

National Historic Preservation Act - Section 106 Consultation Process

**Thomas Kent Jr. Farm
Greene County, Pennsylvania**

**Office of Surface Mining
Record of Consultation Findings**

September 2000

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I. Executive Summary

RAG Emerald Resources Coal Company submitted a proposed revision to a large, existing underground permit, that would provide for full extraction mining under the Thomas Kent Jr. Farm Historic Property (Kent Farm or Farm) in Greene County, Pennsylvania. The proposed permit revision qualifies as a Federal undertaking as defined in the National Historic Preservation Act (NHPA). Under NHPA, a determination is needed regarding the effects a proposed undertaking will have on historic properties listed or eligible for listing on the National Register of Historic Places. Where adverse effects will occur, Section 106 of NHPA requires a consultation process to develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize or mitigate the adverse effects on historic properties.

In Pennsylvania, the Department of Environmental Protection (PADEP) has been delegated primary jurisdiction (primacy) over the regulation of surface coal mining activity under the Federal Surface Mining Control and Reclamation Act of 1977 (SMCRA). This authority includes permit review and approval. In States with primacy, the Office of Surface Mining (OSM), conducts an oversight program to monitor the implementation of the approved State regulatory program. However, while PADEP has authority within its approved program for permit application review and approval, it alleges that it does not have authority under State law and regulation to carry out the consultation requirements of NHPA. Consequently, OSM, as the Federal agency official, carried out Section 106 consultation requirements on the Kent Farm historic property.

Since Pennsylvania is a primacy State, OSM's authority for compliance with NHPA with respect to the Federal undertaking is based on oversight of PADEP's permitting decision in conjunction with the results of the Section 106 consultation process. OSM also evaluated the results of the consultation meetings, reviewed supporting correspondence and evaluated several additional options and alternatives to the proposed undertaking. Based on this analysis, OSM's decision is that the anticipated damages can be minimized and mitigated through repairs by skilled craftsmen that maintain the historic attributes of the property, and its continued status as a National Historic Property.

II. Authorities

A. National Historic Preservation Act and the Section 106 Consultation Process

An amendment to NHPA in 1992 revised the definition of Federal undertaking to include a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including ... those subject to State or local regulation administered pursuant to a delegation or approval by a Federal agency. [16 U.S.C. § 470w(7)(D)]. This statutory language encompasses State permitting actions and related activities carried out under State mining regulatory programs approved pursuant to Section 503 of SMCRA. See Indiana Coal Council, Inc. v. Lujan, 774 F. Supp. 1385, 1401 (D.D.C. 1991). Such activities are Federal undertakings subject to Section 106 review and consultation requirements of NHPA. Section 106 consultation requirements are set forth in 36 CFR Part 800. The basic requirements of the consultation process are briefly discussed here. OSM, as the Federal Agency Official must, in consultation with the State Historic Preservation Officer (SHPO), determine if the undertaking (permit approval) as proposed would have an adverse effect on identified historic properties listed or eligible for listing on the National Register of Historic Places. Adverse effect is defined in 36 CFR 800.5 and includes by example the physical destruction of or damage to all or part of the historic property. If an adverse effect is found, OSM must consult with SHPO, (In Pennsylvania, SHPO is the Pennsylvania Historical and Museum Commission (PHMC), and the other consulting parties to develop and evaluate alternatives or modifications to the undertaking that would avoid, minimize or mitigate the adverse effects (36 CFR 800.6(a)). The Advisory Council on Historic Preservation (Advisory Council or Council) must also be notified when there will be an adverse effect, and be given the opportunity to participate. The desired outcome is for resolution of the adverse effects to be documented through a memorandum of agreement (MOA) signed by all the consulting parties. Although concurrence from all consulting parties is desired, the signatures of OSM and the PHMC are required at a minimum by regulations for an MOA to be viable. If the Advisory Council is participating, OSM and the Council's signatures are required at a minimum for the MOA to be viable. 36 CFR 800.6(c). The successful negotiation of an MOA would complete the Section 106 process. Failure of OSM to negotiate an MOA with PHMC, or the Advisory Council, if participating, would implement the termination of consultation requirements of 36 CFR 800.7. Public involvement in the consultation process, and notification of the final decision is also required in the consultation process. **(See Appendix H for the proposed MOA)**

In applying the requirements of Part 800.6(a), the word *avoid* means mining plan alternatives that will leave enough coal under the Kent Farm to provide full surface support to the residence and other structures, resulting in no adverse effect. This alternative is met by leaving 50 percent or a larger percentage of coal unmined. The word *minimize* means engineering techniques applied to the structures, and natural features such as the pond, which are designed to reduce the severity of subsidence induced damages. The word *mitigate* means post subsidence repair, replacement, or restoration of damaged features, or structural components.

B. Program Oversight Authority and Requirements under SMCRA

In States with primacy over the regulation of coal mining, OSM carries out an oversight program designed to monitor the implementation of the approved regulatory program for consistency with the Federal requirements. OSM's oversight review of Pennsylvania's regulatory program determined that permitting requirements under State law and regulation addressing historic properties, including requirements that the permit applicant identify archaeological and historic resources, and describe measures to be used to prevent adverse effects on properties listed on the National Register of Historic Places. (See **Appendix E Narrative Summary of PADEP's Actions and Decisions**, for a detailed description of the relevant Pennsylvania provisions.) Pennsylvania also may require the applicant to protect historic or archaeological properties listed on or eligible for listing on the Register through appropriate minimization and treatment measures. Where it finds proposed mining will likely cause irreparable damage, Pennsylvania will provide that the mining may not occur unless approved measures are taken to minimize or reduce impacts to structures. Thus, while PADEP contends that it does not possess all of the requisite capability to carry out the consultation provisions of Section 106 of NHPA, Pennsylvania's permitting requirements contain counterparts to Federal permitting provisions in SMCRA regarding historic properties, as well as additional protection provisions, including the irreparable damage criterion. Consequently, OSM conducted an oversight review of the extent that PADEP carried out its corresponding provisions in reviewing the RAG Emerald proposed revision and the extent that it addressed protection of the Kent Farm historic property.

C. Summary of PADEP Permit Review and Approval Process of the RAG permit Revision

In Pennsylvania, PADEP has been designated as the primary regulatory authority to administer the requirements of SMCRA, including review and approval of coal mine permits, through approval from OSM of a program of state coal mining laws, regulations, and guidance. OSM monitors the effectiveness of the State's regulatory program through oversight. Given PADEP is the SMCRA regulatory and permitting agency, with primacy over the coal regulatory program, OSM is incorporating PADEP's permit review and decision actions on the RAG permit revision, as part of this record.

Pennsylvania Regulatory Requirements: 25 Pa Code § 89.38, requires identification of archaeological and historic resources, and a description of measures to be used to prevent adverse effects on properties listed on the National Register of Historic Places. An applicant may be required to protect historic or archaeological properties listed on or eligible for listing on the Register through appropriate minimization and treatment measures. Under §89.142(d), if a mining technique or extraction ratio will cause irreparable damage to a residence, the mining technique or extraction ratio may not be used unless the operator takes measures prior to mining, approved by PADEP, to minimize or reduce impacts to the structures resulting from the mining. Under §89.5, irreparable damage is defined as; damage which would adversely affect the structure's historical or architectural value; damage for which the cost of repair to restore the historic and architectural value of the structure with the same craftsmanship and historically and

architecturally equivalent components would exceed the cost of replacement; damage which would be impossible to repair to restore the historic and architectural value of the structure with the same craftsmanship and historically and architecturally equivalent components.

III. Background

A. Thomas Kent Jr. Farm Historic Property.

The Thomas Kent Jr. Farm National Historic Property is a 102-acre site located in Greene County, Pennsylvania, with six buildings including an 1851, 2½ story Greek Revival-influenced brick house, a 1850 frame barn and corn crib, and an 1920's shed and garage. The Kent Farm is intact and reflects the architectural and agricultural trends common to mid-nineteenth century Greene County farms. It is currently owned and occupied by Laurine and Murray Williams who have restored and maintained the property and structures in excellent condition. The Kent Farmhouse retains many original interior details including a walnut staircase, paneled walnut doors, an elaborate front door with sidelights and transom, and fireplaces with Greek Revival-inspired mantels flanked by built-in cupboards. Additions and alterations to the house have been relegated to the side and rear of the house, following the original lines of the house. The bricks have been repointed using a high lime/low cement ratio with yellow and brown coloring. Windows on the front have been replaced with modern fixtures, and the front porch has been repaired and partially rebuilt. The Williams report expending \$400,000 in historic restoration and repairs since acquiring the property in 1977. According to the Keeper of the Register, these repairs have maintained the historic integrity of the Farm such that the property meets the criteria for historic significance. The setting of the Kent house and outbuildings is composed of unspoiled rolling hills, mature woods, runs, and a pond.

Because of its historical and architectural significance, the Thomas Kent Jr. Farm was listed on the National Register of Historic Places on May 22, 1998. On March 13, 2000, the property was delisted by the Keeper of the National Register of Historic Places, in response to a petition filed by RAG. The Keeper affirmed the criteria for listing, but found in favor of the petitioner, RAG Emerald Resources LP (RAG), because a procedural error may have been made in the original listing regarding notification of property owners. The Keeper was persuaded that mineral owners may have standing as an owner of the property and returned the matter to the PHMC for further consideration. On August 16, 2000, the property was re-listed by the Keeper of the Register.

B. Proposed Coal Mining Activity

Kent Farm lies above the permit boundary of the RAG Emerald No.1 Mine, a 16,000 acre underground coal mine first permitted and opened in the mid-1970's and in continuous operation since that time. The Kent Farm has been within the permit boundary of the overall mine since it was first permitted, but it was not until October, 1997, that RAG submitted a permit revision to authorize mining of 1,954 acres of the permit that included the area of coal below Kent Farm. On July 23, 1998, PADEP issued the permit revision but restricted mining under the Farm by requiring less than 50 percent coal removal so full surface support would be provided through room and pillar mining. PADEP also required RAG to prepare a subsidence control and

minimization plan for the Kent Farm given its historic designation (on May 22, 1998). The property owners appealed the permit decision in August 1998.

In July 1999 RAG prepared detailed mine plans and submitted a permit revision application to the PADEP for full extraction mining under the Kent Farm. In September 1999, the owners of the Kent Farm withdrew their appeal after reaching a settlement agreement with RAG and PADEP. The terms of the agreement provided more specific descriptions of the mining limitations under and adjacent to the Farm boundary, but preserved RAG's right to seek a permit revision from PADEP to allow full extraction mining through longwall mining. The July 1999, permit revision application proposed full extraction mining under the Farm as originally proposed in 1997. It is this permit revision, with proposed mining activity under the Kent Farm, that is the Federal undertaking for the purposes of NHPA. (See **Appendix G, Underground Mining Methods**).

Two longwall panels are proposed to be mined under the Kent Farm property. Each panel will be about 1,000 feet in width, and about 10,000 feet long. However, only the final 1,000 to 1,500 feet of each panel would actually pass under the Farm property. They are: Panel 4 North, which would undermine the Farm beginning about October 1, 2000, and Panel 5 North, which would pass under the Farm structures in the Spring of 2001. Panel 4 North is currently in production, approaching the Farm property from the east. The two panels will be separated by 184 feet of chain pillars. The Pittsburgh coal seam lies an average of 500 feet below the surface, and is about 7 feet thick. The full extraction of this seam is expected to cause a subsidence in excess of 4 feet in the middle of the panels, with decreasing subsidence towards both sides of the chain pillars. Thus, the amount of surface subsidence varies with location above the panel geometry with the greatest amount of differential settlement occurring at the edges of a longwall panel. As mining proceeds under the structures, there will be a wave effect of the subsidence known as dynamic settlement. RAG's subsidence control/minimization plan addresses this dynamic subsidence and proposes how it will be controlled to minimize damage to the structures.

C. PADEP Permit Review and Actions

PADEP issued a full extraction permit to RAG in July 1998, for additional acres in the Emerald No. 1 Mine, but restricted mining under the 102 acre Kent Farm property to less than 50 percent removal. RAG submitted another permit application revision for full extraction mining in July 1999, that included the area under the Kent Farm. PADEP's review focused on assuring that appropriate measures could, and would be taken to prevent adverse effects (irreparable harm), under a full extraction mining plan. The following is a summary of PADEP permit review, and the additional information PADEP required for approval of the RAG permit revision.

(Appendices D and E provide a detailed summation of PADEP's permitting actions and decisions.)

PADEP required an inventory, and mapping of the ground and surface water resources, discussion of the effect, if any, of mining on these resources and a proposed monitoring

plan. Also required were identification of the source of water for the farm pond and options for replacing water supplies.

PADEP required RAG to evaluate the feasibility of undertaking historic minimization and remediation, and required RAG to submit examples of other structures of similar age, and construction, where similar minimization was used (including pre- and post-mining condition, and how well the minimization worked). Specifically, PADEP required documentation that repairs could be made in accordance with the *Secretary of Interior's Standards for Treatment of Historic Structures*. PADEP required measures to assure the protection of certain weak points of the structure of the house (i.e., wood framing, and a bulging brick wall).

PADEP required RAG to assess the potential irreparable damage, as defined in 25 PA Code § 89.5.

PADEP required clarification, or new information pertaining to water resources, the pre- and post-mining condition of other residences, (including a comparison to the Kent Farm residence), geologic data, and additional discussion on the anticipated cost of repair, in regard to the Pennsylvania irreparable damage regulation.

PADEP required additional information regarding longwall mined center line homes, including post-mining damage surveys, and subsidence control plans.

In addition, PADEP contracted for a structural engineer to evaluate the extent of potential damage. The report concluded that the state requirements for protection of historic structures would be met. The consultant also concluded that the proposed mitigative measures would be effective at preventing large scale failure, or even distress, of the structural systems, principally the masonry walls and the floor and roof framing systems. However, the report also predicted significant plaster distress. The report found there are craftsmen with the requisite skills to repair, or reproduce elements of the building. The report concluded that, assuming the models for subsidence are correct, and the mitigative measures are effective, there is little likelihood of damage so extensive as to adversely affect the building's historic or architectural value. **(See Appendix I, Ortega Report.)** Based on concerns raised by the property owners, PADEP requested that RAG amend its minimization plan to provide additional support to floor joists, braces or gussets as needed to provide additional support to the roof rafters, to remove, store, or otherwise protect books in the bookcase, and protect the bookcase from falling. Additional information was provided regarding the fieldstone foundation, and shearing stresses on the brick walls from being out of plumb.

Permit Decision: PADEP issued the permit revision, noting that the NHPA Section 106 Consultation process was still underway, and requiring the posting of a \$219,397.46 subsidence bond for damages to the property. Findings issued by PADEP conclude that the proposed underground mining activities can be conducted without adversely affecting the property (i.e.,

there will be no irreparable damage), that RAG can mitigate any damage that may occur to the Kent Farm structures or features in accordance with plans proposed in the permit application, and that any damage that may be sustained by the Kent Farm can be repaired with the same craftsmanship and using historically and architecturally equivalent components.

