UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 ARCH STREET
PHILADELPHIA, PENNSYLVANIA

FINAL DECISION AND RESPONSE TO COMMENTS ON SELECTION OF CORRECTIVE MEASURE UNDER SECTION 3008(h) OF THE RESOURCE CONSERVATION AND RECOVERY ACT

FOR THE

MARJOL BATTERY SITE THROOP, PENNSYLVANIA

DECEMBER 2000

FINAL DECISION AND RESPONSE TO COMMENTS
MARJOL BATTERY SITE

TABLE OF CONTENTS

FINAL DECISION AND RESPONSE TO COMMENTS ON SELECTION OF CORRECTIVE MEASURE UNDER SECTION 3008(h) OF THE RESOURCE CONSERVATION AND RECOVERY ACT

I. INTRODUCTION

This Final Decision and Response to Comments (FDRTC) is being presented by the United States Environmental Protection Agency (EPA) to identify the remedy that has been selected by EPA. This FDRTC also addresses concerns and issues raised during the public comment period regarding the proposed remediation of contamination at the Marjol Battery Site (Site) in Throop, Pennsylvania, including those that were raised at the public hearing held on January 11, 2000. All of the comments received were carefully reviewed by EPA and have been addressed in this FDRTC. EPA has not modified the excavation, consolidation, and containment requirements presented in the Statement of Basis which was issued on October 15, 1999. However, based on extensive and significant public comment, EPA has modified the treatment and off-site removal requirements as described in the Final Remedy section and explained in the Modifications to the EPA's Proposed Remedy Section of this document. The Statement of Basis is provided in Attachment I of this FDRTC.

On May 31, 1990, EPA, the Pennsylvania Department of Environmental Protection (PADEP), and Gould Electronics, Incorporated (Gould), the current owner of the Site, entered into an Administrative Order on Consent (Consent Order) pursuant to the Resource Conservation and Recovery Act (RCRA) 42 U.S.C. § 6928(h); and the authority vested in PADEP by the Solid Waste Management Act, Act No. 1980-97, 35 P.S. §§ 6018.101 et seq. (SWMA); the Clean Streams Law 35 P.S. §§ 691.1 et seq. (CSL); and Section 1917-A of the Administrative Code, the Act of April 19, 1929, P.L. 177, as amended, 71 P.S. §§ 510-17A, which required Gould to conduct a RCRA Facility Investigation (RFI) at its facility located in Throop, Pennsylvania, and to prepare a Corrective Measures Study (CMS) in which it proposed and evaluated several corrective measures alternatives for Site remediation. Gould submitted an RFI Report to EPA on March 15, 1993. On August 30, 1994, the RFI Report was approved by EPA and PADEP following a thorough review process. Gould submitted a CMS Report to EPA in March 1995. EPA and PADEP disapproved the CMS Report in September 1995. In November 1997, following extensive comments from EPA, PADEP, and the Throop community, including comments regarding the potential for mine subsidence at the Site, EPA required Gould to conduct a Mine Subsidence Investigation and to revise the CMS Report. In March 1999, Gould completed the Mine Subsidence Investigation, which EPA approved in January 1999. On June 21, 1999, Gould submitted the revised CMS Report. On October 15, 1999, EPA issued the Statement of Basis which included the Agency's preferred corrective measures alternatives for the Site.

II. FINAL REMEDY

EPA has selected the following corrective measures to remediate the contaminated soils and battery casing material (BCM) at the Site. These corrective measures include a combination of excavation, waste treatment via solidification/stabilization, potential off-Site disposal, capping, and institutional controls to maintain the protectiveness of the remedy and to protect human health and the environment. These corrective measures are derived from a combination of several Corrective Measure Alternatives presented by Gould in the June 1999 CMS Report. EPA believes this Final Decision includes the necessary components to fully and to permanently protect human health and the environment from the lead contamination on the Marjol Site.

PADEP has reviewed this Final Decision and Response to Comments and supports the final remedy.

A. Excavation of Contaminated Material from Coal Seams

The Final Remedy requires excavation of soil and waste material, including battery casing material, from on-Site areas north of the southern most limit of the General Five-Foot coal seam (Figure 2), which exceeds the soil lead cleanup standard of 500 mg/kg. This material will be consolidated on site or removed for off-site disposal as described below.

B. Waste Treatment

The Final Remedy requires solidification and stabilization of approximately the upper five feet of contaminated material to be placed as a treated layer beneath the RCRA cap. The soil to be treated includes the soil excavated from the area of the Site north of the Five Foot coal seam. EPA will require that this treated layer meet performance standards consisting of a compressive strength of 100 pounds per square inch, and a permeability of 1×10^{-6} cm/second.

C. Cap

The Final Remedy requires a cap to be constructed on top of the contaminated material remaining on site. The cap must comply with applicable federal and state standards. The finished grade of the cap must not exceed a 4 Horizontal to 1 Vertical (4H:1V) slope. The approximate location of the capped area is described in Alternative D-2 of the revised Corrective Measures Study for the Marjol Battery Site dated June 21, 1999. The final location of the capped area may be modified in the design phase of the project and will require a "corrective action management unit" (CAMU) designation by EPA Region III as part of the implementation order.

D. Off-Site Disposal of Additional Contaminated Soil and Waste Material

The Final Remedy requires off-Site disposal of all contaminated soil and waste material exceeding 500 mg/kg lead which cannot be consolidated beneath the cap as determined by the approved design. The exact volume of contaminated material to be consolidated under the cap or removed will be determined during the design of the final remedy for the Site.

E. North Woods and Other Wooded Areas Near the Site

The Final Remedy requires Excavation of soil with lead concentrations exceeding 500 mg/kg in the North Woods (Figure 1), and wooded areas adjacent to the Woodlawn Street playground. Any material excavated under this requirement will be consolidated on-Site or disposed off-Site in accordance with Requirement D, above.

F. Protective Measures During Remedy Implementation

The Final Remedy requires the use of dust control measures to prevent the off-Site migration of contaminated soil during remedial activities. During remedial activities, real-time monitoring for dust and lead will be conducted to ensure that contaminants are not released to the surrounding community. There will be coordination with local officials to plan traffic routes for transport of materials to and from the Site during the implementation of the remedy.

G. Modifications to the Storm Water Management System

The Final Remedy requires the following actions to ensure that the Storm Water Management Basin is effective in preventing releases of contaminants to the Lackawanna River during the implementation of the Final Remedy:

- removal of all hydric vegetation and animal structures within the Basin;
- continued measures to control burrowing animals;
- the floor of the Basin, which has increased in elevation due to sediment accumulation, will be cleaned out to the original grade prior to the beginning of on-Site construction activities, and according to a regular schedule following completion of construction activities;
- the geotextile membrane wrapped around the spillway riser shall be replaced with a non-woven geotextile filter fabric to prevent clogging;
- maintenance of the gate valve will be conducted prior to and after the construction activities. An alternative means of closing the gate valve should be developed as a contingency measure during construction activities; and
- the emergency spillway lining, which consists of clumped rip-rap on the interior of the Basin embankment and grass on the exterior, will be upgraded to rip-rap on both embankment slopes.

H. Institutional Controls

The Final Remedy requires institutional controls such as use restrictions, title notices, and proprietary controls, to ensure that the cap integrity is maintained. Construction or use of the property in a manner inconsistent with the integrity and maintenance of the cap is prohibited.

I. Operation and Maintenance

The Final Remedy requires implementation of Site-wide operation and maintenance activities during and following implementation of the remedy for the Site, including operation and maintenance of the Storm Water Management Basin (Figure 2) to prevent releases of lead and other contaminants to the Lackawanna River during remedial activities.

J. Confirmatory Sampling/ Long Term Monitoring

The Final Remedy requires sampling for lead, PAHs, and PCBs to confirm that soil cleanup standards are achieved on-Site. Further monitoring of sediments in the Lackawanna River will be conducted following remedial activities to determine if lead concentrations remain elevated. If so, the need for further corrective action will be evaluated. Following the completion of on-Site remedial activities, off-Site sampling will be conducted to ensure that remedial activities have not caused off-Site contamination. All confirmatory sampling plans must be approved by EPA and include the requirement that Gould evaluate the verification sample results and perform corrective action activities, as necessary, upon any property with results above the EPA cleanup standard for lead of 500 mg/kg.

The Final Remedy requires groundwater monitoring to continue for an unspecified period to ensure that contaminants are not released following implementation of the remedy.

III. MODIFICATIONS TO EPA'S PROPOSED REMEDY

EPA received several hundred comments on the proposed Marjol remedy described in the October 15, 1999 Statement of Basis. EPA's response to each of the comments is contained in Sections VI and VII of this Final Decision. EPA has considered each of these comments and evaluated the need to modify the proposed remedy in light of the new information and comments received during the public comment period.

EPA continues to believe that a containment remedy is the best, most permanent solution to the environmental and health risks posed by the Marjol site. EPA continues to believe that treatment of lead contaminated material is a necessary component of a containment remedy at Marjol. EPA continues to believe that the excavation of lead-contaminated materials north of the limit of the General Five Foot Coal seam is necessary to protect the containment remedy from mining related impacts. EPA also believes that off-site disposal may be necessary to implement the remedy. However, EPA is modifying the conditions under which off-site disposal and treatment will be required.

EPA believes that this Final Decision improves many components of the proposed remedy by reducing short-term risk, increasing reliance on proven technologies, taking less time to complete, and reducing overall cost. EPA is confident that this Final Decision addresses all issues raised during the comment period and will provide permanent protection for the residents of Throop and nearby communities.

The following table provides a side-by-side comparison of the EPA remedy proposed in the Statement of Basis on October 15, 1999 and EPA's final remedy decision. This section also provides EPA's analysis and rationale for the modifications presented in the Final Decision.

Modifications to Marjol Statement of Basis		
Remedy Element	**Statement of Basis**	**Final Decision**
Excavation	**The remedy proposed by EPA provided for the excavation of lead contaminated material from the northern portion of the Site, above the southernmost limit of the Five Foot Coal Seam**	**Unchanged**
Off-Site Removal	**The remedy proposed by EPA provided for the unconditional off-site removal of approximately 86,000 cubic yards of lead contaminated material that failed the leaching test for hazardous waste**	**The final remedy selected by EPA provides for off-site removal of lead contaminated material only if required by the final design of the containment structure and the location of the capped area.**
Treatment	**The remedy proposed by EPA provided for the in-situ treatment of all lead contaminated material remaining on site below the cap.**	**The final remedy selected by EPA provides for a treated layer of lead contaminated material that will be placed immediately below the cap.**

Modifications to Marjol Statement of Basis		
Soil Clean up Levels	**The remedy proposed by EPA provided a soil lead cleanup level of 500 mg/kg and levels for other constituents consistent with unrestricted use**	**unchanged**

A. Modification to Off-Site Removal

The remedy EPA proposed in the Statement of Basis called for the off-site removal of an estimated 86,000 cubic yards of lead contaminated battery casings and soil. EPA expected that this material would consist of the hazardous waste (i.e. material failing the leaching test EPA uses to define hazardous waste for lead) excavated from the northern portion of the site.

EPA proposed removal for four reasons. First, EPA believed that removal actions could take place in the initial phase of the remedy implementation. EPA envisioned that removal of highly contaminated material in the northern portion of the site, such as the high hazardous pile, could be achieved while design and engineering work began on the containment component. EPA believed that this approach offered the benefits of early progress in remedy implementation.

Second, EPA believed that excavation of an estimated 160,000 cubic yards of material would require the large scale stockpiling of hazardous waste while the cap designs were finalized and cap construction began. Theoretically, these stockpiles could remain on-site for one or two construction seasons. The temporary storage of the lead contaminated material could be avoided by direct removal off-site. EPA saw this as a benefit to the safety of the community during remedy implementation.

Third, EPA believed that off-site removal would reduce the ultimate size of the cap area. A smaller cap area means reduced cap costs and a smaller area subject to perpetual maintenance. In addition, a smaller cap meant more property cleaned up to an unrestricted use standard. EPA saw this as a benefit since more property could be put back to a productive use designated by Gould.

Fourth, EPA believed that a partial removal of hazardous waste (i.e. contaminated material that fails as the characteristic test for lead) would reduce the need to disturb the primary fill area to gain additional space for consolidation. EPA's rationale was that hazardous waste would go off-site after treatment and the remaining material (mostly soils and mine spoils) would simply be spread across the 10-acre capped area for treatment and cap construction. Thus, consolidation activities would involve only those materials with the lowest concentrations of

lead, further reducing the implementation risk to the nearby community.

Public Comments

The removal corrective measure proposed in the Statement of Basis generated comments from both Gould and Throop Borough. Both commentors questioned EPA's rationale for the unconditional and immediate removal proposal. Throop Borough did not object to the partial removal, but they did question how EPA justified the removal of only a fraction of the lead contaminated materials, while allowing the consolidation and capping of the remaining material. The Borough believes such an approach should lead to a decision for complete removal.

Gould objected to the removal of any material from the site. Gould commented that EPA's removal component increased the volume of dust generation and required a great increase in truck traffic through the community. [Gould estimates 9,000 additional truck round trips due to this component alone. (*AGC comment 12*)] Gould also estimated that the removal component would add one additional year to the construction phase and $17 million in cost without any reduction in risk or increase in long-term reliability of the containment remedy. Gould has commented that there are no technical or policy justifications for off-site removal of some material, given EPA's selection of containment for most of the on-site material. Thus, Gould believes EPA's approach should lead to no off-site removal.

EPA Analysis and Modification

EPA acknowledges that there is no precise volume where off-site removal becomes more or less appropriate for the Marjol Site. EPA further understands that the greater the volume of contaminated material removed from the site the greater the increase in short-term risk. This fact is a major reason that EPA selected treatment and capping as the primary elements of the remedy in the Statement of Basis. As explained above, EPA intended that the partial removal component would address implementation issues associated with the remedy. EPA continues to believe that the Final Remedy must be implemented quickly, minimize the disturbance of the primary BCM fill area, minimize temporary stockpiling of lead contaminated material, and minimize the size of the final containment area. Therefore, off-Site removal may be required to accomplish these goals. However, EPA cannot quantify these important considerations until design discussions begin with Gould.

Having had the benefit of the public comments and with our additional review, EPA has concluded that the immediate removal of lead-contaminated material for off-site disposal is not necessary at the Marjol Site. EPA's proposed removal of 86,000 cubic yards in the Statement of Basis would generate a large volume of truck traffic through the community, representing an increased short-term risk as well as increased community disruption. Immediate removal of the volume of materials EPA proposed increases the cost of implementation by several million dollars. The increased short-term risk, disruption, and cost may not prove necessary if a satisfactory final design is found. However, EPA is retaining off-site removal in the Final

Decision as a conditional requirement of the remedy. EPA believes that off-site removal of material may become necessary during implementation, if implementation concerns cannot otherwise be satisfied.

EPA is convinced that the final remedy should retain a removal component based on the possibility that the volume of material on-site may be greater than a properly designed and built landfill can manage. EPA relied on Alternative D-2 of the Corrective Measures Study in developing the remedy proposed in the Statement of Basis. Alternative D-2 describes a 10-acre landfill located in the southern portion of the site, south of the limit of the Five Foot coal seam. In the Corrective Measures Study, Gould did not provide a more precise location nor did EPA require one. In fact, EPA expected that the actual size and location of Alternative D-2 would be worked out in the final design stage.

In their comments (AGC, page ii) Gould states that there are "over 20 acres" of available space to locate the containment remedy. Obviously, Gould believes there is sufficient space on-site to design a large enough landfill to contain all the excavated material. EPA disagrees that there is unlimited space available on the southern part of the site in which to place the landfill. EPA used an estimate of 10 acres, based on the D-2 Alternative in the CMS, to develop this component of the proposed remedy. EPA believes the final design should be close to that outlined in the Corrective Measures Study.

EPA believes that there are several factors that must be considered during the design process that may limit the final location of the capped area and the landfill capacity. The most important consideration is that the volume of material that will need to be excavated and contained is not precisely known. This point was made by Gannett-Fleming in comments prepared for Throop Borough. As detailed in Attachment II of the Response to Comments, EPA does not believe that this uncertainty prevents an on-site remedy as argued by the Borough. However, EPA recognizes that the presence of additional material in the northern portion of the site would present capacity issues for the 10-acre D-2 landfill. Thus, this Final Decision retains off-site removal as one option to manage the possible discovery of additional material above the Five and Eight Foot seams.

There are several other considerations that may impact the final design capacity. Most of these considerations are related to the PADEP solid waste management regulations which contain several criteria that may limit the volume or location of the final remedy. EPA believes that these design criteria are important aspects of the containment remedy and expects that an acceptable final design package will address these criteria. Specifically, EPA expects that the final landfill will meet relevant PADEP criteria related to minimum distances from residential areas, playgrounds and schools. The final elevation (height) of the landfill will be another design criterion. From an engineering perspective, both EPA and PADEP agree that the final slopes of the completed fill cannot exceed 4:1, which may limit the available capacity.

EPA attempted to predict the impact of these considerations by estimating the capacity of

the landfill described in the Statement of Basis. At EPA's request, the U.S. Army Corps of Engineers developed a volume calculation for a landfill located south of the Five Foot Coal seam, built with 4:1 slopes, and constrained by the storm water management structures to the west. The resulting estimate, which has been added to the Administrative Record, showed that nearly 88,000 cubic yards of contaminated material would not fit on the Marjol Site as envisioned. However, in meeting EPA's conditions for the estimate, the Corps had reduced the area of the landfill from 10 acres to 7.7 acres. At this point, EPA recognizes that an actual design is needed to determine the final location, volume, and contours of the landfill.

EPA looked at other remedy selections to provide guidance on the potential landfill capacity issue. The EPA Region III Superfund Program had encountered a similar situation at the Berkley Products Company Superfund Site (Berkley Site) in Lancaster County, Pennsylvania. This Site is a former "town dump" which covers approximately 5 acres of a 21-acre property within a residential area. The Site conditions were such that the EPA selected a consolidation and capping remedy along with the off-site removal of 67 drums filled with liquid wastes. The proposed plan for the Berkley Site remedy was announced to the public in April 1996. At that time, EPA estimated that 18,056 cubic yards of waste would be excavated and consolidated into the 5-acre existing landfill area for placement of a final cap. During the design of the cap, EPA discovered that the volume of waste material scheduled for consolidation exceeded the design capacity of the landfill-cap system by approximately 30,000 cubic yards. EPA could not alter the cap design due to the topography of the site and the need to maintain final slope requirements.

Consequently, in August 1999, EPA announced a change to the Berkley remedy that required the off-site disposal of the excess waste. A total of 30,000 cubic yards of material was disposed off-site as residual waste at an approximate cost of $1.1 million. The Berkley Products Record of Decision and the Explanation of Significant Difference for the off-site removal have been added to the Marjol Administrative Record.

EPA believes an analogous situation exists at the Marjol Site. At this stage of remedy selection, EPA does not have an approved final containment design nor precise information on the total volume of material that will be excavated from the northern area of the Site. EPA currently believes that an off-site removal of up to 88,000 cubic yards may be required as part of the remedy, but EPA acknowledges that relatively minor adjustments to the D-2 Alternative may allow most if not all of this excavated material to fit beneath the approved cap.

In short, EPA has not eliminated off-site removal as a component of the Final Decision. The containment remedy must be safely and properly sited and built in order to be protective for the long-term. Therefore, EPA will not compromise the design of the containment remedy to allow additional waste material to be consolidated on-site. If the amount of material to be consolidated is more than is currently estimated or if containment remedy design principles are affected, EPA will require off-site removal of excess material.

B. Modifications to Treatment Requirement

In the October 15, 1999 Statement of Basis, EPA proposed an innovative treatment component that called for the *in-situ* (in-place) treatment of all waste destined to remain on the site. As described in that proposal, EPA required the use of special equipment to mix treatment compounds into the full depth of the waste remaining in the cap area. This technology was evaluated in the Corrective Measures Study that Gould prepared under the current Consent Order.

EPA originally proposed treatment at Marjol for two reasons. First, EPA remedy selection guidance states that treatment is preferred by EPA programs to reduce the toxicity, mobility, and volume of hazardous constituents involved in remedy selections. Second, EPA believes that treatment is necessary to reduce the remedy's reliance on monitoring and maintenance as the only additional protection if the containment system should fail. EPA proposed *in-situ* techniques as the appropriate technology for Marjol since, in our judgement, *in-situ* technology would avoid dust generation and off-site migration of lead during the remedy implementation.

Public Comments

Throop Borough agreed with EPA's proposal of treatment in general and *in-situ* technology in particular. In their comments, the Borough agreed that EPA's proposed treatment requirement was consistent with EPA guidance. The Borough stated that treatment is "commonplace" in remedy selection at sites with heavy metal contamination. The Borough also offered its belief that without treatment "the lead in those waste materials might be mobilized and transported off-site...by laterally migrating waters." (Throop Borough Comments, page 5). The Borough also contended that treatment is necessary at Marjol to provide equal protection of Throop Borough residents, in accordance with EPA's environmental justice "requirements."

In their comments, Gould disagreed that treatment was necessary for the Marjol remedy and strongly disagreed that the *in-situ* technology proposed by EPA was appropriate. Gould points to the lack of any groundwater threat as the primary reason that no treatment is necessary at Marjol. Further, Gould raised several objections to EPA's requirement for *in-situ* treatment that pertain to cost, implementation time, and technical feasibility. Gould provided examples of other remedy selection decisions that initially required treatment and were later changed by EPA when treatment proved infeasible or unnecessary. Gould also pointed to various EPA guidance documents and the National Contingency Plan as support for their objections.

EPA Analysis and Modification

EPA has reviewed carefully all the comments on treatment. We examined the examples provided by both Gould and the Borough in their submissions and we consulted with EPA's Office of Research and Development (EPA-ORD) on the need for treatment at Marjol and/or the

appropriate technology for the conditions at the Site. EPA believes that treatment remains necessary as part of the remedy for the Marjol Site. However, EPA has modified the final remedy to eliminate the requirement that all waste remaining on-site be treated using *in-situ* techniques. Instead, EPA will require the use of proven treatment techniques to create a layer of treated material directly beneath the cap.

EPA is modifying this component of the remedy in response to Gould comments that the *in-situ* technology is not technically feasible for the type of waste and conditions present at Marjol. EPA also acknowledges that treatment will not reduce either the toxicity or the volume of the lead wastes at Marjol. Yet, EPA believes that treatment is still required at the Marjol site to address the risks associated with the potential failure of the cap. However, EPA agrees with Gould that release of lead to groundwater is not a factor at the Marjol Site. EPA believes that a sufficiently thick layer of treated material beneath the cap will provide long-term reliability to the containment remedy that is not provided by monitoring and maintenance alone. This layer, recommended as five feet thick by EPA-ORD, will adequately address EPA's concerns without the need to treat lead contaminated material present at depths greater than five feet. By including this treated layer and the cap, in the final remedy, untreated lead materials will be at least eight feet below the surface.

This modification to the treatment portion of the remedy provides the more certain containment EPA is seeking without relying on unproven technology. Therefore, EPA believes this change in treatment approach makes the remedy easier and quicker to implement without compromising protection. This change also has the benefit of reducing the cost of the remedy significantly. EPA further believes that this change complies with all current EPA guidance regarding the selection of treatment at RCRA corrective action sites. EPA will designate a Corrective Action Management Unit to facilitate the change from *in-situ* to *ex-situ* technology. This designation will be part of any order requiring implementation of this Final Decision.

EPA's specific response to all comments received on treatment of waste and contaminated materials can be found in the Response to Comments (See EPA Response to Throop Borough Comments 1 and 2, EPA Response to Gould Comments 7,8,9,10,12, and 18; and Advanced Geosciences Corporation Comments 16 through 42).

IV. PUBLIC INVOLVEMENT

Since the Agency became involved with the Site in 1987, EPA has conducted numerous briefings for the Throop Borough Council, has met with the Citizens Review Committee (CRC), and has participated in public meetings held by Gould regarding the Site.

On November 18, 1998, EPA held an informal community meeting at the Mid Valley School in Throop to respond to citizen concerns regarding health effects associated with exposure to contaminants from the Site. Tests conducted by Lackawanna County prior to the emergency removal of lead from residential properties, which began in 1988, revealed elevated

levels of lead in the blood of some children and adults living near the Site. During meetings held in 1998, the community frequently questioned EPA about the potential health effects associated with historical exposure to lead contamination. The purpose of the meeting held on November 18, 1998 was to initiate a dialogue between concerned residents and health professionals in order to begin to address these issues. Representatives from EPA, PADEP, the Agency for Toxic Substances and Disease Registry (ATSDR), the Pennsylvania Department of Health (PADOH), and representatives from the local medical community responded to questions and distributed information. The ATSDR Health Assessment is provided in the Administrative Record for the Site.

The following conclusions can be found on page 14 of the ATSDR report:

1. Since the Marjol Battery Site is currently stabilized and no current exposure is occurring, the site currently presents no apparent public health hazard.

2. Based on historic blood lead data, even though some children with elevated blood lead levels may be adversely affected, widespread health effects are not anticipated from the blood lead levels reported in Throop.

3. There is no evidence of elevation of cancers in Throop or the surrounding areas except for a few cancer types including colorectal cancer. However, lead, PAHs and PCBs have not been implicated with these types of cancer. In addition, the cancer experience in Throop and the surrounding areas was found to be similar to that in northeastern Pennsylvania.

EPA began conducting bi-weekly conference calls with Throop Borough Council and other interested citizens from April 1999 until the issuance of the Statement of Basis in October 1999 in order to continue to respond to community concerns.

On October 19, 1999, EPA held a briefing on the proposed remedy for the Site for representatives from the offices of U.S. Senator Arlen Specter, U.S. Senator Rick Santorum, State Senator Robert Mellow, State Representative Donald Sherwood, State Representative Gaynor Cawley, and the Throop Borough Council. On October 26 and October 27, 1999, EPA conducted a series of briefings on the proposed remedy for concerned citizens at the Throop Borough Civic Center.

On December 11 and December 17, 1999, EPA's announcements of the Marjol public hearing appeared in the Scranton Times. On December 27, 1999, EPA sent announcements of the public hearing on the proposed remedy for the Site to 1,500 residents of Throop, Pennsylvania. The hearing was held on January 11, 2000 at 6:30 p.m. at the Throop Borough Civic Center. Political representatives, Gould, and all concerned community members provided oral and written comments on EPA's proposed remedy for the Site at that time.

After the close of the comment period, the Regional Administrator for EPA Region III

offered Throop Borough representatives and Gould officials an opportunity to discuss their respective concerns directly with him. Both parties accepted this offer and met with the Regional Administrator in August, 2000. In addition, the RCRA/CERCLA Omsbudsman is currently reviewing the Marjol remedy selection process at the request of the Throop area Congressional delegation. As part of this review, a public meeting was held on August 8, 2000. A transcript of this meeting is available, but has not been included in the Administrative Record for this Final Decision and Response to Comments, since EPA did not rely on this meeting to support any part of this Final Decision. Region III has reported to the Omsbudsman's Office that all the substantive issues raised in the August 8, 2000 meeting had been submitted to EPA as comments during the public comment period on the Statement of Basis and have been addressed in this FDRTC.

V. PUBLIC COMMENT PERIOD

A public comment period was held from November 1, 1999 to January 18, 2000. Comments were received from the Throop Borough Council and their legal and technical representatives, local citizens, elected officials, Gould and their legal and technical representatives. The extensive comments received from all parties have been summarized below. They have been separated into categories based on the nature of the comment. Due to the extensive number of comments received on EPA's proposed remedy, the comments have been summarized in order to incorporate all comments and EPA's response to these comments into this Final Decision and Response to Comments. The actual, verbatim comments are located in the Administrative Record for the Site.

Persons interested in viewing the Administrative Record may do so at the:

Throop Borough Municipal Building
436 Sanderson Street
Throop, Pennsylvania 18512-1224
Contact: Elaine Morrell
Telephone Number: (570) 489-8311

and

United States Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103
Contact: Mildred Oruska
Telephone Number: (215) 814-3405

VI. COMMUNITY COMMENTS

EPA is aware that there is significant public sentiment for a total removal of all waste

from the Marjol Site. This sentiment has been expressed by residents and community leaders at every opportunity during this remedy selection process. EPA has prepared a general response to the various issues raised by the community and elected officials who advocated total removal.

Many residents are adamant that all lead-contaminated material be removed from the Marjol property. Their view is that containment is not adequate to ensure long-term protection and that the site would remain a constant threat to the community. Elected representatives at the Federal, State, and local level also have advocated total removal of all contamination. The reasons commentors gave for their position includes fear of an on-going health threat, fear of an unforeseen catastrophic release of lead from the Site in the future, and the existence of a "toxic waste dump" in the community.

Additionally, it is clear to EPA from our involvement with the community that some residents believe that removal of all contaminated material from the Marjol site is the only option to guarantee protection of human health. The Borough expressed concern that Throop residents be treated fairly and submitted a report that argued that EPA's current environmental justice policies "require EPA to select a remedy that fully restores the lawful land use to this site." *(Throop Borough comments, January 18, 2000)* Finally, the Borough commented that an on-site remedy should be rejected based on the current residential zoning of the property. The Borough believes that total removal is necessary to allow residential development to occur on Marjol property.

EPA Analysis – Selection Criteria

EPA considered and rejected a total removal remedy at Marjol during the development of the October 15, 1999 Statement of Basis. EPA rejected this alternative based on our analysis of several factors: overall protection of human health and the environment, short-term effectiveness of total removal, the difficulty in implementing a total removal, and cost. EPA has reviewed carefully the comments calling for total removal in preparing this Final Decision. EPA is not persuaded that a total removal remedy is advisable, necessary, or appropriate for the Marjol site.

EPA estimates that 372,000 cubic yards of lead contaminated material is present at the Marjol site. Complete excavation and removal of this quantity of material would release to the air two to three tons of lead from the site, would require 29,000 to 39,000 trucks of lead-bearing material to use local streets (100 trucks per day), and would take three to four years to complete. Estimates of the cost for off-site disposal of all contaminated material range from $70-$80 million. Total removal would also increase the risk of lead contamination leaving the site through surface water runoff.

EPA's final excavation, treatment and containment remedy is expected to release between 400 and 1100 pounds of lead, requires 7 months to 1 year to complete, and requires only 4800 trucks (31 trucks per day) using the local roads. EPA expects the final remedy to cost between $14 million and $24 million as compared to the $36 million to $41 million estimate for the proposed remedy and upwards of $80 million for total removal. This analysis demonstrates that

total removal presents a real increased risk to the community and much greater cost. Given these facts, EPA remains convinced that there is no technical justification for total removal of contaminated material from the Marjol site when equivalent protection is available under the remedy presented in this Final Decision.

Many residents argue that cost should not play a role in EPA's decision. EPA reiterates that cost is a factor in the all remedy selections. Under the governing laws and regulations, EPA must select a Marjol remedy that is not only protective, but also cost effective. Total removal is very expensive and could only be justified if there were no other alternatives that were as protective of human health and the environment. EPA's final treatment and containment remedy, with conditional removal, is as protective as total removal, presents less risk during implementation, and is less expensive.

EPA Analysis – Public Acceptance

EPA also has considered the other reasons provided by commentors in support of total removal. A main concern expressed throughout the remedy selection process by many elected officials and residents is the sense that containment will not prevent future, uncontrolled releases of lead from the site.

EPA reiterates that this concern is unfounded. The risks posed by the lead contaminated material comes not from the existence of lead, but from one's exposure to it. Based on the information contained in the Administrative Record, the Marjol site is "stable." There are no current releases of lead from the site based on the data obtained from the on-going monitoring of the air and surface water. Once this material is treated and capped, there will be no future exposure to lead contamination under any circumstances. Releases of lead contaminated material related to subsurface mining (discussed in detail later in this section) are addressed in the Final Decision through excavation and relocation/removal of the lead. In the event of cap failure, only treated, stabilized material will be exposed and even that exposure will be limited to the time it takes to repair the cap. In the event that Gould is no longer a financially viable site owner in the future, sufficient resources exist within the financial assurance mechanisms for on-site remedies to take care of future maintenance of the on-site remedy. Ultimately, EPA and PADEP are responsible for proper management of the site, either through enforcement actions against Gould or through government action in the event EPA determines that Gould is no longer financially viable.

EPA and PADEP can envision no feasible future release mechanism that would lead to widespread exposure that many commentors suggest is possible. EPA received no comments during the comment period that suggest additional exposure pathways that were not considered in EPA's Statement of Basis. Thus, this final remedy, with the containment and treatment of lead contaminated material, combined with the relocation and removal as necessary of material, will eliminate the potential for lead releases from the Marjol Site.

EPA Analysis – Zoning and Future Land Use

Throop Borough raised the issue of future land use in their comments on the Statement of Basis. This property has been zoned "residential" by the Borough zoning officials. The Borough's position is that a containment remedy will prevent the use of the Marjol site for future residential development. Therefore, they argue, the final remedy must conform to the local zoning requirements which forces EPA to select a total removal remedy. Throop Borough's official comments included a report from their land use consultants that evaluated the potential for residential use of the site and concluded that between 249 and 290 single family units could be constructed on 45 to 50 acres of the site, if EPA modified the Statement of Basis to select a total removal remedy. Finally, the Borough's written comments claim that EPA's Statement of Basis "neglected all five (5) of the major points identified in the Directive." (*Throop Borough Comment 9)*

The "Directive" the Borough refers to is **OSWER Directive No. 9355.7-04 Land Use in the CERCLA Remedy Selection Process (OSWER Directive).** This guidance describes how EPA is expected to address land use in the Superfund remedy selection process for sites like Marjol. EPA disagrees with the Borough's contention that EPA neglected the land use guidance in the development of the Statement of Basis for Marjol. Further, EPA believes that the land use guidance supports the Final Decision that a containment remedy is the most appropriate remedy for Marjol.

EPA guidance provides that cleanup alternatives at RCRA and CERCLA sites be evaluated under "reasonably anticipated land use."(*OSWER Directive, page 7*) Further, the guidance expects that land uses allowable upon completion of a remedy are to be determined as part of the remedy selection process. In both the Statement of Basis and this Final Decision, EPA has conducted its analysis consistent with the guidance. The clean up levels contained in this Final Decision, for areas not necessary for the cap, are "residential" levels. Thus, implementing the Final Decision will mean that most areas of the site will have no restrictions on usage. However, the ultimate use for the unrestricted portions of the site are under the control of the property owner, in this case, Gould Electronics, who may place restrictions on their property if they so choose.

In responding to this comment, EPA also reviewed information contained in a Gould report titled **Response to USEPA/PADEP Comments On the Corrective Measures Study Report** dated June 7, 1996. This report states that Gould does not believe that the property was ever zoned residential, since they, as the landowner, never received notice of the change in zoning designation. Gould's comments on the Statement of Basis (*AGC comment 9*) acknowledge that the property appears on the current zoning map as R-1 (low density residential) and E-1 (environmental conservation). However, Gould comments submitted to EPA (*AGC Comments – Reference 15*) include a "highest and best use" study that details the history of use of the site. According to this study, the property was used for coal mining from 1900 to 1950 and remained vacant until Marjol began operations in 1962. Gould ceased the battery reclaiming

operations in 1982. Thus, the property was never used as residential property. So while the current zoning may be residential, EPA does not agree that residential use represents a reasonably anticipated future use of the property.

In order for the remedy to be protective, portions of the property will have restrictions placed on future use. This result is discussed in the **Results of Remedy Selection Process** section of the OSWER Directive. The OSWER Directive referenced by the Borough clearly anticipates that the remedy selection process can result in remedies for which parts of the site have a more restricted use due to the need to maintain long-term waste management areas. EPA is confident that this Final Decision reflects the reasonably anticipated future land use for this site in a manner that conforms completely with the OSWER Directive.

EPA Analysis – Coal Mining

In the October 15, 1999 Statement of Basis, EPA proposed that all lead contaminated material north of a line representing the southern limit of the General Five Foot Coal Seam be excavated. EPA and PADEP believe the northern portion of the Marjol site is unsuited for the long-term containment of contaminated materials. Past coal mining activities in this area have rendered the ground surface vulnerable to a phenomenon known as pothole subsidence. In addition, coal mine fires are a possibility in abandoned, unflooded mines. Waste material in the northern portion of the site is in contact with, or close proximity to, the General Five Foot and the General Eight Foot seams. EPA and PADEP believe that such circumstances make permanent containment of lead contaminated material in this area ill-advised. Further, EPA believes that relocating this material, either on-site or off-site, is a much better alternative than capping in place to meet the long-term effectiveness criterion.

The Borough's written comments were in general agreement with this principle; however, the Borough stated that the Statement of Basis did not go far enough in requiring removal of material from coal seams. The Borough and their consultants believe that EPA and PADEP have incorrectly estimated the location of the southernmost limit of the General Five Foot seam. They argue that the limit is much farther south and, as a result, the Borough calculates that a much greater volume of material will need to be excavated. The Borough also states that other coal seams, namely the Top Split of the Top Four Foot and the Top Four Foot coal seams were ignored by EPA in the Statement of Basis. The Borough reasons that if EPA considered these additional seams and their location relative to the proposed landfill area, then EPA would require much more excavation and removal of contaminated material.

The Borough also suggests that the PADEP criteria for landfill separation distances for waste-to-coal seam is applicable for the Marjol site. The Borough believes that application of the PADEP criteria for separation distances would require a greater volume of removal than proposed by EPA.

EPA and PADEP, along with the Pennsylvania Bureau of Abandoned Mine Reclamation,

very carefully reviewed all the technical information provided by the Borough to support their position that total (or near total) off-site removal is necessary to manage subsidence and mine fire potential at Marjol. EPA's detailed response to the Borough's comments can be found in Section VI of the Response to Comments *(Comments Throop Borough 1, 5, 6)* and *Attachment II* to the Response to Comments contains a detailed response to the Gannet-Fleming reports submitted by the Borough.

EPA and PADEP do not agree with Gannett-Fleming's interpretation of the site data. As detailed in the Response to Comments, EPA and PADEP have evaluated carefully these comments and EPA and PADEP are confident that the excavation proposed in the Statement of Basis will eliminate uncertainty with regard to subsidence and mine fires affecting a containment remedy at Marjol.

EPA and PADEP consulted with Pennsylvania Bureau of Abandoned Mine Reclamation (PA BAMR) throughout the preparation of the Statement of Basis and review of the public comments. PA BAMR agrees with EPA's and PADEP's interpretation of the mining issues. This agreement is documented in a memorandum from PA BAMR dated July 13, 1999. This memorandum has been added to the Administrative Record for the Final Decision.

There are three key points in EPA's and PADEP's response to these mining issues. First, EPA and PADEP agree that the limit of the General Five Foot Coal seam is not known with absolute precision at this time. The Final Decision requires that Gould determine the precise location of this limit as part of the design phase of the remedy, either through additional borings or through excavation.

Second, EPA and PADEP do not agree with Gannett-Fleming or the Borough that the Top Split of the Top Four Foot and the Top Four Foot coal seams represent a risk for subsidence or fires. EPA's and PADEP's technical justification for this conclusion is fully explained in Attachment II of the Response to Comments. Basically, there is no evidence that either seam was ever mined in the vicinity of the site, and only mined seams are a concern with regard to mine fire and subsidence potential. In addition, PADEP has concluded that the waste-to-coal seam isolation distance requirement raised by the Borough is appropriate for the Marjol site and will be applied. As detailed in EPA response to *Throop Borough Comment 3*, this does not mean that an on-site remedy at Marjol is subject to PADEP permit requirements. EPA and PADEP believe that this isolation is only applicable to the General Five and General Eight Foot seams. The isolation distance criterion is either met or is not applicable for all other seams on the southern portion of the site.

Third, the January 28, 1999 Mine Subsidence Investigation Report, prepared by Gould and approved by EPA and PADEP, with input from PA BAMR, concluded that any trough subsidence on the southern portion of the site was limited to two feet or less. In the Statement of Basis, EPA stated, and in this Final Decision EPA continues to believe, that a containment remedy can be constructed and will be protective under this subsidence scenario. Subsidence

potentials of two feet or less can be easily managed in the design phase of the remedy.

EPA Analysis – Environmental Justice

In its written comments, Throop Borough argues that "...respect for the communities land use classification and for environmental justice require EPA to select a remedy that fully restores the lawful landfill use to this site." (*Throop Borough comments, page 15*)

EPA does not agree that the Agency's environmental justice policy requires full restoration of the Marjol site to a residential land use that has never existed on the property. EPA environmental justice policies require that in reaching its decisions, the Agency apply all environmental laws, regulations, policies, and guidance in a fair and impartial manner in all communities. EPA has met this standard for the Marjol remedy and for the Throop community.

EPA believes this Final Decision is based on sound data and sound technical evaluation. The public participation aspect of the remedy selection has been comprehensive. At every key point in the Marjol project EPA has sought input from all interested residents and considered the many concerns expressed by community residents and elected officials and Borough professional consultants. We expect to continue this dialogue as the cleanup begins.

Ultimately, EPA must use its combined scientific and technical judgement in selecting the appropriate remedy. The public has received a fair and equitable opportunity to express all and any opinions. In the process of arriving at this Final Decision, EPA has listened and analyzed these opinions openly and objectively. EPA believes the remedy selected in this Final Decision is protective of human health and the environment, meets EPA remedy selection criteria, and properly balances all considerations required by law, regulation, guidance, and policy.

The remainder of this Final Decision and Response to Comments provides EPA's analysis and response to comments submitted during the public comment period. Public comments presented to EPA in writing and as oral testimony during the January 11, 2000 public hearing, were submitted by (A) the citizens of Throop; (B) elected officials; and (C) Douglas Blazey, Special Counsel for Throop Borough, including written comments from Gannett Fleming as technical consultant to Throop Borough dated January 18, 2000. The actual, verbatim comments are available for review in the Administrative Record. EPA responds to all comments in Sections VI.A., VI.B., and VI.C. below.

A. COMMENTS RECEIVED FROM THROOP CITIZENS

EPA received written comments from members of the local community who provided comments on EPA's proposed remedy in the Statement of Basis dated October 15, 1999. The written comments received by EPA from the local community are included in the Administrative

Record. EPA provides the following summary of, and Agency response to, all the written comments received from the local community on EPA's proposed remedy provided in the Statement of Basis.

Comment 1 - **I am concerned about the health and welfare of my family. If all of the lead contamination present at the Marjol Site were removed, it would be difficult to control debris carried by wind as the soil was moved from the site each day. Total removal would take too long with too much traffic through the community. The proposed remedy, which is a combination of several actions outlined by EPA, seems to be the safest and most reasonable choice. In addition, Gould should then make good on its offer to make the Site into a recreational area with trails, etc. to tie into the trail system along the Lackawanna River.**

EPA Response - EPA considered the impact to the community if the entire volume of lead-contaminated soil and debris were removed by truck from the Site. The risk from on-Site excavation is manageable by using dust control methods and best management practices. However, the greater the volume of soil removed from the Site, such as the volume of soil excavation required to remove all contaminants from the Site, the greater the potential for an accidental release during the excavation and off-Site transport of contaminated material. Therefore, EPA's remedy requires only the excavation and off-Site disposal of soil necessary to maintain the long-term effectiveness of the final remedy. In the CMS Report, Gould considers several land use options; however, it is ultimately within Gould's discretion to determine an appropriate, lawful use for its property. EPA supports any use of the property that is protective of human health and the environment and maintains the integrity of the remedy.

Comment 2 - **Total removal of all on-site contaminants is the best way to permanently eliminate the health hazard posed by the Site. Off-site disposal could be conducted carefully so that it would not result in the contamination of the community. EPA should consider the long-term threat of contamination for future generations if all contaminants were not removed from the site.**

EPA Response - EPA received numerous comments from the local community that total removal of all contaminants should be selected as the final remedy for the Site. EPA carefully evaluated the threat of short-term risk from releases of lead dust during the implementation of a total removal remedy, including the excavation of contaminated on-Site soils and the transport of these soils to an off-Site disposal facility (landfill or secondary smelter), and balanced this against the long-term risk associated with leaving waste in place at the Site. EPA determined, after careful consideration of these scenarios, that limited (not total) and controlled excavation of on-Site soils was necessary to eliminate risks associated with pothole subsidence and mine fire at the Site and that waste treatment in conjunction with an effective cap would effectively ensure the long-term protectiveness of the remedy. The remedy selection criteria used by EPA to select the remedy for the Site are defined in Table 4 of this FDRTC. The total removal alternative is compared to the nine remedy selection criteria for both EPA's selected corrective measure and

Gould's recommended remedy in Table 5 of this FDRTC.

Comment 3 - **The community was told by EPA in 1988 that in two years EPA would be done in Throop. At that time the local community expressed concern that EPA was putting the cart before the horse by cleaning off-site properties before cleaning the Site.**

EPA Response - In April 1988, EPA determined that an imminent and substantial endangerment to public health, welfare, or the environment may have been present as a result of releases from the Site. In response to this threat, EPA and Gould entered into a Consent Agreement and Order (Order) pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). This threat to the Throop community established an Agency priority to focus on the cleanup of residential properties prior to finalizing an on-Site cleanup. Under the Order, EPA required Gould to take specific measures to clean up existing off-Site lead contaminated soil and to conduct on-Site activities to keep the Site from releasing additional lead contamination via wind or stormwater runoff. EPA's decision to place priority on the immediate health risks associated with lead exposure at individual residences before the cleanup of the Site was appropriate.

Comment 4 - **EPA's position that total removal could risk recontamination of the surrounding community is invalid and that Gould uses the threat of recontamination to do less than what the residents want, which is a safe permanent cleanup.**
EPA Response - Dust generation during excavation activities can be controlled using the EPA's Best Management Practices for dust control as described in EPA's response to AGC Comment 20(a) in this FDRTC. However, the likelihood of an accidental release of fugitive dust during the implementation of the remedy increases as more contaminated soil is excavated from the Site. Therefore, in selecting a final remedy for the Site, EPA determined that soil excavated and removed from the Site would be limited to contaminated soil and waste material necessary to ensure that the cleanup would be permanent and effective in the long-term. Total removal does not successfully meet the EPA decision criteria when a protective remedy can be implemented at the Site with less disturbance to the local community due to truck traffic, less potential dust generation, and less cost. EPA's selected remedy is protective in that potential on-Site risks due to mine subsidence or mine fire will be eliminated, and contaminants allowed to remain at the Site would be treated, prior to capping, approximately to a five-foot depth which would further control exposure to contaminants in the event of cap failure. Gould will be required to perform perpetual maintenance activities to continue to protect the long-term effectiveness of the remedy.

Comment 5 - **Gould missed deadlines, created delays, and submitted deficient reports which required revision. Gould has made public statements that they would only consider a cap as a final remedy and they (Gould) has also stated publicly that they "would drag it (the remedy) out for 20 years if need be." The December 6, 1999 Marjol newsletter by Gould essentially restates this point. With advancements in technology it is possible to accomplish complete removal of all on-site contaminants and that in the EPA Statement of Basis total removal represents "permanent elimination of future (on-site) risk and offers**

the greatest level of long-term protection to human health and the environment against exposure to contaminants at the Site." Gould's focus on cost as the driver for the cleanup decision is inappropriate. Isn't EPA's first criterion protection of human health?

EPA Response - EPA will continue to ensure that Gould complies with the terms and conditions of current and future legal agreements which could require Gould to conduct activities leading up to and including the implementation of a final Site remedy. EPA has selected a final remedy which protects human health and the environment and achieves long-term protectiveness. EPA has determined that protection of human health and the environment can be achieved by controlling waste left in place with a cap which must comply with EPA and PADEP requirements and specifications, in conjunction with treatment of the material beneath the cap to a depth of approximately five feet. In addition, contaminated material will be removed from the areas of instability at the Site due to potential subsidence of on-Site coal seams. EPA has estimated that as much as 88,000 cubic yards of contaminated material may not fit under the cap without exceeding the slope of 4H:1V and other design considerations. If the final remedy design dictates that excavated material will not fit under the cap, then this contaminated material will be taken off-Site for disposal. These measures will ensure that the remedy remains effective in the worst-case scenarios of mine subsidence, cap failure, or mine fire. Gould will be required to provide perpetual maintenance of the Site. Therefore, protection of human health and the environment will be maintained.

Comment 6 - **Gould stated in the December 6, 1999 newsletter that EPA's solidification proposal would prevent excavation and removal at some future date if Gould chooses to redevelop the Site. Gould would not invest millions of dollars in a remedy only to reinvest millions of additional dollars to redo the remedy at some point in the future.**

EPA Response - EPA has modified the treatment component of the final remedy which includes approximately five feet of treated material beneath the cap. EPA does not believe that this treated layer would prevent total removal if technology or other factors changed significantly in the future. Gould could remove the cap and this treated material to facilitate total removal. However, EPA's remedy is a permanent remedy which provides long-term protection and does not rely on any potential future removal scenario discussed by Gould in its December 6, 1999 newsletter. EPA notes, moreover, that any future proposal to change the remedy would require EPA review and approval.

Comment 7 - **Gould has threatened the Throop community by publicly stating that their recommended remedy (Enhanced Low Permeability Cap) is the only remedy that they will implement. Gould's desire to complete a cleanup of the Marjol Site is questionable because they (Gould representatives) do not live or parent children in Throop.**

EPA Response - EPA did not select as its proposed or final remedy the Enhanced Low Permeability Cap alternative recommended by Gould in their CMS Report. EPA's proposed remedy set forth in the October 15, 1999 Statement of Basis was not based on the public

statements by Gould which are referenced in this comment. EPA's proposed remedy was based on an evaluation of all of the technical information available regarding the Site. EPA will require Gould to implement the final remedy outlined in this FDRTC.

Comment 8 - Under Gould's recommended remedy, Throop will be stuck with a hazardous waste site forever. EPA has made an effort to come up with a compromise between Gould and the community's desired remedies, but more could be done beyond what EPA proposed.

EPA Response - Though hazardous waste will remain at the Site under EPA's final remedy, it will be contained in a protective manner to prevent releases of contaminants from the Site. EPA's proposed remedy was not developed in order to achieve a compromise between Gould's recommended Enhanced Low Permeability Cap alternative and the public's preferred total removal remedy, but was intended to provide the Throop community with a permanent and protective remedy. EPA's final remedy includes a cap component, waste treatment, excavation of waste from coal seams, and contingent removal based on the cap design. Therefore, EPA's remedy achieves a balance of all of the remedy selection criteria and is intended to permanently protect human health and the environment.

Comment 9 - Regulations call for more stringent requirements at sanitary landfills than Gould is offering at a hazardous waste site.

EPA Response - The remedy for the Site is not subject to the Pennsylvania permit requirements for landfills. However, certain landfill design requirements that are appropriate to ensure the protectiveness of the cap will be incorporated into the design of the final remedy. Such design requirements include, but are not limited to, the isolation of contaminated material from coal seams at the Site.

Comment 10 - Gould representatives stated that solidification and stabilization is an unproven technology. However, excavation, treatment via solidification and stabilization, and off-site disposal was conducted at a Gould Site in New York.

EPA Response - EPA has determined that solidification and stabilization is the best technology available for the treatment of lead waste. This treatment technology has been effectively demonstrated at other lead battery sites across the country. Solidification and stabilization is also a proven technology for the immobilization of low levels of PAHs and PCBs. Therefore, EPA's remedy includes solidification and stabilization of approximately five feet of contaminated material beneath the cap to increase the long-term reliability and effectiveness of the remedy.

Gould representatives were referring to *in-situ* technology as innovative. EPA acknowledges that *in-situ* techniques are innovative for battery wastes and have never been successfully used at a site with battery casing waste. The fact that *in-situ* technology is unproven in the treatment of battery casing waste is one reason that EPA has modified the treatment component of the

remedy.

Comment 11 - **Were there mined out areas under the Gould site in Portland, Oregon?**

EPA Response - EPA understands that this question is related to Gould's reference to the remedy selected for their battery site in Portland Oregon. Gould indicated in public meetings, including the public hearing on January 11, 1999, that a RCRA cap was selected as the final remedy for their Portland site. Based on a review of the final decision documents for the Gould site in Portland, Oregon, and numerous discussions with the EPA Project Manager for that site, we have learned that there are no mines beneath the Portland site. In response to the concern that the mines beneath the Marjol Site could impact the cap, EPA's final remedy does not allow the cap to be placed in areas of potential pothole subsidence at the Site.

Comment 12 - **As a good faith effort, would any of the Chief Executive Officers from Gould be willing to live at the Marjol Site with their families for a period of one year?**

EPA Response - This question cannot be answered by EPA.

Comment 13 - **I agree with EPA's proposal. It is time to move forward and put this project to rest.**

EPA Response - EPA welcomes this citizen's support for EPA's remedy decision. The final cleanup of the Marjol Site is an EPA priority. EPA will continue to work with Gould and the local community to resolve issues related to the Site.

Comment 14 - **Are the security vehicles leaving the Site being decontaminated before leaving the Site?**

EPA Response - All security vehicles that enter the Site and travel into contaminated areas of the Site must be decontaminated before leaving the Site. Security staff working during the day do not routinely drive their vehicles into contaminated areas of the Site. The contaminated area of the Site is referred to as the "exclusion zone". The area outside of the exclusion zone is called the "support zone". The support zone is the area of the Site where the security guard trailer, and other trailers used by on-Site personnel and Site visitors, are stationed. The support zone is the uncontaminated area or "clean" area of the property.

Comment 15 - **Complete removal should be selected as the final remedy for the Site with restoration of the property to its former condition prior to Marjol operations. Removal of waste from the Site by rail car instead of by truck may be less expensive, would reduce air releases. Transport by rail would also prevent road damage, traffic congestion, and the potential for truck accidents.**

EPA Response - EPA evaluated the feasibility of removing a portion of the Site's contaminants

by railcar in the Statement of Basis. This commentor is correct that the railcar option would decrease truck traffic and potential accidents. Additionally, the cost of using railcar is less than the cost of using trucks to transport contaminated material for off-Site treatment and disposal. However, the length of time to complete the cleanup of the Site would be longer because the rail line would take additional time to construct. Other considerations which could create difficulties in implementation and cause project delays include obtaining necessary permits to transport hazardous material by rail, gaining access to properties not owned by Gould, and reinforcing the structural stability of the Site in order to support a rail line. In light of these considerations, EPA rejected the option of rail transport in favor of transportation by truck.

Comment 16 - **I was employed at the Marjol Site from 1974 to 1977. I unloaded barrels that were unmarked. These barrels were stacked in deep pits in two different areas of the Site. I cracked open batteries with PCB warning labels on them. The contaminants in these barrels could result in contamination to groundwater beneath the Site 20, 50 or 100 years from now. EPA should do the right thing to protect the community from future problems at the Site.**

EPA Response - EPA is aware that PCB contamination exists at the Site and its final remedy involves either the treatment, capping, or off-Site disposal of all PCB-contaminated soil. EPA is not aware of any barrels buried at the Site. However, if any such barrels are found during the cleanup activities at the Site, they will be disposed off-Site in a safe manner. Additionally, the groundwater will be monitored for all constituents of concern following the completion of cleanup activities at the Site to ensure that contaminants have not migrated into the groundwater beneath the Site. EPA's remedy ensures the protection of the community by selecting a remedy which prevents future releases of contaminants from the Site.

Comment 17 - **What is the impact of the water main beneath the Site on the proposed cap?**

EPA Response - The water main currently existing at the Site is located outside the capped area described in the selected remedy. However, a new water main was installed outside the perimeter of the Site. The abandoned on-Site water main may be removed as part of the design of the final remedy.

Comment 18 - **EPA's proposed remedy was a good first step for the Site but additional removal should be evaluated by EPA.**

EPA Response - EPA has evaluated the total removal alternative and determined that the increased short-term risk, implementation difficulties and greater cost do not justify the selection of total removal when EPA's final remedy is equally protective. The estimated volume of contaminated material that may need to be removed from the Site under EPA's final remedy is manageable. Similar volumes of contaminated material have been successfully removed from other lead sites across the country. Additionally, EPA's final remedy provides for the protection of the community from any future releases of lead from the Site by removing contaminated soil

and waste material from areas of pothole subsidence at the Site, and treating contaminated soil and waste material beneath the cap. Treating material beneath the cap ensures protectiveness by preventing releases of contaminants in the event of cap failure.

Comment 19 - **Gould has made empty promises to the people of Throop. If the Site is capped, the town will have a toxic landfill in its backyard which could create a problem in 10, 20, 30, 50 or more years in the future. The bottom line is money and Gould is unwilling to spend the money to make the Site safe.**

EPA Response - EPA's final remedy increases the long-term permanence of the remedy by removing waste from potentially unstable areas of the Site which are subject to pothole subsidence or mine fire. EPA's remedy further addresses long-term permanence by creating a five foot treated layer of material beneath the cap so that in the event of a problem with the cap, contaminated soil and waste material would not be exposed at the surface, thereby further reducing the potential for releases of lead from the Site. The cap must meet specific design requirements which will also increase the permanence of the remedy. EPA has selected a final remedy for the Site which is protective of human health and the environment. Cost is one of several factors which the Agency considers when protectiveness and permanence of the remedy are achieved.

