chief  
Environmental Defense Section  
Environment and Natural Resources Division  
U.S. Department of Justice  
P.O. Box 23986  
Washington, D.C. 20026-3986

As to the Commonwealth of Kentucky:

Russell Barnett  
Deputy Commissioner  
Commonwealth of Kentucky  
Natural Resources and Environmental  
Protection Cabinet  
Frankfort Office Park  
18 Reilly Road  
Frankfort, Kentucky 40601

XXX. EFFECTIVE DATE

141. The effective date of this Consent Decree shall be the date upon which this Consent Decree is entered by the Court, except as otherwise provided herein.

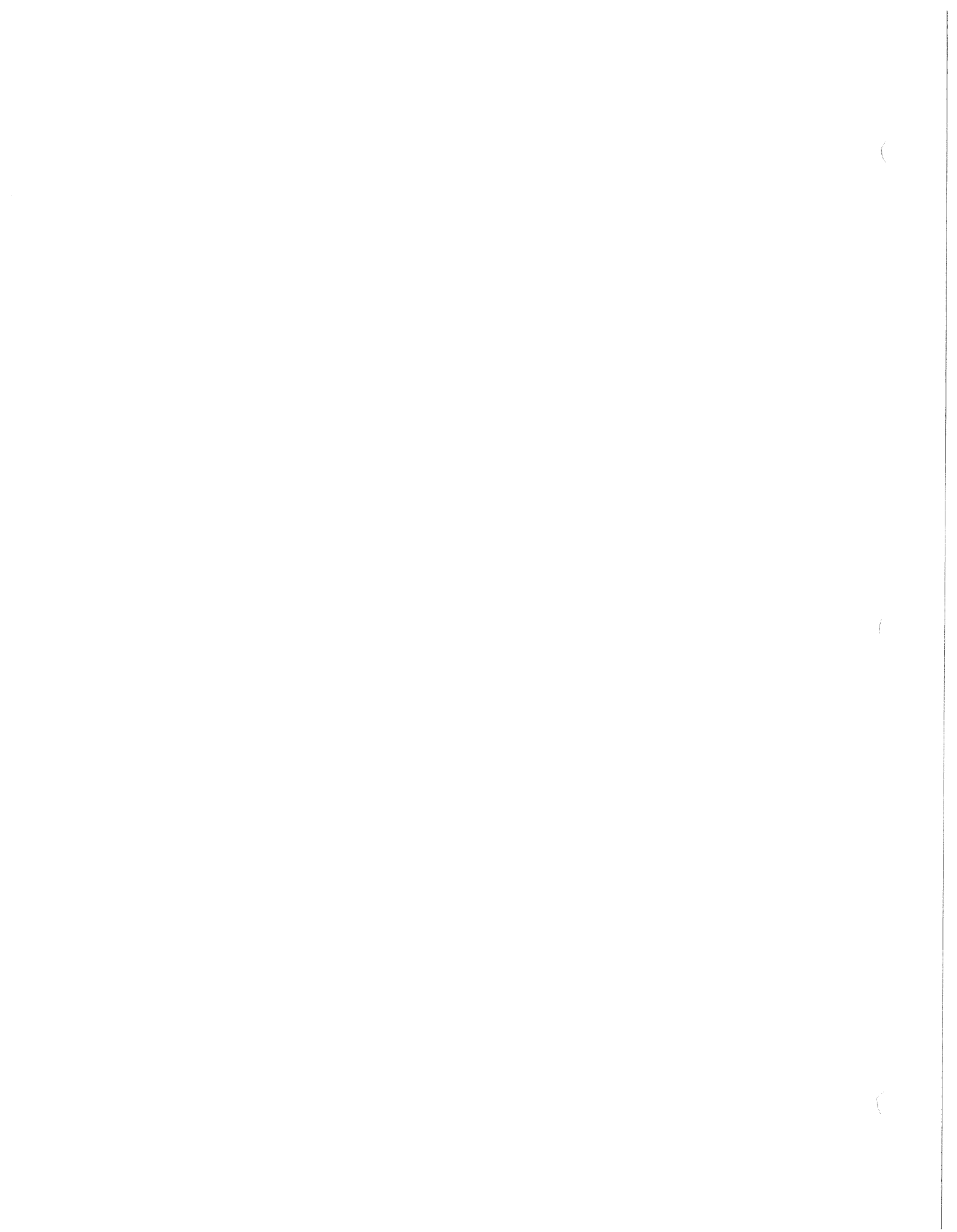
XXXI. RETENTION OF JURISDICTION

142. This Court retains jurisdiction over the subject matter of this Consent Decree and the Settling Parties for the duration of the performance of the terms and provisions of this





Consent Decree for the purpose of enabling any of the Parties to apply to the Court at any time for such further order, direction, and relief as may be necessary or appropriate for the construction or modification of this Consent Decree, or to effectuate or enforce compliance with its terms, or to resolve disputes in accordance with Section XXII (Dispute Resolution) hereof. The Settling Parties agree that the respective obligations undertaken by each of the Settling Parties are intended to benefit each of the other Settling Parties and may be enforced by the Settling Parties against each other subject to any applicable procedures and limitations in Section XXII (Dispute Resolution). In an enforcement action by one Settling Party against another Settling Party that does not proceed under Section XXII, a Settling Party shall not seek relief that compels the Plaintiff or EPA to perform any action or refrain from performing any action, or that supplants, constrains, or imposes conditions upon EPA's authority under CERCLA and this Consent Decree to take response actions or to determine the need for or appropriateness of the Work or response action to be performed under the Consent Decree or under CERCLA at the Site. Notwithstanding the provisions of CERCLA Sections 121 and 122, 42 U.S.C. §§ 9621 and 9622, Settling Parties agree that the relief sought by a Settling Party in any such enforcement action against another Settling Party will not include the recovery of civil or stipulated penalties.



XXXII. APPENDICES

143. The following appendices are attached to and incorporated into this Consent Decree:

"Appendix A" is the ROD.

"Appendix B" is the SOW.

"Appendix C" is the Settlement Agreement.

"Appendix D" is the complete list of Settling Federal Agencies.

"Appendix E" is the complete list of Settling Private Parties.

"Appendix F" is the map of the Site.

XXXIII. COMMUNITY RELATIONS

144. Settling Parties shall propose to EPA their participation in the Revised Community Relations Plan developed by EPA. EPA will determine the appropriate role for the Settling Parties under the Plan. Settling Parties shall also cooperate with EPA in providing information regarding the Work to the public. As requested by EPA, Settling Parties shall participate in the preparation of such information for dissemination to the public and in public meetings which may be held or sponsored by EPA to explain activities at or relating to the Site.

XXXIV. MODIFICATION

145. Schedules specified in this Consent Decree or documents approved pursuant to this Consent Decree for implementation of the Work may be modified by agreement of EPA



and the Settling Parties that are subject to the schedule. All such modifications shall be made in writing.

146. No material modifications shall be made to the SOW without written notification to and written approval of the United States on behalf of EPA, the Settling Parties that are performing or paying for the affected obligation, and the Court. Prior to providing its approval to any modification, the United States will provide the Commonwealth with a reasonable opportunity to review and comment on the proposed modification. Modifications to the SOW that do not materially alter that document may be made by written agreement between EPA and the Settling Parties that are performing or paying for the affected obligation after providing the Commonwealth with a reasonable opportunity to review and comment on the proposed modification.

147. Nothing in this Decree shall be deemed to alter the Court's power to enforce, supervise or approve modifications to this Consent Decree.

XXXV. LODGING AND OPPORTUNITY FOR PUBLIC COMMENT

148. This Consent Decree shall be lodged with the Court for a period of not less than 30 days for public notice and comment in accordance with Section 122(d)(2) of CERCLA, 42 U.S.C. § 9622(d)(2), and 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent to entry of the Consent Decree if the comments regarding the Consent Decree disclose facts or considerations which indicate that the Consent Decree is inappropriate, improper, or inadequate. Settling



Parties consent to the entry of this Consent Decree without further notice.

149. If for any reason the Court should fail to enter this Consent Decree or the De Minimis Consent Decree as lodged with the Court, this agreement is voidable at the sole discretion of any Party, and the terms of the agreement may not be used as evidence in any litigation between the Parties.

XXXVI. SIGNATORIES/SERVICE

150. Each undersigned representative of a Settling Party to this Consent Decree and the Assistant Attorney General for Environment and Natural Resources of the Department of Justice certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind such Party to this document. The Secretary of the Kentucky Cabinet for Natural Resources and Environmental Protection certifies that he is fully authorized pursuant to statute and the Constitution of the United States and the Commonwealth of Kentucky to enter into the terms and conditions of this Consent Decree and to execute and legally bind the Commonwealth to this document.

151. Each Settling Private Party and the Commonwealth hereby agrees not to oppose entry of this Consent Decree by this Court or to challenge any provision of this Consent Decree unless the United States has notified the Settling Defendants in writing that it no longer supports entry of the Consent Decree.





152. The signature of a Settling Private Party shall also constitute execution by such Party of the Settlement Agreement if the signing Party is a party to the agreement.

153. Each Settling Defendant shall identify, on the attached signature page, the name, address and telephone number of an agent who is authorized to accept service of process by mail on behalf of that Party with respect to all matters arising under or relating to this Consent Decree. Settling Defendants hereby agree to accept service in that manner and to waive the formal service requirements set forth in Rule 4 of the Federal Rules of Civil Procedure and any applicable local rules of this Court, including, but not limited to, service of a summons.

SO ORDERED THIS 18<sup>th</sup> DAY OF April,

1976.

Joseph M. Howard  
United States District Judge

THE UNDERSIGNED PARTIES enter into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Site Superfund Site.

FOR THE UNITED STATES OF AMERICA

Date: July 3, 1995

Lois J. Schiffer  
Lois J. Schiffer  
Assistant Attorney General  
Environment and Natural Resources  
Division  
U.S. Department of Justice  
Washington, D.C. 20530

Date: July 3, 1995

Paul G. Wolfteich  
Paul G. Wolfteich  
Environmental Enforcement Section  
Environment and Natural Resources  
Division  
U.S. Department of Justice  
Washington, D.C. 20530

Date: July 3, 1995

Daniel W. Pinkston  
Daniel Pinkston  
Environmental Defense Section  
Environment and Natural Resources  
Division  
9th and Pennsylvania Ave.  
U.S. Department of Justice  
Washington, D.C. 20503

Date: \_\_\_\_\_

\_\_\_\_\_  
[Name]  
Assistant United States Attorney  
Eastern District of Kentucky  
U.S. Department of Justice  
[Address]

Date:

6-28-95

Steven A. Herman  
Assistant Administrator for  
Enforcement and Compliance  
Assurance  
U.S. Environmental Protection  
Agency  
401 M Street, S.W.  
Washington, D.C. 20460

Date:

6-28-95

Cindy A Coldiron  
Cindy Ann Coldiron  
Office of Enforcement and  
Compliance Assurance  
U.S. Environmental Protection  
Agency  
401 M Street, S.W.  
Washington, D.C. 20460

Date:

6-27-95

John H. Hankinson, Jr.  
John H. Hankinson, Jr.  
Regional Administrator, Region IV  
U.S. Environmental Protection  
Agency  
345 Courtland Street, N.E.  
Atlanta, Georgia 30365

Date:

6/27/95

Richard Glaze, Jr.  
Richard Glaze, Jr.  
Assistant Regional Counsel  
U.S. Environmental Protection  
Agency  
Region IV  
345 Courtland Street, N.E.  
Atlanta, Georgia 30365

Date:

6/28/95

Mary Wilkes  
Mary Wilkes  
Associate Regional Counsel  
U.S. Environmental Protection  
Agency  
Region IV  
345 Courtland Street, N.E.  
Atlanta, Georgia 30365

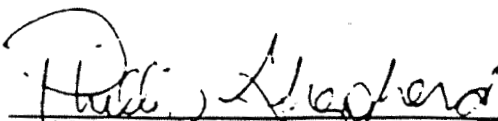
United States v. U.S. Ecology, Inc., et al.  
Consent Decree Signature Page

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR THE COMMONWEALTH OF KENTUCKY

Date:

March 24, 1995

  
Philip J. Shepherd  
Secretary, Natural Resources and  
Environmental Protection Cabinet  
Office of the Secretary  
Frankfort, Kentucky 40601

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: The Babcock & Wilcox Company  
(name of private or federal agency party)

BY: E. O. Hooker *E.O.H.* 03/09/95  
(name of representative authorized to sign for party)

Title: Senior Vice President

Address: P.O. Box 785  
Rt. 726, Mt. Athos Road  
Lynchburg, VA 24505

Agent authorized to accept service on behalf of party:

Name: Edward R. Parker

Title: Registered Agent

Address: 5511 Staples Mill Road / P.O. Box 28236  
Richmond, VA 23228

Tel. Number: (804) 262-4042

\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: BATTELLE MEMORIAL INSTITUTE  
(name of private or federal agency party)

BY: ROBERT W. SMITH, JR. *Robert W. Smith Jr.*  
(name of representative authorized to sign for party)

Title: SR. VICE PRESIDENT

Address: BATTELLE MEMORIAL INSTITUTE  
505 KING AVENUE  
COLUMBUS, OH 43201-2693

Agent authorized to accept service on behalf of party:

Name: JEROME R. BAHLMANN

Title: SENIOR VICE PRESIDENT & GENERAL COUNSEL

Address: 505 KING AVENUE  
COLUMBUS OH 43201-2693

Tel. Number: (614) 424-7360

---

\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Boston Edison Company  
(name of private or federal agency party)

BY: E. Thomas Boulette  
(name of representative authorized to sign for party)  
E. Thomas Boulette  
Title: Senior Vice President Nuclear

Address: Boston Edison Company—  
Pilgrim Nuclear Power Station  
Executive Building  
600 Rocky Hill Road  
Plymouth, MA 02360

Agent authorized to accept service on behalf of party:

Name: William S. Stowe, Esq.  
Assistant General Counsel

Title: Legal Department  
Boston Edison Company

Address: 800 Boylston Street  
Boston, MA 02199

Tel. Number: (617) 424-2544

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Carolina Power & Light Company  
(name of private or federal agency party)

BY: H. William Habermeyer, Jr. *H. William Habermeyer, Jr.*  
(name of representative authorized to sign for party)

Title: Vice President - Nuclear Services and Environmental Support

Address: Carolina Power & Light Company  
P.O. Box 1551  
Raleigh, North Carolina 27602

Agent authorized to accept service on behalf of party:

Name: Richard E. Jones

Title: Senior Vice President

Address: P.O. Box 1551

Raleigh, North Carolina 27602

Tel. Number: (919) 546-6517

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.



THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Chem-Nuclear Systems, Inc.  
(name of private or federal agency party)

BY: Greig R. Siedor Greig R. Siedor  
(name of representative authorized to sign for party)

Title: Senior Counsel

Address: Legal Department  
Chemical Waste Management, Inc.  
3001 Butterfield Road  
Oak Brook, Illinois 60521

Agent authorized to accept service on behalf of party:

Name: Greig R. Siedor

Title: Senior Counsel

Address: Legal Department  
Chemical Waste Management, Inc.  
3001 Butterfield Road  
Oak Brook, Illinois 60521

Tel. Number: (708) 218-1635

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Combustion Engineering, Inc.  
(name of private or federal agency party)

BY: Robert S. Bell, Jr. *Robert S. Bell, Jr.*  
(name of representative authorized to sign for party)

Title: Assistant Secretary

Address: 1000 Prospect Hill Road  
Windsor, Connecticut 06095

Agent authorized to accept service on behalf of party:

Name: Robert S. Bell, Jr.

Title: Assistant Secretary

Address: 1000 Prospect Hill Road  
Windsor, Connecticut 06095

Tel. Number: (203) 285-9780

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Commonwealth Edison  
(name of private or federal agency party)

BY: Mary F. O'Toole *Mary F. O'Toole*  
(name of representative authorized to sign for party)

Title: Environmental Services Manager

Address: 10 S. Dearborn  
Chicago, Illinois 60603

Agent authorized to accept service on behalf of party:

Name: Diane Richardson

Title: Sr. Chemist, Environmental Services 35 FNW

Address: 10 S. Dearborn  
Chicago, Illinois 60603

Tel. Number: 312/394-4438

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Consolidated Edison Company of New York, Inc.  
(name of private or federal agency party)

BY: J. Bowring Woodbury II T. Bowring Woodbury, II  
(name of representative authorized to sign for party)

Title: Senior Vice President & General Counsel

Address: Con Edison  
4 Irving Place  
New York, NY 10003

Agent authorized to accept service on behalf of party:

Name: Michael A. Wilcken

Title: Senior Attorney

Address: Con Edison

4 Irving Place, New York, NY 10003

Tel. Number: (212) 460-3241

---

\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: CONSUMERS POWER COMPANY  
(name of private or federal agency party)

BY: David A. Mikelonis  
(name of representative authorized to sign for party)

Title: David A. Mikelonis  
Sr Vice President and General Counsel

Address: 212 West Michigan Avenue

Jackson, MI 49201

Agent authorized to accept service on behalf of party:

Name: Thomas A. McNish

Title: Vice President and Secretary

Address: 212 West Michigan Avenue

Jackson, MI 49201

Tel. Number: (517)788-1030

APPROVED AS TO FORM

JPM 3/21/95  
CONSUMERS POWER COMPANY  
LEGAL DEPARTMENT

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: The Dow Chemical Company  
(name of private or federal agency party)

BY: Mark Tucker  
(name of representative authorized to sign for party)

Title: Senior Counsel

Address: The Dow Chemical Company  
2030 Dow Center  
Midland, MI 48674

Agent authorized to accept service on behalf of party:

Name: Edward R. Parker

Title: \_\_\_\_\_

Address: CT Corporation  
5511 Staples Mill Road  
Richmond, VA 23228

Tel. Number: 804-262-4042

\_\_\_\_\_  
\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: E. I. du Pont de Nemours and Company  
(name of private or federal agency party)

BY: *John L. Riddle* / John L. Riddle  
(name of representative authorized to sign for party)

Title: Remediation Program Manager

Address: 1007 Market Street

B-12220

Wilmington, DE 19898

Date: March 27, 1995

Agent authorized to accept service on behalf of party:

Name: Guy V. Johnson

Title: Senior Counsel

Address: E. I. du Pont de Nemours and Company  
1007 Market Street  
Wilmington, DE 19898

Tel. Number: (302)-774-5113

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: General Dynamics Corporation  
(name of private or federal agency party)

BY: Edward C. Bruntrager *Edward C. Bruntrager*  
(name of representative authorized to sign for party)

Title: Corporate Vice President & General Counsel

Address: 3190 Fairview Park Drive  
Falls Church, VA 22042

Agent authorized to accept service on behalf of party:

Name: Gary W. Ballesteros, Esq.

Title: \_\_\_\_\_

Address: Jenner & Block

1 IBM Plaza  
Chicago, IL 60611

Tel. Number: (312)-222-9350

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.



THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: General Electric Company  
(name of private or federal agency party)

BY: Robert W. Frantz  
(name of representative authorized to sign for party)

Title: Manager and Counsel, Environmental Remediation Program

Address: 3135 Easton Turnpike  
Fairfield, CT. 06431

Agent authorized to accept service on behalf of party:

Name: Kirk R. Macfarlane  
Title: Counsel - Mid Atlantic/Southeast Region

Address: General Electric Company - CEP  
640 Freedom Business Center  
King of Prussia, PA. 19406

Tel. Number: (610) 992 7976

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: IES Utilities Inc. (f/k/a Iowa Electric Light and Power Company)  
(name of private or federal agency party)

BY: John F. Franz, Jr. *John F. Franz, Jr.* 3/13/95  
(name of representative authorized to sign for party)

Title: Vice President, Nuclear

Address: 200 First Street S.E.

Cedar Rapids, Iowa 52401

Agent authorized to accept service on behalf of party:

Name: Daniel L. Siegfried

Title: Senior Attorney - Environmental

Address: 200 First Street S.E.

Cedar Rapids, Iowa 52401

Tel. Number: (319) 398-4686

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

-144-

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: INGALLS SHIPBUILDING, INC.  
(name of private or federal agency party)

BY: JOHN C. ARLEDGE, III  
(name of representative authorized to sign for party)

Title: STAFF VICE PRESIDENT  
CONTRACTS/ESTIMATING

Address: POST OFFICE BOX 149  
PASCAGOULA, MS 39568-0149

Agent authorized to accept service on behalf of party:

Name: THE PRENTICE HALL CORP. SYSTEMS, INC.

Title: \_\_\_\_\_

Address: 506 SOUTH PRESIDENT STREET  
JACKSON, MS 39201

Tel. Number: 601-948-4870

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Jersey Central Power & Light  
(name of private or federal agency party)

BY: *MR Monell*  
(name of representative authorized to sign for party)

Title: Vice President Regulatory & Public Affairs

Address: c/o Jersey Central Power & Light  
300 Madison Avenue  
Morristown, NJ 07960

Agent authorized to accept service on behalf of party:

Name: James R. Wendelgass, Esq.

Title: Senior Attorney

Address: c/o Metropolitan Edison Company  
2800 Pottsville Pike, P.O. Box 16001  
Reading, PA 19640-0001

Tel. Number: 610-921-6328

---

  
\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Metropolitan Edison Company  
(name of private or federal agency party)

BY: R. J. Toole  
(name of representative authorized to sign for party)

Title: R. J. Toole, Vice President - Generation

Address: c/o Metropolitan Edison Company  
2800 Pottsville Pike, P.O. Box 16001  
Reading, PA 19640-0001

Agent authorized to accept service on behalf of party:

Name: James R. Wendelgass, Esq.