IV. Section 106 Consultation Process

A. Summary of Section 106 Consultation Process for the Kent Farm Historic Property

The Section 106 consultation process for Kent Farm began following receipt of an October 1999 letter of complaint from an attorney representing the property owners. This complaint alleged that the requirements of NHPA were not being followed regarding the permit application revision from RAG to undermine the Kent Farm. In December 1999, the PHMC also contacted OSM and inquired about the need for Section 106 consultation on Kent Farm. In meetings, discussions and correspondence with PADEP on the Section 106 process, PADEP advised OSM of its conclusion that it does not have authority under State Law to administer the requirements of the Section 106 Consultation Process, or to hold up issuance of the permit application until that process is completed. OSM then initiated the Section 106 process as the Federal Agency Official.

Section 106 requires the Federal Agency Official, in consultation with the SHPO, to make a determination of whether the Federal undertaking (permit approval) as proposed would have an effect on identified historic properties listed or eligible for listing on the National Register of Historic Places, and to determine if the effect is adverse or not as defined in 36 CFR 800.5. OSM initiated discussions with PADEP and the PHMC about Section 106 compliance, and submitted letters to PADEP on December 23, 1999, and March 1, 2000, advising of their responsibilities in assisting OSM's compliance efforts. OSM met and discussed the process with PHMC and the Advisory Council on Historic Preservation, and the National Trust For Historic Preservation (National Trust) to fully understand the specific requirements of Section 106 consultation requirements.

On April 20, 2000, OSM issued a draft Finding of Effect determination on the proposed permit revision, regarding adverse effects on the historic attributes of the Kent Farm. This finding was finalized on June, 16, 2000, when it was submitted to the Advisory Council on Historic Preservation. OSM determined, as set forth in detail in the following section, that the proposed mining of longwall Panel 4 North would have no adverse effect and that the proposed mining of longwall Panel 5 North would have adverse effects on the historic attributes of the Kent Farm. This finding was submitted to the identified consulting parties for comment. (See **Appendix A, OSM's Finding of Effect**). As a result of the finding of adverse effect, OSM initiated consultation, resulting in a series of four meetings of the consulting parties between June 7, 2000, and August 4, 2000. Through the consultation process, OSM received documentation from the parties, including consulting reports from the property owners, PHMC, RAG, and PADEP. Comments on the technical issues and mining/minimization alternatives were accepted through August 16, 2000. (See **Appendix B Summary of Consulting Parties Positions, and Appendix C, Chronology of the Section 106 Consultation Process**).

B. Finding of Effect on the Kent Farm Historic Property

An adverse effect, defined in 36 CFR Part 800.5, exists when an undertaking may alter (directly or indirectly) any of the characteristics of an historic property that qualify the property for inclusion in the National Register, in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

On April 20, 2000, OSM issued a draft Finding of Effect to the PHMC, and sent copies to all consulting parties asking for their comments within thirty days. OSM found no adverse effect on the historic attributes of the Farm from the proposed mining in Panel 4, and found an adverse effect on the historic attributes of the Farm structures would result from the proposed mining and subsidence control/minimization plan for Panel 5. In response to a concern raised by a consulting party during its review of the Finding of Effect, OSM conducted a hydrologic investigation regarding mining impacts on the Farm pond, and issued a report on May 15, 2000. The investigation verified that there would be no adverse impact on the water resources of the pond from Panel 4 mining. However, the investigation found that the mining on Panel 5 would likely have an adverse effect on the hydrology of the springs and pond. The Finding of Effect was updated on June 16, 2000. At that time, the Advisory Council was formally notified of the adverse effect, and invited to participate as a consulting party. On June 22, 2000, the Council notified OSM that it would participate. A summary discussion of the Finding of Effect follows.

Panel 4 North. OSM concluded there was no adverse effect on the historic attributes of the Farm from the proposed mining in Panel 4. This Panel is presently being mined. The direction of this Panel is such that it is approaching the north area of the Farm, at an average depth in excess of 500 feet. The mains, sub-mains, and gate road entries that provide access as the Panel is mined, have already been developed under the Kent Farm in accordance with the terms of the original permit. Those permit terms allowed development of the longwall mining as long as at least 50 percent of the coal was left in place under the Kent Farm to support the surface and structures. In the extraction of the longwall Panel, 100 percent of the coal is to be removed, causing surface subsidence estimated at 4.7 feet. The surface of the land above Panel 4 North is a rolling field and contains no buildings or other structures.

Panel 4 North Effects. There are no structures over Panel 4 North and none of the Kent Farm structures are within the subsidence zone for this Panel. The barn is the nearest structure, and lies approximately 100 feet on the south side of the chain pillars separating Panels 4 and 5 North. Subsidence effects from longwall mining on the land surface typically include cracking and landslips where unstable slopes are undermined and changes in stream and spring characteristics and flow. Land cracks either close up naturally or will be filled by RAG if judged to impair the use of the land or cause a safety hazard. There are no water resources identified on the Kent Farm in Panel 4 North. There is a wooded area up slope from the pond, and some scattered trees over the Panel. Most of the land surface is taken up in fields used for cattle grazing. The projected 4.7 foot subsidence from the chain pillars to the middle of the Panel will not be noticeable because of the large surface area involved, and will not have an adverse effect on the land surface or trees. In

comments received with respect to a determination of effects, concern was expressed that a part of the recharge area of the pond is over Panel 4 North, and any loss of water could have an adverse effect on the pond as an historic feature. The pond itself is partially over the chain pillars between Panel 4 and 5 North, and over Panel 5 North. OSM's hydrologic evaluation of this potential impact concluded that mining of Panel 4 would diminish the recharge (flow of water) of the pond less than 10 percent, since the Panel intercepts only a small part of the recharge area. This is not considered an adverse effect because the reduction in water flow into the pond would not alter, directly or indirectly any of the characteristics of the historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. 36 CFR Part 800.5.

Panel 5 North. OSM found that the proposed mining of this Panel would have an adverse effect on the historic attributes of the Farm structures. The house and most of the structures are located in the middle of Panel 5, lying 450 feet above the coal seam. The barn is located about 100 feet from Panel 4 North chain pillar. A pond of about 20 acre-feet is located partially above Panel 5 North and partially above the Panel 4 North chain pillars. The separation between Panels 4 and 5 is 184 feet. The mains for the mine have been developed to the west of the structures, but within the designated Farm area. These mains provide greater than 50 percent surface support and are not expected to cause subsidence. None of the Farm structures are over any mains, or chain pillars.

Panel 5 North Effects. The proposed mining is planned to proceed at a rate of 100 feet per day. Subsidence will begin almost immediately, with the surface influence of the active subsidence lasting about two weeks after mining. Prior studies on longwall subsidence have indicated that, after three months, the surface normally achieves its new configuration, although it is not uncommon for slight additional settlement to occur up to a year or longer. The Kent Farm structures are located near the middle of Panel 5 North. While such a location minimizes the extent of differential settling (one part of the structure settling more than another), the predicted settlement of 4.7 feet is expected to cause some damage. Types of damage typically observed in structures includes cracks in interior walls and plaster, foundations and basement walls, chimneys pulling away, sticking doors and windows, separation of utilities and pipes, the structure being out of level, and cracks and settlements in adjacent walkways and driveways. These damages anticipated at the Kent Farm house, even with the proposed minimization plan RAG plans to install, constitute adverse effect as defined in 36 CFR 800.5(a)(1). Also, 36 CFR 800.5(a)(2) gives as an example of an adverse effect, the physical destruction of or damage to all or part of the property.

The barn and pond are not located in the flat bottom of the subsidence trough. The barn is located above a section of the panel where a 1.10 foot vertical differential settlement is projected across its base, creating a need to re-level the barn once the subsidence is finished. A vertical differential settlement across the pond of 3.2 feet is projected, so that heightening of the embankment will be necessary to prevent the water from overtopping. The pond will also be

subject to cracking in the bed or embankments, which may lead to water loss, until the cracks self seal or the mining company makes specific repairs. The sources of water for the pond are surface runoff, underground flow and springs. Springs are frequently lost as a result of longwall mining, and therefore, the pond could be adversely affected by the mining operation. Spring water also serves as the personal water supply for the Williams. There is a high likelihood that the spring will be adversely affected by the mining, and the water supply will have to be replaced by RAG under the requirements of state law. There are wood lands up slope from the pond, and scattered trees on the property. These natural features will not be adversely affected. There could also be surface cracks in the land, and slips on unstable slopes, and the fences could be damaged. Land cracks either close up naturally or will be filled by RAG if judged to impair the use of the land or cause a safety hazard, and fences will be repaired as necessary.

OSM s conclusion is that the mining of Panel 5 will cause adverse effects on the structures and property of Kent Farm.

C. Summary of Alternatives and Modifications resulting from OSM s Section 106 Consultation.

1. **Total Avoidance:** Total avoidance of mining in an area beginning 300 feet in advance of the Kent Farmhouse, and continuing 1,400 feet to the end of Panel 5, would result in leaving a block of coal 1,000 feet wide, 1,400 feet long, and 7 feet thick, (about 25 acres of coal, or 400,000 tons). This alternative would require a modification in the mining plan, including reconfiguring the conveyor belt and possible unplanned downtime in moving the longwall mining equipment. However, protection may also be achieved through partial extraction room and pillar methods in the zone of subsidence under the residence, and in the remaining portion of the Panel. Room and pillar mining is an alternative that would require leaving about 200,000 tons of coal while still providing an acceptable level of protection to the residence.
2. **Modified Avoidance:** Consideration was given to the option of terminating Panel 5 mining 300 feet in advance of the house, and reinserting the longwall equipment allowing for a 600 foot protection zone around the house. This would require leaving about 200,000 tons of coal in place. This option may be technologically infeasible due to the short remaining distance (800 feet) to the end of the panel. However, it should be noted that longwall mining companies can and do move their equipment in panel in unanticipated situations, or where there is a known obstacle.
3. **RAG Damage Minimization Proposal.** The RAG consultant s analysis indicated that, with appropriate minimization, mining can take place with minor effects to the buildings, most notably, the Kent Farm house. The predictive technique used reportedly has been proven very accurate and applicable to mining in Greene County and case studies submitted by RAG demonstrated that the model yields accurate results. While subsidence prediction is an evolving field, and predictive methods are being continuously developed, evaluated,

and/or refined, the proposed method has been presented at numerous professional meetings/conferences, has been repeatedly refined as additional data is collected, and is generally accepted as being reliable.

The predicted movements and associated stresses/strains that the structure will be subjected to would be expected to result in some damage; this would be in the form of plaster cracks, cement/concrete floor heaving, mortar cracks, and/or floor cracks. Based on the predicted subsidence movements, associated stresses and strains, and the anticipated resulting damages, RAG and its consultants developed a minimization plan. The plan was based on the concept of keeping strains below the maximum tolerable limits for similar structures/materials. The specific damage minimization measures proposed for the farm house include:

- " installation of a series of trenches around specific portions of the house to effectively reduce the effect of dynamic stresses and strains which, during mining, would otherwise impact the foundation and outside wall areas;
- " installation of tension cables around the lower portions of the structure to minimize the effects of tensile stresses and strains;
- " installation of tensioned nylon ropes around the upper portions of the house to minimize the effects of tensile stresses and strains;
- " continuously mining during the time when the longwall face is in the influence area of the farmhouse to minimize dynamic strain; and,
- " planning the longwall panel so that the farmhouse is situated in the center, resulting in minimum differential movement and reduced final strains.

Overall, these measures are intended to reduce the stresses on the farmhouse during the dynamic phase of the subsidence (i.e., while the mining is occurring near/beneath the structure). The trenches serve to isolate the base of the house and lessen the lateral loads imposed on the foundation by the shifting earth during subsidence. The second part of the company's minimization plan involves installation of cables around the foundation and first floor areas of the structure and nylon ropes at the second floor level.

- 4. Gensert Damage Minimization Proposal.** This alternative conceptual proposal was developed by a consultant for the property owners. In this approach, the weight of the superstructure above the foundation walls is transferred to a grid of steel beams supported by hydraulic jacks. Subsidence movements would be monitored continuously and the jacks adjusted to isolate the supported structure from the ground movements (i.e., keep the structure level). Once subsidence is determined to be complete, the structure is transferred back to the foundation. This plan calls for the field stone foundation to be completely dismantled and rebuilt. This concept, known as plane fitting in the technical literature, is

considered as another method to minimize subsidence effects. However, generally it has only been applied to frame-type structures smaller than the Kent Farm house. The method has not been proven reliable for a structure of the size and weight of this house.

The concept of simultaneously monitoring ground movements and adjusting the various supporting jacks to compensate for the movements is easily understood; the complexity of implementing such a system should be equally appreciated. The predicted subsidence of 4.7 feet will occur in less than 10 days, with an anticipated maximum of three feet in one day. The precise movements in relation to the location of each jack support cannot be anticipated. Even with computer control, the premise of instantaneous adjustment of multiple jacks so that the structure experiences no strain is difficult to accept. At a minimum, it would not be surprising for the structure to experience damages similar to those anticipated using the RAG minimization method. In addition, because the structure would be supported on a set number of jacks with significant building loads distributed over each one, the system itself would be susceptible to catastrophic failure due to unidentified structural anomalies and/or system malfunctions. Although the system appears to be promising conceptually, no specific plans were submitted to gauge the severity of the impact on the property.

- 5. Off-Site Move of the Residence.** A third minimization option was discussed very late in the consultation process. This option involves moving the house off-site, while the ground is in active subsidence, and then returning it to its previous location on a rebuilt foundation, was also considered. While this option may be technically feasible and would eliminate the subsidence concerns, additional challenges and risks unique to this option would arise. The size, shape, weight, and age of the structure, its position on the side of a hill, and the large attached porch among other factors would have to be considered in designing a lifting and moving plan. Further, questions regarding the width and curvature of the driveway and access road, weight limits, bridges, side clearance, and overhead utilities have not been answered. Also, there would be the challenge of finding a suitable place to park the house for several months. It would not be on the Williams property and could be several thousand feet away. The panel's geometry is oriented right down the valley so moving the house would involve traveling down Panel 5 and crossing over to Panel 4 which may not have settled to its final elevation. Thus a move may have to be a large distance to get out of the mining area, perhaps involving the use of U.S. Route 19. Consideration of all these factors would add some degree of risk that damages could at least equal the anticipated damages from the other options at a much higher cost.

V. OSM s Decision on the Kent Farms Historic Property

A. OSM Oversight Analysis of PADEP s Permit Review and Decision on the Kent Farm Property

As previously noted, OSM s oversight evaluates the extent that a State follows its approved program in carrying out enforcement and permitting activity. Specifically with respect to the RAG permit revision application, OSM s oversight review focused on several key areas. First, OSM assessed the extent that technical concerns with the subsidence control and minimization plan proposed by RAG, raised during the Section 106 Consultation process, were also raised and addressed during PADEP s permit review process. Second, OSM reviewed whether PADEP followed the permitting requirements of the approved program in its review of the Kent Farm permit revision, including the extent that it required additional information from the company to address adverse impacts. Finally, OSM reviewed for concurrence, any additional evaluations or reports, including consultant reports, relating to impacts to the Kent Farm. Finally, OSM evaluated whether there were outstanding technical issues remaining after PADEP s review and findings that need to be addressed by OSM through an independent consultant review.