Comment 20 - **What will happen with the water beneath the Site? If Gould goes bankrupt Throop will be stuck with a hazardous waste site.**

EPA Response - EPA has evaluated the groundwater conditions beneath the Site. Groundwater beneath the Site primarily exists as part of the regional groundwater system known as the Scranton Mine Pool. Based on testing conducted by EPA in 1998, there is no lead present in the mine pool beneath the Site at levels exceeding EPA's action level of 15 µg/l for drinking water. The mine pool is not used as a drinking water source: The groundwater beneath the Site is described in further detail in Section III.B. of the Statement of Basis which is provided in Attachment I of this FDRTC. EPA's final remedy will include a monitoring program to continue to test the mine pool water for lead, and all constituents of concern, even after the remedy is complete. In addition, EPA's final remedy includes a cap and waste treatment which will prevent the infiltration of contaminants into the mine pool. In the event that Gould were to declare bankruptcy prior to the cleanup of the Site, EPA would expect to use the funds available from the particular financial assurance mechanism selected under the cleanup agreement. EPA can also evaluate the option of utilizing resources in the EPA Superfund Program to ensure that the site cleanup is completed and that human health and the environment are protected.

Comment 21 - **I live across the River from the Site in Dickson City. My daughter used to play along the River bank. She experienced, as well as others living near the Site, severe health problems which may have resulted from exposure to contaminants from the Site. Homes in Dickson City were not cleaned from lead contamination.**

EPA Response - Based on the information provided in this comment, EPA cannot determine if this child was exposed to contaminants from the Site. During numerous public meetings held regarding the Site in 1997-1998, many community members living in Throop and Dickson City have also expressed concerns to EPA about the health of children and adults who may have been exposed to contaminants from the Site. In a meeting held on November 18, 1998, EPA addressed some of the health concerns of the community. Professionals from the Pennsylvania Department of Health and the Agency for Toxic Substances and Disease Registry (ATSDR), were also in attendance at this meeting. During this meeting, EPA and ATSDR informed the community that the Site is no longer releasing lead. Blood lead levels of children tested annually who live near the Site, show that children are not currently being exposed to lead. However, EPA realizes that these findings, while positive, offer little comfort to individuals who may have been exposed to contaminants from the Site during its period of operation from 1963-1981. Sampling conducted near the Site over the past twelve years, has shown elevated lead levels in soil collected from residential properties, and periodic elevations in the levels of lead present in the Lackawanna River sediments. Contaminated soil was removed from over 133 properties between 1987 and 1992.

On July 29, 1999, ATSDR , working with PADOH completed a Health Consultation for the Throop community. The ATSDR Health Consultation Report contains the following conclusions:

1. Since the Marjol Battery Site is currently stabilized and no current exposure is occurring, the site currently presents no apparent public health hazard.

2. Based on historic blood lead data, even though some children with elevated blood lead levels may be adversely affected, widespread health effects are not anticipated from the blood lead levels reported in Throop.

3. There is no evidence of elevation of cancers in Throop or the surrounding areas except for a few cancer types including colorectal cancer. However, lead, PAHs and PCBs have not been implicated with these types of cancer. In addition, the cancer experience in Throop and the surrounding areas was found to be similar to that in northeastern Pennsylvania.

(Page 14, ATSDR Health Consultation Report)

In August 2000, EPA conducted soil sampling of several residential properties in Dickson City. EPA determined, based on the results of this sampling, that air emissions from the Site did not cause lead contamination above health based levels on properties tested in Dickson City. Due to confidentiality requirements, these results are not available to the general public. However, EPA is preparing a summary of these results for general release within the next few months.

Comment 22 - In the past, the water line going across the Site into Dickson City ruptured

and battery acid and lead contamination seeped into the water line and was consumed by residents of Dickson City.

EPA Response - The water main crossing the Site delivering water to Dickson City was rerouted in March 1999.

Comment 23 - **Removal of all of the contaminated material will increase the sense of safety of the local community and calm their fears about the Site it will also have the added benefit of improving property values in the area of the Site.**

EPA has determined that its final remedy protects the community from releases of lead, and other contaminants from the Site. EPA's remedy requires that contaminated material at the Site be safely contained without risk of exposure to the community, or to individuals who may use the Site in the future. EPA realizes that the fact that waste will remain at the Site, even safely contained, does not satisfy the people in the town who wish to have all of the contamination removed from the Site. Though the total removal alternative has the appeal of leaving the Site free of contamination, the potential risk of contaminating the town during the transport of over 372,000 cubic yards of contaminated soil from the Site is too great, implementation would be very difficult, and the cost too high. More importantly, EPA's final remedy is as protective as total removal without these problems. It is EPA's responsibility to ensure that individuals in Throop, and other surrounding towns, are not exposed to Site contaminants during their removal from the Site, that the remedy be technically feasible and that the remedy be cost-effective.

B. COMMENTS RECEIVED FROM ELECTED OFFICIALS

Comment 1 - **Congressman Sherwood asked, during the January 11, 2000 public hearing, that the community carefully evaluate EPA's proposed decision and determine if they believe that it is the right decision for Throop. He further requested EPA to consider the mine fire potential at the Site and Gannett Fleming's information on the conditions of the mines at the Site. He asked EPA not to be intimidated by Gould or the threat of litigation. Lastly, he asked that if the individuals at the meeting, who reside outside of Throop, had to raise their families in Throop, what decision would they make?**

EPA Response - EPA has evaluated carefully the reports submitted by Gannet Fleming and the conditions of the abandoned mines at the Site. EPA and PADEP do not agree with Gannett Fleming's position that additional coal seams have been mined at the Site beyond those already identified and addressed by EPA's proposed and final remedy. EPA's final remedy requires excavation and movement of contaminated material from above the Five and Eight Foot coal seams where the potential for pothole subsidence and mine fires exist. Therefore, EPA's final remedy is protective of human health and the environment.

Comment 2 - **State Representative Cawley submitted a letter to EPA dated January 11, 2000 and made a statement at the January 11, 2000 public hearing in support of the**

removal of all contaminated soils and waste material at the Marjol Site. He stated that the removal of 86,000 cubic yards of contaminated soil from the Site is not the answer to protecting the health and safety of the community. He also asked about the legality of disposing of hazardous material in Pennsylvania.

EPA Response - EPA carefully evaluated the technical feasability of removing the entire volume (372,000 cubic yards) of lead contaminated soil and waste material from the Site. In selecting the final remedy for the Site, EPA has determined that any soil excavated and removed from the Site will be limited to contaminated soil and waste material necessary to ensure that the cleanup will be permanent in the long-term. Total removal is not justified when a protective remedy can be implemented at the Site with less disturbance to the local community due to truck traffic, less dust generation, and lower cost. EPA's selected remedy is protective in that potential on-Site risks due to mine subsidence or mine fire would be eliminated, and contaminants allowed to remain at the Site would be treated to approximately a five foot depth which would further control exposure to contaminants in the event of cap failure. Gould would be required to perform perpetual maintenance activities to continue to monitor the long-term effectiveness of the remedy.

Comment 3 - **Mr. Andy Wallace, Executive Director of U.S. Senator Arlen Specter's Northeast Pennsylvania Office, submitted written comments and also presented these written comments as oral testimony at the January 11, 2000 public hearing. Mr. Wallace stated that Senator Specter has been involved with the Marjol Site issues for many years and has taken numerous steps to effect the cleanup including making five personal site visits and working jointly with Congressman Joe McDade, the late Senator John Heinz, former Senator Wofford, and presently with Senator Rick Santorum and Congressman Don Sherwood. Mr. Wallace has attended 30 local meetings and tracked the progress towards a site cleanup. He indicated that Senator Specter's office will continue to share the community's concerns regarding mine fires, on-site disposal, the cleanup up of the immediate neighborhood near the site, and the health concerns of the local residents. Their office will continue to remain available to the Throop community. Mr. Wallace indicated that though much progress has been made by EPA much remains to be done. He commended EPA for the intent of the proposed remedy but urged EPA to consider the coal mine issue raised by the local community and presented in reports by Gannett Fleming and to evaluate soil sample results in the local residential community. He concluded that EPA apply pressure to Gould to restore the neighborhood to its original condition.**

EPA Response - EPA notes the substantial involvement and interest of Senator Specter on behalf of the citizens of Throop Borough. EPA is committed to ensuring the protection of the local community from any future risk to human health and the environment from the Site. To this end, EPA will pursue all appropriate legal means to have Gould implement the final remedy at this Site.

Comment 4 - **Mr. Cordaro of the Board of Commissioners of Lackawanna County**

expressed the support of Lackawanna County for the people of Throop regarding the Marjol Site. He asked EPA to listen to the concerns of the people of Throop.

EPA Response - Since 1990, EPA has participated in regularly-scheduled briefings for Throop Borough Council and other elected officials, bimonthly Citizens Review Committee meetings, and biweekly conference calls with Throop Borough Council. Additionally, EPA has responded to numerous inquiries from individuals residing near the Site. EPA continues to remain available to listen to the issues of concern to the local community regarding the Site. EPA's final remedy does not satisfy the desire of many vocal members of the community for the total removal of all contaminated material from the Site. However, EPA's final remedy does address the community's concerns regarding the potential for a mine fire and mine subsidence event to cause lead to be released from the Site by removing contaminated material from areas of the Site where such events could occur. Moreover, EPA's final remedy is protective of human health and the environment for Throop and surrounding communities.

Comment 5 - **Mr. Michael Narcavage, Project Coordinator for Senator Santorum expressed the Senator's concern regarding the welfare of the residents of Throop. Senator Santorum has written letters to EPA Administrator Carol Browner regarding delays in receiving a final remedy for the Site. Now that EPA has proposed a decision about the cleanup of the Site, he wants to hear the community's concerns about EPA's remedy. Senator Santorum will remain involved and work with other elected officials to help resolve this issue.**

EPA Response - EPA appreciates the involvement and interest of Senator Santorum on behalf of the citizens of Throop. EPA acknowledges that the remedy selection process has been a long one, with active community participation. EPA has made every effort to respond to each specific issue raised by the Throop community; such issues triggered additional investigations, like the mine subsidence investigation, in order to resolve some difficult technical concerns. However, during the entire process which has lead to this final remedy, the Marjol site has been stable. Gould has continued air and surface water monitoring since the Superfund response action and this monitoring demonstrates that no unacceptable lead contamination has left the Marjol site. EPA was confident the site was stable, and therefore was able to proceed deliberately with the remedy development, including the additional studies of the mining impacts that the community requested.

Comment 6 - **Mayor Wiercinski of Dickson City requested the total removal of all contaminants at the Site.**

EPA Response - EPA carefully evaluated the threat of short-term risk of releases of lead dust during the implementation of a total removal remedy, including the excavation of contaminated on-Site soils and the transport of these soils to an off-Site disposal facility (landfill or secondary smelter), and balanced this against the long-term risk associated with leaving waste in place at the Site. EPA determined, after careful consideration of these scenarios, that limited (not total)

and controlled excavation of on-Site soils was necessary to (1) eliminate risks associated with pothole subsidence at the Site; and (2) that waste treatment in conjunction with an effective cap would effectively ensure the long-term protectiveness of the remedy. The total removal alternative is compared to both EPA's selected corrective measure and Gould's recommended remedy in Table 5 of this FDRTC.

Comment 7 - **Judge Pieski of Dickson City discussed the coal mining history of this region of Pennsylvania. He stated that all contamination should be removed from the Site due to the unknown conditions of the mines beneath the Site.**

EPA Response - EPA has recognized that there has been uncertainty associated with the conditions of the mines beneath the Site. Consequently, EPA required Gould to conduct a Mine Subsidence Investigation in 1998 in order to gain more information on the impact that the conditions of the mines could have on any final remedy selected for the Site. The Mine Subsidence Investigation determined that the potential for trough subsidence, as defined in Attachment II of the Mine Subsidence Investigation, was limited to two feet. The potential for pothole subsidence, which is explained in Attachment III of the Mine Subsidence Investigation, is addressed in EPA's final remedy by requiring the removal of waste material from areas of the Site where the potential for pothole subsidence exists. Additionally, any potential threat of a mine fire igniting contaminants at the Site is eliminated under EPA's selected remedy by the removal of waste material from areas where a mined out coal seams exist. A copy of the Mine Subsidence Investigation is available in the Administrative Record.

Comment 8 - **Mayor Stanley Lukowski of Throop Borough thanked all of the federal, state, and local government officials for attending the hearing. He discussed the history of the Site and its impact on the local community. He asked for the total removal of all lead contamination from the Site.**

EPA Response - Total removal of all of the contaminated material from the Site does not offer additional protection to human health and the environment when compared to EPA's final remedy which can be implemented with less disturbance to the local community caused by truck traffic, less potential dust generation, and lower cost.

Comment 9 - **Throop Borough Council President James Barnick reiterated the position of the Throop Borough Council that total removal is necessary for the Site. He told the audience that Gannet Fleming's technical review of the conditions of the mines at the Site support total removal.**

EPA Response - EPA has evaluated the reports submitted by Gannet Fleming and the conditions of the abandoned mines at the Site. EPA and PADEP do not agree with Gannett Fleming's position that additional coal seams have been mined at the Site beyond those already identified and addressed by EPA's proposed and selected corrective measures. EPA's remedy requires excavation and movement of contaminated material from the Five and Eight Foot coal seams

where the potential for pothole subsidence and mine fires exist. Therefore, EPA's selected corrective measure is protective of human health and the environment.

C. WRITTEN COMMENTS FROM THROOP BOROUGH COUNCIL

The following comments were submitted by Douglas Blazey, Special Counsel for Throop Borough and were presented during the January 11, 2000 public hearing. The complete comments and transcript of the public hearing are available for review in the Administrative Record.

Throop Borough (TB) Comment 1 - **EPA used sound principles to select a proposed remedy as the "minimum" criteria that should be applied to select a final remedy for the Marjol site. EPA's application of sound principles to erroneous facts resulted in the selection of a non-protective remedy. The following components of EPA's proposed remedy are acceptable: (1) the isolation of combustible and lead contaminated soil, waste material, and battery casing material from non-inundated (above the mine pool) coal measures; (2) the consolidation of all remaining lead, PCB or PAH contaminated soils with in-place on-site solidification and stabilization and high quality cap conforming to EPA and PADEP hazardous waste design criteria; (3) Dust control measures; (4) Institutional Controls; (5) Real-time air monitoring; and (6) off-site soil verification following remediation activities.**

The following components of EPA's proposed remedy should be modified: (1) The mined out coal measures (the Five and Eight Foot coal seams) identified by EPA in the Statement of Basis should be extended to include the Top Split of the Top Four Foot and the Top Four Foot seams and to a lesser extent the Four foot seam; (2) Off-site treatment is acceptable instead of the on-site treatment required by the Statement of Basis, provided that lead wastes without S/S can be safely loaded and transported by public roads without fugitive emissions or release of lead; (3) If effective solidification and stabilization cannot be done *in-situ*, then all contaminated materials and BCM must be excavated and disposed off-site; and (4) should any modifications be made to EPA's proposed remedy, that a revised Statement of Basis be prepared and resubmitted to the public for review and comment.

EPA Response - With respect to the Throop Borough's suggested modifications to EPA's proposed remedy, EPA provides the following responses:

(1) EPA reviewed all available information regarding the mining conditions at the Site, including Gannett Fleming's report regarding mining in the Top Split of the Top Four Foot and Top Four Foot coal seams. EPA does not agree that mining activities have occurred in the Top Split of the Top Four Foot or the Top Four Foot coal seams in the area of the Site where waste would remain. Therefore, EPA concludes that the potential for pothole mine subsidence or mine

fire in the Five and Eight Foot coal seams should be the governing factors for determining where waste can safely remain at the Site to ensure long-term protection of human health and the environment. EPA and PADEP conducted a detailed review of the report entitled "Analysis of Coal Stratigraphy and Croplines, Marjol Battery Site, Throop, Pennsylvania" dated January 18, 2000. This review is provided as Attachment II of this FDRTC;

(2) The remedy proposed in the Statement of Basis included on-Site treatment because the treatment equipment would already be available on-Site to treat contaminated material to be placed beneath the cap, thus eliminating the cost of off-Site treatment prior to land disposal, and the on-Site treatment poses less risk to the surrounding communities in the event of a truck accident during transport to the off-Site disposal location;

(3) EPA's final remedy which includes treating approximately the upper five feet of waste beneath the cap provides sufficient protection in the event of cap failure. The *ex-situ* treatment method will produce a better treated product which is capable of meeting the performance standards for strength and permeability. Therefore, the modification to the treatment method in the final remedy achieves the same level of protectiveness as EPA's proposed remedy; and

(4) EPA has modified specific components of its proposed remedy decision based on comments received during the public comment period as defined in Section III of this FDRTC entitled "Modifications to EPA's Proposed Remedy."

The Borough states that any changes in the Final Remedy from the remedy proposed in the Statement of Basis require EPA to provide public notice and comment on those changes. EPA disagrees with the Borough on this issue and will not provide another public comment period for the Final Remedy.

EPA may evaluate the remedy proposed in the Statement of Basis after consideration of comments received from the state, members of the public and any new and significant information. In the event EPA elects to modify the remedy or a component thereof based on such analysis, such changes and the Agency's rationale must be fully explained and documented. The Agency has complied with these requirements and does not believe issuance of another Statement of Basis with a proposed remedy is warranted.

For Marjol, the modifications to the remedy selected in the Final Decision are a logical outgrowth of the remedy proposed by EPA in the Statement of Basis. In fact, it is in response to comments received on the Statement of Basis that EPA has determined to modify the remedy proposed for the Marjol Site. Each of the components of the Final Decision were described in the Corrective Measures Study and the Statement of Basis. The public could have reasonably anticipated the changes made to the proposed remedy since all of the remedy components in the Final Decision were available for the public to review and comment on during the comment period.

The Final Decision includes each of the components of the proposed remedy set forth in the Statement of Basis: excavation, waste treatment, off-site disposal, capping, and institutional controls. The Statement of Basis proposed an innovative technology to treat in place 286,000 cubic yards of lead contaminated material. Based upon comments received, EPA determined that implementation of this component of the remedy would be problematic and that the proposed remedy did not provide the best balance among the alternatives and remedy evaluation criteria. The Agency modified this part of the remedy to require that approximately five feet of the lead contaminated material to be placed under the cap will be treated using an *ex-situ* technology which is a proven and reliable technology. With these modifications, EPA believes the Final Remedy is equally protective over the long term and reduces some short term risks associated with the proposed remedy. In addition, the remedy selected in the Final Decision will cost less than the remedy set forth in the Statement of Basis.

TB Comment 2 - **Effective treatment of any contaminated materials, soil, or BCM allowed to remain in place (following the removal of soil, waste material, and BCM in contact with or within 25 feet from non-inundated coal measures) at the site is acceptable for the following reasons:**

(1) The Advanced Notice of Proposed Rulemaking (ANPR) indicates consistency between the CERCLA NCP and the RCRA program. The NCP favors the permanent "reduction of toxicity, mobility or volume through treatment over containment or isolation of hazardous substances unless consideration of one or more of the nine criteria discussed in subsections (e) "Feasibility Study" and (f) "Selection of Remedy" indicate a substantial basis for selecting mere containment. Section 300.430(f)(1)(ii)(E) states: "each remedial action shall utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

- **The ANPR indicates that the Agency goal for the RCRA program to "use treatment to address the principal threats posed by a Site whenever practicable and cost-effective" (Section III.C.5.(a)), etc.;**
- **Stabilization of heavy metal bearing wastes is commonplace and can be implemented at Marjol;**
- **Without solidification/stabilization of the lead in the waste materials, the lead might be mobilized and transported off-site, regardless of the effectiveness of any cap for percolating surface water, by laterally migrating waters;**
- **Potential for mine fires; and**
- **The Environmental Justice Report by Gannett Fleming supports stabilization of on-site lead contamination at other hazardous waste sites.**

EPA Response - In the Statement of Basis, EPA proposed waste treatment in order to address principal threat waste at the Site. Principal threat wastes are source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur (EPA Presumptive Remedy for Metals-in-Soil Sites, EPA 540-F-98-054, September 1999). In addition, both the ANPR and the NCP favor the permanent reduction of toxicity, mobility, or volume through treatment whenever practicable over containment alone. Given the expected technical difficulties with EPA's proposed treatment technology, EPA has modified the treatment component of its proposed remedy in the Statement of Basis to address the need for treatment of only that waste material that would pose a threat in the event of cap failure. In this final remedy decision, EPA has determined that treatment of material to a depth of approximately five feet would prevent risk to human health or the environment should exposure occur.

The mine pool is not contaminated by lead under current uncapped conditions. All of the site investigations conducted to date have not found laterally migrating waters mobilizing and transporting lead off-Site under current conditions. Water in the subsurface above the mine pool moves downward until it joins the mine pool. Mine pool water is the only groundwater at the site which moves laterally off-Site, but the mine pool is not contaminated by lead above drinking water standards. EPA's remedy will reduce the amount of infiltration into the waste, so the amount of lead migrating down to the mine pool will be even less than under current conditions.

EPA conducted a review of the Gannett Fleming report entitled "Environmental Justice Issues, Marjol Battery Site, Throop, Pennsylvania" dated February 1999. EPA provided its response to this report in two letters to Mr. James Barnick dated August 27, 1999. These letters explained how EPA's environmental justice policy affects the remedy selection process at corrective action sites, such as the Marjol Site. The Environmental Justice report submitted by Gannett Fleming on behalf of Throop Borough involved a summary of remedies selected at other lead battery sites in the country. In response to this report, EPA independently reviewed the remedies selected at these same sites. Based upon this review, EPA concludes that the final remedy is consistent with remedies selected at other lead battery sites. A copy of the Environmental Justice Report and EPA's evaluation of this Report is available for review in the Administrative Record.

TB Comment 3 - PADEP residual waste regulations require a 25 foot non-combustible isolation barrier between coal seams/deposits/refuse and waste disposal units (25 PA Code § 288.261). These regulations require that daily cover for operating waste landfills may not contain more than 12% coal or combustible material and final covers may not contain any combustible material. Throop supports these requirements as a minimum for any battery case material capped as part of the on-site remedy at Marjol.

EPA Response - EPA and PADEP agree that many residual waste landfill design requirements make sense for the on-Site portion of the Marjol remedy. EPA and PADEP intend to use the residual waste criteria as guidance to review the engineering design of the on-Site remedy. EPA and PADEP further agree that waste left on-site must be isolated from the near surface coal

seams/deposits/refuse, as outlined in the Statement of Basis. However, the commentor (or any other person) should not construe this response to indicate that EPA and PADEP anticipate strict adherence to the full scope of the Pennsylvania residual waste siting and design criteria because the Site is not currently, and was never, permitted as a landfill. The on-Site remedy described in this Final Decision is not subject to current PADEP permit requirements for newly permitted facilities.

TB Comment 4 - EPA's alternatives to the 5.0 mg/L treatment standard established by the TCLP as stated in the letter from EPA to Advanced GeoServices dated January 7, 2000 is acceptable.

EPA Response - EPA acknowledges Throop Borough's agreement with respect to using an alternative treatment standard to the TCLP test alternatives including compressive strength and hydraulic conductivity or permeability. These alternatives will be used in the final remedy to establish performance standards for waste treatment.

TB Comment 5 - Inappropriate drilling techniques were used by Gould during the Mine Subsidence Investigation which resulted in the loss of data and inadequate data recovery. Gannett Fleming's conclusions regarding the MSI are reported in a document entitled "Mine Subsidence Investigation Oversight - Marjol Battery Site" dated March 25, 1998, and "Mine Subsidence Investigation Oversight, Marjol Battery Site: Comments on AGC's Mine Subsidence Investigation Report" dated April 20, 1999. The second report also raises issues regarding (1) the location of the Five Foot coal seam; and (2) the potential mining of the Top Four Foot coal seam.

EPA Response - EPA is satisfied with the drilling techniques conducted during the Mine Subsidence Investigation because they were adequate for the stated goals of that investigation. The issues raised by Gannett Fleming regarding drilling techniques will be considered during the design phase of the remedy when determining the actual limit of the Five Foot coal seam.

EPA evaluated all of Gannett Fleming's conclusions regarding the location of the Five Foot coal seam which will be addressed during the design of the final remedy. In the Statement of Basis, EPA proposed that the limit of the Five Foot coal seam be determined either by requiring additional borings or by excavation to a level clearly below the Five Foot seam. EPA received no comment on either of these proposals and still believes that they are sound options.

EPA and PADEP conducted a detailed review of the Gannett Fleming reports entitled "Analysis of Coal Stratigraphy and Croplines" and "Mine Subsidence Investigation Oversight: Comment of AGC's Mine Subsidence Investigation Report." EPA and PADEP have reviewed all of the information provided by Gannett Fleming in those reports and do not agree that the Top Split of the Top Four Foot coal seam or the Top Four Foot coal seam have been mined under the Site. EPA's detailed comments on Gannett Fleming's reports are provided in Attachment II of this FDRTC. Therefore, EPA has already addressed all known potential for mine subsidence or mine

fires at the Site in its proposed remedy and no additional measures are required. However, as discussed in the Statement of Basis, EPA will require an investigation during the design of the final remedy to accurately determine the limit of the Five Foot coal seam. This recommendation was included in Gannett Fleming's conclusions specified in Section 3.0 of the report entitled "Analysis of Coal Stratigraphy and Croplines." These Gannett Fleming reports are contained in the Administrative Record.

TB Comment 6 - **The report by Gannett Fleming entitled "Analysis of Coal Stratigraphy and Croplines: Commentary on the USEPA Statement of Basis and Previous Subsurface Investigations" provides substantial evidence that all seams have been mined in the immediate vicinity of the Marjol Site which thereby enhances mine fire threat to this Site.**

EPA Response - EPA conducted a detailed review of the report submitted by Gannett Fleming entitled "Analysis of Coal Stratigraphy and Croplines" dated January 18, 2000. As stated in EPA's response to TB comment 5 above, EPA and PADEP do not agree that the Top Split of the Top Four Foot coal seam or the Top Four Foot coal seam have been mined under the Site. EPA and PADEP's detailed review which supports this conclusion is provided in Attachment II of this FDRTC.

TB Comment 7 - **More than 86,000 cubic yards of highly contaminated material and BCM exist above the Five Foot coal seam. Gannett Fleming initially submitted a report entitled "Soil Volumes With Lead Contamination, Marjol Battery Site, Throop, Pennsylvania" dated March 1999, which supported this conclusion. According to this report, the difference between EPA's calculated volume of highly contaminated soil and BCM and Gannett Fleming's calculation, is the contaminated material in the eastern Five Foot strip pit. EPA's Statement of Basis ignores this volume of BCM. Gannett Fleming updated their initial calculations of waste volumes and remedial cost estimates and resubmitted this information in a report entitled "Spatial Distribution of Battery Casing Material, Marjol Battery Site, Throop Borough, Lackawanna County, Pennsylvania" dated January 18, 2000. Gannett Fleming calculated EPA's proposed remedy to be $64 million versus the $36-41 million cost estimated by EPA in the Statement of Basis, and that total removal would cost $87.3 million. The revised total volume of contaminated material at the Site is 291,577 cubic yards of which 193,278 cubic yards is BCM within the limits of the mined coal seams.**

EPA Response - EPA agrees and has always been aware that more than 86,000 cubic yards of contaminated soil and BCM material exist above the Five Foot coal seam. The 86,000 cubic yards was EPA's estimate of only the volume of material located above the Five Foot coal seam likely to fail TCLP, not the volume of material which exceeds the lead cleanup level of 500 mg/kg. In a letter from Sibyl Hinnant (EPA) to Chris Reitman (AGC) and Frank Swit (Gannett Fleming), dated January 7, 2000, EPA clarified that the contaminated material which comprised the 86,000 cubic yards of hazardous material included the "high" hazardous waste pile (22,000 cubic yards); the mine spoils from the Five and Eight Foot coal seams (35,000 cubic yards);

BCM from the Five and Eight Foot strip pits (17,000 cubic yards); and BCM from the primary BCM fill area north of the Five Foot coal seam (12,000 cubic yards). With respect to the eastern Five Foot strip pit, the RFI indicates that the eastern Five Foot strip pit contains mostly contaminated mine spoils and some residential topsoil. The 35,000 cubic yards of mine spoils noted in Table 1 of this FDRTC represents mine spoils from all the strip pits combined, including the eastern Five Foot strip pit. Therefore, the volume of contaminated material from the eastern Five-Foot strip pit was not ignored in EPA's calculations.

EPA and PADEP conducted a detailed review of both of Gannett Fleming's reports identified in this comment. EPA's responses are provided in Attachment II of this FDRTC. With respect to Gannett Fleming's report entitled "Soil Volumes With Lead Contamination, Marjol Battery Site, Throop Pennsylvania," dated March 1999, Gannett Fleming states that the total volume of lead contaminated material that they calculated is less than the 372,000 cubic yards reported by Gould. EPA determined that Gannett Fleming's soil volume estimates are based on a soil lead cleanup level of 1,000 mg/kg. The soil volume estimates provided by Gould in the CMS Report are based on the soil lead cleanup level of 500 mg/kg. The CMS Report identifies 500 mg/kg as the soil lead cleanup level, which will represent a greater volume of material. Because EPA's proposed soil cleanup level is 500 mg/kg, EPA concludes that Gould's volume estimates are more reliable.

EPA and PADEP also conducted a detailed review of the Gannett Fleming report entitled "Spatial Distribution of Battery Casing Material, Marjol Battery Site, Throop Borough, Lackawanna County, Pennsylvania" dated January 18, 2000 which is available for review in the Administrative Record. EPA's response to this report is provided in Attachment II of this FDRTC. EPA determined that the cost estimates provided in that report are overstated, because of incorrect conversions from volume to weight.

EPA recalculated the cost of its final remedy using actual costs of remedial work at hazardous waste sites. These revised cost estimates are provided in Table 6 of this FDRTC. EPA's initial cost estimate was taken directly from information provided by Gould in their CMS Report.

TB Comment 8 - **The EPA document entitled "Best Management Practices (BMPs) for Soil Treatment Technologies" indicates that excavation can be safely performed. Throop Borough states that EPA's rejection of total removal "due to increased risk of exposure associated with the excavation of all of the contaminated material" is invalid because if removal of 86,000 cubic yards can be safely achieved then the excavation of all of the contaminated material can also be safely achieved.**

EPA Response - Dust generation during excavation activities can be controlled using the EPA's Best Management Practices guidance for dust control as described in EPA's response to AGC Comment 20(b) in this FDRTC. However, the likelihood of an accidental release of fugitive dust during the implementation of the remedy increases as more contaminated soil is excavated from the Site. Therefore, in selecting a final remedy for the Site, EPA determined that soil excavated

and removed from the Site would be limited to that volume of contaminated soil and waste material necessary to ensure that the cleanup would be permanent. Total removal is not necessary when an equally protective remedy can be implemented at the Site that will cause less disturbance to the local community due to truck traffic, a decrease in the amount of dust generation, decreased possibility of lead exposure to the community through fugitive dust emissions, and decreased cost. EPA's final remedy is protective in that potential on-Site risks due to mine subsidence or mine fire would be eliminated, and contaminants allowed to remain at the Site will be treated to an approximate five foot depth which will further control exposure to contaminants in the event of cap failure. Gould would be required to perform perpetual maintenance activities to continue to protect the long-term effectiveness of the remedy.

TB Comment 9 - **EPA's silence regarding Throop's residential designation for the Marjol Battery site itself and the associated North Woods tract is inappropriate. EPA is required to consider local land use issues in selecting a remedy. Throop has legitimate expectations for this property and for its community that must be considered and, if at all possible and feasible, respected by EPA. Throops' expectations are realistic and feasible and can contribute "value" or offsetting credits to support the cost of remediation. Documents dealing with future land use include: the EPA directive titled "Land Use in the CERCLA Remedy Selection" dated May 25, 1995, the May 1, 1996 Federal Register, and the RCRA Cleanup Reforms published in July 1999.**

EPA Response - With respect to any future land uses for the Site, it is EPA's policy that, "current and reasonable expected future land use and corresponding exposure scenarios should be considered in both the selection and timing of remedial actions." In the June 21, 1999 CMS Report, Gould discusses several potential land use scenarios for the property which include a recreational park or a light industrial/commercial future use that may benefit the surrounding Throop community. EPA considered such land use options during the corrective measures selection process. In fact, the ANPR advises that, "reasonable future land use assumptions should be assessed when developing remedial goals for any given facility and used to focus all aspects of the corrective action process..." As prescribed in the Land Use guidance referenced in this comment, from 1990 to the present, EPA participated in numerous discussions with the local community in the form of Throop Borough Council briefings, Citizens Review Committee meetings, and public meetings. During these meetings numerous discussions took place regarding the possible future uses for the Site.

Protection of human health and the environment is EPA's primary goal; Gould, as the property owner, may determine an appropriate use for the property so long as such use is consistent with the objectives of EPA's final remedy and conforms with applicable laws. In addition, the cleanup levels established by EPA for on-Site contaminants are protective for unrestricted use; consequently, any future land use scenario is acceptable to EPA as long as the integrity of the final remedy is preserved.

VII. GOULD'S COMMENTS

Comments submitted by Gould included comments from (A) Michael Veysey, Senior Vice President, Gould in the form of written comments and oral testimony provided during the January 11, 2000 public hearing; (B) Robert Collings, Attorney for Gould; and (C) Advanced GeoServices Corporation, technical consultant to Gould. All of these comments are provided in their entirety in the Administrative Record.

A. Comments by Gould by Michael Veysey, Senior Vice President

Comment - **Michael Veysey provided an overview of Gould's operations and assets. He described the details surrounding Gould's acquisition of the Site and its operation of the Site for six months prior to closing down its lead battery reclamation operations. Gould has accepted the legal and moral responsibility associated with the contamination from the Site by fulfilling the CERCLA Emergency Removal Order and by recommending a protective remedy for the Site. Gould opposes EPA's proposed remedy and will exhaust every effort to challenge this proposal.**

EPA Response - EPA recognizes that Gould has cleaned Throop residential properties contaminated with lead attributable to the Site. EPA also recognizes that Gould has recommended a remedy which is more protective than current Site conditions. However, EPA's final remedy achieves the best balance of all of the EPA remedy selection criteria which include long-term protectiveness and reliability.

B. Comments submitted by Robert Collings on behalf of Gould

Gould Comment 1: **Issues Related to the Administrative Record.**

Gould Comment 1(a) - **What is the Administrative Record? Is it the basis for EPA's decision? The documentation in the Index (of the Administrative Records) provided by EPA does not support EPA's changes to Gould's recommended remedy. Specific documents should be added to the Administrative Record (to review complete list of documents refer to Gould's comments provided in the Administrative Record).**

EPA Response - An Administrative Record is the compilation of information upon which an administrative decision is based. The documents contained within the Administrative Record support EPA's final remedy. EPA did not incorporate documents identified by Gould which were not used in the selection of the proposed or final remedy for the Site.

Gould Comment 1A: **The Administrative Record Contains No Information Supporting EPA's Proposal for Removal of Materials and Off-Site Disposal.**

Gould Comment 1A(i) - **The Administrative Record does not contain examples of lead-contaminated soil removal (at Marjol levels) at other "industrial" sites, no evidence of risk of subsidence or mine fires, and no justification for off-site disposal of any material. Gould states that EPA provides no engineering evaluations of the objective rate of dust emissions other than AGC's in the Administrative Record.**

EPA Response - The Administrative Record does contain examples of lead-contaminated soil removal at other industrial sites including the amended Record of Decision for the Brown's Battery Superfund Site. Excavation, on-site treatment, and off-site disposal of soil and battery casing material is being implemented at the Brown's Battery Superfund Site. The Administrative Record also contains evidence of mine subsidence and mine fire potential at the Site in the RFI, CMS, and Mine Subsidence Investigation Reports for the Marjol Site. EPA and PADEP have determined in the development of the final remedy that the most protective method to prevent the risk associated with potential mine subsidence and mine fire is to remove contaminated material from the area of the Five and Eight Foot coal seams. EPA included volume estimates in the Administrative Record based on calculations by the Army Corps of Engineers that up to 88,000 cubic yards of contaminated material may have to be removed from the Site. EPA is aware that this estimate may change subject to the final design of the cap. However, the Administrative Record supports that off-site disposal may be required in the design of the final remedy.

EPA is not required to conduct an independent engineering evaluation, as indicated in EPA's response to Gould's Comment 3(a) below. However, EPA has determined, based on experience at other sites where excavation activities have been conducted, that the dust estimated by Gould in their CMS Report that may be generated during the implementation of the final remedy is manageable using appropriate dust control methods such as soil wetting techniques.

Gould Comment 1A(ii) - **The Administrative Record does not support removing material from the Five- and Eight-Foot seams. Removal of material from these areas is unjustified because treatment handling and off-site removal will slightly increase the risk of community exposure to lead, and risks from pothole subsidence of these coal seams is manageable.**

EPA Response - As indicated in EPA's response to Gould's comment above, EPA has determined that the volume of contaminated material that could be excavated and disposed off-Site is manageable based on EPA's experience at sites with similar contaminated media. EPA has selected a remedy that calls for the excavation of contaminated material from above these coal seams in order to manage risk from pothole subsidence and mine fire. Such excavation permanently eliminates the potential for pothole subsidence or mine fire from the Five or Eight Foot coal seams to impact the on-Site portion of the remedy. EPA will determine, at the design stage of the remedy, whether this excavated material will be treated and contained under the cap or treated and removed from the site.

Gould Comment 1B: The Administrative Record Contains No Information Supporting EPA's Proposal for In-Place Solidification.

Gould Comment 1B(i) - There are no examples of in situ S/S for metals-containing sites. Gould rejected in-place S/S due to the physical characteristics of the waste. Caps alone are reliable.

EPA Response - EPA has eliminated the *in-situ* technology proposed in the Statement of Basis. EPA has modified the treatment component of the final remedy because of the technical difficulties and the unproven nature of the technology that was evident from EPA's review of Gould's comments. However, to respond to this comment, there is an *in-situ* solidification and stabilization project currently underway at the Whitehouse Site in Florida. The remedy being implemented at that site involves *in-situ* solidification and stabilization to immobilize lead but involves a different type of lead contamination

EPA notes that Gould did not reject *in-situ* solidification and stabilization due to the physical characteristics of the waste. With respect to the physical characteristics of the waste, Gould states on page 5-47 of the CMS Report that "consistent reduction in TCLP levels for lead below 5.0 mg/L would be difficult due to the physical characteristics (i.e., battery casing fragment's size and shape variations) and chemical characteristics of the battery casing material." EPA has previously clarified its position in a letter dated January 7, 2000, that the TCLP will not be used as a performance standard. Instead, a compressive strength of 100 pounds per square inch, and a permeability of 1×10^{-6} cm/second are recommended. However, some leaching tests, either TCLP or SPLP, will need to be conducted for the purpose of monitoring the treated waste to ensure that leachability is not increased with the addition of alkaline reagents. Additionally, Gould indicated in its CMS Report that "site conditions which may impede the successful in-place S/S of the Site material would be large, subsurface, impenetrable masses and the heterogeneous nature of Site materials. Subsurface obstacles could be overcome in the manner described in the grouting alternative". The CMS Report also states, in the description of the grouting alternative, that "although numerous subsurface investigations performed in the battery casing fill and mine spoil fill areas have not indicated the presence of such objects, there is still a possibility they could be encountered. Mitigative measures for such scenarios include excavating shallow obstacles, increasing the grout-mix viscosity by pumping pressures to force grout injected around the perimeter of the obstruction to flow beneath it or installing the grout injection tubes on an angle to get beneath the obstruction."

EPA did not interpret this evaluation of in-place S/S to be a rejection of this technology by Gould, but rather, a determination that this technology could be conducted at the Site with the use of appropriately modified implementation techniques to address any potential complications due to the physical characteristics of the waste.

Gould Comment 1B(ii) - Gould states that waste treatment is not cost effective.

EPA Response - In this Final Decision, waste treatment is required for two reasons: (1) to prevent risk from exposure to Site contaminants in the event of cap failure; and (2) to treat contaminated material prior to transport to an off-Site disposal facility. EPA has determined that these actions are necessary to implement the final remedy and can be conducted safely. EPA's waste treatment components of the final remedy include the solidification and stabilization of a five foot layer of contaminated material, and the stabilization of up to 88,000 cubic yards of contaminated material if that material must be removed. EPA estimates that these treatment components combined cost approximately $6.8 million if off-site removal is required. (Refer to Table 6 for EPA's cost estimate for its selected remedy.) EPA balanced this cost against the increase in long-term reliability and the need to ensure that the containment structure design meets appropriate criteria. EPA determined that waste treatment is necessary to improve the permanence and reliability of the remedy. The ANPR states on page 1948 that "EPA expects to use treatment to address the principal threats posed by a Site whenever practicable and cost-effective. The term cost effective does not necessarily imply least costly." However, EPA has selected the least costly remedy which also achieves the best balance of all of the remedy selection criteria.

Gould Comment No. 2 - EPA has accepted and approved the Site Descriptions and Data in the Descriptions of Current Conditions, the RCRA Facility Investigation (RFI) Report, the Human Health and Risk Assessment, the Mine Subsidence Report, the Corrective Measures Study Report, and reports and data submitted pursuant to the CERCLA Consent Order. The Statement of Basis acknowledges this.

EPA Response: EPA has approved the RFI Report, the Human Health and Risk Assessment, and the Mine Subsidence Investigation Report pursuant to the RCRA Section 3008(h) Administrative Order on Consent. In the Statement of Basis, EPA indicated that Gould had submitted a CMS Report dated June 29, 1999. To date, EPA has accepted but not approved the CMS Report, however EPA has determined that sufficient information is contained within the CMS Report to allow EPA do develop a remedy for the Marjol site. EPA has developed a Final Remedy on the basis of the Administrative Record. EPA does not agree that acceptance or approval of these individual documents, reports, or data obligate EPA to agree with Gould's recommended remedy.

Gould Comment No. 3 - EPA approved Gould's technical consultant, Advanced GeoServices Corp. Except with respect to the mine subsidence, AGC's work is the only detailed engineering analysis of remedies for this site data by the parties in the Administrative Record. AGC's work is entitled to deference on engineering issues.

Gould Comment 3 (a) - EPA should include its own engineering analysis in areas where EPA's remedy differs from Gould's remedy (i.e: removal and waste treatment), or justify reaching different conclusions on issues such as technical feasibility and effectiveness.

EPA Response - There is no requirement in the Corrective Measures Study process for EPA to perform an engineering analysis where EPA selects a different Corrective Measures alternative than the one recommended by the facility. In fact, while it is the responsibility of the facility owner to develop and recommend a remedy, the Agency can reject the recommendation and either require the facility to conduct a further analysis or prescribe a different remedial alternative or remedy. Please see the ANPR, 61 Fed. Reg. 19448.

Gould Comment 4: **Issues Related to the Remedy Selection Process**

Gould Comment 4(a) - **EPA's Order and RCRA policies call for Gould to recommend a remedy. Gould did this. EPA must explain in detail its rejection or modification of the recommended remedy. Gould recommended a corrective measure alternative in the CMS Report in accordance with the RCRA Consent Order, Attachment C, Task XI, and that EPA must consider the recommendation and may reject it but cannot ignore the recommendation.**

EPA Response - EPA agrees that the RCRA Section 3008(h) Consent Order required that Gould develop and recommend a remedy and that Gould has met this obligation. After consideration of Gould's proposed remedy, other remedial alternatives enumerated in Gould's CMS Report and public comment, EPA has provided a detailed explanation and description of its preferred remedial alternative including modifications to certain components of the proposed remedial alternative in this Final Decision. Please see Section II, infra, of this FDRTC.

EPA policy regarding the corrective action process does not require EPA to accept the proposed remedy submitted by Gould in its Corrective Measures Study Report. As Gould states in this comment, "EPA must consider the recommended alternative and may reject it but can not ignore the recommendation." The ANPR provides that during the remedy selection process "EPA will consider the facility owner/operator's preferred remedial alternative, other remedial alternatives and public comment. Although it is the responsibility of the facility owner/operator to develop and recommend a preferred remedial alternative or remedy performance standard, the Agency can reject any alternative and require further analysis or prescribe a different remedial alternative or remedy performance standard."(61 Fed. Reg. 19448). The ANPR clearly provides that EPA may reject a proposed remedy and require further analysis or prescribe a different remedial alternative. In this case, EPA considered Gould's recommendation but opted to prescribe a different remedial alternative in the selection of the remedy for the Site.

Gould's statement that EPA ignored and rejected the proposed remedy in the CMS Report is incorrect. EPA did consider Gould's proposed remedy and decided to expand some of its components, but the Agency neither ignored Gould's proposal nor totally rejected it. A rejection of Gould's remedy would not have included a cap component. In fact, EPA's remedy incorporated the following components of Gould's proposed remedy as set forth in the CMS Report:

Cap Component - EPA's final remedy, which is similar to Gould's proposed remedy, includes the construction of a cap. The cap proposed by Gould is called an "Enhanced Low Permeability Cap" as described in the CMS Report. However, as EPA indicated in its letter to Gould dated November 20, 1997, the cap must meet the design requirements specified by the PADEP minimum cap requirements. The cap requirements are further described in the Section entitled "Selected Remedy" in this FDRTC and will be further specified in the design of the final remedy.

Maintenance Program - The maintenance program recommended in Gould's CMS Report was adopted and integrated in both EPA's proposed remedy and its Final Decision. This maintenance program includes regular site inspections, grass mowing, and fertilization. The frequency of Site inspections, and other details associated with long-term Site maintenance would be specified in the corrective measures implementation design plans.

Monitoring - EPA accepted and adopted Gould's proposed monitoring program which will consist of a system to detect releases to groundwater, surface water, sediment, and air.

Contingency Plan - EPA accepted and adopted the component of Gould's proposed remedy regarding a contingency plan to be developed in conjunction with the maintenance plan to establish how problems with the cap system will be addressed if they occur. However, EPA's proposed remedy and Final Decision includes a contingency in the actual remedial design that incorporates a treatment component along with the cap cover system. The treated material serves to further ensure that any problems with the cap cover system would not result in an imminent health threat prior to the repair of the cap. EPA's selected remedy improves upon Gould's recommendation in the CMS Report to "*address possible problems such as excessive erosion under flooding conditions, significant changes in the ground surface due to mine subsidence and mine fire*" through the monitoring and contingency plans.

Periodic Review - EPA incorporated Gould's recommendation to conduct periodic reviews of the implemented corrective measure as determined during the long-term operation and maintenance plan. As indicated in its CMS Report, Gould would be responsible for addressing issues and modifications which arise from the review.

Lackawanna River Sediments - EPA incorporated Gould's recommendation that no actions be taken to address contaminated sediments in the Lackawanna River at this time. EPA concurred with Gould that continued monitoring be conducted. EPA determined that the sediment sampling procedures would be modified in order to reduce fluctuations in sediment sampling data. EPA is requiring upgrades to the Stormwater Management Basin during and after implementation of the final remedy as specified in EPA's response to Gould Comment 21(a) below. Further characterization of sediments in the Lackawanna River will be needed following remedial activities to determine if lead

concentrations remain elevated, necessitating potential corrective action.

Groundwater - EPA incorporated Gould's recommendation that additional actions were not necessary to address groundwater and that routine monitoring would be conducted as specified in the above paragraph entitled "Monitoring."

Gould Comment 4(b) - **EPA has not explained in detail why Gould's preferred remedy is not the best fit, and that having also agreed to the Order, EPA is not free to prescribe a different remedy without a suitable analysis" and that "EPA has not produced an engineering analysis".**

EPA Response - Pursuant to the RCRA Section 3008 (h) Administrative Order on Consent, EPA is required to provide a summary of its proposed corrective measure and EPA's justification for proposing such corrective measure. The Order also requires that this information be made available to the public for review. In October 1999, EPA fulfilled this requirement with the issuance of the Statement of Basis. The Order also requires EPA and PADEP to provide the reasons for their final decision in writing, after consideration of public comments. EPA is providing such reasons for the selection of its preferred corrective measure in this FDRTC. Additionally, in this FDRTC, EPA provides more detailed technical information regarding the components of its preferred corrective measure.

Gould Comment 4(c) - **EPA should have matched its proposed remedy (point-by-point) against Gould's with the application of the five balancing criteria.**

EPA Response - Using the five balancing criteria, EPA provided a detailed analysis of Gould's recommended corrective measure, the additional remedial alternatives developed in Gould's CMS Report along with EPA's proposed remedy in the October 1999 Statement of Basis.

Gould's Comment 5: **EPA did not properly apply the Remedy Selection criteria and did not explain its evaluation sufficiently to allow for complete comment process.**

Gould Comment 5(a) - **EPA's application of the remedy selection criteria lacks qualitative or quantitative balancing. EPA criticizes capping based on its heavy reliance on long-term maintenance to ensure continued protectiveness. However, there is no analysis of EPA's proposed remedy and its reliance on capping and long-term maintenance. EPA's remedy relies equally on long-term operation and maintenance.**

EPA Response - Considering the remedy selection criteria set forth in the proposed Subpart S (55 Fed. Reg. 30823-24), EPA has developed a corrective measure that provides for long-term protectiveness of human health and the environment. EPA's remedy selection process included a detailed analysis of Gould's recommended corrective measure, as well as the additional remedial alternatives developed in Gould's CMS Report. EPA's selected corrective

measure for the Site (treatment in conjunction with capping) is consistent with EPA policy and guidance for the selection of remedies which offer long-term protectiveness at hazardous waste sites. The ANPR allows flexibility in the remedy selection process to determine which of the balancing criteria "might prove to be the most important at a particular Site." (61 Fed. Reg. 9449). The ANPR states that "a remedy at a certain site might be protective in the short term but not necessarily reliable in the long-term (e.g., capping of a highly contaminated area)." In this case, the need for long-term reliability and the potential for long-term operation and maintenance costs would tend to point toward a remedy which presented a more advantageous combination of the balancing criteria (e.g., removal or treatment of hot spots, capping residual contamination, and implementing an institutional control)." EPA's selected corrective measure focuses heavily on long-term protectiveness whose components provide for treatment of waste that could cause unnecessary risk to human health and the environment should exposure occur.

EPA's selected corrective measure for the Site is also consistent with the Agency's expectations for final remedies at RCRA sites based on Fact Sheet #2 - "Expectations For Final Remedies At RCRA Corrective Action Facilities", March 1999, from EPA's RCRA Corrective Action Workshop on Results-Based Project Management. This Fact Sheet, which is available for review in the Administrative Record for the Site, states that "*Final remedies for RCRA Corrective Action facilities should be protective of human health and the environment, and maintain protection over time. In meeting this remedial goal, EPA has learned that certain combinations of facility-specific circumstances are often addressed by similar approaches. Based on this experience, the Agency has developed certain general expectations for remedies. Remedy expectations are not binding requirements; rather, they should be used to focus program implementors and facility owner/operators on remedial alternatives that have the greatest likelihood of fulfilling the statutory and regulatory intent of RCRA Corrective Action. Currently, EPA has the following remedial expectations for implementing final remedies at RCRA Corrective Action facilities.*" Some of the remedial expectations that are generally applicable to all RCRA facilities, including the Site, include:

> *EPA expects to use treatment to address the principal threats posed by a site whenever practicable and cost-effective. Contamination that represents a principal threat for which treatment is most likely to be appropriate includes contamination that is highly toxic, highly mobile, or cannot be reliably contained, and that would present a significant risk to human health and the environment should exposure occur.*
>
> *EPA expects to use engineering controls, such as containment, for wastes and contaminated media which can be reliably contained, pose relatively low long-term threats, or for which treatment is impracticable.*
>
> *EPA expects to use a combination of methods (e.g., treatment, engineering and institutional controls), as appropriate, to achieve protection of human health and the environment.*

EPA expects to consider using innovative technology when such technology offers the potential for comparable or superior treatment performance or implementability less adverse impact, or lower costs for acceptable levels of performance when compared to more conventional technologies.

EPA expects to remediate contaminated soils as necessary to prevent or limit direct exposure of human and environmental receptors and prevent the transfer of unacceptable concentrations of contaminants (e.g., via leaching, runoff or air borne emissions) from soils, including subsurface soils, to other media.

EPA believes that this final decision does properly balance the selection criteria and provides a more protective remedy for the Marjol site than Gould's cap only alternative.

Gould Comment 5(b) - **The CERCLA and RCRA remedy selection criteria are consistent except that CERCLA mainly relates to problems of assuring long-term care at abandoned uncontrolled waste sites and that under RCRA expectations of on-site management should apply.**

EPA Response - EPA agrees that CERCLA and RCRA remedy selection criteria are consistent and that the remedy EPA has selected for the Site is protective of human health and the environment and consistent with applicable CERCLA and RCRA guidance and regulation. EPA has consistently viewed the lead contamination present at the Marjol site to be the result of uncontrolled releases from the former battery breaking operations, and not, as Gould suggests, the result of the operation of a RCRA interim status landfill. Thus, EPA is using the RCRA corrective action program to address the cleanup issues at Marjol.

Gould Comment 5(c) - **EPA did not consider effectiveness, reliability, uncertainties, risks or benefits in terms of magnitudes of those factors, or degrees of effectiveness or uncertainty.**

EPA Response - EPA did consider the long-term reliability and short-term effectiveness of the selected corrective measure. The components of EPA's selected remedy which provide additional long-term effectiveness beyond Gould's recommended remedy include; (1) the removal of contaminated material from the area of the Five and Eight Foot coal seams thereby permanently eliminating any risk associated with potential pothole subsidence and mine fire; and (2) reducing, by treating contaminated materials beneath the cap to a depth of approximately five feet, any potential exposure to contaminants beneath the cap in the event of cap failure or a tear in the liner of the cap. The proposed Subpart S states that "The Agency intends to place special emphasis in selecting remedies on the ability of any remedial approach to provide adequate protection of human health and the environment over the long-term." Therefore, EPA guidance does not specify that the magnitude and the degree of the factors be determined with the precision Gould implies but that the remedial criteria be balanced to achieve the best corrective measure for the Site.

Gould Comment 6 - **Under EPA Policies, Corrective Action is primarily aimed at protection from risk. The Marjol site presents no risks that cannot be managed by capping, in accordance with common RCRA procedures.**

Gould Comment 6(a) - **EPA's purpose of the proposed corrective measure alternative, identified on page 21 of the SB, is to eliminate risks to human health and the environment associated with exposure or potential exposure to contaminants at and from the Site. This purpose is not appropriate. Risks can not be eliminated, therefore, the goal should be to prevent actual significant risk and minimize potential future significant risks to the maximum extent practical.**

EPA Response - The goals of EPA's final remedy are consistent with the goal of the RCRA Corrective Action program which is to eliminate significant releases of hazardous waste that pose threats to human health and the environment and to clean up contaminated media to a level consistent with reasonably expected, as well as current, uses. Proposed Subpart S expresses the Agency's intention to "place special emphasis on selecting remedies on the ability of any remedial approach to provide adequate protection of human health and the environment over the long term." (55 Fed. Reg. 30824). Proposed Subpart S goes further to state that, "...source control technologies that involve treatment of wastes, or that otherwise do not rely on containment structures or systems to ensure against future releases, will be strongly preferred to those that offer more temporary, or less reliable controls. Whenever practicable, RCRA corrective action remedies must be able to ensure with a high level of confidence that environmental damage from the sources of contamination at the facility will not occur in the future.". The ANPR explains that, "... the Agency's fundamental goal in the corrective action program is to control or eliminate risks to human health and the environment. Risk-based decision making is especially important in the corrective action program, where it should be used to ensure that corrective action activities are fully protective given reasonable exposure assumptions and consistent with the degree of threat to human health and the environment at a given facility". (61 Fed. Reg. 19441).

Gould Comment 6(b) - **Neither RCRA nor CERCLA require risk elimination. 55 Fed. Reg. 8366 (II. § 300.430(e)(March 8, 1990)) states that "CERCLA does not require the complete elimination of risks or of all human or anticipated adverse effects." RCRA is intended to manage risk at waste disposal or handling facilities (RCRA clean closure policy).**

EPA Response - EPA believes that the final remedy provides a permanent solution to the lead contamination at the Marjol site by properly managing the risk posed by the large volume of highly concentrated lead waste at the site and is protective of human health and the environment consistent with EPA's statutory mandate.

Gould Comment 6(c) - **EPA's corrective action objective (p.21 of the SOB) to**

prevent exposure to lead at 500 mg/kg is not appropriate. The appropriate standard should recognize any future risk from nonresidential exposures to lead only at much higher levels.

EPA Response - EPA selected the lead cleanup standard of 500 mg/kg for the Site because it is protective of human health and is the cleanup standard recommended by Gould in the CMS Report. Gould's CMS Report includes the following Corrective Action Objectives (CAO):

- the proposed CAO for lead in soils is to prevent direct contact with lead above an average concentration of 500 mg/kg (page ES-7);

- the proposed CAO for lead in soils is to prevent direct contact with lead at concentrations above an average concentration of 500 mg/kg. The 500 mg/kg soil lead CAO is consistent with the cleanup level set for remediation of yards in Throop established as part of the 1988 residential cleanup under CERCLA. Cleanup goals and action levels will continue to be set on a case-by-case basis by EPA depending on exposure scenarios relevant for that Site and specific Site characteristics. Therefore, the 500 mg/kg average soil lead CAO is consistent with current EPA guidance, as well as consistent with previous EPA decisions at the Site (see CMS Report, page 3-6);

- the corrective measure should prevent the potential for direct contact with Site materials containing lead concentrations above an average of 500 mg/kg (page 3-7); and

- under Gould's recommended alternative, the Enhanced Low Permeability Cap alternative, the CMS Report states this alternative "involves the consolidation of shallow material outside the cap area with average lead concentrations above the 500 mg/kg CAO for lead (page 5-22)."