Title: Senior Attorney

Address: c/o Metropolitan Edison Company  
2800 Pottsville Pike, P.O. Box 16001  
Reading, PA 19640-0001

Tel. Number: (610)-921-6328

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: MINNESOTA MINING AND MANUFACTURING  
(name of private or federal agency party)

BY: *Russell H. Susag* Russell H. Susag  
(name of representative authorized to sign for party)

Title: Director, Environmental Regulatory Affairs

Address: P O Box 33331  
St. Paul, MN 55133-3331

Agent authorized to accept service on behalf of party:

Name: Brian H. Davis

Title: Senior Counsel

Address: Bldg 220-12E-02  
P O Box 33428  
St. Paul, MN 55133-3428

Tel. Number: 612/733-5553

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent-Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: The NDJ Organization, Inc.  
(name of private or federal agency party)

BY: Peter J. Pastorella *Peter J. Pastorella*  
(name of representative authorized to sign for party)

Title: President

Address: P. O. Box 791  
Peekskill, New York 10566  
tel: 914-737-7200

Agent authorized to accept service on behalf of party:

Name: Same As Above

Title: \_\_\_\_\_

Address: \_\_\_\_\_

Tel. Number: \_\_\_\_\_

---

\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent-Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: New York Power Authority  
(name of private or federal agency party)

BY: Charles M. Pratt *Charles M. Pratt*  
(name of representative authorized to sign for party)

Title: Senior Vice President and General Counsel

Address: New York Power Authority  
1633 Broadway  
New York, New York 10019

Agent authorized to accept service on behalf of party:

Name: James D. Lyons

Title: Principal Attorney

Address: New York Power Authority  
1633 Broadway

New York, New York 10019

Tel. Number: ---212-468-6135

\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.



THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Newport News Shipbuilding and Dry Dock Company  
(name of private or federal agency party)

BY: *W. P. Fricks* W. P. Fricks  
(name of representative authorized to sign for party)

Title: President and Chief Operating Officer

Address: Newport News Shipbuilding and Dry Dock Company  
4101 Washington Avenue  
Newport News, VA 23607

Agent authorized to accept service on behalf of party:

Name: Stephen B. Clarkson

Title: General Counsel and Secretary

Address: 4101 Washington Avenue

Newport News, VA 23607

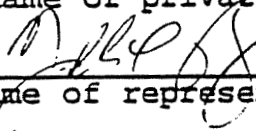
Tel. Number: 804-380-3600

---

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Newport News Industrial Corporation/Construction Company, Inc.  
(formerly Nuclear Service and  
(name of private or federal agency party))

BY:  W. P. Fricks  
(name of representative authorized to sign for party)

Title: Director

Address: Newport News Industrial Corporation

4101 Washington Avenue

Newport News, VA 23607

Agent authorized to accept service on behalf of party:

Name: Stephen B. Clarkson

Title: General Counsel and Secretary

Address: 4101 Washington Avenue

Newport News, VA 23607

Tel. Number: 804-380-3600

---

\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: NIAGARA MOHAWK POWER CORPORATION  
(name of private or federal agency party)

BY: Thomas R. Fair  
(name of representative authorized to sign for party) *WCV*  
Thomas R. Fair

Title: Vice President - Environmental Affairs

Address: 300 Erie Boulevard West  
Syracuse, New York 13202

Agent authorized to accept service on behalf of party:

Name: Thomas J. O'Neill, Esq.

Title: Assistant General Counsel

Address: 300 Erie Boulevard West - System Law Dept.  
Syracuse, New York 13202

Tel. Number: (315) 428-6942

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: NL Industries, Inc.  
(name of private or federal agency party)

BY: Marcus A. Martin  
(name of representative authorized to sign for party)  
Marcus A. Martin, Esq.

Title: Counsel for NL Industries, Inc.

Address: 511 16th Street, Suite 700  
Denver, Colorado 80202  
(303) 592-3180

Agent authorized to accept service on behalf of party:

Name: David B. Garten

Title: Vice President and General Counsel

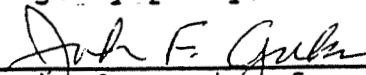
Address: 16825 Northcase Drive, Suite 1200  
Houston, Texas 77060

Tel. Number: (713) 423-3305

\_\_\_\_\_  
\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: NORTHEAST UTILITIES SERVICE COMPANY\*  
(name of private or federal agency party)

BY: JOHN F. OPEKA   
(name of representative authorized to sign for party)

Title: EXECUTIVE VICE PRESIDENT

Address: P.O. BOX 270  
HARTFORD, CT 06141

Agent authorized to accept service on behalf of party:

Name: PHILIP M. SMALL

Title: ASSISTANT GENERAL COUNSEL

Address: P.O. BOX 270  
HARTFORD, CT 06141

Tel. Number: (203) 665-3214

\* AS AGENT FOR NORTHEAST NUCLEAR ENERGY COMPANY AND CONNECTICUT YANKEE ATOMIC POWER COMPANY.

---

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Nuclear Fuel Services, Inc.  
(name of private or federal agency party)

BY: Dwight B. Ferguson, Jr. *Dwight B. Ferguson, Jr.*  
(name of representative authorized to sign for party)

Title: President

Address: 1205 Banner Hill Road  
Erwin, TN 37650

Agent authorized to accept service on behalf of party:

Name: Neil J. Newman

Title: General Counsel

Address: 1700 Rockville Pike, Suite 400  
Rockville, MD 20852-1631

Tel. Number: (301)770-5510

\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Nuclear Metals, Inc.  
(name of private or federal agency/party)

BY: Frank J. Vumbaco *Frank J. Vumbaco*  
(name of representative authorized to sign for party)

Title: Vice President, Health and Safety

Address: Nuclear Metals, Inc.  
2229 Main Street  
Concord, MA 01742

Agent authorized to accept service on behalf of party:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

Tel. Number: \_\_\_\_\_

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: PECO Energy Company (formerly Philadelphia Electric Co.)  
(name of private or federal agency party)

BY:   
(name of representative authorized to sign for party)

Title: Dickinson M. Smith  
Senior Vice President

Address: PECO Energy Company  
Nuclear Group Headquarters  
965 Chesterbrook Blvd. 63C-3  
Wayne, PA 19087

Agent authorized to accept service on behalf of party:

Name: Edward J. Cullen, Jr.

Title: Assistant General Counsel

Address: PECO Energy Company  
2301 Market Street - S23-1, Philadelphia, PA 19103

Tel. Number: (215) 841-4273

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.



THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Rochester Gas and Electric Corporation  
(name of private or federal agency party)

BY: Terrence Weis *Terrence Weis*  
(name of representative authorized to sign for party)

Title: Group Manager, Support Services

Address: 89 East Avenue  
Rochester, NY 14649

Agent authorized to accept service on behalf of party:

Name: Terrence Weis

Title: Group Manager, Support Services

Address: 89 East Avenue

Rochester, NY 14649

Tel. Number: (716) 724-8104

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Safety Light Corporation  
(name of private or federal agency party)

BY: Charles R. White  
(name of representative authorized to sign for party)

Title: president

Address: 3140 Old Berwick Road  
Bloomsberg, PA

Agent authorized to accept service on behalf of party:

Name: Carole Stern

Title: McKenna + Cuneo

Address: 1575 Eye Street, NW  
Washington, DC 20005

Tel. Number: 202-789-7775

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Saxton Nuclear Experimental Corporation  
(name of private or federal agency party)

BY: Beverly A. Good *Beverly A. Good*  
(name of representative authorized to sign for party)

Title: Vice President and General Manager

Address: c/o GPU Nuclear Corporation  
One Upper Pond Road  
Parsippany, NJ 07054

Agent authorized to accept service on behalf of party:

Name: James R. Wendelgass, Esq.

Title: Senior Attorney

Address: c/o Metropolitan Edison Company  
2800 Pottsville Pike, P.O. Box 16001  
Reading, PA 19640-0001

Tel. Number: 610-921-6328

---

\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Smith Kline Beecham Corporation  
(name of private or federal agency party)

BY: Alan M. Robinson  
(name of representative authorized to sign for party)

Title: V. P. and Associate General Counsel

Address: One Franklin Plaza  
Philadelphia, PA 19102

Agent authorized to accept service on behalf of party:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

Tel. Number: \_\_\_\_\_

\_\_\_\_\_  
\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Union Carbide Corporation  
(name of private or federal agency party)

BY: <sup>usc</sup> DC Macaulay  
(name of representative authorized to sign for party)

Title: Director, Environment

Address: 39 Old Ridgely Rd  
Denbury CT 06817

Agent authorized to accept service on behalf of party:

Name: Christopher S. Colman

Title: Environmental Counsel

Address: 39 Old Ridgely Road  
Denbury CT 06817

Tel. Number: 203-794-6258

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: U.S. ECOLOGY, INC  
(name of private or federal/agency party)

BY: Stephen W. Travers  
(name of representative authorized to sign for party)

Title: Secretary

Address: 5333 Westheimer, Suite 1000

Houston, TX 77056-5407

Agent authorized to accept service on behalf of party:

Name: Stephen W. Travers

Title: Secretary

Address: 5333 Westheimer, Suite 1000

Houston, TX 77056-5407

Tel. Number: \_\_\_\_\_

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Vermont Yankee Nuclear Power Corporation  
(name of private or federal agency party)

BY: Russell W. Weyman  
(name of representative authorized to sign for party)

Title: Vice President of Finance and Treasurer

Address: Ferry Road  
Brattleboro, VT 05301

Agent authorized to accept service on behalf of party:

Name: Dean Weyman

Title: Environmental Supervisor


Address: Ferry Road  
Brattleboro, VT 05301

Tel. Number: 802-258-4114

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Virginia Power  
(name of private or federal agency party)

BY:   
(name of representative authorized to sign for party)

Title: Sr Vice President - Corporate Services

Address: P. O. Box 26666  
Richmond, Virginia 23261-6666

Agent authorized to accept service on behalf of party:

Name: Burton M. Marshall

Title: Manager - Water Quality

Address: 5000 Dominion Blvd.

Glen Allen, VA 23060-6711

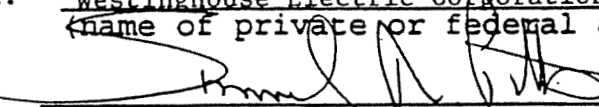

Tel. Number: 804-273-2990

          
\*A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.



THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Westinghouse Electric Corporation  
(name of private or federal agency party)

BY:    
(name of representative authorized to sign for party)

Samuel R. Pitts  
Title: Vice President

Address: Westinghouse Electric Corporation  
11 Stanwix Street  
Pittsburgh, PA 15222

Agent authorized to accept service on behalf of party:

Name: Roger E. Wills, Jr.

Title: Assistant General Counsel

Address: 11 Stanwix Street

Pittsburgh, PA 15222

Tel. Number: (412) 642-5815

---

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THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: WHITTAKER CORPORATION  
(name of private or federal agency party)

BY: Gordon J. Louttit  
(name of representative authorized to sign for party)

Title: GORDON J. LOUTTIT  
VICE PRESIDENT

Address: 10880 WILSHIRE BLVD.,  
LOS ANGELES, CALIFORNIA  
90024

Agent authorized to accept service on behalf of party:

Name: \_\_\_\_\_

Title: (SAME AS ABOVE)

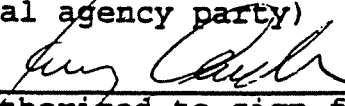
Address: \_\_\_\_\_

Tel. Number: (310) 475-9411

\_\_\_\_\_  
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FOR: X-RAY INDUSTRIES INC  
(name of private or federal agency party)

BY: KURT J. ANDREWS   
(name of representative authorized to sign for party)

Title: CHIEF FINANCIAL OFFICER

Address: 1961 THUNDERBOLT  
TROY MI 48064  
810-362-2242 / 810-362-4422 (FAX)

Agent authorized to accept service on behalf of party:

Name: N/A

Title: \_\_\_\_\_

Address: \_\_\_\_\_

Tel. Number: \_\_\_\_\_

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FOR: The National Aeronautics and Space Administration (NASA)

(name of private or federal agency party)

BY:

Benita A. Cooper  
(name of representative authorized to sign for party)

Benita A. Cooper

Title: Associate Administrator for Management Systems & Facilities

Address: NASA Headquarters

300 E Street, S.W.

Washington, D.C. 20546

Agent authorized to accept service on behalf of party:

Name: Edward A. Frankle

Title: General Counsel

Address: NASA Headquarters

300 E Street, S.W., Washington, D.C. 20546

Tel. Number: (202) 358-2450

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

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-144-

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: U.S. Department of Energy

BY: *Thomas P. Grumbly*  
Thomas P. Grumbly Date

Title: Assistant Secretary for Environmental Management

Address: 1000 Independence Ave., S.W.  
Washington, D.C. 20585

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

-144-

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FOR: United States Army  
(name of private or federal agency party)

BY: Lewis D. Walker  
(name of representative authorized to sign for party)  
Deputy Assistant Secretary of the Army  
Title: (Environment, Safety and Occupational Health)

Address: 1100 Army Pentagon, Rm 2E577  
Washington, DC 20310-0110

Agent authorized to accept service on behalf of party:

Name: Chief Environmental Law

Title: U.S. Army

Address: 901 N Stuart Street

Arlington, Va 22333-1837

Tel. Number: 703-696-1230

Lewis D. Walker  
Signature

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FOR: United States Navy

(name of private or federal agency party)

BY:

(name of representative authorized to sign for party)

Robert B. Pirie, Jr.  
Title: Assistant Secretary of the Navy  
(Installations & Environment)

Address: 1000 Navy Pentagon  
Washington, DC 20350-1000

Agent authorized to accept service on behalf of party:

Name: Steven S. Honigman

Title: General Counsel of the Navy

Address: 1000 Navy Pentagon

Washington, DC 20350-1000

Tel. Number: 703-614-1994

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FOR: United States Air Force  
(name of private or federal agency party)

BY: Thomas W. L. McCall, Jr. *Tom McCall*  
(name of representative authorized to sign for party)

Title: Deputy Assistant Secretary of the Air Force  
(Environmental Safety and Occupational Health)

Address: 1660 Air Force Pentagon  
Washington DC 20330-1660

Agent authorized to accept service on behalf of party:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

Tel. Number: \_\_\_\_\_

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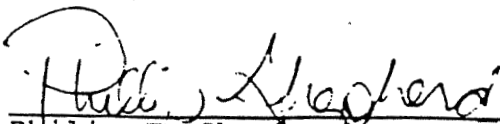
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FOR THE COMMONWEALTH OF KENTUCKY

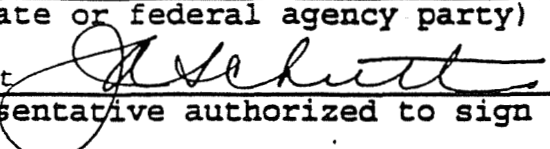
Date:

March 24, 1995

  
Philip J. Shepherd  
Secretary, Natural Resources and  
Environmental Protection Cabinet  
Office of the Secretary  
Frankfort, Kentucky 40601

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: ALLIEDSIGNAL INC.  
(name of private or federal agency party)

BY: James A. Schutt   
(name of representative authorized to sign for party)

Title: Director, Manufacturing Services

Address: 101 Columbia Road  
Morristown, NJ 07962

Agent authorized to accept service on behalf of party:

Name: David P. Cooke, Esq.

Title: Assistent General Counsel

Address: 101 Columbia Road  
Morristown, NJ 07962

Tel. Number: (201) 455-2817

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THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: AMAX, INC. n/k/a CYPRUS Amax Minerals Company  
(name of private or federal agency party)

BY: [Signature]  
(name of representative authorized to sign for party)

Title: Director, Environmental Affairs

Address: 9100 E MINERAL CIRCLE  
ENGLEWOOD, CO 80112

Agent authorized to accept service on behalf of party:

Name: THE CORPORATION TRUST COMPANY

Title: REGISTERED AGENT FOR CYPRUS Amax Minerals Company

Address: 1209 Orange Street  
Wilmington, DELAWARE 19801

Tel. Number: 302-658-7581

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Arkansas Power & Light Company  
(name of private or federal agency party)

BY: Donald C. Hintz *Donald C. Hintz*  
(name of representative authorized to sign for party)

Title: Executive Vice President-Nuclear

Address: P.O. Box 31995  
Jackson, MS 39286-1995

Agent authorized to accept service on behalf of party:

Name: Shirley Hunter

Title: Assistant Secretary

Address: 625 West Capitol Street  
Little Rock, Arkansas 72201

Tel. Number: (501) 377-3533

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.

THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: CWM Consolidation Sub, Inc. successor-in-interest to ATCOR, Inc.  
(name of private or federal agency party)

BY: Greig R. Siedor Greig R. Siedor  
(name of representative authorized to sign for party)

Title: Senior Counsel

Address: Legal Department  
Chemical Waste Management, Inc.  
3001 Butterfield Road  
Oak Brook, Illinois 60521

Agent authorized to accept service on behalf of party:

Name: Greig R. Siedor

Title: Senior Counsel

Address: Legal Department  
Chemical Waste Management, Inc.  
3001 Butterfield Road  
Oak Brook, Illinois 60521

Tel. Number: (708)-218-1635

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THE UNDERSIGNED PARTY enters into this Consent Decree in the matter of United States v. U.S. Ecology, Inc., et al., relating to the Maxey Flats Disposal Superfund Site.

FOR: Atlantic Richfield Company  
(name of private or federal agency party)

BY: R. J. Trunek by C. K. [unclear] 3/15/95  
(name of representative authorized to sign for party)

Title: Vice President, Environment, Health & Safety

Address: 515 South Flower Street  
Los Angeles, California 90071

**Agent authorized to accept service on behalf of party:**

Name: C T CORPORATION SYSTEM

Title: REGISTERED AGENT

Address: 1201 PEACHTREE ST. N.E.  
ATLANTA, GEORGIA 30361

Tel. Number: 410-888-6488

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BY: *Benita A. Cooper*  
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Title: Associate Administrator for Management Systems & Facilities

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BY: *Thomas P. Grumbly*  
Thomas P. Grumbly Date

Title: Assistant Secretary for Environmental Management

Address: 1000 Independence Ave., S.W.  
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BY: Lewis D. Walker  
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Deputy Assistant Secretary of the Army  
Title: (Environment, Safety and Occupational Health)

Address: 1100 Army Pentagon, Rm 2E577  
Washington, DC 20310-0110

Agent authorized to accept service on behalf of party:

Name: Chief Environmental Law

Title: U.S. Army

Address: 901 N Stuart Street

Arlington, Va 22333-1837

Tel. Number: 703-696-1230

*Lewis D. Walker*

Signature

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BY: Thomas W. L. McCall, Jr. *Tom McCall*  
(name of representative authorized to sign for party)

Title: Deputy Assistant Secretary of the Air Force  
(Environmental Safety and Occupational Health)

Address: 1660 Air Force Pentagon  
Washington DC 20330-1660

Agent authorized to accept service on behalf of party:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

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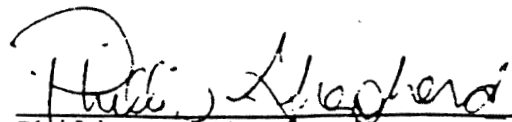
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FOR THE COMMONWEALTH OF KENTUCKY

Date:

March 24, 1995

  
Philip J. Shepherd  
Secretary, Natural Resources and  
Environmental Protection Cabinet  
Office of the Secretary  
Frankfort, Kentucky 40601

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BY: James A. Schutt   
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Title: Director, Manufacturing Services

Address: 101 Columbia Road  
Morristown, NJ 07962

Agent authorized to accept service on behalf of party:

Name: David P. Cooke, Esq.