OSM has reviewed PADEP s permitting record for the Kent Farm application revision and the results of the consultation process and reached the following conclusions:

Most of the technical concerns with the subsidence control and minimization plan proposed by RAG, which were raised during the Section 106 Consultation process by the property owners and PHMC, were also raised and addressed during PADEP s permit review process.

PADEP followed the permitting requirements of the approved program in its review of the Kent Farm permit revision. The Pennsylvania regulations for protection of historic properties required additional review by PADEP on the impacts to the Kent Farm. This resulted in requests for additional information from RAG in support of the proposed subsidence control/minimization plan and possible impacts on the historic nature of the property. PADEP contracted with an independent historic consultant and structural engineer to provide comment and analysis regarding the proposed action as part of the additional review of the impacts to the property.

PADEP s permit findings assessed the likely amount of damage expected from mining using the minimization plan, as modified through the permit review process. The finding is that the damage will not be irreparable and can be repaired with skilled craftsmanship and using historically and architecturally equivalent components.

OSM s review concurred with the structural consultant report (June 2, 2000, Richard Ortega, PE.) obtained by PADEP in support of its findings.

OSM has found no outstanding technical issues remaining after PADEP's review and findings, that need to be addressed by OSM through an independent consultant review.

PADEP's review of RAG's permit application, and decision that the subsidence control/minimization plan meets its program regulations, including those at 25 Pa. Code 89.5 for irreparable damage to historical properties is incorporated in OSM's decision on Kent Farm.

B. Rationale for OSM's Review and Decision on the Federal Undertaking

The Record of Consultation Findings establishes the standards for analyzing impacts to properties protected under the NHPA. Additionally, this record identifies the potential impacts likely to occur from the proposed mining, actions to be taken to minimize and/or mitigate those damages, and the basis for concluding that any anticipated damages should be repairable to a level that maintains the architectural and historic integrity of the Kent Farm structures. This section describes the criteria that OSM used in reviewing the proposed longwall coal mining plan of operation and the subsidence control plan submitted by RAG as required by the approved Pennsylvania regulatory program.

Under NHPA, OSM as the Federal agency official, must implement the consultation requirements of Section 106 by developing and analyzing alternatives and/or modifications of the proposed coal mining operation that would avoid, minimize and/or mitigate adverse impacts to the listed historic property.

Comparison of Primary Minimization Options The RAG minimization techniques have been considered successful by OSM and PADEP in minimizing the effects of subsidence. The methods proposed in the Gensert alternative have also been used, although not as extensively in mine subsidence situations. The concept has not been proven with structures of the size/weight of the Kent farmhouse. It is also noted that in the context of subsidence minimization, success is not synonymous with zero effects or no damage. It is generally accepted that due to the complex nature of ground movements and structure response, damages such as plaster cracking, concrete floor heaving, and brick/mortar cracking are likely to occur even with implementation of these methods. Therefore, an assessment of success must take into consideration the type of structure and its intended use; how critical each component is for proper functioning; and, in this case, how such damages affect the historic integrity. If repair/restoration of the types of damages identified above is unacceptable from the historic preservation perspective, then neither minimization proposal would be appropriate. Only the avoidance alternative (i.e., leaving a solid block of coal under the residence, or limited extraction mining designed to provide long-term stability) can be reasonably anticipated to result in no damage to the house.

OSM finds that both the RAG and Gensert options have implementation uncertainties, and can be expected to result in some level of damage. However, the Gensert option is in concept only and has not been designed. Further, adoption of the Gensert option, over the objections of RAG, would also raise the question of responsibility for any implementation problems, and repair costs.

OSM found that the Gensert option was not preferable over the mining operation and subsidence control plan proposed by RAG.

OSM analyzed the impacts associated with the proposed mining operation and subsidence control plan to determine if impacts were of the type and extent that could result in a delisting of the historic property pursuant to the NHPA's Section 106 implementing regulations at 36 CFR 800.5(a)(1), Criteria of adverse effect. After analyzing the proposed mining operation in terms of the Criteria of Adverse Effect OSM then applied the conclusions of the analysis to the NHPA Section 106 Criteria for evaluation (36 CFR Part 60.4) to determine if any proposed impacts would delist the Kent Farm property.

OSM's review of the proposed plan of operation and subsidence control plan concludes that adverse effects to the Kent Farm structures will be minimized through the sequence of mining that is presented in the proposed plan of operation and through the subsidence control plan that proposes to trench and cable the structures.

Once OSM determined that the proposed plan of operation and subsidence control plan would minimize material damages to the Kent Farm structures, OSM reviewed the subsidence control plan to determine if material damages would be mitigated through repairs that maintained the historic integrity of the structures. OSM's analysis indicates that the subsidence control plan includes provisions to repair damage to structures using skilled craftsmen to ensure that the property's historic integrity is maintained to the standards of the Secretary of Interior's Standards for Treatment of Historic Structures .

Since OSM determined that the proposed plan of operation and subsidence control plan provides for initially minimizing any material damages to the property and mitigates any material damages that may occur, OSM concluded that avoidance was unnecessary to preserve the historic integrity of the property.

OSM has also determined that any repairs to the property that are necessary must comply with the following:

- (1) The selected minimization and mitigation plan must preserve the historic integrity and eligibility of the property for the Register and maintain the property's ability to function as a livable residence (See 36 CFR 60.4 for a discussion of the criteria used in evaluating a property's eligibility for the National Register).
- (2) Any anticipated and/or unanticipated damage to the historic features must be repaired in accordance with the Secretary of Interior's Standards for Treatment of Historic Structures .
- (3) Skilled craftsmen must be available for any needed repairs that will maintain the historic integrity of the structures.

C. Impacts of Mining on Historic Resources

RAG made commitments toward preserving the historic fabric of the house which are provided in a Mitigation Plan for The Thomas Kent Farm, Greene County, Pennsylvania prepared by Cultural Resource Analysts, Inc. The plan calls for the sensitive removal of important architectural features during the subsidence period, repair of damage such as cracks in plaster and floors, and replacement of features (if necessary) using experienced, local, skilled craftsmen and appropriate materials. All of the activities will be undertaken in consideration of the *Secretary of the Interior's Standards and Guidelines*. Through the consultation process, RAG has informally committed to complying with the terms of the proposed Memorandum of Agreement (MOA), even if an executed agreement is not possible. OSM will coordinate with PADEP to have the terms of the MOA incorporated in the permit. **(See Appendix I, Proposed Memorandum of Agreement for a full presentation of the Kent Farm proposal.)**

Selected details from the proposed MOA, of the actions to record, preserve and restore the historic features and attributes of the Kent Farm are presented below.

Structures: Pre-Mining Survey

Photographs. Both color and black and white photographs printed on 8 x 10 inch paper will be taken, documenting the pre-mining condition of the property structures. Medium format (2¼ x 2¼ inches or 6 x 6 cm) will be used with modern single lens reflex medium format equipment. The black and white photography must be archivally stable and based on HABS/HAER photographic standards. The color photography will document the condition of each building so that after mining, the structures can be returned to historic, pre-mining appearance. The following photographs of the house must be taken at a minimum.

Exterior elevations: Photographs of each facade (as a whole) and detail/close-up, to document the color, texture, and workmanship of masonry and woodwork.

Interior elevations: Photographs of each wall in all rooms, including the hall.

Details: Photographs of all architecturally significant features including all mantles, all doors and associated architraves, windows and associated architraves, balustrade and stair, both from the bottom looking up and the top looking down, the side cupboards, front door with transom and sidelights, porch and foundation.

Floor Plan - measured drawings must be undertaken of each room, including measurements of wooden floorboards.

" **Water Resources - Surveys** **Pond**

RAG will immediately begin monthly monitoring (flow and quality) of the pond outflow and principal inflow sources. Water quality parameter analyses should include; pH, temperature, alkalinity, acidity, total iron, total manganese, total aluminum, sulfate, total suspended solids, total dissolved solids, and sodium.

Begin daily discharge rate monitoring of the pond outflow and main inflow sources once the Panel 4 North longwall face approaches to 500 feet of the closest point of the pond. Repeat for Panel 5 North.

Continue flow monitoring on a daily basis for a least a week after the longwall face has passed the pond. The monitoring can be scaled back to weekly for the next three months and monthly for the next 9 months. Water quality monitoring should be performed weekly for the first month after the face has passed, and monthly for the next year. The timetable should be modified to the Panel 5 North mining schedule when it approaches within 500 feet of the pond.

House Spring

RAG will immediately begin monthly monitoring of the quantity and quality of the spring water. When the face of Panel 5 North comes within 500 feet of the spring, RAG will begin daily monitoring of the spring using the same quality criteria as the pond. Monitoring will continue on a daily basis for a week after the mining face has passed under the spring house, and monthly after, for a year, or until a permanent replacement water supply is provided, if required.

Archaeological Resources

RAG will consult with the PHMC and a professional archaeologist, approved by PHMC, to develop a specific plan for the investigation, identification and retrieval of historical artifacts that may be encountered while installing the subsidence mitigation plan. Persons responsible for the excavation shall be made aware of the possibility of uncovering historical artifacts, and provided training regarding the proper techniques to use in excavation to minimize potential damage to artifacts, and techniques to recover and protect any artifacts found. A professional archaeologist/historian will be on site to monitor excavation activities. All features and artifacts uncovered shall be documented to professional standards. Any artifacts recovered shall, upon completion of documentation, be turned over to the Williams unless other arrangements are made.

Details:

The Williams , RAG, the PHMC, a historical architect, and appropriate skilled craftsperson, suitable to the parties, will consult and document steps that will be taken to protect specific historical features, and how repairs to these features will be made. If architectural features are removed from the house for protection during the subsidence process, they must be labeled and stored in a dry, secure place away from the site. Labeled items shall be cross matched with the measured drawings and photographs to assure exact positions are maintained. They should be replaced only after the danger of further subsidence has passed. The process of removal and replacement of the architectural features must be under the care or supervision of a person with significant experience and skill in the restoration of properties of similar age and character.

Repair/Restoration

Structures:

Any restoration or repair needed in the structures of the Kent Farm as a result of mining activities must be undertaken in a manner consistent with the Secretary of the Department of the Interior's *Standards for the Treatment of Historic Properties* and associated guidelines, regardless of how the previous rehabilitation was undertaken. Repairs must be undertaken by craftsmen with significant experience in working on structures of similar age and type, and proven skills in the required areas of expertise. The PHMC shall be consulted on the selection of the craftsmen who will be responsible for restoration/repair activities at the Farm. The repair/restoration standards include but are not limited to the following:

Brick Masonry: If brick crack, break, or spall, and removal is determined to be necessary, replacement brick must match the existing historic brick in size, color, firing and texture, and preferably be from the same era.

Mortar: Damaged mortar will be repointed in accordance with Preservation Brief #2 *Repointing Mortar Joints in Historic Brick Buildings*. New mortar must match the historic high lime mortar, in color, texture, and joint profile.

Wood Trim and Wood Surfaces: Any wooden feature, or finish damaged as a result of the mining activity, must be replicated in kind, matching the historic/existing profile and surface treatment.

Interior Surfaces:

Plaster: Damage to plaster surfaces and walls, must be removed, and new plaster must be applied in accordance with Preservation Brief #21 *Repairing Historic Flat Plaster - Walls and Ceilings*.

Gypsum Wallboard: Gypsum wallboard must be removed to assess the damage to frescoed plaster wall surfaces. These decorative wall surfaces must be repaired by skilled craftsmen specializing in Decorative Arts Restoration. After restoration, new gypsum board should be applied so as not to damage the historic plaster surfaces, in accordance with recommendations in the *Gypsum Construction Handbook* published by United States Gypsum, or approved equal.

Water Resources:

Farm Pond: The pond is identified as a contributing feature to the historical property. As such it needs to be maintained both as a visual aspect of the property and as an agricultural water for the cattle operation. RAG will take the necessary steps to compensate for differential settlement, and any loss of water due to bottom cracking. RAG will also be responsible for replacing any loss of water inflow as a result of mining, which is significant enough to adversely effect the use or appearance of the pond.

House Spring: Should the spring, serving the personal water needs of the Williams , be damaged or lost, the water supply will be replaced on a temporary and permanent basis, in accordance with the requirements of Pennsylvania and Federal law. The spring house must be maintained/repaired/restored as an historic structure.

Overall Appearance and Use of the Property

RAG will be responsible for correcting any damages to the land surface which adversely affect the appearance or use of the property. Damages could include side hill slips and cracks in the surface of the land. Shrubs, trees, grass, and other landscaping around the buildings damaged as a result of the mitigation measures, or repairs, shall be replaced or repaired with similar plant materials as directed by the Williams .

Additional consultations will take place to assure that the house is sufficiently documented (photographs, drawings, floor plans) to assist in repairs. Discussions will be undertaken to determine which, if any, architectural features need to be removed and the best methods to accomplish their removal. Features that may require special considerations, such as support for hanging cabinets and protection of window glass, will be identified. In addition, RAG and PHMC will consult to determine the best way to conduct and monitor the trenching activities to preserve any artifacts uncovered. Additionally, the National Trust raised an issue concerning the

unusual, bolted connection between the front porch and the front wall of the house, with the potential for differential settlement of the house and porch causing damage to both. OSM consulted with RAG about this issue and was advised that no problem is anticipated with settling between the porch and house. However, RAG agreed to monitor this situation during settlement and take corrective actions as required.

D. Additional Recommendations

OSM recommends that additional discussions be held among the property owners, RAG, PHMC, and historical architects and craftsmen regarding necessary precautions to protect crucial historic features and any repair/restoration of those features. Also, concerns have been raised about the potential for uncovering archeological resources during the excavation around the foundation to install the cabling system. OSM will provide assistance as needed to facilitate a written Memorandum of Agreement among the parties on these matters.

OSM has reviewed all information presented in the four consultation meetings, supporting correspondence, has conducted a review of PADEP's permit record and decision, and has developed and evaluated options and alternatives to the undertaking. OSM has evaluated the potential damage to the residence that would be likely under RAG's proposed mitigation plan. We determined that the anticipated damages should be repairable to a level that maintains the architectural and historic integrity of the house and Farm. Likewise, anticipated impacts to the pond and other features on the farmstead have been evaluated. The evaluation indicated that the proposed mitigation and repairs should preserve the historic integrity and eligibility of the property for the Register, and maintain the farmstead's ability to function as a livable residence. Anticipated damages can be repaired or restored by skilled craftsmen in a manner that maintains the historic attributes of the property, and its continued status as a National Historic Property. Thus, based on the entirety of its review, OSM has concluded that RAG's mining and subsidence control and mitigation plans, if properly implemented and monitored, are reasonable and prudent measures to protect the historic attributes of the Kent Farmhouse, and property. Because of the findings summarized above, OSM has further concluded that avoidance of the surface effects of longwall mining under the Farm is not necessary.

Appendix A

Thomas Kent Jr. Farm Historical Property Finding of Effect April 20, 2000, revised June 16, 2000

RAG Emerald Resources Corporation Permit Revision No. 1 CMAP 30841307

Information required by 36CFR Part 800.11(e)

Description of the Undertaking

In July 1999, the RAG Emerald Resources Corporation submitted to the Pennsylvania Department of Environmental Protection (PADEP) an application to revise its Emerald Mine permit (CMAP No. 30841307). The revision would permit the development of mains, sub-mains gate road entries and retreat longwall mining under a 102 acre tract of land known as the Thomas Kent Jr. Farm, a property eligible for listing on the National Register of Historical Places.