Gould Comment 6(d) - **EPA's corrective action objective (p.21 of the SOB) to prevent exposure to PAHs and PCBs (Aroclor 1254) in soil at concentrations greater than their respective Cleanup Standards identified in Section X of the SOB is not appropriate.**

EPA Response - As EPA indicated in its response to Gould Comment 6(c) above, EPA has selected a cleanup standard for PAHs and PCBs consistent with the standards developed for lead contained in the CMS Report. EPA believes that these standards are likely to be met by the same actions required to manage the lead contamination (i.e. excavation and relocation or removal) since these contaminant are, for the most part, co-located on the site with lead. EPA did not want to rely on institutional controls alone for human health protection on the site. The cleanup levels EPA has selected for PCBs and PAHs are consistent with unrestricted use levels and will likely be achieved through the implementation activities already anticipated in the Final

Decision.

Gould Comment 6(e) - **EPA's corrective action objective to minimize future releases of lead, PAHs, and PCBs into groundwater and the regional mine pool is not appropriate.**

EPA Response - In this final remedy, EPA is selecting capping in conjunction with treatment primarily to prevent human exposure to the contaminated material and to increase reliability rather than to minimize future releases of contaminants to groundwater. However, these same measures also will minimize future releases to groundwater. Although treatment performance standards focus on measurements of solidification, such as compressive strength and permeability, rather than on measurements of leaching, the solidification reagents chosen must not increase leaching of lead, so some leaching tests will need to be conducted to ensure that the treatment does not increase lead mobility.

In addition, Gould's CMS Report indicates on page ES-7 that "the following general Corrective Action Objectives will be considered when evaluating corrective action technologies and alternatives at the Site: The corrective measure should mitigate releases to groundwater." Thus, Gould acknowledges the appropriateness of mitigating the releases of such contaminants into the groundwater.

Gould Comment 6(f) - **EPA's corrective action objective to prevent migration of lead, PAHs, and PCBs which would result in exceedences of the applicable Water Quality Criteria, or adversely impact sediments in the Lackawanna River is not appropriate.**

EPA Response - EPA's Statement of Basis clearly includes a discussion of the quarterly sediment monitoring results for the Lackawanna River in Section VI.E., with the conclusion that: "The results of this long-term aquatic sediment monitoring in the River adjacent to the Site indicate a potential contribution of lead-contaminated soil from the Site to the River sediments." The elevated sediment lead concentrations may have an adverse impact on the benthic habitat quality of the river, and, since analyses have never been conducted for PAHs or PCBs, it is unknown whether the Site contributed these constituents to the river sediments. Since EPA believes that there may be an ongoing contribution of lead to the river sediments, this specific objective is appropriate and is affirmed in this Final Decision.

Gould Comment 6(g) - **EPA's corrective action objective to prevent releases to the air which exceed the National Ambient Air Quality Standards of 1.5 micrograms per cubic meter ($\mu g/m^3$) for lead is not appropriate.**

EPA Response - This Corrective Action Objective is appropriate and is affirmed in this Final Decision. The prevention of lead releases to air, and Gould's goal of minimization of the risks of lead air emissions during and after the remedy process, are essentially identical. As Gould indicates on page ES-7 of the CMS Report "the corrective measure should mitigate releases to air." Preventing releases of lead to the air in excess of the National Ambient Air

Quality Standard serves to protect the surrounding community from risk associated with the inhalation of lead from fugitive air emissions from the Site.

Gould Comment 6(h) - **EPA's corrective action objective to minimize the potential for future releases as a result of mine subsidence or mine fire events is not appropriate.**

EPA Response - This Corrective Action Objective is appropriate and is affirmed in this Final Decision. EPA's final remedy reduces the uncertainties associated with the potential for future releases as a result of mine subsidence or mine fire events. EPA proposed excavation of material north of the southernmost limit of the Five Foot coal seam because such action will increase the long-term reliability and effectiveness of the remedy by eliminating the potential for mine subsidence or mine fire from the Five or Eight Foot coal seams to impact waste material left on site. This action eliminates the need for fire monitoring systems, eliminates the need for managing future problems related to such events, and reduces the size of the capped area. According to Gould's cost estimates for alternatives D1 and D2, a cap limited to the area south of the Five Foot coal seam is less costly than a cap which also extends over waste above the Five and Eight Foot coal seams.

Gould Comment 6(i) - **EPA's rules for the in-place closure of older "interim status" landfills including closure performance standards are applicable to the Marjol Site and no remedy beyond capping should be required for this Site.**

EPA Response - EPA applied the selection criteria for RCRA corrective action as the appropriate framework for the Statement of Basis and this Final Decision. EPA does not agree that the closure standards for interim status landfills is a more appropriate framework for a permanent remedy. As discussed in EPA's response to *Gould Comment 5(b)*, this is not a closure action for an interim status landfill.

Gould Comment 7 - **EPA has agreed that there is no statutory requirement for removal or treatment of materials at the Site. The removal and treatment portions of the proposed remedy are based on EPA's evaluation of site data under the protectiveness, feasibility and cost criteria for corrective action. This evaluation should be based on these criteria. EPA's evaluation is based on an incorrect application of the facts and the criteria.**

Gould Comment 7(a) - **Unlike CERCLA, RCRA has no provisions indicating a preference for treatment under corrective action and that the only treatment mandate is connected to the disposal of newly-generated waste (i.e.: the Land Disposal Restrictions of § 3004 of RCRA).**

EPA Response - The purpose of Proposed Subpart S, 55 Fed. Reg. 30798 was to establish a comprehensive regulatory framework for the implementation of the Agency's Corrective Action Program under RCRA. The goal of Subpart S was also to define both the procedural and substantive requirements associated with Sections 3004(u) and 3000(v) of RCRA.

Although most of proposed Subpart S was formally withdrawn in the October 7, 1999 Federal Register Notice, the ANPR, 61 Fed. Reg. 19448, continues to supply program implementors, regulators and owners/operators with detailed guidance on the Corrective Action program goals and expectations as it relates to treatment by stating that "EPA expects to use treatment to address the principal threats posed by a site whenever practicable and cost effective. Contamination that represents a principal threat for which treatment is most likely to be appropriate includes contamination that is highly toxic, highly mobile, or cannot be reliably contained, and that would present a significant risk to human health should exposure occur. EPA expects to remediate contaminated soils as necessary to prevent or limit direct exposure of human and environmental receptors and prevent the transfer of unacceptable concentrations of contaminants (e.g., via leaching, runoff or air borne emissions) from soils, including subsurface soils, to other media." Therefore, the Corrective Action program has specific expectations regarding treatment of principal threat waste.

EPA is requiring treatment in the Final Remedy primarily to protect and enhance the long term reliability of the cap in preventing exposure to the high levels of lead present at the site.

Gould Comment 7(b) - **EPA states that Land Disposal Restrictions do not apply to the consolidation of previously released materials on site. Gould agrees. This is a correct application of EPA's "Area of Concern" concept, which interprets LDRs to apply only to materials which are excavated and sent offsite for disposal. Materials sent offsite must be treated like other wastes with similar characteristics. Materials which remain on the site where they have already been placed are not being handled like newly generated wastes. Treatment is only considered in terms of feasibility, the benefits conferred, if any, and costs.**

EPA's analysis of treatment requirements for offsite shipment is much less clear. If removal is required as a matter of protective benefits, then the comparison of remedies which meet threshold criteria must include cost-effectiveness. EPA does not clearly identify the standard for treatment of material disposed offsite. If they are to be treated to meet the Phase IV Land Disposal Restrictions, the performance standard would be much more stringent, the degree of handling may be greater, and cost will certainly be greater. There is no consideration of this issue. With no statutory preference for treatment under RCRA, the evaluation of treatment must be based solely on degree of protectiveness, i.e., relative risk or effectiveness of treatment or containment remedies. EPA has misapplied the preference for treatment at this site.

EPA Response - Treatment to create a layer of approximately five feet under the cap is used to increase the long-term reliability, effectiveness, and protectiveness of the remedy. Treatment requirements for off-Site disposal vary depending upon the disposal facility selected. Contaminated material which exceeds the TCLP standard for lead of 5.0 mg/L, must comply with Pennsylvania Hazardous waste regulations for off-Site transport. Contaminated material that is determined to be non-hazardous must comply with Pennsylvania Residual Waste regulations

for off-Site transport. Some residual waste disposal facilities have treatment standards for waste disposal that are below the TCLP standard of 5.0 mg/L for lead. Therefore, the TCLP tests would need to be performed on contaminated material to be disposed off-Site.

Gould Comment 7(c) - **EPA's requirement for treatment prior to off-site disposal is questionable. EPA did not evaluate cost effectiveness nor the treatment standards for materials disposed off site. Treatment to Phase IV LDR would require a more stringent performance standard, greater handling and a greater cost.**

EPA Response - On-Site treatment decreases the risk of accidental releases during transport and is less costly than treatment at the off-Site disposal location.

Gould Comment 8 - **EPA's remedy is "treatment for treatment's sake," which is not allowed under RCRA.**

Gould Comment 8(a) - **If this were a Superfund site, cost would be evaluated by the Superfund Remedy Review Board.**

EPA Response - EPA does not agree that the treatment required by this Final Decision represents "treatment for treatment's sake." The Marjol Site is currently being managed according to the goals of the RCRA Corrective Action process as set forth in the ANPR. Such process requires EPA to consider the four general standards of protectiveness and the five corrective measure selection decision factors in arriving at a remedial alternative that is protective of human health and the environment. EPA's final remedy meets those standards and factors.

Gould Comment 8(b) - **EPA must acknowledge that Gould has met its obligations under the Order and their right to hold its property from future residential or public use in order to limit exposure risks to the public.**

EPA Response - EPA acknowledges that, to date, Gould has met its obligations under the Consent Order.

With respect to any future land uses for the Site, it is EPA's policy that, "current and reasonable expected future land use and corresponding exposure scenarios should be considered in both the selection and timing of remedial actions." In the June 21, 1999 CMS Report, one of the potential uses Gould recommended for the property includes a recreational future use scenario that may benefit the community. Based on Gould's recommendations, EPA considered such land use options during the corrective measures selection process. In fact, the ANPR advises that, "reasonable future land use assumptions should be assessed when developing remedial goals for any given facility and used to focus all aspects of the corrective action process..." However, "EPA recognizes the complexities associated with developing reasonably anticipated land use assumptions and the need for caution when basing remedial decisions on

assumptions of future use, however, the Agency believes that non-residential land use assumptions are appropriate for many corrective action facilities." With the protection of human health and the environment being the primary goal of EPA's selected corrective measure, Gould may determine an appropriate use for the property so long as such use is consistent with the objectives of EPA's final remedy. Also refer to EPA's response to Gould Comment 6(c).

EPA's remedy seeks to limit reliance on institutional controls like land use restrictions as the sole means to prevent exposure to the lead contamination at the Marjol site.

Gould Comment 8(c) - **EPA must not require treatment or removal of materials on Gould's private property without a sound technical basis and demonstration of cost-effectiveness.**

EPA Response - EPA has provided its rationale for treatment and removal in this final decision and the Administrative Record for the Site. EPA also has demonstrated that cost was appropriately considered, along with all of the remedy selection criteria, in the selection of a final remedy for the Site.

Gould Comment 8(d) - **The preamble to the CAMU states that "the Agency believes that treatment provides greater long-term effectiveness than containment alone but that in certain circumstances, the Agency may consider containment to be sufficiently effective."**

EPA Response: EPA has modified the treatment component in the final remedy. The treatment component of the proposed remedy involved the treatment of the entire volume of contaminated soil and waste material buried beneath the cap. Based on comments provided by Gould, EPA has reevaluated the treatment component of the proposed remedy and determined that treatment to a depth of approximately five feet beneath the cap would provide the necessary assurance of additional long-term protection of the final remedy in the event of a breach or failure of the cap. EPA may include such measures to increase the reliability and effectiveness of a remedy, and improve the protectiveness of the remedy in the event of a failuré of the engineering or institutional control. The ANPR states that "...permanent reductions in toxicity, mobility, or volume are preferred to exposure control because it is protective of human health and the environment in the long-term and ***removes the risks associated with the potential failure of engineering or institutional controls***. Program implementors and facility owner/operators are cautioned against too great a reliance on exposure control remedies when alternatives which include permanent reduction in toxicity, mobility, or volume are available, affordable, and practical." The treatment of waste beneath the cap, under EPA's selected remedy, does not decrease the toxicity of the waste, however, it does reduce the mobility of the waste. It also reduces the hazardous nature of the waste as measured by the TCLP test. TCLP will not be used as a performance standard for the treated layer beneath the cap. Instead, a compressive strength of 100 pounds per square inch, and a permeability of 1×10^{-6} cm/second are recommended. However, some leaching tests, either TCLP or SPLP, will be conducted for the purpose of monitoring the treated waste to ensure that leachability is not increased with the addition of

alkaline reagents. This treatment requirement, and the appropriate treatment specifications, were made in consultation with numerous technical experts, within and outside of EPA, who have been or are currently involved in capping remedies at hazardous waste sites. Documentation supporting the need for waste treatment at the Site is provided in the Administrative Record. Also refer to EPA's response to Gould Comment 5(a).

Gould Comment 9 - **The requirements in EPA's proposal for treatment and removal are contrary to EPA's historical application of corrective measures at RCRA facilities.**

Gould Comment 9(a) - **EPA routinely allows waste disposal facilities to close with caps and post-closure monitoring, without requiring either treatment or off-site disposal of solid wastes prior to capping. Therefore, EPA's proposal goes beyond what is often required for solid waste management units.**

EPA Response - EPA selected a remedy based on the remedy selection process outlined under the Section 3008(h) Corrective Action process. This process doesn't restrict EPA from requiring off-Site disposal or waste treatment as appropriate to achieve the best balance of the selection criteria and increase the long-term effectiveness of the remedy.

Gould Comment 9(b) - **EPA has not cited the proper controlling policies and standards that govern its proposal and its remedy selection process. Application of the correct policies must lead to the cap alternative.**

EPA Response - As stated in EPA's response to Gould's Comment 5(a), EPA applied the remedy selection criteria set forth in the proposed Subpart S, and the ANPR to select a remedy for the Site that provides long-term protection of human health and the environment. EPA's selected remedy increases the long-term protection of the remedy by eliminating potential risk from pothole subsidence or mine fire in the areas of the Five and Eight Foot coal seams, and treatment of contaminated material beneath the cap to reduce the mobility of contaminants in the event of a cap failure.

Gould Comment 9(c) - **(Groundwater Considerations) - EPA has approved caps without treatment or off-site disposal at RCRA sites with groundwater concerns. Marjol has no groundwater concerns and EPA has rejected capping alone as a remedy. This deviation from previous EPA action is unjustified. Gould again uses NGK Metals, GE Glass Plant in Bridgeville, the Rohm and Haas Landfill, and the Dorney Landill as examples of such actions. Gould objects to EPA's proposed remedy based on this "departure" from its prior policy for RCRA Corrective Action.**

EPA Response - EPA evaluated the list of Sites provided by Gould in this comment and determined that additional measures were taken, as necessary, to address groundwater concerns at each of these sites. Gould's characterization of the scope of the remedies at these sites is incomplete because additional protective measures taken to increase the effectiveness of these

remedies are not referenced in Gould's comment. For example, at the Rohm and Haas Landfill, soil-bentonite walls (hydraulic barrier) which extends down to bedrock was constructed in conjunction with the cap. Gould fails to mention in their comment that the total volume of waste material was encapsulated at the Rohm and Haas site which accounted for a substantial portion of the total cost of the remedy. The remedy selected for the NGK Metals facility included an extensive groundwater pump and treat system in conjunction with the cap. The GE Glass Plant remedy included the installation of sheet pilings to effectively isolate the waste from contact with a nearby stream and to allow effective collection of near surface groundwater. EPA has added the relevant details on these remedies to the Administrative Record.

EPA is not requiring treatment at Marjol to protect groundwater. In this final decision, treatment of contaminated material will increase the long-term protectiveness of the cap and reliability of the containment remedy.

Gould Comment 9(d) - **(Health and Safety Considerations) - On-site management of contaminated soil poses less risk than a major removal and treatment project.**

EPA Response - EPA's proposed remedy and final remedy involve the excavation of all contaminated soil and waste material from the area above the Five and Eight Foot Coal seams in order to eliminate the risk of pothole subsidence or mine fire from impacting waste remaining in the permanent capped area of the Site. EPA has modified the removal requirement in the final remedy to require off-site removal in the event it proves necessary in order that the cap meet appropriate design standards.

Gould Comment 9(e) - **(Health and Safety Considerations) - NGK Metals, the Rohm and Haas landfill, and the Dorney Road landfill are sites where excavation remedies were not selected due to the potential for short-term exposure to dust and airborne contaminants.**

EPA Response - EPA notes that the final remedy does not include excavation of the total volume of contaminated material from the Site. The estimated volume of contaminated material that may be disposed off-Site under EPA's selected remedy (88,000 cubic yards) and the dust suppression methods which will be employed are consistent with the volume of contaminated material and preventative steps taken at other sites where off-site removal occurred. For example, 67,000 cubic yards of lead-contaminated soil and battery casing material is being stabilized and disposed off-Site at the Brown's Battery Site. Dust suppression methods, such as soil wetting, are being used at this Site. Furthermore, the remedy selected for the Rohm and Haas landfill includes complete encapsulation of the waste with the construction of a hydraulic barrier down to bedrock in conjunction with a cap. Additionally, contrary to Gould's statement, the remedy implemented at Rohm and Haas involved the excavation and relocation of contaminated material in order to construct the hydraulic barrier. Excavation and soil relocation was also required at the Dorney Road landfill in order to relocate and construct wetlands.

Gould Comment 9(f) - (Cost Considerations) - **Cost is a significant criterion for RCRA corrective action remedy evaluation. EPA has recognized that, even in the context of RCRA's "overriding mandate" of protection of human health and the environment, "relative cost is a relevant and appropriate consideration when selecting among alternative remedies that achieve the clean-up range." 55 Fed. Reg. 30825, col. 1 (July 27, 1990). Where "different technical alternatives to remediation will offer equivalent protection of human health and the environment, but may vary widely in cost... it is appropriate in these situations to allow cost to be one of the several factors influencing the decision for selecting among such alternatives." Id. The Marjol site presents precisely the situation contemplated by these EPA comments. Where all technical and investigatory information makes clear that the cap alternative combined with oversight and maintenance will provide the necessary protection for human health as well as the environment, EPA's proposed remedy of not only a cap and O&M but also significant excavation and stabilization/solidification for both materials to be disposed of on-site and also off-site is, simply, overkill that cannot be justified in the face of the enormous cost differential.**

EPA Response - While cost is a "relative and appropriate consideration" when selecting among remedies that achieve the goals of long term protectiveness of human health and the environment, the ANPR also supports the proposition that, "... while preventing exposure may appear to be the most direct near-term means of reducing risk, permanent reduction of the toxicity, mobility and/or volume of contaminated materials may be the most cost-effective means of reducing risk over time. When treatment to reduce toxicity, mobility or volume is chosen, EPA does not necessarily expect the remedy to involve treatment alone. However, the exact balance between reduction in toxicity, mobility or volume and exposure control will best be established on a case by case basis in consideration of site specific conditions..." (ANPR 61 Fed. Reg. 19448)

EPA does not agree that capping alone offers "equivalent protection of human health and the environment...." EPA is requiring treatment in the final remedy as an exposure control measure in the event that the cap system fails.

Gould Comment 9(g) - (Cost Considerations) - **At the NGK Metals site, EPA noted that the proposed remedy, which included capping the SWMUs without any mention of treatment or removal of contaminants would be "implementable and cost effective in comparison to the other Corrective Measures Alternatives presented in the Corrective Measures Study" see Attachment 15 - including excavation and off-site disposal of the contaminated soils. See Attachment 15 at 18. Although EPA judged both types of caps proposed by NGK Metals Corrective Measures Study to be effective, it selected for its proposed remedy the less expensive cap by far ($2.4 million versus $4.4 million), also demonstrating that, all other things being equal, cost is a significant factor. At the Marjol site, as well, all other things are equal - the cap alone would be at least as effective in controlling contaminants and protecting health as EPA's more expensive proposed remedy, at which point the enormous cost differential between the two becomes determinative.**

EPA Response - EPA has determined that the cost of the treated layer of waste beneath the cap increases the long-term permanence of the final remedy in the event of a cap failure. The ANPR states that EPA prefers the selection of remedies which provide additional protection in the event of failure of engineering controls as discussed in EPA's response to Gould's Comment 8(d) above. EPA provides a side-by-side comparison of its final remedy to Gould's recommended remedy, and the total removal alternative, in Table 5 of this final decision. EPA estimates that the remedy selected in this Final Decision will cost between $14 million and $24 million which reflects a more cost effective remedy than originally proposed by EPA.

Gould Comment 9(h) - **(Cost Considerations) - Even at a Superfund site like the Dorney landfill, EPA considered cost in deciding between alternative corrective measures of equal effectiveness: "The selected remedy is cost-effective as it provides the best balance between cost and effectiveness in comparison with the other alternatives...[The PA-type multi-layer cap] is protective of human health and the environment,...[and] will reduce the migration of contaminants to groundwater, and has a considerable cost savings when compared to [the RCRA-type multi-layer cap]" - a "considerable cost savings of $1 million." See Attachment 18 at AR 000102. There, also, EPA eliminated off-site disposal as a possible remedy based on the justification that on-site disposal would "perform the same function at a much lower cost." Id. at AR 000089.**

EPA Response - EPA believes this Final Remedy is superior to Gould's preferred remedy particularly in addressing long-term issues related to containment. Thus, the additional cost for EPA's Final Remedy is justified. See also EPA's response to Gould Comment 9(f).

Gould Comment 10 - **EPA's proposal for solidification is really a containment measure with no significant improvement over capping. Short-term exposures and technical uncertainty make it less reliable than capping alone.**

Gould Comment10(a) - **Solidification is another way to contain the lead and capping is already demonstrated to be very effective as a containment measure at this Site, the added cost isn't justified.**

EPA Response - Based on Gould's CMS Report page 5-49 "the long-term environmental benefits for this alternative are similar to the Enhanced Low Permeability Cap alternative. Long-term benefits are slightly increased if the material is treated in-place (as compared to the cap only alternative). These marginal improvements are a result of solidifying the material into a low permeable, durable monolith which would be less erosive in the unlikely event the cap was breached". EPA's Final Remedy modifies the *in-situ* treatment element by replacing it with *ex-situ* treatment of waste. EPA's final remedy is similar to Gould's alternative in the CMS Report which involves the *ex-situ* treatment of contaminated material prior to capping. With respect to this alternative, Gould states in the CMS Report that "the long-term environmental benefits of this alternative (treatment and capping) would be similar and possibly slightly better than the In-place S/S alternative if cement-based stabilization reagents are used for

this alternative". Finally, Gould states in the CMS Report that "treatment of the material will provide negligible increase in protection against the occurrence and effect of pothole mine subsidence, and will be protective against the potential effects of trough mine subsidence and mine fire on the battery casing material". Therefore, EPA's final remedy which includes treatment in conjunction with a cap will, according the CMS Report, adds protection to the final remedy in the event of a breach in the cap, trough mine subsidence, or a mine fire.

Given the high concentration of lead contamination that would be exposed in the event of cap failure, EPA believes that this final remedy is more protective and permanent with treatment than Gould's capping only remedy. Therefore, EPA believes that the treatment required by this final remedy offers a significant improvement over the remedy alternatives with no treatment. (Also refer to EPA's response to AGC Comment 39(b).

Gould Comment 10(b) - **Gould discusses the risk to workers caused by waste treatment.**

EPA Response - Gould will be responsible for ensuring that on-Site workers comply with the appropriate health and safety procedures. EPA will provide oversight of these activities to ensure that work is being conducted in accordance with these procedures. EPA evaluated the potential for the use of other dust control measures, in addition to soil wetting, which could be used to further protect on-Site workers, and the surrounding community during construction activities. Such measures include a product that would create a shell-like layer over the top of the soil to reduce the release of fugitive dust during excavation or staging of contaminated soil, and the use of a temporary holding tank for excavated soil. Information collected by EPA on these methods to increase the protectiveness of soil handling activities are included in the Administrative Record.

Gould Comment 10(c) - **Gould discusses the longer implementation time at a greater cost due to waste treatment.**

EPA Response - EPA's final remedy will require more time to implement than Gould's recommended remedy. However, EPA estimates that approximately one additional construction season may be required to implement its final remedy. Therefore, the total implementation time for EPA's final remedy would be two construction seasons (years). EPA has determined that this increased implementation time is acceptable in order to increase the permanence of the final remedy.

Gould Comment 11 - **The remedy also represents "removal for removal's sake", which is equally illegal.**

Gould Comment 11(a) - **The RCRA program is designed to manage the onsite disposal of wastes and that clean closure is one option for closing a waste unit but it is neither better nor preferred. Gould further states that EPA has agreed as a matter of**

regulation and practice, that wastes may be left onsite as part of clean closure.

EPA Response - "Closure" is the period directly after a treatment, storage and disposal facility ceases its operations. During this period, such a facility (which may be permitted or not) would stop accepting hazardous waste; complete treatment, storage, and disposal of any wastes left on site; and dispose or decontaminate any equipment, structures and soils. "Clean closure," is an operation during which hazardous waste and contaminated media, which do not exceed EPA recommended exposure levels, are completely removed. In appropriate situations, clean closure is indeed an option for closing a waste unit, however, if cleanup is required at an interim status facility, such as the Marjol Battery facility, it will be addressed under EPA's corrective action authorities set forth at RCRA Section 3008(h) or Section 7003, 42 U.S.C. §§ 6928(h) or 6973.

Gould Comment 11(b) - **EPA's selected use of TCLP exceedences for offsite disposal is inappropriate and an analysis of media cleanup standards and points of compliance determination should be made.**

EPA Response - Treatment requirements for off-Site disposal vary depending upon the disposal facility selected. Contaminated material which exceeds the TCLP standard for lead of 5.0 mg/L, must comply with Pennsylvania hazardous waste regulations for off-Site transport. Contaminated material that is determined to be non-hazardous must comply with Pennsylvania residual waste regulations for off-Site transport. Some residual waste disposal facilities have treatment standards for waste disposal that are below the TCLP standard of 5.0 mg/L for lead. Therefore, the TCLP tests would need to be performed on contaminated material to be disposed off-Site.

Gould Comment 11(c) - **The cleanup standard for the property should allow lead to remain at much higher levels as long as TCLP values are met at the boundary of the containment unit since the property is nonresidential.**

EPA Response - TCLP values are not health-based cleanup levels, but rather are levels above which a waste material is a characteristic hazardous waste. Contaminated material which is non-hazardous may still exceed health-based cleanup levels.

EPA has selected cleanup levels that allow unrestricted use of the property and are consistent with the community -wide cleanup already completed by Gould. EPA has retained these standards in the final remedy.

Gould Comment 11(d) - **Gould further questions why removal is required if consolidation and capping can achieve the same result at a cheaper cost.**

EPA Response -EPA has modified the removal component of the final remedy to require the treatment and off-site disposal of lead contaminated material that will not fit within an

approved landfill. EPA will require excess material to be disposed off-site to protect the integrity of the landfill. See *Section III, Modifications to EPA's Proposed Remedy* of this FDRTC for additional discussion.

Gould Comment 11(e) - **EPA guidance notes that constituents which are located in deeper soils may not require remediation in the absence of downward migration and contamination of groundwater. (Gould quotes 55 Fed. Reg. 30627 Vol 3 July 27, 1990).**

EPA Response - This comment is no longer relevant because soils and waste material below the five-foot treated layer under the cap will not require treatment under EPA's final remedy.

Gould Comment 11(f) - **No background levels were determined for PAHs and PCBs. EPA must propose additional studies to determine the extent of contamination and cleanup standards for soil.**

EPA Response - EPA's proposed and final remedies typically include final cleanup standards. Based on data collected by Gould, the extent of PCB and PAH contamination was determined during the RFI. Confirmatory sampling will be conducted to ensure that cleanup levels are achieved.

Gould Comment 12 - **EPA's principal threat guidance does not support either treatment or removal. Gould has already abated the original principal threats, and current primary threats are excavation and handling of soil; and**

Gould Comment 12(a) - **CERCLA's "Guide to Principal Threat Wastes (EPA Fact Sheet PB 92-9633245)(November 1991) is referenced, and that since Marjol is not a Superfund cleanup, CERCLA's preference for treatment does not legally apply here.**

EPA Response - Gould's statement is incorrect. The ANPR clarifies in the paragraph entitled "Concept of Parity" that consistency should exist in the technical decisions applied to the selection of remedies at RCRA and CERCLA sites. Therefore, applicable technical CERCLA guidance such as the Guide to Principal Threat Wastes may also be relevant for use at certain RCRA sites depending on site-specific conditions. The presence of principal threat waste at the Site, and the preference for treatment of such waste identified in the ANPR and proposed Subpart S, allow EPA to consider and select treatment alternatives as appropriate to ensure protectiveness and the long-term effectiveness of the remedy. See also EPA's response to Gould Comment 12(b).

Gould Comment 12(b) - **Gould also identified the preamble to the NCP that expectations (Gould is referring to principal threat wastes) are not binding requirements. Gould further states that consistency between the proposed remedy and these expectations is not grounds to select that alternative.**

EPA Response - The ANPR deals with the issue of treatment by stating on page 19448 that "EPA expects to use treatment to address principal threats posed by a Site whenever practicable and cost-effective. Contamination that represents principal threats for which treatment is most likely to be appropriate includes contamination that is highly toxic, highly mobile, or cannot be reliably contained, and that would present a significant risk to human health and the environment should exposure occur." EPA's remedy requires treatment to ensure protectiveness in the event that exposure should occur. EPA modified its treatment component in the proposed remedy which included treatment of the entire volume of material beneath the cap to treatment to a five-foot depth in the final remedy. This depth of treatment is appropriate to minimize potential risk and direct exposure to untreated principal threat waste in the event exposure occurred. The ANPR indicates that the Agency should use treatment to address this potential exposure scenario.

Gould Comment 12(c) - **Gould cites principal threat criterion and states that buried materials pose no principal threat.**

EPA Response - This comment is no longer relevant since in this Final Decision, EPA has eliminated the requirement to treat all of the contaminated material beneath the cap. Under EPA's selected remedy, waste treated beneath the cap is limited to that waste that may, in EPA's best professional judgement, present a risk of exposure in the event of cap failure.

Gould Comment 13 - **EPA has repeatedly said that the primary risk at this site would come from unnecessary excavation and handling of soils.**

Gould Comment 13(a) - **EPA's Statement of Basis states that soil excavation and handling should be minimized.**

EPA Response - EPA's proposed and final remedies limit soil excavation primarily to the areas where soil and waste material must be moved in order to prevent any risk associated with leaving waste in contact with mined coal seams. However, all of the remedial alternatives evaluated in the Corrective Measure Study Report, including Gould's preferred cap, require some degree of soil movement. It is impossible to develop a final remedy for the site which involves zero soil movement. Therefore, as with all construction and remediation projects, adequate health and safety precautions must be in place to protect on-Site workers. Fugitive dust control measures, such as soil wetting, must also be implemented during soil excavation and movement activities.

Gould Comment 13(b) - **An EPA representative made a statement at a public meeting that EPA did not select total removal due to the potential for lead contaminated soil to end up on residential properties during off-Site transport.**

EPA Response - EPA has indicated that total removal was not selected at the Site for

several reasons, one of which is the potential for accidental releases of contaminated material during off-Site transport. While preventive measures must be taken to prevent such accidental releases, the larger the volume of material transported from the Site, the greater the likelihood that an accidental release could occur. EPA's selected remedy may require limited off-Site transport of contaminated soil for the purpose of increasing the long-term effectiveness and reliability of the remedy. Contaminated soil has been successfully transported from other hazardous waste sites for off-Site disposal.

Gould Comment 13(c) - **Truck traffic, soil handling, remediation time, and off-site soil testing is excessive. Off-site disposal is not technically effective or cost effective.**

EPA Response - EPA's selected remedy may require the off-Site disposal of approximately 88,000 cubic yards of contaminated material if necessary to ensure the proper design and construction of the landfill and cap. Off-Site disposal of comparable volume of contaminated material has been successfully conducted at other Sites. For example, 67,000 cubic yards of lead-contaminated soil is being treated and disposed off-site at the Brown's Battery Site. Therefore, EPA disagrees that this component of the selected remedy is excessive. Furthermore, at Marjol, the removal of this soil is based on the technical design criteria which may limit the volume of soil that can be consolidated beneath the cap.

Gould Comment 13(d) - **EPA must revise its remedy to account for workers and community issues. Unnecessary excavation and handling of soils on-site and off-site creates a risk which however large or small outweighs any putative benefits of removal or treatment. EPA recognized the risk associated with unnecessary waste handling in the following RODS (1) Lone Pine Landfill (2) Seymour Recycling and (3) Tyson's Dump.**

EPA Response - EPA's final remedy does not require the "unnecessary excavation and handling of soils," as indicated in EPA's response to Gould's Comment 13(c) above.

Gould Comment 13(e) - **EPA's remedy must be revised to account for worker and community safety issues. Unnecessary excavation and handling of soils onsite and offsite (by trucks) creates a risk which, however large or small, outweighs any putative benefits of removal or treatment. The Superfund program has recognized this issue as a significant factor in remedial decisions. Unnecessary waste handling is to be avoided. The courts have agreed with this view as well. United States v. Royal Hardage , 750 F Supp. 1460, 1476-7 (D. Ok., 1990)**

EPA Response - During EPA's review and analysis of the alternatives presented in Gould's CMS Report, including Gould's recommended remedy, all of the remedial alternatives would require some degree of soil movement thereby causing some dust generation during the remedial implementation phase. EPA, being mindful of this possibility, sought to select the most protective and effective corrective measure which satisfies the fundamental mandate of RCRA, the protection of human health and the environment, including the safety and protection of

workers at the Site as well as the surrounding community. Please see EPA response to AGC Comment 20(a) regarding risk prevention measures that can be employed during soil treatment cleanup activities. EPA's selected remedy is based on the conditions unique to the Marjol Site and cannot be viewed as contrary to the court's decision in Hardage.

Gould Comments 14 - **Mine subsidence is a manageable aspect of any onsite remedy at Marjol. The record contains evidence of the careful investigation of subsidence potential and management of risks. This information must be considered and applied.**

Gould's Comment 14(a) - **The risk of mine subsidence and mine fires exists throughout this region.**

EPA Response - EPA agrees that the mine subsidence and mine fire potential generally exist throughout the region. At a Site-specific level, however, mine subsidence and mine fire potential are determined by the subsurface conditions which vary across a Site. EPA has tailored this final remedial decision to the specific conditions at the Site and has chosen the most stable area for long-term waste placement and capping with the least potential to be impacted by mine subsidence or mine fire in order to maximize the long-term reliability and effectiveness of the on-Site remedy.

Gould's Comment 14(b) - **EPA, PADEP, and Gould have performed extensive assessments of subsurface conditions at the site including collecting and reviewing mine maps, surface surveys, evaluations by mining geology firms, discussions with DEP experts, and field mining investigations which included the collection of drilling data and mine pool water sampling.**

EPA Response - EPA does not dispute that extensive work has been performed at this Site. In fact, as a result of a detailed review of all of the data collected to evaluate subsurface conditions at the Site, specifically the Mine Subsidence Investigation, EPA determined that waste could remain in place at certain areas of the Site and still be protective of human health. The information obtained from the Mine Subsidence Investigation will also be utilized in the design of the remedy.

Gould Comment 14(c) - **Technical information provided in Advanced GeoServices Corporation's Comments 13 and 14 state that the risks posed by mine subsidence are technically manageable.**

EPA Response - EPA agrees that the risks posed by mine subsidence are technically manageable. EPA is confident that the cap can be engineered to account for the worst case trough subsidence potential of two feet as determined from the Mine Subsidence Investigation. EPA has determined that pothole subsidence or mine fire impact can be managed by removing all overlying waste that is situated north of the Five Foot coal seam limit.

Gould Comment 14(d) - **Gannett Fleming must not be allowed to advance uncertainty as an issue, and must offer information to rebut the current detailed analysis.**

EPA Response - As with all commentors, Gannett Fleming is allowed to present alternate views on EPA's proposed remedy decision. Gannett Fleming did submit a detailed analysis identifying their position regarding the mine subsidence and mine fire potential at the Site. These analyses were primarily provided in a report entitled "Analysis of Coal Stratigraphy and Croplines: Commentary on the USEPA Statement of Basis and Previous Subsurface Investigations Marjol Battery Site, Throop Borough, Lackawanna County, Pennsylvania" dated January 18, 2000, which is available for review in the Administrative Record. EPA's detailed response to this Gannett Fleming report is provided in Attachment II of this FDRTC.

Gould Comment 14(e) - **There is no evidence that an isolation distance is required to protect against mine subsidence risk.**

EPA Response - An adequate isolation distance will be required to prevent damage to the cap system from potential mine subsidence and mine fire. As stated in a letter from PADEP to EPA dated August 15, 2000 regarding this issue "The twenty-five feet exclusionary criteria between combustible waste and coal deposits is intended to ensure there is no potential for underlying coal to effect the waste or vice versa. This situation is relevant for example if an underground mine fire were to burn beneath, or adjacent to, the Site. This situation is possible in northeastern Pennsylvania due to the extensive coal deposits in this region." This letter further states that "because mine fires are known to be capable of burning slowly for several decades, this situation has the potential to impact the long-term stability of the cap". Therefore, EPA and PADEP have determined that the use of the 25 feet isolation distance is appropriate at the Site to prevent against risk associated with a potential mine fire. EPA and PADEP have also addressed the applicability of PADEP residual waste regulations in their response to Throop Borough's Comment 3.

Gould Comment 14(f) - **PA has closed inactive landfills (i.e., Dorney Road) leaving waste over mine seams.**

EPA Response - Based on discussions with PADEP personnel, there are no mines at the Dorney Road landfill, only Karst features associated with limestone. Additionally, the elevated levels of heavy metals present at the Marjol Site are not present at Dorney Road landfill. Based on the nature and extent of contamination present at Dorney Road such as low-level chlorinated solvents and low-level metals, it was determined that a cap in conjunction with additional protective measures such as wetlands replacement and measures to protect groundwater were appropriate measures for this Site. These conditions differentiate Dorney Road landfill from the Marjol Site.

Gould Comment 14(g) - **The maximum subsidence potential is small and manageable for purposes of cap construction and long-term effectiveness of containment in place.**

EPA Response - EPA agrees that the trough subsidence potential of two feet as determined by the Mine Subsidence Investigation is manageable for the purposes of cap construction. However, treatment to a depth of approximately five feet is also being required to increase the long-term effectiveness of the remedy in the event of cap failure or erosion. This additional stability beneath the cap will prevent any erosion of waste beneath the cap, as well as enhancing the performance of the cap system. This stabilized layer will also prevent uneven or differential settlement that may occur over time as a result of waste consolidation within the disposal area.

Gould Comment 14(h) - AGC's comments 3, 11, and 12 indicate that removal creates short-term risks.

EPA Response - In the Statement of Basis, EPA evaluated all alternatives against EPA's four general standards and five remedy selection decision factors. The five remedy selection decision factors, often called balancing criteria, include: (1) long-term reliability and effectiveness, (2) reduction of toxicity, mobility, or volume of wastes (3) short-term effectiveness, (4) implementability, and (5) cost. EPA is concerned with the short-term risks posed by excavation of the material at the Site. As EPA indicated in the Statement of Basis in the discussion on short-term effectiveness on page 41: "The most significant concern regarding the short-term effectiveness of a Corrective Measure Alternative which involves the excavation and movement of contaminated on-site soils is the control of fugitive dust emissions in order to protect the surrounding community and on-site workers." However, excavating waste north of the Five Foot Coal seam limit eliminates any potential for pothole subsidence or mine fire from the Five or Eight Foot Coal seams to impact the on-site portion of the remedy, and therefore increases the long-term reliability and effectiveness of the remedy. EPA's final remedy minimizes the short-term risks of excavation by requiring dust control measures and air monitoring during the construction of the remedy.

Gould Comment 15 - Mine fires are a manageable aspect of any onsite remedy at Marjol. The record contains detailed evidence of the careful investigation of mine fire risks, and management of risks. This information must be considered and applied.

Gould Comment 15(a) - The ignition of battery casing material would not take place by a grass fire at the surface, and direct ignition is equally remote.

EPA Response - In 1974, a fire in both the Five and Eight Foot coal seams occurred about 1/5 mile to the north of the Site in a mine fire known as the Eddy Creek fire. Although that fire was successfully extinguished, it indicates the potential for a fire in those coal seams to initiate off site and potentially impact the Site. EPA's final remedy eliminates the potential for a fire in the Five or Eight Foot coal seams from impacting the on-site portion of the remedy at Marjol. Removal of contaminated material north of the Five Foot coal seam limit is technically feasible, cost effective, and increases the long-term reliability and effectiveness of the remedy. Consequently, the capped area is smaller, and, according to Gould's cost estimates for alternatives

D1 and D2, the cap part of the remedy is less costly. EPA's final remedy also does not require fire monitoring and detection systems or a grout cutoff wall as recommended in AGC's Comment 14 below.

Gould Comment 15(b) - **The risks of mine fire are not significant enough and can be managed with wastes capped in place as discussed in AGC's comment 14. If the risks of BCM ignition can be managed so that they do not occur, there is no benefit to justify the short-term risks and costs of removal or treatment.**

EPA Response - AGC's comment 14 identified several alternatives, initially presented in the CMS Report, to manage the risk associated with a mine fire. One of the alternatives involved moving the contaminated material which is currently located north of the Five Foot coal seam to south of the Five Foot seam. Isolating waste from the Five Foot and Eight Foot coal seams permanently eliminates the potential for mine fire from ever impacting the on-Site portion of the remedy at Marjol. As indicated in EPA's response to Gould Comment 15(a) above, removal of contaminated material north of the Five Foot coal seam limit is technically feasible, cost effective, and increases the long-term reliability and effectiveness of the remedy. The capped area is smaller, and, according to Gould's cost estimates for alternatives D1 and D2, the cap part of the remedy is less costly. EPA's selected remedy eliminates the potential for a mine fire to come in contact with contaminated material at the Site. Therefore, EPA's selected remedy does not require fire monitoring and detection systems, or a grout cutoff wall, in the area of the Five and Eight Foot coal seams since all waste will be removed from areas above these seams.

Gould Comment 15(c) - **Setting isolation distances for municipal waste from mined coal seams do not apply at Marjol, and are factually and technically irrelevant.**

EPA Response - Isolating waste from the Five and Eight Foot coal seams is technically feasible, cost-effective, and permanently eliminates the potential for pothole subsidence or mine fire from ever impacting the on-Site portion of the remedy. The capped area is smaller, and according to Gould's cost estimates for D1 and D2 set forth in the CMS Report, the cap is less costly. EPA's final remedy eliminates the potential for a mine fire to come in contact with contaminated material at the Site. Gould proposed in AGC Comment 14, that monitoring and contingency plans could be developed to address the possibility of mine fire. EPA's final remedy does not require fire monitoring and detection systems or a grout cutoff wall, in the area of the Five and Eight Foot coal seams since all waste will be removed from areas above these seams. At other sites situated on or near coal seams, PADEP typically requires isolation of the coal seam from the waste to prevent both the propagation of a mine fire into the waste, and a near surface mine fire from causing subsidence that could damage the cap. EPA and PADEP agree that removal of waste material above the Five and Eight Foot coal seams is the most direct way to deal with uncertainty surrounding a mine fire near the Site. Eliminating the threat that a mine fire could impact the disposal area provides better long-term reliability and effectiveness for the selected remedy than a monitoring approach.

Gould Comment 16 - **In-place Solidification/Stabilization (S/S) is not a demonstrated**

remedy. EPA used an incorrect physical characterization of the site, and ignored the uncertainties as to implementability, reliability and effectiveness, implementation time, and cost.

EPA Response: This response applies to Gould Comment 16, and AGC Comments 19, 23, 26, and 27 related to the in-place treatment of soil and BCM at the Site. EPA's evaluation of in-place solidification/stabilization and related site conditions were taken directly from Gould's Corrective Measures Study Report. Based on Section 5.0 of the CMS report, in-place solidification and stabilization meets the technical and environmental criteria for feasible remedies which could be considered for the Site. However, EPA has reevaluated in-place S/S and has determined that ex-situ treatment is preferable to in-place S/S because it is more feasible, more effective, and a ***less costly*** alternative.

Gould Comment 17 - **EPA's proposed remedy is not cost-effective for the Marjol site.**

Gould Comment 17(a) - **EPA has excluded the cost-effectiveness requirement from the proposed remedy and that any added benefit seen by EPA which increases cost is not legally acceptable.**

EPA Response - As stated on page 30 of the Statement of Basis, EPA used the nine remedy selection criteria set forth in EPA's "Guidance on RCRA Corrective Action Decision Documents" (OSWER Directive 9902.6) dated February 1991 and the Advanced Notice of Proposed Rulemaking, *Federal Register* 61, no. 85:19451-52.

EPA has modified the treatment requirement proposed in the Statement of Basis for both implementability reasons and for cost reasons. The final remedy will require only a layer of treated material, not treatment throughout the waste. The final remedy will rely on proven technology, not innovative technology. These modifications reduce the cost of the treatment element of the Final Remedy from $17 million to $4 million, while providing the same additional protection in the event the cap is damaged.

Gould Comment 17(b) - **EPA should compare its remedy to capping alone.**

EPA Response - In accordance with the ANPR , EPA considered Gould's preferred remedial containment (cap) alternative, other remedial alternatives set forth in Gould's CMS Report and public comment. After careful review of all relevant information, EPA has developed a final remedy which offers long term protection of human health and the environment. In Table 5 of this FDRTC EPA has provided a comparison among EPA's final remedy, Gould's recommended remedy, and the total removal alternative, based on EPA's remedy selection criteria.

Gould Comment 17(c) - **In its Superfund guidance, EPA considers cost in two ways: (1) balanced against the statutory preference for treatment, and (2) considering whether it**

meets the NCP test for cost effectiveness: "costs are proportional to its overall effectiveness." NCP, 40 C.F.R. § 300.430(f)(l)(ii)(D). Role of Cost in the Superfund Remedy Selection Process, EPA OSWER, EPA 540/F-96/018 (September 1996), p.5.

EPA Response - Please see EPA response to Gould comment 17(a).

Gould Comment 17(d) - **The benefits of treatment do not justify the added cost. Superfund guidance, referenced above, screens out alternatives with similar effectiveness and implementability, but greater cost.**

EPA Response- In balancing the need for treatment and exposure control, the ANPR recognizes that, "... permanent reduction of the toxicity, mobility and/or volume of contaminated materials might be the most cost effective means of reducing risk over time." EPA has considered all of the remedial alternatives and has selected a remedy with this objective in mind.

Gould Comment 17(e) - **Although RCRA imposes no mandates for treatment to affect balancing, EPA does recognize the issue of cost-effectiveness under RCRA. Using the NCP approach, it is essential to do some level of quantifying benefits in order to assess cost effectiveness. (Gould cites the preamble to the NCP 55 Fed. Reg. 8366 (II..300.430(f) and 51427-8 (December 1988).**

EPA Response - Please see EPA response to Gould Comment 17(a).

Gould Comment 17(f) - **CERCLA "most likely" prefers treatment in the absence of an owner/operator to manage a long-term containment remedy. The overarching mandate of the Superfund program is to protect human health and the environment from the current and potential threats posed by uncontrolled hazardous waste sites (55 Fed. Reg. 8666 Comments & Responses § II. 300.430) (March 8, 1990).**

EPA Response - Please see EPA response to Gould Comment 5(a) for a discussion of RCRA Corrective Action remedial goals and expectations.

Gould Comment 17(g) - **Containment may not be successful where groundwater is shallow or migration pathways exist. These conditions do not exist at Marjol.**

EPA Response - EPA agrees that groundwater conditions at the Site do not prevent a containment remedy from being selected at the Site. Therefore, EPA's remedy involves containment of Site contaminants with a cap in conjunction with waste treatment to increase the long-term reliability and effectiveness of the remedy.

Gould Comment 17(h) - **EPA cannot deem that treatment is necessary to protect human health and the environment.**

EPA Response - Please see EPA response to Gould Comment 5(a) for a discussion of RCRA Corrective Action remedial goals and expectations. Please also see EPA response to Gould Comment 5(d).

Gould Comment 17(i) - **In Superfund, EPA has acted to restrain "treatment for treatments" sake where it is not shown to be cost-effective.**

EPA Response - Please see EPA response to Gould Comments 5(a), 5(d), and 17(d).

Gould Comment 17(j) - **Gould has spent millions of dollars, conducted numerous studies, and has been a responsible site owner.**

EPA Response - EPA does not disagree with Gould's statement.

Gould Comment 18 - **Gould has been a responsible owner/operator of this RCRA site for 20 years. EPA's remedy is inconsistent with Gould's demonstrated responsible ownership of the site, and management as an industrial facility.**

Gould Comment 18(a) - **EPA does not require other RCRA facilities to cleanup to residential standards, therefore, EPA should use a non-residential scenario at Marjol. The community would never become the owner of the Site and that Gould has rights to the Site's pre-existing use. EPA could impose contingent standards which would apply to any future developments for residential use. EPA should reconsider the use of residential standards as conditional future standards.**

EPA Response - EPA's selection of cleanup standards is always a site specific decision. At most RCRA facilities, manufacturing or other non-residential activity is expected to be the most likely long term use of the property. In this final decision, EPA is requiring cleanup levels consistent with the Corrective Action Objectives contained in the CMS Report.

Gould Comment 18(b) - **Solidifying the waste would restrict Gould if better technologies became available or if market conditions warranted that Gould might want to remove more materials at some point in the future. Under Gould's proposal, the cap could be opened. EPA's remedy with treatment of all waste would make future changes to the remedy less likely.**

EPA Response - The cap and the approximately five feet of treated waste material required under EPA's final remedy would not prevent additional material from being removed from the Site in the future. Additionally, under EPA's selected remedy, contaminated material would already be removed from the area above the Five and Eight Foot coal seams.

Gould Comment 18(c) - **Gould's cap remedy could be modified with provisions for review and change. Therefore, if Throop's development potential warrants, more removal**

might occur. If more effective and less costly in situ treatment became available it could be used around the perimeter of the cap.

EPA Response - EPA's final remedy is a permanent remedy. EPA's final remedy would not prohibit additional treatment or removal activities if Throop's development potential encouraged Gould to request EPA and PADEP to review the remedy to allow for residential use, or a use of the property that has not yet been considered.

Gould Comment 19 - **EPA's public involvement activities with respect to the Marjol site may have led to misperceptions by EPA as to relevant community opinion, and also may have contributed to community misperceptions of site conditions. Have these public involvement activities influenced the remedy proposal in the Statement of Basis in any way? If they have, what was their influence? How was it factored in?**

Gould Comment 19(a) - **Two aspects of community relations are accepted parts of RCRA procedure: (1) EPA is expected to conduct public involvement activities to learn what site issues are of concern to the community; and (2) EPA is expected to conduct public involvement activities in order to explain important realities about site conditions to community members. Local government officials and community members seeking contact with EPA have expressed the view that removal is their preferred remedy, and that EPA's removal/treatment/cap hybrid is preferable to Gould's capping remedy. This view is not shared by the majority of Throop based on Gould's informal survey of community opinion about the Site. Gould asks the following questions of EPA:**

1) Does EPA believe that the opinions forcefully expressed to it by government officials and their consultants are representative of community opinions more generally? Has EPA taken steps to secure a broader range of local opinions? Have the opinions expressed to EPA as part of this public involvement process influenced the choice of remedy or other EPA decisions in any way? If so, which opinions were influential and what was their influence?

2) Does EPA agree that these two claims are mistaken? If so, what steps has EPA taken to correct these understandings? If not, what evidence is in the Administrative Record to support the two claims? Are there any other public misunderstandings or possible misunderstandings that EPA has tried to correct as part of its public education effort at the Marjol site, and if so, what are they and what has EPA done to correct them?

3) Did public statement influence EPA's proposal? If so, which statements were considered and how were they applied to remedy selection. Did EPA factor in any public statement? Which ones? How were they considered in the remedy selection process?

EPA Response - EPA has considered all comments received during the public comment period from Gould, elected officials, and the general public, in arriving at this final decision. One

of EPA's objectives during the corrective action remedy selection process is to solicit participation from the public in an effort to inform and involve the public in decisions that affect them and their communities. EPA has always been committed to providing and facilitating meaningful participation for affected stakeholders in the corrective action process. As discussed earlier in EPA's response to Gould Comment 1(a), "program implementors and facility owners/operators should develop public participation strategies on a site-specific basis, consistent with existing public participation requirements and the program goal of full, fair, and equitable public participation. At a minimum, information regarding corrective action activities should be available to the public and the public should be given an opportunity to review and comment on proposed corrective action remedies." See 61 Fed. Reg. 19454. In fact, "one of the central goals of the RCRA program is to provide equal access to information and an equal opportunity to participate." See 61 Fed. Reg. 19454.

Gould Comment 20 - The TCLP test is not appropriate.

Gould Comment 20(a) - Gould states that the use of the TCLP test to identify wastes requiring treatment is unjustified.

EPA Response - In a letter from EPA to AGC and Gannett Fleming, dated January 7, 2000, which is available for review in the Administrative Record, EPA clarified its position on the use of the TCLP standard for treated waste for on-Site disposal. TCLP will not be used as a performance standard. Instead, a compressive strength of 100 pounds per square inch, and a permeability of 1×10^{-6} cm/second are recommended. However, some leaching tests, either TCLP or SPLP, will be conducted for the purpose of monitoring the treated waste to ensure that leachability is not increased with the addition of alkaline reagents. Contaminated material treated on-Site for off-Site disposal must comply with applicable standards.

Gould Comment 21 - The surface water detention basin and discharge basin do not require additional work.

Gould Comment 21(a) - The stormwater management basin and runoff collection system were designed with EPA's supervision. The stormwater management basin system is adequate for any remedial purpose. Specify any changes that may be required as part of the final remedy.

EPA Response - As identified in Section IV entitled "Final Remedy", EPA has determined that the following maintenance activities must be conducted to the Stormwater Management Basin to prevent releases of lead from discharging into the Lackawanna River during the implementation of the remedy at the Site:

- removal of all hydric vegetation and animal structures within the Basin;
- continued measures to control and dissuade burrowing animals;

- the floor of the Basin, which has increased in elevation due to sediment accumulation, shall be cleaned out to the original grade prior to the beginning of on-Site construction activities, and according to a regular schedule following completion of construction activities;

- the geotextile membrane wrapped around the spillway riser shall be replaced with a non-woven geotextile filter fabric to prevent clogging;

- maintenance of the gate valve shall be conducted prior to and after the construction activities. An alternative means of closing the gate valve shall be developed as a contingency measure during construction activities;

- the emergency spillway lining, which consists of clumped rip-rap on the interior of the Basin embankment and grass on the exterior, shall be upgraded to rip-rap on both embankment slopes.

The EPA report which provides the basis for these maintenance activities and an evaluation of the Basin's performance is entitled "Evaluation of Stormwater Management Basin, Marjol Battery Site, Throop, Pennsylvania." A copy of this report is available for review in the Administrative Record.

Gould Comment 22 - There is no evidence of potential impacts to sediments in the Lackawanna River.

EPA Response - Quarterly analytical sample results measuring lead levels in the sediments in the Lackawanna River show that lead levels exceed biologically-based sediment screening value range of 31 mg/kg - 250 mg/kg (Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment Associated Biota: 1997 Revision). Therefore, EPA has included as a component of the final remedy the further characterization of sediments in the Lackawanna River, following remedial activities, to determine whether lead concentrations remain elevated in sediments. If so, potential corrective action will be evaluated.

Gould Comment 23 - The public comments of the experts representing the Borough tend to support Gould's analysis of protectiveness and cost-effectiveness.

Gould Comment 23(a) - Gould disagrees with the opinions of Throop Borough's legal and technical experts. The Borough's legal and technical experts are advocates for the community and are not adequately representing factual conditions at the Site. EPA must consider all arguments but *their* proposal accommodates remote and manageable risk with little added protectiveness and at greater cost. Gould supports EPA's rejection of total removal.

EPA Response - EPA has evaluated comments submitted by all parties and interested persons equally and fairly.

C. COMMENTS SUBMITTED BY ADVANCED GEOSERVICES CORP.

AGC Comment 1 - **The main source of lead which was released from the Site, and represented the primary threat, has already been addressed.**

AGC Comment 1(a) - **The battery handling and breaking operations which initially allowed the wind to carry the lead off the Site, and which constitute the original threat from the Site, no longer exist. These operations included the processes initially used at the Site to crush and separate smaller pieces of lead from the rubber and plastic materials. Because this process was more efficient on dry materials, the casings were often stockpiled outside for 24 hours to air dry. Temporary storage areas for batteries being processed were located outside of the crusher and battery house buildings. Front end loaders would move materials either for further processing or to the temporary storage areas. These processes also created considerable dust which local winds carried into the adjacent residential neighborhood. In addition, the process at times included heating small pieces of recovered lead (i.e., posts and connectors) in the melting pot.**

EPA Response: EPA agrees with Gould's assessment that previous Site operations created off-Site lead contamination due to releases of lead from the battery handling and breaking operations and from the melting pot operations. EPA does not dispute that Gould addressed the primary threat from such operations by ceasing such operations and stabilizing the Site. EPA is requiring the additional measures contained in this Final Decision to provide permanent containment and stability for the Site.