Title: Assistant General Counsel

Address: 101 Columbia Road  
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FOR: AMAX INC. n/k/a CYPRUS Amax Minerals Company  
(name of private or federal agency party)

BY: J.A. Darling  
(name of representative authorized to sign for party)

Title: Director, Environmental Affairs

Address: 9100 E MINERAL CIRCLE  
ENGLEWOOD, CO 80112

Agent authorized to accept service on behalf of party:

Name: THE CORPORATION TRUST COMPANY

Title: REGISTERED AGENT FOR CYPRUS Amax Minerals Company

Address: 1209 Orange Street  
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BY: Donald C. Hintz *Donald C. Hintz*  
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Title: Executive Vice President-Nuclear

Address: P.O. Box 31995  
Jackson, MS 39286-1995

Agent authorized to accept service on behalf of party:

Name: Shirley Hunter

Title: Assistant Secretary

Address: 625 West Capitol Street

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Tel. Number: (501)377-3533

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(name of private or federal agency party)

BY: Greig R. Siedor Greig R. Siedor  
(name of representative authorized to sign for party)

Title: Senior Counsel

Address: Legal Department  
Chemical Waste Management, Inc.  
3001 Butterfield Road  
Oak Brook, Illinois 60521

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BY: R. J. Trunek by C. Knowles 3/15/95  
(name of representative authorized to sign for party)

Title: Vice President, Environment, Health & Safety

Address: 515 South Flower Street  
Los Angeles, California 90071

Agent authorized to accept service on behalf of party:

Name: C T CORPORATION SYSTEM

Title: REGISTERED AGENT

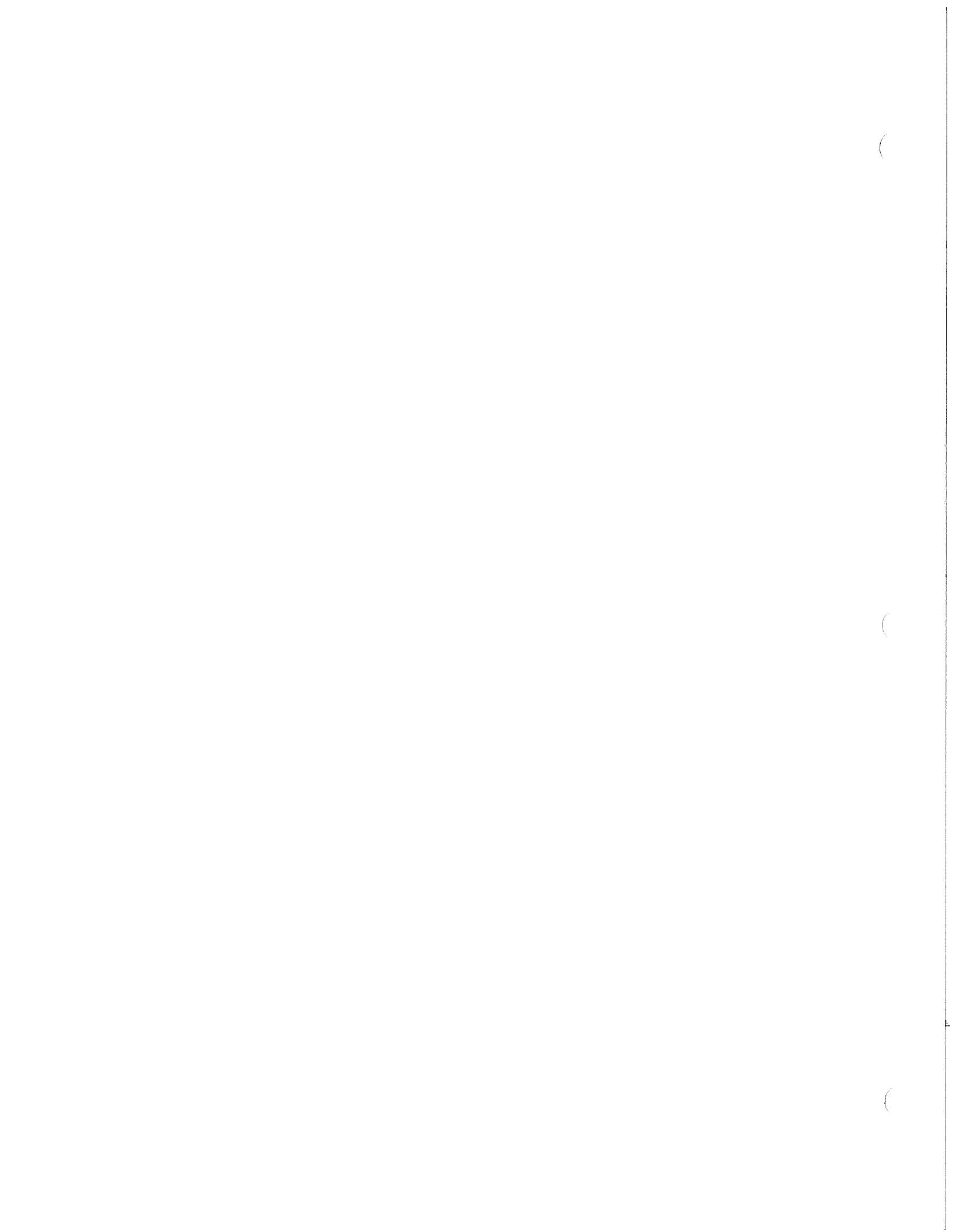
Address: 1201 PEACHTREE ST. N.E.  
ATLANTA, GEORGIA 30361

Tel. Number: 410-888-6488

A separate signature page must be signed by each Settling Private Party and Settling Federal Agency.







# Appendix A



SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

RECORD OF DECISION  
REMEDIAL ALTERNATIVE SELECTION

MAXEY FLATS DISPOSAL SITE  
FLEMING COUNTY, KENTUCKY

PREPARED BY:  
U.S. ENVIRONMENTAL PROTECTION AGENCY  
REGION IV  
ATLANTA, GEORGIA

OCTOBER 1991

DECLARATION STATEMENT

RECORD OF DECISION

MAXEY FLATS DISPOSAL SITE  
FLEMING COUNTY, KENTUCKY

SITE NAME AND LOCATION

Maxey Flats Disposal Site, Fleming County, Kentucky

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Maxey Flats Disposal Site, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The remedy selection is based upon the Administrative Record for the Maxey Flats Disposal Site.

The Commonwealth of Kentucky has concurred in the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF REMEDY

This final remedy substantially controls and reduces site risks to an acceptable level through treatment, engineering and institutional controls, and containment. The major components of the selected remedy include:

- Excavation of additional disposal trenches for disposal of site debris and solidified leachate
- Demolition and on-site disposal of site structures



Declaration - Page 2

- Extraction, solidification and on-site disposal of approximately three million gallons of trench leachate
- Installation of an initial cap consisting of clay and a synthetic liner
- Maintenance and periodic replacement of initial cap synthetic liner
- Re-contouring of capped disposal area to enhance management of surface water runoff and runoff
- Improvements to existing site drainage features to enhance management of surface water runoff
- Installation of a ground water flow barrier, if necessary
- Installation of an infiltration monitoring system to continuously verify remedy performance and detect the accumulation of leachate in disposal trenches
- Monitoring of ground water, surface water, air, selected environmental indicators, and rates of subsidence
- Procurement of a buffer zone adjacent to the existing site property boundary, estimated to range from 200 to 400 acres, for the purposes of preventing deforestation of the hillslopes or other activities which would accelerate hillslope erosion and affect the integrity of the selected remedy, and to provide for frequent and unrestricted access to areas adjacent to the site for the purpose of monitoring
- Five year reviews to evaluate the protectiveness of the remedy and to ensure the selected remedy is achieving the necessary remedial action objectives
- Institutional controls to restrict use of the Maxey Flats Disposal Site and to ensure monitoring and maintenance in perpetuity.

The estimated cost of the selected remedy is \$ 33,500,000.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to the remedial action, or obtains a waiver of specified requirements, and is cost

Declaration - Page 3

effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for the Maxey Flats Disposal Site. Because treatment of the principle threats of the site was not found to be practicable; however, this remedy does not satisfy the statutory preference for treatment as a principle element of the remedy.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action, and every five years thereafter, to ensure that the remedy continues to provide adequate protection of human health and the environment.

*Greer C. Tidwell / Deputy for*  
Greer C. Tidwell  
Regional Administrator

SEP 30 1991  
Date

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MAXEY FLATS DISPOSAL SITE  
FLEMING COUNTY, KENTUCKY

SECTION 1.0 - SITE LOCATION AND DESCRIPTION

1.1 Location

The Maxey Flats Disposal Site (MFDS) is located on County Road 1895, approximately 10 miles northwest of the City of Morehead, Kentucky and approximately 17 miles south of Flemingsburg in eastern Fleming County. Figures 1 and 2 illustrate the site location and site vicinity. The MFDS itself occupies 280 acres of land. Approximately 4.8 million cubic feet of low-level radioactive waste is buried in an approximate 45-acre area, designated as the Restricted Area. Approximately 27 acres within the Restricted Area have been used for the construction of 52 disposal trenches. The Restricted Area also contains storage and warehouse buildings, liquid storage tank buildings, gravel driveways and a parking area. Figure 3 depicts the trenches, trench sumps, and structures within the Restricted Area as well as the extent of a polyvinylchloride (PVC) cover over the 27-acre trench disposal area<sup>1</sup>.

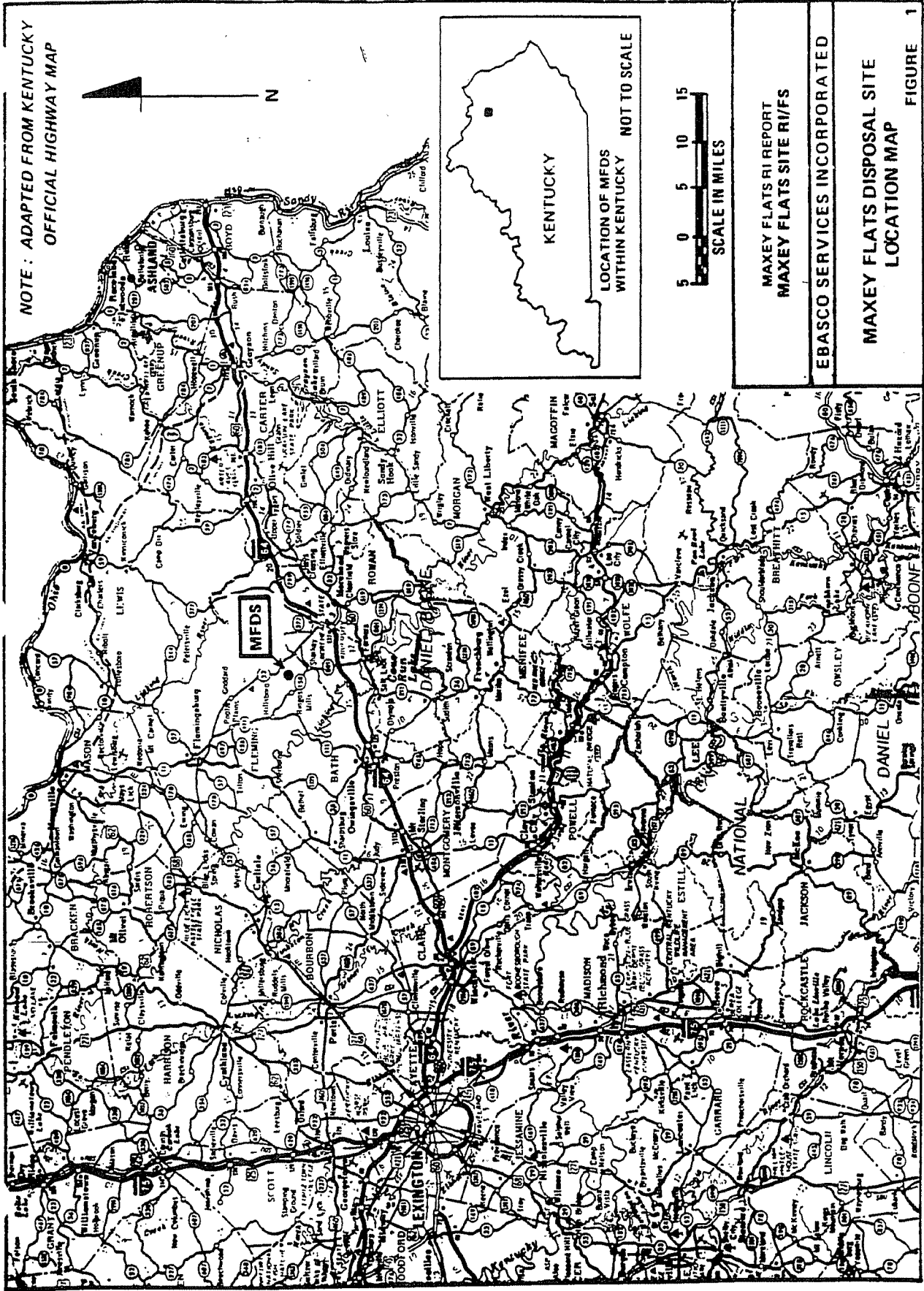
1.2 Demographics

Approximately 57 residential structures exist within a 1.0 mile radius of the MFDS, housing approximately 152 persons. In an area between 1.0 and 2.5 miles from the MFDS, 192 residential structures house approximately 511 persons. Therefore, an estimated total of 663 persons live within 2.5 miles of the MFDS (This 2.5 mile radius is hereafter referred to as the study area). Of the estimated 663 persons, an estimated 148 (22.3 percent) are women of childbearing age (15 to 44 years old) and an estimated 148 (22.3 percent) are children (under the age of 14).

Within a one-half mile radius of the MFDS, there exist approximately 11 residences. The actual population of this area is 25 people, 14 male and 11 female. Of the eleven females, seven are of childbearing age. Only two children are present in the population.

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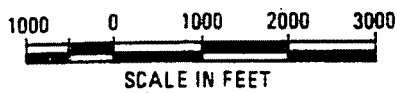
<sup>1</sup> - The PVC cover over the trench disposal area currently covers the access road between the trenches; thus, Figure 3 is slightly outdated and does not reflect all of the areas currently covered by the PVC liner.





**EXPLANATION**

- MFDS RESTRICTED AREA
- MFDS PROPERTY BOUNDARY



MAXEY FLATS RI REPORT  
MAXEY FLATS SITE RI/FS

EBASCO SERVICES INCORPORATED

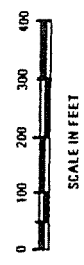
MAXEY FLATS DISPOSAL SITE  
VICINITY MAP

FIGURE 2

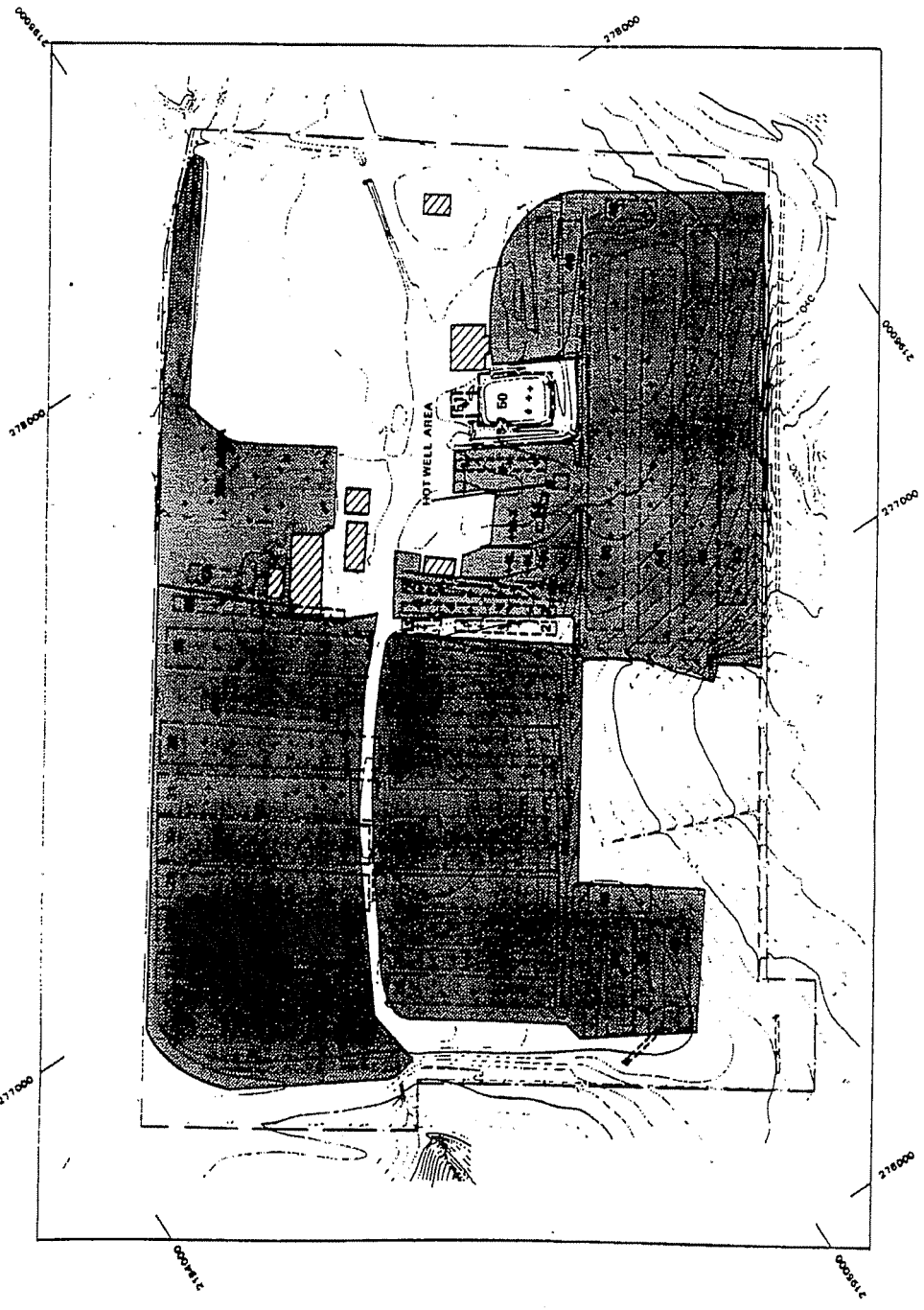


**EXPLANATION**

- + TRENCH SUMP
- APPROXIMATE BOUNDARY OF TRENCH
- - - FENCELINE AND BOUNDARY OF RESTRICTED AREA
- APPROXIMATE AREAS COVERED BY PVC
- RUTH DING



SCALE IN FEET



MAXEY FLATS FS REPORT  
MAXEY FLATS SITE RI/Fs

EBASCO SERVICES INCORPORATED

LOCATION OF TRENCHES,  
TRENCH SUMPS, AND BUILDINGS  
IN RESTRICTED AREA

The MFDS study area population represents approximately 5.3 percent of the total Fleming County population. The projected population of the 2.5 mile radius study area will increase from 663 persons in 1985 to a projected population of 767 in 2020, an increase of approximately 15 percent. Additionally, a projected population of 171 women of childbearing age and 171 children will reside in the study area surrounding the MFDS by the year 2020.

### 1.3 Topography

The MFDS is located in the Knobs physiographic region of Kentucky, an area characterized by relatively flat-topped ridges (flats) and hills (knobs). The MFDS is located on a spur of Maxey Flats, one of the larger flat-topped ridges in the region. The site is bounded by steep slopes to the west, east, and south and is approximately 350 feet above the adjacent valley bottoms.

### 1.4 Land Use

The land surrounding the MFDS is primarily mixed woodlands and open farmland. A number of residences, farms, and some small commercial establishments are located on roadways near the site.

The two nearest municipalities, the cities of Morehead (approximately 10 miles southeast of the MFDS) and Flemingsburg, Kentucky (approximately 17 miles northwest of the MFDS) have populations of 7,196 and 2,721, respectively. The closest major cities are Lexington to the west, and Huntington, West Virginia, to the east, both about 65 miles from the MFDS.

Transportation in the immediate vicinity of the site is based on a network of secondary roadways, the routes of which are dictated by the local topography of relatively level stream valleys and steep plateau slopes.

The region around the site is rural in character, primarily due to topographic restrictions that limit access to the area and the shortage of land available for development. In the immediate vicinity of the MFDS, within one-half mile, approximately one dozen homes are located along the unpaved roads at the base of the site in Drip Springs Hollow and along Rock Lick Creek, and on top of the plateau along Maxey Flats Road. The slopes in the vicinity of the MFDS are covered mostly with mixed evergreen and deciduous forest land. Wooded areas in the region provide a supply of hardwood timber for the local sawmills and logging industry.

Four small family farms are located within a one-half mile radius of the site. These farms raise beef cattle, swine, goats, and sheep for meat and sale; poultry for eggs; tobacco for sale; and hay and silage as food for their livestock. In addition to the farms, most of the local residences have small vegetable gardens for their private use. Table 1 summarizes the land use within a 2.5 mile radius of the MFDS.

The Maxey Flats region has a public water supply system that is operated by the Fleming County Water Association. Essentially all residents in the area are served by this water system, much of which was installed in 1985. The extent of the water supply system is illustrated in Figure 4.

There are no large-scale commercial and industrial developments, or higher density residential developments in the area within 2.5 miles of the site. In summary, the area surrounding the MFDS is best characterized as a rural, undeveloped area distinguished by low-density housing and rugged topography.

The limited employment base of the area, along with the limited roadway and utilities access, makes large-scale economic expansion in this region unlikely. Future land use can be expected to follow the same historical patterns for the area: small family farms, crop raising, logging activities and moderate growth in population.