In an earlier settlement agreement between the property owners, RAG Emerald, the Pennsylvania Museum and Historic Commission (PHMC), and PADEP, a permit was issued that allowed mining under the farm with surface support and no longwall mining operations within three hundred feet of the primary residence of Kent Farm. The permitted mining plan would provide full protection to the surface from the effects of subsidence, and therefore have no effect on the historical property. RAG Emerald proceeded to use this permit to develop the underground support areas for two long wall mining panels that would pass beneath the Farm in accordance with the overall mining plan for the Emerald Mine. The settlement agreement provided the opportunity for further permit revisions. After preparing a subsidence control plan for the Thomas Kent Jr. Farm, and the application, a permit revision was submitted.

Two longwall panels are proposed to be mined under the Kent Farm property, in this revision to the permit. Longwall mining is a full extraction mining method, which causes rapid surface subsidence as the temporary roof supports at mine level are removed when the mining machinery moves forward. Each panel will be about 1,000 feet in width, and about 10,000 feet long. However, only the final 1,000 to 1,500 feet of each panel would actually pass under the Farm property. The panels are 4 North, which would undermine the Farm beginning in late September, 2000, and 5 North which would pass under the Farm in the Spring of, 2001. Panel 4 North is currently in production, approaching the Farm from the east. The two panels will be separated by 184 feet of pillars and the gate roads. The Pittsburgh coal seam lies an average of 500 feet below the surface, and is about 7 feet thick. The full extraction of this seam is expected to cause a surface reduction in elevation of about 4.7 feet in the middle of the panels, with a decreasing amount as the distance to the mains and gate roads lessens. Support areas subject to developmental mining will have little or no subsidence. The amount of surface subsidence will also depend on the location within the panel. However, the greatest amount of differential

settlement will occur at the edges of the panel. The Kent Farm house is in the middle of the panel, and therefore, not likely to be subject to any differential settlement. As mining proceeds under the structures, there will be a wave effect of the subsidence, known as dynamic settlement. RAG/Emerald's subsidence control plan addresses this dynamic subsidence, and how it will be controlled to minimize damage to the structures.

PADEP is in the process of reviewing the application for permit revision, and has requested additional information in several correction letters. At the date of this finding, PADEP's review is nearing completion. Their consultant report on the effects on underground mining on the Kent Farm house was issued on June 2, 2000.

In 1992, amendments to the National Historic Preservation Act (NHPA) defined undertakings to include projects, activities or programs subject to State or local regulations administered pursuant to a delegation or approval by a Federal agency. Because the PADEP reviews and approves coal mining permits subject to primacy program authority granted by the Office of Surface Mining, permitting actions are considered Federal undertakings, subject to the requirements of the NHPA, including the Section 106 consultation process.

Description of the steps taken to identify historic properties

The presence of the Thomas Kent Farm was identified in the permit revision by RAG Emerald Resources Corporation, and was known to the mining company through earlier permitting activities. The PHMC has submitted several reviews and recommendations to the PADEP regarding the mining proposal and protection of the Thomas Kent Farm. The owners are represented by legal counsel, and have also been in discussions with the other consulting parties regarding the proposed mining activity and adverse impacts on the Kent Farm. PADEP during their review process, has requested additional information from RAG Emerald regarding their mining, and subsidence control plans in regard to the Kent Farm. There were no other historical properties identified in this permit revision.

The Thomas Kent Jr. Farm was listed on the National Register of Historic Places on May 22, 1998, for its historic and architectural significance. On March 13, 2000, the property was de-listed by the Keeper of the National Register of Historic Places, in response to a petition filed by the RAG Emerald Resources Corporation. The Keeper affirmed the criteria for listing, but found in favor of the petitioner that a procedural error may have been made in the original listing regarding notification of property owners. The Keeper was persuaded that the mineral owner may have standing as an owner of the property, and returned the matter to the PHMC for further consideration. Since the property remains eligible for listing, the Section 106 consultation process still applies to the property and permitting action. The PHMC will apply for the property to be re-listed, and a hearing is scheduled for the week of June 12, 2000.

Description of the affected historic properties

The Kent Farm is a 102 acre site located in Greene County Pennsylvania, with 6 buildings including a 1851, 2 ½ story Greek Revival-influenced brick house, a 1850 frame barn and corn crib, and 1920's shed and garage. The Kent Farm is intact and reflects the architectural and agricultural trends common to Greene County farms. It is currently owned and occupied by Laurine and Murray Williams who have maintained the property and structures in excellent condition. The Kent Farm is representative of rural, mid-nineteenth century, Green County farms. The Kent Farm house retains many original interior details including a walnut stair case, paneled walnut doors, elaborate front door with sidelights and transom, and fireplaces with Greek Revival-inspired mantels flanked by built in cupboards. Additions and alterations to the house have been relegated to the side and rear of the house, following the original lines of the house. The brick have been re-pointed using a high lime/low cement ratio with yellow and brown coloring. Windows on the front have been replaced with modern fixtures, and the front porch has been repaired and partially rebuilt. These changes do not significantly compromise its historical integrity, and indeed in the Keeper s March 13, 2000 de-listing, affirmed that the property meets the criteria for historical significance. The setting of the Kent house and outbuildings is composed of unspoiled rolling hills, mature woods, runs, and a pond.

Description of the undertaking s effects on the historic property

For the purpose of Section 106, the undertaking is the approval of the mine permit revision by which RAG Emerald Resources proposes to conduct longwall coal mining operations beneath the entire farm.

Panel 4 North would be mined first, cutting under the north area of the Farm at an average depth exceeding 500 feet. The main and sub-mains and the gate road entries to provide access as the panel is mined, have already been developed under the farm in accordance with the terms of the original permit, which allowed mining as long as at least 50% of the coal was left in place to support the surface and structures. It is the actual development of the longwall panel where 100% of the coal is removed, that causes the 4.7 surface subsidence. The surface of the land above panel 4 north is a rolling meadow, and contains no buildings or other structures. When this panel is completed at the west end mains, the mining machinery will be moved back up the gate road to the beginning of panel 5 North, and the next longwall panel will begin. **Panel 5 North** would undermine (if approved) the Kent Farm structures. The main house and most of the structures would be in the middle of panel 5 about 450 feet above the mine. The barn is located about 150 feet from panel 4 North gate road. A pond of about 20 acre feet is located partially above panel 5 North and partially above the panel 4 North gate roads. There is about 184 feet of gate road between the two panels. To the west of the structures within the designated farm area, the mains for the mine have been developed. These mains provide greater than 50% support for the surface and are not expected to cause subsidence. No Kent Farm structures are over any mains, or gate roads.

Panel 4 North Effects. There are no structures over panel 4 North, and none of the Kent farm structures are within the subsidence zone for this panel. The barn is the nearest structure, and lies at least 100 feet on the south side of the gate road separating panels 4 and 5 North. Subsidence effects from longwall mining on the land surface typically include cracking and land slips where unstable slopes are undermined, and changes in stream characteristics and flow, and springs. Land cracks either close up naturally, or will be filled by mining company personnel or contractors if judged to impair the use of the land, or cause a safety hazard. There are no water resources identified on the Kent Farm in panel 4 North. The 4.7 feet reduction in general elevation from the gates to the middle of the panel will not be noticeable because of the large surface area involved. In our solicitation of comments for this finding of effect, concern was expressed that a part of the recharge area of the pond is over panel 4 north, and any loss of water could have an adverse effect on the pond as a historical feature. The pond itself is partially over the gateway between panel 4 and 5 north, and over panel 5 north. OSM conducted a hydrologic evaluation of this potential impact. The conclusion was that the mining of panel 4 could result in a diminished flow of water to the pond of less than 10%.

Panel 5 North Effects. This panel will pass beneath the Kent Farm structures, pond and the majority of the acreage. The extraction of coal under the farm will proceed at a rate of 100 ft/day. Subsidence will begin almost immediately, with the surface influence of the active subsidence lasting about two weeks after mining. Studies show that after three months, the surface has achieved its new configuration, although additional settlement up to a year or longer after mining is not uncommon.

An adverse effect is defined in 36 CFR part 800.5 when an undertaking may alter, directly, or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. In 800.5(2), an example of adverse effect is the physical destruction of or damage to all or part of the property.

Although the Kent Farm structures' location near the middle of panel 5 North will minimize the problem of differential settling (one part of the structure settling more than another), the predicted settling of 4.7 feet is expected to cause some damage to the house and outbuildings. Types of damage typically observed in structures include cracks in living area walls and plaster, foundations and basement walls, chimneys pulling away from the structure, sticking doors and windows, separation of utilities and pipes, the structure being out of level, cracks and settlements in adjacent walkways and driveways. In extreme circumstances, damage is so extensive, structure replacement is necessary. However, in the large majority of cases, the damage is minimized through preventative measures taken in advance of the mining or is repaired by the mining company, or a settlement is reached with the property owner for the cost of the damages.

The Kent Farm, includes 6 structures; house, garage, shop, storage building, wagon house, barn, and a pond. The barn, and pond are the only features not located in the flat bottom of the subsidence trough, where the maximum drop in elevation (4.7ft) is expected. No differential

settling is expected in this area, although the ground will subside in a wave effect as the longwall mining machine advances the cutting edge. The barn is located nearer the Panel 4 North gate road, and is expected to have a 1.10 foot vertical differential settlement across its base, creating a need to re level the barn once the subsidence is finished. The pond is located partially on the gate road between 4 and 5 North, and partially over the 5 North panel. This will create a vertical differential settlement across the pond of 3.20 feet, causing the need to heighten the embankment to prevent the water from overtopping. The pond will also be subject to cracking in the bed or embankments, which may lead to water loss, unless the cracks self seal, or the mining company takes specific repair actions. The pond is filled by surface runoff, base flow, and springs. Springs are frequently lost, or displaced in longwall mining operations, and therefore, the viability of the pond could be adversely effected by the mining operation.

Why the criteria of adverse effect were found applicable or inapplicable, including any conditions or future actions to avoid, minimize or mitigate adverse effects.

These comments and conclusions are based on a review of the proposed permit revision, and consulting party comments, and assumes the mining will take place as described. If PADEP denies the permit revision, there will be no effect on Kent farm, because greater than 50% surface support will be provided, and the mining will be at depths greater than 500 feet. The consideration of adverse effects of the mining plan revision as proposed needs to be longwall panel specific because of the great variance of anticipated effects between panel 4 north and 5 north.

Panel 4 North. The proposed permit revision would change the method of mining under the northern portion of the Kent farm from development mining, providing support to the historic property, to full extraction using the longwall method. Essentially, the now permitted 4 north panel would be extended to the west to its previously proposed terminus. The mining will reach the Kent Farm property in late September, 2000. The panel will not affect any structures, and could have a minimal impact on the pond because of a diminution in water flow. Land subsidence could cause some surface cracking, and side hill slips, that will naturally heal, or be corrected by RAG Emerald as appropriate. The surface of the land will differentially settle depending on the distance from the mains and gate roads. However, these impacts will either be unnoticeable, or be corrected, and would not meet the criteria of Part 800.5(a)(1) for adverse effects. That is, there will be no diminishment in the integrity of the property s location, design, setting, materials, workmanship, feeling or association.

Conclusion: There will be no adverse effect from the mining of panel 4 north as proposed in the July, 1999 revision to the RAG Emerald Resources Corporation permit No. CMAP 30841307. The consulting parties were given 30 days to respond to this finding of effect. Comments from the PHMC indicated it is not proper to segment the action, and that effect should be evaluated on the property as a whole. The property owners objected to this finding of no adverse effect because of the potential impact panel 4 would have on the recharge area of the pond, and the resultant flow of water into the pond. The pond is currently used as an agricultural water supply

to provide water to cattle. Based on these comments, OSM will not seek a separate decision on Panel 4 North.

Panel 5 North. The proposed permit revision would change the method of mining under the structures and pond of the Kent Farm from developmental mining, providing support to the property, to full extraction using the longwall method. Essentially, the now permitted 5 North panel would be extended to the west to its previously proposed terminus. The panel is scheduled to reach the boundaries of the Kent Farm in the spring of 2001. Several consultant reports have been prepared to evaluate the impacts of full extraction mining on the structures and pond of the Kent Farm. The PHMC, RAG Emerald, the Williams, and PADEP have prepared assessments. While the assessed severity of the potential impacts may differ between reports, there can be no other conclusion than there will be an adverse impact in accordance with Part 800.5, in that there will be physical damage to all or part of the property. Undermining using the longwall mining method, will cause differential settlement depending on the location of the feature, and dynamic settlement as the structures settle to their new location. Depending on the protection techniques, and mitigation measures used to help protect the features, there will be varying amounts of cracking in the walls, and foundations, damage to plaster, and wallpaper that will require restoration/repair. There will also be a loss or diminution in water resources on the Farm, including the pond, and spring water serving the residence.

Conclusion: There would be adverse effects on the Thomas Kent Jr. Farm historical property from mining as proposed in the July, 1999, revision to the RAG Emerald Resources Corporation permit No. CMAP 30841307, as further modified. The Office of Surface Mining, as the responsible agency official, is proceeding with the consulting parties in resolution of the adverse effects in accordance with 36 CFR Part 800.6.

At this point, there are a range of options proposed by the consulting parties to avoid, minimize, or mitigate adverse effects for the panel 5 north longwall mine. However, no final decisions have been made, and the permit is still under review and modification. The next section will discuss the positions of the primary consulting parties, and proposed minimization, mitigation actions.

Copies or summaries of any views provided by consulting parties and the public.

The primary consulting parties are:

Laurine and Murray Williams, the owners of the Kent Farm property

Pennsylvania Historical and Museum Commission (PHMC)

Pennsylvania Department of Environmental Protection (PADEP)

The National Trust for Historic Preservation

RAG Emerald Resources Corporation

Office of Surface Mining

The positions of these parties, as expressed in correspondence, meetings, and reports, are summarized below.

The Williams are concerned that the mining operation as proposed will at least cause damages to the structures, and at worst, could lead to the collapse of the residence. They also believe the mining plan will cause significant damages to the water resources on the farm, including the pond, and springs serving the house. They have submitted professional structural engineering reports that evaluate the age and condition of the primary residence and conclude that extensive (irreparable) damage would result from the mining plan. Specific structural weaknesses are identified. One report identifies damages in a nearby house of similar construction and age, which was protected by RAG using methods similar to those proposed for the Williams house. It needs to be understood that the nearby property was subject to differential settlement, and therefore, the damages may not reflect the anticipated damages at the Williams house using similar protection and mitigation techniques. The reports were prepared by EEI Geophysical, and R.M. Gensert Associates, Inc. The EEI Geophysical report was prepared prior to RAG completing its Subsidence Control Plan for the Williams house and farm. However, it is the firm position of the Williams that the protective and mitigative measures will be ineffective, and significant damage will result if the mining is allowed to proceed in accordance with the plan. The Williams recommend avoidance as the preferred method of mining. This would require RAG to modify its mining plan to leave either a solid block of coal under the house, in sufficient size to eliminate the possibility of subsidence, or modify the plan to allow some method of mining that will provide full support to the house.