AGC Comment 2 - **Wind erosion of lead from surficial contamination has never been the main source of off-site contamination.**

EPA Response - Refer to EPA's response to AGC Comment 1(a) above.

AGC Comment 3 - **Excavation and soil handling significantly increase emissions.**

AGC Comment 3(a) - **Excavation and handling of surficially-exposed lead materials is a significant source for air lead moving off-site. Third quarter 1989 air data showed five times higher lead concentrations than the lead levels measured at upwind locations despite extensive use of water as a dust control measure. On-site activities which took place during third quarter 1989 included the transport of soils into stockpiles, the spreading of topsoil to cover contaminated surfaces, construction of check dams, and the excavation of the North Ravine. High lead levels obtained in the personal air samplers and downwind air monitors.**

A proper site remedy should limit this source of exposure.

EPA Response - AGC indicates that a Site remedy should limit soil excavation and handling in order to limit dust generation. EPA's remedy does limit soil excavation and handling to only those activities which the Agency has determined are necessary to ensure the long-term protectiveness of the remedy. Neither EPA's proposed nor final selected Site remedy involves the excavation of the primary battery casing fill area which represents the largest volume of contaminated material at the Site. EPA's final remedy involves only the excavation of contaminated material from the area of the five and eight foot coal seams, and the excavation of surface material from the primary BCM fill area to the extent required to create a five foot layer of treated material beneath the cap. Therefore, EPA is only requiring excavation in areas based upon a technically sound justification in order to ensure the long-term protectiveness of the selected remedy.

AGC's argument that dust control methods utilized during the third quarter 1989 raises the questions as to what extent were soil wetting and other dust control measures used to control dust. Dust control is an important component of EPA's selected remedy in order to prevent risk to on-Site workers and the surrounding community during the implementation of the remedy. Gould's potential failure to implement adequate dust control techniques in 1989 cannot be used as an excuse not to take necessary corrective measures to protect human health and the environment from future Site risks. All alternatives presented in the CMS Report, including Gould's recommended remedy, involve some degree of dust generation which can only be addressed by utilizing appropriate dust control methods during the implementation of the remedy. EPA suggests additional dust control methods for Gould's consideration in its response to Gould Comment 10(b) above.

AGC Comment 4 - Site data and documents within the Administrative Record support the conclusion that wind erosion is not a significant source of future releases of lead.

AGC Comment 4(a) - Air monitoring data collected since 1991 have been below the NAAQS for lead. A permanent multi-layer cap with best management practices will further reduce the potential for wind erosion of these materials without creating significant dust. If the cap were to fail and the material beneath the cap were to be exposed, the surficial materials would not be a significant source for off-site migration unless significant excavation activities took place. There is no justification for solidifying these materials to prevent unlikely, hypothetical future off-site exposures. The CMS states that Gould would maintain the cover system in the event of failure. Additionally, releases that did occur would be small in magnitude when compared to dust levels generated during plant operations. At worse case, the lead levels released from a failed cover system would be close to the lead levels prior to stabilization activities but not as high as levels estimated for excavation activities. There is no mechanism identified (by EPA) for this type of release.

Material settlement is not expected to be significant, and global subsidence of the landfill as

a result of trough subsidence would not harm the final cover.

EPA Response: EPA's inclusion of solidification as part of the Site remedy is not only to prevent potential off-Site exposure to the surrounding community in the event of cap failure but to provide long-term protectiveness on-Site as well. Gould's Corrective Measures Study Report included several land use options, one of which is the use of the property as a recreational area. Given the possible future uses of the property, which allow for individuals to have unrestricted access to the property, EPA's treatment component of the final remedy will also prevent on-Site exposure in the event of cap failure.

AGC Comment 5 - **Lead releases from the Site via surface water runoff are not occurring. No modifications to the stormwater management basin are necessary.**

EPA Response - Refer to EPA's response to Gould Comment 21(a).

AGC Comment 6 - **Gould has been proactive and responsible over the past 20 years in addressing Site risks and the principal threats and will continue to be following capping.**

AGC Comment 6(a) - **Gould has demonstrated that they are willing and able to implement a permanent remedy at the Site.**

EPA Response - This statement does not require a response by EPA.

AGC Comment 7 - **The EPA, PADOH, ATSDR, and Gould agree the Site is safe, stable and currently presents no apparent public health hazard.**

AGC Comment 7(a) - **EPA and Gould are in agreement on the following points: (1) site risks have been effectively controlled; (2) nine years of data demonstrate that the Site is stable since the air monitoring program began in 1989, there have been no exceedences of this air standard for lead at the Site; (3) the potential threat to human health represented by the off-site migration of lead from Marjol operations was addressed by Gould's 1988-1992 cleanup effort; (4) EPA sent letters to property owners subject to the removal activities to verify that the cleanup was complete, and that the risks associated with exposure to Site contaminants has been addressed by the soil removal action. ATSDR verified these conclusions. Control of lead-contaminated materials has been accomplished with only a soil and grass cover. There is some potential for mine subsidence and a very remote possibility of mine fire.. The residual risk at the Site is minimal. EPA's remedy creates new risks due to truck traffic and dust which can not be justified considering current stable Site conditions. The Administrative Record supports the capping-only remedy with proper maintenance.**

EPA Response - While EPA generally agrees that the Site conditions are stable, perpetual operation and maintenance is not an adequate substitute for a permanent Site remedy. The Site,

though stable, continues to pose a potential future threat to human health and the environment until a final Site remedy is implemented. The primary purpose of the final remedy for the Site is to provide for the long-term protection of human health and environment.

AGC Comment 8 - The EPA's proposed remedy does not address risks identified in the Baseline Risk Assessment more effectively than the Gould remedy.

AGC Comment 8(a) - EPA agreed with conclusions in the Baseline Risk Assessment and approved it (USEPA, 1995c). The Baseline Risk Assessment demonstrates that only minimal residual risk needs to be addressed by the remedy.

EPA Response - EPA's final remedy is not inconsistent with the Baseline Risk Assessment nor does EPA's conditional approval of the Baseline Risk Assessment require EPA to select Gould's preferred alternative remedy of capping alone for the Marjol site.

AGC Comment 8 (b) - The proposed EPA remedy does not address risks identified in the Baseline Risk Assessment more effectively than the Gould remedy.

EPA Response - The ANPR addresses by stating that "Risk is a function of toxicity and exposure; therefore, risk reduction can be accomplished by reducing toxicity (e.g., through treatment to reduce toxicity, mobility, or volume) and/or preventing exposure(e.g., through engineering and institutional controls." It further states that "When treatment to reduce toxicity, mobility, or volume is chosen, EPA does not necessarily expect the remedy to involve treatment alone. For example, highly toxic contaminated material could be treated so that the concentrations of hazardous constituents, while still above media cleanup levels, would support a reliable containment remedy." EPA applied this principle in selecting the remedy for the Site. Under EPA's final remedy, treatment offers added reduction in the mobility of the contaminated material through solidification, and reduces, using stabilization, the hazardous nature of the toxic waste material beneath the cap.

AGC Comment 9 - The use of residential cleanup standards is not appropriate.

EPA Response - EPA has determined that the 500 mg/kg lead standard established in the CMS Report is appropriate for any reasonably anticipated future use of the Site. EPA has developed cleanup standards for PCBs and PAHs as part of the development of the proposed and final remedy for the Site. EPA has applied a residential standard for these constituents to be consistent with the lead standard.

AGC Comment 10 - EPA used an unreasonably stringent risk target in developing clean-up goals for PCBs and PAHs.

AGC Comment 10(a) - In discussions with EPA during the final revisions to the CMS, it was agreed that Corrective Action Objectives should not be developed until the

remedial design phase when the final land use is known (AGC, 1999b, pg.4). Despite this oral agreement, EPA developed Corrective Action Objectives with an improper assumption of residential land use.

EPA Response - EPA is not aware of the existence of any oral agreements between EPA and AGC on this issue. During the Corrective Action process, proposed and final remedies include final cleanup standards.

AGC Comment 10(b) - **As presented in the Baseline Risk Assessment, cumulative cancer risk for PCBs and PAHs did not exceed 10^{-4} and the Hazard Index was less than 1. Under EPA policy, development of Corrective Action Objectives is not required under such circumstances (OSWER Directive 9355.0-30, USEPA, 1991f). EPA required the development of Corrective Action Objectives in conflict with this directive.**

EPA Response - EPA's development of the residential-based Corrective Action Objectives is not in conflict with existing EPA policy. EPA selected the cleanup levels for PCBs and PAHs to be consistent with the cleanup level established for lead in this Final Decision. EPA believes that the steps necessary to implement the final remedy will also serve to remediate the PCB and PAH hot spots co-located with lead contamination. These cleanup levels will allow unrestricted use of the property, where appropriate and at Gould's discretion.

AGC Comment 10(c) - **EPA's risk target of 1.0×10^{-7} is two orders of magnitude lower than what is required under EPA guidance for an industrial site. No rationale for this unreasonably stringent risk target is provided. An appropriate risk target is 10^{-5} per constituent with cumulative risk not to exceed 10^{-4}.**

EPA Response - The target risk of 1.0×10^{-7} for the six individual carcinogens achieves a cumulative target risk of 1.0×10^{-6}, the lower end of EPA's acceptable excess cancer risk range of 1.0×10^{-4} to 1.0×10^{-6}. There is no existing EPA policy which establishes a target risk for industrial sites of 1.0×10^{-5}.

AGC Comment 11 - **The proposed EPA remedy creates real and unnecessary risks to eliminate future hypothetical risks which are unlikely to ever occur.**

AGC Comment 11(a) - **Risk associated with construction activities are often higher than the potential risks of exposure to contamination at large site like Marjol.**

EPA Response - In selecting a final remedy for the Site, EPA balanced the short-term effectiveness of implementing the remedy against long-term protectiveness. The ANPR deals with the balancing of these two criteria by stating that "any one of the balancing criteria might prove to be protective in the short-term but not necessarily protective in the long-term (e.g., capping of a highly contaminated area). In this case the need for long-term reliability and the potential for long-term operation and maintenance costs point toward a remedy which presented a

more advantageous combination of the balancing criteria (e.g., removal or treatment of hot spots, capping residual contamination, and implementing an institutional control)." With regard to Marjol, EPA has determined that treating the approximately upper five feet of waste beneath the cap, and removing waste from the areas of pothole subsidence, will increase the long-term effectiveness of the remedy. Operation and maintenance of the cap is required under EPA's final remedy. However, in the event of cap failure, the treated material beneath the cap would prevent risk associated with exposure to Site contaminants.

AGC Comment 11(b) - **Table 1 of Estimated Risk of Occupational Fatalities Associated with Hazardous Waste Site Remediation (Hoskin et. al., 1994) showed 17 occupations involved in hazardous waste remediation tasks have widely varying average annual fatality rates. The two most hazardous occupations (deaths per person per year) are truck drivers and laborers. Remediation alternatives which reduce dependence on these two occupations are the most desirable to minimize this risk to workers. Off-Site disposal (of 500,000 cubic yards of material) has a fatality rate of 0.161. The workers' risk of fatality due to physical hazards is 10^{-1} to 10^{-2}. For capping, the expected fatality risk is 0.0117. EPA's proposal to excavate and dispose of 86,000 cubic yards of hazardous material off-site creates a risk to workers. Based on the CMS, a risk of an accident is four times higher for EPA's remedy than Gould's remedy. This risk is above the range of risks EPA would tolerate from a contamination source (10^{-6} carcinogenic risk).**

EPA Response - The reference used by AGC (Hoskin et. al., 1994) estimates occupational fatality rates for a hypothetical remediation project by using known fatality rates categorized by occupation. AGC directly compares the potential for accidents, which are random events, directly with the risk due to potential exposure to contaminants which is based on a dose-response function. This potential for truck accidents is not typically used for construction projects at hazardous waste sites. Gould's Site remediation contractors will be employing appropriate safety measures, with oversight by EPA and PADEP, to minimize the potential for such random accidents.

AGC Comment 11(c) - **EPA's remedy does not change on-site risks posed following capping or the cap size. Removal does not provide a quantitative increase in protectiveness of human health and the environment. Therefore, the increased time, risk, and expense are too excessive to implement EPA's remedy. EPA's remedy requires extensive excavation and in-place solidification and stabilization which will increase the risk of injury or fatality to workers as compared to Gould's containment remedy.**

EPA Response - EPA's final remedy provides a technical solution to protect the remedy in the event of potential long-term Site risks. EPA routinely considers potential future risks in the selection of final remedies at hazardous waste sites. In the development of the remedy for the Site, EPA considered the potential for cap failure to occur in the future due to such events as erosion, freeze/thaw cycles, burrowing animals, ground subsidence, tree roots, and the effects of acid rain. Additionally, the solidified and stabilized layer of contaminated material will minimize

the potential for cap subsidence, and will also serve as a biotic barrier beneath the synthetic cap system to prevent vector intrusion into the waste.

AGC Comment 12 - **Excavation and off-site disposal of 86,000 cy of materials disrupts the community and creates an unnecessary exposure risk.**

EPA Response - In this final remedy, off-site disposal is contingent on design criteria for the cap; any volume of contaminated material requiring off-site disposal will be achieved using appropriate steps to minimize exposure.

AGC Comment 13 - **Movement of materials is not necessary to address risks from mine subsidence.**

AGC Comment 13(a) - **Excavation and off-Site disposal of 86,000 cubic yards of material that overlies the Five- and Eight-Foot Coal seams is unwarranted to protect against mine subsidence because a cap would eliminate infiltration, liners can tolerate stress, grouting of voids in the Five- and Eight Foot Coal seams could be done, or reinforcing materials such as geogrids could be added to the cap if necessary.**

EPA Response - EPA's final remedy requires excavation of material north of the southernmost limit of the Five Foot coal seam because such action will increase the long-term reliability and effectiveness of the remedy by eliminating the potential for pothole subsidence or mine fire from the Five or Eight Foot coal seams to impact waste material left on site. Grouting of the Five and Eight Foot coal seams is unnecessary since the cap will not extend over those seams. According to Gould's cost estimates for alternatives D1 and D2, the cap portion of the remedy is less costly.

AGC Comment 13(b) - **AGC states that people cannot become exposed if a pothole occurs - waste would move down, reducing direct contact threat.**

EPA Response - EPA has proposed removal of material above the Five Foot coal seam to not only address pothole subsidence concerns but also to address the concerns regarding the potential for mine fires in the Five or Eight Foot coal seams to ignite lead-contaminated waste remaining on the Site.

AGC Comment 13(c) - **AGC predicts that over 900 pounds of lead would be released during excavation, and EPA implied that no dust will be generated during remedial construction.**

EPA Response - EPA has not implied that there would be no dust generated during remedial construction. As EPA stated on page 41 of the Statement of Basis in the discussion on short-term effectiveness, "The most significant concern regarding the short-term effectiveness of a Corrective Measure Alternative which involves the excavation and movement of contaminated on-Site soils is the control of fugitive dust emissions in order to protect the surrounding

community and on-Site workers." Because EPA is aware that dust would be generated, EPA has included dust control measures and air monitoring in its proposed and final remedy.

AGC Comment 13(d) - **There is no evidence that either the Top Split of the Top Four Foot or the Top Four Foot coal seams were ever surface or subsurface mined at the site, and there is no basis to require removal of BCM over these seams.**

EPA Response - EPA reviewed Gannett Fleming's arguments for concluding that the Top Split of the Top Four Foot and the Top Four Foot Coal seams had been mined under the Marjol Site. EPA's responses to Gannett Fleming's comments are contained in Attachment II of this FDRTC. EPA does not agree with Gannett Fleming that the Top Split of the Top Four Foot and the Top Four Foot coal seams were mined in the area of the Site where the cap will be placed. EPA agrees that BCM does not need to be removed from over these two coal seams. For a more detailed discussion of EPA and PADEP's analysis of this issue, please see Attachment II of this Final Decision.

AGC Comment 13(e) - **Gannett Fleming's interpretation of the location of the Five Foot seam does not affect the selection of an appropriate remedy since AGC contends that it is not necessary to remove material above the Five Foot coal seam.**

EPA Response - In the Statement of Basis, EPA had already recognized that there was some uncertainty in the actual location of the southernmost limit of the Five Foot Coal seam. EPA proposed to manage this uncertainty by requiring that the limit be determined in the design stage of the remedy, either through the drilling of additional borings, or through over-excavation of waste material to a level which is clearly below the Five Foot coal seam. EPA does not agree with AGC that it is not necessary to remove contaminated material above the Five Foot coal seam. Removing contaminated material from that location permanently eliminates the possibility that pothole subsidence or mine fire from the Five or Eight Foot coal seams could impact the on-Site remedy.

AGC Comment 13(f) - **Site materials can be reliably contained under either of their alternatives D1 or D2 without offsite disposal, and therefore there is no justification for the offsite disposal remedy component which creates implementation risks, increases implementation time, creates dust, and adds expense without any measurable or plausible increase in the long-term effectiveness or protectiveness of the remedy.**

EPA Response - EPA's final remedy recognizes that off-site disposal is contingent on design criteria for the cap and that the volume of material to be disposed off-site is dependent on the capacity of the landfill.

AGC Comment 14 - **Movement of materials is not necessary to address risk from mine fire.**

AGC Comment 14(a) - **EPA and Gannett Fleming's proposals to remove**

contaminated material for off-site disposal to address risk from mine fires that is "so remote as to not even be worthy of consideration according to the Pennsylvania Bureau of Abandoned Mine Reclamation"(statement in the Scranton Tribune, 1999)

EPA Response - A memorandum from Ernest Giovannitti, Director of the Bureau of Abandoned Mine Reclamation, PADEP, to Joseph Brogna, Environmental Cleanup Program Manager of the PADEP Northeast Regional Office, dated July 16, 1999, provides the PADEP position on the potential for a coal bed fire to impact the Site. In its memorandum, PADEP states that, "To completely eliminate the Five Foot Bed as a potential fire hazard the final design would have to be changed. All battery casing material above the Five Foot bed would need to be removed. This would increase the separation between the Five Foot bed and combustible battery casing material and effectively eliminate the fire hazard." This PADEP memorandum is available for review in the Administrative Record.

AGC Comment 14(b) - **The possibility of a mine fire originating off-site in either the Eight or Five Foot seams and migrating below ground to the Marjol site is extremely unlikely. The surface features (i.e., sinkholes and fissures) discussed in Appendix (of the RFI) as potential contact points for the Eight Foot seam to surface fires are fenced off and can remain inaccessible as part of the final remedy.**

EPA Response - Refer to EPA's response to Gould Comment 14(e), Gould Comment 15(a), Gould Comment 15(b), and AGC Comment 14(a) above with respect to mine fires at the Site.

AGC Comment 14(c) - **17,000 cubic yards out of the 86,000 cubic yards of materials to be excavated and disposed of off-site is battery casing material that is possibly in direct contact with a mine seam. The portion of the primary battery casing material fill area which overlies the Five-Foot seam is isolated from that seam by at least four feet of soil; in most of the area the thickness of soil is more on the order of 10 to 18 feet. This soil insulates the battery casing material making it impossible to transmit enough heat to cause ignition.**

EPA Response - In addition to battery casing material in the primary battery casing material fill area, there is also battery casing material in the Five and Eight Foot strip pits which has not been addressed in AGC's comment. Furthermore, AGC has not provided any data in their comment to demonstrate that four feet of soil provides sufficient insulation to prevent ignition. Even if the battery casing material were not ignited directly, mine fire can cause subsidence. All of these problems are avoided if waste is removed from above the Five and Eight Foot coal seams.
In addition, under EPA's final remedy, all hazardous material excavated from the Five and Eight Foot coal seams is not necessarily disposed off-Site.

AGC Comment 14(d) - **Gould proposed, in the CMS, to address any remaining concerns over mine fires by installing a monitoring and detection system. This system could be installed to the north of the capped area such that in the extremely unlikely event of a**

mine fire that could impact the Site, there is sufficient time to either construct a cutoff wall either by grouting or by excavation.

EPA Response - As indicated in EPA's response to Gould Comment 15(c) above, Gould has proposed monitoring and contingency plans to address the possibility of a mine fire. PADEP has evaluated this proposal and rejected it based on their experience with mine fires throughout northeastern Pennsylvania. In similar situations, PADEP typically requires isolation of the coal seam from the waste unit to prevent both the propagation of a mine fire into the waste and to prevent a near surface mine fire from causing subsidence that could damage the cap. PADEP and EPA agree that physical separation of waste material from the Five and Eight Foot coal seams is the most efficient way to deal with the uncertainty surrounding a mine fire near the Site by eliminating any chance that a mine fire could impact the disposal area. EPA and PADEP have determined that eliminating the threat as achieved under EPA's remedy provides greater long-term reliability and effectiveness than the monitoring approach proposed by Gould.

AGC Comment 14(e) - **The CMS discusses the use of grout in the seams as a cutoff wall in the Eight-Foot and Five-Foot seams as part of the remedy (Alternative F2) or moving the materials south of the Five-Foot seam but consolidating them on-site (Alternative D2). These alternatives are as protective as removal and are more cost-effective than removal and off-site disposal.**

EPA Response - EPA agrees with the approach in Alternative D2 which moves the material south of the Five Foot seam. EPA included this approach in its final remedy because it provides greater long-term reliability and effectiveness than grouting the seams or relying on fire monitoring.

AGC Comment 15 - **The performance standards and goals for the S/S are unclear.**

EPA Response - Refer to EPA's response to Gould Comment 20(a) above.

AGC Comment 16 - **EPA mischaracterized the principal threat wastes at the site.**

AGC Comment 16(a) - **EPA did not clearly identify the principal threat waste at the Site. The principal threat waste determination was reevaluated at the Jack's Creek Superfund Site. Recent EPA guidance considers "principal threat materials as those source materials with toxicity and mobility characteristics that combine to pose a potential risk several of order of magnitude greater than the risk level that is acceptable for the current or reasonably anticipated future land use, given realistic exposure scenarios." (USEPA, 1997c, p.11)**

EPA Response - As stated in the ANPR "EPA expects to use treatment to address the principal threats posed by a Site whenever practicable and cost-effective. Contamination that

represents principal threats for which treatment is most likely to be appropriate includes contamination that is highly toxic, highly mobile, or cannot be reliably contained, and that would present a significant risk to human health and the environment should exposure occur."

The Jack's Creek Superfund Site to which Gould refers ultimately established a principle threat waste as lead contaminated material containing greater than 40,000 mg/kg of lead. EPA's remedy ensures that principal threat waste, which at this Site includes waste with lead concentrations above 40,000 mg/kg, will not present a significant risk if exposure where to occur in the event of cap failure. (See also January 7, 2000 letter to Mr. Reitman (AGC) and Mr. Swit (Gannett Fleming) contained in the Appendix to the Statement of Basis and attached to this FDRTC.)

AGC Comment 17 - **A properly defined principal threat must be justified in several different ways on a site-specific basis.**

AGC Comment 17(a) - **The following questions are asked with respect to principal threat waste:**

(1) What are the characteristics of the materials that would pose a threat should exposure occur? EPA defined the high concentration of lead in battery casing material and soils as the principal threat. This meets the first part of the principal threat definition.

(2) Can exposure occur and by what means?

(3) Will S/S reduce the amount or volume of lead at the Site?

(4) Will the lead be less mobile?

(5) Will the lead be less toxic?

(6) If there is a decrease in toxicity of the lead (and possibly an increase), there is no significant reduction in mobility, and the volume of contaminated material actually increases following treatment how does this treatment eliminate the principal threat?

EPA Response - The definition of principal threat waste is provided in the EPA guidance documents "Presumptive Remedy for Metals-in-Soil Sites, September 1999", and "A Guide to Principal Threat and Low Level Threat Wastes, November 1999." According to these documents, principal threat waste is defined as "source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur." The Presumptive Remedy guidance further states that "Examples include surface soil or subsurface soil containing high concentrations of contaminants of concern that are (or potentially are) mobile due to wind entrainment, volatilization, surface runoff, or sub-surface transport; and highly toxic source material, such as soils containing significant concentrations of highly toxic materials." Based on

this definition, the Site contains a significant volume of principal threat waste. This waste would present a significant risk to human health and the environment should exposure occur. Therefore, EPA determined that capping the highly contaminated or principal threat waste was necessary in order to ensure the protectiveness of the remedy. The treatment of the upper layer of waste decreases the potential for direct contact exposure to principal threat waste beneath the cap in the event of a cap rupture or failure. The treated material would prevent short-term exposure via direct contact with lead-contaminated soil beneath the cap (i.e., human or environmental exposure to principal threat waste during the future use of the Site as a recreational area, commercial facility, or other such end use). In addition, the treated material would prevent the release of lead via surface runoff if the cap were to rupture. Based on EPA experience at other lead battery sites, treatment using S/S will reduce the mobility of the contaminated material. EPA agrees that S/S treatment will not reduce the volume nor toxicity of lead present at the Site.

AGC Comment 18 - **A principal threat analysis is not necessary.**

EPA Response - EPA disagrees. EPA provides its evaluation of the principal threat materials at the Site in responses to AGC Comment 16(a) and AGC Comment17(a)above.

AGC Comment 19 - **Treating BCM in-place is impracticable.**

EPA Response - In-place treatment has been eliminated from the final Site remedy, therefore, this comment is no longer applicable.

AGC Comment 20 - **Excavation is the primary threat.**

AGC Comment 20(a) - **The primary threat posed by the Site is the excavation of materials and excavation should be minimized. A multi-layer cap could be constructed by placing low concentration material over high concentration material to minimize the potential exposure to high concentration materials in the event of cap erosion. The top foot of material under the cap could be solidified though Gould believes such redundancy is not required. S/S is not a practicable nor cost effective means of controlling exposure to high concentrations of lead or minimizing leaching to groundwater.**

EPA Response - EPA disagrees that excavation presents the primary threat at the Site if such activities are conducted in a safe and protective manner. Based on EPA's experience, it is possible to excavate similar volumes of contaminated material while controlling releases of contaminants and protecting on-site workers. EPA has implemented numerous policies related to the management of contaminated soil during remedial activities. The EPA document entitled "Best Management Practices (BMPs) for Soils Treatment Technologies - Suggested Operational Guidelines to Prevent Cross-Media Transfer of Contaminants During Cleanup Activities (EPA 530-R-97-007, May 1997)" provides guidance on the design and implementation of soil remediation activities at RCRA and other hazardous waste sites so that transfers of contaminants from contaminated soil to other media (i.e., clean soil, air, and surface or groundwater) are

minimized. Its primary purpose its to provide guidance on preventing cross-media transfer of contaminants during implementation of soils treatment technologies for treating contaminated soils or solid media in compliance with applicable state and/or federal regulations. Releases that may result in transfer of contaminants from the soil or solid media to water, or other natural media are generally referred to as cross-media transfer. This document also assists in reducing worker exposure to contaminants by identifying the potential for cross-media transfer and recommending possible control mechanisms during implementation of soils treatment technologies. BMPs for soil treatment technologies such as solidification and stabilization as well as containment, excavation, and off-site disposal. Table (3-3) of this guidance provides technologies for reducing contaminant concentrations in air emissions during remediation. This document is available for review in the Administrative Record for the Site. In addition, EPA balanced the potential short-term risk of implementation against the long-term protectiveness and effectiveness of its selected remedy. EPA determined that excavation of contaminated material above the Five and Eight Foot coal seams is necessary to increase the long-term protectiveness of the remedy.

EPA's remedy includes the solidification and stabilization of approximately the upper five feet of contaminated material beneath the cap. This requirement offers several advantages over AGC's suggestion that a multi-layer cap, with lower concentration waste being placed above higher contaminated material, be constructed. One such advantage is that the treated layer will serve as a biotic barrier to prevent vector intrusion into the waste. The presence of burrowing animals at the Site is well-documented. Gould has been faced with trapping such animals for many years. Geosynthetic liners have been torn by burrowing animals. The treated layer will protect the remedy in the event that an animal burrows through the cap system by establishing an impenetrable layer between the cap and the contaminated material. In addition, this treated layer will offer stability to the cap by preventing uneven or differential settlement that may occur over time as a result of waste consolidation within the disposal area.

EPA's remedy requires approximately a five-foot treated layer instead of a one-foot layer based on the best professional judgement of its technical expert who works exclusively on S/S treatment at hazardous waste sites. This expert is available to meet with Gould and its technical consultants to assist in the design and implementation of this component of EPA's final remedy.

EPA disagrees with Gould's conclusion that S/S is not a practicable nor cost effective means of controlling exposure to high concentrations of lead or minimizing leaching to groundwater. EPA has provided numerous references to sites, including the Sapp Battery and Schuylkill Metals Sites where S/S is being used for such purposes. Moreover, EPA's review of lead battery sites across the country determined that S/S treatment was the most commonly selected remedy for the treatment of lead-contaminated material. EPA has provided its review of these sites in the Administrative Record.

Furthermore, EPA's final remedy which requires treatment of approximately five feet of material beneath the cap instead of the entire volume of contaminated material, and the replacement of *in-situ* treatment with *ex-situ* treatment, decreases the cost of EPA's proposed remedy by more than

$10 million. Therefore, EPA's selected remedy provides Gould with a more cost-effective method of achieving long-term reliability and effectiveness.

AGC Comment 21 - **Lead from the site has not contaminated the groundwater.**

EPA Response - In this comment AGC compares dissolved lead concentrations from lysimeters with TCLP standards. However, TCLP regulatory levels are not "necessarily" health-based standards. Material which leaches at concentrations less than the TCLP regulatory level (used to determine if a material is a hazardous waste exhibiting the characteristic of toxicity) may still pose a threat to human health and the environment, and may still be source for groundwater contamination. However, with respect to Site-specific conditions at Marjol, EPA agrees that the lead which is observed to be leaching from the BCM fill areas is either attenuated before it reaches the mine pool, or is significantly diluted when it reaches the mine pool.

AGC Comment 22 - **Stabilization of Site materials to prevent leaching is unnecessary.**

AGC Comment 22(a) - **Contaminated materials are stabilized to reduce leaching of compounds to groundwater. EPA's Statement of Basis states that the mine pool groundwater monitoring conducted by Gould from September through November 1998 during the Mine Subsidence Investigation did not show the presence of elevated levels of lead. The purpose of leaching tests such as TCLP and SPLP is to prevent human health risks from contaminated groundwater. Therefore, these tests, specifically TCLP, are not appropriate because lead is not leaching into the mine pool from the Site. S/S of Site materials to reduce leachability is not necessary to protect groundwater as the materials are geochemically stable under site-specific leaching conditions.**

EPA Response - EPA agrees that the primary purpose of treating Site materials (to be placed beneath the cap) is not to reduce leachability to groundwater. As cited in a memorandum to Sibyl Hinnant EPA Region III from Edward Bates in the EPA-ORD dated March 15, 2000, "S/S treated material, using cement and creating a monolith produces a treated product that is less easily eroded by either wind or water than untreated material. A final cap also provides added protection. However, any failure in the final Site cap, would immediately expose the untreated material to erosion. S/S treated material would provide resistence to such erosion until the cap could be repaired." This memorandum can be found in the Administrative Record.

EPA has provided clarification of the use of the TCLP standard for lead as the treatment performance standard for *in-situ* solidification and stabilization in a letter from EPA dated January 7, 2000. In this letter, EPA stated that other standards such as the synthetic precipitation leaching procedure, unconfined compressive strength, and hydraulic conductivity (permeability) are commonly used as performance standards for solidification and stabilization of metals to be disposed of on Site. The final remedy identified in this Final Decision and Response to Comments uses compressive strength and hydraulic conductivity (permeability) as measurements of the performance of the on-Site treatment component of the final remedy. This letter is

provided in the Administrative Record.

AGC Comment 23 - **Cement-based, in-place S/S may mobilize lead at the Site;**

AGC Comment 23(a) - **S/S is pH-sensitive and that misapplying cement-based S/S to lead contaminated wastes may increase lead leachability. AGC cites several references which discuss this issue.**

EPA Response - EPA is aware that treatment of metals contaminated soil and waste material using S/S is pH-sensitive. As EPA indicated in its response to AGC's comment 39(b) above, the use of cement alone to treat lead contaminated materials, soil and battery casings, may not reduce the mobility of lead as measured in leaching tests performed on ground samples, such as the TCLP or SPLP (SW846, Methods 1311 and 1312). These methods are provided in the Administrative Record. Lead is most soluble at both high and low pH. Cement addition often raises the pH into the soluble pH range (over 11.0) for lead. Thus, treatment with cement, which could mobilize lead, would not be desirable.

At least four S/S projects are currently underway at lead sites and lead battery sites (Brown's Battery, Sapp Battery, Schuylkill Metals, East Penn Manufacturing). Treatability tests conducted at Sapp Battery confirmed that solubility of lead could increase by S/S treatment unless pH was controlled and/or a reagent was added to bond with the lead and to make it non-leachable. At both the Sapp Battery and Schuylkill Metals Sites, a phosphate was added as a reagent to bond with the lead and made it non-leachable. Both sites were successfully remediated using this approach. Treatment specifications for Schuylkill Metals called for 5 mg/l of lead or less measured by TCLP. Sapp Battery's specifications called for 500 microgram per liter (µg/l) of lead, or less, measured by the SPLP.

AGC Comment 24 - **The S/S of materials as described in the EPA remedy will not significantly reduce the toxicity, mobility, or volume of the materials present at the Site. S/S of Site materials is not necessary to ensure that the materials on-site are reliably contained. Considering these facts, EPA guidance indicates S/S treatment is not appropriate at this Site.**

AGC Comment 24(a) - **AGC refers to EPA policy in the ANPR which states: "..to significantly reduce the toxicity and/or mobility of contaminants posing a significant threat (i.e., "contaminants of concern") wherever practicable to reduce the need for long-term management of hazardous material. EPA will seek to reduce hazards (i.e. toxicity and/or mobility) to levels that ensure that contaminated material remaining on-site can be reliably controlled over time through engineering and/or institutional controls."**

AGC also states "..the Superfund program also uses as a guideline for effective treatment the range of 90-99% reduction in the concentration or mobility of contaminants

of concern....EPA believes that, in general, treatment technologies or treatment trains that cannot achieve this level of performance on a consistent basis are not sufficiently effective and generally will not be appropriate." (USEPA, 1990a, p.8701)

Therefore, AGC concludes that based on these policies, EPA should review the benefits of treatment to assure that treatment meets the goals established above.

EPA Response - Refer to EPA's response to AGC Comment 39(b).

AGC Comment 24(b) - **Marjol is a high-volume Site. EPA, ATSDR, PADOH, and Gould agree that Marjol represents a low-level risk in its present condition.**

EPA Response - Although the Site is currently stabilized, the purpose of the selected remedy is to prevent future risk as stated in the ANPR on page 19448 "Remedies should be protective of human health and the environment, and maintain protection over time."

AGC Comment 24(c) - **S/S reduces water infiltration through the cap only by 0.03" and that is not worth an increased cost of $16 million, 2-3 years extra implementation time, and risk of contamination from truck traffic.**

EPA Response - This portion of the proposed remedy has been modified in the final remedy, as explained in EPA's response to Gould Comment 10(a), the purpose of the S/S is primarily to increase the long-term reliability and effectiveness of the remedy in the event of a breach or failure of the cap in the future. EPA estimates that the cost added to the final remedy as a result of the addition of a five-foot layer of treated material beneath the cap is $4 million. This is a reduction from the proposed remedy which required the treatment of the entire volume of contaminated material beneath the cap.

As EPA explained in the response to AGC Comment 39(d), the treated layer beneath the cap, and the construction of the cap, could be completed within one construction season or approximately nine months. This is not an unreasonably lengthy implementation time given the nature and volume of contaminants present at the Site.

The risk of contamination from truck traffic can be managed by implementing appropriate safeguards during the off-Site transport of contaminated soil.

EPA balanced the short-term risk of the implementation of the remedy against the long-term effectiveness and protectiveness of the remedy, and determined that the short-term risks could be adequately controlled in order to increase the long-term effectiveness of the remedy.

AGC Comment 24(d) - **Materials at the Site do not leach above the performance standard and EPA did not provide site-specific information, calculations, or guidance and engineering text to support it's position that site materials (beneath the cap) should be**

protected from wind erosion or water erosion.

EPA Response - As indicated in EPA's response to AGC Comment 22(a), TCLP will not be used as a performance standard for S/S treatment beneath the cap. However, a leaching test such as SPLP, will be conducted only to monitor the application of the S/S treatment to prevent misapplication which could increase rather than decrease the mobility of lead. The performance standards will be based on the strength and permeability of the treated waste. EPA-ORD will provide assistance in the design of the treatment component of the final remedy.

AGC Comment 24(e) - **EPA's S/S component may increase the toxicity of lead because lead in the subsurface may be converted to lead hydroxides and lead carbonates which have a higher bioavailability than the existing lead compounds at the Site (Barltrop & Meek, 1975).**

EPA Response - The treatment of the lead waste using S/S will not decrease the inherent toxicity of the material. However, since S/S makes the lead less leachable, as measured by the TCLP test, it is less available to the environment. Therefore, the lead toxicity is indirectly reduced because of its decreased availability to leach into the surrounding environment. Additionally, AGC is referring to lead reactions which occur in alkaline environment. As EPA indicated in its response to AGC Comment 23(a), the treatment of metals contaminated soil and waste material using S/S is pH-sensitive. Lead is most soluble at both high and low pH, and as a result is more toxic. Cement addition often raises the pH into the soluble pH range (over 11.0) for lead. Thus, treatment with cement alone, which could mobilize lead, would not be desirable. Consequently, the appropriate stabilizing agent will be identified during the design of the final remedy.

AGC Comment 24 (f) - **S/S will increase the volume of contaminated material by approximately 20–40%. Therefore, S/S will not meet the goal of reducing the volume of lead-contaminated material. Moving material to another location doesn't decrease the volume of contaminated material.**

EPA Response - EPA agrees that S/S will increase the volume of contaminated material (approximately 20% is common), and that moving the material will not decrease the overall volume of contaminated material. EPA did not select treatment to decrease the volume of contaminated material at Marjol, but to permanently safeguard the remedy in the event the cap fails.

AGC Comment 25 - **S/S does not reduce Site risks or reduce the reliance on the cap as the primary means of controlling risk.**

EPA Response - Though the series of events connected with cap failure described by Gould may not occur simultaneously, it is possible that such events could occur over an extended period of time. Cap failure has occurred due to erosion, freeze/thaw cycles, burrowing animals, ground

subsidence, tree roots, and the effects of acid rain. It is very likely that a plant root growing into the cap or a hole created by a burrowing animal could go undetected for some period of time even with best management practices and good Site maintenance practices. The layer of solidified waste material would limit exposure to contaminants beneath the cap until such problems with the cap could be identified and repaired. EPA has included references and articles on both the benefits and the concerns associated with the capping of hazardous waste, including mechanisms of cap failure, in the Administrative Record.

EPA is relying on the cap as the primary means to control exposure to the high lead materials at Marjol. EPA is relying on treatment to prevent exposure and migration of these same high lead materials in the event the cap fails.

AGC Comment 26 - **In-place S/S is an innovative technology and has never been used to treat battery casing material.**

EPA Response - In response to comments received by EPA in the proposed remedy, EPA's final remedy has been modified to eliminate in-place treatment.

AGC Comment 27 - **In-place S/S treatment at Marjol is not best demonstrated available technology (BDAT).**

EPA Response - Refer to EPA's response to AGC Comment 26.

AGC Comment 28 - **Solidification of Site materials is not necessary to improve the physical characteristics of materials.**

AGC Comment 28(a) - **EPA's use of the term clay-like material, or granular particulate as a definition of solidification doesn't apply to the "solid" material at the Marjol Site in its current form. The waste at Marjol is stable, does not biodegrade or create gas nor contains mobile or toxic liquids. The Revere Superfund Site, Tonolli, H. Brown, NGK Metals are other sites with inert soil and debris. In-place S/S provides only marginal benefit, and other controls identified in AGC comment 29 below, could be used to prevent cap erosion. Windblown dust poses less risk than risk of excavation and handling.**

EPA Response - Refer to EPA's response to AGC Comments 26.

AGC Comment 29 - **Better, more cost-effective engineering solutions than S/S are available.**

AGC Comment 29(a) - ***In-situ*** **S/S is a redundant containment measure. The following options are offered:**

(1) If necessary, the top one foot of material beneath the cap could be stabilized to provide and equivalent amount of protection at a fraction of the cast;

(2) The use of erosion protection mats to be placed below the cap to provide erosion protection;

(3) The consolidation of Site soils (staging) to place more contaminated soils deeper and less contaminated soils closer to the surface:

EP A Response - The final remedy has been modified and the use of *in-situ* S/S has been deleted as a component of the final remedy. EPA has replaced *in-situ* S/S of the entire volume of contaminated material beneath the cap with the solidification and stabilization of approximately the top five feet of material beneath the cap. This modification is consistent with AGC's proposed option (1) of this comment. Refer to Section III of this FDRTC entitled "Modification to EPA's Proposed Remedy" for a discussion of this modification to the proposed remedy.

AGC Comment 29(b) - **There is no literature showing a failure of a multi-layer cap. In-place S/S for erosion protection is not necessary, is too costly, and that the major pathway of off-site lead exposure is dust from the battery breaking operation.**

EPA Response - There are references that discuss potential mechanisms of cap failure which are available for review in the Administrative Record. In-place S/S has been eliminated from EPA's final remedy.

AGC Comment 30 - **Misreading of groundwater conditions has resulted in the misapplication of S/S at other sites considered by EPA.**

AGC Comment 30(a) - **The treatment of all materials exceeding 500 parts per million lead is not cost-effective or practicable.**

EPA Response - Refer to Section III of this FDRTC entitled "Modifications to EPA's Proposed Remedy" to review EPA's modification to the proposed treatment component of the remedy. As discussed in EPA's response to AGC Comment 29(a), EPA's final remedy involves the treatment of a portion of the contaminated soil and waste material excavated from the area above the Five Foot coal seam to create a layer of approximately five feet of such material beneath the RCRA cap. In addition, stabilization will be required for any contaminated material transported off-Site for disposal.

AGC Comment 31 - **Treatment of material at the Site is not necessary to comply with any regulation or law.**

EPA Response - Though waste treatment is not a regulatory requirement, the technical benefits of waste treatment at corrective action sites with high volume contaminated soil and waste material, as are present at the Site, is clearly articulated in the ANPR which states that "*a remedy at a certain site might be protective in the short term but not necessarily reliable in the long term (e.g., capping of a highly contaminated area). In this case, the need for long term reliability and the potential for long-term operation and maintenance costs would tend to point toward a remedy*

which presented a more advantageous combination of the balancing criteria (e.g., removal or treatment of hot spots, capping residual contamination, and implementing an institutional control)."

As discussed in EPA's response to AGC Comment 32(a), EPA's selection of waste treatment is based on discussions and meetings with EPA regional and national technical experts, and consultations with the U.S. Army Corps of Engineers. During these discussions and meetings, the technical recommendation developed by EPA, and supported by the U.S. Army Corps of Engineers, is to treat waste material beneath the cap to a depth of approximately five feet in order to provide an additional level of long-term protection against contaminant release in the event of cap erosion.

AGC Comment 32 - Materials at the Site are physically stable without S/S and can be reliably contained.

AGC Comment 32(a) - The RFI determined that the materials at the Site are stable and were resistant to drilling. (Refer to Figure 4-6 of the RFI). If a design engineer determines that additional strength is required, compaction methods are available to increase the strength of these materials. In-place compaction could be considered treatment to improve the physical properties of the waste.

EPA Response - EPA, PADEP, EPA's Office of Research and Development, and the U.S. Army Corps of Engineers have all concurred that a layer of approximately five feet of treated material will prevent exposure to site contaminants in the event of a cap failure as well as increase the strength of the material prior to capping. This is supported by a letter from EPA's Office of Research and Development dated September 19, 2000 and an evaluation from the U.S Army Corps of Engineers dated August 3, 2000. Compaction may improve the strength of the untreated material but would not address the potential exposure to high concentrations of lead in the event the cap fails.

AGC Comment 33 - Capping the materials alone is protective.

EPA Response - EPA's final remedy includes a cap. A layer of solidified and stabilized waste is added as a component of EPA's final remedy in order to prevent exposure to contaminants beneath the cap in the event of erosion or cap failure. In addition, in the CMS Report on page 5-53, Gould states that "although only limited data on the long-term behavior of treated material are available, since the treated material will be isolated from the deleterious effects of acid rain, freeze/thaw and wet/dry cycles, and groundwater, it is believed that the treated material will have a long-term effectiveness of equal to or longer than the Enhanced Low Permeability Cap (hundreds of years) portion of this alternative."

AGC Comment 34 - The possibility of mine subsidence is not a threat to cap integrity or effectiveness.

AGC Comment 34(a) - **EPA cites residual mine subsidence and/or settlement of material beneath the cap as potential failure mechanisms. EPA has not provided an independent engineering analysis to support the structural benefit gained by solidification. A cap with best management practices meets all requirements, therefore, any additional remedial action is excessive.**

EPA Response - EPA has cited residual mine subsidence and settlement of material beneath the cap as potential failure mechanisms. However, EPA has also cited other potential causes of cap failure which include, but are not limited to, major precipitation events, and animals burrowing into the geosynthetic liner. EPA further stated that the solidification of the soil and waste material beneath the cap would eliminate the concern regarding such cap failures and increase the stability of the cap. EPA's determination of the need for a five foot treated layer of material beneath the cap to increase the effectiveness of the remedy is summarized in a letter from EPA's Office of Research and Development dated September 12, 2000. This letter is available for review in the Administrative Record.

AGC Comment 35 - **A cap is a cost-effective means of risk reduction.**

AGC Comment 35(a) - **In order for risk to occur following cap placement several events need to occur including erosion of three foot soil layer, failure of best management practices, failure to address the problem, tear in two geosynthetic layers, exposure of materials beneath the cap, wind erosion carrying lead off-site, and exposure of individuals to contaminated material. Since it is unlikely that all of these events will occur, EPA's in-place S/S component to the proposed remedy is not necessary.**

EPA Response - Though the series of events indicated by Gould may not occur simultaneously, it is possible that such events could occur over an extended period of time. The mechanisms of some documented cap problems which resulted in various types of cap failure include erosion, freeze/thaw cycles, burrowing animals, ground subsidence, tree roots, and effects of acid rain. Some of the less obvious mechanisms such as a plant root growing into the cap or a hole created by a burrowing animal could go undetected for some period of time even with best management practices and good Site maintenance practices. The layer of solidified soil would limit exposure to contaminants beneath the cap until such problems with the cap could be identified and repaired. EPA includes references and articles on both the benefits and the concerns associated with the capping of hazardous waste, including mechanisms of cap failure, in the Administrative Record.

AGC Comment 36 - **Multi-layer caps provide all the engineering redundancy necessary.**

AGC Comment 36(a) - **Additional options are available if engineering analysis indicate additional options are necessary to ensure the protectiveness of the cap, such as grouting of mine voids, adding additional layers to the cap, adding reinforcements such as geogrids, or moving and consolidating materials on site. Gould doesn't see a convincing**

reason to implement any of these options.

EPA Response - EPA agrees that multi-layer caps are effective in preventing exposure, infiltration, and erosion and that is why EPA has selected such a cap for the Marjol remedy. However, EPA believes that for the Marjol Site the additional step of treatment is required to provide long term protection and reliability for the containment remedy. Some of the material to be contained on site exhibit percentage levels of lead. Exposure to this material "as is" would represent an unacceptable risk in the event of cap failure. EPA believes it is reasonable to require a treated layer of waste beneath the cap to provide additional reliability to the remedy. EPA's position is supported by the EPA Office of Research and Development and the U.S. Army Corps of Engineers, as documented in the Administrative Record.

AGC Comment 37 - A containment remedy can be implemented quickly with minimal risk (dust generation, truck traffic).

AGC Comment 37(a) - Gould's remedy is projected to take less than one year to implement once the construction season starts with a one year design phase. EPA's remedy will take four years to implement and additional years in the design phase for pilot studies and investigations. Gould's remedy will be complete on 2002 and EPA's in 2006.

EPA Response - Based on Gould's estimates on implementation time identified in the CMS and comments on the length of time required to implement EPA's proposed remedy, EPA further evaluated the implementation time for the final remedy provided in Section II of this FDRTC. In order to calculate actual implementation time, EPA examined, with the assistance of the U.S. Army Corps of Engineers, the actual time projected to complete remedies at sites similar to Marjol such as the Brown's Battery Site. The remedy for the Brown's Battery Site includes the off-site disposal of approximately 67,000 cubic yards of lead-contaminated soil and battery casing material. Approximately, 40,000 cubic yards which exceeds the TCLP value for lead will be treated on-site via stabilization prior to off-site disposal. Excavation to a depth of 12-15 feet in an area of the Brown's Battery site, and removal of a waste pile is required to implement this remedy. These activities, which are currently underway, have a total projected implementation time of 7 months.

EPA acknowledges that the remedy proposed for the Marjol site in the Statement of Basis would have required a longer implementation period, during which the potential for lead dust migrating from the site is a concern.

EPA's final remedy for the Marjol Site includes treatment using a stabilization technology similar to the one used at Brown's Battery. EPA estimates that its final remedy will add only one additional construction season to Gould's recommended remedy based on the construction implementation time at the Browns' Battery Site and other similar sites. A description of the work currently underway at the Brown's Battery Site is contained in the "Amendment to the Record of Decision Operable Units 1 and 2 Brown's Battery Breaking Site" dated May 31, 2000. A copy of this document is available for review in the Marjol Administrative Record.

AGC Comment 37(b) - **EPA's remedy involves four times the truck traffic of Gould's remedy. The additional 14,000 truck trips due to the off-site disposal component of EPA's remedy increases the short-term and long-term risk.**

EPA Response - EPA's final remedy may require a greater number of trucks than Gould's recommended remedy. EPA has determined that the truck traffic needed to implement the final remedy is necessary to ensure the best possible cap and containment system design on which the long-term protectiveness of the remedy depends.

AGC Comment 38 - **Capping in consistent with EPA remedial decisions on other sites.**

AGC Comment 38(a) - **Information from the EPA and PADEP support the fact that capping is typically used as a remedy for Sites similar to Marjol.**

EPA Response - EPA did consider Gould's recommended alternative in the remedy selection process and Gould's recommended alternative is a major component of EPA's selected remedy. However, EPA's remedy also includes a treated layer (approximately 5 feet) to ensure the protectiveness of the remedy in the event of a cap failure.

AGC Comment 38(b) - **The EPA publication Presumptive Remedy for Metal-in -Soil Sites (1999) indicates that containment by capping is the technology used most often for Sites with greater than 200,000 cubic yards of contaminated material (USEPA, 1999d, p.A-7).**

EPA Response - AGC's statement is incorrect. EPA is aware that the Presumptive Remedy Guidance identifies capping as one of the technologies used at sites with greater than 200,000 cubic yards of contamination. However, of the fifty-one sites evaluated for the presumptive remedy guidance, only eight sites had soil contaminant volumes which exceeded 200,000 cubic yards. Of these eight sites, containment was selected at four sites, immobilization (via solidification/stabilization) was selected at two sites, recovery was selected at one site, and off-site disposal was selected at one site. Therefore, the number of containment remedies selected for these sites is equal to, not greater than, the number of non-containment remedies selected for these sites.

The Presumptive Remedy Guidance also indicates on page 2, that "In many cases, EPA expects to use a combination of methods, as appropriate, to achieve protection of human health and the environment. EPA indicates in the NCP that it expects to use treatment to address the principal threats posed by the Site, wherever practicable, and engineering controls, such as containment, for waste that poses a relatively low long-term threat or where treatment is impracticable. Therefore, site managers can expect to use a combination of presumptive technologies identified in this directive to address metal-in-soil sites, if appropriate (see section 300.430 of the NCP)." EPA's selected remedy includes such a combination of technologies including partial immobilization (with the treatment of some contaminated material beneath the cap), and containment through

capping to address the principal threat waste at the Site. Consequently, EPA's selection of the final remedy for the Site is consistent with the Presumptive Remedy Guidance.

AGC Comment 38(c) - **EPA supports containment remedies. Jack's Creek, the Bypass 601 Sites, and the H.Brown Site all have containment remedies.**

EPA Response - EPA is familiar with all of the Sites discussed in this comment. EPA's final remedy at Marjol is largely a containment remedy. EPA's remedy involves containment with some treatment. As indicated in this AGC's Comment 38(b), Jack's Creek also involved containment with some treatment. Therefore, EPA's remedy is consistent with remedies selected at similar Sites.

AGC Comment 39 - **EPA did not properly apply the five balancing criteria.**

AGC Comment 39(a) - **Remedies that meet the four threshold criteria, identified in the CMS Report and the Statement of Basis, are evaluated using the five balancing criteria to determine the appropriate remedy. Both EPA and Gould's remedies meet the threshold criteria but an incorrect application of the five balancing criteria resulted in EPA's selection of an incorrect remedy. Figures 1 and 2 compare EPA's proposed remedy with Gould's preferred remedy. AGC evaluated the long-term reliability and effectiveness of these two remedies. Containment is a part of both EPA's proposed and Gould's recommended remedy and containment is reliable and effective but relies on long-term maintenance for continued protectiveness. Data supporting long-term effectiveness of solidification and stabilization, as proposed in EPA's remedy, are limited. Therefore, the solidification and stabilization component of the remedy is unproven and undemonstrated in acidic areas like Marjol and for battery casing material. In-place S/S may be misapplied and may mobilize lead. Both remedies are reliable because of the cap.**

EPA Response - EPA's final remedy for the Site (capping supplemented with treatment) is consistent with EPA policy and guidance for the selection of remedies which offer long-term protectiveness at hazardous waste sites.

With respect to the long-term reliability and effectiveness of EPA's proposed remedy and Gould's recommended remedy, AGC's analysis of long-term reliability based on infiltration rates and potential lead exposure is partially complete. EPA's evaluation of this criterion is also based on potential cap failures that could occur over the life of the cap. Gould has indicated in discussions with EPA, PADEP, the local community, and in the CMS Report, that one of the land use scenarios being considered for the Site is a recreational park following the cleanup of the Site. Other suggested uses include a golf course, and a commercial facility. EPA determined that to ensure the long-term protection of human health and the environment, under any such land use scenario, that the treatment of contaminated material beneath the cap (to a depth of approximately five feet) would be sufficient to prevent direct exposure to on-Site contaminants in the event of cap failure. This layer of treated waste will be incorporated into the final cap design as part of the implementation of the corrective measure. EPA's Office of Research ad Development (ORD),

and the U.S. Army Corps of Engineers, assisted the EPA Region III technical staff in the development of this component of the remedy. ORD's recommendation for including approximately five feet of treated material beneath the cap is provided in the Administrative Record.

AGC's statement that S/S is unproven in acidic areas like Marjol where battery casing material is present is an incorrect assessment. Sites including Sapp Battery, and Schuylkill Metals represent lead battery sites in acidic environments where S/S treatment is being successfully implemented. Information on the remedial activities underway at these Sites has been added to the Administrative Record.

As discussed in EPA's response to AGC Comment 23(a), pH control and proper application of S/S reagents is necessary to prevent lead mobility.

In summary, EPA's remedy provides for greater long-term protection. EPA's remedy includes a layer of solidified and stabilized material beneath the cap to prevent releases in the event of catastrophic events such as severe weather conditions, flooding, hurricanes, earthquakes, burrowing animals, or plant roots. Therefore, even under a worse-case scenario where the cap eroded or ruptured, EPA's remedy would not result in direct exposure to contaminants beneath the cap. Since the in-place S/S component of the remedy has been omitted, this part of the comment is no longer relevant.

AGC Comment 39(b) - Gould's recommended remedy does not reduce the toxicity or volume of the waste but it decreases its mobility. EPA's proposed remedy may increase the mobility of lead due to changes in pH, that treatment by S/S causes an increase in waste volume, and off-site disposal does reduce the volume of waste but relocates it. Neither remedy meets or exceeds this criterion and that EPA's remedy is at a disadvantage under this criterion.

EPA Response - Gould is correct that the toxicity of lead is not reduced under Gould's recommended remedy or EPA's proposed remedy. Gould is also correct that S/S results in a volume increase (approximately 20%) due to the bulking of S/S materials and that the overall volume of lead is not reduced if it is transported off-Site to another disposal location. EPA is aware that treatment of metals contaminated soil and waste material using S/S is pH-sensitive. As EPA indicated in its response to AGC's comment 39(b) above, the use of cement alone to treat lead contaminated materials, soils and battery casings, may not reduce the mobility of lead as measured in leaching tests performed on ground samples, such as the TCLP or SPLP (SW846, Methods 1311 and 1312). These methods are provided in the Administrative Record. Lead is most soluble at both high and low pH. Cement addition often raises the pH into the soluble pH range (over 11.0) for lead. Thus, treatment with cement, which could mobilize lead, would not be desirable. See *Gould Comment 10* for additional discussion of the treatment issue.

EPA does believe that treatment as required in the final remedy does decrease mobility in the sense that future exposure to lead contamination will not occur in the event the cap fails.