### 1.5 Natural Resources

#### 1.5.1 - Surface Water

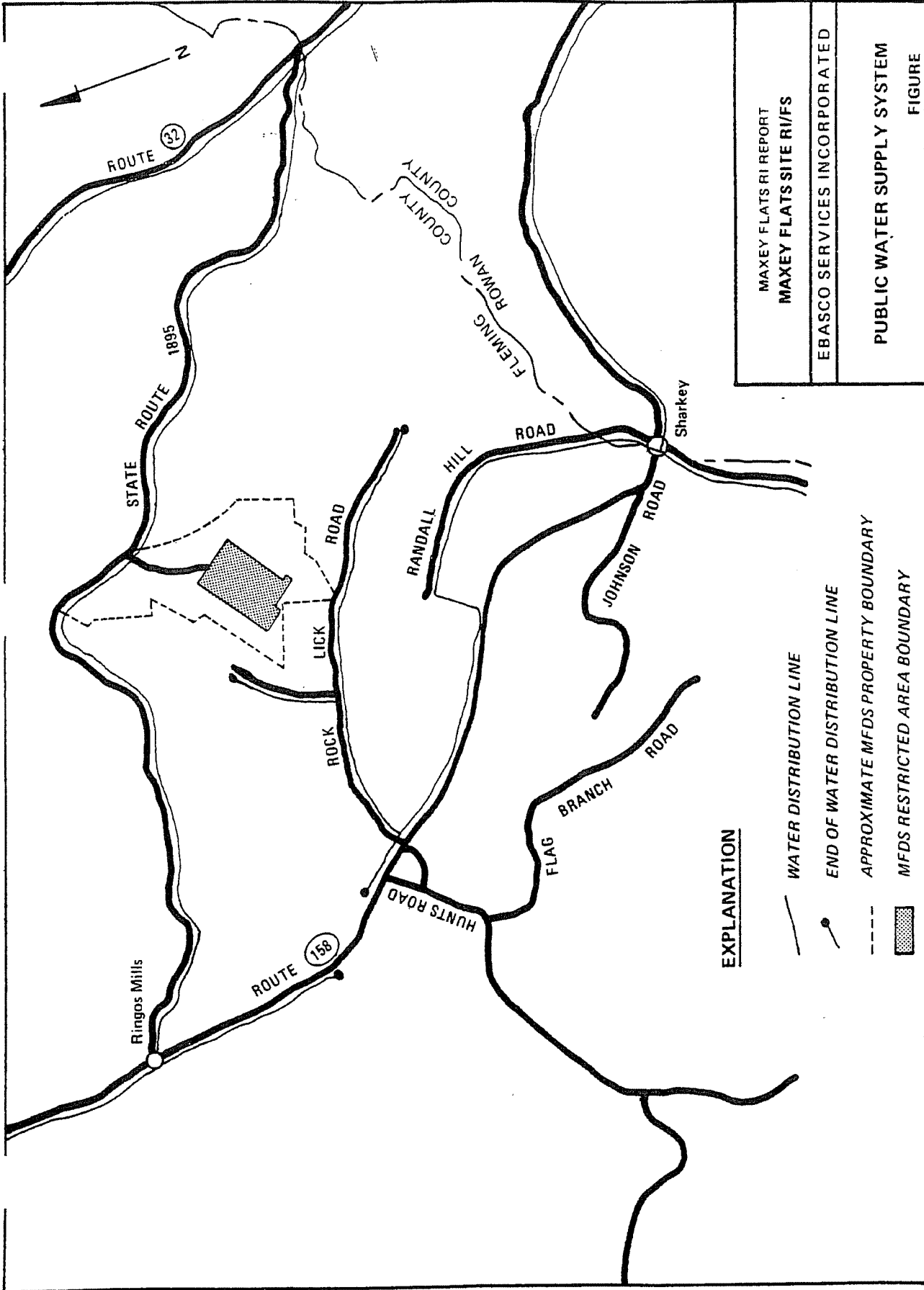
Hillslope runoff at the MFDS typically travels in narrow, high gradient, steep walled channels. These drainage channels connect to the perennial streams that flow along the base of the plateau at the periphery of the MFDS area. These streams, Drip Springs, No Name, and Rock Lick Creeks, flow through relatively level valleys bordered by steep hillslopes. Drip Springs Creek, located on the west side of the site, and No Name Creek, located on the east side of the site, flow into Rock Lick Creek to the southwest of the site. Rock Lick Creek flows into Fox Creek approximately two miles southwest of the MFDS. Fox Creek flows into the Licking River, approximately 6.5 miles west of the MFDS, which in turn empties into the Ohio River near Cincinnati, Ohio, approximately 100 miles from the MFDS.

The perennial streams at the base of the plateau are used as freshwater supplies for livestock raised in the valleys. Fox

TABLE 1

ACREAGE-TABULATION FOR THE AREA WITHIN 2.5 MILES OF THE MFDS

<u>Land Use</u>	<u>Total Acres</u>	<u>Percentage of Primary Study Area</u>
Residential	132	1.0
Other Urban or Built Up Land	44	0.3
Cropland and Pasture	4,885	39.6
Brush Covered Land	167	1.3
Evergreen Forest Land	254	2.1
Deciduous Forest Land	597	4.8
Mixed Forest Land	6,128	49.6
Streams	161	1.3
	<hr/>	<hr/>
Primary Study Area	12,368	100





Creek is also used for light recreational fishing. The Licking River is used both for recreational purposes and as a source of public drinking water through municipal water systems upstream and downstream of the MFDS. The nearest municipal water intake downstream of the MFDS on the Licking River is located approximately 54 miles from the site.

#### 1.5.2 - Geology and Ground Water

Potential geological resources in the area of Fleming County around the MFDS include building stone, clay and shale, petroleum, oil shale and ground water. With the exception of small amounts of building stone and ground water for private residential use, these geological resources are currently not being exploited.

Ground water resources in the area are very limited, with residential supplies generally available only in the valley bottoms. Ground water quality in the area is generally poor.

Residents in the immediate vicinity of the MFDS have been on public water supply since 1985. Prior to 1985, water was typically obtained from shallow dug wells which reportedly supplied sufficient quantities of water for household use.

#### 1.5.3 - Biota

The region surrounding the MFDS includes many woodlots that are periodically logged for timber. The wooded areas in this region are classified as deciduous, evergreen, or mixed forest land. The hillslopes adjacent to the MFDS are primarily deciduous and include hickories, oak, ash, maple, black gum, tulip-poplar, and beech. Because much of the hillslopes are privately owned, and logging is an active industry in the immediate area, it is possible that the standing timber on these slopes could be harvested in the future.

Wildlife species common to the MFDS area are those associated with the oak-hickory forest of the ridge slopes, the adjacent farmlands, or a mix of these two habitats. This mix benefits such game species as white-tailed deer, woodchuck, opossum, fox squirrel, and migrating woodcock, as well as furbearers such as red fox, gray fox, long-tailed weasel, raccoon, and striped skunk. Rough grouse and gray squirrel are also hunted in the more extensively wooded areas. During late autumn and winter, numerous Canada geese, as well as mallards, wood duck, green-winged teal, and other game waterfowl feed on open crop

lands of the region. The acorn and hickory mast produced on the hillslopes of the MFDS probably constitutes an important part of the diet for white-footed mice, deer, squirrel, and turkey.

Several species of sport fish that are native to the Licking River drainage have been collected from Fox Creek including muskellunge, channel catfish, rockbass, spotted bass, largemouth bass, white crappie, various sunfish, and sauger.

There are no federal threatened or endangered species known to exist within the vicinity of the MFDS. Blazing Star, a plant species listed as being of special concern by the Kentucky Preserves Commission, does occur within a 2.5 mile radius of the site, but would not be threatened by any physical activities at the MFDS due to its distance (approximately 1.5 miles) from the site.

#### 1.6 Climate

The climate of the MFDS area is classified as Temperate Continental. The summers are warm with temperatures above 90°F occurring approximately 30 days per year. The winters are cold but not extreme, as temperatures below zero generally occur only a few times per year. Temperatures above 100°F and minimum temperatures as low as -22°F have been recorded in the region.

Average annual precipitation in the MFDS area is approximately 44 inches. A maximum 24-hour precipitation total of 5.8 inches would be expected for a 100-year return period in the area. However, the possibility exists for extreme rainfall events to exceed the 100 year maximum in the MFDS area. Snowfall in the area averages approximately 18 inches per year with the highest monthly average occurring during January.

Wind distribution data for the MFDS area reveals a fairly even annual distribution of wind direction, with the greatest frequency from the south and southwest directions. The average wind speed observed over a 10-year period was 9.7 miles per hour. Average wind speeds are greater during the spring and winter seasons and the greatest percentage of calm wind conditions occur during the summer months. A maximum wind speed of 90 miles per hour associated with a return period of 100 years is estimated for the MFDS area.

SECTION 2.0 - SITE HISTORY AND ENFORCEMENT ACTIVITIES

In 1954, the U.S. Congress passed the Atomic Energy Act which provided for the development and utilization of atomic energy for peaceful purposes. In 1959, Congress amended the Atomic Energy Act of 1954 to provide for State participation in certain regulatory controls on the use of atomic energy. Provisions were made for the federal government to enter into agreements with states on such participation.

As part of a program to encourage nuclear industry in Kentucky, the Kentucky General Assembly created the Division of Nuclear Information in the Kentucky Department of Commerce. The Kentucky General Assembly then passed legislation in 1960 which provided power to the Governor to enter into an agreement with the federal government for the transfer of certain regulatory powers in atomic energy to Kentucky. Also in 1960, the Governor of Kentucky charged the Department of Health with the responsibilities of providing regulations for the licensing of radioactive materials. The Kentucky General Assembly passed legislation in 1962 enabling the Commonwealth of Kentucky (Commonwealth) to purchase lands for the disposal of radioactive waste; the land to be owned and controlled in perpetuity by the Commonwealth. Also in 1962, the Commonwealth became the first state to sign an agreement with the federal government for the transfer of certain regulatory powers in atomic energy and, thus, became what is referred to as an "agreement state". In this agreement, authority was vested in the Commonwealth to license the disposal of low-level radioactive waste. The Atomic Energy Commission retained authority to license the burial of waste from the reprocessing of spent nuclear fuel.

The Kentucky Division of Nuclear Information was succeeded by the Division of Atomic Development, whose responsibilities were then transferred to the newly created Kentucky Atomic Energy Authority in 1962, which eventually became the Kentucky Science and Technology Commission. In 1962 a commercial organization, Nuclear Engineering Company, Inc. (NECO), purchased 252 acres of land in Fleming County, Kentucky, in a knob area known as Maxey Flats and submitted an application to the Kentucky Department of Health for a license to bury radioactive waste at Maxey Flats. Following site evaluations and approval, the Commonwealth issued a license, effective January 1963, to NECO for the disposal of solid by-product, source and special nuclear material at the proposed site, and a contract was negotiated between the Commonwealth (Kentucky Atomic Energy Authority) and NECO. Issuance of this license was contingent upon conveyance of the title of the site to the Commonwealth in accordance with state and federal regulations.

The Kentucky Atomic Energy Authority, in turn, leased this tract of land back to NECO for a twenty-five year period with the option for NECO to renew the lease for another twenty-five year period thereafter. The lease agreement provided for the establishment of a perpetual care fund, requiring a cost per cubic foot of waste disposed, to be paid to the Commonwealth by the operator (NECO).

The first radioactive material was disposed at the Maxey Flats Disposal Site in May 1963. From May 1963 to December 1977, NECO managed and operated the disposal of an estimated 4,750,000 cubic feet of low-level radioactive waste (LLRW) at the MFDS.

In order to protect public health and the environment from exposure, low level radioactive waste must be isolated during the time that its radioactivity is decaying. To achieve this isolation at the MFDS, low level radioactive waste was disposed at the site using shallow land burial. The waste was disposed of in 46 large, unlined trenches (some up to 680 feet long, 70 feet wide and 30 feet deep) which cover approximately 27 acres of land within a 45-acre fenced portion of the site known as the Restricted Area. However, "hot wells" were also used at the MFDS for the burial of small-volume wastes with high specific activity. Most of the "hot wells" are 10 to 15 feet deep, constructed of concrete, coated steel pipe or tile, and capped with a large slab of concrete.

The trench wastes were deposited in both solid and solidified-liquid form. Some wastes arrived at the site in containers such as drums, wooden crates, and concrete or cardboard boxes. Other wastes were disposed of loosely. Fill material (soil), typically 3 to 10 feet in thickness, was then placed over the trenches to serve as a protective cover. After 1977, six additional trenches were excavated for the disposal of material generated on-site, bringing the total number of trenches at the site to 52.

Environmental monitoring, in 1972, by the Kentucky Department of Health (Department for Human Resources) revealed possible migration of radionuclides from the Restricted Area. This monitoring indicated that water entering the trenches had become the pathway by which radioactive contaminants, primarily tritium which is a radioactive form of hydrogen, were beginning to migrate out of the disposal trenches. A special study of the site was conducted by the Commonwealth of Kentucky in 1974 to determine whether the MFDS posed any contamination problem. The

study confirmed that tritium and other radioactive contaminants were migrating out of the trenches and that some radioactive material had migrated into unrestricted areas. Various other studies of the MFDS were initiated by the U.S. EPA, U.S. Nuclear Regulatory Commission, U.S. Geological Survey, and the Kentucky Department for Human Resources during the 1970's and 1980's.

The Kentucky Science and Technology Commission was abolished in 1976 and the perpetual care and maintenance responsibilities for the MFDS were transferred to the Kentucky Department of Finance.

In 1977, during construction of Trench 46, it was determined that leachate was migrating through the subsurface geology (approximately 25 feet below ground surface). Subsequently, in December 1977, the Commonwealth ordered NECO to cease the receipt and burial of radioactive waste.

In 1978, the Commonwealth and NECO entered into an agreement under which NECO's twenty-five year contract/lease was terminated. After disposal operations ceased and the lease with NECO was terminated, NECO's license remained in effect, with certain modifications, until 1979 at which time the license was transferred to the Commonwealth. The Commonwealth's operational responsibilities at the MFDS were transferred from the Department of Finance to the Department for Natural Resources and Environmental Protection in 1979, with regulatory responsibilities remaining with the Kentucky Department for Human Resources. Upon transfer of NECO's license to the Commonwealth, private companies such as Westinghouse Electric Corporation (the current site custodian) were hired to stabilize and maintain the site. Stabilization and maintenance activities have included installation of temporary covers over an approximate 27-acre trench disposal area, surface water controls, subsidence monitoring and contaminant monitoring.

From 1973 through April, 1986, an evaporator was operated at the site as a means of managing the large volume of water infiltrating the disposal trenches as well as waste water generated by on-site activities. The evaporator generally operated 24 hours per day, approximately 250 days of the year until 1986, when it was shut down. The evaporator processed more than 6,000,000 gallons of liquids, leaving behind evaporator concentrates which were then stored in on-site, above-ground tanks. Evaporator concentrates were eventually disposed of by the Commonwealth in Trench 50, which was constructed in 1985 and 1986.

In 1981, a polyvinylchloride (PVC) cover was placed over the disposal trenches as a means of minimizing the infiltration of rainfall into the trenches. Liquid storage tanks remained on-site for future storage of site-generated liquids and emergency trench overflow pumping operations. Those steps, however, were temporary.

In 1983, at the request of the Commonwealth, EPA began the process of determining whether the MFDS would be eligible for remediation under CERCLA. In 1984, EPA proposed the MFDS for inclusion on the National Priorities List (NPL) of hazardous waste sites to be addressed under the federal Superfund Program and, in 1986, this listing was finalized.

The MFDS was a primary disposal facility for low-level radioactive waste in the United States during its period of operation. As a result, the list of parties potentially liable for site cleanup, known as Potentially Responsible Parties ("PRPs"), includes more than 650<sup>2</sup> radioactive waste generators and transporters. The generator PRPs<sup>3</sup> include many private companies in the nuclear industry as well as numerous hospitals, research institutions and laboratories. Several federal agencies, including the U.S. Department of Defense (DOD) and U.S. Department of Energy (DOE) are also generators of site waste. The Commonwealth of Kentucky, as the site owner<sup>4</sup> and a generator, is also a PRP.

In 1986, EPA issued general notice letters notifying 832 Potentially Responsible Parties of their potential liability with respect to site contamination and offering them an opportunity to conduct and fund a Remedial Investigation/Feasibility Study (RI/FS) of the MFDS. In March 1987, eighty-two PRPs signed an Administrative Order by Consent (EPA Docket No. 87-08-C) to perform the RI/FS. This group of PRPs

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<sup>2</sup> - If each facility or division of a PRP is treated as a single entity, the number of PRPs totals more than 800.

<sup>3</sup> - Some of these radioactive waste generators also disposed of chemical wastes at the MFDS.

<sup>4</sup> - The Commonwealth was required by state and federal regulations to own the MFDS property, as is required for all low-level radioactive waste disposal sites.

formed the Maxey Flats Steering Committee (Committee). The Committee has conducted and partially funded the technical work required for the Remedial Investigation/Feasibility Study performed at the site. The largest portion of costs incurred in conducting the RI/FS was paid by DOD and DOE, both named as PRPs but not members of the Maxey Flats Steering Committee.

In November 1988, EPA notified the PRPs of an imminent threat to public health, welfare and the environment posed by the potential release of liquids stored in the on-site storage tanks. The threat arose from the presence of eleven 20,000 gallon tanks in the tank farm building that had been present on-site for 10 to 15 years and whose structural integrity was of great concern. The unstable condition of the filled-to-capacity tanks posed an immediate threat to public health and the environment. The PRPs declined the offer to participate in the removal actions; thus, on December 19, 1988, EPA initiated phase one of the removal.

Phase one consisted of the installation of heaters in the tank farm building to prevent the freezing, and subsequent rupturing, of tank valves and fittings which were submerged under water that had infiltrated the tank farm building. Phase one, which was completed in February 1989, also included the installation of additional storage capacity on-site.

Phase two of the removal was initiated by EPA in June 1989. Phase two began with the solidification of approximately 286,000 gallons of radioactive liquids stored in the eleven tanks and of water that had accumulated on the floor of the tank farm building. Solidification activities were completed in November 1989 and resulted in the generation of 216 blocks of solidified tank and tank floor liquids. Burial of these blocks, which were stored on-site and above-ground, was initiated in August 1991 with completion scheduled for November 1991. Solidification blocks will be disposed in a newly constructed trench within the MFDS Restricted Area.

The Remedial Investigation Report for the MFDS was approved by EPA in July 1989. The Feasibility Study for the MFDS was finalized and, along with the Administrative Record file for the site to date, was submitted to the public in May 1991.

SECTION 3.0 - HIGHLIGHTS OF COMMUNITY PARTICIPATION

Community interest and concern about the MFDS began in 1963 shortly after approximately 252 acres of land was purchased for radioactive waste disposal operations. Area residents reported initially that they were not informed of plans for the property and that authorities provided little or no opportunities for community input to the decision-making process. Area residents also were concerned with methods used to place wastes in the disposal trenches. When the Commonwealth released its 1974 study of the site, findings of elevated radionuclide levels drew the attention of local and national media. In response, citizens in the site community formed The Maxey Flats Radiation Protection Association to investigate site conditions and publicized the need for protection of nearby residents. Organized citizen concern declined for a period after the Commonwealth closed the site to the receipt of wastes in late 1977.

Concern resurfaced in 1979 when area residents learned that tritium was escaping from an evaporator used at the site to reduce the volume of liquids that had accumulated from trench pumping operations. A second group, called the Concerned Citizens for Maxey Flats, formed to organize citizen concerns regarding the tritium releases. This group requested that public water be provided to residents in the Maxey Flats site vicinity. Public water was extended in 1985, by the Fleming County Water Association, after which organized community efforts again subsided. Community members remained concerned, however, that the site should be cleaned up.

The present-day Maxey Flats Concerned Citizens, Inc. (MFCC) has been very active throughout the Remedial Investigation (RI) and Feasibility Study (FS). The MFCC submitted an application to EPA for a Technical Assistance Grant (TAG) in 1988, and on January 13, 1989, EPA provided \$ 50,000 to the MFCC for the purpose of hiring technical advisors to help the local community understand and interpret site-related technical information and advise the community on its participation in the decision-making process.

A Community Relations Plan for the MFDS was developed and finalized in 1988, which described the proposed community relations activities, along with a Work Plan describing the technical work to be performed as part of the RI/FS. Pursuant to the Community Relations Plan, information repositories were established into which EPA could place information to keep the public apprised of developments related to the MFDS. Due to the proximity of the site to both the cities of Morehead and Flemingsburg, and the locations of interested citizens, two



information repositories were established for the MFDS; one located in the Fleming County Public Library, 303 South Main Cross Street, Flemingsburg, KY 41041; and the second, located in the Rowan County Public Library, 129 Trumbo Street, Morehead, Kentucky, 40351.

Beginning with the Community Relations Plan and the RI/FS Work Plan in February 1988, a number of site-related documents have been placed in the repositories. A draft version of the RI Report was placed in both repositories in November 1988 and the final RI Report was placed in the repositories in September 1989. The revised draft Feasibility Study Report was provided to the MFCC in September 1989; revision pages to the revised draft FS Report were also provided to the MFCC in December 1989, and the final FS Report was submitted to the MFCC and to both information repositories in June 1991. The Administrative Record file, which is a compilation of documents and information considered during the selection of the site remedy, was placed in the Fleming County Public Library on June 12, 1991, and on June 14, 1991 at the Rowan County Public Library.

In addition to the technical reports and documents placed in the repositories, fact sheets summarizing particular site developments have periodically been issued to help keep the public informed about activities at the MFDS. Fact sheets were issued by EPA in September 1987, July 1989 and May 1991. Additionally, fact sheets have been periodically distributed by the MFCC and the Maxey Flats Steering Committee throughout the RI/FS process. On May 30, 1991, EPA mailed more than 600 Proposed Plan Fact Sheets to members of the community, interested parties, and Potentially Responsible Parties, informing them of EPA's preferred remedy and announcing the holding of a public meeting on June 13, 1991.

A number of meetings have also been held regarding developments at the MFDS. EPA held a citizen's information meeting in January 1988, and again in September 1988 at the Fox Valley Elementary School in Wallingford, Kentucky to discuss the activities to be performed as part of the RI/FS. A meeting was held with the MFCC in September 1989 to discuss the development of remedial alternatives in the Feasibility Study. A citizens rally was put on by the MFCC in October 1989 to discuss the RI findings, risk assessment conclusions, and remedy options. In October 1990, the MFCC sponsored a forum on the MFDS (which included EPA, Commonwealth and PRP participation) to discuss the site status. On May 22, 1991, EPA and the Commonwealth of Kentucky held a meeting with landowners adjacent to the MFDS for

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the purpose of discussing the buffer zone component of the preferred remedy and, on June 13, 1991, EPA sponsored a public meeting at the Ersil P. Ward Elementary School in Wallingford, KY to discuss EPA's preferred remedy for site cleanup as well as other alternatives considered during the FS process. Press conferences and site tours were conducted in October 1987 and June 1991.

The public meeting on the preferred remedy/Proposed Plan, which was held on June 13, 1991, initiated a public comment period which concluded on August 13, 1991. A press release and three local newspaper notices were published announcing the meeting. Prior to the initiation of the public comment period, EPA extended the usual 30-day public comment period on the preferred remedy/Proposed Plan to 60 days due to site complexity, numerous issues involved, number of documents in the Administrative Record file, and a high level of community interest at the site.