The PHMC, in their review of the permit application, has provided comments to PADEP, and contracted two consultant reports which evaluate potential adverse effect from the proposed mining plan. The PHMC's position at this time is that the mining plan should be structured to avoid impacts on the property. PHMC asserts that the full extraction method of mining will have an adverse effect on the historic property, and the permit should be denied. PHMC also advised that the currently approved method of mining, which allows mining with at least 50% of the coal left in place, will result in no effect on the Farm.

September 1, 1999, the PHMC sent a comment letter to PADEP which recommended the permit revision be denied, and discussed the specific conditions of the farmhouse and geology under the foundation that make it susceptible to severe damage, and possible collapse should the proposed mining take place. This assessment was based on a consultant review dated August 25, 1999. Severe deficiencies that reduce the structural integrity include low strain tolerances in the brick walls; bulging of the east wall; marginally stable roof framing; low pull out resistance in the timber floor and ceiling joists; and serious insect damage. This report asserted that the mitigation measures proposed by RAG Emerald

would not be effective in preventing significant damages. The PHMC also provided mitigation instructions for the farmhouse should the permit be issued. Those included repairs in accordance with the Secretary of the Interior's Standards for the treatment of Historic Properties; photo documentation using HABS/HAER standards; floor plans; use of an on site engineer with 10 years experience with historical buildings; removal storage and handling of details of the farmhouse including re installation by a cabinet maker with 20 years experience in working on historic structures.

March 20, 2000, the PHMC received a second consultant report summarizing a field evaluation of the Kent Farmhouse. The report included a review of similar nearby structures which had been undermined by the longwall mining process, and were subjected to the same types of subsidence impact minimization techniques proposed by RAG Emerald for the Kent Farm house and buildings. The consultant summarized his evaluation of the Williams residence concluding that the stone and brick walls and framing systems for the floors and roof all appear to be in very good condition in all accessible locations. He further stated that the areas of earlier settlement and cracking in the walls on the south side and inward bowing on the east side appear to be sound and do not display any movement since the restoration work of the 1970's.

The consultant looked at the exteriors of two nearby farm houses, and out buildings that were undermined by the longwall process. These structures had engineered protection measures in place at the time of mining. He concluded that the walls appear to have survived the subsidence process with relatively inconsequential amounts of cracking and damage to the masonry joints, and that the settlement patterns appear to have occurred as predicted by the consultant to the mining company. No assessment of inside features, or structural components could be made, but there were no obvious structural problems observed. The consultant observed that the brick and mortar walls of all three houses were similar (except for the repointing of the Kent Farm house), and that the Kent Farm house should experience a similar outcome.

PADEP. On June 5, 2000, the PADEP released its structural consultant review of the Kent Farmhouse. That consultant reviewed the Subsidence Control Plan and protection/mitigation measures proposed for the farm house; and evaluated similar nearby properties that had been undermined by RAG. His conclusions include that there is little likelihood of damage so extensive as to adversely affect the building's historical or architectural value, and that qualified mechanics are available to effect the post-subsidence repairs to the Kent Farmstead with the same craftsmanship and historically and architecturally equivalent components. PADEP in its permit review process has requested additional information from RAG regarding specific concerns with the structures, the Subsidence Control Plan, and protection of water resources. PADEP is scheduled to meet with the Williams, and PHMC during the week of June 19, 2000 to discuss their consultant report.

Pennsylvania law permits the undermining of historical properties as long as there will not be irreparable damage, which is defined as adverse effects on the structure's historical or architectural value, damage for which the cost of a historical repair would exceed the cost of replacement, and damage which would be impossible to repair with the same craftsmanship and historically equivalent components. PADEP's consultant reported that these thresholds will not be met. Pennsylvania's subsidence laws require that houses undermined by the full extraction method, be fully repaired or restored, or that the owner be compensated up to the amount required for the full replacement cost of the house. Pennsylvania mining law Also requires that companies work with the property owners to minimize the effects of the mining operation through pre mining damage prevention and mitigation measures.

RAG Emerald Resources Corporation. RAG Emerald has submitted information that they believe can accomplish the mining plan; prevent serious damages to the Kent Farm through engineered protection, and mitigate lesser damages through restoration and repair. The initial permit revision application contained a detailed analysis of the anticipated land subsidence on the surface of the Kent Farm, anticipated impacts on each structure and the pond, and mitigation measures to be taken to lessen the adverse impacts on each building and the pond. That documentation has been supplemented by the provision of subsidence reports for similar structures undermined by longwall operations, and responses to specific questions raised by PADEP in their permit review process. RAG Emerald proposes that their success in preventing or minimizing damage to similar properties, which were in greater zones of differential settlement, is evidence of their knowledge and skills in predicting subsidence, and minimizing damage at the Kent Farm. RAG uses a predictive model developed by the College of Engineering at West Virginia University, to determine the degree of subsidence impacts that can be expected, and then develops a protection and mitigation plan to deal with those impacts. Using these techniques, RAG reports successfully undermining and protecting numerous homes from irreparable damages. Protection of the Kent Farm structures would be accomplished through engineered systems of trenches, cabling and roping, temporary removal of delicate original historical features, restoration and repair in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties, and use of local skilled craftsmen with the necessary knowledge of historical restoration. Protection of the pond will be accomplished by increasing the height of the embankments to prevent overtopping, repairing any cracks that do not self seal, and development of alternate water supplies for the pond, if necessary.

When questioned about alternatives to longwall mining for the property, RAG Emerald reports that, if the mining plan were to be modified to prevent subsidence under the Farm, up to 1 million tons of coal would be unmined. To provide full support to the structures would leave 350,000 tons of coal. RAG Emerald reports that changing the mining plan under Kent Farm, to a room and pillar method, which would allow up to 50% removal, is not an option, and that the mine is a long wall full extraction mine. RAG Emerald reports there would be significant costs incurred if the permit is denied. Under the terms of the current approved permit, RAG has already developed the mine under the Farm for full extraction mining. RAG Emerald reports that

modifications in the plan, and resulting down time as mining adjustments are made, would add up to millions of dollars in lost revenue, and employee wages in addition to the value of the coal.

National Trust for Historic Preservation. By letter of April 17, 2000, the National Trust for Historic Preservation requested inclusion as a consulting party. They attended a June 7, 2000 meeting of the consulting parties, and expressed their position that RAG Emerald should avoid any mining activity that would cause impacts on the historic property.

Office of Surface Mining. In matters of subsidence damage to land and structures, and drinking, domestic, and residential water loss, OSM's role is one of oversight of the approved state program that gives PADEP the primary enforcement authority in Pennsylvania. OSM oversight ensures that the requirements of the Federal Energy Policy Act, and the March 31, 1995 implementing regulations in 30CFR are implemented by PADEP. These regulations require mining related material damages to dwellings and related structures to be repaired or that the owner be compensated for the diminution in value as a result of mining. If the repair option is selected, the mining operator must fully repair, restore or replace the damaged structure. Full extraction mining plans must document the methods to be used to minimize damage to dwellings. Sites proposed for undermining, which are on the National Register of Historic Places, are not subject to the mining prohibitions found in Section 522 (e)(3) of the Surface Mining Control and Reclamation Act of 1977 (SMCRA). In matters of damages to historical properties, OSM is required to comply with the Section 106 Consultation Process in determining how damages will be mitigated, repaired or restored. OSM has been gathering permit information, engineering reports, and consulting with the parties on an individual basis, since being advised of the situation by the property owners in October, 1999. On June 7, 2000, the first meeting of all the consulting parties was held. The purposes included providing the parties the opportunity to express their responsibilities, concerns, questions, and desired outcomes; to facilitate a discussion of alternatives, and modifications, to the mining plan, and measures proposed to minimize impacts, and to discuss the terms of a framework of a memorandum of agreement. Based on the body of information currently available to OSM, a draft MOA was distributed for comment. This draft MOA accepted that the proposed mining could be accomplished, while assuring the structural integrity of the residence, and preserving the historical attributes through protection, and repair/restoration using skilled craftsmen. A copy is attached. This draft MOA was distributed as a starting point for discussion, with the recognition that PADEP has not yet completed their permit review, or review to their consultant report, and that additional information regarding the mining impacts and the success of the proposed mitigation measures may still be submitted. While the draft MOA is evidence of OSM's current assessment regarding the decision, the parties were advised that no option has been closed at this time, that the consultation process is continuing, and that information may be provided that would cause OSM to re-assess the language of the draft MOA. There was a concern expressed by the property owners that their consultants were not in attendance, and an agreement was made to schedule a follow up meeting specifically to discuss the technical issues. Although there was some limited discussion of the avoidance option at the meeting, RAG Emerald has been asked for additional

information regarding the mining impacts of terminating the long wall panel in such a way to provide full protection to the residence.

Chronology of major events in the Section 106 Consultation Process. Updated through June 13, 2000.

- May 22, 1998 The Thomas Kent Jr. Farm was listed on the National Register of Historic Places on May 22, 1998, for its historic and architectural significance.
- July 1999 RAG Emerald Resources Corporation permit revision to PADEP for longwall mining under Kent Farm National Historic Site.
- October 29, 1999 Citizen complaint from property owners received by Harrisburg Field Office alleging that OSM and PADEP were not in compliance with the Section 106 consultation requirements of the National Historic Preservation Act (NHPA).
- December 23, 1999
March 1, 2000 OSM advised PADEP of the requirements of the NHPA; of OSM s responsibilities in the consultation process; and advised PADEP not to issue the permit until that process was completed.
- March 13, 2000 The property was de-listed by the Keeper of the National Register of Historic Places, in response to a petition filed by the RAG Emerald Resources Corporation. The Keeper affirmed the criteria for listing, but found in favor of the petitioner that a procedural error may have been made in the original listing regarding notification of property owners. However, the property automatically reverts to an eligible for listing status, and the Section 106 consultation process makes no distinction between properties listed and properties eligible for listing. Hearing before PA Historical Review Board scheduled for June 13, 2000, and relisting is anticipated.
- April 20, 2000 OSM s Harrisburg Field Office issued a Finding of Effect for the proposed permit revision. OSM found that mining of panel 4 North as proposed would have no adverse effect on the historical attributes of the Kent Farm, and that mining of panel 5 North would have adverse effects. The finding was distributed to the primary consulting parties for a 30 comment period.
- May 15, 2000 OSM issues a hydrologic investigation of the possible effects on the pond of the mining of the adjacent panel 4. Finding was that there could be up to a 10% diminution in water flowing into the pond caused by the mining.

- May 19, 2000 Comments on Finding of Effect received from PHMC and property owners. PHMC agreed with adverse effect finding, and re affirmed their position that no long wall mining be allowed under the Farm. By telephone, PHMC also questioned OSM s decision to act on Panel 4 and 5 separately. Property owners questioned our determination of no adverse effect on the pond from panel 4.
- June 5, 2000 PADEP s consultant report issued. Finding is there will be no irreparable damage as a result of the mining, with the protection, mitigation/ repair and restoration measures proposed.
- June 7, 2000 OSM conducts first meeting of the combined consulting parties. Issues draft MOA for discussion and comment.
- June 12, 2000 Attorney for property owners requests Advisory Council participation in the consultation process.

Attachments (Not Attached, but available in the file).

Mining map showing boundary of Kent Farm and structures.

RAG/Emerald Subsidence Control Plan and relevant permit responses.

Property Owner Reports

EEI Geophysical - Hemple (excluding pre-mining structural survey)
R.M. Gensert Associates

PHMC consultant reports

Advanced GeoServices Corporation
John Bowie Associates

PADEP consultant report - Ortega Consulting

OSM s report on the hydrology of the pond

OSM s Draft Memorandum of Agreement

Selected correspondence to illustrate the concerns of the consulting parties.

(Available in File)

September 1, 1999, letter from PHMC to PADEP advising them of concerns with Kent Farm mining permit.

October 29, 1999, letter from Attorney Ehmann to OSM advising of concerns with 106 consultation process.

December 23, 1999/March 1, 2000, letters from OSM to PADEP advising them of requirements of consultation process.

February 18, 2000, letter from attorney Ehmann to PADEP.

April 20, 2000, OSM s Finding of Effect.

May 19, 2000, letters from Attorney Ehmann and PHMC providing comments on OSM s April 20, 2000, Finding of Effect.

June 12, 2000, letter from attorney Ehmann to Advisory Council requesting participation.

June 14, 2000, letter from RAG Emerald in response to specific technical concerns raised by PHMC.

Appendix B

Summary of Consulting Parties Positions. (At conclusion of Consultation Comment Period)

The primary consulting parties are:

Laurine and Murray Williams, the owners of the Kent Farm property.

Pennsylvania Historical and Museum Commission (PHMC)

Pennsylvania Department of Environmental Protection (PADEP)

The National Trust for Historic Preservation

RAG Emerald Resources Corporation

Advisory Council on Historic Preservation

Office of Surface Mining (OSM)

The positions of these parties, as expressed in correspondence, meetings, and reports, are summarized below.

The Williams are concerned that the mining operation as proposed will at least cause severe, irreparable damages to the structures, and at worst, could lead to the collapse of the residence. They also believe the mining plan will cause significant damages to the water resources on the farm, including the pond, and springs serving the house. They have submitted professional structural engineering and geological reports that evaluate the age and condition of the primary residence and conclude that extensive (irreparable) damage would result from the mining plan. The reports were prepared by EEI Geophysical, and R.M. Gensert Associates, Inc. structural engineer (Gensert). Gensert identifies specific structural weaknesses in the floor joists, field stone foundation, roof rafters, and brick walls, that could fail with the projected subsidence and the RAG mitigation plan. Gensert evaluated subsidence damages in a nearby house of similar age and construction that was mitigated in a manner proposed for the Kent Farmhouse to demonstrate the severity of likely damages. Damages at the referenced property included cracked foundation walls, and basement floors, out of level floors, interior cracks in walls, and out of alignment doors. The referenced property was subjected to differential settlement that exceeded what is anticipated at the Kent Farm and, therefore, may not be a valid comparison. EEI Geophysical conducted a review of selected homes in the region that were mitigated using the technique proposed for the Kent Farmhouse. The subsidence control plans for many of these homes were designed by the WVU Engineering group that designed the plan for Kent Farm. The report also evaluates homes that were not mitigated. EEI Geophysical concludes that the mitigation technique is not always effective in reducing or preventing damage that would be unacceptable at the Kent Farm. Using a PADEP data base of homes damaged by longwall mining EEI compiled the costs of repairs to homes where no mitigation occurred and costs of repairs to homes that were mitigated. The conclusion of EEI is that the average cost to repair mitigated homes is more than the average cost to repair unmitigated homes. Therefore, EEI concludes that the mitigation technique generally used by RAG is not effective in minimizing damages caused by longwall mining.