AGC Comment 39(c) - **Gould's recommended remedy is superior to EPA's remedy in terms of short-term risk because less waste handling is involved, less truck traffic, less risk to on-site workers, and a shorter implementation time.**

EPA Response - It is not appropriate to focus solely on short-term risk in implementing a permanent remedy at this Site. The ANPR specifically deals with balancing short-term risk against long-term permanence by stating that "a remedy at a certain site might be protective in the short-term but not necessarily reliable in the long-term (e.g., capping of a highly contaminated area). In this case, the need for long-term reliability and the potential for long-term operation and maintenance cost would point towards a remedy which presented a more advantageous combination of the balancing criteria (e.g., removal or treatment of hot spots, capping residual contamination, and implementing an institutional control)." EPA's final remedy modifies the cap-only alternative by adding measures to protect the long-term permanence of the remedy. Using Gould's analysis of one criterion without evaluating and balancing all of the remedy selection criteria, the argument can be made, and is supported in Gould's CMS Report, that total removal provides the greatest degree of long-term effectiveness because contaminants are permanently eliminated from the Site. This alternative was not selected by EPA because long-term effectiveness was balanced against the other criteria including short-term implementation risk and cost. EPA's final remedy provides for greater long-term reliability and effectiveness than Gould's recommended remedy by (1) removing contaminated soil and waste material from the area of the Site subject to pothole subsidence and mine fire potential; and (2) preventing exposure to Site contaminants beneath the cap in the event of cap failure.

Based on AGC's estimates Gould's recommended remedy would generate 0.92 ug/m^3 of dust and approximately 1.14 ug/m^3 of dust would be generated under EPA's remedy. However, even Gould's remedy, and in all protective remedies evaluated in the CMS, the generation of some dust is inevitable which is why the dust generation must be controlled under any remedial alternative. The increase in dust generated under EPA's remedy is justified in order to increase the long-term permanence of the remedy.

AGC Comment 39(d) - **Containment through capping is easy to implement. EPA's remedy would take 3-4 times longer to implement and that in-place S/S is unproven and undemonstrated. Therefore, Gould's proposed remedy is superior to EPA's proposed remedy.**

EPA Response - EPA estimates that its final remedy may require one additional construction season (year) more than Gould's recommended remedy. Implementation time is only one of many criteria considered in EPA's remedy selection process. EPA believes that the increased implementation time increases the protectiveness of the final remedy.

AGC Comment 39(e) - **Gould's remedy is superior with respect to cost because it is a less expensive remedy.**

EPA Response - Gould is correct that their recommended remedy is less costly than

EPA's final remedy. However, EPA believes the final remedy is superior to Gould recommendation when compared to the other four balancing criteria for remedy selection including long-term reliability and effectiveness; reduction of toxicity, mobility, and volume of waste; short-term effectiveness; and implementability. EPA has balanced the cost of its selected remedy against other feasible alternatives including, but not limited to, Gould's recommended Enhanced Low Permeability cap, and the total removal alternatives. EPA has determined that Gould's recommended cap remedy would be protective and permanent if modified to include the following: (1) designing the cap to comply, at a minimum, with the PADEP cap requirements submitted to Gould in a letter from EPA dated November 20, 1997; (2) the addition of a protective layer of approximately five feet of treated material beneath the cap; (3) the removal of contaminated material from areas of the Site with mined-out coal seams; and (4) the conditional off-Site disposal of up to an estimated 88,000 cubic yards of contaminated material which may not be placed beneath the cap based on EPA/PADEP's cap design specifications. Therefore, EPA determined that its selected remedy is the least costly remedy which also meets the other remedy selection criteria. EPA also addresses the issue of cost and cost-effectiveness in its responses to Gould Comment 9(f) and Gould Comment 17(a) above.

AGC Comment 39(f) - **EPA's remedy only offers additional erosion protection and that it isn't worth the following: (1) the $33 million cost increase, (2) three extra years of implementation time; (3) 14,000 extra trucks; (4) 1600 extra pounds of dust; (5) the 60,000-120,000 cubic yard increase in volume of contaminated material.**

EPA Response - The treatment component of EPA's remedy provides additional erosion protection for the cap. As stated in the letter dated March 15, 2000 from EPA's Office of Research and Development to EPA Region III, which provides technical support for the S/S of metals contaminated soil, "S/S treated material, using cement and creating a monolith, produces a treated product that is less easily eroded by either wind or water than untreated material. A final site cap would provide added protection . However, any failure in the final Site cap would immediately expose the untreated material to erosion. S/S treated material would provide resistence to such erosion until the cap could be repaired." Therefore, based on this recommendation from ORD, EPA has determined that the treated layer beneath the cap will increase the overall protectiveness of the remedy. This component adds $4.4 million to the final remedy instead of an additional $16 million in the proposed remedy (using EPA estimates provided in Table 6) and one additional year (construction seasons) to implement the final remedy instead of three to four additional years required to implement the proposed remedy. EPA's remedy also increases the long-term permanence of the remedy by preventing cap erosion or cap failure in the event of mine subsidence or mine fire.

AGC Comment 40 - **EPA Mistakenly Did Not Consider Cost as a Balancing Criterion.**

AGC Comment 40(a) - **EPA did not apply cost as a balancing criteria as it is required to in EPA's Corrective Action Plan (USEPA, 1994b). Cost is an appropriate decision-making criterion when several alternatives offer equal protection of human health and the environment but vary significantly in cost. The Guidance on RCRA Corrective**

Action Decision Documents: the Statement of Basis Final Decision and Response to Comments (1991), and the proposed Subpart S rulemaking (1996a), indicate that cost is one of the five balancing criteria used in the selection of corrective action alternatives that meet threshold criteria.

EPA Response - Refer to EPA's response to AGC Comment 39(e) above.

AGC Comment 41 - **The Administrative Record is not thorough. The Statement of Basis does not reflect the findings of the Administrative Record.**

AGC Comment 41 (a) - **Gould's remedy provides the best balance of the five balancing criteria.**

EPA Response - EPA's final decision is based on the Administrative Record. EPA has determined that its final remedy provides the best balance of the five balancing criteria.

AGC Comment 41 (b) - **The Statement of Basis states that EPA's remedy does not rely as heavily on cap maintenance as alternatives which do not include waste treatment. However, the long-term maintenance is the same for both remedies (EPA's and Gould's).**

EPA Response - EPA agrees that long-term maintenance is required under its final remedy; however, EPA's remedy would prevent exposure to human health and the environment from Site contaminants beneath the cap until the cap could be repaired in the event of a cap failure.

AGC Comment 41(c) - **EPA states that direct exposure to Site contaminants would be minimized by the proposed S/S due to erosion beneath three feet of soil and several geosynthetic layers. S/S does not reduce the lead concentration nor toxicity of the lead. Since the toxicity isn't reduced and lead concentrations aren't reduced, the risk of direct contact is not reduced in the event of a cap failure.**

EPA Response - EPA did not state that S/S would reduce lead toxicity but rather that lead mobility would be reduced in the event of a cap failure if contaminated material beneath the cap were treated using solidification and stabilization.

AGC Comment 41 (d) - **As identified in EPA's remedy, removal of material from the Five-Foot and Eight-Foot coal seams completely eliminates the potential for pothole subsidence. However, the conclusion in EPA's Statement of Basis that capping the materials in or over these seams does not eliminate this potential risk simply because the contaminated materials are still there is incorrect. Appendix B of the CMS Report analyzes the impacts of pothole subsidence and mine fires on the materials in or above these seams and concludes that the potential for pothole subsidence is eliminated by capping. With respect to mine fires, the RFI and CMS indicate that the potential is remote and can be adequately addressed by a monitoring and contingency plan. EPA does not offer any**

analyses or data to support excavation and off site disposal as the only option that addresses these risks.

EPA Response - Appendix B of the CMS does not state that capping eliminates the potential for pothole subsidence. Rather, Section 3.2.1 of Appendix B states that "the reduction in infiltration achieved by a cap significantly reduces the potential for pothole development." EPA's assertion in the Statement of Basis that Alternatives D1, E, F1, F2, G, and H do not eliminate this risk is accurate and supported by Appendix B of the CMS (which is contained in the Administrative Record). EPA's proposed remedy, as stated by AGC in their comment, completely eliminates the potential for pothole subsidence. It eliminates the potential for a mine fire in either the Five or Eight Foot coal seams from ever impacting the final cap. No mine fire monitoring or contingency plans are necessary under EPA's final remedy.

EPA has never stated that other options do not address risks from pothole subsidence or mine fire. In the same section of the Statement of Basis that AGC cited (p. 34) EPA indicated that CMS Alternative D2 also completely eliminates these risks. Other options presented by Gould in the CMS (Alternatives I, J, K, and L) also completely eliminate these risks by removing all waste from the Site. Furthermore, EPA pointed out that Alternative F2 also increases the long-term reliability of the remedy by stabilizing the mine voids to minimize the impact of any future pothole subsidence. The Statement of Basis states that, for remedies where waste will remain at the Site, EPA's proposed remedy and Alternative D2 provide a greater degree of long-term protection against potential pothole mine subsidence or mine fires. EPA's analysis is based on and supported by the information Gould provided in the CMS (see, for example, page 5-27 of the revised CMS which states that Alternative D2 eliminates the potential for pothole mine subsidence). Capping the waste reduces the risk for pothole subsidence, but moving the waste material off the Five and Eight Foot seams eliminates this risk. Moving the waste also eliminates the mine fire risk, and the final cap is smaller and less expensive. EPA selected its proposed remedy over Alternative D2 for other reasons, as articulated in the Statement of Basis, and is supported by the Administrative Record. EPA's final remedy which retains removal of the material from the Five Foot and Eight Foot Coal Seams achieves the best balance among the criteria for remedy selection. Achieving a balance does not mean that a particular remedy is the "best" under any single criterion, but maximizes the benefits under all criteria.

AGC Comment 41(e) - **EPA does not offer any analyses to support its conclusion that the risks which would potentially be incurred by pothole subsidence, if it occurred beneath the capped area, are greater than those which will definitely be incurred by excavating at least 86,000 cubic yards of material, treating them and transporting them to an off-site disposal location. Caps can withstand the strain of subsidence, therefore, pothole subsidence does not increase site risks, excavating material and transporting them off-site does.**

EPA Response - There are several long-term benefits from excavating material above the Five and Eight Foot coal seams. First, such action will increases the long-term reliability of the cap by not leaving waste in the area of pothole subsidence potential. Second, the potential for

mine fire in either the Five or Eight Foot coal seams to impact waste material remaining on-Site will be eliminated. Finally, the cap portion of the remedy, which reduces the size of the cap, costs less than the seventeen acre cap recommended by Gould in their CMS Report. All of these benefits are fully supported by information provided in the CMS Report.

EPA acknowledged the short-term risk of excavation in the Statement of Basis (p. 42), but proposes to manage this risk by requiring dust control measures, real-time dust monitoring, as well as chemical specific monitoring to ensure that Site contaminants are not released to the surrounding community during the implementation of the remedy. During the excavation and off-Site disposal of contaminated soil from the on-Site drainage swale, Gould and its contractors have demonstrated their ability to safely excavate, manage, and transport waste from the Site without causing releases to the surrounding community. EPA is confident that Gould and its contractors will be able to perform this activity in the future in a safe and protective manner if off-site removal should prove necessary. EPA notes that, even under Gould's proposed remedy, 70,000 cubic yards of soil would be consolidated, and that the CMS proposes dust control measures to manage this short-term risk (CMS p. 5-25).

EPA did not directly compare the risk of pothole subsidence to the risk of excavation in the Statement of Basis. Nevertheless, the risks of pothole subsidence and of mine fire were evaluated under the Long-Term Reliability and Effectiveness remedy decision criteria, whereas the risk of excavation was evaluated under the Short-Term Effectiveness remedy decision criterion. EPA evaluated all remedies using the four general standards and five remedy selection decision factors. EPA's proposed remedy achieves the best balance among the criteria for remedy selection. Achieving a balance does not mean that a particular remedy is the "best" under any single criterion, but maximizes the benefits under all criteria. EPA concluded that the long-term benefits of excavating material outweighed the short-term risks, because the short-term risks can be managed effectively. Once construction is complete, the short-term risks from excavating waste are eliminated. Under Gould's remedy, the long-term risks of pothole subsidence and mine fire (and the need for fire monitoring and contingency plans) continue forever. Under EPA's proposed remedy, no waste remains in areas subject to pothole subsidence or mine fire from the Five and Eight Foot coal seams.

In the final remedy, EPA has limited off-site transportation by requiring that only excess material be removed from the site. EPA believes that the off-site transport of lead contaminated material may be necessary to ensure the integrity of the containment design and construction.

AGC Comment 41(f) - In Section XV.A.2 of the Statement of Basis, EPA states that the performance standard for contaminated material stabilized and solidified at the site will be a TCLP result less than 5 mg/l (USEPA, 1999e, p.35). EPA has indicated verbally that this would not be the performance standard for materials which remain at the site. However, no amendment to the Statement of Basis has been made.

EPA Response - EPA provided clarification of the use of the TCLP standard for lead as the treatment performance standard for *in-situ* solidification and stabilization in a letter from EPA

to AGC and Gannett Fleming dated January 7, 2000. In this letter, EPA stated that other standards such as the synthetic precipitation leaching procedure, unconfined compressive strength, and hydraulic conductivity are commonly used as performance standards for solidification and stabilization of metals to be disposed of on Site. The final remedy identified within this Final Decision and Response to Comments uses compressive strength and hydraulic conductivity as measurements of the performance of the on Site treatment component of the final remedy. This letter has been added to the updated Administrative Record for the Site and was also forwarded to all parties interested in the cleanup of the Marjol Site.

AGC Comment 41(g) - **EPA cites the report entitled "The Stabilization/Solidification Bench-Scale Treatability Study Report" to support its conclusion that treatability studies demonstrate successful compliance with the TCLP performance standard. The referenced report does not include a treatability study for battery casing material, which makes up the majority of the material to be treated at the Site.**

EPA Response - The design of the remedy will include pilot testing during the design of the final remedy in order to determine the most effective S/S treatment technique. However, other sites such as Sapp Battery have successfully treated BCM prior to capping using S/S. Based on experience at this Site, the best approach is to use cement and a phosphate reagent in order to achieve improvements in both physical and chemical properties. Treatment using maectite, which is a Sevenson proprietary phosphate formula, can lower solubility substantially. However, unless cement is also used, there would not be any changes to strength or permeability. EPA's Office of Research and Development is available to provide technical assistance for the treatment component of the final remedy.

AGC Comment 41(h) - **EPA does not provide information in the Administrative Record to support the selection of in-place S/S.**

EPA Response - Refer to EPA's response to AGC Comments 26.

AGC Comment 41(i) - **EPA does not offer any alternative cost analysis in the Administrative Record nor does it cite any EPA policy, guidance or regulation to justify its total disregard for the criterion of cost and cost-effectiveness.**

EPA Response - EPA did not disregard the criterion of cost. EPA included a cost estimate for its remedy, which was within the range of costs for all the remedies evaluated by Gould in the CMS Report. EPA did consider cost in the selection of the proposed remedy and selected off-Site disposal of contaminated material with trucks instead of the more costly railcar option. Additionally, based on Gould's cost estimates in the CMS Report, in-place solidification and stabilization was less costly than *ex-situ* solidification and stabilization. EPA evaluated cost in the selection of the final remedy for the Site. EPA estimates that the total cost of the final remedy is between $14 million and $24 million. The final cost is obviously dependent on the volume of lead contaminated materials which must be removed off-site. A summary of the cost calculation is provided in Table 6 of this Final Decision and Response to Comments. All

calculation is provided in Table 6 of this Final Decision and Response to Comments. All supporting documentation used to develop this cost estimate is provided in the Administrative Record.

AGC Comment 42 - **Remedies selected by EPA often need to be changed/modified to be completed.**

AGC Comment 42(a) - **EPA selected an innovative remedy at Gould's Site in Portland Oregon. Problems experienced during full-scale start-up cost Gould $25 million. Processing problems, cost overruns, and schedule delays can increase cost. EPA has changed 15 remedy decisions. Gould doesn't want to repeat this scenario at Marjol, and they will implement the "proper" remedy which reduces risk and is cost-effective.**

EPA Response - EPA did not rely on the Gould site in Portland, Oregon as the basis for any decisions embodied in either the Statement of Basis or this Final Decision. EPA has modified the treatment component of the Marjol remedy to eliminate "innovative" technology and to rely on proven treatment technologies. Thus, EPA does not expect that the Marjol remedy implementation will encounter problems similar to Gould's Portland site.

VIII. DECLARATION

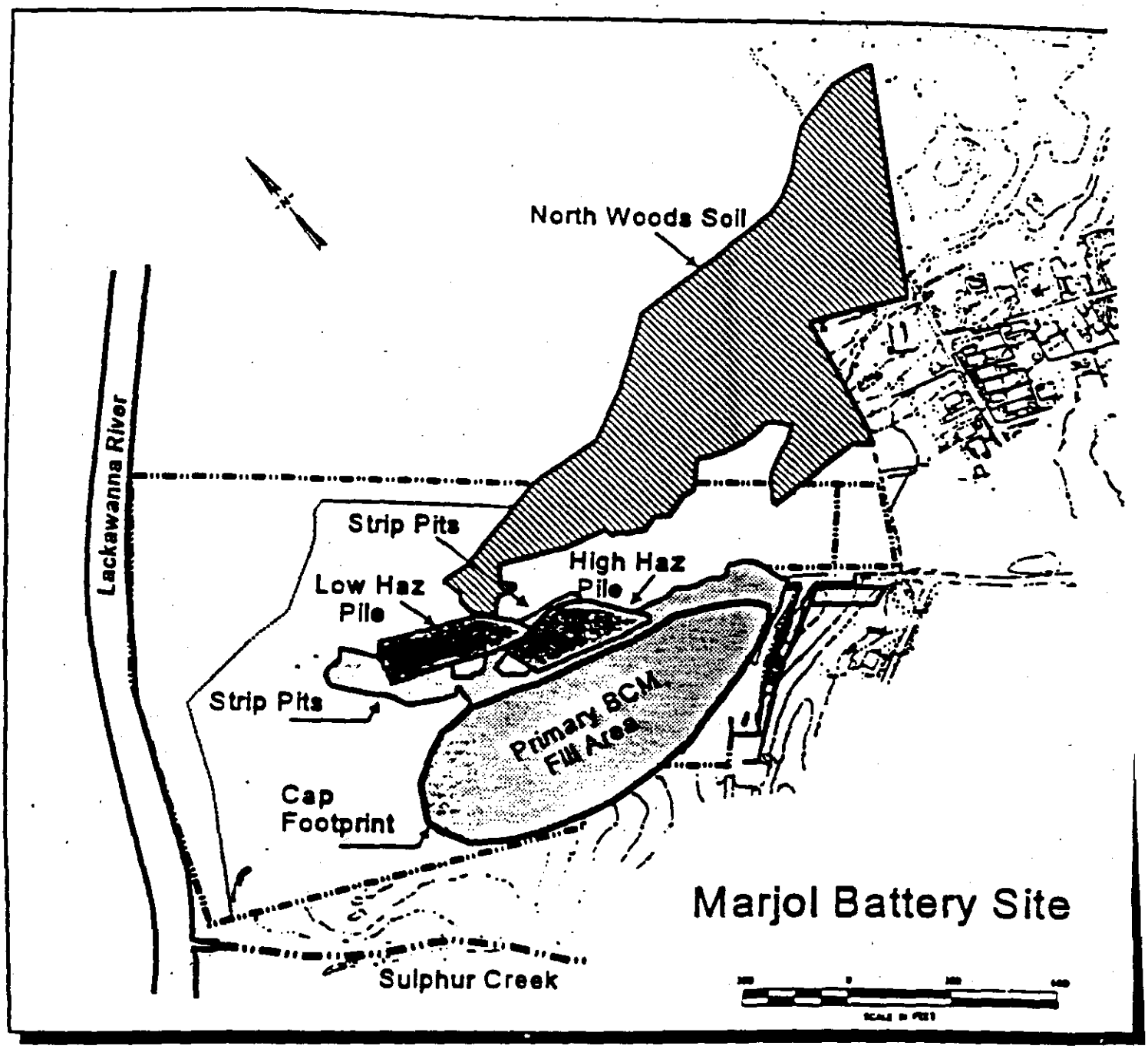
Based on the Administrative Record compiled for the Marjol Battery Site, I have determined that the selected Corrective Measure as set forth in the Statement of Basis, which has been modified and clarified by this Final Decision is appropriate and will be protective of human health and the environment.

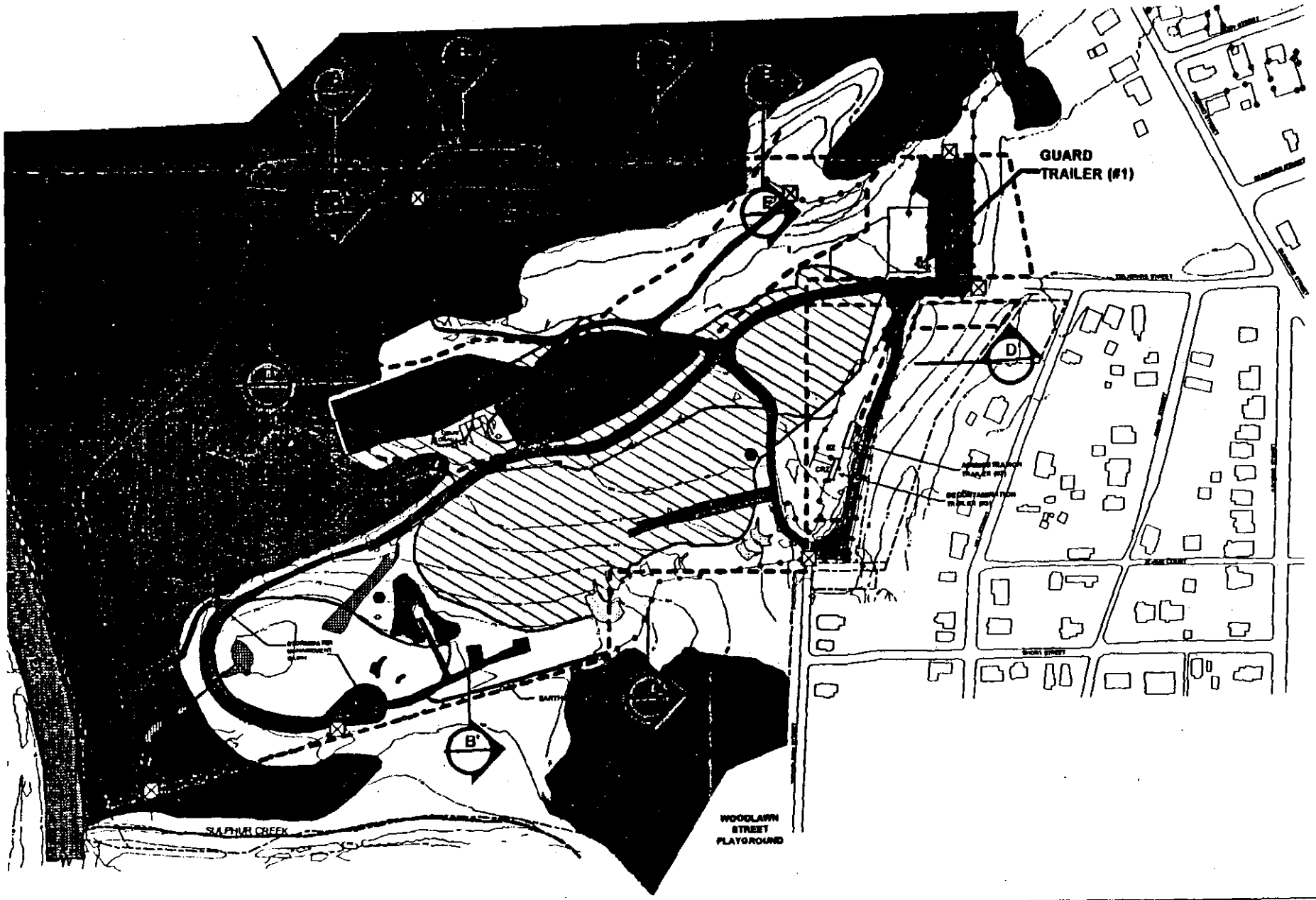
Date: December 7 2000

Bradley M. Campbell
Regional Administrator
U.S. Environmental Protection Agency
Region III

FIGURES

Figure 1


North Woods Soil
Lackawanna River
Strip Pits
High Haz Pile
Low Haz Pile
Strip Pits
Primary BCM Fill Area
Cap Footprint
Sulphur Creek
Marjol Battery Site



SOU

Base

Advanced Geo

Cross-Sectic

GAI Consult

5 Ft. Coal Se

Advanced Geo

8 Ft. Coal Sea

Advanced Geo

N

Approximate
1 Inch = 21

LUME AIR SAMPLER	PERSONNEL/VEHICLE GATE	18-INCH DIAMETER D I P	PROPERTY BOUNDARIES OF LAND OWNED BY GOULD ELECTRONICS INC
OUR LINE	SZ SUPPORT ZONE	STORM WATER CATCH BASIN	5 FT COAL SEAM
TY POLE	CRZ CONTAMINATION REDUCTION ZONE	SITE TRAILER	8 FT COAL SEAM
E LINE	MARJOL BATTERY SITE PROPERY BOUNDARY	BATTERY CASING FILL AREA	CROSS SECTION LOCATIONS
LINE	EXCLUSION ZONE	EARTHEN BERM	
OMINANTELY DED AREA	CHECK DAM	RIP RAP MATERIAL	

MARJOL BATTERY SITE

THROOP BOROUGH, LACKAWANNA COUNTY, PENNSYLVANIA

WINTER 1997
CURRENT CONDITIONS PLAN
Figure 2

TechLaw, Inc.

EPA REGION 3

TABLES

TABLE 1 - BREAKDOWN OF VOLUME OF CONTAMINANTS AT THE MARJOL BATTERY SITE

Material		Acres	Volume (cubic yards)
Primary Fill Area			
BCM in landfill		7.7	159,000
Secondary Fill Areas			
BCM in 5' western strip pit		0.8	13,000
BCM in 8' western strip pit		0.5	4,000
Mine Spoils			
5' strip pit & 8' pit strip			35,000
intermediary fill layer in BCM			7,000
surface mine spoil fill			16,000
Beneath parking lot (2'-8' depth)			
east & west of primary BCM (2' depth)			
Residential Topsoil (1'-2' depth)		8.2	25,000
High Hazard Soil Stockpile (>3500mg/kg)		49,300sq.ft	22,000
Low Hazard Soil Stockpile		44,500sq.ft	12,000
Affected Soil	North Woods soil (>500mg/kg)		7,200
	Other, on-site soils (>500mg/kg)		71,800
Total			372,000

** Mine spoils consist of soil and rock excavated from the Site during former coal mining operations.

TABLE 2 - LEAD CONCENTRATIONS IN WASTE MATERIAL AT THE MARJOL BATTERY SITE

Material	Lead Concentration (Minimum)	Lead Concentration (Maximum)	Lead Concentration (Average)
Residential Topsoil and "Low" Hazardous Waste Pile	120 mg/kg	20,000 mg/kg	1,300 mg/kg
Battery Casing Material	7 mg/kg	290,000 mg/kg	52,000 mg/kg
"High" Hazardous Waste Pile	1200 mg/kg	130,000 mg/kg	7,500 mg/kg
Mine Spoils	22 mg/kg	250,000 mg/kg	16,000 mg/kg

TABLE 3 - SUMMARY OF PCBs (AROCLOR 1254) AND PAH DATA FROM THE RCRA FACILITY INVESTIGATION FOR THE MARJOL BATTERY SITE

SUMMARY OF RFI DATA FOR PCBs (AROCLOR 1254) and PAHs

Compound	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Average Concentration (mg/kg)
PCB - Aroclor 1254	0.5 ND*	355	7.4
Benzo(a)anthracene	0.05 ND*	75	4.9
Benzo(a)pyrene	0.05 ND*	17	2.8
Benzo(b+k)fluoroanthene	0.05 ND*	52	4.9
Dibenzo(a,h)anthracene	0.1 ND*	25	5.2
Indeno(1,2,3-cd)pyrene	0.1 ND*	25	25

*ND- Non-Detectable Concentration

TABLE 4 - EXPLANATION OF REMEDY SELECTION CRITERIA

Four General Standards for Corrective Measures:	**Explanation of Criteria:**
Overall Protection of Human Health and the Environment	Measures how alternatives provide human health and environmental protection.
Attain Media Cleanup Standards	Measures ability of alternative to achieve media cleanup standards.
Control the Source of Releases	Measures how alternative reduces or eliminates further releases to the maximum extent possible.
Comply with Standards for Management of Wastes	Measures how alternatives assure that management of wastes during corrective measures is conducted in a protective manner.
Five Selection Decision Factors:	
Long-Term Reliability and Effectiveness	Measures magnitude of residual risk and adequacy and reliability of controls.
Reduction of Toxicity, Mobility, or Volume of Wastes	Evaluates: - treatment process used and materials treated; - amount of hazardous materials destroyed or treated; - degree of expected reductions in toxicity, mobility, or volume; and - degree to which treatment is irreversible type and quantity of residuals remaining after treatment.
Short-Term Effectiveness	Evaluates: - protection of community during remedial actions; - protection of workers during remedial actions; - environmental impact; time until remedial action objectives are achieved;

TABLE 4 - EXPLANATION OF REMEDY SELECTION CRITERIA (continued)

Implementability	Evaluates: - ability to construct and operate the technology; - reliability of the technology; - ease of undertaking additional corrective measure if necessary; - ability to monitor effectiveness of remedy; - coordination with other agencies; - availability of offsite treatment, storage and disposal services and specialties; and -availability of prospective technologies.
Cost	Evaluates Capital costs, Operation and Maintenance Costs, and Present Worth Costs.

TABLE 5 - COMPARISON OF REMEDY SELECTION CRITERIA

Nine Remedy Selection Criteria	**EPA's Selected Remedy (Cap, Waste Treatment, and Off-Site Disposal) (1)**	**Gould's Recommended Remedy (Enhanced Low Permeability Cap)**	**Community's Preferred Remedy (Total Removal)**
Overall Protection of Human Health and the Environment	Achieved by preventing exposure to lead, PAHs, PCBs above cleanup levels through the use of a cap and waste treatment.	Achieved by preventing exposure to lead, PAHs, PCBs above cleanup levels through use of a cap.	Achieved by preventing exposure to lead, PAHs, PCBs above cleanup levels through total removal of all contaminated soil.
Attain Media Cleanup Standards	Eliminates exposure to soil with lead greater than 500 mg/kg through capping and partial treatment of waste; Eliminates exposure to soil with PAHs and PCBs above residential cleanup levels (through either removal or placement beneath cap depending on location).	Eliminates exposure to soil with lead greater than 500 mg/kg through capping; Eliminates exposure to soil with PAHs and PCBs (levels to be determined during design) through capping.	Eliminates exposure to soil with lead greater than 500 mg/kg through removal; Eliminates exposure to soil with PAHs and PCBs (levels to be determined during design) through removal.
Control the Source of Releases	Achieved through cap and waste treatment.	Achieved through cap.	Achieved through removal.

TABLE 5 - COMPARISON OF REMEDY SELECTION CRITERIA (continued)

Nine Remedy Selection Criteria	**EPA's Selected Remedy (Cap, Waste Treatment, and Off-Site Disposal) (1)**	**Gould's Recommended Remedy (Enhanced Low Permeability Cap)**	**Community's Preferred Remedy (Total Removal)**
Comply with Standards for Management of Waste	Meets federal and state standards for cap; Meets federal, state, and local standards for waste treatment and off-Site disposal; Uses BMPs(2), and other measures, to control dust; Complies with health and safety procedures.	Meets federal and state standards for cap; Uses BMPs, and other measures, to control dust; Complies with health and safety procedures.	Meets federal and state standards for cap; Meets federal, state, and local standards for off-Site disposal; Uses BMPs, and other measures, to control dust; Complies with health and safety procedures.
Long-Term Reliability and Effectiveness	Eliminates potential future risk to remedy from cap failure due to pothole subsidence, mine fire by removing waste from Five and Eight Foot coal seams and added treated layer beneath cap.	Eliminates potential future risk to remedy from cap failure due to pothole subsidence, mine fire by capping and operation and maintenance.	Eliminates potential future risk by total removal of all contaminated material.

TABLE 5 - COMPARISON OF REMEDY SELECTION CRITERIA (continued)

Reduction of Toxicity, Mobility, or Volume of Wastes	Reduces mobility of waste by preventing infiltration and preventing direct contact exposure by capping waste; further reduces mobility by immobilizing waste layer beneath cap using solidification and stabilization; mobility of waste disposed off-Site (which may not fit under cap) is reduced via treatment and then placement into a regulated landfill.	Reduces mobility of waste by preventing infiltration and preventing direct contact exposure by capping waste.	Total reduction of toxicity, mobility, and volume through removal of all contaminated material from the Site.
Short-Term Effectiveness	Protection of surrounding community and on-Site workers with BMPs and potential for use of additional dust control measures; improves maintenance on Stormwater Management Basin to protect Lackawanna River during construction activities.	Protection of surrounding community and on-Site workers with BMPs, and potential for use of additional dust control measures.	Protection of surrounding community and on-Site workers with BMPs, and potential for use of additional dust control measures.

TABLE 5 - COMPARISON OF REMEDY SELECTION CRITERIA (continued)

Implementability	Capping and ex-situ treatment are constructable and reliable technologies; additional corrective measures (beyond Gould's recommended remedy) could be undertaken if necessary by excavating the five foot treated layer; Involves approximately 2 years to implement.	Capping is a constructable and reliable technology; additional corrective measures could be undertaken if necessary without extensive work; Involves approximately 7 months to implement.	Removal can be implemented at the Site. However, this alternative has the greatest potential to have an accidental release of contaminants into the surrounding community because it involves the greatest volume of soil excavation and off-site transport, and approximately 3-4 years to implement.
Cost	$15-24 million	$7 million	$86 million

(1) Established using a hybrid of remedies identified in the CMS Report using EPA and PADEP regulations, technical guidance, and technical expertise.
(2) Best Management Practices
(3) EPA's remedy is based on EPA's independent cost estimates. The complete estimates are provided in the Administrative Record. Gould's recommended remedy and the Community's preferred remedy are the estimates provided by Gould in the CMS Report.

TABLE 6-BREAKDOWN OF EPA'S COST ESTIMATE FOR THE FINAL REMEDY

REMEDIAL COMPONENT	NO OFF SITE REMOVAL COST ESTIMATE	MAX ESTIMATED OFF-SITE REMOVAL-COST ESTIMATE
SITE PREPARATION Access Roads Clearing/Grubbing Decontamination Facilities	 25,378 57,046 1,084,377	 25, 378 57,046 1,084,377
EXCAVATION	3,485,875	3,485,875
CAP	3,021,124	3,021,124
TREATMENT 50.000 cy (S/S 5'layer) 88.000 cy (for off-site disposal)	 4,447,843 _____	 4,447,843 2,370,526
OFF-SITE DISPOSAL 88.000cy PCB-contaminated soil	_____ _____	 4,735,058 2,411,048
SITE RESTORATION (cleanup/landscape)	27,941	27,941
ON-SITE SOIL MOVEMENT (loading/hauling)	438,389	438,389
ENGINEERING OVERSIGHT	2,756,184	2,756,184
MISCELLANEOUS Storm Sewer user defined estimates	101,702 144,634	101,702 144,634
5% OWNER'S COST (b)	(779,525)	(1,255,356)
TOTAL CAPITAL COST (minus 5% owner's cost)	14,810,968	23,851,769
O&M (for 30 years)	2,179,346	2,179,346

(a) Based on the use of $20/ton for the stabilization of 88,000 cubic yards and $35/ton for transportation and off-site disposal of 88,000 cubic yards. These per ton costs were the lowest estimates obtained by the US Army Corps of Engineers on behalf of EPA and derived from costs from Brown's Battery Site (b) 5% owner's cost-incurred by regulatory agency(ies) to provide 100% oversight.

ATTACHMENTS

ATTACHMENT I

EPA STATEMENT OF BASIS

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION III

STATEMENT OF BASIS
MARJOL BATTERY SITE
THROOP, PENNSYLVANIA

Statement of Basis
Marjol Battery Site

TABLE OF CONTENTS

Statement of Basis
Marjol Battery Site

TABLE OF CONTENTS

Statement of Basis
Marjol Battery Site

TABLE OF CONTENTS

Figures

TABLE OF CONTENTS

Tables

Appendices

Statement of Basis
Marjol Battery Site

I. Purpose of the Environmental Protection Agency's Statement of Basis

This Statement of Basis explains the Corrective Measure Alternatives being proposed by the United States Environmental Protection Agency ("EPA") in consultation with the Pennsylvania Department of Environmental Protection ("PADEP") for remediating soil and waste material at the Marjol Battery Site ("Marjol" or the "Site"). Contaminants of concern at the Marjol Site are lead, polyaromatic hydrocarbons ("PAHs") and polychlorinated biphenyls ("PCBs"). This Statement of Basis also summarizes the remedial alternatives presented in the Corrective Measures Study ("CMS") Report, prepared by Gould Incorporated (hereafter "Gould"), for the Marjol Battery Site dated June 21, 1999.

On May 31, 1990, EPA, PADEP, and Gould, the present Site owner, entered into an Administrative Order on Consent, Docket No. RCRA-III-021-CA ("RCRA Consent Order") pursuant to Section 3008(h) of the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984 (Collectively referred to hereinafter as "RCRA"), 42 U.S.C. Section 6928 (h). The Interim Measures provision in Section VI.A. of the RCRA Consent Order incorporated any continuing obligation Gould had pursuant to an Administrative Order on Consent (Docket No. III-88-26-DC) of Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. § 9606(a), that had been previously issued by EPA. These actions included, but were not limited to, the removal of contaminated soil from off-Site residential properties. This Statement of Basis proposes a remedy for the Site. This Statement of Basis does not address the off-Site requirements contained in the Interim Measures provisions of the RCRA Consent Order.

Under the terms of the RCRA Consent Order, Gould was required to complete a RCRA Facility Investigation ("RFI") in order to identify the nature and extent of on-Site and off-Site contaminants and to conduct a Corrective Measures Study to evaluate various cleanup alternatives. Gould has completed the RFI, and has submitted a CMS Report dated June 21, 1999 to EPA which evaluates Corrective Measure Alternatives for remediation of contamination at the Site.

Key information from the RFI and CMS Reports as well as other environmental investigations are highlighted in this document. Detailed environmental reports and other information pertaining to the Site are located in the Marjol Battery Site Administrative Record. A copy of the Administrative Record is available for review at the following locations:

Throop Borough Council Building
436 Sanderson Street
Throop, Pennsylvania 18512-1224
Contact: Elaine Morrell
Telephone Number: (570) 489-8311

and

United States Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103
Contact: Mildred Oruska
Telephone Number: (215) 814-3405

EPA may modify the proposed corrective measure or select another corrective measure based on new information furnished by the public. Therefore, the public is encouraged to review and comment on all alternatives, including alternatives not presented in the CMS Report. Persons wishing to review the Administrative Record or wishing to provide comments on EPA's proposed Corrective Measure Alternative, should contact the EPA Project Manager, Sibyl Hinnant, at the address and telephone number given in Section XVI of this document.

II. EPA's Proposed Corrective Measures Alternatives

EPA is proposing response actions to remediate the contaminated soils and battery casing material ("BCM") at the Site. These response actions include a combination of excavation, waste treatment via solidification/stabilization, on and off-Site disposal, capping, and institutional controls to protect the selected remedy. These actions are derived from a combination of several Corrective Measure Alternatives presented by Gould to EPA in the Marjol CMS Report and were selected because they achieve the best balance among EPA's criteria for remedy selection. A summary of all of the corrective measures provided in the CMS Report and evaluated in this Statement of Basis, is provided in Section XII. EPA's criteria for the selection of the proposed remedy are set forth in Section XIII. The specific details of EPA's proposed remedy are provided in Section XIV. An evaluation of EPA's proposed remedy and the Corrective Measures Alternatives presented by Gould, are specified in Section XV. Figure 1 provides a general layout of the Site. The components of the proposed remedy are outlined below as follows:

- Excavation followed by treatment using solidification/stabilization, and subsequent off-Site disposal of approximately 86,000 cubic yards of soil and waste material, including battery casing material, with lead concentrations exceeding the Toxicity Characteristic Leaching Procedure ("TCLP") standard of

5.0 milligrams per liter ("mg/l") from on-Site areas north of the southern most limit of the General Five-Foot coal seam. A description of the General Five Foot coal seam is provided in Section III.B. "Site Geology", and Section VII "Mining Issues". The area to be excavated for off-Site disposal includes, but is not limited to, the "high" hazardous soil stockpile, a portion of the primary BCM fill area, and BCM and contaminated soil contained in strip pits from former coal mining operations. After this material is treated, it will be disposed of off-Site. (General definitions of TCLP and solidification/stabilization are provided in Appendix 1);

- Consolidation of the remaining contaminated soil in the area of the Site north of the southern most limit of the General Five-Foot coal seam, with lead concentrations less than the TCLP standard of 5.0 mg/l, and exceeding the soil lead cleanup standard of 500 milligrams per kilogram ("mg/kg") under an on-Site cap as described below;

- In-place solidification/stabilization of the approximately 286,000 cubic yards of contaminated material in the remaining primary BCM fill area which had been consolidated from other areas of the Site with lead concentrations exceeding 500 mg/kg, and cover with a cap to be constructed south of the limit of the General Five Foot coal seam. The exact volume of contaminated material to be consolidated under the cap would be determined during the design of the final remedy for the Site. Additional contaminated material may need to be transported off-Site for disposal to ensure that the integrity of the cap design is maintained. The cap must also comply with state requirements, as specified in Section XV entitled "Compliance With Waste Management Standards";

- Excavation of contaminated soil in the "North Woods", which is the wooded area located to the north of the Marjol Battery property boundary, and the wooded area adjacent to the Woodlawn Street playground, with lead concentrations exceeding 500 mg/kg, and consolidation of this contaminated soil with the contaminated material in the primary BCM fill area on-Site under the capped area;

- Implementation of dust control measures to prevent the off-Site migration of contaminated soil during remedial activities;

- Air monitoring for real-time dust emissions and for lead during remedial activities to ensure that contaminants are not released to the surrounding community during remedial activities;

- Institutional controls such as use restrictions, title notices, and proprietary controls, to ensure that the cap integrity is maintained. Construction or use of the property that in any way is inconsistent with the proposed remedy and the integrity

or maintenance of the cap will be prohibited;

- Performance of confirmatory sampling for lead, PAHs, and PCBs to ensure that soil cleanup standards are achieved. The cleanup standards are specified in Section X.A.;

- Reconstruction of the Stormwater Management Basin to prevent releases of lead to the Lackawanna River during remedial activities;

- Continued monitoring of groundwater and the Lackawanna River surface water and sediment to ensure that contaminants are not released to the surrounding environment during and after remedial activities;

- Implementation of Site-wide operation and maintenance activities during and following implementation of the remedy for the Site;

- Coordination with local community and Throop Borough Council to plan traffic routes for transport of materials to and from the Site during the implementation of the remedy; and

- Following the completion of on-Site remedial activities, soil verification sampling will be conducted to ensure that remedial activities have not caused off-Site contamination. EPA's approval of the confirmatory sampling plan will include the requirement that Gould evaluate the verification sample results and perform corrective action activities, as necessary, upon any property with results above the EPA cleanup standard for lead of 500 mg/kg.

III. Facility Background

A. Site Description

The Marjol Battery Site is located in the Borough of Throop, Lackawanna County, Pennsylvania, five miles north of Scranton. A regional map showing the location of Lackawanna County is provided as Figure 2. The Site consists of 43.9 acres of land adjacent to the Lackawanna River which borders the Site to the west. Sulphur Creek is adjacent to the Site and discharges to the Lackawanna River. Wooded, undeveloped land is found north ("North Woods") and south of the Site. Residential areas, within the Borough of Throop, exist to the east and southwest of the Site. Dickson City is located across the Lackawanna River to the west of the Site. Approximately five thousand people live within one mile of the Site. Figure 3 shows the street location for the Site.

The Site was formerly known as the Marjol Battery and Equipment Company which operated as a lead battery crushing and reclamation plant between 1963 and 1981. The first phase of the process involved severing the top of the battery and removing the lead plates and acid within the case. Prior to 1976, the battery acid (sulphuric acid) was collected in floor drains which routed the acid away from the operational area along adjacent drainage ways into Sulphur Creek. In 1976, an acid treatment building was constructed to neutralize the acid. During the second phase of the process, batteries were crushed and small pieces of lead were separated from the rubber and plastic casings. This process also involved washing the casings in order to remove soil and lead oxides. The final process involved heating the recovered lead in the melting pot. Molten lead was poured into ingots and moved to temporary storage areas and subsequently sent off-Site. Approximately six to seven tons of lead were processed daily into a melting pot. Crushed battery casings were discarded into on-Site strip mining pits, a drainage way to the south, and an area in the eastern portion of the Site referred to as the primary BCM fill area.

As a result of the plant operations, the ground surface at the Site became contaminated with lead. Fugitive dust emissions and lead contained in on-Site soils were carried off-Site by windborne transport. Stormwater runoff carried lead contaminated soil off-Site into adjacent drainage ways toward Sulphur Creek. Sulphur Creek was also contaminated with lead. Gould purchased the Marjol Battery and Equipment Company in May 1980 and ceased operations at the Site in April 1982.

B. Site Geology

The geology at the Site consists of unconsolidated deposits of mine spoils and residual soils overlying sedimentary bedrock. The bedrock beneath the unconsolidated materials consists mainly of interbedded sandstones, siltstones, and shales, but also contains seams of coal, many of which have been mined. The land surface at the Site generally slopes from east to west towards Sulphur Creek and the Lackawanna River. The ground surface elevation at the Site ranges from 890 feet on the northern portion of the property to 730 feet near the confluence of Sulphur Creek and the Lackawanna River.

Prior to the Site operations, the property was used primarily for surface strip mining and deep mining of anthracite coal. Nine coal seams were deep mined beneath the Site by various coal companies prior to 1961. Surface mining was also conducted in limited areas in the two uppermost coal seams at the Site, known as the General Five-Foot and the General Eight-Foot coal seams. The past mining activities have altered the surface topography at the Site and also created the potential for mine subsidence to occur. Section VII of this document provides a discussion on relevant mining issues at the Site.

Additional information on the mining history of the Site is contained in Appendix H of the RFI Report dated March 15, 1993. A Mine Subsidence Investigation Report, dated

January 28, 1999, also contains information on the condition of the mines beneath the Site. These documents are available for review in the Administrative Record for the Site.

C. Groundwater/Regional Aquifer

Groundwater at the Site exists in three different zones: localized groundwater adjacent to the Lackawanna River; unsaturated zone water, and mine pool groundwater. Currently at the Site localized groundwater is monitored by one well. The unsaturated zone water is monitored by several wells and lysimeters. Lysimeters are devices used to collect moisture present in the unsaturated zone. Mine pool groundwater is monitored by five wells. The results of the sampling of the monitoring wells and lysimeters for lead is provided in Section VI.C of this document.

The localized groundwater zone occurs in shallow unconsolidated deposits adjacent to the Lackawanna River. The water in this zone mostly comes from the Lackawanna River because the river is a losing stream where it passes the Site. Losing streams are characterized as such because the water level in the stream is higher than the water level in the adjacent groundwater, thus some of the water seeps out of the river and into the adjacent unconsolidated deposits. The water in the shallow unconsolidated deposits eventually makes its way down into the mine pool groundwater. The localized groundwater zone is not used as a drinking water supply.

Unsaturated zone water includes groundwater in soil and in bedrock above the mine pool. It occurs either as groundwater in isolated perched zones or as water infiltrating to the lower mine pool. The direction of flow in the unsaturated zone is predominantly downward through fractures in the rock. Water in this zone is monitored by wells and lysimeters. There are no users of, or other exposures to, the unsaturated zone groundwater at the Site. Perched groundwater is not useable as a water supply because the limited volume of water available would be insufficient even for residential use.

The mine pool groundwater is the regional groundwater system in the area. Beneath the Site the various mine voids are interconnected creating an underground reservoir known as the Scranton Mine Pool. At the Site, the mine pool exists at an elevation of around 618 to 625 feet above sea level (approximately 200 feet below ground surface). The mine pool groundwater is not used as a drinking water supply in the area. Furthermore, the mine pool groundwater meets the criteria of a Class IIIA aquifer using EPA's classification system as defined in the Final Draft document entitled "Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy" dated December 1986. Aquifers with a Class III designation are not a potential source of drinking water and are of limited beneficial use.

D. Previous Investigations

In 1967, PADEP, then known as the Pennsylvania Department of Environmental Resources ("PADER"), began collecting air quality data from the Site due to complaints from residents near the Site about particulate emissions coming from the Site. Between 1969 and 1971, PADER issued several Air Pollution Abatement Orders to the Marjol Battery and Equipment Company requiring air control measures to be implemented at the Site. From 1975 to 1980, PADER continued to collect air quality data and expanded sampling efforts to include off-Site and on-Site samples, stack tests of emissions from the melting pot, and garden vegetable samples from residences. In 1980, PADER issued an Administrative Order to the Marjol Battery and Equipment Company which required the company to reduce the ambient air lead concentration and implement a groundwater monitoring program.

Gould purchased the Site in May 1980 and ceased plant operations in April 1982. Between 1983 and 1984, Gould conducted the following environmental investigations at the Site. These reports are contained in the Administrative Record for the Site:

- Groundwater Investigation at the Marjol Battery Plant (Dames and Moore 1983) -. The purpose of this investigation was to evaluate hydrogeologic conditions, and to identify the extent of lead contamination in the groundwater at the Site. The results of this investigation showed that lead exists in the unsaturated zone water, at levels exceeding EPA's acceptable concentration. However, this water is not used as a water supply source and is hydraulically isolated from water supply aquifers.

- Environmental Assessment of the Soils and Groundwater at the Marjol Battery Plant (Dames and Moore 1984) - The purpose of this investigation was to identify the extent of lead migration from the Site into on-Site soils, groundwater, and the Lackawanna River. The results of this investigation showed that lead has migrated from the Site by erosion and deposition into areas off the Site which are downgradient of the primary battery casing fill area. On-Site soils were found to contain elevated levels of lead at various locations across the Site. Shallow groundwater at the Site was also determined to contain elevated levels of lead.

IV. CERCLA Removal Consent Order

In 1987, EPA's Region III Technical Assistance Team collected surface soil samples at the Site and in surrounding residential areas. Analysis of these samples showed elevated lead concentrations on-site and in off-site residential areas. On April 6, 1988, EPA and Gould entered into an Administrative Order on Consent (Docket No. III-88-26-DC), pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA") 42 U.S.C. Section 9606(a) ("CERCLA Removal Consent Order").

Under this CERCLA Removal Consent Order, Gould agreed to conduct a study to determine the extent of contamination at and from the Site, to secure the Site to prevent further releases of contaminants from the property into the surrounding community, and to remove soil from off-site properties impacted by contamination from the Site.

On May 1, 1989, Gould submitted to EPA its "Report on Extent of Contamination Study, Marjol Battery Plant, Throop, Pennsylvania." This report presented the findings of sampling activities that had been conducted by Gould at the Site since May 1988. The Extent of Contamination Study consisted of sampling and analysis of soil, sediment, surface water, groundwater, and air to determine the magnitude and extent of contamination both on the Site and in the surrounding community. Gould's on-Site investigation included a geophysical survey, test pit excavations, sampling, and analysis of fill materials to characterize the primary BCM fill area.

As part of Gould's Extent of Contamination Study, over 400 residential and commercial properties were sampled. This sampling effort resulted in the removal of lead contamination from 135 residential and commercial properties during the period from 1988 to 1992. Lead dust was removed from the interior of 107 residential units. Excavation involved the removal of residential soils with lead concentrations greater than 500 mg/kg attributable to the Marjol Site operations and consistent with existing trends. Excavated off-Site areas were backfilled with clean soil as confirmed by soil analyses.

Between April and July 1988, Gould installed a security fence around the perimeter of the Site to prevent unauthorized entry. From July 1988 to August 1990, the "low" hazard and "high" hazard soil stockpiles were constructed to contain contaminated soil, BCM, and debris. Between 1989 and 1990, the stormwater management basin was constructed in order to collect runoff from the Site, thereby preventing further transport of contaminants into the Lackawanna River. Asphalt curbing, check dams, and earthen berms were also installed in order to prevent runoff of contaminants from the Site. Between August and September 1990, an erosion control and a vegetative cover system were placed on-Site and a cover was placed over the "high" hazard soil stockpile. Site maintenance activities continue to be conducted at the Site. Routine monitoring of the air, groundwater, and surface water and sediments in the Lackawanna River began following the stabilization activities and continue to be conducted to date. Based on a review of the monitoring data, these actions have prevented further release of Site contaminants to the surrounding community. Elevated levels of lead present in the sediments in the Lackawanna River are addressed in EPA's proposed corrective measure alternatives for the Site, specified in Section XIV.

V. RCRA Interim Measures Activities

A. North Woods Soil Removal

In August 1992, Gould submitted a work plan to EPA entitled "Work Plan to Address the North Woods Soil Excavation." In 1993, Gould installed a six-foot high chain-link fence around contaminated portions of the North Woods. Subsequent actions to address contamination in the North Woods include excavation of 1,000 cubic yards of soil in a 0.6 acre area with soil lead levels exceeding 500 mg/kg and extension of the Site security fence to enclose a four acre area with lead concentrations ranging up to 45,000 mg/kg lead. The "North Woods Completion Report" dated June 30, 1994 is contained in the Administrative Record.

B. Drainage Swale Soil Removal/Water Main Relocation

On September 29, 1998, Gould submitted a document to EPA entitled "Former Drainage Swale Soil Removal Workplan for the Marjol Battery Site, Throop, Pennsylvania." The drainage swale comprises a seventy-foot long channel located between the western perimeter fence of the Site and the Lackawanna River. Following comments from EPA, PADEP, and the Throop Borough Council, Gould implemented the Workplan which included the removal of lead contaminated soil from the former drainage swale and the relocation of a water main. The existing water main was located beneath the Site and passed under the battery casing fill area. Lead contaminated soil was removed from the swale area to eliminate direct contact exposures to construction workers installing and testing the new water main. In order to delineate the area of soil excavation, 138 soil surface and subsurface soil samples were collected from thirty-six locations in the drainage swale. When the lead concentration in a soil sample exceeded 500 mg/kg, three additional soil samples were collected to depths of two feet. Figure 4 shows the soil sampling locations, and the corresponding soil lead levels obtained during the drainage swale sampling investigation, prior to soil removal activities. In November 1998, a total of 577 tons of lead-contaminated soil was excavated and transported off-Site for disposal. Samples were collected to confirm that the cleanup level of 500 mg/kg was achieved. The area was backfilled with clean soil, regraded, and revegetated. By March 1999, a new water main was installed along the southern Site property boundary and connected to the existing water main prior to crossing the Lackawanna River. This water main supplies drinking water to Dickson City. The abandoned section of the water main was completely grouted. The final report containing the details of these activities is entitled "Former Drainage Swale Soil Removal Completion Report" dated February 11, 1999.

VI. Summary of RCRA Facility Investigation

A. Background

The Extent of Contamination Study conducted under the CERCLA Removal Consent Order, described in Section IV., determined that lead is the primary constituent of concern at the Site. PAHs (polyaromatic hydrocarbons), and PCBs (polychlorinated biphenyls) were also identified as constituents of concern in soils at the Site. The analytical data collected during the Extent of Contamination Study are provided in Volume I of the document entitled "Report on Extent of Contamination Study Marjol Battery Plant" dated May 1, 1989. A RCRA Facility Investigation ("RFI") was conducted by Gould pursuant to the RCRA Consent Order at the Site between November 1991 and December 1992. The RFI was focused on determining the extent of lead, PAH, and PCB contamination at the Site by conducting tests on surface and subsurface soil, surface water, groundwater, and waste material at the Site. The RFI Report is dated March 15, 1993, and is provided in the Administrative Record for the Site.

B. Soil

BCM, and other lead-contaminated debris, were found on-Site in the primary battery casing material fill area, the "low" hazardous waste pile, the "high" hazardous waste pile, and on-Site strip pits. Mine spoils, from former mining operations, also contain battery casing material and lead-contaminated soil. The primary battery casing material fill area encompasses approximately 7.7 acres of land at the Site. This area consists of approximately 50% battery casing material. The intermediary fill zones within the primary battery casing fill area are the result of soil layers placed over the battery casings during Site operations. Tests conducted on material at the Site determined that 60-75% of the battery casings in the primary fill area are 1/4 to 2 inches in size. The remainder of the battery casings are less than 1/4 inch in size.

Surface and subsurface soil sampling conducted during the RFI determined that the contaminated material present at the Site did not exceed the Toxicity Characteristic Leaching Procedure standard of 5.0 mg/l when total lead concentrations within the contaminated material were below 3500 mg/kg. The "low" hazard soil stockpile, shown as the "low haz" pile on Figure 1, contains lead with concentrations of 3500 mg/kg or less. The "high" hazard soil stockpile, shown as the "high haz" pile on Figure 1, contains lead with concentrations above 3500 mg/kg. The material in this stockpile includes off-Site soil, debris from the demolition of on-Site buildings, and battery casings. The composition of the waste in this stockpile is approximately 85% soil, 13% BCM, and 2% miscellaneous debris. Table 1 summarizes the total volume and type of contaminated material present at the Site. Table 2 provides the minimum, maximum, and average lead concentrations for the various waste material present at the Site.