A response to the comments received during the public comment period is included in the Responsiveness Summary, which is Appendix A to this Record of Decision. A transcript of the June 13, 1991 public meeting on the preferred remedy/Proposed Plan is included as Appendix C of this Record of Decision.

SECTION 4.0 - SCOPE AND ROLE OF RESPONSE ACTION

The selected remedy presented in this decision document serves as the first and final remedial action for the Maxey Flats Disposal Site. The treatment, containment, engineering and institutional control components of the selected remedy will reduce the potential risks from the site to an acceptable level upon remedy completion. As part of the selected remedy, EPA will require further data collection and analyses to determine the necessity of a horizontal flow barrier as a component of the remedy. If, based on this data collection and analyses, EPA determines that a horizontal flow barrier is necessary, it will be installed as part of this remedial action. The type and location of the barrier will be determined by EPA in consultation with the Commonwealth.

SECTION 5.0 - SUMMARY OF SITE CHARACTERISTICS

The Remedial Investigation (RI), which was initiated at the Maxey Flats Disposal Site (MFDS) in 1987, included the collection of more than 700 samples at, and adjacent to, the MFDS, from environmental media such as trench leachate, ground water, soil and soil water, surface water, and stream sediment. The samples were analyzed for a variety of radiological and non-radiological (chemicals, metals, etc.) constituents. A summary of the sample matrix, number of samples, and type of sample analyses performed during the Remedial Investigation is presented in Table 2.

The environmental analyses conducted during the RI complemented the extensive sampling activities previously performed by the Commonwealth, the United States Geological Survey and national laboratories. The data collected prior to the RI was utilized in the RI to the extent practicable. Sampling activities by the Commonwealth are still continuing.

5.1 Nature and Extent of Contamination

Most of the waste disposed of at the MFDS was in solid form, although some container-enclosed liquids and solidified liquid wastes were accepted during the earlier years of site operation. The wastes were in a variety of containers including cardboard or fiberboard boxes, wooden crates, shielded drums or casks, and concrete blocks. Wastes of low specific activity which were buried in the Restricted Area include paper, trash, cleanup materials and liquids, packing materials, protective apparel, plastics, laboratory glassware, obsolete equipment, radiopharmaceuticals, carcasses of animals, and miscellaneous rubble. Higher activity waste buried in the Restricted Area included sealed sources, irradiated reactor parts, filters, ion-exchange resins, and shielding materials. Transuranic waste, generally associated with glove boxes, gaskets, plastics, rubber tubing, paper, and rags, was also buried at the MFDS.

Information on the types and quantities of chemical wastes buried at the MFDS was generally not recorded at the time of waste burial. However, some Radioactive Shipment Records note the disposal of "Liquid Scintillation Vials" ("LSVs"). LSVs are small vials, generally containing a solvent and a radioactive constituent. LSVs are used in laboratories to count the amount of radioactivity in laboratory samples for diagnostic tests, environmental monitoring and in other industrial and medical applications. The principal hazardous organic constituents associated with liquid scintillation fluids are toluene and xylene.

TABLE 2

REMEDIAL INVESTIGATION SAMPLING AND ANALYSIS PROGRAM

<u>SAMPLE MATRIX</u>	<u>NUMBER OF SAMPLES COLLECTED</u>	<u>CHEMICAL ANALYSES<sup>a</sup></u>	<u>RADIONUCLIDE ANALYSES<sup>b</sup></u>
LEACHATE			
15 Trench Sumps	15 + 1 dup <sup>c</sup>	Complete, RCRA	H-3, IG, EXP, C-14
MONITORING WELLS			
8 Producing Wells	16 + 2 dup	Complete, RCRA	H-3, IG, EXP, C-14
2 USGS Wells	4	Complete, RCRA	H-3, IG, EXP, C-14
1 Producing Background Well	2	Complete, RCRA	H-3, IG, EXP, C-14
BOREHOLE SAMPLES			
Soil and Rock	261	none	H-3 <sup>t</sup>
SOIL			
Round 1	218 + 12 dup	none	H-3
Round 2	132 + 7 dup	none	H-3, IG
Round 2 (select samples)	16 + 2 dup	Complete, RCRA <sup>*</sup>	H-3, IG
Food Crop Samples	5 + 1 dup	Complete	H-3, IG
Background	3	Complete	H-3, IG, EXP
SOIL WATER			
1 Producing Well Point	2 + 2 dup	Complete, RCRA	H-3, IG, EXP
SURFACE WATER			
Surface Water	20 + 2 dup	Complete	H-3, IG
Background SW	2	Complete	H-3, IG, EXP
STREAM SEDIMENT			
Sediment	20 + 2 dup	Complete	H-3, IG
Background Sed.	2	Complete	H-3, IG, EXP

a) Chemical Analyses:

- Complete - Target Compound List (TCL) organic chemicals
- Target Analyte List (TAL) inorganic chemicals
- RCRA      - pH, sulfide screen, ignitability screen
- RCRA<sup>\*</sup>    - pH, sulfide screen, ignitability screen, acid reactivity, base reactivity, water reactivity

b) Radionuclide Analyses:

- H-3      - Tritium
- H-3<sup>t</sup>    - Tritium analyzed by on-site laboratory
- IG       - Isotopic Gamma
- EXP      - Expanded: Sr-90 and gross alpha; if gross alpha was greater than 0.015 pCi/ml, then analyses for Ra-226, and isotopic Pu and U were also performed
- C-14     - Carbon-14

c) dup = duplicate sample

The total volume of waste received from off-site and buried at the MFDS has been estimated at approximately 4.8 million cubic feet. Of this volume, the activity of by-product material alone (material that has become radioactive by neutron activation in nuclear reactors), disposed of at the MFDS, has been estimated at 2.4 million Curies. Much of this material was reported as mixed fission products; thus, the total activity from by-product waste may be underestimated. Other wastes disposed of at the MFDS include Special Nuclear Material (Plutonium, Uranium-233 and enriched Uranium-235) and source material (Uranium and Thorium, not including Special Nuclear Material).

In addition to the wastes received from off-site sources, on-site operations have generated material which includes waste from ground surface grading, trench leachate pumping, evaporator operation, and general waste handling. Wastes generated from on-site activities have been disposed of, in solid form, in newly constructed trenches within the site's Restricted Area. Trenches 48 and higher contain waste generated from on-site activities. Trench dimensions and volumes are presented in Table 3.

#### 5.1.1 - Trench Characteristics

The RI estimated that a total of approximately 2.8 million gallons of leachate are in the disposal trenches. The RI, as well as previous investigations, concluded that there is a large range of contaminant concentrations in samples collected from trenches in different parts of the Restricted Area. Additionally, site records indicate that samples (tritium, gross alpha and beta particle analyses) from the same trench sump yield varying concentrations at different times.

Fifteen trench sumps were sampled during the RI. Trench sump sampling locations are illustrated in Figure 5. The trench leachate was found to contain a variety of radionuclides (of which tritium is the most predominant), as presented in Table 4. In general, the non-radiological, chemical concentrations in trench leachate samples were low. The dominant chemical constituents detected were solvents, chelating agents, phthalate esters, hydrocarbons, phenolics, ethers, and carboxylic acids. Concentrations of chemical constituents ranged from non-detect to less than 10 ppm. (See Table 5.) A review of pre-RI trench data indicates that the total organic carbon (TOC) concentration was variable among the trenches sampled, with TOC values ranging from 460 to 3300 ppm. The results of inorganic sample analyses are presented in Table 6. In general, trench leachate appeared

TABLE 3

TRENCH DIMENSIONS, VOLUMES AND BURIAL PERIODS<sup>1</sup>

Trench Number	Dimensions L x W x D (feet)	Trench Volume (cu ft x 1000)	Trench Number	Dimensions L x W x D (feet)	Trench Volume (cu ft x 1000)
1	162 x 10 x 15	24	26	300 x 50 x 10	150
1S	78 x 25 x 15	29	27	350 x 70 x 18 <sup>2</sup>	441
2	79 x 25 x 15	30	28	350 x 70 x 18	441
3	275 x 15 x 15	62	29	350 x 70 x 18	441
4L	44 x 15 x 15	10	30	360 x 75 x 22	594
5S	68 x 15 x 14	14	31	360 x 76 x 22	602
6L	44 x 15 x 14	9	32	350 x 70 x 22	539
7	242 x 15 x 15	54	33L	350 x 50 x 10 <sup>3</sup>	150
8L	50 x 15 x 13	10	34	140 x 24 x 10 <sup>4</sup>	34
9L	32 x 15 x 12	6	35	300 x 70 x 20	420
10	300 x 30 x 15	135	36	200 x 20 x 18	72
11S	300 x 30 x 12	108	37	200 x 20 x 18	72
12L	35 x 10 x 8	3	38	200 x 50 x 17	68
13L	15 x 10 x 8	1	39	200 x 50 x 16	160
14L	15 x 9 x 5	1	40	686 x 70 x 30	1,441
15	300 x 50 x 12	180	41	255 x 20 x 10	51
16L	15 x 10 x 8	1	42	650 x 70 x 30	1,365
17L	30 x 15 x 10	5	43	614 x 50 x 30	921
18	275 x 40 x 9	99	44	681 x 55 x 30	1,124
19S	300 x 40 x 10	120	45	145 x 55 x 32	255
20	300 x 40 x 12	144	46	190 x 50 x 15	143
21L	300 x 42 x 15	189	47	150 x 34 x 15	77
22	300 x 20 x 12	72	48	100 x 40 x 15	60
23	300 x 60 x 10	180	49	200 x 30 x 15	90
24	300 x 50 x 10	150	50	65 x 45 x 20	58
25	300 x 30 x 11	99	51	43 x 46 x 15	30

- <sup>1</sup> - Source for information on Trenches 1 through 46, except Trench 34, from Westinghouse Hittman Nuclear, Inc., 1984 and Zehner, 1983.
- <sup>2</sup> - East end of Trench 27 is deeper than west end.
- <sup>3</sup> - Actual trench area is estimated to be approximately 33 percent of the areal dimensions. Depth is based on the average depth of sumps and depth range in Zehner (1983).
- <sup>4</sup> - Source: Photo Science, Inc., 1983.

FIGURE 5

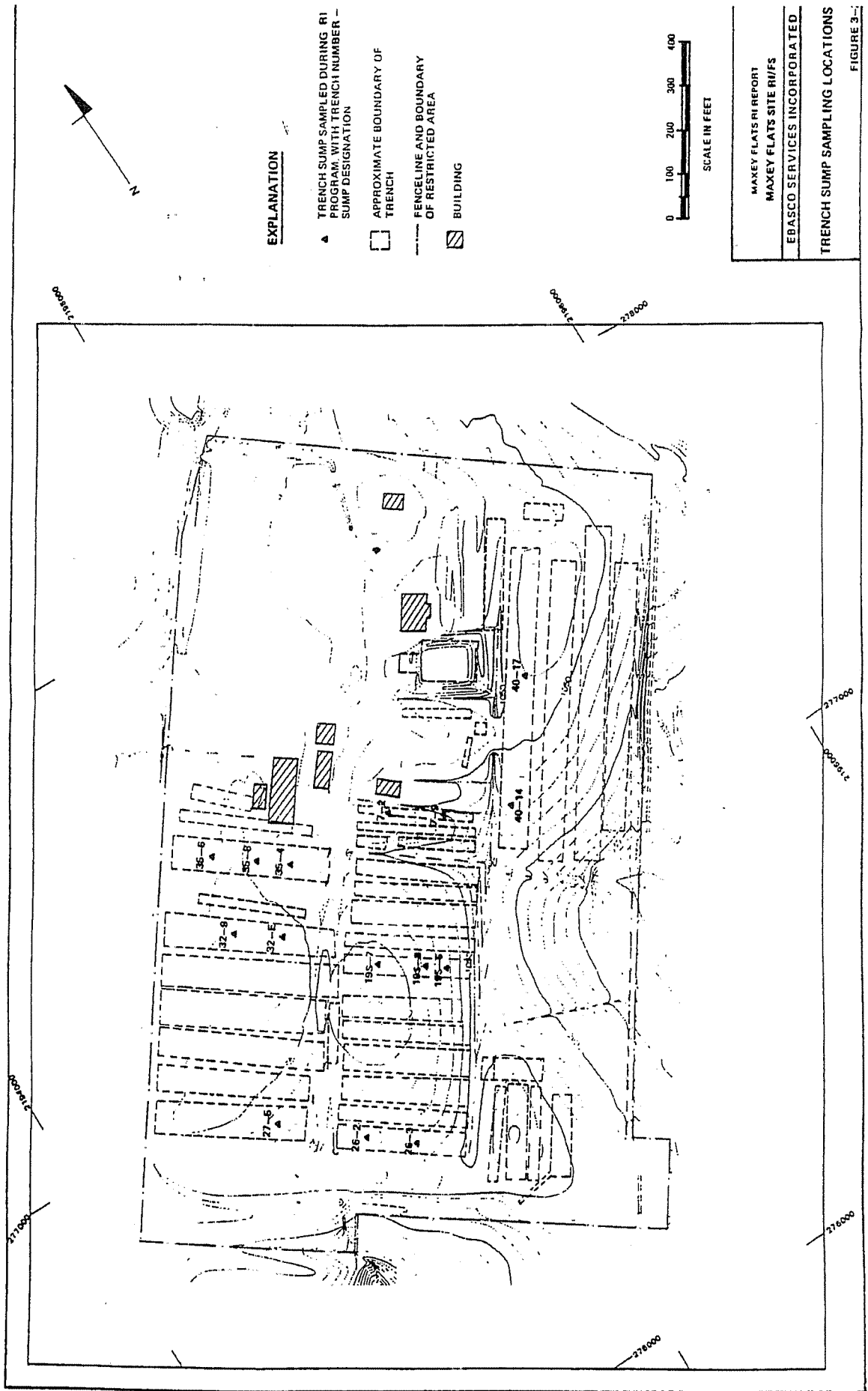




TABLE 4

RADIONUCLIDES IN TRENCH LEACHATE (ALL PROGRAM ANALYSES)  
(concentrations in pCi/ml)

SMP #	THIUM	C-14	HE-32	PO-60	SR-90	CS-137	RA-226	U-233/234	U-235	U-238	PU-238	PU-239/240
7-2	230000 +/- 10000	<10	<0.1	0.4 +/- 0.1	830 +/- 40	1.5 +/- 0.1	0.030 +/- 0.002	0.26 +/- 0.01	0.012 +/- 0.001	0.106 +/- 0.005	0.042 +/- 0.004	0.0089 +/- 0.0005
7-9	162000 +/- 8000	<10	<0.1	1.5 +/- 0.1	380 +/- 20	9.9 +/- 0.5	0.181 +/- 0.008	0.166 +/- 0.008	0.009 +/- 0.001	0.169 +/- 0.008	0.025 +/- 0.002	0.0094 +/- 0.0002
195-6	62000 +/- 3000	<10	<0.1	0.3 +/- 0.1	2000 +/- 100	<0.1	0.660 +/- 0.03	0.05 +/- 0.02	<0.002	0.008 +/- 0.005	69 +/- 7	0.07 +/- 0.04
195-7	58000 +/- 3000	20 +/- 10	<0.1	0.5 +/- 0.1	185 +/- 10	16 +/- 4	0.560 +/- 0.03	0.080 +/- 0.004	0.002 +/- 0.001	0.003 +/- 0.001	7.4 +/- 0.7	0.09 +/- 0.01
195-8	190000 +/- 10000	<10	0.07 +/- 0.02	1.4 +/- 0.1	190 +/- 10	<0.1	0.320 +/- 0.02	0.60 +/- 0.04	0.023 +/- 0.007	<0.005	92 +/- 20	<0.02
26-2	152000 +/- 8000	<10	<0.1	0.5 +/- 0.1	0.07 +/- 0.2	4.3 +/- 0.2	0.050 +/- 0.003	0.012 +/- 0.002	<0.0004	0.0007 +/- 0.0005	1.6 +/- 0.7	4 +/- 2
26-5	260000 +/- 10000	<10	<0.1	2.5 +/- 0.2	144 +/- 72	4.4 +/- 7	0.350 +/- 0.002	0.066 +/- 0.002	<0.0005	0.0008 +/- 0.0005	3.1 +/- 0.3	1.3 +/- 0.1
27-5	1170000 +/- 70000	<10	<0.1	0.3 +/- 0.1	2.6 +/- 0.2	5.7 +/- 0.2	0.630 +/- 0.03	0.26 +/- 0.01	0.0028 +/- 0.0008	0.0008 +/- 0.0005	64 +/- 22	0.7 +/- 0.2
32-9	2200000 +/- 500000	<10	<0.1	0.7 +/- 0.1	3.2 +/- 0.2	<0.1	0.008 +/- 0.004	9.4 +/- 0.7	0.12 +/- 0.01	0.03 +/- 0.03	34 +/- 4	1.3 +/- 0.2
32-9d	2400000 +/- 800000	<10	0.05 +/- 0.02	0.9 +/- 0.1	2.4 +/- 0.1	<0.1	0.001 +/- 0.002	0.1 +/- 0.1	<0.02	0.028 +/- 0.004	24 +/- 2	1.2 +/- 0.1
32-E	4300000 +/- 1500000	<10	0.05 +/- 0.03	2.9 +/- 0.2	68 +/- 4	1.0 +/- 0.1	0.002 +/- 0.002	130 +/- 12	<0.1	0.16 +/- 0.04	52 +/- 5	0.24 +/- 0.05
35-4	870000 +/- 600000	<10	<0.1	0.5 +/- 0.1	3.1 +/- 0.2	39 +/- 2	0.042 +/- 0.006	2.3 +/- 0.1	0.100 +/- 0.01	0.77 +/- 0.05	370 +/- 60	0.6 +/- 0.1
35-4	820000 +/- 600000	<10	<0.1	1.8 +/- 0.1	6.4 +/- 0.3	7.4 +/- 0.2	0.022 +/- 0.001	1.18 +/- 0.06	0.022 +/- 0.007	0.69 +/- 0.02	2.9 +/- 0.2	0.035 +/- 0.004
35-8	2100000 +/- 1000000	<10	<0.1	0.1 +/- 0.2	14.1 +/- 0.7	0.5 +/- 0.1	0.005 +/- 0.001	14.2 +/- 0.7	0.440 +/- 0.06	4.00 +/- 0.03	0.42 +/- 0.03	0.021 +/- 0.005
40-16	3300000 +/- 1000000	<10	<0.1	1.7 +/- 0.2	3.7 +/- 0.2	6.2 +/- 0.2	0.016 +/- 0.004	0.12 +/- 0.01	0.008 +/- 0.004	<0.005	6.2 +/- 0.4	0.027 +/- 0.007
40-17	2400000 +/- 300000	<10	<0.1	4.2 +/- 0.2	0.96 +/- 0.2	7.0 +/- 0.4	0.037 +/- 0.002	0.21 +/- 0.01	0.012 +/- 0.003	0.075 +/- 0.007	90 +/- 10	1.6 +/- 0.2

d = Duplicate sample

TABLE 5

RESULTS OF ORGANIC CHEMICAL ANALYSES FOR FRENCH LEACHATE (RI PROGRAM ANALYSES)  
(concentrations in ppb)

Sump	Acetone	Benzene	Toluene	Xylene	Ethyl- benzene	Methylene chloride	Chloro- form	Vinyl chloride	Chloro- ethane	1,1 Dichloro- ethane	1,2 Dichloro- ethene	Phthalate esters	Naphthalene	2-Methyl phenol	4-Methyl phenol
07-2	<10	<5	<5	51	21	<5	<5	<10	<10	<5	<5	<10	<10	<10	<10
07-9	<10	<5	<5	10	<5	<5	<5	<10	12	<5	<5	<10	<10	<10	<10
19S-6	<10	<5	<5	77j	<5	<5	<5	<10	2700	210	<5	<10	<10	<10	<10
19S-7	<10	290	2900j	300	<5	120j	<5	150j	<10	54j	75j	<10	770j	48	100
19S-8	<10	12	6j	12	<5	6j	<5	12j	250	140	11	390	<10	<10	<10
26-2	200j	<5	<5	<5	<5	<5	<5	<10	<10	<5	<5	<10	<10	<10	<10
26-3	<10	<5	<5	<5	<5	<5	<5	<10	66j	<5	<5	<10	300j	<10	<10
27-5	<10	100	810	400	50	<5	<5	<10	<10	<5	<5	<10	59	<10	45
32-9	130j	21j	1300	150	<5	41j	<5	41j	<10	<5	<5	<10	58	74	380
32-9d	120j	29j	1700	270	22j	<5	23j	61j	<10	24j	<5	<10	58	74	380
32-E	<10	<5	<5	<5	<5	<5	<5	<10	<10	<5	<5	<10	<10	<10	<10
35-4	<10	<5	<5	<5	<5	<5	<5	<10	<10	<5	<5	<10	<10	<10	<10
35-6	<10	22	1500	3100	43	<5	<5	24	<10	13	<5	<10	160	140	320
35-8	<10	<5	5300	4400j	35	<5	<5	<10	<10	<5	<5	<10	280	100	130
40-14	<10	<5	8j	17j	<5	17j	<5	<10	540	120	<5	<10	<10	<10	<10
40-17	170j	48	11	93	10	<5	<5	<10	<10	22	<5	<10	<10	<10	<10