It is the position of the Williams that the protective and mitigative measures proposed by RAG will be ineffective and significant damage affecting the historic attributes of the house will result if longwall mining is allowed to proceed. The Williams recommend avoidance as the preferred method of mining. This would require RAG to modify its mining plan to leave either a solid block of coal under the house, in sufficient size to eliminate the possibility of subsidence, or modify the plan to allow room-and-pillar mining that will provide full support to the house. During the July 17, 2000, consultation meeting, Gensert proposed another alternative mitigation concept that would protect the structure by separating the house from its foundation by supporting the house on a steel beam platform. The foundation would be temporarily removed and a system of jacks would be installed to keep the house level while subsidence was occurring. Once the ground surface stabilized, the foundation and the basement floor would be rebuilt and the house lowered back on the foundation. Gensert believes that the resulting damages can be controlled and minimized to a greater extent than under the RAG method. This alternative mitigation concept was evaluated by RAG, and further discussed at the August 4, 2000, meeting. RAG will only agree to the plan if the Williams assume the additional costs to install and monitor the mitigation and any additional costs of repairs, and full responsibility for any failure in the technique would not be the responsibility of RAG. OSM has also evaluated this concept as discussed under Alternatives and Modifications.

The Williams have also been actively interested in the Section 106 consultation process and have raised questions about OSM's administration of the requirements of NHPA, and what authorities OSM has under SMCRA or Section 106 to protect historic resources. They have also raised questions regarding OSM's response to PADEP's permit issuance prior to completion of the Section 106 process. These questions are being addressed in separate documents.

The PHMC, in its review of the permit application has provided comments to PADEP on several occasions and contracted for two consultant reports that evaluated potential adverse effects from the proposed mining plan. PHMC's position at this time is that the mining plan should be changed to avoid the property. PHMC asserts that the full extraction methods of mining will have an adverse effect on the historic property and the permit should be denied. PHMC also advised that the currently approved room-and-pillar method of mining, which allows mining with at least 50 percent of the coal left in place, will result in no effect on the Farm.

The first report prepared for the PHMC, dated August 25, 1999, was submitted by Advanced GeoServices Corp. It is a structural engineering report presenting numerous structural weaknesses and geological concerns. Severe deficiencies that reduce the structural integrity include low strain tolerances in the brick walls; bulging of the east wall; marginally stable roof framing; low pull out resistance in the timber floor and ceiling joists; and serious insect damage. The report concludes that because of these issues, collapse of the structure would be possible with longwall mining and that the RAG mitigation plan would not be effective in reducing the magnitude of damage. The report indicates that any representation that the house would not suffer irreparable damage from mining is erroneous.

The second report, which was submitted March 13, 2000, was prepared by John Bowie, an historic architect. This report presented an architectural evaluation of the house and condition of its structural components and comparisons to nearby houses of equivalent age and construction that had been undermined by RAG using similar mitigation plans. It was not an engineering evaluation of the impacts of subsidence or the effectiveness of the proposed mitigation plan. The report also presents the State and Federal regulatory framework for protecting historic resources. Bowie summarized his evaluation of the Williams residence concluding that the stone and brick walls and framing systems for the floors and roof all appear to be in very good condition in all accessible locations. He further stated that the areas of earlier settlement and cracking in the walls on the south side and inward bowing on the east side appears to be sound and do not display any movement since the restoration work of the 1970's.

Bowie looked at the exteriors of two nearby farmhouses and outbuildings that were undermined by the longwall process. These structures had engineered protection measures in place at the time of mining. He concluded that the walls appear to have survived the subsidence process with relatively inconsequential amounts of cracking and damage to the masonry joints and that the settlement patterns appear to have occurred as predicted by the consultant to the mining company. No assessment of inside features or structural components could be made, but there were no obvious structural problems observed. Bowie observed that the brick and mortar walls of all three houses were similar (except for the repointing of the Kent Farmhouse) and that the Kent Farmhouse should experience a similar outcome.

On September 1, 1999, PHMC sent a comment letter to PADEP that recommended the permit revision be denied and discussed the specific conditions of the Farmhouse and geology under the foundation that make it susceptible to severe damage and possible collapse should the proposed mining take place. PHMC also provided mitigation instructions for the Farmhouse should the permit be issued. Those included repairs in accordance with the Secretary of the Interior's Standards for the treatment of Historic Properties; photo documentation using HABS/HAER standards; preparation of detailed floor plans; use of an on-site engineer with 10 years of experience in restoring historical buildings; removal, storage and handling of details of the Farmhouse including reinstallation by a cabinet maker with 20 years of experience in working on historic structures.

PHMC is supporting the alternative mitigation concept as proposed by Gensert. (See the alternatives and modifications section). PHMC also supports the concept of moving the house to a subsidence free location until settlement is finished and then returning the house to its original location on a rebuilt foundation.

PADEP. Pennsylvania law allows the undermining of historic properties as long as there will not be irreparable damage, which is defined as adverse effects on the structure's historic or architectural value, damage for which the cost of an historical repair would exceed the cost of replacement and damage which would be impossible to repair with the same craftsmanship and historically equivalent components. PADEP's consultant reported that these thresholds will not

be met. Pennsylvania's subsidence laws require that houses undermined by the full extraction method be fully repaired or restored, or that the owners are compensated up to the amount required for the full replacement cost of the house. Pennsylvania mining law also requires that companies work with the property owners to minimize the effects of the mining operation through pre-mining damage prevention and mitigation measures.

On June 5, 2000, PADEP released its structural consultant review of the Kent Farmhouse, prepared by Richard Ortega, P.E. Ortega reviewed the subsidence control plan and protection/mitigation measures proposed for the Farmhouse and evaluated similar nearby properties that had been undermined by RAG. His conclusions are that there is little likelihood of damage so extensive as to adversely affect the building's historic or architectural value and that qualified craftsmen are available to repair the anticipated damages to the Kent Farmhouse. On several occasions in its permit review process PADEP requested additional information from RAG regarding specific concerns with the structures, the subsidence control plan, and protection of water resources. In response, RAG made several modifications to its mitigation plan to address structural weaknesses. PADEP also consulted with Kittatinny Archaeological Resources, Inc., an historical consultant in completing its review. PADEP met with the Williams and their attorney on June 28, 2000; with PHMC participating by telephone. Additional comments were received from PHMC on June 30, 2000, and from the Williams on July 6, 2000.

On July 14, 2000, PADEP approved the permit revision, allowing full extraction mining under the Farm and requiring a subsidence control bond of \$219,347.46 for repair of damages. The permit revision approval noted that the Section 106 process was ongoing and that nothing in the permit limits OSM actions to satisfy the requirements of NHPA. The permit did not condition mining on completion of the Section 106 process. In approving this permit revision PADEP found that the Kent Farm can be protected and any damage, which may occur, can be repaired as described by RAG's application in accordance with the Bituminous Mine Subsidence and Land Conservation Act (BMSLA) and Chapter 89 of the Department's regulations.

RAG Emerald Resources Corporation. RAG submitted a subsidence control and mitigation plan that it believes can accomplish the mining plan; prevent serious damages to the Kent Farm through engineered protection, and mitigate lesser damages through restoration and repair. The plan presents a detailed analysis of the predicted subsidence and its impacts on each structure and the pond, and mitigation measures to be taken to lessen the adverse impacts on each building and the pond. That documentation was supplemented in the permit review by the provision of subsidence reports for similar structures undermined by longwall operations and responses to specific technical questions raised by PADEP. RAG also submitted additional documentation regarding its mining and mitigation plan and the structural integrity of the residence to OSM under Section 106 Consultation process. RAG also provided an evaluation of the alternative mitigation concept proposed by the Williams consultant, as well as information on other options.

RAG proposes that its success in preventing or minimizing damage to similar properties, which were in greater zones of differential settlement, is evidence of its knowledge and skills in predicting subsidence and its ability to minimize damage at the Kent Farm. RAG uses a predictive model developed by West Virginia University to determine the degree of subsidence impacts that can be expected and then develops a protection and mitigation plan to deal with those impacts. Using these techniques, RAG reports successfully undermining and protecting numerous homes from irreparable damage. Protection of the Kent Farm structures would be accomplished through engineered systems of trenches, cabling and roping, temporary removal of delicate original historical features, restoration and repair in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties, and use of local skilled craftsmen with the necessary knowledge of historic restoration. Protection of the pond will be accomplished by increasing the height of the embankments to prevent overtopping, repairing any cracks that do not self seal and development of alternate water supplies for the pond, if necessary.

When questioned about alternatives to longwall mining for the property, RAG reported that, if the mining plan were to be modified to prevent subsidence under the Farm, up to one million tons of coal would be unmined. To provide full support to the residence could leave up to 400,000 tons of coal. RAG reports that changing the mining plan under the Kent Farm to a room and pillar method, which would allow up to 50 percent removal, is not an option for it because of the time involved in bringing back the continuous mining machines from other longwall panel development; and that the costs of the limited room and pillar operation would exceed the value of the coal. RAG also raises miners' safety concerns in implementing an in panel move of the longwall equipment that would be required by changes in the mining plan at this point. Since the permit including Kent Farm was first submitted in 1997, the intent has been to conduct full extraction mining under the Farm. Under the terms of the permit revision approved in July 1998, RAG has already developed the mine under the Farm for full extraction mining. RAG contends that modifications in the plan, and resulting down time as mining adjustments are made, would add up to millions of dollars in lost revenue and employee wages in addition to the value of the coal.

National Trust for Historic Preservation. By letter of April 17, 2000, the National Trust for Historic Preservation (Trust) requested inclusion as a consulting party. Its representatives attended all meetings of the consulting parties and expressed their position that RAG should avoid any mining activity that would cause impacts on the historic property. Absent that option, the Trust is supporting the mitigation alternative concept proposed by consultant for the Williams (the plane lifting method) or even removal of the structure from the subsidence area until the event is completed. The Trust has expressed specific concern over the feasibility of the RAG mitigation plan to prevent significant damages. The Trust prefers a mining and mitigation option that RAG and the property owners can both agree to.

Advisory Council on Historic Preservation. On June 22, 2000, the Advisory Council agreed to participate in the consultation process. Its expressed interest is completion of the process as defined in Part 800. The Council formally asked OSM for its position on PADEP's issuance of

the permit prior to completion of the process; whether issuance foreclosed the Council's effective participation; and what authorities OSM has to insure completion of the Section 106 process.

Appendix C

Chronology of the Section 106 Consultation Process

October 29, 1999	Citizen complaint from owners received by Harrisburg Field Office alleging that OSM and PADEP were not in compliance with the Section 106 consultation requirements of NHPA. First notice to OSM of issue.
December 2, 1999	PHMC notified OSM of Kent Farm issue.
December 23, 1999	OSM advises PADEP of Section 106 Consultation requirements.
February 7, 8, 2000	PADEP responses to OSM s December 23, 1999 letter.
February 16, 2000	OSM and PHMC meet to discuss Section 106 process and Kent Farm.
March 1, 2000	Letter from OSM advised PADEP of the requirements of the NHPA and of OSM s responsibilities in the consultation process.
March 13, 2000	The Kent Farm was de-listed by the Keeper of the National Register of Historic Places, in response to a petition filed by RAG. The Keeper affirmed the criteria for listing, but found in favor of the petitioner that a procedural error may have been made in the original listing regarding notification of property owners. However, the property automatically reverts to an eligible for listing status, and the Section 106 consultation process makes no distinction between properties listed and properties eligible for listing.
March 13, 2000	PHMC s second structural consultant report issued.
March 23, 2000	OSM s Harrisburg Field Office staff met with PADEP regarding Section 106 Compliance on Kent Farm
April 17, 2000	National Trust for Historic Preservation requests to be considered a consulting party.
April 20, 2000	OSM s Harrisburg Field Office issued a Finding of Effect for the proposed permit revision. OSM found that mining of Panel 4 North as proposed would have no adverse effect on the historic attributes of the Kent Farm, and that mining of Panel 5 North would have adverse effects.
May 2, 2000	OSM and PADEP met at Kent Farm to evaluate possible hydrologic impacts, from Panel 4, on the pond.

May 15, 2000	OSM issued a hydrologic investigation of the likely impacts of longwall mining on the farm pond.
May 19, 2000	OSM received responses from PHMC and the property owners, to April 20, Finding of Effect.
June 7, 2000	OSM Harrisburg Field Office staff held its first Section 106 Consultation Meeting with all parties present. Significant discussions were held regarding the technical issues, the Section 106 process, PADEP s permit review status, and the mining plan and mitigation proposal.
June 16, 2000	Advisory Council on Historic Preservation was notified of OSM s finding of adverse effect and provided documentation in accordance with the requirements of Part 800. The Council was invited to participate in the Consultation Process.
June 22, 2000	Advisory Council notified the Interior Secretary that it had decided to participate in the Consultation process.
July 7, 2000	OSM s Harrisburg Field Office staff held the second all party consultation meeting, with the addition of the Advisory Council on Historic Preservation. Additional discussions were held on technical issues, and OSM s position relative to PADEP s pending issuance of the permit.
July 14, 2000	PADEP issued the permit revision.
July 14, 2000	OSM received a letter from the Advisory Council requesting information regarding OSM s authority as the Federal responsible Agency, and answers to other questions.
July 17, 2000	OSM s Harrisburg Field Office staff held the third all party consultation meeting. Primary topics of discussion were PADEP s issuance of the permit, and what OSM s response would be, and how it affected the Section 106 Consultation process. Additional discussions on the technical merits of the mitigation plan, and mining alternatives were discussed. Agreement was reached to have another meeting on August 4, for the purpose of discussing an alternative mitigation method proposed by the property owners, mining alternatives, responses to technical concerns, and OSM s response to PADEP s permit issuance.
July 19, 2000	Letter to RAG, in accordance with meeting commitment, requesting evaluation of alternative mitigation plan, and additional information in response to property owners technical concerns, and mining alternatives.

July 28, 2000 OSM issued a Ten-Day Notice (TDN) to PADEP in response to a citizen complaint on the approval of the RAG permit revision without prohibiting mining until the Section 106 process is completed.

July 31, 2000 OSM received PADEP s response to the TDN, and initiated the TDN response review.

August 1, 2000 OSM received a letter from the Advisory Council seeking information regarding OSM s actions, and the Section 106 process, in response to permit issuance.

August 4, 2000 OSM conducted fourth Consultation meeting. Additional information on alternative mitigation plan and technical issues provided by RAG, were discussed. Completion of Section 106 Consultation process, and MOA were discussed. August 16 was established as the deadline for final comments on technical issues.

August 14, 2000 OSM issues a response to PADEP s TDN response. Additional information regarding PADEP s authority to administer the Section 106 responsibilities is requested.

August 16, 2000 Final comments received from the property owners, PHMC, and the Trust.

August 16, 2000 The Thomas Kent Jr. Farm was relisted by the Keeper of the National Register.

Appendix D

Chronology of PADEP s Permitting Actions.