The analytical results for PCBs and PAHs which exceeded the EPA Region III Risk-Based Concentrations, are provided in Table 3. The EPA Region III Risk-Based Concentrations are defined in Appendix 1 of this document. These constituents were found in surface and subsurface soil samples collected from 0 to 4 feet below ground surface at random and isolated locations in the former lead reclamation area. Table 3 refers to PCB - Aroclor 1254. PCBs are a group of individual chemicals which were originally formulated in different technical mixtures. The most common technical mixtures were called Aroclors by the original manufacturer. When environmental samples containing PCBs are analyzed, the results are matched to individual Aroclor mixtures. At the Site, only Aroclor 1254 was detected. Based on the Extent of Contamination Study discussed in Section IV., the source of the PCBs contamination is suspected to be the use of hydraulic oils associated with equipment maintenance at the Site. The source of the PAH contamination is suspected to be the burning of plastic and rubber battery casings. The soils which exhibit PAH and PCB concentrations comprise a relatively small volume of material in isolated areas of the Site.

C. Groundwater

Groundwater quality of all three groundwater zones located beneath the Site was evaluated during the RFI, the Supplementary RFI Activities Report dated July 17, 1995, and the Mine Subsidence Investigation. The reports from all of these investigations are included in the Administrative Record for this site. Although lead was found to be leaching from the battery casing fill area into the unsaturated zone water, the amount of the leaching has not been enough to cause the mine pool groundwater to become contaminated with lead. EPA established 15 micrograms per liter (μg/l) as the action level for lead in public drinking water supplies pursuant to The Safe Drinking Water Act, 42 U.S.C. §§ 300f et seq.

Monitoring well MW-B-13 monitors the localized groundwater adjacent to the Lackawanna River. The Site monitoring wells are shown in Figure 5. The annual average concentration of dissolved lead in that well ranged from less than 1 μg/l to 25.5 μg/l during the period of 1992 to 1998. This concentration (25.5 μg/l) exceeds EPA's action level for lead in drinking water of 15 μg/l, but the localized groundwater is not used as a water supply.

The unsaturated zone water is monitored by both wells and lysimeters. The wells monitor isolated occurrences of water or perched zones. The lysimeters collect soil moisture from underneath the primary BCM fill area. Analyses of water from some of these wells and lysimeters show elevated levels of lead, indicating that lead is currently leaching from the BCM fill area into the unsaturated zone water. The annual average concentrations of dissolved lead in the unsaturated zone monitoring wells ranged from less than 1 μg/l to 46.3 μg/l between the period of 1992 to 1998. The annual average concentrations of dissolved lead found in the lysimeters in the unsaturated zone ranged from 10 μg/l to 1,850 μg/l. Although some of these concentrations exceed EPA's action level for lead in drinking water of 15 μg/l, the unsaturated

zone groundwater is not useable as a water supply because the limited volume of water available is insufficient even for residential use. Water in the unsaturated zone continues to move vertically downward through fractures in the rock until it eventually joins the mine pool groundwater.

The mine pool groundwater was sampled for lead during the Mine Subsidence Investigation conducted by Gould from September through November 1998. The mine pool monitoring wells are shown in Figure 6. The results of the monitoring of the mine pool water did not show the presence of elevated levels of lead. The only detection for lead occurred in an unfiltered sample from well MSB-3, which detected lead at 0.99 μg/l, just above the detection limit of 0.8 μg/l. This concentration is below EPA's action level for lead of 15 μg/l. The absence of elevated lead concentrations in the mine pool water indicates that the lead found in the unsaturated zone groundwater above the mine pool is either attenuated before it reaches the mine pool, or is significantly diluted when it reaches the mine pool. The mine pool is not used as a drinking water supply.

D. Air

Since 1989, five monitors have measured the lead levels in the air in the vicinity of the Site. In 1992, Gould added a sixth air monitor was added in the central area of the Site. Table 4 and Figure 7 provides the exact location of each of the six air monitors. Average annual lead concentrations measured in 1989 and 1990 showed levels of lead elevated above background concentrations of 0.05 micrograms per cubic meter ($\mu g/m^3$). However, the primary and secondary National Ambient Air Quality Standard ("NAAQS") for lead, established by EPA pursuant to Section 109 of the Clean Air Act, 42 U.S.C. § 7409, is 1.5 $\mu g/m^3$. Since the air monitoring program began in 1989, there have been no exceedences of this air standard for lead at the Site.

E. Surface Water/Sediment

Since 1991, Gould has conducted surface water sampling at four locations (two upstream from the Site and two downstream from the Site) in the Lackawanna River and in the on-Site Stormwater Management Basin. Since that time, such sampling has shown that lead levels have been consistently below EPA's chronic Water Quality Criteria for the protection of aquatic organisms for lead, which is 2.5 μg/l (National Recommended Water Quality Criteria - Correction, 822-Z-99-001, April 1999).

Since 1991, Gould has also conducted quarterly monitoring of the Lackawanna River aquatic sediments. The results of this long-term aquatic sediment monitoring in the River adjacent to the Site indicates a potential contribution of lead-contaminated soil from the Site to the River sediments. A summary of the Lackawanna River sediment monitoring results is available in the Administrative Record.

VII. Mining Issues

Between 1900 and 1961, the property was used primarily for surface strip mining and deep mining of anthracite coal by various coal mining companies. Nine coal seams were deep mined beneath the Site. Surface mining was also conducted in limited areas in the two uppermost coal seams at the Site, known as the General Five-Foot and the General Eight-Foot coal seams. The past mining activities have altered the surface topography at the Site, and also created the potential for mine subsidence to occur, either as pothole subsidence or trough subsidence. Pothole and trough subsidence are defined in Sections VII. A and B below. In addition, the presence of former mining activities raises concerns for the potential for mine fires to impact the Site.

A. Pothole Subsidence

Pothole subsidence is caused by erosion of surface material into mined-out coal seams which lie at or near the surface. Two such mine seams occur at the Site. Those seams are the General Five Foot and General Eight Foot coal seams. Both of these seams exist in the northern portion of the Site, but do not exist in the southern portion of the Site. The approximate southern-most limit of each of these seams has been estimated from mining maps, and borings drilled throughout the Site. The limit of the Eight Foot seam lies north of the limit of the Five Foot seam, as shown in Figure 8. South of the limit of the Five Foot seam, pothole subsidence from either of these seams cannot occur because these coal seams do not exist south of this limit. The community's concerns regarding the potential for pothole subsidence are addressed in Section XIV entitled "EPA's Proposed Remedy".

B. Trough Subsidence

Trough subsidence is a surficial depression that develops as the rock layers which overlie a coal seam sag downward after the coal and other roof support is removed or crushed. To determine the potential for trough subsidence and its possible impact upon remedial alternatives being considered by EPA for the Site, a Mine Subsidence Investigation was conducted from September through November 1998. The field work was conducted by Gould's contractor, and was overseen by the Bureau of Abandoned Mines Reclamation of the Pennsylvania Department of Environmental Protection, the United States Army Corps of Engineers, as well as by Gannet Fleming Inc, an environmental contractor for the Throop Borough Council. The Mine Subsidence Investigation Report dated January 28, 1999 contains the information gathered during the investigation. The Bureau of Abandoned Mines Reclamation conducted an independent evaluation of the data collected during the investigation and concluded that the maximum trough subsidence potential south of the limit of the Five Foot seam is less than two feet. In a letter dated March 10, 1999, EPA informed Gould that it would be appropriate to utilize the two foot subsidence potential to evaluate the Corrective Measures Alternatives.

C. Mine Fires

Mine fires can occur in mined-out coal seams because some coal as well as oxygen from the atmosphere is present in the mined-out voids. Of the nine mined-out coal seams present under the Site, only the upper three have a potential for fire. Those are the Eight Foot, the Five Foot, and the Four Foot seams. None of the deeper mined seams have any potential for fire because they lie beneath the level of the mine pool and are completely saturated with water.

The greatest concern for fire at the Site is where BCM from the Site lies directly in contact with the mine seams. If a fire occurred in those seams, the BCM could ignite. At the Site, BCM is in direct contact with the Five Foot and Eight Foot coal seams, but it is not in direct contact with the Four Foot seam. The Four Foot coal seam also underlies the area of the primary BCM fill area, but it is not in contact with the lead contaminated waste. The minimum amount of overburden rock and weathered rock located above the Four Foot seam is approximately 50 feet as determined from core boring MSB-7 (Figure 6). An additional 36 feet of soil material lies above the weathered rock. This amount of separation between the Four Foot seam and the BCM significantly reduces the risk of a fire due to convection of heat upward through cracks in the rock. Therefore, the potential risk from a fire in the Four Foot seam at the Site is considered minimal. EPA addresses the community's concern regarding the potential for contaminants to be released from the Site in the event of a mine fire, in Section XIV entitled "EPA's Proposed Remedy."

VIII. Summary of Site Risks

A. On-Site

On April 16, 1988, EPA and Gould entered into the CERCLA Removal Consent Order, referred to previously in Section I of this document, to address the release of contaminants from the Site into the community and to conduct an Extent of Contamination Study. Pursuant to the CERCLA Removal Consent Order, Gould conducted stabilization activities which effectively controlled on-Site risks and prevented further transport of contamination to off-Site locations. Because current on-Site risks have been effectively controlled, EPA's proposed remedy for the Site is based on long-term elimination and/or control of remaining contaminated soil and waste to prevent potential future releases and exposures.

By 1990, the Site was secured against unauthorized entry via installation of a security fence and 24-hour security guard presence. On-Site stabilization activities included interim containment and stockpiling of contaminated soil and debris, installation of a vegetated topsoil cover, and construction of a stormwater management basin. In 1989, Gould instituted an air monitoring program at the Site as part of the stabilization activities.

To protect on-Site workers from potential exposure, Level D protection (29 CFR § 1910.120 Appendix B) is required for any individuals performing Site work. This protection level consists of the wearing of hard-hats, gloves, eye protection, full coveralls and covered boots while on Site. In addition, workers must go through decontamination procedures before leaving the Site to prevent the transport of contamination off-Site. Worker presence on Site is intermittent only, primarily associated with Site maintenance activities or short-term projects. The short durations of on-Site work in conjunction with occupational health and safety measures effectively control the risks associated with on-Site worker exposure.

B. Off-Site

1. Human Health

Pursuant to the April 6, 1988 CERCLA Removal Consent Order, Gould removed lead-contaminated soils and lead dust, from 135 off-Site properties and from the interior of 107 off-Site residential properties. The work began in 1988 and was completed by the summer of 1992. Surface soil was excavated from properties with soil lead levels above 500 mg/kg and replaced with uncontaminated soil. This work was overseen by the EPA Region III CERCLA Removal Program.

In July 1993, EPA held a meeting with the Throop community. During the meeting, EPA's Region III CERCLA Removal Program stated that the potential threat to human health represented by the off-Site migration of lead from Marjol operations was successfully addressed by Gould's 1988-1992 cleanup effort performed under their direction. In June 1999, at the request of the Throop Borough Council, EPA sent letters to property owners subject to the removal activities to verify that the cleanup of their properties was complete, and that the risk associated with exposure to Site contaminants had been addressed by the soil removal action.

EPA is aware that some residents in the Throop community have questions regarding the adequacy and extent of the residential lead cleanup. EPA will address any outstanding issues related to the removal of lead contaminated soil attributable to operations at the Site separately from this Statement of Basis. EPA will consider mechanisms such as the interim measures provision in Section VI.A. of the RCRA Consent Order to address any activities that may be required to resolve issues such as the sampling of its residential soil and any other additional work. EPA and PADEP will oversee such work in full consultation with concerned residents, the Throop Borough Council, and Gould representatives.

In addition, EPA's remedy proposed in this Statement of Basis does include off-Site confirmatory sampling to be conducted following the completion of the on-Site remedy in order to verify that residential areas remain protected. Refer to Section XI. entitled "Remedy Performance Monitoring" for information regarding the confirmatory sampling associated with the on-Site corrective measure.

On November 18, 1998, EPA conducted a meeting with the Throop community to discuss the health effects associated with exposure to lead, PCBs, and PAHs, to respond to community concerns regarding historical exposure to contaminants at the Site. On July 29, 1999, a health consultation for the Throop community was also conducted by the Pennsylvania Department of Health and the Agency for Toxic Substances and Disease Registry. Upon finalization, a report by these agencies outlining the health consultation will be made available for public review.

2. Ecological

Current sediment monitoring in the Lackawanna River indicates that aquatic sediments adjacent to and near the Site exhibit elevated concentrations of lead, in comparison to the ecological screening value range of 31 mg/kg - 250 mg/kg (*Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision*, Jones, D.S., G.W. Suter II, and R.N. Hull, Oak Ridge National Laboratory, 1997). These screening values are based on adverse effects to sediment-associated aquatic biota, and serve to indicate only the potential for adverse ecological effects. EPA's proposed remedy, described in Section XIV., includes a strategy for addressing the elevated concentrations of lead in the Lackawanna River sediments.

C. Toxicological Properties of Site Contaminants

There are three types of contaminants of concern present at the Site: lead, PCBs, and PAHs. This section will present EPA's current knowledge regarding the toxicity of, and possible effects of exposure to, each of these substances. For each substance, both non-carcinogenic and carcinogenic effects will be presented.

Lead

Lead is a naturally occurring metallic element which is used in a wide range of products. Lead was previously used as an additive to gasoline and a pigment in paint (*Toxicological Profile for Lead*, Agency for Toxic Substances and Disease Registry, TP-92/12). Lead is currently used in a wide variety of medical, scientific, and military equipment, roofing materials, and in lead-acid batteries for automobiles. Lead is commonly found in the environment because of its extensive uses. Following is a summary of the toxic effects of lead in humans and experimental animals.

Neurobehavioral research has demonstrated that sensory motor and attention/memory areas are the cognitive functions primarily affected by lead exposure (*Inorganic Lead Exposure, Metabolism and Intoxication*, Eds.: N. Castellino, P. Castellino, N. Sannolo, CRC Press, 1995). It is generally accepted that neurobehavioral effects occur in children with blood lead levels of 40 - 60 micrograms per deciliter (ug/dL) resulting from chronic exposure when no other symptoms

of lead poisoning are evident (*Inorganic Lead Exposure, Metabolism and Intoxication*, Eds.: N. Castellino, P. Castellino, N. Sannolo, CRC Press, 1995; *Toxicological Profile for Lead*, Agency for Toxic Substances and Disease Registry, TP-92/12). Such effects include lowered IQ, decreased fine motor skills, and impaired ability to learn and control behavior resulting in decreases in school performance. Lead also appears to affect the central nervous system at lower exposure levels (less than 40 ug/dL); these effects have been demonstrated best in experimental animal models and in children during early stages of development. Protection against adverse neurobehavioral effects is the basis of the blood lead guideline of 10 μg/dL in children, established by the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services (Centers for Disease Control and Prevention, *Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials*. Atlanta: CDC, 1997). The CDC guidance document describes actions to be taken based on diagnostic (venous) blood lead results obtained in children of ages one to six years. These recommended actions are shown in Table 6.

Acute lead poisoning in children results in acute encephalopathy (cerebral edema) with symptoms such as seizures, vomiting, stupor, and potential coma (*Toxicological Profile for Lead*, Agency for Toxic Substances and Disease Registry, TP-92/12). Acute poisoning is associated with very large elevations in blood lead, ranging from approximately 100 μg/dL to 1,000 μg/dL.

Many studies have been conducted to evaluate the potential effects of prenatal exposure to lead in children, estimated by the pregnant mother's blood lead level and/or the umbilical cord blood lead level at birth (*Toxicological Profile for Lead*, Agency for Toxic Substances and Disease Registry, TP-92/12). The only effect which was consistently associated with lead concentrations in these studies was neurobehavioral delay, as demonstrated by infant neurodevelopment test scores.

Regarding reproductive effects, exposure to high concentrations of lead has been linked to decreased male fertility in some studies of occupationally exposed men (*Inorganic Lead Exposure, Metabolism and Intoxication*, Eds.: N. Castellino, P. Castellino, N. Sannolo, CRC Press, 1995). There is insufficient information compiled on females regarding a link between lead exposure and increased incidences of spontaneous abortion.

The kidney is also a target organ in human lead exposure (*Inorganic Lead Exposure, Metabolism and Intoxication*, Eds.: N. Castellino, P. Castellino, N. Sannolo, CRC Press, 1995; *Toxicological Profile for Lead*, Agency for Toxic Substances and Disease Registry, TP-92/12). However, kidney disease and dysfunction is apparent only at relatively high exposure concentrations. For example, nephropathy (kidney disease) occurs in children only at blood lead levels greater than 80 μg/dL. Chronic nephropathy has been observed in occupationally exposed workers who had blood lead concentrations ranging from 40 to greater than 100 μg/dL at the time of examination; however, the workers previous exposures may have been higher. Epidemiological studies of lead-exposed workers revealed significant increases in kidney disease

as compared to the general population.

Lead decreases the activity of enzymes involved in the synthesis of the oxygen-carrying pigment known as hemoglobin in red blood cells (*Toxicological Profile for Lead*, Agency for Toxic Substances and Disease Registry, TP-92/12). The threshold blood lead level for a decrease in hemoglobin in humans is estimated to be 50 μg/dL with subsequent development of anemia as hemoglobin levels decrease. At lower lead exposures, the enzyme activity is decreased, perhaps with no actual blood lead threshold. However, the effects of enzyme decrease alone without any detectable decrease in hemoglobin are unclear.

Many studies have been conducted in both the general population and the occupationally exposed population to evaluate whether lead exposure is associated with hypertension or elevated blood pressure (*Toxicological Profile for Lead*, Agency for Toxic Substances and Disease Registry, TP-92/12). The evidence is most convincing for adult men aged 40-59 years old. Some research indicates a one unit increase in systolic blood pressure for every doubling of blood lead concentrations. However, there are many studies which demonstrate no association between blood pressure and blood lead concentrations. Acute lead poisoning in humans has been associated with structural and functional cardiac alterations, including electrocardiographic changes and myocarditis.

EPA currently classifies lead as a probable human carcinogen (*USEPA Integrated Risk Information System*, 1999). However, this classification is based on carcinogenic evidence in test animals. The evidence in humans is considered inadequate to either demonstrate or refute carcinogenicity in humans as a result of lead exposure.

The majority of cancer studies conducted in test animals resulted in kidney tumors in the treated groups which did not spontaneously occur in the control groups (*USEPA Integrated Risk Information System*, 1999). However, the kidney tumors only occurred in animals that were fed the highest lead concentrations, which, in some cases, were also directly toxic to the animals. For that reason, the validity of the animal test data for lead carcinogenicity and its applicability to humans may be questionable.

The human evidence consists of four retrospective epidemiologic studies of workers who were routinely exposed to lead, including lead smelter workers and battery plant workers (*USEPA Integrated Risk Information System*, 1999). All together, the studies evaluated outcomes for over 9,000 male workers over a period of 25 to 30 years. One study of battery plant workers found a statistically significant greater number of deaths due to gastrointestinal tract cancer and lung cancer. However, corrections were not made in the studies for confounding factors such as smoking, alcohol consumption, and diet. Another study of lead smelter workers did not find an overall increase in cancer mortality among the workers, although deaths due to kidney cancer in the workers was significantly increased compared to the general population.

Finally, the two remaining studies did not find significant increases in cancer mortality in lead workers.

Polychlorinated Biphenyls (PCBs)

PCBs are a group of synthetic organic chemicals that were previously used as coolants and lubricants in transformers, capacitors, and other electrical equipment (*Toxicological Profile for Polychlorinated Biphenyls (Update)*, Agency for Toxic Substances and Disease Registry, TP-99/09). EPA prohibited the manufacture and use of PCBs in 1977 under the authority of the Toxic Substances Control Act. PCB contamination is usually associated with the presence of waste oil and oil spills from electrical equipment. Following is a summary of the toxic effects of PCBs in humans and experimental animals.

The evidence for the non-carcinogenic effects of PCBs has primarily been obtained from studies in test animals, not studies in humans (*Toxicological Profile for Polychlorinated Biphenyls (Update)*, Agency for Toxic Substances and Disease Registry, TP-99/09). From these studies, the following adverse effects have been observed:

- Toxicity to the liver resulting in tissue damage and increased liver enzyme activity,
- Endocrine alterations, mainly to the thyroid gland and thyroid hormone blood levels (reduced hormone concentrations, enlarged and altered thyroid gland cells),
- Dermal effects including edema, acne, and nail alterations,
- Decreases in immune system function (e.g., reduced ability to respond to immune system challenge, such as infectious agent exposure),
- Adverse effects on male and female reproductive functions, such as decreased fertility, and
- Developmental effects: prenatal exposure in multiple species resulted in adverse effects upon the offspring, including dermal, immune, reproductive, and neurological.

EPA currently classifies PCBs as a probable human carcinogen (*USEPA Integrated Risk Information System*, 1999). However, this classification is mainly based on carcinogenic evidence in test animals. The evidence in humans is considered inadequate to demonstrate carcinogenicity, but suggestive of carcinogenicity in humans. A number of cancer studies in test animals have demonstrated statistically significant increases in liver tumors, in a dose-responsive manner. The animal evidence for liver carcinogenicity is considered adequate.

The human evidence for PCB carcinogenicity includes three epidemiological studies of workers who were routinely exposed to PCBs at capacitor manufacturing plants, comprising an evaluation of over 7,000 workers in total (*PCBs: Cancer Dose-Response Assessment and Application to Environmental Mixtures*, EPA/600/P-96/001F, September 1996). In these studies, there were statistically significant increases in deaths from gastrointestinal tract cancer, liver cancer, and skin cancer.

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are a group of chemicals which occur as complex mixtures resulting from the incomplete burning of coal, oil, gasoline, plastic, wood, garbage, and other organic substances such as tobacco in cigarettes and in meats when grilled. PAHs are also a component of numerous organic substances such as crude oil, coal tar pitch, asphalt, and creosote [*Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs), (Update)*, Agency for Toxic Substances and Disease Registry, TP-94/09]. Due to the many sources of PAHs, they are commonly found throughout the environment with the highest concentrations occurring in industrialized area soils. Following is a summary of the toxic effects of PAHs in humans and experimental animals.

The evidence for non-carcinogenic effects of PAHs has primarily been obtained from studies in test animals not studies in humans. [*Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs), (Update)*, Agency for Toxic Substances and Disease Registry, TP-94/09].

From these studies, the following adverse effects have been observed:

- Liver effects including increased liver enzyme activity and liver enlargement,
- Adverse effects on male and female reproductive functions, such as decreased fertility,
- Developmental effects: prenatal exposure in test species resulted in adverse effects upon the offspring, which included birth defects and reproductive effects, and
- Skin disorders following dermal PAH application, and allergic contact hypersensitivity.

PAHs are complex mixtures of carcinogenic and noncarcinogenic compounds. EPA currently classifies the following PAHs as probable human carcinogens: benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene (*USEPA Integrated Risk Information System*, 1999). However, this classification is based on carcinogenic evidence in test animals. The evidence in humans is considered inadequate to demonstrate carcinogenicity, but suggestive of carcinogenicity in humans.

Studies in test animals have demonstrated increased tumors in multiple species by multiple routes of exposure to the carcinogenic PAHs with tumors occurring at the site of exposure (*USEPA Integrated Risk Information System*, 1999). Inhalation studies resulted in respiratory tract tumors, ingestion studies resulted in digestive tract tumors, and dermal application studies resulted in tumors at the skin site of application.

In humans, the available information is considered inadequate, but suggestive of carcinogenicity in humans (*USEPA Integrated Risk Information System*, 1999). Lung cancer is observed in humans exposed to PAH mixtures containing benzo(a)pyrene and the other carcinogenic PAHs, such as cigarette smoke, roofing tar, and coke oven emissions. However, since the individual PAH concentrations were unknown during these exposures, chemical-specific dose-responses cannot be quantified.

IX. Scope of Corrective Action/Corrective Action Objectives

The purpose of the proposed Corrective Measure Alternative presented in this document is to eliminate risks to human health and the environment associated with exposure or potential exposure to contaminants at and from the Site. More specifically, the purpose of the Corrective Measure Alternative is to achieve the following corrective action objectives:

- prevent exposure to lead in soil at concentrations greater than 500 mg/kg;
- prevent exposure to PAHs and PCBs (Aroclor 1254) in soil at concentrations greater than their respective cleanup levels, as provided in Section X;
- minimize future releases of lead, PAHs and PCBs (Aroclor 1254) into groundwater and the regional mine pool;
- prevent migration of lead, PAHs and PCBs (Aroclor 1254) which would result in exceedences of the applicable Water Quality Criteria, or adversely impact sediments in the Lackawanna River;
- prevent releases to the air which exceed the National Ambient Air Quality Standards of 1.5 micrograms per cubic meter for lead, and
- minimize the potential for future releases as a result of mine subsidence or mine fire events.

X. Cleanup Standards/Treatment Performance Standards

A. Cleanup Standards

Cleanup standards have been established for the Corrective Measure Alternative proposed by EPA in order to determine when the remediation activities are complete. On-site soils will be sampled following remedial activities to ensure that all of the cleanup levels have been achieved. The on-Site cleanup standard for lead is 500 mg/kg, based on the EPA Directive, *Interim Guidance on Establishing Soil Lead Clean-up Levels at Superfund Sites (September 7, 1989 OSWER Directive 9355.4-02).* This directive recommended interim cleanup values of 500 mg/kg to 1,000 mg/kg for residential areas. The cleanup standards for the PAHs benzo(a)anthracene, benzo(a)pyrene, benzo(b+k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene are 0.15 mg/kg, 0.015 mg/kg, 0.15 mg/kg, 0.015 mg/kg, and 0.15 mg/kg, respectively. The cleanup standard for the PCB Aroclor 1254 is 0.054 mg/kg. The PAH and PCB cleanup standards are also based on residential exposures, to be consistent with the lead cleanup standard. A summary of the cleanup standards for the Site is provided in Table 5. The technical references and explanation for the PCB and PAH cleanup standards are provided in Appendix 2 of this document.

When establishing cleanup standards, it is necessary to establish the locations where these standards will be measured. The following areas must achieve the cleanup levels stated above: all on-Site soils, the contaminated portions of the North Woods, and the wooded area adjacent to the Woodlawn Street playground. Confirmatory soil samples will be collected to ensure that cleanup levels are achieved for each constituent of concern (lead, PAHs, and PCBs-Aroclor 1254). The number and location of confirmatory samples will be identified during the remedial design phase of the Corrective Measure Alternative for the Site.

B. Treatment Performance Standard

The contaminated soil and waste material must achieve a TCLP level below the regulatory standard of 5.0 mg/L for lead after treatment by solidification/stabilization.

XI. Remedy Performance Monitoring

The following areas will be monitored in order to evaluate the overall effectiveness of the Corrective Measure Alternative. This monitoring will be conducted by Gould, with oversight and approval by EPA and PADEP:

- Following the completion of on-Site remedial activities, soil verification sampling will be conducted to ensure that remedial activities have not caused off-Site contamination. EPA's approval of the confirmatory sampling plan will include the requirement that Gould evaluate the verification sample results and perform

corrective action activities, as necessary, upon any property with results above the EPA cleanup standard for lead of 500 mg/kg.

- Following the Stormwater Management Basin reconstruction, sediment monitoring will continue for a period of time to determine if further action is required to address the lead-contaminated sediments.

- The Regional Mine Pool will continue to be monitored for a period of time to ensure that the mine pool remains unaffected by releases from the Site. The frequency and duration of monitoring will be determined during the remedial design phase of the Corrective Measure Alternative for the Site.

- Surface water will continue to be monitored for a period of time to ensure that Site contaminants are not released into the Lackawanna River during and after the implementation of the remedy. The frequency and duration of monitoring will be determined during the remedial design phase of the Corrective Measure Alternative for the Site.

- Air monitoring will continue for a period of time to ensure that Site contaminants are not released during and after the implementation of the remedy. The frequency and duration of monitoring will be determined during the remedial design phase of the Corrective Measure Alternative for the Site.

XII. Summary of Corrective Measures Alternatives

Pursuant to the RCRA Consent Order dated May 31, 1990, Gould submitted a Corrective Measure Study Report which evaluated and recommended thirteen Corrective Measure Alternatives for remediation of contamination at the Site. Each of these thirteen alternatives were considered by EPA in the development of the proposed corrective action for the Site. A summary of each of these Corrective Measures Alternatives, as described by Gould, is provided in this Section. The detailed discussion of each Corrective Measures Alternative is provided in the revised CMS Report dated June 21, 1999. The letter designations used to identify the corrective measures alternatives in this Statement of Basis are the same as the letter designations used in this revised CMS Report. For example, Alternative D1 identifies the same remedy in both the CMS Report and this Statement of Basis. A Low Permeability Cap alternative (Alternative C) was presented by Gould in the original CMS Report submitted on March 15, 1995. EPA requested, in letters dated September 14, 1995 and November 20, 1997, and numerous discussions with Gould, that Alternative C be eliminated from the revised CMS Report, due to its similarity to Alternative D1 (Enhanced Low Permeability Cap). Therefore, Alternative C has been omitted from the list of feasible Corrective Measures Alternatives provided in this Statement of Basis.

Present worth capital costs for alternatives with a greater than two year implementation time were assumed to occur at equal intervals over the implementation time. For alternatives which could be implemented in less than two years, the present worth of the capital costs were assumed to be equal to the capital costs. The present worth of the operation and maintenance phase was also determined for each alternative. The total present worth reported for each alternative is the sum of the present worth of the capital costs and the present worth of the annual operation and maintenance costs. Capital costs included engineering design and oversight, Site preparation, construction, health and safety, insurance and bonding, and contingency costs. Operation and maintenance (O&M) costs, are calculated for a period of thirty years, and include labor, sampling/analysis, waste management/disposal, permitting, health and safety measures, and training costs. Each Corrective Measures Alternative is summarized below:

Alternative A: No Action

Capital Cost: 0
Operation and Maintenance: $4,400,000
Total Cost: $4,400,000
Time of Implementation: 0 months

Corrective Measure Alternative A (No Action) provides no additional measures beyond those currently being taken to prevent exposure to Site contaminants which include monthly Site visits, restricted Site access, routine operation and maintenance activities, and monitoring of the groundwater, air, stormwater, surface water and sediments. The No Action Alternative cannot be considered a feasible option to address the contamination at the Site. However, it is included in this Statement of Basis solely for the purpose of providing a baseline for comparing other alternatives for the Site.

Alternative B: Soil Stockpile Consolidation

Capital Cost: $1,200,000
Operation and Maintenance: $4,100,000
Total Cost: $5,300,000
Time of Implementation: 3 months

Corrective Measure Alternative B (Soil Stockpile Consolidation) involves excavating an estimated 12,000 cubic yards of soil in the low hazard soil stockpile and 7,500 cubic yards in the North Woods with average lead concentrations above 500 mg/kg and placing the soil over the existing geomembrane which covers the high hazard stockpile. The soil would be graded to reduce the current slopes of the existing high hazard stockpile and subsequently covered with two feet of imported cover soil. A two-foot thick layer of imported cover soil would be placed over the former location of the low hazard soil stockpile. All of the newly covered areas would be hydroseeded with a grass seed mix tolerant to the regional climate.

Alternative D1: Enhanced Low Permeability Cap (17 acres)

Capital Cost: $5,000,000
Operation and Maintenance: $2,900,000
Total Present Worth: $7,900,000
Time of Implementation: 7 months

Corrective Measure Alternative D1 (Enhanced Low Permeability Cap) involves the consolidation of materials outside the cap area with average lead concentrations greater than 500 mg/kg. These materials would be placed in the central area of the Site, and covered with an enhanced low permeability cap. Under Alternative D1, the enhanced low permeability cap design would comprise a 17-acre area on the Marjol Site and would consist of the following components in descending depth:

- Top Layer
  - Vegetation
  - Topsoil (6 inches)
  - General Fill Layer (18 inches);
- Geosynthetic Filter Fabric;
- Drainage Layer (12 inches);
- Geocomposite Liner or Flexible Membrane Liner or 2 Feet of Clay (Low Permeability Barrier), and
- Existing Soil Cover and Consolidated Soils (depth varies).

Alternative D2: Enhanced Low Permeability Cap (10 Acres)

Capital Cost: $4,400,000
Operation and Maintenance: $2,900,000
Total Present Worth: $7,300,000
Time of Implementation: 7 months

Corrective Measure Alternative D2 (Enhanced Low Permeability Cap) is similar to Alternative D1, however, under Alternative D2, the capped area would comprise 10 acres instead of the 17-acre area in Alternative D1. Soils and waste material situated north of the General Five Foot coal seam, with lead at average concentrations greater than 500 mg/kg, would be consolidated under a 10-acre cap located south of the General Five Foot seam. Under Alternative D2, the enhanced low permeability cap design would consist of the following components in

descending depth:

- Top Layer
  - Vegetation
  - Topsoil (6 inches)
  - General Fill Layer (18 inches);
- Geosynthetic Filter Fabric;
- Drainage Layer (12 inches);
- Geocomposite Liner or Flexible Membrane Liner or 2 Feet of Clay (Low Permeability Barrier), and
- Existing Soil Cover and Consolidated Soils (depth varies).

Alternative E: RCRA Cap

Capital Cost: $6,600,000
Operation and Maintenance: $2,900,000
Total Present Worth: $9,500,000
Time of Implementation: 1 year

Corrective Measure Alternative E (RCRA Cap) involves the consolidation of materials outside of the cap area with lead at average concentrations greater than 500 mg/kg. The amount of material consolidation and the area of the RCRA cap would be similar to the Enhanced Low Permeability Cap alternative in D1 above. Under Alternative E, the RCRA cap design would comprise a 17-acre area and would consist of the following components in descending depth:

- Top Layer
  - Vegetation
  - Topsoil (6 inches)
  - General Fill (18 inches);
- Geosynthetic Filter Fabric;
- Drainage Layer (12 inches);

- Low Permeability Layers
  - Flexible Membrane Liner
  - Low Permeability Soil Layer (24 inches) or Geocomposite Layer, and
- Existing Soil Cover and Consolidated Soils (depth varies).

Alternative F1: Battery Casing Material (BCM) Grouting and Enhanced Low Permeability Cap

Capital Cost: $10,300,000
Operation and Maintenance: $2,900,000
Total Present Worth: $13,200,000
Time of Implementation: 1 year

Corrective Measure Alternative F1 (BCM Grouting and Enhanced Low Permeability Cap) involves the consolidation of material with average lead concentrations above 500 mg/kg. This material would be placed into a central area of the Site and an enhanced low permeability cap would be constructed over it. Grouting in this alternative would be used either to fill the areas of the Five-Foot and Eight-Foot mine seams that lie beneath the proposed 17-acre cap area or to create a four- to five-foot thick layer of solidified battery casing material in the bottom of the 9-acre battery casing material fill area. The cap design would be identical to the enhanced low permeability cap presented in Alternatives D1 and D2 above.

Alternative F2: Mine Void Grouting and Enhanced Low Permeability Cap

Capital Cost: $ 10,400,000
Operation and Maintenance: $2,900,000
Total Present Worth: $13,300,000
Time of Implementation: 1.3 years

Corrective Measure Alternative F2 (Mine Void Grouting and Enhanced Low Permeability Cap) involves the consolidation of material outside of the proposed cap area with average lead concentrations above 500 mg/kg. This material would be placed into a central area of the Site and an enhanced low permeability cap would be constructed over it. Grouting under this alternative would be used to fill the void spaces in the Five-Foot and Eight-Foot mine seams that lie beneath the proposed cap. The cap design identical to the one presented in Alternative D1 and D2 above.

Alternative G: In-Place Solidification/Stabilization with an Enhanced Low Permeability Cap

Capital Cost: $32,500,000
Operation and Maintenance Cost: $2,300,000
Total Present Worth: $31,300,000
Time of Implementation: 2.8 years

Corrective Measure Alternative G (In-Place Solidification/Stabilization with Enhanced Low Permeability Cap) involves the consolidation of material outside of the cap area with average lead concentrations exceeding 500 mg/kg. This material would be placed into a central area of the Site and an in-place deep-mixing solidification/stabilization method, most likely utilizing an auger delivery system, would be used to treat the contaminated material because of its advertised ability to reach depths of greater than 100 feet. An enhanced low permeability cap identical to the cap design in Alternatives D1 and D2 above would be constructed over the top of the treated material.

Alternative H: On-Site Solidification/Stabilization, On-Site Disposal with an Enhanced Low Permeability Cap

Capital Cost: $41,400,000
Operation and Maintenance: $ 2,100,000
Total Present Worth: $37,900,000
Time of Implementation: 3.3-3.7 years

Corrective Measure Alternative H (On-Site Solidification/Stabilization, On-Site Disposal with an Enhanced Low Permeability Cap) includes excavation of all on-Site material with an average lead concentration above 500 mg/kg lead. This alternative is the same treatment process as is described in Alternative G above. However, on-site solidification/stabilization requires the excavation of contaminated material prior to treatment. The treated and encapsulated waste is then disposed of on-Site with an enhanced low permeability cap constructed over the treated material as described in Alternatives D1 and D2 above.

Alternative I: On-Site Solidification/Stabilization with Off-Site Disposal

Truck:
Capital Cost: $85,200,000
Operation and Maintenance: $300,000
Total Present Worth: $75,800,000
Time of Implementation: 2.7-3.7 years

Rail: **Capital Cost: $85,500,000 - $88,500,000**
Operation and Maintenance: $300,000
Total Present Worth: $76,000,000 - $78,700,000
Time of Implementation: 2.7-3.7 years

Corrective Measure Alternative I (On-Site Solidification/Stabilization with Off-Site Disposal) involves excavating all on-Site material with an average lead concentrations above 500 mg/kg. This material would be treated using on-Site solidification/stabilization, and transporting the treated material to a RCRA Subtitle D landfill via truck or railcars. Following corrective action activities the Site would be graded to promote positive drainage and revegetated. In addition, approximately 6,600 cubic yards of material may have PCB concentrations greater than 50 mg/kg and may need to be transported off-Site for disposal at a Toxic Substance Control Act permitted landfill.

Alternative J: Off-Site Solidification/Stabilization with Off-Site Disposal

Truck: **Capital Cost: $102,300,000**
Operation and Maintenance: $200,000
Total Present Worth: $86,400,000
Time of Implementation: 4.3 years

Rail: **Capital Cost: $97,300,000 - $98,600,000**
Operation and Maintenance: $200,000
Total Present Worth: $82,200,000 - $83,300,000
Time of Implementation: 4.3 years

Corrective Measure Alternative J (Off-Site Solidification/Stabilization with Off-Site Disposal) involves the excavation of all material with average lead concentrations above 500 mg/kg lead, transporting the material to a RCRA Subtitle C treatment facility for treatment, and subsequently transporting the material to a RCRA Subtitle D facility for disposal. Additionally, approximately 6,600 cubic yards of materials with concentrations of PCBs greater than 50 mg/kg may need to be transported off-site for disposal at a TSCA permitted landfill. Following remedial activities, the Site would be graded to promote drainage and revegetated.

Alternative K : Soil/Battery Casing Washing and Off-Site Disposal

Capital Cost: $245,600,000
Operation and Maintenance: $ 200,000
Total Present Worth: $170.800,000
Time of Implementation: 9.3-9.7 years

Corrective Measure Alternative K (Soil/Battery Casing Washing and Off-Site Disposal)

involves excavating and washing all on-Site material with average lead concentrations above 500 mg/kg. The soil and waste material would be washed with a water-based solution to remove the contaminants of concern. This process removes contaminants from soils in either one of two ways: (1) by dissolving or suspending them in the wash solution, or (2) by concentrating the contaminants into a smaller volume of soil through simple particle separation techniques. Acid leaching removes lead from soils by first converting them to a soluble lead salt, and then precipitating a lead salt from solution. The treated material would be disposed of off-Site either to a RCRA Subtitle D landfill or to a secondary smelter. Excavated areas would be restored with clean fill to the original grade and revegetated.

Alternative L: Off-Site Thermal Treatment

Capital Cost: $245,000,000
Operation and Maintenance: $100,000
Total Present Worth: $122,700,000
Time of Implementation: 19.4-19.8 years

Corrective Measure Alternative L (Off-Site Thermal Treatment) involves excavating all material with average lead concentrations above 500 mg/kg, segregating the materials into soil and battery casing waste streams, and transporting these materials to a secondary smelter via trucks for thermal treatment. Thermal treatment technologies for soil and battery casing material wastes involve using high temperatures (>2000 degrees Fahrenheit) in a reactor or furnace to vaporize and/or destroy the organic portion of the waste. Excavated areas of the Site would be restored with clean fill to the original grade and revegetated.

XIII. EPA Criteria for Remedy Selection

Each of the thirteen alternatives included in this Statement of Basis have been evaluated with respect to the nine remedy selection criteria set forth in EPA's "Guidance on RCRA Corrective Action Decision Documents: The Statement of Basis Final Decision Response to Comments (OSWER Directive 9902.6)" dated February 1991, and the Advanced Notice of Proposed Rulemaking, *Federal Register* 61, no. 85:19451-52. These documents describe four general standards and five corrective measure selection decision factors that assist in evaluating the overall effectiveness of the Corrective Measures Alternatives. The four general standards for corrective measures are:

1. ***Overall Protection of Human Health and the Environment*** - addresses whether a remedy provides adequate protection and describes how risks are eliminated, reduced, or controlled.

2. ***Attainment of Media Cleanup Standards*** - addresses whether a remedy will meet the appropriate federal and state cleanup standards.

3. *Control of the Source of the Release* - relates to the ability of the selected remedy to reduce or eliminate to the maximum extent practicable further releases.

4. *Compliance with Waste Management Standards* - assures wastes are managed in a protective manner during the implementation of corrective measures.

The five selection decision factors for corrective measures are:

5. *Long-term Reliability and Effectiveness* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals are achieved.

6. *Reduction of Toxicity, Mobility, or Volume of Wastes* addresses the degree to which remedial alternatives employ recycling or treatment that reduces toxicity, mobility, or volume of contaminants.

7. *Short-term Effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

8. *Implementability* addresses the technical and administrative feasibility of the remedy, including the availability of materials and services needed to implement a particular remedial option.

9. *Cost* includes estimated capital, operation and maintenance costs, and present worth costs.

The Corrective Measures Alternatives are evaluated against these nine criteria in Section XV below.

XIV. EPA's Proposed Remedy

EPA proposed remedy achieves the best balance of all of the nine remedy selection criteria defined in Section XIII above. Approximately one-third of the total volume of contaminated material will be treated on-Site and disposed of off-Site. For the remaining material, EPA's proposed remedy involves treating and capping contaminated material at the Site. The specific details of EPA's proposed remedy are described in the following paragraphs:

(1) The excavation, on-Site treatment, and off-Site disposal of approximately 86,000 cubic yards of soil and waste material, including BCM, with lead concentrations exceeding the

Toxicity Characteristic Leaching Procedure standard of 5.0 mg/l from on-Site areas north of the southern-most limit of the General Five-Foot coal seam. The approximate limit of this coal seam is shown in Figure 8 of this document. The area of excavation and off-Site disposal includes, but is not limited to, the "high" hazardous waste pile and battery casing material and soil contained in strip pits from former coal mining operations. Treatment requirements for off-site disposal would be identified during the design phase depending on the final disposal location and must comply with all applicable federal and state regulations. Excavated areas would be restored with clean fill to the original grade and then vegetated.

(2) The in-situ treatment of approximately 286,000 cubic yards of contaminated soil and battery casing material at the Site using solidification and stabilization and covering the treated waste with a 10-acre cap which complies with state requirements as specified in Section XV "Compliance With Waste Management Standards." The specific methods that will be used to treat the waste would be determined during the design phase of the final remedy for the Site. The 10-acre cap will be constructed south of the limit of the General Five-Foot coal seam. The material to be consolidated and capped at the Site includes:

- contaminated soil and waste material in the existing primary battery casing fill area located south of the limit of the General Five Foot coal seam;
- contaminated soil and waste material excavated from the area north of the limit of the General Five Foot coal seam with lead concentrations less than the Toxicity Characteristic Leaching Procedure standard of 5.0 mg/l;
- contaminated soil excavated from other on-Site areas, outside of the proposed capped area, with lead concentrations exceeding 500 mg/kg; and
- 7,200 cubic yards of soil excavated from the North Woods, and the wooded area adjacent to the Woodlawn Street playground, with lead concentrations exceeding 500 mg/kg.

(3) An investigation of the exact limit of the General Five Foot coal seam. The area above the Five Foot coal seam is the area of pothole mine subsidence at the Site. Drilling information collected during the Mine Subsidence Investigation determined that the exact southern-most limit of the Five Foot coal seam varies slightly from what is estimated from old mining maps. Therefore, EPA will require either the drilling of additional borings to confirm the limit of the Five Foot coal seam, or the over-excavation of waste material to a level which is clearly below the Five Foot seam. One of these options will be selected during the remedial design to ensure that waste is removed from the entire area above the Five Foot seam.

(4) The reconstruction of the Stormwater Management Basin, currently located west of the primary battery casing fill area, to be consistent with current engineering requirements and

comply with the appropriate erosion control measures, and maintenance schedule for the basin. These improvements are expected to result in decreases in sediment lead concentrations obtained in the Lackawanna River sediment monitoring program. However, if the sediment monitoring program results following the Stormwater Management Basin upgrade do not show decreases in lead concentrations, then further investigations will be conducted to determine the following: (a) whether currently unknown upgradient sources on the River are contributing to the elevated lead concentrations in the sediment, and (b) whether the elevated lead sediment concentrations are resulting in an adverse effect on the River's aquatic biota. The goal of these investigations will be to determine whether further action to address contaminated sediments is warranted.

(5) Institutional controls such as use restrictions, title notices, and proprietary controls, to ensure that the cap integrity is maintained. Construction or use of the property that in any way is inconsistent with the proposed remedy and the integrity or maintenance of the cap will be prohibited; and

(6) Dust control measures will be required to prevent contaminants from being released from the Site during remedial activities. Air monitoring for real-time dust emissions and for airborne site contaminants will be conducted during remedial activities. Compliance with action levels will be required to ensure that contaminants are not released to the surrounding community during remedial activities. Monitoring of groundwater, surface water, soil, and sediment, for all constituents of concern, will ensure that contaminants are not released to the surrounding environment during remedial activities. Such monitoring will continue after the remedial activities to measure the effectiveness of the remedy.

(7) Air monitoring for real-time dust emissions and for lead during remedial activities will be required to ensure that contaminants are not released to the surrounding community during remedial activities.

(8) Coordination with local community and Throop Borough Council to plan traffic routes for transport of materials to and from the Site during the implementation of the remedy will be required.

XV. Evaluation of the Proposed Remedy/Comparison of Alternatives

A. Four General Standards of Corrective Action

1. Overall Protection of Human Health and the Environment

Each Corrective Measure Alternative addresses how to achieve the overall protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternatives D1, D2, E, F1, and F2, involve the construction of a cap over the entire volume of waste material at the Site. Capping or containment technologies isolate contaminants from the surrounding environment and eliminate direct exposure to Site contaminants. However, long-term protectiveness from exposure to Site contaminants is contingent upon maintenance of the engineering controls. Waste treatment, specified in EPA's proposed remedy, and Alternatives G and H provide an additional level of protectiveness beyond containment. Although long-term maintenance is still required under these alternatives, they do not rely as heavily on cap maintenance as Alternatives D1, D2, E, F1, and F2, which do not include waste treatment. Since EPA's proposed remedy requires the waste to be treated, the potential for direct exposure to Site contaminants would be minimized, even in the event of a cap failure.

EPA's proposed remedy, similar to Alternative D2, completely eliminates the potential risks associated with leaving waste in the areas of pothole subsidence at the Site by removing all contaminated soil and waste material with lead concentrations exceeding 500 mg/kg lead, and PCBs and PAHs exceeding their respective cleanup levels, as specified in Section X, from areas of the Site above the Five Foot coal seam. In addition, EPA's proposed cap is not situated in areas of the Site where waste material comes in contact with coal seams where a potential for mine fire exists. Alternatives D1, E, F1, F2, G, and H do not eliminate this potential risk, because, under these alternatives, a portion of the cap is located in areas of potential mine subsidence and mine fires.

Alternatives I, J, K, and L permanently eliminate future risk associated with exposure to contaminants by removing all waste from the Site. Therefore, these alternatives offer the greatest level of long-term protection to human health and the environment against exposure to contaminants at the Site. However, actual risk of exposure to the community is increased during the implementation of the remedy in direct proportion to the volume of contaminated material excavated from the Site. Due to the increased risk of exposure associated with the excavation of all of the contaminated material, EPA did not select Alternatives I, J, K, or L, which include total removal of all contaminated material from the Site. These alternatives involve a greater potential short-term and real risk to human health and the environment during the implementation of the remedy, due to a greater potential for air releases during excavation, treatment, and transport of contaminated material. Alternatives J, K and L involve the transport of hazardous waste from the Site prior to treatment. These corrective measures alternatives were not considered to be as protective as remedies in which waste treatment occurred on-Site prior to off-Site disposal due to the potential for accidental releases of hazardous and untreated waste into the surrounding community and environment during transport. Dust control measures will be implemented under any remedy which involves waste excavation. EPA has determined that the potential for lead to migrate from the Site through fugitive emissions generated during remedy implementation increases in direct proportion to an increase in the volume of contaminated material removed from the Site. Excavation of contaminated material in the area of the Site above the General Five Foot coal seam is unavoidable due to the risk associated with leaving waste in place in areas of potential pothole subsidence. Therefore, the contaminated material

located above the General Five Foot coal seam will be excavated because this waste is in direct contact with areas of pothole subsidence. The potential for releases of contaminants into the surrounding community during excavation, treatment, and transport of the waste was considered in the evaluation of the overall protectiveness of the proposed remedy. Under EPA's proposed remedy all waste removed from the Site would be treated prior to off-Site disposal.

Alternatives K and L, which involve waste treatment, do not offer a greater degree of protectiveness when compared to the other treatment options (Alternatives I and J) because they require a longer implementation time at greater cost. Alternative K, which involves washing hazardous constituents from the waste, has been proven difficult to implement at other Sites when lead battery casings are present in the waste material.

Alternatives A and B offer no overall protection to human health and the environment, because these alternatives do not eliminate, reduce, or control Site risk through treatment, engineering controls or institutional controls.

2. Attainment of Media Cleanup Standards

This criterion measures the ability of the proposed Corrective Measure Alternatives to meet the media cleanup standards and performance standards described in Section X. A and B above.

Under EPA's proposed remedy, soil with lead concentrations exceeding 500 mg/kg, and PCBs (Aroclor 1254) and PAHs exceeding their respective cleanup standards, which are specified in Section X.A above, would be excavated from areas of the site outside the area of the proposed 10-acre cap. Confirmatory sampling would be conducted after the soil excavation to ensure that all cleanup standards are achieved for all constituents of concern. All excavated soil and waste material with lead concentrations exceeding the TCLP standard of 5.0 mg/L, would be treated on-Site, and disposed of off-Site. Excavated soil and waste material with lead concentrations below the TCLP standard would be treated and consolidated on-Site under the 10-acre cap. The performance standard for contaminated material solidified and stabilized at the Site will be the TCLP test. The waste will be treated to achieve a TCLP level below the regulatory limit of 5.0 mg/L. The specific in-situ technology requirements, such as material and reagents that will be used and mixing methods, will be specified in the design for the final remedy for the Site.

Alternatives G, H, I, J, and EPA's proposed remedy all involve the solidification and stabilization of contaminated material at the Site. The performance standard for this treatment technology is compliance with the TCLP standard of 5.0 mg/l. The ability of the treated waste material to meet this standard demonstrates that contaminants have been successfully immobilized during the treatment process. Treatability studies conducted by Gould on contaminated material collected from various on-Site locations demonstrate successful

compliance with the TCLP standard. Gould prepared a report entitled "The Stabilization/Solidification Bench-Scale Treatability Study Report" dated April 28, 1994 which is available for review in the Administrative Record for the Site.

Alternatives I, J, K, all would attain the media cleanup standards in on-Site soils for lead, PAHs, and PCBs by removing all contaminated material from the Site.

Alternative A does not attain media cleanup standards for the Site, and there would continue to be the potential for direct contact with on-Site soils which exceed EPA's cleanup standards for lead, PAHs, and PCBs. Alternative B offers very limited protection against exposure to Site contaminants by removing contaminated soil from the North Woods and the low hazard soil stockpile. Exposure to Site contaminants exceeding the cleanup standards for lead, PAHs, and PCBs would still occur under this alternative.

3. Controlling the Source of the Release

This criterion measures the ability of the selected remedy to reduce or eliminate, to the maximum extent practicable, further releases of hazardous waste (including hazardous constituents) from the Site into the surrounding environment. Potential pathways for release of contaminants from the Site include air releases, releases to groundwater, and contaminant release to surface water, sediments, and soils via runoff from the Site. Each Corrective Measures Alternative seeks to control such releases to varying degrees.

Alternatives D1, D2, E, F1, F2, G, and EPA's proposed remedy all involve the construction of a cap. Capping involves the installation of an impermeable barrier to eliminate direct contact with contaminated soil and waste material. Capping also reduces the infiltration of water through the contaminated soil and waste material. An effective cap would mitigate the risks from direct contact, air releases, and surface water contamination by erosion of contaminated material. Caps are engineered to reduce groundwater contamination caused by leaching of contaminants. Containment or capping is often selected as the remedial action due to its effectiveness in protecting the surrounding community and the environment.

EPA's remedy, and Alternatives G and H offer additional control over the source of releases of contaminants from the Site by treating the BCM located in the primary fill area at the Site. BCM is the principal source of lead contamination at the Site. Treatment of the battery casing material using solidification and stabilization will provide additional source control by preventing direct exposure to the on-Site source material in the event of a cap failure. In addition, treating the source material will further reduce the ability of water to infiltrate through the BCM, as compared to "cap only" alternatives, thereby preventing any migration or movement of contaminants beneath the cap.

Alternatives I, J, K, and L, involve the total removal of all battery casing material from

the Site. Therefore, permanent source control for the Marjol property is achieved by each of these corrective measures alternatives.

Alternatives A and B do not control the source of contamination at the Site because the BCM remains covered with a temporary soil cover which does not minimize infiltration and leaching.

4. Compliance With Waste Management Standards

This criterion measures the ability of the selected Corrective Measure Alternative to manage waste in a protective manner during the implementation of the remedy. This is achieved through compliance with all applicable federal, and state waste management standards.

Each of the Corrective Measures Alternatives, except the No Action alternative, requires on-Site soils to be moved and/or consolidated during the implementation of the remedy. These activities would require a plan approval under 25 Pa. Code Chapter 102.

Corrective Measures Alternatives D1, D2, E, F1, F2, G, and EPA's proposed remedy, all involve the construction of a cap. The cap design must comply with the standards established by the Pennsylvania's Hazardous Waste Regulations, 25 Pa. Code Chapter 260-270 et. seq. Specifically sections located in 25 Pa. Code Chapter 264 and 102 that incorporate Subchapters 264.1, 264.11, 264.31, 264.90, 264.110, and 264.300, and related sections, 264.301, 264.304, 264.309, 264.310, and 264.316. Further capping details are located on pages 264-163, 264-164, and 264-165.

Each of the Corrective Measures Alternatives, except the No Action alternative, would require that fugitive dust emissions generated during remedial activities comply with the National Ambient Air Quality Standards set forth in 40 CFR Part 50 and 25 PA Code Sections 131.2 and 131.3. Such emissions will comply with regulations in the federally approved State Implementation Plan for the Commonwealth of Pennsylvania, 40 CFR Sections 123.1 and 123.2. Normal dust control measures would be implemented to mitigate short-term adverse effects or releases during Site activities. Normal dust control measures consist of the application of water onto the excavation area and the haul roads to suppress the generation of fugitive dust emissions. Additional dust control measures would be necessary if levels were found to exceed the National Ambient Air Quality Standard for lead or if real-time dust monitoring results exceed background dust concentrations. Examples of such measures include the application of dust suppressant foams, restrictions on the rate of excavation, or installation of temporary structures. The specific dust control measures to be used during remedial activities will be determined in the design phase of the final remedy for the Site.

Each of the alternatives, except no action, would comply with the requirements of the Pennsylvania Soil Erosion and Sediment Control Regulations set forth in 25 PA Code, Chapter

102. Erosion and sediment control measures that will be implemented include, but are not limited to, the reconstruction of the existing stormwater management basin, and the installation of silt fences, hay bales, check dams, drainage diversions and temporary erosion matting. The specific erosion and sediment control measures to be used during remedial activities will be determined in the design phase of the final remedy for the Site.

The Land Disposal Restrictions contained within 40 CFR Part 268 require that specific hazardous wastes must meet treatment standards prior to being land disposed. EPA's memorandum "Use of the Area of Contamination Concept During RCRA Cleanups" dated March 13, 1996, states that "certain discrete areas of generally dispersed contamination (called "areas of contamination" or "AOCs") could be equated to a RCRA landfill and that movement of hazardous wastes within the (AOC) would not be considered land disposal and would not trigger the RCRA Land Disposal Restrictions." This interpretation allows waste to be consolidated or treated in-situ within the AOC without triggering land disposal restrictions or minimum technology requirements. The AOC concept is discussed in detail in the preamble to the National Contingency Plan (55 FR 8758-8760, March 8, 1990).