Miscellaneous Organic Chemicals Present in Only a Few Trenches

Sump	Chemical	concentration	Chemical	concentration	Chemical	concentration	Chemical	concentration
07-2	Bis(2Cl-Et)ether	210						
07-9	Bis(2Cl-Et)ether	10	Benzyl alcohol	16				
19S-7	Bis(2Cl-Et)ether	14	1,2-Dicl-benzene	35	2,4-Dimethylphenol	85		
19S-8	Tricl-ethene	10						
27-5	1,2-Dicl-benzene	11j						
32-9d	Benzolic acid	300j	2,4-Dimethylphenol	42j	1,4-Dicl-benzene	10j		
35-4	2-4 Dimethylphenol	1500						
35-6	Carbon disulfide	11	4-He-2-pentanone	21	Tetracl-ethene	7	2,4-Dimethylphenol	32
35-8	1,2-Dicl-ethane	6						
40-14	4-He-2-pentanone	27						
	1,1,1-Tricl-ethane	27						

Note: Cl = chloro Et = ethyl Me = methyl

j) Estimated value because of exceeding a data validation criterion, or below detection limit due to laboratory sample dilution.

d) Duplicate Sample

TABLE 6  
RESULTS OF INORGANIC ANALYSES FOR TRENCH LEACHATE (RI PROGRAM ANALYSES)  
(concentrations in ppb)

SAMP	Al	Sb	As	Ba	Bb	Bc	Cd	Ce	Cr	Co	Cu	Fe	Pb	Hg	Mn	Hg	Ni	K	Se	Ag	Hg	Il	V	Zn
07-2	<200	<60	<10	3310	<5	<5	<5	28910	<10	<50	<25	12280	<5	44540	43	<0.2	<40	156330	5.4 <sup>r</sup>	<10	285500	<10	<50	23
07-9	<200	<60	<10	15937	7.6	<5	<5	7350	19	<50	<25	ND	9.2 <sup>r</sup>	64190	34	<0.2	157	140630	<5	<10	479800	<10	<50	28
198-6	<200	<60	<10	1163	<5	<5	<5	30380	14	<50	<25	23120	17.6 <sup>r</sup>	139220	50	0.2 in	1066	20400	<5	<10	282400	<10	<50	38
198-7	<200	70	<10	1850	<5	<5	<5	41350	15	<50	<25	27800	6.9 <sup>r</sup>	168220	62	<0.2	624	45940	<5	<10	ND	<10	<50	416
198-8	<200	<60	<10	824	<5	<5	<5	24350	13	86	150	11110	18.0 <sup>r</sup>	171020	148	0.5 in	1264	23440	<5	<10	ND	<10	<50	206
26-2	<200	<60	<10	994	<5	<5	<5	10220	<10	<50	<25	14910	6.1	90070	42	<0.2	78	39910	<5	<10	290000	<10	<50	279
26-3	<200	<60	<10	457	<5	<5	<5	9670	16	<50	<25	9840	5.2	161750	46	<0.2	253	51410	<5	<10	366000	<10	<50	121
27-5	<200	<60	<10	16270	<5	13	<5	199120	<10	<50	<25	93940	<5	290430	4490	<0.2	118	82480	<5	<10	520000	<10	<50	980
32-9	<200	<60	12 <sup>r</sup>	1364	<5	<5	<5	21040	42	<50	<25	9170	7.1 <sup>r</sup>	109240	99400	<0.2	63	276090	<5	<10	1591300	<10	<50	223
32-9d	<200	<60	<10	1036	<5	<5	<5	10460	45	<50	<25	7810	<5	98400	79	<0.2	63	223270	<5	<10	1593500	<10	<50	176
32-E	<200	<60	20 <sup>r</sup>	410	<5	<5	<5	10100	11	<50	<25	1670	<5	177890	62	<0.2	160	129360	<5	17	1649300	45 <sup>r</sup>	<50	28
35-4	<200	<60	341 <sup>r</sup>	1956	<5	<5	<5	24370	13	<50	<25	3560	<5	246090	185	<0.2	76	202370	<5	13	1601100	<10	<50	21
35-6	<200	<60	56 <sup>r</sup>	439	<5	<5	<5	26260	<10	<50	<25	1020	<5	218550	300	<0.2	<40	63880	<5	<10	1340500	<10	<50	<20
35-8	<200	<60	72 <sup>r</sup>	<200	<5	<5	<5	7000	16	<50	268	7580	19.3 <sup>r</sup>	33670	106	<0.2	<40	47840	<5	7.6 <sup>r</sup>	<10	<50	22	
40-14	<200	<60	<10	298	<5	<5	<5	23990	<10	<50	<25	11830	6.0	155670	63	<0.2	109	116040	<5	<10	633000	<10	<50	176
40-17	<200	<60	22 <sup>r</sup>	2680	<5	<5	<5	19200	11	<50	<25	14900	22.1	106000	67	<0.2	100	150000	<5	<10	866000	<10	<50	<20

RESULTS OF CYANIDE AND TOTAL PHENOLICS ANALYSES FOR TRENCH LEACHATE (RI PROGRAM ANALYSES)  
(concentrations in ppb)

Samp	Cyanide	Total Phenolics
07-2	<10	34 <sup>r</sup>
07-9	<10	24 <sup>r</sup>
198-6	<10	41 <sup>r</sup>
198-7	10	128 <sup>r</sup>
198-8	21	16 <sup>r</sup>
26-2	<10	81 <sup>r</sup>
26-3	<10	36 <sup>r</sup>
27-5	<10	111 <sup>r</sup>
32-9	129	147 <sup>r</sup>
32-9d	90	31 <sup>r</sup>
32-E	179	67 <sup>r</sup>
35-4	<10	35 <sup>r</sup>
35-6	17	13 <sup>r</sup>
35-8	<10	22 <sup>r</sup>
40-14	<10	20 <sup>r</sup>
40-17	<10	17 <sup>r</sup>

j) Estimated value because of exceeding a data validation criterion, or below detection limit due to laboratory sample dilution.  
 in) Estimated value and tentative identification  
 r) Rejected result due to exceeding a data validation criterion.  
 ND) No Data  
 d) Duplicate sample

to be highly buffered and exhibited near-neutral pH values. The trench samples yielded negative results for RCRA screening tests for sulfide and ignitability. Additionally, organic and inorganic analyses performed on the trench leachate samples indicated that EP Toxicity and Toxicity Characteristic Leachability Procedure (TCLP) test results would also be negative for those samples. Table 7 presents the results of RCRA analyses performed on trench leachate samples.

#### 5.1.2 - Geology and Ground Water

Maxey Flats is located in the Appalachian Plateau, in the Knobs physiographic region of northeast Kentucky. The MFDS lies in a tectonically stable region of North America with few exposed faults and relatively infrequent earthquakes. However, minor damage from earthquakes has been reported in the region from recent earthquakes, one of which occurred in 1988, having a magnitude of 4.5 on the Richter Scale with an epicenter approximately 25 miles southwest of the MFDS.

Figure 6 illustrates the rock units exposed in the area surrounding MFDS which consist of shale, siltstone, and sandstone ranging in age from the Silurian to Mississippian (320 to 430 million years old). In the MFDS area, the rock units dip 25 feet/mile (0.3 degrees); regionally they dip to the east at 30 to 50 feet/mile.

The Nancy Member of the Borden Formation is exposed on the hilltop at the MFDS and is 27 to 60 feet thick. The unit is mostly shale with two laterally extensive siltstone beds, the Lower Marker Bed (LMB) and Upper Marker Bed (UMB). These beds are 0.2 to 2.8 feet thick where encountered during drilling operations at the MFDS.

Underlying the Nancy Member, the Farmers Member of the Borden Formation is characterized as an interbedded siltstone and shale, approximately 29 to 42 feet thick. Underlying the Farmers Member is the four to seven feet thick shale of the Henley Bed, 17 to 18 feet thick Sunbury Shale, and 21 feet thick Bedford Shale.

Fractures are present in all rock units at the MFDS, with fracture sets oriented, in descending order, northeast-southwest, northwest-southeast, and north-south. The fracture sets are generally within 20 degrees of vertical. The weathered shale of the Nancy Member is the most highly fractured. Most ground water available for sampling during the RI was obtained from fractures of geologic units. Figure 7 identifies the location of monitoring wells sampled for ground water.

TABLE 7

RESULTS OF RCRA ANALYSES FOR TRENCH LEACHATE

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<u>TRENCH SUMP</u>	<u>pH</u>	<u>SULFIDE SCREEN</u>	<u>IGNITABILITY SCREEN</u>
7-2	7.50	Neg	Neg
7-9	7.83	Neg	Neg
19S-6	7.32	Neg	Neg
19S-7	7.33	Neg	Neg
19S-8	7.66	Neg	Neg
26-2	7.80	Neg	Neg
26-3	8.03	Neg	Neg
27-5	5.07	Neg	Neg
32-9	7.83	Neg	Neg
32-9 <sup>d</sup>	7.89	Neg	Neg
32-E	8.49	Neg	Neg
35-4	8.05	Neg	Neg
35-6	8.24	Neg	Neg
35-8	8.65	Neg	Neg
40-14	7.57	Neg	Neg
40-17	8.14	Neg	Neg

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Neg) Negative results  
 d) Duplicate sample

Note: Organic and inorganic analyses performed on the trench leachate samples indicated that EP Toxicity test results would be negative.

FIGURE 6

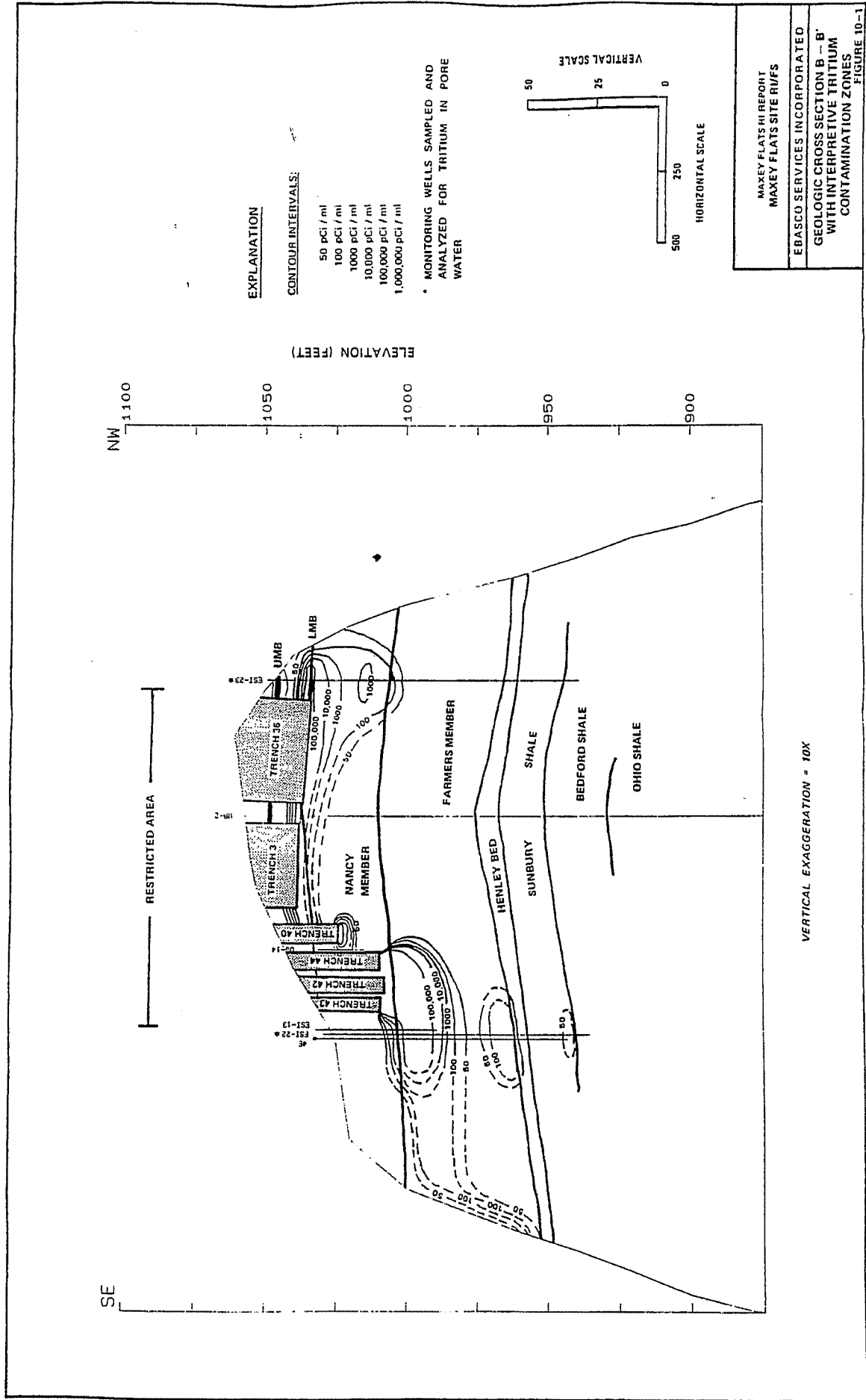
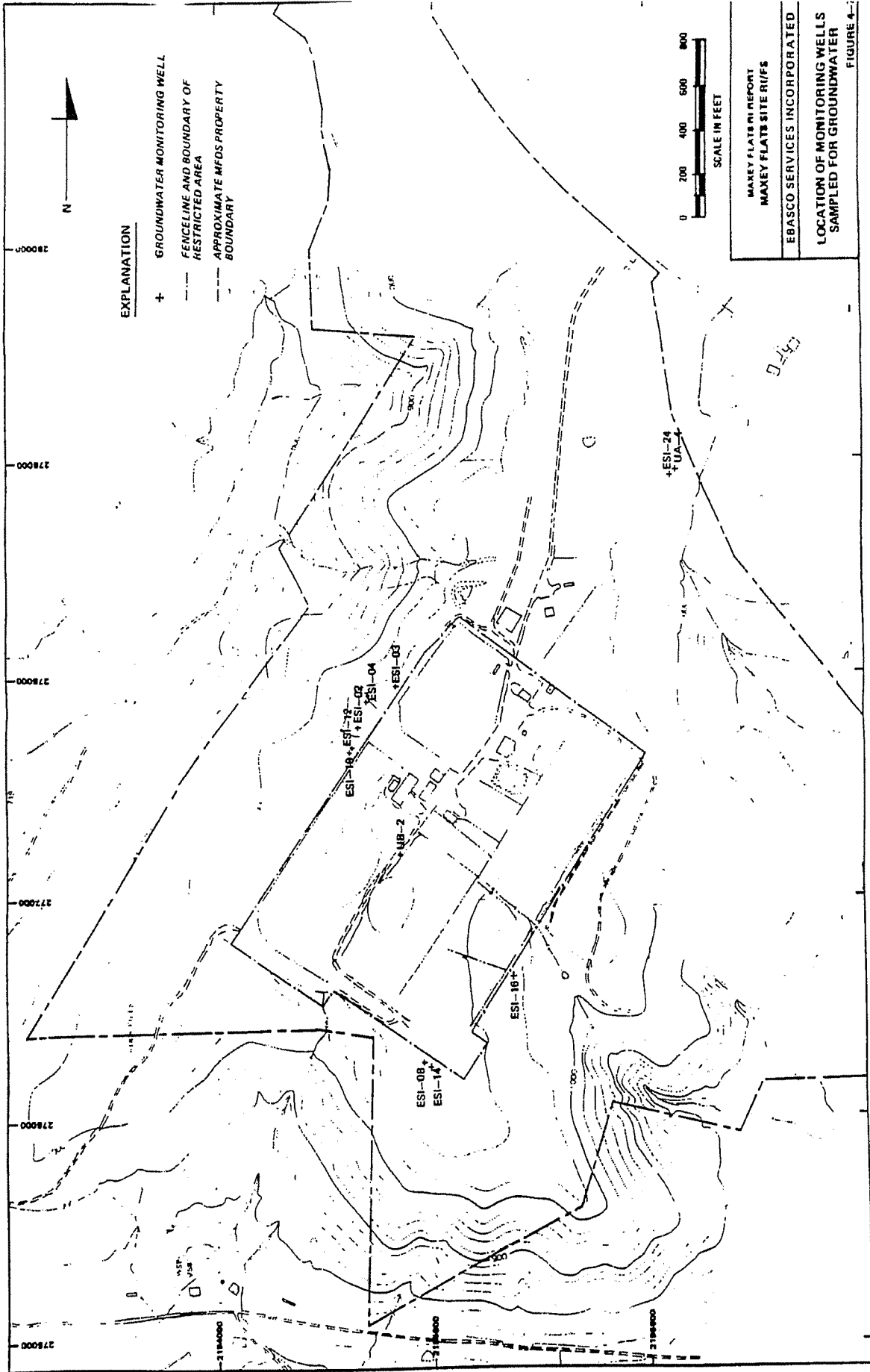


FIGURE 7



The distinguishing feature of the Nancy Member, and perhaps that of the site's geology, is the Lower Marker Bed of the Nancy Member. The LMB is a thin siltstone layer that is generally flat-lying (some local undulations of the bed are present, however), fractured and weathered, and lies approximately 15 to 25 feet below ground surface. The LMB is the principal leachate flow pathway at the MFDS and underlies or intersects the majority of disposal trenches. Consequently, the LMB is a highly contaminated geologic unit at the MFDS. Another distinguishing characteristic of the LMB is that underlying units are hydraulically connected to the LMB. However, rates and quantities of flow to the underlying units are, most likely, low.

It is estimated that the maximum total flow rate away from the Restricted Area and through the LMB represents 70 percent of the entire flow system at the MFDS. The volume of LMB exfiltration to the hillslopes has been estimated at approximately 159 gallons per day, at a minimum. The total flow from the LMB and lower lying beds has been estimated at 227 gallons per day.

Vertical migration between geological strata is limited by shale layers of low permeability, which act as aquitards. On the west side of the site, trench leachate migrates horizontally through fractures of the Lower Marker Bed, which lies approximately 15 feet below ground surface in that area. On the east side of the site, the 40 series trenches, which commonly bottom near the top of the Farmers Member (approximately 40 feet below ground surface), leach tritium and other contamination to the Farmers Member. Because the MFDS is bounded on three sides by steep slopes, the contaminated leachate migrating horizontally through the fractured siltstone layers generally moves into the bottom of the soil layer on these hillslopes. However, as evidenced by the occurrence of seeps on the east hillside, not all leachate migrates to the bottom of the soil layer on the hillslopes.

Hydrogeologic evaluations of the MFDS indicate that ground water movement through the rock strata to the disposal trenches may be negligible. However, a potential pathway for ground water flow into the trenches would be through the narrow neck at the north side of the site where the MFDS trench area is connected to the main portion of the Maxey plateau. Because of present water mounding at the site (i.e., there is a higher potentiometric surface at the center of the site than at the edges), the tendency is for water/leachate to migrate outwardly from the site rather than into it. Furthermore, even if the trend were



reversed, the ground water migration into the trenches is anticipated to be minimal for two reasons. First, the very limited permeability of the various rock strata (except through fractures) would preclude significant migration. Second, due to the natural geological configuration of the MFDS plateau and the narrow land bridge connecting the MFDS to the remainder of the plateau, ground water flowing south toward the trenches would very likely migrate and drain into the natural gullies to the east and west of the connecting land bridge rather than migrate the longer distance into the trenches. Further modeling, monitoring, and data evaluation are planned to assess hydrogeologic conditions at the MFDS.

Tritium is the predominant radionuclide detected in ground water, as confirmed during the RI. Samples taken from monitoring wells in the Lower Marker Bed had higher tritium concentrations (up to 2,000,000 pCi/ml) than samples taken from deeper geologic units, with the highest tritium concentrations detected on the west side of the Restricted Area. Other radionuclides detected include cobalt-60, carbon-14, strontium-90, radium-226, uranium-233/234, uranium-235, uranium-238, plutonium-238, and plutonium-239/240. These tritium concentrations and the presence of other radionuclides indicate that the contamination was caused by trench leachate. Table 8 summarizes the results of radionuclide analyses on ground water samples collected during the RI.

Non-radionuclide analyses in monitoring wells indicate the presence of organics and inorganics such as benzene, toluene, xylenes, arsenic, total phenolics and cyanide. The highest concentrations of non-radionuclides were detected in wells completed in the LMB on the west side of the Restricted Area, which also had the highest radiological contamination. Tables 9 through 11 present the results of organic, inorganic and RCRA analyses on ground water samples collected during the RI.

The LMB and the Farmers Member are the two principal geological formations at the MFDS by which leachate migrates to the hillslopes.

### 5.1.3 - Soils

Soil cover on the hillslopes in the MFDS area averages five feet thick, but ranges from 0.5 to greater than 18 feet thick. The soil types are generally an upper soil unit of clayey silt, and a lower soil unit of silty clay.