September 1997	RAG submitted a revision to its Emerald Mine permit to extend the mining and subsidence control plan for full extraction mining to include 1,954 additional acres, including the Kent Farm. Kent Farm was already within the permitted mine boundary.
January 1998	An application to list the Kent Farm as an historic property was filed with PHMC.
May 22, 1998	Kent Farm was officially listed on the National Register of Historic Places.
July 23, 1998	PADEP issued the permit revision for the 1,954 acres, but restricted mining under the boundaries of Kent Farm to less than 50 percent coal removal pending development of a subsidence control and mitigation plan specific to the special requirements of the historic property.
August 14, 1998	The owners of the Farm appealed issuance of the permit.
July 14, 1999	RAG submitted a permit revision to PADEP for full extraction mining under Kent Farm. The required subsidence control documents were included.
August 24, 1999	PHMC submitted comments to PADEP recommending rejection of the permit.
September 1, 1999	PHMC submitted comments to PADEP recommending permit denial.
September 17, 1999	An agreement was reached between RAG, the owners, and PADEP, which resulted in withdrawal of the owners August 14, 1998, appeal.
September 20, 1999	PHMC submitted additional comments regarding historic nature of property, and the need for expert evaluation on mitigation plan.
September 30, 1999	PADEP submitted first comment letter to RAG with 32 comments and questions regarding the Kent Farm permit. RAG responded on October 29, 1999.
December 17, 1999	PHMC submitted additional comments to PADEP.

December 3, 1999 PADEP submitted second comment letter with 12 comments. RAG responded on January 21, 2000.

January 5, 2000 RAG met with PADEP to review comments. Additional information was submitted in February, 2000.

March 23, 2000 PADEP submitted third comment letter with 5 comments. RAG responded on April 21, 2000. Additional information provided by RAG in May, 2000, in response to PADEP requests.

June 5, 2000 PADEP s structural engineer report was issued.

July 14, 2000 RAG provided final information.

July 14, 2000 PADEP issued permit.

Appendix E

Narrative Summary of PADEP s Activities and Decisions in Reviewing and Approving the Kent Farm Permit.

PADEP made its permit decision under the following regulations directly affecting historic resources. Not all the regulations discussed below have been approved by OSM as part of the coal regulatory program.

Pennsylvania Regulations at 25 Pa. Code § 89.38 require the operation plan of a permit to identify archaeological and historic resources, and to describe measures to be used to prevent adverse effects on properties listed on the National Register of Historic Places. The Department may require the applicant to protect historic or archaeological properties listed on or eligible for listing on the Register through appropriate mitigation and treatment measures. If the Department finds that a mining technique or extraction ratio will cause irreparable damage to a residence, the Department will notify the operator that the mining technique or extraction ratio may not be used unless the operator takes measures prior to mining, approved by the Department, to minimize or reduce impacts to the structures resulting from the mining (25 Pa. Code § 89.142(d)). Irreparable damage to structures recognized as historically or architecturally significant is defined as: damage which would adversely affect the structure s historical or architectural value; damage for which the cost of repair to restore the historic and architectural value of the structure with the same craftsmanship and historically and architecturally equivalent components would exceed the cost of replacement; damage which would be impossible to repair to restore the historic and architectural value of the structure with the same craftsmanship and historically and architecturally equivalent components. (25 Pa. Code § 89.5)

When PADEP issued a full extraction permit to RAG in July 1998, for 1,954 additional acres in the Emerald No. 1 Mine, it restricted mining under the 102 acre Kent Farm to less than 50 percent removal. This step was taken so the historic properties of the Farm could be protected while RAG completed a subsidence control and mitigation plan specifically designed for the Farm. PADEP s review of the Kent Farm permit application from July 1999, to July 2000, was focused on assuring that appropriate measures could, and would be taken to prevent adverse effects (irreparable harm), under a full extraction mining plan.

The following provides a summary of PADEP s questions and concerns in reviewing the permit revision application for Kent Fam.

October 20, 1999, PADEP issued its first comment letter for the permit revision. RAG responded with comments on October 29, 1999. There were 32 comments in PADEP s letter as summarized below, with RAG responses:

PADEP requested RAG to complete and submit Module 8 of the permit application. Module 8 is an inventory, and mapping of the ground and surface water resources, and discussion of what

effect, if any, mining has or will have on these resources. Module 8 also includes a monitoring plan. RAG provided the requested module and information, and also referred to information already on file for the revision previously issued for the 1,954 acres. Possible sources of replacement water for the loss of springs or wells were also discussed.

PADEP requested RAG to identify the source of water for the farm pond. RAG identified a spring and surface run off, but stated that on the day of sampling (10/21/99), there was no detectible inflow, and only a minimal outflow.

PADEP requested additional information in regard to several other permit modules. This included the amount of cover from the surface to the mining operation, options for replacing water supplies, feasibility of undertaking historic mitigation and remediation, and examples of other structures of similar age, and construction, where similar mitigation was used (including pre- and post-mining condition, and how well the mitigation worked). This information was provided. The Evelyn Minor house, and the Nettie Woods Covered Bridge were provided as examples of successful mitigation from the effects of subsidence.

PADEP asked RAG to document that repairs could be made in accordance with the Secretary of Interior's Standards for Treatment of Historic Structures. RAG provided statements from Cultural Resources Analysts, Inc., documenting that both the materials, and skilled craftsmen were available to make repairs to structures like Kent Farm. RAG also provided testimony supporting its statement that the Farmhouse already had been partially repaired/restored/modified with new materials.

In response to a PADEP comment, RAG provided an explanation of the subsidence prediction model (CISPM), which was used for the Kent Farm.

There were other questions from PADEP and information provided from RAG on the location and identification of the structures, and geology of the Kent Farm.

PADEP raised questions regarding how certain weak points of the structure of the house would be protected (i.e., wood framing, and a bulging brick wall). RAG responded that the use of trenches, cable and ropes, would protect the structure, and that the mitigation plan addressed potential impacts on each structure. RAG also provided information on the effects of maximum displacement and deformation on the structures. RAG also provided more detailed information on the mitigation plan for the pond, and anticipated damages to the structure of the pond and impacts to the water resources that maintain the pond.

PADEP raised the question of archaeological resources that may be found during trenching for the mitigation. RAG reported that should any artifacts be uncovered, an expert will be called in to help identify and catalog the resources.

PADEP raised a question regarding the definition of irreparable damage in 25 Pa. Code § 89.5. It is irreparable damage to an historic structure when the cost to repair the historic and architectural value of the structure with the same craftsmanship and historically equivalent components would exceed the cost of replacement, or when it would be impossible to repair or restore the historic value of the structure with the same craftsmanship and historically equivalent components. RAG responded that the cost of repair would not exceed the cost of replacement, and that repairs that would maintain the historical nature of the structure could be made.

RAG also provided information in response to PHMC's September 1, 1999, letter to PADEP.

December 3, 1999, PADEP forwarded its second comment letter. This letter contained 12 requests for clarification, or new information. Additional information was provided in a January 21, 2000, letter, pertaining to water resources, the pre- and post-mining condition of the Minor and Mooney residences, (including a comparison to the Williams residence), geologic data, and additional discussion on the anticipated cost of repair, in regard to the Pennsylvania irreparable damage regulation.

February 8, 2000, RAG provided additional hydrologic data, and information regarding other structures in the center of a longwall mine panel. On February 18, 2000, RAG provided information regarding the Williamson's residence.

March 23, 2000, PADEP submitted its third comment letter, requesting more information to address 5 questions. By submission of April 21, 2000, RAG provided more information regarding center line homes, including post-mining damage surveys, and subsidence control plans.

May 1, 2000, RAG submitted responses to concerns raised with the sandstone bedrock under the house, and how the porch would be protected during subsidence.

May 10, 2000, RAG submitted additional information regarding the Simpson house and the sandstone base.

May 25, 2000, RAG submitted additional information regarding the Simpson house including a pre-mining survey, and a subsidence control/mitigation plan.

June 5, 2000, PADEP issued its consultant structural engineer's report. The conclusion was that the requirements of 25 Pa. Code § 89.5 (no irreparable damage) would be met, assuming the mitigative measures to be employed are effective. The consultant concluded, based on review of the Minor, Williamson, and Simpson structures, that the mitigative measures are effective at preventing large scale failure, or even distress, of the structural systems, principally the masonry walls and the floor and roof framing systems. However, based on interior evidence at the Simpson residence, the consultant predicts significant plaster distress. The consultant states that there are craftsmen with the requisite skills to repair, or reproduce an element of the building,

and points to the restoration work already completed by the Williams as example. The consultant concludes that assuming the models for subsidence are correct, and the mitigative measures are effective, there is little likelihood of a damage so extensive as to adversely affect the building's historic or architectural value.

July 14, 2000, RAG provided amendments to its mitigation plan for Kent Farm agreeing to provide additional support to floor joists, braces or gussets as needed to provide additional support to the roof rafters, to remove, store, or otherwise protect books in the bookcase, and protect the bookcase from falling. Additional information was provided regarding the fieldstone foundation, and shearing stresses on the brick walls from being out of plumb.

July 14, 2000, PADEP issued the permit revision, noting that the NHPA Section 106 Consultation process was still underway, and requiring the posting of a \$219,397.46 subsidence bond for damages to the property. Findings issued by PADEP conclude that the proposed underground mining activities can be conducted without adversely affecting the property (no irreparable damage), and that RAG can mitigate any damage that may occur to the Kent Farm structures in accordance with plans proposed in the permit application, and that any damage that may be sustained by the Kent Farm can be repaired with the same craftsmanship and using historically and architecturally equivalent components.

Appendix F

OSM s Evaluation of Mining and Mitigation Options and Alternatives

KENT FARM SUBSIDENCE

Issue:

As part of the Section 106 process required under NHPA, we reviewed materials presented in reference to a request by RAG Emerald Resources, LP (RAG) for a permit revision to extend two longwall panels to remove coal beneath a structure eligible for listing on the National Register of Historic Places known as the Kent Farmhouse. The purpose of the review was to evaluate proposed alternatives for the protection of the Farmhouse from adverse effects of subsidence resulting from the proposed mining. Two proposed mitigation methods (a mitigation plan submitted by the company and a conceptual mitigation plan submitted by the property owners); as well as an avoidance scenario (i.e., no mining or limited mining) were considered. The following points were considered:

- " Overall technical feasibility,
- " Whether assumptions that were made are reasonable,
- " Whether the analyses were correct and accurate; and,
- " Whether the results were correctly applied to existing conditions.

Background:

RAG plans to conduct full extraction longwall mining in the Pittsburgh coal seam beneath the Kent Farm property located in Greene County, approximately 2.5 miles south of Waynesburg, Pennsylvania. Structures on the property include the Farmhouse, barn, several outbuildings, and a pond. The Farmhouse is a 150-year-old, two story, brick building with a field stone foundation. It is considered the most significant structure on the property from the historic preservation perspective. In this area, the Pittsburgh seam is +/- 7 feet thick and ranges in depth from 415 to 628 feet. The surface slope near the Farmhouse is about 15 percent, sloping away from the front of the house. The mining beneath the property is expected to be completed within one year.

Drs. Yi Luo and Syd S. Peng, of West Virginia University (WVU), were hired as consultants by RAG to assess the effects of the proposed mining on the Kent Farm property. Based on their analysis, they developed a mitigation plan consisting of trenching and cabling; trenching would limit lateral strains on the structure foundation while cabling would provide additional direct support to the structure and foundation to compensate for anticipated strains resulting from subsidence. This mitigation plan was included as part of the revised mining permit approved by

PADEP on July 14, 2000. An alternate conceptual proposal was subsequently introduced by R.M. Gensert Associates, Inc. (Gensert) on behalf of the property owners. This alternative proposed the installation of a rigid steel beam cradle and hydraulic jack system to isolate the structure from the dynamic stresses related to subsidence; this concept involves the adjustment of jacks as subsidence occurs to keep the house level.

Subsidence Effects:

The materials presented by the Section 106 consulting parties vary in points of view from imminent collapse of the Kent Farmhouse should longwall mining occur to a prediction of little or no damage to the house and other structures on the Kent Farm property. The analysis presented by WVU on behalf of the mining company indicates that mining can take place with minor effects to the buildings, most notably, the Kent Farmhouse. The predictive technique used, i.e., Comprehensive and Integrated Subsidence Prediction Model (CISPM), reportedly has been proven very accurate and applicable to mining in Greene County; case studies submitted by RAG demonstrated that the model yields accurate results. In addition, data presented in the EEI Geophysical draft report Mitigation Assessment of the RAG/WVU Method, dated 07/06/00, verifies that at a minimum, movements predicted using CISPM are higher than observed (i.e., predicted differential movements in five instances where data was presented were higher than observed movements). EEI Geophysical is a consultant to the property owners. It should be understood that subsidence prediction is an evolving field, and predictive methods are being continuously developed, evaluated, and/or refined. As indicated by Drs. Luo and Peng in their response to the EEI Geophysical report, the method has been presented at numerous professional meetings/conferences, has been repeatedly refined as additional data is collected, and is generally accepted as being reliable.

Compounding the problem of accuracy of subsidence prediction, is the underlying question of how the subsidence movements translate into damages to a surface structure. Linking predicted surface deformations to resulting damages in specific structures is not so refined as to be considered exact. Actual damage prediction is based on data tabulated on the amount of movement/strains that a structure made of a specific material can withstand (i.e., the amount of movement/strain that a structure of certain materials can be subjected to before certain types of damage can be expected to occur, from hairline cracks to total failure/collapse). This is the method applied to the Kent Farmhouse by WVU/RAG. The subsidence analysis considered both dynamic and final movements in determining the maximum strains that the structure will be subjected to. The maximum dynamic strain is based on a fairly continuous progression of mining for a distance of approximately 200 feet before reaching and 400 feet beyond the house; if mining stops for an extended time in this zone, the resulting static strains would be expected to be in the magnitude of two to three times the predicted dynamic strain. RAG has taken this variation into consideration in developing the mitigation plan.

The predicted movements and associated stresses/strains that the structure will be subjected to would be expected to result in some damage; this would be in the form of plaster cracks, cement/concrete floor heaving, mortar cracks, and/or floor cracks.

RAG (WVU) Mitigation Plan:

Based on the predicted subsidence movements, associated stresses and strains, and the anticipated resulting damages, WVU and RAG developed a mitigation plan. The plan was based on the concept of keeping strains below the maximum tolerable limits for similar structures/materials.

The specific mitigation measures proposed for the Farmhouse include:

- " installation of a series of trenches around specific portions of the house to effectively reduce the effect of dynamic stresses and strains which, during mining, would otherwise impact the foundation and outside wall areas;
- " installation of tension cables around the lower portions of the structure to minimize the effects of tensile stresses and strains;
- " installation of nylon ropes (tensioned) around the upper portions of the house to minimize the effects of tensile stresses and strains;
- " continuously mining during the time when the longwall face is in the influence area of the Farmhouse to minimize dynamic strain; and,
- " planning the longwall panel so that the Farmhouse is situated in the center, resulting in minimum differential movement and reduced final strains.

Overall, these measures are intended to reduce the stresses on the Farmhouse during the dynamic phase of the subsidence (i.e., while the mining is occurring near/beneath the structure). The trenches serve to isolate the base of the house and lessen the lateral loads imposed on the foundation by the shifting earth during subsidence. The homeowners raised a concern as to the depth of the trench on the west side of the house (in the area of the shop); it did not extend to the depth of the foundation footer as did the east trenches. Position and depth of trenches are dependent on the position of the structure in relation to the mining panel as well as the direction of mining. The company responded that the west trench depth was decided based on the fact that mining would be progressing away from the structure at that point, and thus, stresses would not be as great. This implies that the resulting stress as mining moves away from the structure is thought to be not critical at the depth below the trench.