Each of the corrective measures alternatives involves movement or consolidation of contaminated soil and waste material at the Site during remedial activities, except the No Action alternative. According to the AOC policy, movement within or consolidation of waste within the AOC would not constitute waste placement, therefore, the specific LDR hazardous waste treatment requirements would not be triggered. However, under EPA's proposed remedy all contaminated soil and waste materials that will remain at the Site would be treated.

B. Summary of the Four General Standards of Corrective Action

The No Action Alternative (Alternative A) and the Soil Stockpile Consolidation Alternative (Alternative B) will not be considered further in this analysis because they fail to meet the four general standards for corrective measures including the overall protection of human health and the environment, the attainment of media cleanup standards, controlling the source of the release, and compliance with waste management standards. All of the other Corrective Measures Alternatives will be evaluated against the five remedy selection decision factors in Section XV.C. below.

C. Five Remedy Selection Decision Factors for Corrective Action

Each of the remaining corrective measures alternatives is measured against the five remedy selection decision factors including: (1) Long-term reliability and effectiveness, (2) Reduction of toxicity, mobility, or volume of waste, (3) Short-term effectiveness, (4) Implementability, and (5) Cost. These factors are used as the final balancing criteria to identify the best remedy for the Site.

1. Long-Term Reliability and Effectiveness

Alternatives D1, D2, E, F1, and F2, involve the consolidation and capping, without treatment, of the contaminated soil and waste material at the Site. Corrective Measures Alternatives which involve the construction of a cap are proven to be reliable and effective remedies at hazardous waste sites; however, they rely heavily on long-term maintenance to ensure continued protectiveness.

Alternatives G , H, and EPA's proposed remedy, increase the long-term reliability by treating the waste prior to capping. Under these alternatives, even if the cap were to erode over an extended period of time, the contamination would remain solidified which would prevent direct contact with waste beneath the cap surface. Additionally, the solidification and stabilization of the waste decreases the ability of contaminants to leach into the groundwater beneath the waste material.

EPA's proposed remedy, and Alternative D2, provide a greater degree of long-term protection against potential pothole mine subsidence or mine fires. Under EPA's proposal, waste is removed from areas of potential pothole mine subsidence. Pothole subsidence potential exists north of the limit of the Five Foot coal seam. If a cap were situated in this area, the potential exists for erosion to occur which could compromise the integrity of the cap resulting in a break or breach in the cap. Additionally, if a mine fire were to occur after the implementation of the final remedy for the Site, these alternatives would continue to prevent the release of contaminants from the Site because waste would be removed from areas with greatest mine fire potential.

Alternative F1 increases the long-term reliability of the remedy as compared to Alternatives D1, D2, and E by grouting the bottom of the primary BCM fill area in order to increase the stability of the waste material prior to capping. Alternative F2 would also increase the long-term reliability of the remedy by stabilizing the mine voids to minimize the impact of any future pothole subsidence events that may occur in the Five- and Eight-Foot coal seams. However, Alternatives G, H, and EPA's proposed remedy provide a greater degree of long-term protectiveness and reliability as compared to these alternatives because the entire volume of waste material beneath the cap would be treated prior to capping.

Alternatives I, J, K, and L, provide the greatest level of long term reliability and effectiveness of all of the Corrective Measures Alternatives because all of the contaminated material would be removed from the Site.

Each of the Corrective Measures Alternatives would involve the use of institutional controls such as use restrictions, title notices, and proprietary controls, as necessary to ensure the protectiveness of the remedy. EPA's proposed remedy would involve the implementation of

controls to limit the following: (1) future development at the Site; (2) future earth moving activities such as excavation and well drilling; and (3) future earth disturbing activities on the capped portions of the Site. In addition, each of the Corrective Measures Alternatives, would include long-term (post-closure) requirements including, but not limited to, monitoring of the air, groundwater, surface water, and sediment, and cap maintenance activities.

2. Reduction of Toxicity, Mobility, or Volume of Waste

This criterion evaluates the following: the treatment process used and the materials treated during the implementation of the selected remedy; the amount of hazardous material destroyed or treated; the degree of expected reductions in toxicity, mobility, or volume of the waste; the degree to which treatment is irreversible; and the type and quantity of residuals remaining after treatment.

Alternatives D1, D2, E, F1, and F2 do not reduce the toxicity, mobility, or volume of waste through treatment. However, they do reduce the mobility of Site contaminants into the air by covering them with the protective layers of a cap. Surface water would be protected by the cap which would prevent contaminated runoff from migrating from the Site into the Lackawanna River. Groundwater would be protected by the cap, which would reduce infiltration of precipitation through the contaminated material located beneath the cap following implementation of the final remedy for the Site. The solidification/stabilization of the waste, as required by EPA's proposed alternative, would achieve an even greater reduction in the mobility of the waste, as compared to "cap-only" alternatives. Though the toxicity of the waste would not decrease, the leachability of the lead would decrease under EPA's proposal, thus rendering the waste material remaining at the Site non-hazardous as measured by the TCLP analysis.

Alternative F1 would offer a slightly greater degree of reduction in the mobility of the waste as compared to Alternatives D1, D2, and E, by solidifying the bottom of the primary BCM fill area. This alternative would provide an additional level of protection against the leaching of lead from the primary BCM fill area into the groundwater. However, Alternatives G, H, and EPA's proposed remedy, would provide an even greater reduction in the mobility of the waste because the entire volume of waste material would be treated.

Alternatives G, H, and EPA's proposed remedy require the addition of solidification and stabilization materials which increases the total volume of material present beneath the cap although the volume of contaminated material would remain the same. However, EPA's remedy requires that one-third of the contaminated material at the Site be treated and taken off-Site for disposal. Therefore, a smaller volume of contaminated material will be consolidated under the cap, under EPA's proposed remedy, as compared to Alternatives D1, D2, E, F, G, and H, which involve the consolidation of all contaminated material at the Site under the cap.

Alternatives G, H, I, J, K, and L all involve some level of waste treatment either via

solidification/stabilization, soil/battery casing material washing, or thermal treatment. Solidification/stabilization is a preferred treatment method as compared to soil/battery casing material washing because the latter process generates wastewater that must be properly managed. This process could potentially increase the mobility of the lead and discharge contaminated runoff into the stormwater management basin, and subsequently the Lackawanna River, during the implementation of the remedy. Therefore, this option is less desirable than other treatment alternatives which do not generate a large volume of wastewater.

Alternative L involves the destruction of the Site contaminants using high temperatures in a reactor or furnace, and is therefore, an irreversible treatment process. However, there are a limited number of thermal treatment facilities available which can receive the large volume of contaminated material from the Site. Therefore, implementation time for this remedy is too lengthy to make it a feasible remedial alternative for the Site.

3. Short-term Effectiveness

This criterion measures the length of time needed for the proposed Corrective Measure Alternative to achieve the desired level of protection. It also evaluates any adverse impacts to human health and the environment that may be posed during the implementation of the remedy.

Table 7 provides the time for implementation for each Corrective Measures Alternative. The time for implementation includes the time it will take to complete all construction activities associated with the remedy and the time to achieve all cleanup standards. Construction activities required for each Corrective Measures Alternative would begin in the spring and continue through a nine month construction season. Construction activities would not take place during the winter months. Alternatives D1, D2, E, F1, and F2, require approximately seven to sixteen months to implement. These are the shortest implementation times of all the feasible Corrective Measures Alternatives. Alternatives G, and H, require approximately three to four years to implement. The length of time required to dispose of all of the waste off-Site ranges from approximately four years for Alternative I, to twenty years for Alternative L. The time required to implement Alternative L is approximately twenty years if three thermal treatment facilities are utilized. The implementation time is so lengthy due to three factors: (1) only five truckloads of contaminated material could leave the Site per day, (2) the slow rate of treatment of the contaminated material at the thermal treatment facility, and (3) the limited ability of the treatment facility to store hazardous waste on-Site during the implementation of the remedy. Therefore, Alternative L is not a desirable remedy for the Site due to the potential adverse impact to human health and the environment during the lengthy implementation time.

EPA's proposed remedy, which requires in-situ treatment of approximately two-thirds of the contaminated material, and off-Site disposal of approximately one-third of the contaminated material at the Site can be implemented in approximately three to four years. This implementation time is reasonable for the volume of waste present at the Site.

The most significant concern regarding the short-term effectiveness of a Corrective Measure Alternative which involves the excavation and movement of contaminated on-Site soils is the control of fugitive dust emissions in order to protect the surrounding community and on-Site workers. In order to prevent exposure to the community to fugitive emissions during remedial activities, dust control measures, such as soil wetting, will be a component of all remedial alternatives involving soil removal. EPA's proposed remedy would also require extensive real-time dust monitoring, as well as chemical specific monitoring to ensure that Site contaminants are not released to the surrounding community during the implementation of the remedy. The types of dust control methods, the number and location of air monitors, and the frequency of air monitoring will be specified in the work plans for the corrective measures design and implementation. On-Site workers will also be required to wear personal protective equipment during the implementation of the remedy.

Alternatives H, I, J, K, and L, involve the excavation of all contaminated soils and waste material from the Site. Consequently, these alternatives have the greatest potential for release of fugitive dust to the surrounding community, or for truck accidents to occur during transport of materials from the Site. In general, the larger the volume of soil removed from the Site, the greater the risk to the surrounding community from accidental releases of contaminated material during the implementation of the remedy.

EPA's proposed remedy involves in-situ waste treatment which reduces the risk of releases of fugitive dust to the community as compared to Alternative H in which all waste material is excavated prior to treatment.

All of the Corrective Measure Alternatives, including EPA's proposed remedy, include erosion control measures to be implemented during the remediation activities to prevent contaminated surface runoff from migrating to the Lackawanna River. The existing Stormwater Management Basin would be reconstructed under each of the Corrective Measures Alternatives.

4. Implementability

This criterion measures the technical and administrative feasibility of constructing, operating, and maintaining a remedial action alternative, the reliability of the technology, the ability to monitor the effectiveness of the remedy, the availability of off-Site treatment, storage, and disposal services, coordination with other Agencies, and the ease of undertaking additional corrective measures, if necessary.

Alternatives D1, D2, E, F1, F2, G, H, and EPA's proposed remedy all involve the construction of a cap. The cap, required under these alternatives, is easy to construct. The earthmoving equipment, labor, and materials required to construct the cap are locally available and can be found within a reasonable distance from the Site.

EPA's proposed remedy involves the solidification and stabilization of contaminated soil and waste material at the Site. Solidification/stabilization is recognized by EPA as a Best Demonstrated Available Technology for the remediation of hazardous waste at lead battery sites. Therefore, this alternative is technically feasible to implement. The in-situ technology is more innovative; however, it has been successfully implemented at many hazardous waste sites. EPA's remedy also involves in-situ solidification/stabilization of on-Site soil and waste material. In-situ treatment relies on the delivery and effective mixing of materials such as cement, fly ash, and stabilization reagents with the contaminated waste materials. This process eliminates difficulties in achieving uniformity in the solidified matrix due to the variability or inhomogeneous nature of the soil and BCM. However, under the in-situ solidification and stabilization treatment alternative based on performance at other lead battery sites, waste can be treated in place to depths exceeding 100 feet. The greatest depth of the waste material at the Site is approximately 25-30 feet. EPA considers the in-situ treatment of metal-contaminated waste to be very effective using an auger system to depths of thirty feet (EPA Document No. 540/S-94/500). Therefore, it is feasible to deliver the solidification/stabilization reagents to waste currently buried at the Site. The specific treatment materials and method of delivery of such materials to the waste at the Site will be specified in the design of the final remedy for the Site.

Table 7 shows the number of trucks per day and the total number of trucks required to transport materials to and from the Site during the implemenation of each Corrective Measures Alternative. To address community concerns, traffic planning and safety considerations would be required under each alternative. Gould would coordinate with the local community and with the Throop Borough Council to minimize, to the maximum extent possible, any disruption to the normal traffic pattern in the vicinity of the Site.

Alternative D2 would involve fewer trucks than the other Corrective Measures Alternatives over the shortest period of time because the cap size under this alternative is smaller than the other cap alternatives. Therefore, less capping material would be needed to be transported onto the Site to construct the cap. Alternatives G and H would require more trucks than "cap-only" options because waste treatment materials must be transported to the Site. Alternatives I, J, K, and L would require the largest number of trucks, because these options transport all of the on-Site contaminated material to off-Site locations for disposal. However, the rail options for Alternatives I and J would significantly reduce the number of trucks needed to transport materials to and from the Site. Rail options would thus require a number of trucks similar to the number of trucks required for the "cap-only" alternatives. EPA's proposed remedy would require the transport of treatment and cap materials to the Site and treated waste material from the Site. Therefore, based on the volume estimates for EPA's remedy, the total number of trucks required to implement EPA's Corrective Measures Alternative would be approximately the sum of two-thirds of the number of trucks required under Alternative G plus one-third of the number of trucks required for Alternative I. The calculated number of trucks required to implement EPA's proposed remedy is also provided in Table 7.

Alternative K involves soil/BCM washing. The performance of this technology in at least one other Site (Gould's Portland Oregon Superfund Site) was not successful in washing the BCM. Therefore, under this alternative, treatment using solidification/stabilization may still be required before disposing of the washed material off-site.

5. Cost

EPA evaluated cost as a final balancing criteria after each of the other criteria were evaluated. Since EPA designed the proposed remedy based on Alternatives G and I, EPA estimated the cost of the proposed remedy by using Gould's estimates for the relevant portions as presented in the CMS Report. EPA estimates that the cost of the proposed remedy will range from $36 to $41 million.

XVI. Community Involvement/ Public Participation

EPA recognizes the level of interest expressed by the community regarding the selection and implementation of a remedy for the Site. Since 1988, EPA has participated in numerous meetings with the Citizens Review Committee, Throop Borough Council, and the local community residing near the Site. EPA currently holds biweekly conference calls with the Throop Borough Council, and other concerned citizens, in order to respond to the concerns of the community with respect to the Site. EPA has carefully considered comments from the local community in the development of this proposed remedy.

Following the release of the Statement of Basis, EPA will conduct several briefings with interested public officials and members of the public. These briefings will take place in Throop, Pennsylvania between October 18 and October 30, 1999. EPA's briefings are intended to inform all interested parties about EPA's proposed remedy and to enable all members of the community to provide meaningful comments during the public comment period which will follow. A thirty (30)-day public comment period will begin on November 1, 1999 and end on December 1, 1999. Members of the public are encouraged to submit comments, questions, or any additional information to EPA and PADEP for review. Written comments should be submitted to:

Ms. Sibyl Hinnant
U.S. EPA, Region III
1650 Arch Street
Philadelphia, PA 19103
Attn: 3WC22
(215) 814-3417

Statement of Basis
Marjol Battery Site

A formal public hearing is scheduled for November 22, 1999 from 6:30 pm-9:00 pm at the Borough Civic Center in Throop, PA. During this hearing, EPA will receive public comments on EPA's preferred Corrective Measure Alternative. Persons wishing to view the Administrative Record may do so at the following locations:

Throop Borough Council Building
436 Sanderson Street
Throop, Pennsylvania 18512-1224
Contact: Elaine Morrell
Telephone Number: (570) 489-8311

and

United States Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103
Contact: Mildred Oruska
Telephone Number: (215) 814-3405

After evaluation of the public's comments, EPA will prepare a Final Decision and Response to Comments which identifies the selected remedy. The Final Decision will identify the Corrective Measures Alternative selected by EPA after its consideration of comments it received on the proposed remedy. The Response to Comments will address all significant written comments and oral comments made during the public meeting. If, on the basis of such comments or other relevant information, significant changes are made in the Corrective Measures Alternatives selected by EPA, EPA may seek public comments on the revised Corrective Measures Alternative(s). If public comments do not result in a significant change to the Corrective Measure Alternative selected by EPA, EPA will issue its Final Decision and Response to Comments. At that time, EPA may provide Gould an opportunity to negotiate a RCRA §3008(h) Consent Order to implement the remedy selected.

10/15/99
Date

John A. Armstead, Director
Waste and Chemicals Management Division
U.S. EPA Region III

FIGURES

Figure 1

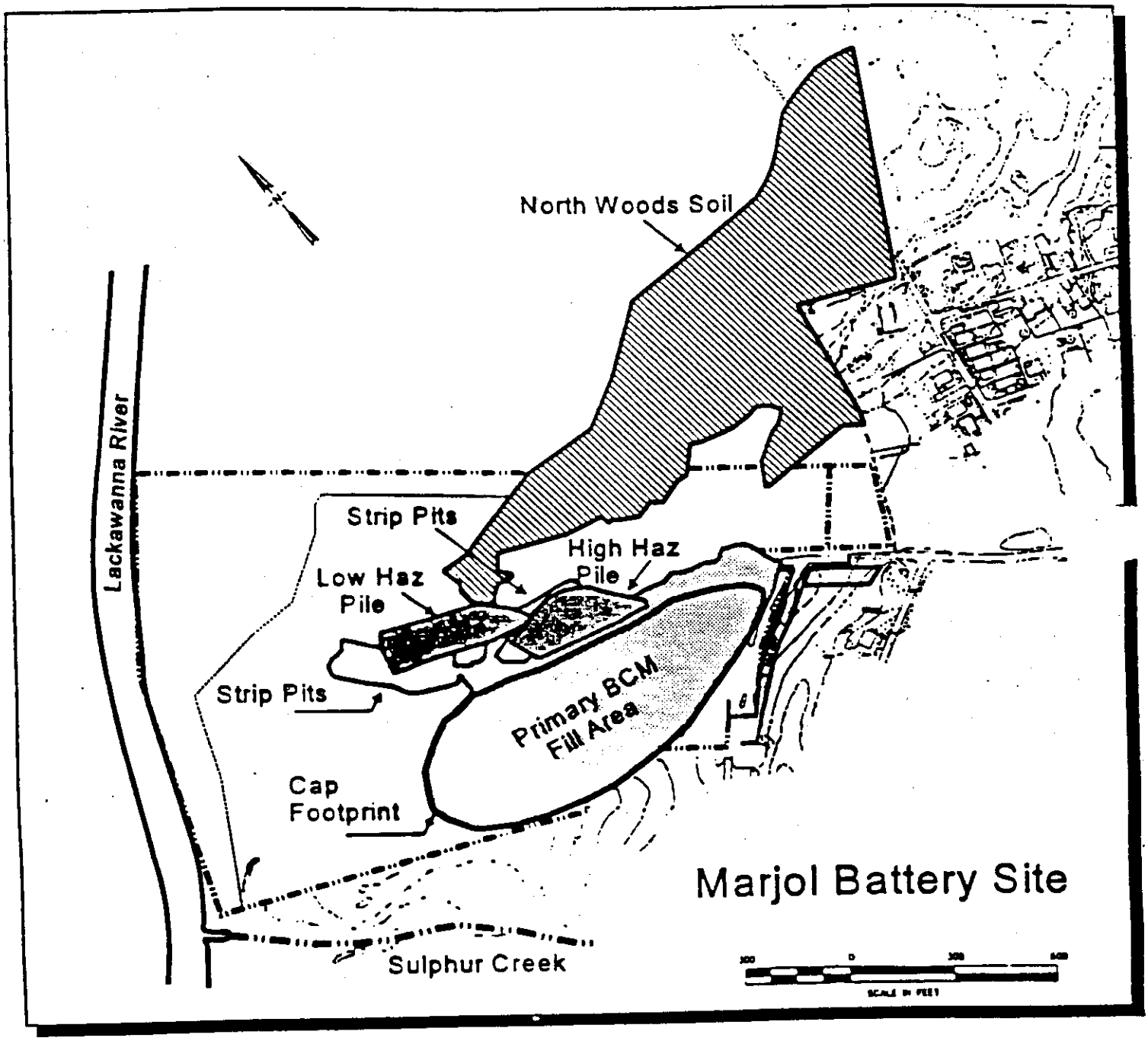

North Woods Soil
Lackawanna River
Strip Pits
High Haz Pile
Low Haz Pile
Strip Pits
Primary BCM Fill Area
Cap Footprint
Sulphur Creek
Marjol Battery Site

Figure 2

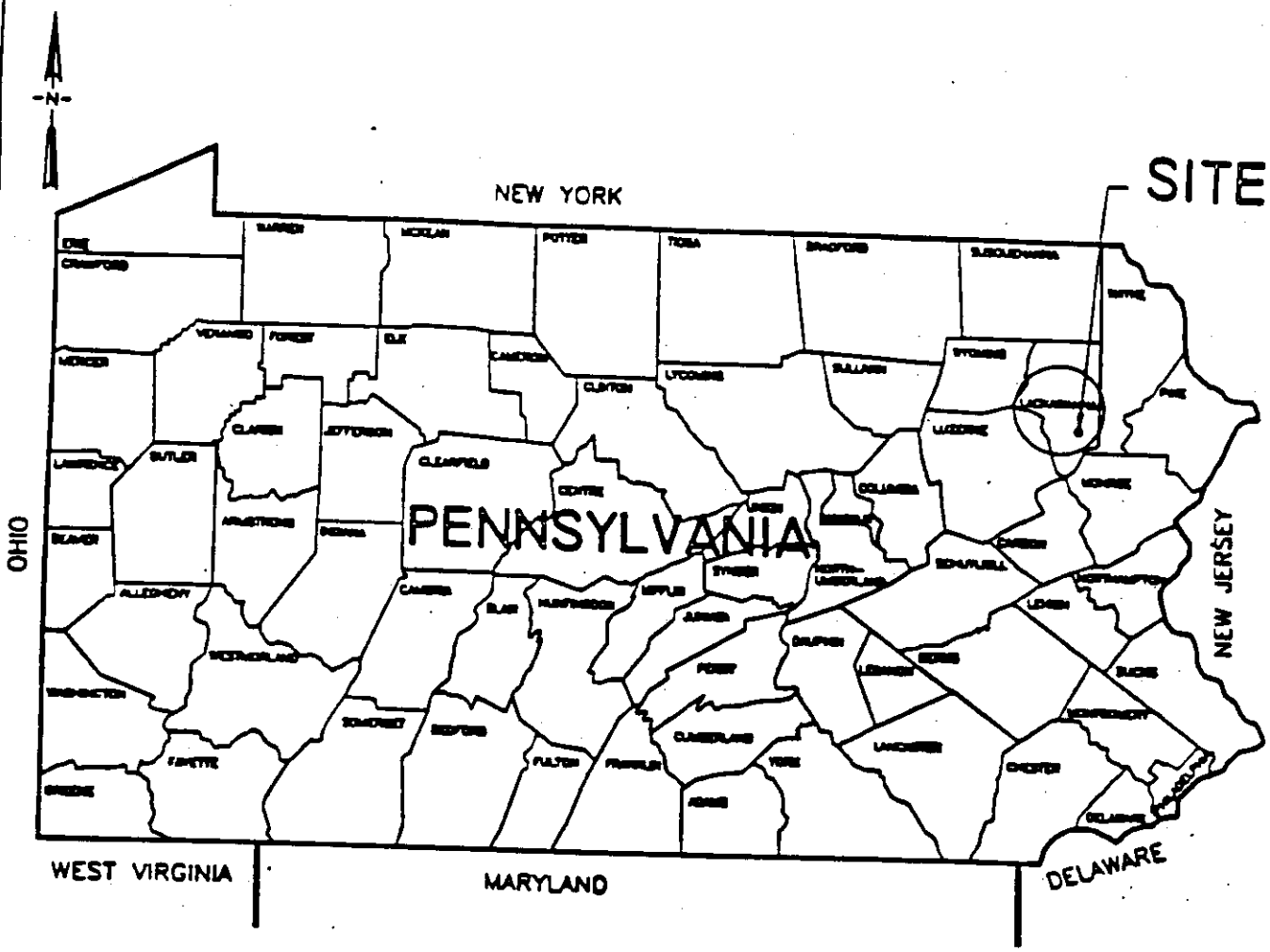
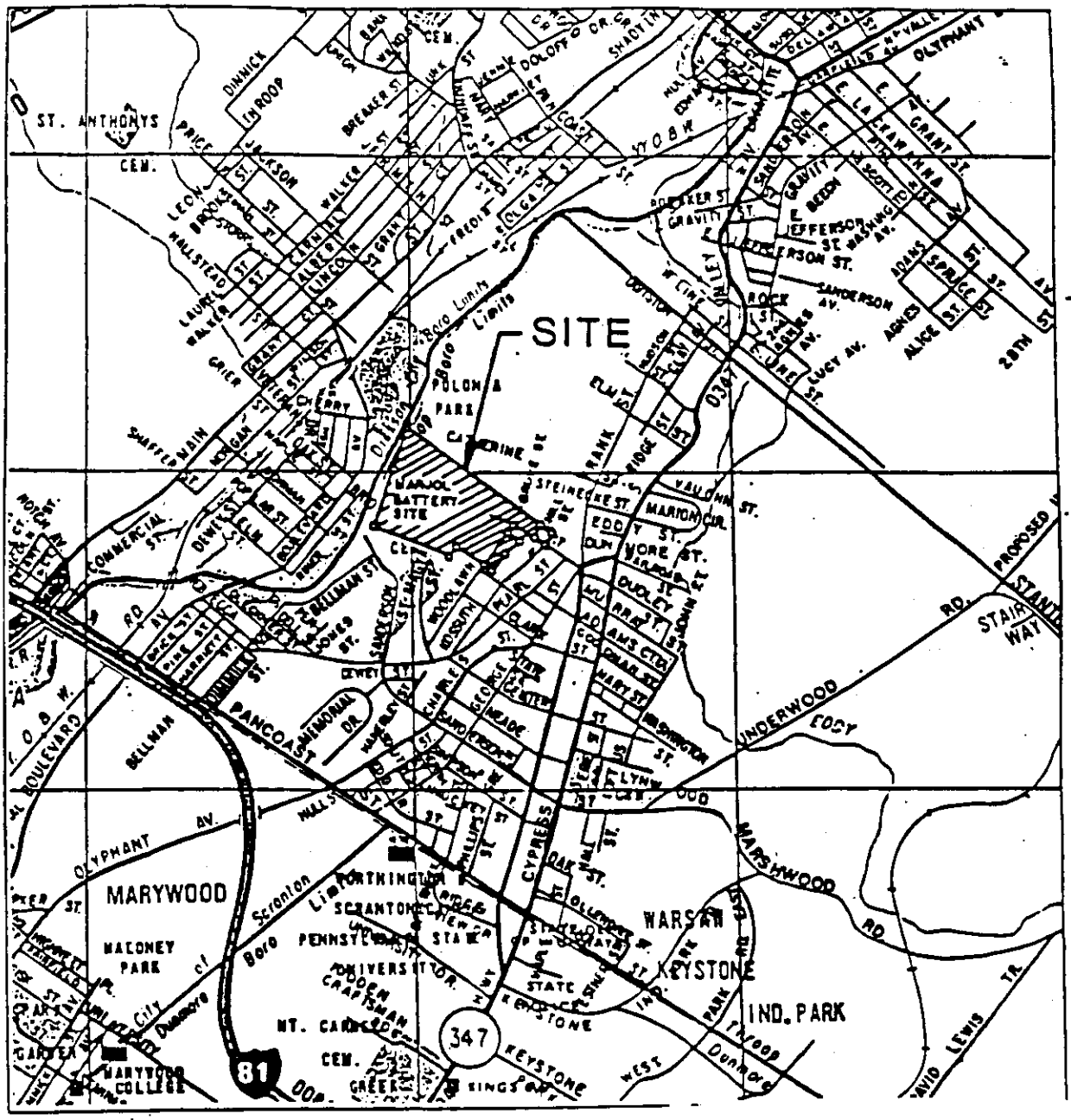

N
NEW YORK
SITE
PENNSYLVANIA
OHIO
NEW JERSEY
WEST VIRGINIA
MARYLAND
DELAWARE

Figure 3



THIS FIGURE IS BASED ON THE CHAMPION'S STREET MAP OF SCRANTON, PENNSYLVANIA.

Figure 4

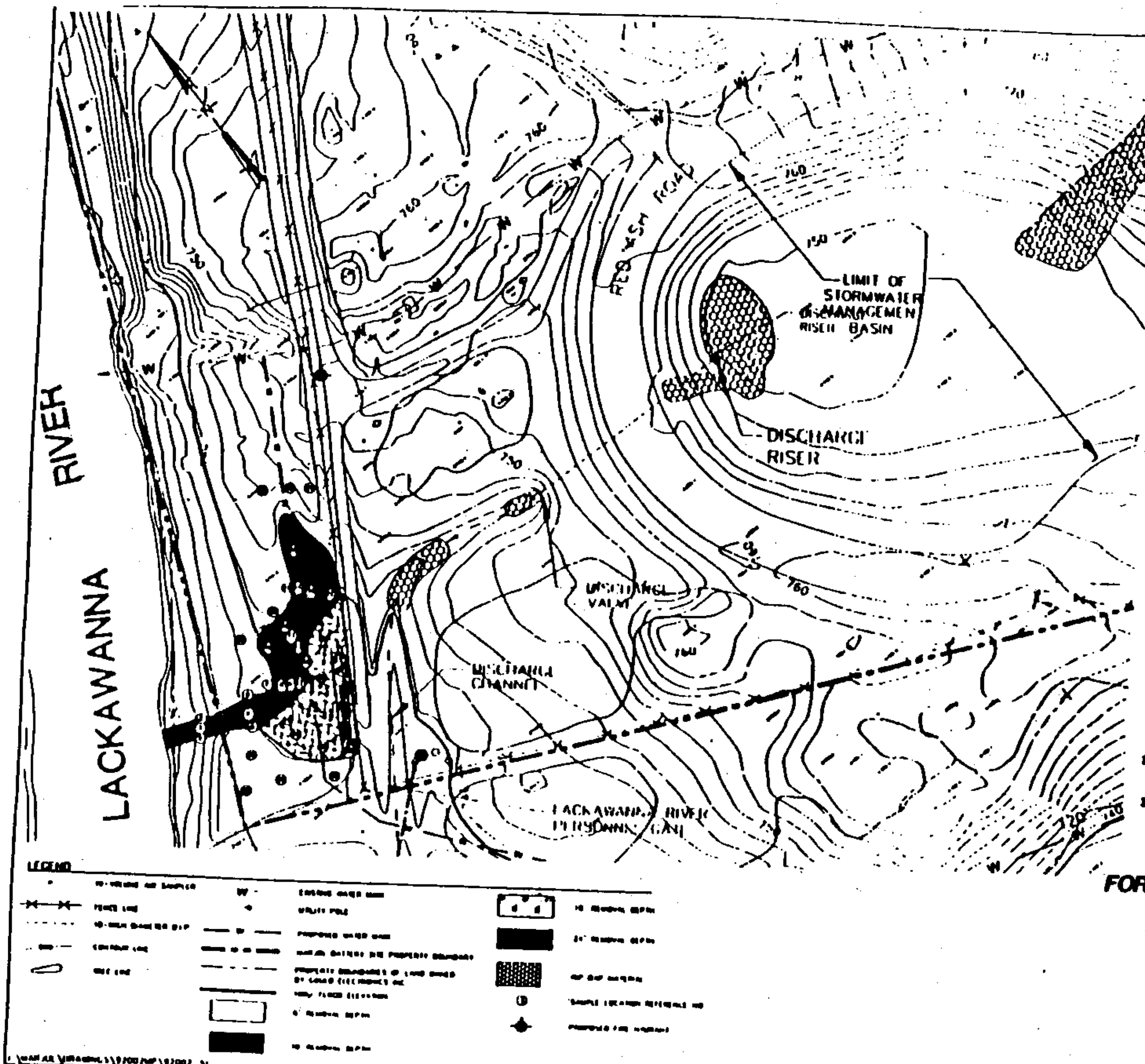


TABLE 1
SOIL SAMPLING RESULTS (XRF/AAB)
(MG/KG LEAD)

SAMPLE LOCATION REFERENCE NO	SAMPLE NO	INTERVAL DEPTH			
		A (0"-2")	B (2"-10")	C (10"-18")	D (18"-2[illegible])
1	12-EN-1552	-230	-205	-200	830
2	12-EN-1553	-290	-210	-300	-370
3	12-EN-1554	-310	-300/80	-310	-70
4	12-EN-1555	-190	-337	395/79	309
5	12-EN-1556	-210	2390	2057	292/898
6	12-EN-1557	-232	-305	-343	370
7	12-EN-1558	-1	-203	327	300
8	12-EN-1559	4005	4790/3300	352	-80
9	12-EN-1560	10023	10207	1003	331
10	12-EN-1561	13100	8100	9100	821
11	12-EN-1562	8811	3791/2000	170	409
12	12-EN-1563	2501	5104	870	1330
13	12-EN-1564	-368	-201/30	-207	-204
14	12-EN-1565	10213	12004	4353	40/330
15	12-EN-1566	19450	10107	848	909/1100
16	12-EN-1567	12271	2020	157/730	-100
17	12-EN-1568	21049	17630	8820	1034
18	12-EN-1569	3310	13117/23000	1333	101/900
19	12-EN-1570	10982	8100	1101	NS
20	12-EN-1571	-270	-201	-130	-304
21	12-EN-1572	830/920	8953	8653	3450
22	12-EN-1573	8853	792	120	-209
23	12-EN-1574	-73	-239	213/39	-203
24	12-EN-1575	17002	8822	230/770	NS
25	12-EN-1576	2293	341	231	-207
26	12-EN-1577	904	312/830	1031	130
27	12-EN-1578	1300	405	-180	NS
28	12-EN-1579	7410	10122	300	NS
29	[illegible]	171/130	-213	NA	NS
30	[illegible]	83/316	[illegible]	-310	NA
31	[illegible]	91	[illegible]	700	NA
32	12-EN-1581	2703	81	230/130	NA
33	12-EN-1582	NA/210	NA/39	NA/10	NS
34	[illegible]	NA/340	NA/120	NA/15	NS
35	[illegible]	NA/190	NA/80	NA/31	NS
36	12-EN-1587	NA/190	NA/87	NA/19	NS

NOTE: 1) NS: NOT SAMPLED; NA: NOT ANALYZED
2) [illegible] OF SAMPLES WERE ANALYZED BY [illegible] LABORATORIES USING ATOMIC ABSORPTION AND RESULT [illegible]

NOTES

1. TOPOGRAPHICAL INFORMATION BASED ON AERIAL SURVEY PERFORMED IN 1982 BY AERIAL DATA REDUCTION INC. GROUND SURFACE ELEVATIONS BASED ON THE NATIONAL GEODETIC VERTICAL DATUM (1929).
2. SOIL SAMPLING PERFORMED BY ADVANCED GEOSERVICES CORP. (AGC) ON JULY 27, 28, & 29, 1988
3. SAMPLE LOCATIONS WERE SURVEYED ON JULY 31, 1988 BY GEORGE DUNDA ASSOCIATES, 221 BARNARD STREET, DUNMORE, PA 18512, WITH RESPECT TO THE SITE-SPECIFIC COORDINATE SYSTEM

MARJOL BATTERY SITE
FORMER DRAINAGE SWALE SOIL REMOVAL
THROOP BOROUGH, LACKAWANNA COUNTY, PENNSYLVANIA

Figure 5

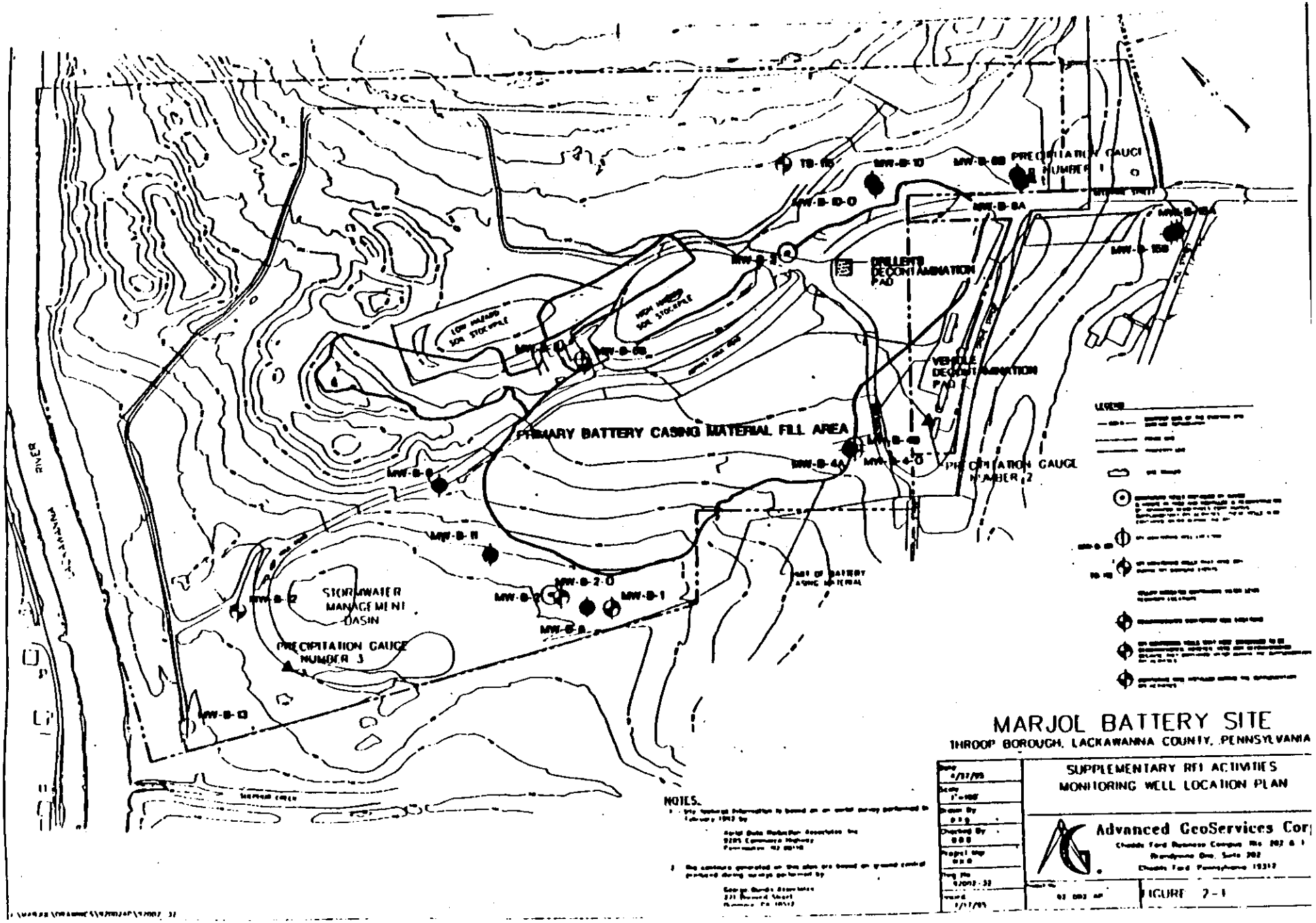

PRIMARY BATTERY CASING MATERIAL FILL AREA
STORMWATER MANAGEMENT BASIN
PRECIPITATION GAUGE NUMBER 3
PRECIPITATION GAUGE NUMBER 2
DRILLERS DECONTAMINATION PAD
VEHICLE DECONTAMINATION PAD
MW-B-1
MW-B-2
MW-B-2-D
MW-B-3
MW-B-4A
MW-B-4-D
MW-B-5
MW-B-6
MW-B-7
MW-B-8
MW-B-9
MW-B-10
MW-B-11
MW-B-12
MW-B-13
TB-10
NOTES.
MARJOL BATTERY SITE
THROOP BOROUGH, LACKAWANNA COUNTY, PENNSYLVANIA
SUPPLEMENTARY RFI ACTIVITIES
MONITORING WELL LOCATION PLAN
Advanced GeoServices Corp
FIGURE 2-1

Figure 6

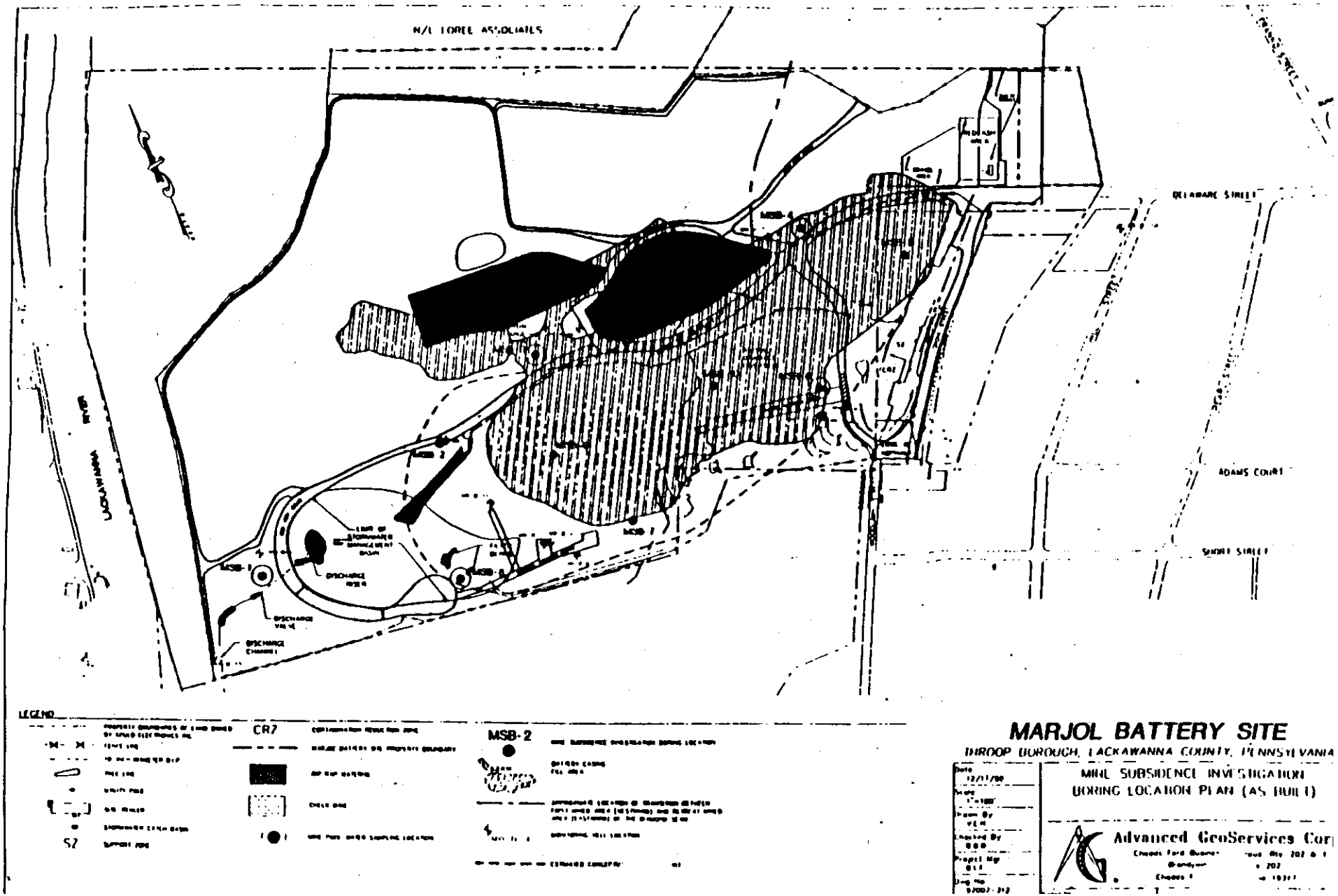

N/L TORRE ASSOCIATES
DELAWARE STREET
ADAMS COURT
SHORT STREET
LACKAWANNA RIVER
MSB-1
MSB-2
DISCHARGE
DISCHARGE
DISCHARGE
LEGEND
CR7
S2
MSB-2
MARJOL BATTERY SITE
DROOP BOROUGH, LACKAWANNA COUNTY, PENNSYLVANIA
MINE SUBSIDENCE INVESTIGATION
BORING LOCATION PLAN (AS BUILT)
Advanced GeoServices Corp

Figure 7

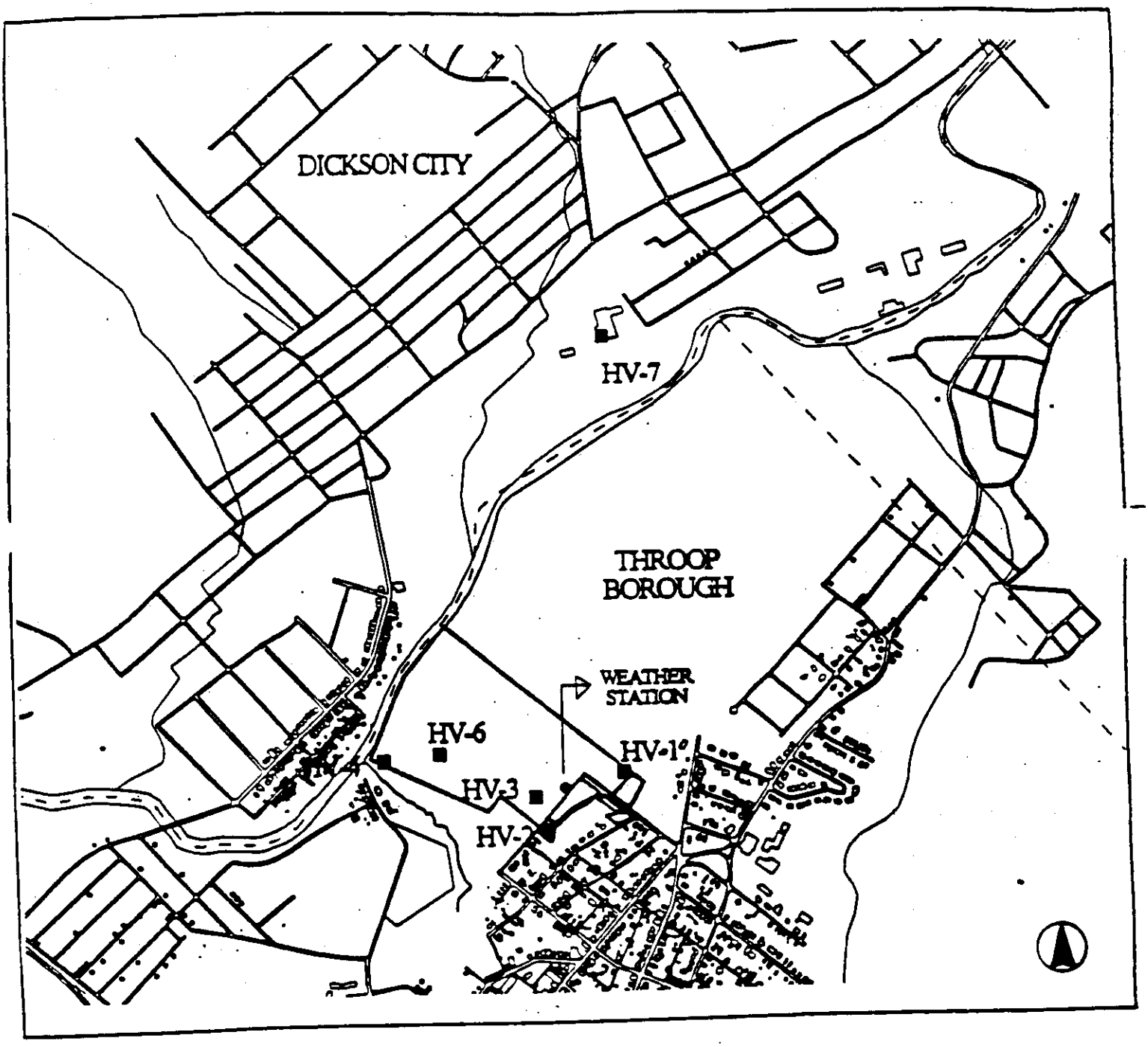

DICKSON CITY
HV-7
THROOP
BOROUGH
WEATHER
STATION
HV-6
HV-1
HV-3
HV-2
0
1000
2000 Feet
HIGH VOLUME SAMPLERS

Figure 8

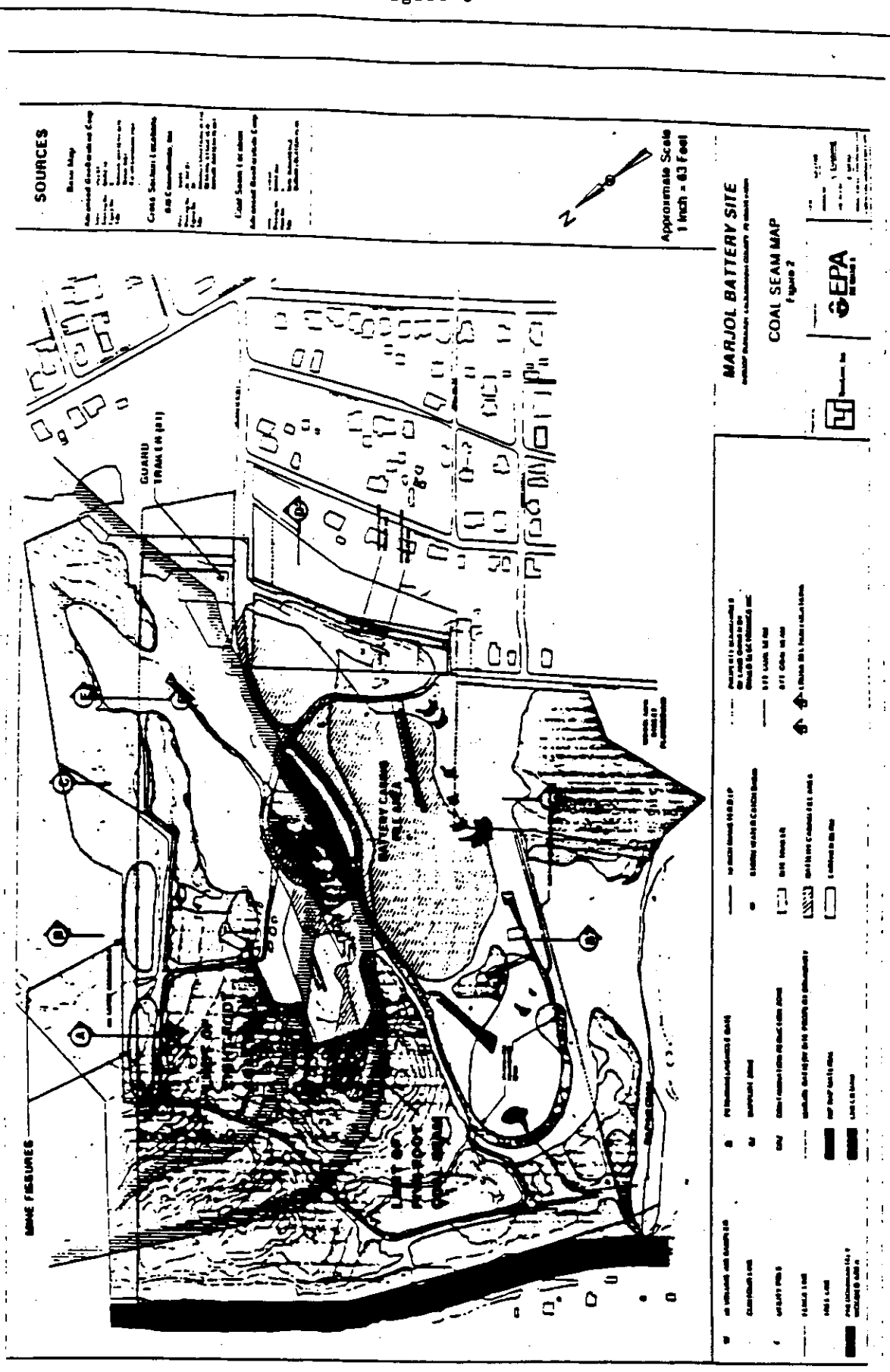

SOURCES
Approximate Scale
1 Inch = 63 Feet
MARJOL BATTERY SITE
COAL SEAM MAP
Figure 2
EPA
MINE FISSURES
GUARD
TRAILER (N.P.I.)
BATTERY CARBON
PIT AREA

TABLE 1 - BREAKDOWN OF VOLUME OF CONTAMINANTS AT THE MARJOL BATTERY SITE

Material		Acres	Volume (cubic yards)
Primary Fill Area BCM in landfill		7.7	159,000
Secondary Fill Areas BCM in 5' western strip pit BCM in 8' western strip pit		0.8 0.5	13,000 4,000
Mine Spoils 5' strip pit & 8' pit strip intermediary fill layer in BCM surface mine spoil fill Beneath parking lot (2'-8' depth) east & west of primary BCM (2' depth)			35,000 7,000 16,000
Residential Topsoil (1'-2' depth)		8.2	25,000
High Hazard Soil Stockpile (>3500mg/kg)		49,300sq.ft	22,000
Low Hazard Soil Stockpile		44,500sq.ft	12,000
Affected Soil	North Woods soil (>500mg/kg)		7,200
	Other, on-site soils (>500mg/kg)		71,800
Total			372,000

** Mine spoils consist of soil and rock excavated from the Site during former coal mining operations.

TABLES

TABLE 2 - LEAD CONCENTRATIONS IN WASTE MATERIAL AT THE MARJOL BATTERY SITE

Material	Lead Concentration (Minimum)	Lead Concentration (Maximum)	Lead Concentration (Average)
Residential Topsoil and "Low" Hazardous Waste Pile	120 mg/kg	20,000 mg/kg	1,300 mg/kg
Battery Casing Material	7 mg/kg	290,000 mg/kg	52,000 mg/kg
"High" Hazardous Waste Pile	1200 mg/kg	130,000 mg/kg	7,500 mg/kg
Mine Spoils	22 mg/kg	250,000 mg/kg	16,000 mg/kg

TABLE 3 - SUMMARY OF PCBs (AROCLOR 1254) AND PAH DATA FROM THE RCRA FACILITY INVESTIGATION FOR THE MARJOL BATTERY SITE

SUMMARY OF RFI DATA FOR PCBs (AROCLOR 1254) and PAHs

Compound	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Average Concentration (mg/kg)
PCB - Aroclor 1254	0.5 ND*	355	7.4
Benzo(a)anthracene	0.05 ND*	75	4.9
Benzo(a)pyrene	0.05 ND*	17	2.8
Benzo(b+k)fluoroanthene	0.05 ND*	52	4.9
Dibenzo(a,h)anthracene	0.1 ND*	25	5.2
Indeno(1,2,3-cd)pyrene	0.1 ND*	25	25

*ND- Non-Detectable Concentration

TABLE 4 - LOCATIONS OF AIR MONITORS FOR THE MARJOL BATTERY SITE

Number of Air Monitor	Location
Sampler #1	East corner of the Site. This location is downwind of the primary battery casing material fill area when the wind is from the west and northwest.
Sampler #2	South side of the Site. This location is downwind of the primary battery casing material fill area when the wind is from the west and northwest.
Sampler #3	Southeast of the primary battery casing material fill area; inside the Site perimeter fence. This location is downwind of the battery casing material fill area when the wind is from the west and northwest.
Sampler #4	Southwest corner of the Site. The location is predominantly upwind of the primary battery casing material fill area.
Sampler #6	Northeast of the stormwater management basin; inside Site perimeter. This location is predominately upwind of the battery casing material fill area.
Sampler #7	Next to Dickson City Fire House. Approximately, one mile north of the Site.

TABLE 5 - CLEANUP STANDARDS FOR LEAD, PCBs, AND PAHs

Compound	Residential Exposure
Lead	500 mg/kg
PCBs - Aroclor 1254	0.054 mg/kg
Benzo(a)anthracene	0.15 mg/kg
Benzo(a)pyrene	0.015 mg/kg
Benzo(b+k)fluoranthene	0.15 mg/kg
Dibenzo(a,h)anthracene	0.015 mg/kg
Indeno(1,2,3-cd)pyrene	0.15 mg/kg

TABLE 6 - RECOMMENDED ACTIONS BASED ON BLOOD LEAD LEVELS IN CHILDREN

BLOOD LEAD LEVEL (μg/dL)	RECOMMENDED ACTION
<10	Re-screen in one year.
10 - 14	Provide follow-up testing within three months and family education, including methods of effective cleaning, hazards of improper lead-based paint removal, and nutritional guidance. Refer to social services, if necessary.
15 - 19	Provide follow-up testing within two months and family education, including methods of effective cleaning, hazards of improper lead-based paint removal, and nutritional guidance. Refer to social services, if necessary. If two venous blood lead levels in this range are obtained at least three months apart, proceed according to actions for blood lead levels of 20-44 μg/dL.
20 - 44	Provide clinical management (including clinical evaluation and chelation therapy, if appropriate), case management, environmental investigation, lead hazard control, and follow-up testing at one- to two-month intervals until three conditions are met: the blood lead level has remained less than 15 μg/dL for at least six months, lead hazards have been removed, and there are no new exposures.
45 - 69	Within 48 hours begin clinical management (including clinical evaluation and chelation therapy, if appropriate), case management, environmental investigation, lead hazard control, and follow-up testing at one- to two-month intervals until three conditions are met: the blood lead level has remained lower than 15 μg/dL for at least six months, lead hazards have been removed, and there are no new exposures.

BLOOD LEAD LEVEL (μg/dL)	RECOMMENDED ACTION
70 or greater	Hospitalize child and begin medical treatment immediately, including clinical management (including chelation therapy and clinical evaluation), case management, environmental investigation, lead hazard control, and follow-up testing at one- to two-month intervals until three conditions are met: the blood lead level has remained lower than 15 μg/dL for at least six months, lead hazards have been removed, and there are no new exposures.