TABLE 8  
RADIONUCLIDE CONCENTRATIONS IN GROUND WATER  
(concentrations in pCi/ml)

Well	Sampling Date	ICL	5r-90	Co-90	Es-137	Ar-226	U-233/234	U-235	U-238	Pu-238	Pu-239/240
<b>BOUND 1</b>											
E51-02	03/05/88	<10	0.03 +/- 0.02	0.4 +/- 0.1	<0.1	0.0008 +/- 0.0003	0.025 +/- 0.003	0.0008 +/- 0.0002	0.0313 +/- 0.0006	0.14 +/- 0.01	0.0007 +/- 0.0001
E51-03	03/03/88	<10	0.19 +/- 0.01	0.6 +/- 0.1	<0.1	0.0008 +/- 0.0003	0.105 +/- 0.007	<0.0008	0.0024 +/- 0.0007	0.134 +/- 0.009	0.0010 +/- 0.0006
E51-04	03/03/88	<10	0.09 +/- 0.01	0.5 +/- 0.1	<0.1	0.0008 +/- 0.0004	0.100 +/- 0.006	<0.0007	0.0016 +/- 0.0010	0.14 +/- 0.01	0.0004 +/- 0.0006
E51-08	03/02/88	<10	0.007 +/- 0.002	0.5 +/- 0.1	<0.1	MD	MD	MD	MD	MD	MD
E51-12	03/02/88	<10	0.25 +/- 0.01	<0.1	<0.1	0.0012 +/- 0.0003	0.0014 +/- 0.0005	<0.0002	0.0005 +/- 0.0003	0.009 +/- 0.002	0.0012 +/- 0.0009
E51-14	02/24/88	<10	0.049 +/- 0.005	0.004 +/- 0.02	<0.1	MD	MD	MD	MD	MD	MD
E51-16	03/15/88	<10	12.6 +/- 0.6	<0.1	<0.1	MD	MD	MD	MD	MD	MD
E51-19	03/05/88	<10	0.010 +/- 0.003	<0.1	<0.1	0.0007 +/- 0.0004	0.092 +/- 0.005	<0.0004	0.0029 +/- 0.0007	0.36 +/- 0.04	0.003 +/- 0.002
E51-24	03/15/88	<10	0.013 +/- 0.001	<0.1	<0.1	0.013 +/- 0.001	0.010 +/- 0.001	<0.0003	0.005 +/- 0.001	<0.0003	0.005 +/- 0.002
UB-2	03/22/88	<10	0.017 +/- 0.001	<0.1	<0.1	0.013 +/- 0.001	0.010 +/- 0.001	<0.0003	0.005 +/- 0.001	<0.0003	0.005 +/- 0.002
UA-4	03/20/88	<10	0.027 +/- 0.002	<0.1	<0.1	0.42 +/- 0.02	0.0034 +/- 0.0007	0.0003 +/- 0.0002	0.0018 +/- 0.0005	0.00005 +/- 0.0002	<0.0001
<b>BOUND 2</b>											
E51-03	04/19/88	<10	<0.004	0.4 +/- 0.1	<0.1	MD	MD	MD	MD	MD	MD
E51-04	04/20/88	<10	0.16 +/- 0.01	0.5 +/- 0.1	<0.1	0.0005 +/- 0.0001	0.092 +/- 0.005	<0.0004	0.0017 +/- 0.0005	0.049 +/- 0.004	<0.0001
E51-08	04/20/88	<10	0.005 +/- 0.002	0.5 +/- 0.1	<0.1	MD	MD	MD	MD	MD	MD
E51-12	04/21/88	<10	<0.005	<0.1	<0.1	MD	MD	MD	MD	MD	MD
E51-14	04/21/88	<10	<0.005	<0.1	<0.1	MD	MD	MD	MD	MD	MD
E51-16	04/22/88	<10	<0.005	<0.1	<0.1	MD	MD	MD	MD	MD	MD
E51-19	04/22/88	<10	0.4 +/- 0.03	0.8 +/- 0.1	<0.1	0.00044 +/- 0.00009	0.091 +/- 0.005	<0.0003	0.0024 +/- 0.0005	0.18 +/- 0.01	0.0012 +/- 0.0005
E51-24	04/22/88	<10	0.14 +/- 0.01	0.8 +/- 0.1	<0.1	0.00048 +/- 0.0001	0.094 +/- 0.006	0.004 +/- 0.001	0.0051 +/- 0.0008	0.20 +/- 0.01	0.0012 +/- 0.0005
UB-2	04/25/88	<10	<0.005	<0.1	<0.1	MD	MD	MD	MD	MD	MD
UA-4	04/25/88	<10	<0.005	<0.1	<0.1	0.066 +/- 0.003	0.008 +/- 0.001	0.0008 +/- 0.0004	0.0051 +/- 0.0008	0.0023 +/- 0.0007	<0.0004

a) Result suspect; independent analyses performed in the Kentucky Cabinet of Human Resources Laboratory on a duplicate sample had a tritium concentration of 2.0 +/- 0.2 pCi/ml (voiper, 1988)  
 d) Duplicate sample  
 MD) No Data, analyses not performed for these alpha emitters (Ra-226 and isotopic U and Pu) because gross alpha was less than 0.015 pCi/ml

TABLE 9  
ORGANIC CHEMICAL CONCENTRATIONS IN GROUNDWATER  
(concentrations in ppb)

ORGANIC CHEMICAL	ES1-3		ES1-3 <sup>d</sup>		ES1-4		ES1-2		ES1-19		ES1-19 <sup>d</sup>		ES1-8		ES1-14	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
Acetone	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzene	86	66	86	9	9	18	25	<5	65	96	84	<5	<5	<5	<5	<5
Toluene	7	<5	9	<5	<5	<5	<5	<5	10	6	7	<5	<5	<5	<5	<5
Naphthalene	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Vinylchloride	76	45	97	<10	<10	<10	<10	<5	29	40	37	<5	<5	<5	<5	<5
Chloroform	<5	<5	8	24	21	6	6	9	<5	<5	<5	<5	<5	<5	<5	<5
1,1 Dichloroethane	6	<5	13	<5	6	<5	<5	5	9	8	7	<5	<5	<5	<5	<5
1,2 Dichloroethane	12	12	12	6	11	6	6	34	57	57	52	<5	<5	<5	<5	<5
1,2 Dichloroethane	57	48	69	9	17	9	7	32	63	63	55	<5	<5	<5	<5	<5
Trichloroethene	100	93	96	9	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chlorobenzene	<5	9	11	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

ORGANIC CHEMICAL	LOWER MARKER BED/ LOWER MANCY		LOWER MANCY		UPPER FARMERS		OHIO SHALE		OHIO SHALE	
	ES1-24	R2	ES1-12	R2	ES1-16	R2	UB-2	R2	VA-4	R2
Acetone	<10	<10	<10	<10	14	<10	200	2200	<10	<10
Benzene	<5	<5	<5	<5	<5	<5	<5	<5	12	12
Toluene	<5	<5	<5	<5	<5	22	5	<5	12	7
Phenol	<10	<10	<10	<10	<10	<10	<10	500	<10	290
Carbon disulfide	<5	<5	<5	<5	<5	<5	<5	<5	<5	8
Vinylchloride	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloroform	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1 Dichloroethane	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2 Dichloroethane	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2 Dichloroethane	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

J) Estimated value because of exceeding a data validation criterion, or below detection limit due to laboratory sample dilution.  
 R1) Round 1 Sample  
 R2) Round 2 Sample  
 d) Duplicate Sample

TABLE 10  
 INORGANIC CHEMICAL CONCENTRATIONS IN GROUNDWATER  
 (concentrations in ppb)

LOWER MARKER BED

INORGANICS	ESI-03		ESI-03 <sup>d</sup>		ESI-04		ESI-02		ESI-19		ESI-19 <sup>d</sup>		ESI-08		ESI-14		
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2	
Al	<200	<200	<200	<200	4100 <sup>j</sup>	469 <sup>j</sup>	2110 <sup>r</sup>	852 <sup>j</sup>	<200	<200	<200	<200	1260 <sup>j</sup>	<200	<200	<200	<200
Sb	<60	<60	<60	<60	<60 <sup>j</sup>	<60 <sup>j</sup>	<60	<60 <sup>r</sup>	<60	<60	<60 <sup>r</sup>	<60	<60	<60	<60	<60	<60
As	57	44 <sup>r</sup>	57	57	25 <sup>j</sup>	29 <sup>r</sup>	46	60 <sup>r</sup>	66	67 <sup>r</sup>	90 <sup>r</sup>	<10	<10	<10	<10	<10	<10
Ba	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Be	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cd	<5	<5	<5	<5	<5	<5	<5	<5	6	<5	<5	<5	<5	<5	<5	<5	<5
Ca	150000	147000	149000	151000 <sup>j</sup>	156000	139000 <sup>j</sup>	142000	109000	98900	103000	64610	62400	63910	61100	<10	<10	<10
Ct	<10	<10	<5	<5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Co	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Cu	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
Fe	5660	5460	5670	5680	1110	19100 <sup>r</sup>	12900	3540 <sup>j</sup>	3190	3320	2750	661	<100	<100	<100	<100	<100
Pb	<5	<5	<5	<5	<5	<5	<5	66	<5	<5	<5	<5	<5	<5	<5	<5	<5
Mg	157000	162000	155000	140000	154000	216000	218000	158000	154000	161000	115000	110000	96440 <sup>j</sup>	95900	3615 <sup>j</sup>	3680	<0.2
Mn	4870	4780	4770	282	429	4040	3980	3840	3470	3640	44	29	29	29	3615 <sup>j</sup>	3680	<0.2
Hg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.4 <sup>in</sup>	<0.2	<0.2	<0.2	74 <sup>j</sup>	90	<0.2
H1	60 <sup>j</sup>	61	66 <sup>j</sup>	65	55	178 <sup>j</sup>	120	440	440	440	440	59	59	59	74 <sup>j</sup>	90	<0.2
K	9780	8610	9800	13300	12900	14600	9820	14900	14300	13700	8380	7020	8690 <sup>j</sup>	7290	8690 <sup>j</sup>	7290	<0.2
Se	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ag	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Ne	361000	344000	362000	288000	272000	425000	394000	466000	399000	415000	280000	261000	237000 <sup>j</sup>	204000	<10	<10	<10
Tl	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
V	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Zn	<20	<20	<20	31	782 <sup>r</sup>	<20	<20	<20	10 <sup>j</sup>	12 <sup>j</sup>	12 <sup>j</sup>	12 <sup>j</sup>	12 <sup>j</sup>	<10	<10	<10	<10
Cyanide	<10	<10	<10	<10	<10	<10	<10	<10	17 <sup>j</sup>	14 <sup>j</sup>	<10	<10	<10	<10	<10	<10	<10
Phenolics	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

j) Estimated value because of exceeding a data validation criterion, or below detection limit due to laboratory sample dilution.  
 in) Estimated value and tentative identification.  
 r) Rejected results due to exceeding a data validation criterion.  
 R1) Round 1 Sample.  
 R2) Round 2 Sample.  
 d) Duplicate Sample.

TABLE 10 (CONTINUED)

INORGANIC CHEMICAL CONCENTRATIONS IN GROUNDWATER  
(concentrations in ppb)

INORGANICS	LOWER MARKER BED/ LOWER MANCY ESI-24		LOWER MANCY ESI-12		UPPER FARMERS ESI-16		OHIO SHALE UB-2		OHIO SHALE UA-4	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
Al	4670	2740	3960j	1390j	700j	2470j	<200	2060j	50j	1960j
Sb	<60	<60	<60	<60	<60	<60	<60	<60	<60	<60
As	<10	<10	<10	<10	<10	<10	16r	<10	<10	<10
Ba	<200	<200	<200	<200	<200	<200	1140	3360	7270	3770
Be	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cd	<5	<5	<5	<5	<5	<5	<5	<5	8	5j
Ce	126000	109000	366000	319000	196000	173000	295000	211000	NA	1800000
Cr	32j	23j	23j	10j	<10	13j	<10	<10	11j	19j
Co	<50	<50	<50	<50	<50	<50	<50	<50	<50	64
Cu	<25	<25	<25	<25	<25	<25	101	203	1730	974
Fe	11200	6850	7070	3380	1440	5180	2270	40700	34700	54500
Pb	<5	<5	<5	<5	<5	<5	<5	77	107j	353
Mg	145000	136000	379000	349000	292000	279000	70900	53600	517000	372000
Mn	406	377	164	127	112	140	235	806	2080	2170
Hg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ni	52j	45	<40	<40	47j	49	<40	67	54j	105
K	21400	11700	16600	13700	26200	23000	28000	19300	70500	53300
Se	<5	<5	<5	<5	<5	<5	110	<5	219	<5
Ag	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Na	268000	222000	295000	264000	279000	251000	3940000	2460000	12900000	9450000
Tl	<10	<10	<10	<10	<10	<10	<10	<10	39j	<10
V	73	66r	<50	<50	<50	<50	<50	<50	<50	<50
Zn	<20	<20	20	<20	<20	<20	159	384r	770	2670r
Cyanide	<10	<10	<10	<10	<10	<10	34j	56j	<10	<10
Phenolics	<10	<10	<10	<10	<10	<10	89r	1020j	54r	487j

J) Estimated value because of exceeding a data validation criterion, or below detection limit due to laboratory sample dilution.

r) Rejected results due to exceeding a data validation criterion

NA) Not Analyzed

R1) Round 1 Sample

R2) Round 2 Sample

d) Duplicate Sample

TABLE 11

RESULTS OF RCRA ANALYSES FOR GROUND WATER

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<u>WELL</u>	<u>pH</u>	<u>SULFIDE SCREEN</u>	<u>IGNITABILITY SCREEN</u>
ESI-2	8.13	Neg	Neg
ESI-3	8.04	Neg	Neg
ESI-3 <sup>d</sup>	8.08	Neg	Neg
ESI-4	7.61	Neg	Neg
ESI-8	7.20	Neg	Neg
ESI-12	8.00	Neg	Neg
ESI-14	6.85	Neg	Neg
ESI-16	NA	NA	NA
ESI-19	8.02	Neg	Neg
ESI-24	7.26	Neg	Neg
UA-4	6.77	Neg	Neg
UB-2	7.25	Neg	Neg

---

Neg) Negative Results  
 NA) Not Analyzed  
 d) Duplicate Sample

Note: Organic and inorganic analyses performed on these samples indicated that EP Toxicity test results would be negative.

Figure 8 identifies the locations of soil samples obtained from hand augers during the RI. In the soils on the three slopes adjacent to the site, tritium is the predominant contaminant, with the largest contaminated areas and highest levels of tritium contamination on the upper part of the northwest side of the site (north of the Western Series trenches). Tritium concentrations ranged from non-detect to 560,000 pCi/ml. The soil analyses, in conjunction with the ground water and trench leachate analyses, indicate that tritium has migrated through the fractured LMB from the trenches toward the west hillslope and has subsequently migrated down-slope along the soil/rock interface. Additionally, elevated tritium concentrations (50 to 420 pCi/ml) were observed near the center of the east slope, below an outcrop of the fractured Farmers Member. See Figure 9. This tritium originated in the 40 Series trenches on the east side of the site, which were excavated to near the top of the upper Farmers Member. Other site-related radionuclides detected in soils at the MFDS include cobalt-60 (0.3 pCi/gram) and cesium-137 (0.1 - 0.8 pCi/gram). Previous testing along the soil-rock interface by the Commonwealth indicated the presence of additional radionuclides such as strontium-90, carbon-14, and plutonium-238 and -239. Table 12 provides the concentration ranges of radionuclides in RI soil samples.

Toluene was the most widely detected chemical contaminant at the MFDS, ranging from 40 to 250 ppb. Other volatile organic contaminants detected in soils include acetone and methylene chloride in low concentrations. Pesticides, PCBs, and semi-volatile contaminants were not detected in soils of the MFDS study area, with the exception of one pesticide, Dieldrin, which was detected in a food crop study area (See discussion below). All soil samples displayed inorganic concentrations within ranges considered normal for soils, with the exception of Arsenic, which was detected at 60 to 106 ppm. Tables 13 and 14 provide the concentration ranges for organic and inorganic analyses, respectively, performed on site soil samples during the RI. As indicated in Tables 15 and 16, negative results were reported for the RCRA parameters tested for soil and soil water. Organic and inorganic analyses performed on these soil samples indicate that EP toxicity and TCLP test results would also be negative.

Samples collected in the food crop study area (See Figure 10 for sample locations) indicate no site-related contamination in these off-site locations. Dieldrin, a pesticide, was detected in one food crop sample but is related to farming activities rather than the site.

FIGURE 8

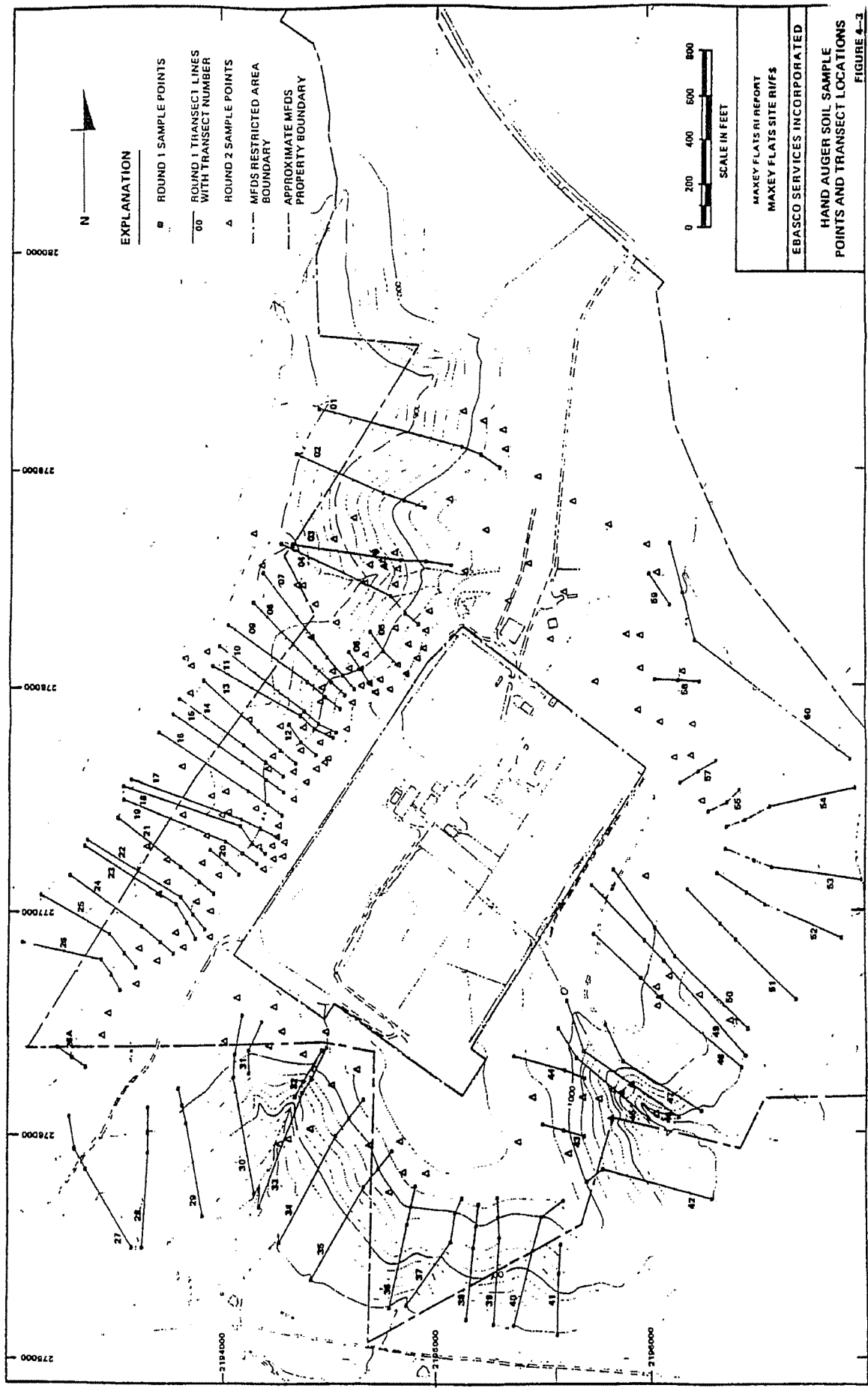




FIGURE 9

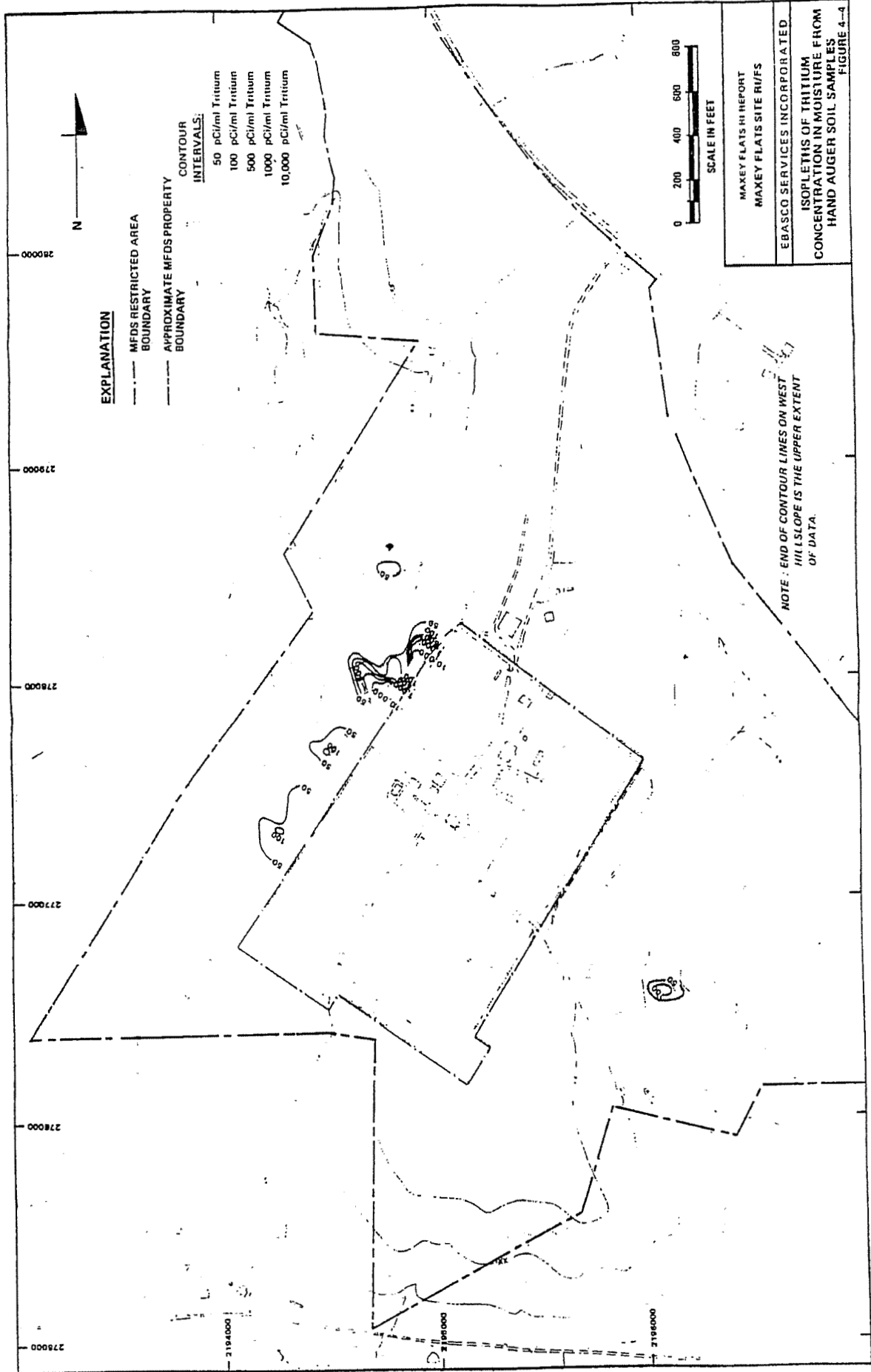


TABLE 12

CONCENTRATION RANGES OF RADIONUCLIDES IN SOIL  
(concentrations in pCi/ml or pCi/gram)