Excerpted from: Centers for Disease Control and Prevention, *Screening Young Children for Lead Poisoning: Guidance for State and Local Public Health Officials*. Atlanta: CDC, 1997.

TABLE 7 - IMPLEMENTABILITY OF CORRECTIVE MEASURES ALTERNATIVES

Corrective Measures Alternatives	Time of Implementation	Number of Trucks Per Day Total Number of Trucks
Alternative D1 (Enhanced Low Permeability Cap - 17 acres)	7 months	53 trucks/day 8,200 total
Alternative D2 (Enhanced Low Permeability Cap - 10 acres)	7 months	31 trucks/day 4,800 total
Alternative E (RCRA Cap)	1 year	62 trucks/day 12,200 total
Alternative F1 (BCM Grouting and Enhanced Low Permeability Cap)	1 year	48 trucks/day 9,400 total
Alternative F2 (Mine Void Grouting and Enhanced Low Permeability Cap)	1.3 years	51 trucks/day 13,400 total
Alternative G (Inplace S/S and Enhanced Low Permeability Cap)	2.8 years	35 trucks/day 14,600 total
Alternative H (On-Site S/S, On-Site Disposal and Enhanced Low Permeability Cap)	3.3 - 3.7 years	21 - 32 trucks/day 10,300 - 14,600 total
Alternative I (On-Site S/S, Off-Site Disposal)	2.7 - 3.7 years	Truck Option: 75 - 97 trucks/day 29,300 - 37,800 total Rail Option: 15 - 25 trucks/day 5,800 - 10,000 total

Corrective Measures Alternatives	Time of Implementation	Number of Trucks Per Day Total Number of Trucks
Alternative J (Off-Site S/S, Off-Site Disposal)	4.3 years	Truck Option: 35 trucks/day 25,000 total Rail Option: 5 trucks/day 3,600 total
Alternative K (Soil/BCM Washing)	9.3 - 9.7 years	19 trucks/day 33,000 total
Alternative L (Thermal Treatment)	19.4 - 19.8 years	5 trucks/day 25,000 total
EPA's Proposed Remedy *	3 - 4 years	44-49 trucks/day 18,000-20,000 total

*** Values are extrapolated from Gould's estimates provided in CMS Report**

APPENDIX 1 - DEFINITIONS

EPA Region III Risk-Based Concentrations - The EPA Region III Risk-Based Concentrations (RBCs) for individual chemicals are derived by combining individual chemical toxicity factors with standard exposure assumptions to determine chemical concentrations corresponding to fixed levels of risk. EPA Region III primarily uses these RBCs to screen site chemicals for inclusion in risk assessments. The internet address for the EPA Region III RBC Table is: www.epa.gov/reg3hwmd/risk/riskmenu.htm..

Micrograms/per Liter (μg/l) - The concentrations are presented in micrograms of lead per liter of water, which can also be called one part per billion. Some of the reference documents where the data come from present concentrations as milligrams per liter, or mg/l, which can also be called one part per million. It takes one thousand parts per billion to make one part per million (i.e., 1000 μg/l = 1 mg/l).

Solidification/Stabilization - Solidification/Stabilization is a proven and effective technology for the treatment of waste produced at lead battery sites. Solidification processes produce large blocks of waste with low permeability and high structural integrity, which significantly reduces pollutant mobility. The optimum mixture to treat on-Site waste is determined through pilot-scale studies during the design phase of the remedial action. Stabilization methods involve the addition of materials, which limit the solubility or mobility of waste constituents. Solidification and stabilization is considered the Best Demonstrated Available Technology for treatment of RCRA wastes with metals prior to landfilling. This process would solidify Site waste materials and immobilize lead. Immobilization would be accomplished through both physical and chemical processes. Immobilization provides a significant decrease in leachability, which is measured by the Toxicity Characteristic Leaching Procedure and the potential for contaminant migration. Physical processes involve the entrapment of contaminants within a solid matrix and reducing the contaminant mobility by decreasing the permeability of contaminated material. Chemical processes reduce contaminant mobility by various methods such as converting the contaminant to a less mobile form or adjusting the pH of the waste materials to reduce their solubility. This technique does not decrease the overall volume of lead at the Site. However, by decreasing the mobility of lead, this method would offer additional protectiveness in combination with a cap remedy by limiting the potential for air releases in the event of a breach or break in the cap cover. Solidification and stabilization of contaminated soil can be conducted either in-situ (in-place) or ex-situ. In-situ solidification/stabilization allows the waste material to be treated without being excavated and transported to another location, thus reducing fugitive air emissions.

Toxicity Characteristic Leaching Procedure - A laboratory procedure designed to predict whether a particular waste is likely to leach hazardous concentrations of chemicals into groundwater.

APPENDICES

APPENDIX 2 - TECHNICAL EXPLANATION OF CLEANUP STANDARDS FOR PCBs (AROCLOR 1254) AND PAHS

TECHNICAL REFERENCE DOCUMENT -

Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals) Interim (Publication 9285.7-01B, USEPA, 1991).

The calculation used to develop the cleanup standards for PCBs (Aroclor 1254) and PAHs is as follows:

The exposure pathway is residential incidental soil ingestion only, estimated Reasonable Maximum Exposure using default exposure parameters. Equation as follows:

$$\text{Target Clean-up Goal} = \frac{TR \times AT \times 365\ \text{days/yr}}{SF \times CF \times EF \times IF}$$

Target Clean-up Goal: mg/kg.
TR : Target Risk for each of six carcinogens = 1.7E-7
AT: Averaging Time = 70 years.
SF: Carcinogenic potency slope factor, oral (risk per mg/kg/day); chemical-specific.
CF: Conversion Factor = 1E-6 kg/mg.
EF: Exposure Frequency = 350 days/year.
IF: Age-Adjusted Soil Ingestion Factor = 114 mg-year/kg-day.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Chris Reitman
Advanced GeoServices Corp.
Chadds Ford Business Campus
Rts. 202 & 1, Brandywine One - Suite 202
Chadds Ford, PA 19317-9676

Mr. Frank Swit
Gannett Fleming, Inc.
P.O. Box 67100
Harrisburg, PA 17106-7100

Dear Mr. Reitman and Mr. Swit

The United States Environmental Protection Agency (EPA) has received preliminary comments and questions on EPA's proposed remedy presented in the Statement of Basis dated October 15, 1999. EPA has determined that the following questions can be answered at this time for the purposes of clarifying the Agency's proposed remedy. This letter is being forwarded to all interested parties and will be made publicly available in the Administrative Record for the Site. All other comments or questions on the Statement of Basis received by EPA to date will be incorporated into EPA's Final Decision and Response to Comments.

Questions Submitted to EPA:

1) Which contaminated material comprises the estimated 86,000 cubic yards (cy) of hazardous material which is targeted for off-site disposal?

"High" Hazardous Waste Pile (*RFI)	22,000 cy
Mine Spoils from the Five and Eight Foot Coal Seams (RFI)	35,000 cy
Battery Casing Material (BCM) from the Five and Eight Foot Coal Seams (RFI)	17,000 cy
Battery Casing Material from the Primary BCM Fill Area North of the Five Foot Coal Seam (EPA estimate)	12,000 cy
	86,000 cy

* Gould's RCRA Facility Investigation (RFI) dated March 15, 1993

2) How did EPA calculate the cost of the proposed remedy?

EPA's remedy is a combination of Alternative G (In-place Solidification/Stabilization with Enhanced Low Permeability Cap) and Alternative I (On-Site Solidification/Stabilization with Off-Site Disposal) from the Corrective Measures Study (CMS) Report dated March 15, 1995 and revised June 21, 1999. The cost estimates provided in the CMS Report for these alternatives are based on the total volume of contaminated material at the Site (372,000 cy). EPA used the cost estimates provided in the CMS Report to calculate the cost of the proposed remedy. The maximum cost of EPA's proposed remedy ($41 million) was calculated as follows:

(286,000cy/372,000cy)(Total Present Worth Cost of Alternative G= $31 million) = $24 million
(86,000 cy/372,000 cy)(Total Present Worth Cost of Alternative I = $76 million) = $17 million

The lower end of the range of EPA's cost estimate of $36 million was calculated by subtracting the cost difference between the 17-acre cap and the 10-acre cap, the cost of the recently installed water main, and activities that would be duplicated under alternatives G and I, from $41 million. Activities that are components of both Alternatives G and I include, but are not limited to, construction of North Woods access roads, and O&M activities such as long-term sampling and analysis.

3) Why did EPA select a remedy with waste treatment in conjunction with capping instead of a containment-only remedy?

It is EPA's policy to use treatment to address principal threats posed by a site whenever practicable and cost effective. Contamination that represents principal threats for which treatment is most likely to be appropriate includes contamination that is highly toxic, highly mobile, or cannot be reliably contained, and that would present a significant risk to human health and the environment should exposure occur (Advanced Notice of Proposed Rulemaking, Federal Register 61, no. 85, May 1, 1996). Lead concentrations in subsurface soil samples collected from the Site have been measured at levels as high as 374,000 ppm. Elevated concentrations of toxic compounds are considered by EPA to pose a principal threat. Treatment of the contaminated soil and waste material remaining on Site would eliminate the principal threat concern. Treatment of contaminated soil and waste material is currently underway at hazardous waste sites in Region 3 (Jack's Creek, Tonolli, East Penn Manufacturing) where elevated levels of contaminants exist similar to those at the Marjol Site.

Secondly, EPA is concerned about potential instability or failure of a cap placed directly on the contaminated soil and waste material at the Site, due to residual mine subsidence and/or settlement of material beneath the cap. EPA expressed concerns regarding potential cap failure and cap instability in a comment letter to Gould on the CMS Report. This letter was dated September 14, 1995. EPA and PADEP cap experts have cited potential causes of cap failures which include, but are not limited to, major precipitation events, and animals burrowing into the

geosynthetic liner. The solidification of the soil and waste material beneath the cap would eliminate the concern regarding such cap failures and increase the stability of the cap.

4) What type of solidification/stabilization technology is referred to in the Statement of Basis?

Solidification and stabilization are generic names applied to a wide range of discrete technologies. Solidification refers to techniques that encapsulate the waste, forming a solid material. The product of solidification may be a monolithic block, a clay-like material, a granular particulate, or some other physical form commonly considered a "solid". Stabilization refers to techniques that reduce the hazard potential of a waste by converting the contaminant to a less soluble, mobile, or toxic form (Innovative Site Remediation Technology; Volume 4; Stabilization/Solidification, EPA Document No. 542-B-97-007, September 1997). EPA selected solidification/stabilization for the treatment of the waste material at the Marjol Site, because this technology is considered by EPA to be the Best Demonstrated Available Technology for the treatment of RCRA waste with metals prior to landfilling. This is also stated by Gould in its CMS Report on page 4-9.

EPA did not identify in the Statement of Basis the specific reagents and additives to be used in the treatment of the contaminated soil and waste material at the Site. However, the CMS Report did identify treatability studies conducted by Gould which evaluated the use of a cement-based grout, a cement/pozzolonic reagent, and maectite for the treatment of contaminated soil and waste material at the Site. The intent of the Statement of Basis was not to dictate the type of treatment additive(s) to be used but to allow for the determination of the best treatment reagents during the design of the final remedy.

5) Why did EPA select an in-situ treatment technology?

EPA selected in-situ treatment instead of waste excavation/treatment and on-site disposal in order to minimize the potential for air releases of contaminants during remediation activities. EPA recognized that in-situ treatment of the waste material at the Site is an innovative technology and would not result in the consistent level of treatment that can be obtained by excavating the contaminated material prior to treatment. However, the Site Program Demonstration Test conducted at the General Electric Company in Hialeah, Florida showed success in the utilization of Geo-Con's in situ solidification technology (Site Demonstration Test International Waste Technologies In Situ Stabilization/Solidification Hialeah, Florida, EPA Document No. 540/5-89/004a, June 1989). The application of treatment agents to a largely undisturbed in situ geology gives in situ treatment distinct advantages (EPA Engineering Forum Issue - Considerations in Deciding to Treat Contaminated Unsaturated Soils In Situ, EPA Document No. 540/S-94/500, December 1993), such as minimizing soil disturbances which may result in the release of contaminants into the surrounding atmosphere.

6) Why did EPA select the Toxicity Characteristic Leaching Procedure (TCLP) standard for lead as the treatment performance standard for solidification/stabilization?

The Statement of Basis identified TCLP as the treatment performance standard for solidification/stabilization. EPA recognizes that other standards are used to measure the performance of waste treated for on Site placement. Design criteria such as the synthetic precipitation leaching procedure (SW-846 Method 1312, September 1994) is also used by EPA to measure the leachability of contaminants in treated material disposed of on Site. A copy of the synthetic precipitation leaching procedure is attached and is also being added to the Administrative Record. Additionally, an unconfined compressive strength of 50-100 pounds per square inch and a hydraulic conductivity of 1×10^{-6} cm/sec are also commonly used to measure the performance of the solidification/stabilization technology. EPA will consider other such options in the selection of a final remedy for the Site.

7) How did EPA use the Records of Decision from other lead battery sites in the development of the proposed remedy for the Marjol Site?

EPA initially evaluated the RODs for the list of sites provided by Gannett Fleming in the Report entitled "Environmental Justice Issues Marjol Battery Site"dated February 1999. In February 1999 when this report was received, a summary of these RODs entitled "Selected Remedies for Lead Battery Sites" was prepared by EPA. This summary was previously forwarded to your attention and has been added to the Administrative Record. This ROD summary was not compiled with the purpose of selecting a remedy for the Marjol Site. However, based on the review of these RODs, it was determined that 24 of the 25 lead battery sites identified in the Environmental Justice Report included treatment of lead contaminated soil and/or waste material using solidification and/or stabilization as a component of the final remedy selected by EPA. This was consistent with EPA's development of a proposed remedy for the Marjol Site, which was already being drafted by EPA at the time the ROD summary was prepared. The abstracts for these RODs, as well as others, can be obtained on-line at http://www.epa.gov/superfund/sites/rodsites/. Hard copies of all signed RODs are also available in the EPA Region 3 library.

8) Are there any other documents that were used to develop the proposed remedy, or were considered during the development of the proposed remedy, that are not currently included in the Administrative Record.

The following documents are attached to this letter and are being added to the Administrative Record because they were either included in the proposed remedy, or were evaluated as background information during the remedy selection process. All EPA and PADEP regulations and guidance documents considered during the remedy selection process are not included in the Administrative Record.

- the Environmental Justice Report prepared for Throop Borough Council by Gannett Fleming, dated February 1999;

- two EPA letters to Mr. James Barnick regarding the Environmental Justice Report, dated August 27, 1999;

- Gould's Agenda for the Citizen's Review Committee Meeting on November 9, 1994 - Discussion /Evaluation of Solidification/Stabilization; and

- a copy of the Synthetic Leaching Procedure (SW-846 Method 1312).

The end of the public comment period is January 15, 2000. However, January 15th falls on a Saturday, and Monday, January 17th is a national holiday. Therefore, EPA will accept any comments received in the office by the close of business on Tuesday, January 18, 2000. If you have any questions, please feel free to contact me at (215) 814-3417.

Sincerely,

Sibyl L. Hinnant
Project Manager

Enclosures

cc: Mr. Robert Collings, Esq.
Mr. Douglas Blazey, Esq.
Len Zelinka, PADEP
James Barnick, Throop Borough Council
Paul Gotthold, EPA
Maria Vickers, EPA
Yvette Hamilton, EPA

Response to Technical Comments
provided by
Gannett Fleming

Gannett Fleming Comments

Gannett Fleming (GF), contractor for the Throop Borough Council, provided comments on EPA's Statement of Basis for the Marjol Battery Site in two separate reports:

1. Analysis of Coal Stratigraphy and Croplines: Commentary on the USEPA Statement of Basis and Previous Subsurface Investigations, Marjol Battery Site, Throop Borough, Lackawanna County, Pennsylvania (January 18, 2000)

2. Spatial Distribution of Battery Casing Material, Marjol Battery Site, Throop Borough, Lackawanna County, Pennsylvania (January 18, 2000)

The first report provides specific comments regarding (1) the location of the limit of the Five Foot Coal seam, and (2) undocumented mining of the Top Split of the Top Four Foot and the Top Four Foot coal seams.

The second report questions volume estimates and cost calculations made by Gould in their CMS report which evaluated several remedial alternatives. That report also provides recalculated costs of EPA's proposed remedy, since EPA relied on Gould's volume estimates. The report further calculates costs for removal of additional material so that BCM would not remain above the Top Split of the Top Four Foot coal seam and the Top Four Foot Coal seam. GF presents these alternatives because GF asserts (in the first report) that these coal seams have also been mined under the Marjol site.

EPA's Response to Gannett Fleming's Comments

First GF Report - Analysis of Coal Stratigraphy and Croplines

The following discussion responds to specific issues that GF raised within their first report (*Analysis of Coal Stratigraphy and Croplines: Commentary on the USEPA Statement of Basis and Previous Subsurface Investigations, Marjol Battery Site, Throop Borough, Lackawanna County, Pennsylvania (January 18, 2000)*. The section names and numbering below correspond to the names and numbering in that report. GF's comment is paraphrased in italics, followed by EPA's response. All section headings are included, even those that did not require a response.

1.1 Introduction

1.1.1 Pothole Subsidence Hazard

GF states that pothole subsidence would tend to increase the cap's permeability, allowing more infiltration, and increase the rate at which contaminants are released to the environment, particularly at groundwater discharge locations. GF further states that although the property owner may be able to remedy damage to the cap from pothole subsidence, there is no long-term certainty that the owner will be around forever to provide this service.

EPA Response: As determined from sampling during the Mine Subsidence Investigation, groundwater in the mine pool under the site is not contaminated by lead under current (uncapped) conditions. EPA's proposed remedy requires capping and treatment primarily to protect against exposures and releases at the surface, but the treatment would also reduce leaching of lead in the event of damage to the cap. EPA's proposed remedy minimizes the potential for pothole subsidence to affect the long-term reliability and effectiveness of the cap by requiring that the cap not extend over areas where pothole subsidence could occur. In addition, EPA's remedy requires treatment of the waste beneath the cap so that, should failure of the cap occur, untreated waste would not be exposed at the surface.

1.1.2 Mine Fire Hazard

GF indicates that there were two mine fires in close proximity to the Marjol Site: the Eddy Creek fire in the Five and Eight Foot coal beds, and the Throop Fire in the Birds-Eye mine. They also indicate the presence of a third fire "known to be currently burning along the boundary of Throop with the City of Scranton."

EPA Response: EPA's proposed remedy does not leave any waste above the Five Foot or Eight Foot coal seams, thereby eliminating the risk of mine fire in those seams from impacting the remaining capped and treated waste. The Throop Fire in the Birds-Eye mine was located about 1.25 miles east of the Marjol Site. The fire had spread from a strip pit of the New County Bed to the Clark Bed. The fire was extinguished by mid 1969. The New County Bed and the Clark bed are below the level of the mine pool under the Marjol Site and therefore do not pose any mine fire threat to the site. According to Dave Philbin of the U.S. Office of Surface Mining Reclamation and Enforcement, there is no current fire burning in Throop.

1.1.3 Proposed Remedy

1.1.4 Basis of Comments

GF identifies the materials they reviewed in developing their comments. EPA and PADEP have reviewed this available information, the maps and cross-sections that GF developed, as well as any other available information we could find, especially regarding the conditions of the Top Split of the Top Four Foot coal seam and the Top Four Foot Coal seam. This review included the following:

- boring logs from Gould/AGC
- boring logs from US Army Corps of Engineers
- video logs from RFI and MSI
- rock core from RFI and MSI
- mining maps from OSM
- Act 17 investigation on adjacent property
- RFI and CMS Reports
- GF reports provided before EPA's Statement of Basis

1.2 Stratigraphy and Mine Map Information

1.2.1 Stratigraphy

1.2.2 OSM Mine Map Information

1.2.2.1 Surface Mining

1.2.2.2 Eight Foot Coal Mine Map

1.2.2.3 Five Foot Coal Mine Map

1.2.2.4 Four Foot Coal Mine Map

1.2.3 Other Mine Map Information

1.3 Coal Horizon Data

1.3.1 Eight Foot Coal Horizon

1.3.2 Five Foot Coal Horizon

GF questions AGC's pick of the Five Foot coal in MSB-3. AGC picked the

elevation at a depth of 38 to 39 feet. GF provides their interpretation of the location of the Five Foot coal in Figure 5 of their report, and indicate that the Five Foot coal is within the interval of 50' to 62' depth where very few cuttings were returned to the ground surface during drilling. GF further states that, if AGC's pick were correct, then the loss of drill cuttings from 50' to 62' would suggest possible mining of the Top Split of the Top Four Foot coal.

EPA Response: EPA and PADEP agree that the elevation of the Five Foot coal in MSB-3 is within the interval of 50' to 62' depth as indicated by the loss of drill cuttings during drilling. This zone would therefore not represent possible mining of the Top Split of the Top Four Foot coal at that location.

GF questions AGC's pick of the Five Foot coal in MSB-4. AGC picked the elevation at a depth of 44.5 to 50.2 feet. This pick results in a thickness interval between the Five Foot and Four Foot coals of 126.3'. GF characterizes this thickness interval as somewhat anomalous. GF considers that interval to represent the Top Split of the Top Four Foot coal, and the Five Foot to be at an elevation of 798' or a drill depth of 37'. GF states that the unstable conditions at 44.5 to 50.2 feet may correspond to deep mining of the Top Split of the Top Four Foot coal.

EPA Response: EPA and PADEP do not agree with GF's interpretation of the elevation of the Five Foot coal in boring MSB-4 to be at 798' (drill depth 37'). GF picked this elevation by adding 140' to the elevation of the Four Foot coal. The boring log for that interval, which was drilled, not cored, describes the interval as being a fine to very fine grained sandstone. No coal was encountered, and there was no drilling evidence (rod drops, hole collapse, etc.) to indicate the presence a mined-out coal seam. Using a constant thickness for an interval can help predict where a seam might lie, but thickness intervals can vary naturally. There is very little boring data available to characterize naturally occurring thickness variations between these two seams. However, GF states that they used the mine map information to establish interval thicknesses. GF developed two structure contour maps based on elevations from OSM mining maps for the Five Foot and the Four Foot coal seams (see Figures 3 and 4 of their report). EPA overlay these two maps, and created an isopach map based on the elevation difference between these two maps (see EPA Figure 1, attached). That isopach map indicates that the interval between the Five Foot and Four Foot coal seams ranges between 122' and 144'. According to this isopach map, the thickness at MSB-4 would be around 130'. EPA and PADEP do not agree that a thickness, based on boring log data, of 126.3' is anomalous. It is within the thickness range from mining map data as contoured by GF.

EPA and PADEP conclude that AGC's pick for the elevation of the Five Foot coal is consistent with all the available data and naturally occurring thickness variations between the Five Foot and Four Foot coal seams; the unstable hole conditions at MSB-4 represent mining in the Five Foot coal seam.

1.3.3 Top Split of Top Four Foot Coal Horizon

GF indicates that the variation in thickness for the Top Split of Top Four Foot coal seam could be the result of natural processes or a result of borings penetrating rooms where coal has been removed (MSB-2, MSB-3, and MW-B-5A) and a pillar where the coal is still in place (TB-107).

EPA Response: To help ascertain whether thickness variations noted by GF for the Top Split of the Top Four Foot coal were the result of mining, EPA and PADEP reviewed the available rock core that AGC has stored at the Marjol Battery site. Rock core is available for this coal seam for borings MSB-3 and MW-B-5A. Rock coring at MSB-2 began below this interval, but there were no indications in the drilling log of any voids, rod drops, etc. that would indicate that the coal encountered at 58' to 59' was mined. Rock coring was not conducted at TB-107: split spoon sampling was conducted. At both MSB-3 and MW-B-5A, the coal was present in the rock core at the interval and thickness specified in the drilling logs. The coal was a high quality anthracite coal, and the coal in this interval was clearly in an unmined condition. There was no evidence of any collapse features in the rock above this coal; the RQD of the rock core was very high above the coal; there was no loss of drilling water during drilling; fractures are along bedding planes; there were no vertical fractures; and the fractures had no staining. EPA and PADEP conclude that, even though the coal is thin in MSB-3 and MW-B-5A, the Top Split of the Top Four Foot coal has not been mined at those locations.

A sample of the coal from TB-107 was available, although it was collected by split spoon sampling, not by rock coring. As the drilling log indicates, split spoon sampling was not continuous. The split spoon sampler was 18 inches long. Coal was found in the sample from 20 feet to 21.5 feet. After retrieving the spoon, drilling continued to the next depth where the next split spoon sample was to be collected, which was at 25 feet depth. The person logging the well assigned the thickness of coal to be 5', but there was no split spoon sample collected from 21.5 feet to 25 feet, and there is no other description of cuttings from that interval noted on the drilling log. GF considers this thickness to be a mineable thickness at that location, and that it could represent a pillar of coal still in place and not mined. EPA and PADEP consider the thickness of coal to be uncertain because continuous samples were not collected over that interval. No other boring log or

core from the site in this zone documented a thickness greater than one foot.

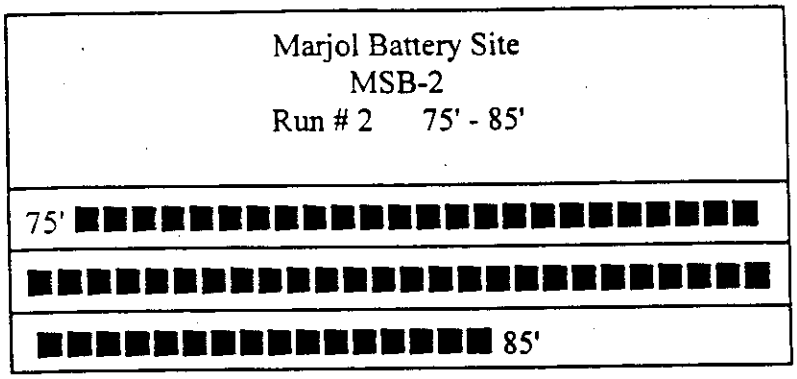
GF notes that, although they initially interpreted the coal encountered at a depth of 67.8 to 68.5 feet in MSB-4 to be the Top Split of the Top Four Foot coal, they now consider the Top Split of the Top Four Foot coal to be present in MSB-4 within the collapsed zone from 50 to 60 feet depth. AGC and ACE considered that zone to be the Five Foot coal seam.

EPA Response: As noted above, EPA and PADEP disagree with GF's pick of the Five Foot coal in MSB-4. Therefore, the Top Split of the Top Four Foot coal would have to lie below the cased-off depth, and is likely to be the coal noted at 67.8 feet. EPA and PADEP examined that coal in the rock core from MSB-4. That coal seam was present in an unmined condition. There was no indication of mine gob, and the rock above this coal was a high RQD sandstone. The thickness of the coal in this interval was identified in the Corps of Engineers boring log as 0.7 feet thick, consistent with the thicknesses found in MSB-2, MSB-3, and MWB-5A. EPA and PADEP conclude that the Top Split of the Top Four Foot coal seam is present at the site, is unmined where drilled, and the thickness variations are the result of natural thickness variations (MSB-2, MSB-3, MSB-4, MW-B5A) or an overestimate based on imprecise sampling techniques (TB-107). It is important to note that, because the location of MSB-4 lies above the limit of the Five Foot coal, the cap would not extend over that location.

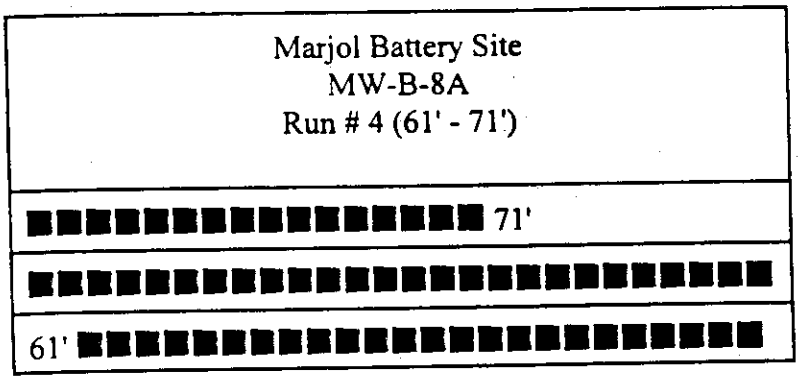
1.3.4 Top Four Foot Coal Horizon

GF states that their stratigraphic correlation suggests that the Top Four Foot coal may lie below the below the coal seam described at a depth of 61.0 to 63.5 feet in the log of boring MW-B-8A. They further state that the coal seam is not visible in the photograph of the core box, but that it appears more likely to be in the material from 63.5 feet to 71.0 feet.

EPA Response: EPA and PADEP examined the rock core in the core box for MW-B-8A. The coal in the box was present in the interval and depths noted in the boring log for that well. However, we did notice that the way that the rock core was placed and labeled in the core box differed in convention from how the rock core was placed and labeled in the core boxes from the more recent Mine Subsidence Investigation. Below is a schematic representing an open core box from the Mine Subsidence Investigation. The identifying notes are on the inside of the open lid. The shallowest depth (in this case 75') is placed at the upper left and is progressively deeper from left to right. The bottom of the core interval (in this case 85') is at the lower right.



Following is a schematic representing the core box for MW-B-8A. The identifying notes are on the inside of the open lid. The shallowest depth (in this case 61') is placed at the lower left and is progressively deeper from left to right. The bottom of the core interval (in this case 71') is at the upper right.



In general, rock core from earlier investigations (MW-B series) were labeled as above for MW-B-8A, although not consistently. The rock core from the Mine Subsidence Investigation was consistently labeled as described above for MSB-2. In referencing the photograph of the core for MW-B-8A, GF probably thought that the shallow part of the rock core would be at the upper left, which is the convention.

EPA and PADEP conclude that the Top Four Foot coal in MW-B-8A is present at the depths and thickness as noted on the original boring log, and is consistent with the rock in the core box and how it was labeled.

GF states that the coal thickness ranges from 0.5 feet (MSB-6 and MSB-8) to 3.8 feet (MSB-4), and that this variation in thickness and low recovery in two of the

borings (MSB-1 and MSB-4) could represent evidence of mining. They conclude that the test boring data do not clearly indicate that the Top Four Foot coal is unmined.

EPA Response: To help ascertain whether thickness variations noted by GF for the Top Four Foot coal were the result of mining, EPA and PADEP reviewed the available rock core that AGC has stored at the Marjol Battery site. Rock core was examined for the following borings: MSB-1, MSB-2, MSB-3, MSB-4, MSB-5, MSB-9, MSB-10, MWB-5A, and MWB-8A.

Although EPA and PADEP examined what was available from MSB-1, no rock core was available for this interval due to poor recovery in MSB-1. MSB-1 is about 600 feet west of the BCM fill area. For all other borings, the Top Four foot coal was present in varying thicknesses. Thickness ranged from 1.3 feet (MSB-3) to 3.1 feet (MSB-5) . There were no indications of mining at any location. Roof contact is gradational to black shale, making it difficult to pick exactly where coal starts (which could account for some of the variability in the coal thickness in the boring logs). GF presents Top Four Foot Coal thicknesses in Table 4 of their report, but have selected data from different sources within the same table. For some of the borings, there were differences between what the ACOE and AGC interpreted to be coal. For example, at MSB-4 ACOE indicated 3.8 feet of coal, but AGC picked 2' 10". However, both ACOE and AGC indicated 100 % core recovery for this interval in their boring logs despite GF's assertion in their comment that there was poor recovery at MSB-4. The thickness of 2.5 feet of coal for MW-B-4A is overstated in GF's Table 4. This cored interval was only 2.5 feet long with a 67% recovery. The description is heavily weathered shale, coal and sandstone from 40 to 42.5 feet. Assigning the entire interval to be coal is not supported by the drilling log description or the recovered core. Poor recovery may also be expected since this interval is highly weathered and very near the crop line. This interval was not cored in MSB-6 and MSB-8. The drilling logs for these borings indicate the presence of coal with a thickness of 0.5' in both of the borings. These locations are also near the crop line. For all of the borings that are clearly not near the crop line, the thickness variations appeared to be natural variations or the result of differences in opinion of the field geologists as to what was coal. There was no indication that the Top Four Foot coal was mined: there was no evidence of mine gob; no evidence of voids; no wood; fractures exist above and below the coal (caused by subsidence from deeper seams); and core recovery in the interval was good.

1.3.5 Four Foot Coal Horizon

1.4 Analysis of Coal Seam Limits

1.4.1 Rock Surface

GF developed a rock surface contour map to overlay with coal structure contour maps to determine where the coal seams intersect the rock surface.

EPA Response: GF relied on a significant amount of data to develop this map, but the source of the data was from a variety of investigative techniques which may make identifying the top of rock as a specific elevation somewhat imprecise. For example, Table 6 (Rock Surface Elevation Data) provides a description from the drilling logs indicating what was used to determine when top of rock was encountered. In some instances it is based on refusal of the drilling/sampling device, and in other instances it is based on observations in collected samples. Table 6 is inconsistent with data shown on Figure 8 (Rock Surface Contour Map). The top of rock for AB-109 is listed as 788.4 feet in Table 6, but is shown as 793.4 on Figure 8, and lies above the 790 foot elevation contour. The drilling log for AB-109 notes the presence of coal at 793', decomposed shale at 793.5', intact fractured shale at 788', and spoon refusal at 782'.

1.4.2 Five Foot Coal Limit

GF states that they projected the location of the Five Foot coal horizon in fourteen test boring locations and used this data (in Table 7 of their report) to develop structure contour maps of the Five Foot coal seam (Figures 9 and 10).

EPA Response: GF used a constant thickness of 140 feet above the floor of the Four Foot coal to determine the elevation of the Five Foot coal seam. Using a constant thickness for an interval can help predict where a seam might lie, but thickness intervals can vary naturally. There is very little boring data available to characterize naturally occurring thickness variations between these two seams. GF states that they used the mine map information to establish interval thicknesses. GF developed two structure contour maps based on elevations from OSM mining maps for the Five Foot (Figure 3) and the Four Foot (Figure 4) coal seams. As stated above in response to Section 1.3.2, EPA overlay these two maps, and created an isopach map based on the elevation difference between these two maps. That isopach map indicates that the interval between the Five Foot and Four Foot coal seams ranges between 122' and 144'.

1.4.3 Top Split of Top Four Foot Coal Limit

1.4.4 Top Four Foot Coal Limit

1.4.5 Four Foot Coal Limit

2.0 Specific Comments

2.1 Location of the Limit of the Five Foot Coal

GF states that their analyses indicate the limit of the Five Foot coal extends farther south into the BCM fill area than the limit assumed in EPA's Statement of Basis, and more BCM will have to be excavated to achieve the desired isolation from the Five Foot coal seam.

EPA Response: In the Statement of Basis, EPA had already recognized that there was some uncertainty in the actual location of the southernmost limit of the Five Foot coal seam. EPA proposed to manage this uncertainty by requiring that the limit be determined in the design stage of the remedy, either through the drilling of additional borings, or through over-excavation of waste material to a level which is clearly below the Five Foot coal seam. GF provides some specific suggestions regarding proper investigative techniques to determine the limit of the coal seam, but does not specifically comment on EPA's proposal to manage this issue during remedy design, rather than before remedy selection.

EPA concludes that its proposal for determining the limit of the Five Foot coal seam during remedy design is practical and protective. EPA will consider Gannett Fleming's suggestions for proper investigative techniques at that time.

2.2 Undocumented Mining

GF states that it is not clear from the boring data that the Top Split of Top Four Foot and the Top Four Foot coals are unmined. GF states that the thickness variations of these coals may be a result of natural variations in seam thickness, but could also be a result of mining. GF states that these seams could have been mined from the north by the Olyphant Colliery, as were the Eight Foot and Five Foot coal seams.

EPA Response: As indicated above, EPA and PADEP examined all of the available rock core and boring logs which penetrate these coal seams at the site and have concluded that the Top Split of the Top Four Foot and the Top Four Foot coal seams are present at the site, are unmined where drilled, and the thickness variations are the result of natural thickness variations.

3.0 Conclusions

GF concludes that EPA must insist on the following to establish a remedy for the Marjol Site that is protective of human health and the environment:

- *Proper investigative techniques, during or before final remedial design to evaluate the position of mined coal seams above the mine pool that underlie the Marjol Site, including but not limited to split-inner barrel core drilling and additional stratigraphic correlation work.*

- *A remedial alternative which takes into account mining in the Eight Foot, Five Foot, Top Split of Top Four Foot, and Top Four Foot coal seams.*

- *Additional BCM removals or other measures to isolate BCM from the coal seams and mine fire hazard, if it cannot be shown the the Top Split of Top Four Foot and the Top Four Foot coal seams are unmined.*

EPA Response: As indicated above, EPA will consider GF's suggestions for proper investigative techniques during the design stage of the remedy. EPA's proposed remedy takes into account mining of the Eight Foot and Five Foot coal seams, by requiring that the limit of the cap lie south of the southernmost limit of the Five Foot coal seam. EPA and PADEP have carefully considered all of the issues and evidence that GF presented in their report with regard to mining of the Top Split of the Top Four Foot and the Top Four Foot coal seams. EPA and PADEP conclude that there is no indication that the Top Split of the Top Four Foot coal seam and the Top Four Foot coal seam have been mined under the Marjol Battery site. No change to EPA's proposed remedy is needed to address this issue.

Second GF Report - Spatial Distribution of Battery Casing Material

The following discussion responds to specific issues that GF raised within their second report (*Spatial Distribution of Battery Casing Material, Marjol Battery Site, Throop Borough, Lackawanna County, Pennsylvania (January 18, 2000)*). The section names below correspond to the section headings in that report.

INTRODUCTION

BACKGROUND

GF references a previous report they developed titled Soil Volumes With Lead Contamination, Marjol battery Site, Throop, Pennsylvania, dated March 1999. GF states that the total volume of lead contaminated material that they calculated in that report was less than the 372,000 cubic yards reported by Gould.

EPA Response: EPA reviewed GF's March 1999 report. GF used a grid method to calculate the volume of material contaminated by lead at a concentration of 1,000 mg/kg or greater. The 372,000 cubic yards calculated by Gould includes all material greater than 500 mg/kg. EPA concludes that the primary reason for the difference in volume estimates results from the different threshold criteria (500 mg/kg vs. 1,000 mg/kg) used by Gould and GF. EPA's cleanup level for soil at the site as presented in the Statement of Basis is 500 mg/kg, so the larger volume as calculated by Gould is probably more representative.

EPA STATEMENT OF BASIS

GF states that Table 1 in EPA's Statement of Basis relied on Gould's volume estimates, and contains little information about location of the waste material and no spatial distribution information relative to the Five Foot coal seam.

EPA Response: The volume estimates for removal and off-site disposal in the Statement of Basis were determined for material which would likely fail TCLP and which was located north of the Five Foot coal seam. In the Final decision, EPA is no longer basing the off-site disposal requirement on TCLP. However, the following discussion is provided to clarify the volume estimates and spatial distribution of contaminated material identified in Table 1 of the Statement of Basis relative to the Five Foot coal seam. Based on sampling data and results from the RFI, material which would likely fail TCLP would include BCM, contaminated mine spoils, and material in the High Hazard soil stockpile. EPA used volume estimates from Gould's reports to calculate the volume of material

north of the Five Foot coal seam which would likely to fail TCLP. That volume included 12,000 of the 159,000 cubic yards of BCM in the primary fill area, which is the amount of BCM in the primary fill area that EPA estimates lies north of the Five Foot coal. All other volumes are taken directly from Gould's estimates: 13,000 cubic yards of BCM in the 5' western strip pit; 4,000 cubic yards of BCM in the 8' western strip pit; 35,000 cubic yards of mine spoils in the 5' and 8' strip pits; and 22,000 cubic yards in the High Hazard soil stockpile. EPA determined that each of these areas lie north of the Five Foot Coal limit, and are likely to fail TCLP. Other material which lies north of the Five Foot coal limit, but which likely passes TCLP includes the Low Hazard Soil stockpile (22,000 cubic yards) and the North Woods soil (7,200 cubic yards). In the Final decision, EPA will require the relocation of all material north of the Five Foot coal limit which exceeds the soil lead cleanup level of 500 mg/kg, and off-site removal of any material that cannot fit within an approved containment design.

GF states that the Five Foot coal seam EPA used in the Statement of Basis is that limit identified by Gould.

EPA Response: GF is correct in noting that EPA used the Five Foot coal seam limit identified by Gould. However, EPA also recognized, in the Statement of Basis, that there was some uncertainty in the actual location of the southernmost limit of the Five Foot coal seam. EPA proposed to manage this uncertainty by requiring that the limit be determined in the design stage of the remedy, either through the drilling of additional borings, or through over-excavation of waste material to a level which is clearly below the Five Foot coal seam.

GF states Gould has not adequately characterized the site to spatially determine where the volume and significant concentrations exist.

EPA Response: EPA is satisfied with Gould's characterization of the spatial distribution of contamination at the site. Gould characterized the spatial and volume distribution of potential source and other contaminated material in the RFI using data from borings, test pits, wells, pre-existing topographic surveys, and aerial photographs, among other techniques. The collected data was input into computer software to generate maps of upper and lower surfaces of the different materials. These maps were then used to create isopach (thickness) maps and volume estimates of the different contaminated materials. GF uses Gould's own data to develop alternative volume estimates, so it appears that GF is actually questioning Gould's data interpretation rather than the adequacy of site characterization. No further site characterization is necessary to select a remedy. Further sampling will occur as the remedy is implemented. As indicated in the Statement of Basis, the remedy includes soil sampling, air monitoring, groundwater monitoring, surface water monitoring, and post-excavation sampling to ensure that the site conditions will be protective of human health and the environment after the remedy is implemented.

GF states that using the Five Foot coal seam identified by Gould and the spatial distribution of BCM (i.e., 1,000 mg/kg lead concentration in soil values interpreted from the GF data analysis presented in the March, 1999 report), there are approximately 116,000 cubic yards of contaminated material that requires removal and off-site disposal, rather than 86,000 cubic yards estimated by EPA.

EPA Response: GF is incorrect when they equate material exceeding 1,000 mg/kg with BCM. Other materials (soil, mine spoils) have been found at the site at concentrations exceeding 1,000 mg/kg. Furthermore, EPA did not propose that all material exceeding 1,000 mg/kg be removed. EPA proposed that material which fails a leaching test using a method called the Toxicity Characteristic Leaching Procedure (TCLP) should be removed from the site if that material lies north of the Five Foot coal seam limit. Material which passed the TCLP test, but which exceeds EPA's proposed lead cleanup level of 500 mg/kg would be removed from that area and consolidated under the cap. EPA has modified this element of the remedy to allow on-site consolidation of all contaminated material that will fit beneath the cap.

EPA concludes that the volume difference that GF calculates results from different assumptions about what levels should trigger removal, and the location of the limit of the Five Foot coal seam. GF calculates volumes based on the volume of material exceeding 1,000 mg/kg, which will overestimate the volume requiring removal based on TCLP as EPA proposed.

GF states that they corrected three line items in the CMS alternative I remediation estimate for 372,000 cubic yards. GF states that the most significant error is the conversion of soil volume to tons, and results in a significant under-reporting of site cleanup costs. In their March 1999 report, GF indicated that the volume of contaminated soil should be converted to weight (i.e., tons) based upon a specific gravity of 2.6 for contaminated fill material as measured during the RFI.

EPA Response: Soil or other unconsolidated material consists of solid particles and the spaces between the solid particles. The space between solid particles is referred to as pore space. There are many physical properties that can be measured for soils. Among these are particle density and bulk density. Density is represented in units of mass per unit volume. Particle density represents the density of only the particles of the soil (not including pore space). Bulk density is the density of soil including both solid particles and pore space. To determine the weight of a particular volume of soil (which includes solid particles and pore space), the volume should be multiplied by the bulk density of the soil. Specific gravity is the density of a substance divided by the density of water. It is a unit-less number. Specific gravity must be converted to density before it can be used to convert a volume of a substance to its weight.

EPA reviewed Appendix B-8 (Physical Testing of Soils) and Appendix F-11 (Physical Testing Data) of the RFI. In Appendix B-8, Gould indicated that they followed American Society of Testing and Materials (ASTM) Standard D 854 to measure the specific gravity of both residential topsoil and mine spoil fill material. ASTM Standard D 854 (Standard Test Method for Specific Gravity of Soils) calculates the specific gravity only of the particles in the soil. It does not calculate the specific gravity of the bulk soil including both solid particles and pore spaces. Specific gravity measurements as determined using ASTM Standard D 854 can be converted to particle density, but it cannot be converted to bulk density, unless there is also a measure of porosity.

GF multiplies 372,000 cubic yards by a particle specific gravity of 2.6 to obtain a weight of 967,000 tons. This value is more than double Gould's estimate of weight of total site materials (470,000 tons). A specific gravity of 2.6 is equivalent to a density of 162.2 lbs/ft^3. During the RFI, Gould measured the average wet density of BCM, which is a measure of the bulk density of a material. As reported in Section 4.2.1, page 4-16 of the RFI Report, the average wet density of BCM was 62 lbs/ft^3, much less than the particle density of 162.2 lbs/ft^3.

GF is incorrect in stating that a specific gravity of 2.6 should be used to convert cubic yards of contaminated soil to tons. Using a particle specific gravity (converted to particle density) rather than bulk density of soil will grossly overestimate the weight, and hence, the cost.

In addition to overestimating the weight and cost because of improper use of particle specific gravity, GF also overestimates weight by performing the volume to weight conversion incorrectly. GF multiplies 372,000 cubic yards by a specific gravity of 2.6 to obtain a weight of 967,000 tons. GF's calculation is incorrect, because GF did not first convert specific gravity (a unit-less number) to density, and then perform appropriate unit conversion to convert cubic yards to tons. The result of this error is an overestimation of the weight, and hence the cost. Correct unit conversion is critical to obtaining a valid result:

The density of water is 62.4 lbs/ft^3

To convert a specific gravity of 2.6 to density, multiply by water density:

2.6 x 62.4 lbs/ft^3 = 162.2 lbs/ft^3 of soil

Convert units of lbs/ft^3 to tons/yard^3:

162.2 lbs/ft^3 x 1 ton/2000 lbs x 27 ft^3/1 yard^3 = 2.2 tons/yard^3

To determine weight of 372,000 cubic yards:

$372{,}000 \text{ yard}^3 \times 2.2 \text{ tons/yard}^3 = 818{,}400 \text{ tons}$

(GF's value of 967,000 tons overestimates this value by around 18 %)

This value (818,400 tons) is still a gross overestimate, because it is based on a particle specific gravity of 2.6 (i.e., a particle density of 162.2 lbs/ft^3) rather than bulk density.

EPA and PADEP conclude that GF's calculations of material weight and weight-based costs are gross overestimates because GF used particle specific gravity rather than bulk density. GF compounds that error further by improper unit conversion. No change to Gould's cost calculations are needed to compare remedial alternatives.

LIMIT OF THE FIVE FOOT COAL

GF states that, using the GF geologic assessment of the outcrop location of the Five Foot coal seam and applying the GF March, 1999 spatial distribution of BCM (i.e., 1,000 mg/kg lead concentration in soil values interpreted from GF data analysis), there is approximately 157,000 cubic yards of contaminated material that requires removal and offsite disposal under GF's Five Foot coal seam, Alternate 1.

EPA Response: As stated above, GF is incorrect in equating the spatial distribution of BCM with material exceeding 1,000 mg/kg of lead.

OTHER MINED COAL SEAMS

GF states that if the decision principles in EPA's Statement of Basis are applied to the Top Split of the Top Four Foot and Top Four Foot coal seams, which GF considers to have been mined under the site, than additional contaminated material would have to be excavated and removed from the site.

EPA Response: EPA reviewed GF's evaluation regarding other mined coal seams and does not agree the Top Split of the Top Four Foot and the Top Four Foot coal seams have been mined in the area of the site where the cap would be placed. EPA does not agree that additional contaminated material needs to be excavated to address mine fires or pothole subsidence from these coal seams.

GF states that the material estimate by Gould is 372,000 cubic yards of contaminated soil for the entire site, where as GF calculates 316,000 cubic yards with a spatial distribution based on soils above 1,000 mg/kg.

EPA Response: Gould's estimate of total volume for the entire site is based on material exceeding 500 mg/kg of lead. EPA's soil cleanup level, as proposed in the Statement of Basis, is 500 mg/kg of lead. EPA therefore accepts Gould's estimate as a more realistic estimate than that proposed by GF. GF provides no justification for wanting to raise the soil cleanup level from 500 mg/kg to 1,000 mg/kg. EPA's proposed cleanup level of 500 mg/kg is an appropriate and protective cleanup level for the site.

VALIDATION OF BCM QUANTITIES TO COAL SEAM OUTCROPPINGS

GF states that they entered boring log BCM data into a CADD program, and allowed the computer to construct upper and lower surfaces of BCM, and then to construct a battery casing isopach map (figure 2). GF states they used CADD to compute volume of contaminated material and present those calculations in Table 2A. GF further provides Table 2B with additional lead contaminated materials as their opinion of the total amount of lead contaminated materials at the site.

EPA Response: GF's Table 2B includes BCM volume as calculated using CADD (as presented in their Table 2A) and also includes volume of other lead contaminated soils from the High Hazard Stockpile, the Low Hazard Stockpile, Other On-Site Soil, Residential Topsoil, and North Woods Soil. The values they include in this table are identical to Gould's values for the High Hazard Stockpile, the Low Hazard Stockpile, Residential Topsoil, and North Woods Soil. The value for Other On-Site Soil is less than half as much as Gould's value. GF's value (31,148 cubic yards) appears to be calculated from the spatial distribution grid analysis, because that value is hand written in the margin of Table 5, page 2 of 2 which is provided within a section of their report labeled *Volume of Contaminated Soil - Grid Method.* That table calculates volumes of soil that exceed 1,000 mg/kg. Gould's value for Other On-Site Soil is based on the volume exceeding 500 mg/kg of lead, which is EPA's proposed cleanup level. GF does not include contaminated mine spoils on their table, although some of the volume of mine spoils is probably included in their CADD calculated BCM volume, since mine spoils exist as intermediary fill layers within the BCM fill area. GF appears to have not included the contaminated mine spoils outside of the primary BCM fill area, which would further account for the discrepancy between GF's volume estimates and Gould's. For these reasons, EPA has greater confidence in Gould's estimate of contaminated soil volume.

SUMMARY

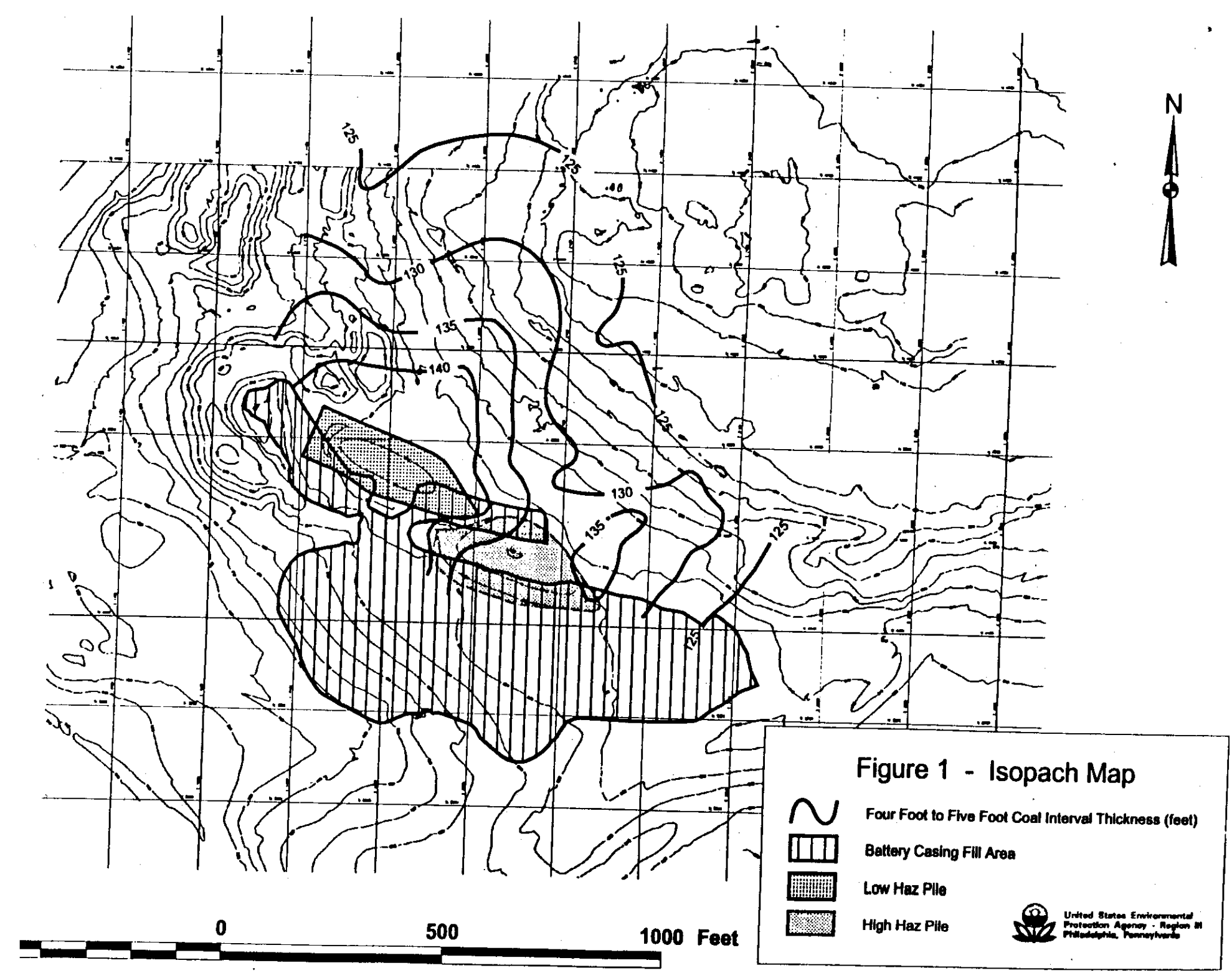
GF states that there will be a perpetual risk to the Throop community if the BCM remains in contact with mined coal seams. GF further states that Throop is requesting that if EPA is willing to remove lead contaminated material in contact with the mined coal

seams at the Marjol site, then it appears to make sense that all of the contaminated material can be removed from the Marjol site, instead of the hybrid remedy proposed by EPA. That is the only remedy that is protective of the community using the decision process outlined in the EPA 's Statement of Basis.

EPA Response: BCM will not remain in contact with mined coals seams under EPA's proposed remedy. As indicated above, EPA does not agree that the Top Split of the Top Four Foot and Top Four Foot coal seams have been mined under the Marjol site where the cap would be placed. Waste would be removed from contact with the Five Foot and Eight Foot coal seams, thereby removing any risk of mine fire or pothole subsidence from those seams. EPA's proposed remedy is protective of human health and the environment, and achieves the best balance among the decision criteria for remedy selection.

EPA Figure 1

Isopach - Four-Foot to Five-Foot Coal Seam Interval


N
125
130
135
140
0
500
1000 Feet
Figure 1 - Isopach Map
Four Foot to Five Foot Coal Interval Thickness (feet)
Battery Casing Fill Area
Low Haz Pile
High Haz Pile
United States Environmental Protection Agency - Region III
Philadelphia, Pennsylvania

ATTACHMENT III

LIST OF TECHNICAL REFERENCES

ATTACHMENT III

List of Technical/Resource Documents

Solidification/Stabilization

EPA Solidification/Stabilization Resource Guide
EPA/542-B-99-002
April 1999

EPA Innovative Site Remediation Technology
Volume 4
EPA 542-B-97-007
September 1997

*Handbook of Hazardous Waste Treatment and Disposal
Section 7.3.-Solidification and Stabilization Technology

EPA Handbook - Stabilization Technologies for RCRA Corrective Action
EPA/625/6-91/026
August 1991

EPA Engineering Bulletin Solidification/Stabilization of Organics and Inorganics
EPA/540/S-92/015
May 1993

EPA Applications Analysis Report
Hazcon Solidification Process
Douglassville, PA
EPA/540/A5-89/001
May 1989

Remedial Alternatives for Metals Sites

EPA Engineering Bulletin
Technology Alternatives for the Remediation of Soils Contaminated with As, cd, Cr, Hg, and Pb
EPA/540/S-97/500
August 1997

* Available in EPA Region III Library

ATTACHMENT III (CONTINUED)

Selection of Control Technologies for Remediation of Lead
Battery Recycling Sites
Risk Reduction Engineering Laboratory Office of Research and Development
U.S. EPA
Cincinnati, Ohio 45219

In-Situ Treatment Technologies

EPA Engineering Forum Issue
Considerations in Deciding to Treat Contaminated Unsaturated Soils in Situ
EPA/540/S-94/500
December 1993

EPA Guidance Document
Recent Developments for In-Situ Treatment of Metal Contaminated Soils
EPA-542-R-97-004
March 1997

EPA Site Demonstration Project
Geo-Con In Situ Solidification and Stabilization
Hialeah, Florida

Other Relevant Documents:

EPA Best Management Practices for Soils Treatment Technologies
EPA-530-R-97-007
May 1997