<u>Radionuclide</u>	<u>Background Soil</u> <sup>a</sup>	<u>Food Crop Study Area</u>	<u>Hand Auger Soils</u>
Tritium	<10 <sup>b</sup>	<10	<10-560,000
K-40	20.0-26.0	7.0-22.0	<1.0-31.0
Cs-137	<0.1	<0.1-0.30	<0.1-0.80
Ra-226	0.80-1.10	<0.1-0.30	<0.1-9.40
Th-232	1.10-1.40	0.70-1.50	0.50-1.80
U-238	<2.0	<2.0	<2.0-14.0
Co-60	<0.1	<0.1	<0.1-0.3

a) Daniel Boone National Forest

b) One background tritium analysis discounted by laboratory review (Sample BK-3, See Appendix B, Section 4.2.1 of RI Report)

TABLE 13

CONCENTRATION RANGES OF ORGANIC CHEMICALS IN SOIL SAMPLES  
(concentrations in ppb)

<u>Chemical</u>	<u>Background Soil<sup>a</sup></u>	<u>Food Crop Study Area</u>	<u>Hand Auger Soils</u>
Methylene Chloride	<5	<5	<5-6
Chloroform	<5	<5	<5
Toluene	5 <sup>j</sup> -35	7-180	<5-250 <sup>b</sup>
Acetone	<10	<10	<10-36 <sup>j</sup>
2-Butanone	<10	<10	<10
Di-n-octyl phthalate	<330	<330	<330
Dieldrin	<16	<16-290	<16
Phenanthrene	<330	<330	<330
Fluoranthene	<330	<330	<330
Pyrene	<330	<330	<330

- a) Daniel Boone National Forest
- j) Estimated value because of exceeding a data validation criterion, or below detection limit due to laboratory sample dilution
- b) Estimated value due to the detector's response being outside of the detector's linear range

TABLE 14

CONCENTRATION RANGES OF INORGANIC CHEMICALS IN SOIL SAMPLES  
(concentrations in ppm)

<u>Analyte</u>	<u>Background Soil<sup>a</sup></u>	<u>Food Crop Study Area</u>	<u>Hand Auger Soils</u>
Al	8540-11100	7090-10100	2980-10900
Sb	<12	<12	<12
As	<2-14.6 <sup>j</sup>	<2-27.1 <sup>x</sup>	6.7 <sup>j</sup> -106.0 <sup>j</sup>
Ba	45 <sup>j</sup> -64	<40-95	<40-163
Be	<1	<1	<1-8.8
Cd	<1	<1	<1
Ca	<1000	<1000-1330	<1000-2180
Cr	15.0-18.4	10.5-16.5	6.4-18.8 <sup>j</sup>
Co	11.3-14.6	<10-26.2	<10-25.5
Cu	9.3-15.7	<5-61.2	<5-53.7
Fe	21400-28500 <sup>j</sup>	15200-31400	16000-95200
Pb	<1-19.8	12.7-33.2	2.4-39.6
Mg	2770 <sup>j</sup> -3030	<1000	<1000-4260
Mn	98 <sup>j</sup> -250 <sup>j</sup>	371 <sup>j</sup> -850 <sup>j</sup>	8 <sup>j</sup> -538 <sup>j</sup>
Hg	<0.04 <sup>j</sup>	<0.04-0.06 <sup>jn</sup>	<0.04-0.20 <sup>jn</sup>
Ni	28-44 <sup>j</sup>	<8-22	<8-63 <sup>j</sup>
K	<1000-1890 <sup>j</sup>	<1000-1280	<1000-2160
Se	<1	<1	<1-4.2 <sup>j</sup>
Ag	<2	<2	<2
Na	<1000	<1000	<1000-1880
Tl	<2-5.2 <sup>j</sup>	<2	<2-3.4
V	21-28 <sup>j</sup>	24-72	<10-276
Zn	49-67	<4-90	6-298
Cyanide	<2	<2	<2
Phenolics	<2	<2	<2

a) Daniel Boone National Forest

j) Estimated value because of exceeding a data validation criterion, or below detection limit due to laboratory sample dilution

jn) Estimated value and tentative identification

TABLE 15

RESULTS OF RCRA ANALYSES FOR HAND AUGER SOIL SAMPLES (ROUND 2)

LOCATION	pH	SULFIDE	IGNITABILITY	ACID REACTIVITY	BASE	WATER
				HCL / H2SO4	REACTIVITY	REACTIVITY
03T-32	3.9	Neg	Neg	Neg / Neg	Neg	Neg
05-10	4.6	Neg	Neg	Neg / Neg	Neg	Neg
05A-35	4.0	Neg	Neg	Neg / Neg	Neg	Neg
06-10	5.5	Neg	Neg	Neg / Neg	Neg	Neg
06-10 <sup>d</sup>	5.7	Neg	Neg	Neg / Neg	Neg	Neg
06-20	6.2	Neg	Neg	Neg / Neg	Neg	Neg
11A-00	4.4	Neg	Neg	Neg / Neg	Neg	Neg
12A-30	4.4	Neg	Neg	Neg / Neg	Neg	Neg
12A-30	4.5	Neg	Neg	Neg / Neg	Neg	Neg
13A-38	4.2	Neg	Neg	Neg / Neg	Neg	Neg
17-10	5.2	Neg	Neg	Neg / Neg	Neg	Neg
17-10 <sup>d</sup>	4.5	Neg	Neg	Neg / Neg	Neg	Neg
18A-00	4.6	Neg	Neg	Neg / Neg	Neg	Neg
43A-10	4.6	Neg	Neg	Neg / Neg	Neg	Neg
48-30	5.4	Neg	Neg	Neg / Neg	Neg	Neg
50A-05	5.5	Neg	Neg	Neg / Neg	Neg	Neg
58A-05	3.9	Neg	Neg	Neg / Neg	Neg	Neg
58A-15	6.8	Neg	Neg	Neg / Neg	Neg	Neg

Neg = Negative test results  
d = Duplicate sample

Note: Organic and inorganic analyses performed on these samples indicated that EP Toxicity test results would be negative.

TABLE 16

RESULTS OF RCRA ANALYSES FOR SOIL WATER

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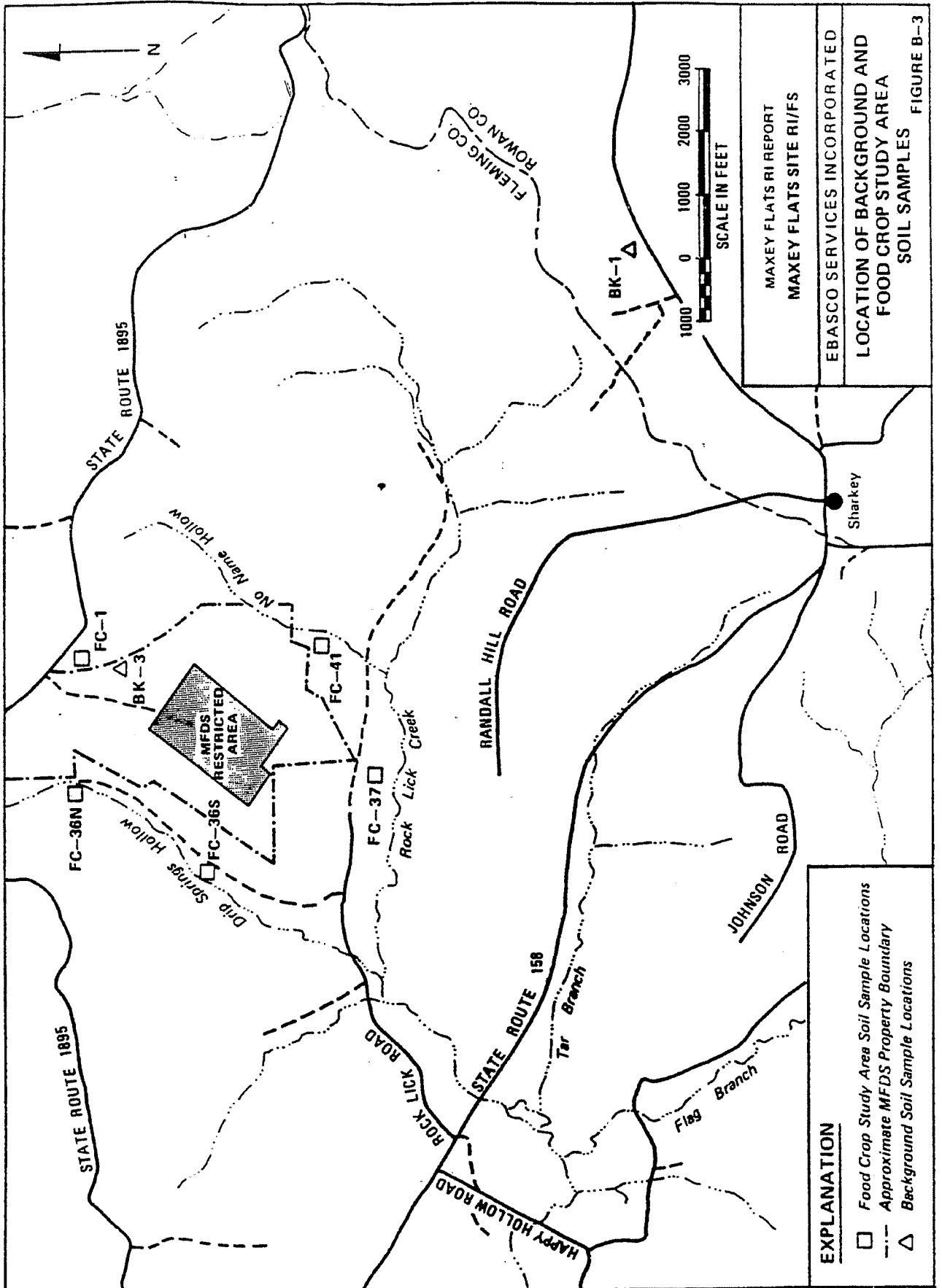
	<u>Date Sampled</u>	<u>pH</u>	<u>Sulfide Screen</u>	<u>Ignitability Screen</u>
WP-1	03/07/88	7.39	Neg	Neg
WP-1 <sup>d</sup>	03/07/88	7.44	Neg	Neg
WP-1	04/19/88	6.40	Neg	Neg
WP-1 <sup>d</sup>	04/19/88	6.30	Neg	Neg

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d) Duplicate sample  
Neg) Negative results

Note: Organic and Inorganic analyses performed on these samples indicated that EP Toxicity test results would be negative.

FIGURE 10



#### 5.1.4 - Surface Water and Sediments

Surface water and sediment investigations during the RI involved the collection and analyses of samples from surface water runoff leaving the Restricted Area (which exits through three water control structures located at the periphery of the Restricted Area) and off-site creeks which receive runoff from the MFDS as well as from off-site sources. Figure 11 illustrates the locations of surface water and sediment sample collection during the RI.

Tritium (10 to 60 pCi/ml) and Radium-226 (0.26 pCi/gram [Rock Lick Creek] and 0.29 pCi/gram [Drip Springs Hollow]) were the only radionuclides detected in the surface water samples during the RI. Concentrations of tritium were highest at the water control structures adjacent to the Restricted Area and decreased with distance away from the Restricted Area. The principal sources of tritium entering these structures are contaminated liquids that have migrated from the trenches to the hillslopes through fractured bedrock and atmospheric releases of tritium from the trenches. The concentration ranges of radionuclides in surface water samples are presented in Table 17.

The Commonwealth of Kentucky has detected Strontium-90 in surface water in the East Main Drainage Channel. The Commonwealth has also detected Strontium-90 in the east pond, at the east pond outlet, and in the south drainage area. Additionally, the Commonwealth has detected tritium concentrations in various site drains in excess of 1000 pCi/ml.

Analytical results from the RI indicate low concentrations (ranging from 5 ppb to 98 ppb) of chemical constituents in surface water. Chemical contaminants detected in surface water samples were limited to acetone, 2-butanone, chloroform, toluene, bis(2-ethylhexyl)phthalate, and hexachlorobenzene. Concentration ranges of organic and inorganic chemicals are presented in Tables 18 and 19, respectively.

In conjunction with the surface water sampling program during the RI, sediment samples were collected at the same locations (See Figure 11). Sediment sample analyses indicated tritium concentrations ranging from 10 to 70 pCi/ml. Tritium concentrations were greater at the water control structures adjacent to the Restricted Area than at the more distant stream sampling stations. Other radionuclide concentrations in sediment moisture were within the range of background concentrations. (See Table 20 for concentration ranges of radionuclides in stream sediment samples.)



FIGURE 11

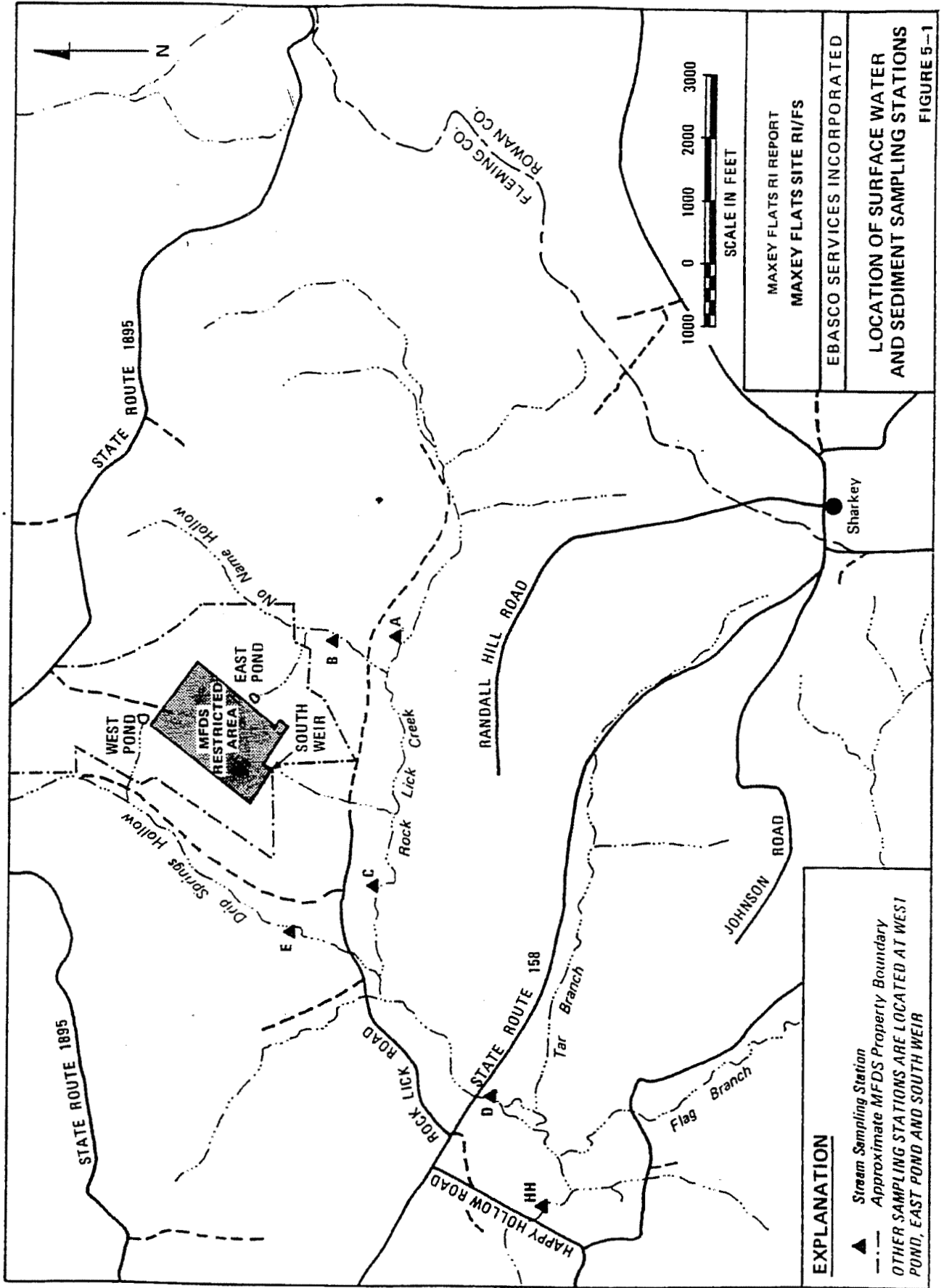


TABLE 17

CONCENTRATION RANGES OF RADIONUCLIDES IN SURFACE WATER  
(concentrations in pCi/ml)

	<u>Background<sup>a</sup></u> <u>Surface Water</u>	<u>Downstream</u> <u>of Site Area</u>	<u>Site Area</u> <u>Streams</u>	<u>MFDS</u> <u>Ponds and Weir</u>
Tritium	<10-40 <sup>b</sup>	<10-31 <sup>b</sup>	<10-30	<10-60
K-40	<1.0	<1.0	<1.0	<1.0
Cs-137	<0.1	<0.1	<0.1	<0.1
Ra-226	<0.1	<0.1-0.29	<0.1	<0.1
Th-232	<0.2	<0.2	<0.2	<0.2
U-238	<2.0	<2.0	<2.0	<2.0
Co-60	<0.1	<0.1	<0.1	<0.1

a) Daniel Boone National Forest and Stream Sampling Station A (upstream of Site Area).

b) High value suspect, see Appendix E, Section 4.1 of MFDS RI Report for discussion.

TABLE 18

CONCENTRATION RANGES OF ORGANIC CHEMICALS IN SURFACE WATER  
(concentrations in ppb)

<u>Organic Chemical</u>	<u>Background<sup>a</sup> Surface Water</u>	<u>Downstream of Site Area</u>	<u>Site Area Streams</u>	<u>MFDS Ponds and Weir</u>
Acetone	<10	<10	<10-68	<10-14
Toluene	<5-9	<5-5	<5	<5-42
Chloroform	<5	<5	<5-5	<5
2-Butanone	<10	<10-36 <sup>j</sup>	<10	<10
Bis(2-ethyl hexyl)-phthalate	<10	<10	<10	<10-98
Hexachloro-Benzene	<10	<10-29 <sup>j</sup>	<10	<10
Heptachlor	<0.05	<0.05	<0.05	<0.05-0.09
Endosulfan 1	<0.05	<0.05	<0.05-0.08	<0.05

a) Daniel Boone National Forest and Stream Sampling Station A (upstream of Site Area)

j) Estimated value because of exceeding a data validation criteria, or below detection limit due to laboratory sample dilution.

TABLE 19

CONCENTRATION RANGES OF INORGANIC CHEMICALS IN SURFACE WATER  
(concentrations in ppb)

<u>Analyte</u>	<u>Background<sup>a</sup> Surface Water</u>	<u>Downstream of Site Area</u>	<u>Site Area Streams</u>	<u>MFDS Ponds and Weir</u>
Al	<200	<200-430	<200-880	<200-1820
Sb	<60	<60	<60	<60
As	<10	<10	<10	<10
Ba	<200	<200	<200	<200
Be	<5	<5	<5	<5
Cd	<5	<5	<5	<5-5
Ca	<5000-9540	11700-24400	5390-26200	<5000-40500
Cr	<10	<10	<10	<10
Co	<50	<50	<50	<50
Cu	<25	<25	<25	<25
Fe	<100-660	<100-2490	360-560	<100-1090
Pb	<5	<5	<5	<5
Mg	<5000	<5000-10200	<5000-5260	<5000
Mn	88-341 <sup>j</sup>	<15-961 <sup>j</sup>	<15-310	<15-172
Hg	<0.2	<0.2	<0.2	<0.2
Ni	<40	<40	<40	<40
Se	<5000	<5000-7450	<5000	<5000
Te	<5	<5	<5	<5
Ag	<10	<10	<10	<10
Na	<5000	<5000-6920	<5000	<5000
Tl	<10	<10	<10	<10
V	<50	<50	<50	<50
Zn	<20-85	<20-43	<20-33	<20-22
Cyanide	<10	<10	<10	<10
Phenolics	<10	<10	<10	<10

a) Daniel Boone National Forest and Stream Sampling Station A  
(upstream of Site Area)

j) Estimated value because of exceeding a data validation criterion,  
or below detection limit due to laboratory sample dilution.