The second part of the company mitigation plan involves installation of cables around the foundation and first floor areas of the structure and nylon ropes at the second floor level. The

cables and ropes would then be tensioned to provide additional strength to the associated walls that would compensate for the stresses resulting from surface deformation. The cables and ropes pre-compress the walls to prevent them from going into tension and cracking as the earth subsidence ripples across the house. Because the Farmhouse is located near the center of the panel, it is anticipated that the final attitude of the house will be the same as before the subsidence (i.e., essentially level), thus there will be no need to level the house. This serves to minimize any residual stress caused by the building being out of plumb.

The homeowners raised several concerns with this system, with the most critical centering around the amount of tension to be applied; more specifically, they needed confirmation that specific building properties were taken into account in determining the tension. The company maintained that tensions were determined using engineering methods applied to the specific building materials as well as cable and rope strengths.

The homeowners and PHMC also raised concerns as to bearing surfaces of first floor joists on the foundation and roof rafters/joists on the second floor walls. There was concern that independent movement, even as a unit, of the foundation and/or structure could result in the floor joists dislodging from the bearing foundation walls; the company later addressed this by committing to providing jack and cross member supports in the basement to provide support of the floors independent of the basement walls. The company also supplemented the mitigation plan to provide for the installation of braces and gussets as necessary to prevent roof rafters from shifting off of their bearing surfaces where appropriate.

The homeowners and PHMC also expressed the general concern that the mitigation plan was generic and did not consider unique features of the structure, such as field stone foundation, chimneys, combination brick/woodframe construction, and topography. These concerns appear to be rooted in the fact that the company has used the same technique on several structures in the area, and has used these examples as justification for applying the same at the Kent Farm. It is because of this company experience that consideration of specific features of the Kent property are not readily apparent. Company responses in relation to the trenches, cable position, type, and tensioning, and field stone foundation reflect that specific conditions and features of the Kent house were considered. Recent experience in undermining two structures considered reasonably similar in age and/or construction to the Kent Farmhouse does, however, support the use of similar (if not the same) mitigation methods. Two of the structures, the Minor and Simpson homes, were judged by two reports (i.e., Bowie and Ortega) to be equivalent to the Kent home in age, method of construction, and design; the third home (i.e., Williamson) was considered similar enough for comparison although it was somewhat newer than the other two. In general, the compared structures were configured and/or located in positions above the mining area that would have made them more vulnerable to the effects of subsidence. All the structures withstood the effects of undermining with little noticeable external damage. The interior of Simpson and Williamson dwellings was examined; they did experience plaster cracking, basement floor heave, and basement floor cracking. The owner of the third home (Minor) did not permit entry for

examination. Similar damages may have occurred at the Minor home and can be anticipated for the Kent house.

Finally, the homeowners raised the bottom line concern that the company method does not work. The EEI Geophysical report (07/06/00) lists damages to homes where similar mitigation plans were implemented and went on to compare costs for repair of those homes with repair costs for homes where no mitigation/minimization systems were installed. EEI Geophysical found that the costs to repair damages to homes using the Peng and Luo method of mitigation were roughly double those of homes with no mitigation. From this, EEI Geophysical concluded that these mitigation methods were totally ineffective in limiting damages. The company refuted some of these comparisons as inappropriate due to absence of controls on implementation of the plans and unique features of the structures.

The concerns of all parties notwithstanding, while the cost of repair can be used as an indicator of the success of mitigation, it should not be the sole indicator on which to base such a conclusion. It is not clear that variables that could influence cost of repair were appropriately considered in the EEI Geophysical analysis (e.g., types of structures; size of structures; materials; location relative to mining; specific methods of mitigation; and, specific details on how mitigation was implemented). In addition, there is the ultimate unknown of what the effects would be/have been if no minimization measures were implemented at a specific site. In general, subsidence damage prediction is not so exact as to allow precise identification of resulting effects, with or without mitigation; while existing methods can predict the types of damages that can be expected to occur, the exact dimensions and/or locations of the damages cannot accurately be identified. When considering this along with the variables related to cost of mitigation, it does not seem prudent to conclude that higher repair cost equates to failed mitigation. Likewise, it is certainly not prudent to imply that no mitigation is a better choice than trenching and cabling.

Alternative (Gensert) Proposal:

Due to the property owners concerns with the RAG mitigation plan, an alternative conceptual proposal was developed on their behalf by Gensert. In this approach, the weight of the superstructure above the foundation walls is transferred to a grid of steel beams supported by hydraulic jacks. Subsidence movements would be monitored continuously and the jacks adjusted to isolate the supported structure from the ground movements (i.e., keep the structure level). Once subsidence is determined to be complete, the structure is transferred back to the foundation. This plan calls for the field stone foundation to be completely dismantled and rebuilt. This concept, known as plane fitting in the technical literature, is considered as another method to minimize subsidence effects. However, generally it has only been applied to frame-type structures smaller than the Kent house. The method has not been proven for a structure of the size and weight of this house.

The concept of simultaneously monitoring ground movements and adjusting the various supporting jacks to compensate for the movements is easily understood; the complexity of

implementing such a system should be equally appreciated. The predicted subsidence of 4.7 feet will occur in less than 10 days, with an anticipated maximum of three feet in one day. The precise movements in relation to the location of each jack support cannot be anticipated. Even with computer control, the premise of instantaneous adjustment of multiple jacks so that the structure experiences no strain is difficult to accept. At a minimum, it would not be surprising for the structure to experience damages similar to those anticipated using the RAG (i.e., WVU) mitigation method. In addition, because the structure would be supported on a set number of jacks with significant building loads distributed over each one, the system itself would be susceptible to catastrophic failure due to unidentified structural anomalies and/or system malfunctions. Although the system appears to be promising conceptually, no specific plans were submitted to gauge the severity of the impact on the property.

Avoidance:

This alternative requires leaving virgin coal beneath the Farmhouse within an influence area defined by a 25-degree draw angle projected downward from a line 15 feet outward from the periphery of the house to the coal seam level. The depth to the Pittsburgh seam below the house is 450 feet, which defines the influence line for protection to be 225 feet (210 feet by the angle of draw + 15 feet from the edge of the structure). An additional 70 feet is added to account for the slope on the east side of the structure (450 feet depth x 15 percent slope) and 50 feet is added for the house width. Considering all of the above, approximately 600 feet of the panel would be left to provide the desired protection for the Farmhouse. Considering a panel width of approximately 1000 feet and a seam height of 7 feet, approximately 200,000 tons of coal must be left in order to protect the Farmhouse. In addition, because the Farmhouse is located near the end of the panel, it would be difficult to mine the remaining 800-foot block by longwall methods; it would not be operationally feasible to reinstall the longwall equipment to mine an 800-foot long panel. Therefore, 1,400 feet of the panel must be left, which is equal to approximately 400,000 tons of coal. The corresponding surface area of the Kent Farm property that would be protected is 25 acres. However, protection may also be achieved through partial extraction room and pillar methods in the zone of influence and remaining panel; the allowable extraction percent in the zone of influence would be based on pillar stability calculations that meet a minimum factor of safety of 2.5; there would be no limit placed on the room and pillar method applied outside of the zone. Although the room and pillar method would not be desirable from an economic standpoint when compared to longwall mining, it is an alternative that would require leaving significantly less than 400,000 tons while still providing an acceptable level of protection.¹

Conclusion:

¹ Experience has shown that mining up to 50 percent extraction at depths less than 600 feet will result in acceptable long term pillar stability (i.e., minimum factor of safety of 2.5); applying a 50 percent extraction limit to the entire 1,400-foot x 1,000-foot influence/panel area would result in less than 200,000 tons of coal being left for surface protection.

The mitigation techniques proposed by WVU have been used extensively in the U.S. and Europe. When carefully implemented, they are considered successful in minimizing the effects of subsidence. The methods proposed in the Gensert alternative have also been used, although not as extensively; the concept has not been proven with structures of the size/weight of the Kent Farmhouse. It is to be noted that in the context of subsidence mitigation, success is not synonymous with zero effects or no damage. It is generally accepted that due to the complex nature of ground movements and structure response, damages such as plaster cracking, concrete floor heaving, and brick/mortar cracking are likely to occur even with implementation of these methods. Therefore, an assessment of success must take into consideration the type of structure and its intended use; how critical each component is for proper functioning; and, in this case, how such damages affect the historic integrity. If repair/restoration of the types of damages identified above is unacceptable from the historic preservation perspective, then neither mitigation proposal would be appropriate. Only the avoidance alternative (i.e., leaving a solid block of coal under the residence, or limited extraction mining designed to provide long-term stability) can be reasonably anticipated to result in no damage to the house.

Appendix G

UNDERGROUND COAL MINING METHODS

In underground mining, also known as deep mining, coal is excavated within the horizon of a coal seam and without removing the overlying overburden for reasons other than primary seam access. Underground mines can be categorized by the manner in which access to a coal seam is made, and by the manner in which a coal seam is extracted. Access methods can include drift, slope and shaft mines; and extraction methods can include room-and-pillar (conventional and continuous) and longwall mining. The method of coal extraction is not dependent on the method of access, and multiple methods of access and extraction may be present in any one mine.

Room-and-Pillar Mining

The defining principle of a room-and-pillar mine is that portions of the coal seam are removed, while portions are left in place to support the roof of the mine and the surface of the land. These mines are developed by driving a parallel series of entries, usually four to eight in a series, with perpendicular crosscuts that connect the entries to form a grid-like pattern in a panel of coal, which can be more than 400 feet wide and half a mile long. The coal blocks that remain after mining is completed are referred to as pillars or stumps and serve to support the roof of the mine and the surface of the land. The coal pillars are generally 20 to 90 feet wide, and the entries average 20 to 30 feet wide.

Longwall Mining

Longwall mining is characterized by the use of mobile mechanical supports for the mine roof and essentially complete coal extraction within the working area of the longwall equipment. In the longwall method, two or three parallel entries (or headings) are driven into the coal seam via continuous room-and-pillar methods to a planned maximum extent, where a cross heading is driven between the ends of the entry headings to create a panel. These panels are usually 850 to 1,100 feet in width and 7,500 to 15,000 feet in length. A plow-type cutting head mounted on a track then travels back and forth across the cross heading, cutting the coal off in strips and working backwards towards the beginning of the panel. When the end of the panel is reached, the cutting direction is reversed, and the longwall miner moves back across the coal face in the opposite direction. As mining progresses, since no coal is left in place to support the roof of the mine, the mined-out area collapses behind the longwall mining machine. Since no pillars are left within the coal seam, after the roof of the mine collapses, the surface will subside normally about two-thirds of the thickness of the coal seam being mined.

Draft September 11, 2000

Memorandum of Agreement

Among the Office of Surface Mining Reclamation and Enforcement (OSM), the Pennsylvania Historical and Museum Commission (PHMC), and the Advisory Council on Historic Preservation (Council), the Commonwealth of Pennsylvania, Department of Environmental Protection (PADEP), RAG Emerald Resources LP (RAG), Murray and Luarine Williams, and the National Trust For Historic Preservation.

Whereas, the United States Department of the Interior, Office of Surface Mining Reclamation and Enforcement (OSM) is the *Agency Official* for coal mining permits issued by PADEP through a delegation of authority authorized under the Surface Mining Control and Reclamation Act of 1977; and

Whereas, OSM has determined that the revision to Underground Coal Mining Permit CMAP No. 30841307, Emerald Mine No. 1, approved by PADEP on July 14, 2000, will have an effect on the 102 area Kent Farm, a property listed on the National Register of Historic Places, and has consulted with the Pennsylvania Historical and Museum Commission (PHMC), and the Advisory Council on Historic Preservation (Council) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470(f)); and

Whereas, PADEP and RAG, which have responsibilities in implementing this MOA, have been invited to be signatories to the agreement; and

Whereas, Mr. and Mrs. Murray Williams, the owners of the Thomas Kent Jr. Farm and the National Trust, at their request, participated in the consultation and have been invited to concur in this Memorandum of Agreement; and

Now, therefore, OSM, PHMC, and the Council agree that the permit revision, which will allow RAG to conduct full extraction coal mining activities beneath the boundaries of the Thomas Kent Jr. Farm, shall be implemented in accordance with the following stipulations in order to take into account the effects of the undertaking.

Stipulations

OSM, with the assistance of PADEP, will insure the following measures are carried out:

RAG will conduct its full extraction mining operation in Panels 4 and 5 North of the Emerald Mine No. 1, in accordance with the terms of PADEP approved revision to CMAP No. 30841307.

RAG shall implement, with consent of the Williams, the subsidence control and mitigation plan approved by PADEP to avoid, minimize, or mitigate adverse effects to the Kent Farm land, water resources, and structures. The plan shall be implemented and monitored by persons and companies with significant experience, skills, and success in protecting resources, and structures of similar age, condition, and construction.

This Memorandum of Agreement (MOA) will be incorporated by reference and inclusion in the approved permit CMAP No. 30841307, and be monitored for compliance by officials of RAG, and PADEP, with OSM providing program oversight.

Measures taken by RAG in regard to protection of the Kent Farm property from the adverse effects of the mining activity, including those taken before mining to document the pre-mining condition, to avoid, or minimize adverse effects, and those taken after mining to repair, restore or compensate the property owners for damages to structures, driveways, walkways and other appurtenances, land, and water resources, shall be in accordance with the requirements of Pennsylvania law and regulations (**citation**), and, when directed by OSM, the requirements of the Federal Energy Policy Act (**citation**) and applicable implementing regulations.

Structures: Pre-Mining Survey

Photographs. Both color and black and white photographs printed on 8x10 inch paper will be taken, documenting the pre-mining condition of the property structures. Medium format (2¼ x 2¼ inches or 6 x 6 cm) will be used with modern single lens reflex medium format equipment. The black and white photography must be archivally stable and based on HABS/HAER photographic standards. The color photography will document the condition of each building so that after mining, the structures can be returned to historic, pre-mining appearance. The following photographs of the house must be taken at a minimum.

Exterior elevations: Photographs of each facade (as a whole) and detail/close-up, to document the color, texture, and workmanship of masonry and woodwork.

Interior elevations: Photographs of each wall in all rooms, including the hall.

Details: Photographs of all significant architecturally significant features including all mantles, all doors and associated architraves, windows and associated architraves, balustrade and stair both from the bottom looking up and the top looking down, the side cupboards, front door with transom and sidelights, porch and foundation.

Floor Plan - measured drawings must be undertaken of each room, including measurements of wooden floor boards.

Water Resources - Surveys Pond

RAG will immediately begin monthly monitoring (flow and quality) of the pond outflow and principal inflow sources. Water quality parameter analyses should include: pH, temperature, alkalinity, acidity, total iron, total manganese, total aluminum, sulfate, total suspended solids, total dissolved solids, and sodium.

Begin daily discharge rate monitoring of the pond outflow and main inflow sources once the Panel 4 North longwall face approaches to 500 feet of the closest point of the pond. Repeat for Panel 5 North.

Continue flow monitoring on a daily basis for a least a week after the longwall face has passed the pond. The monitoring can be scaled back to weekly for the next three months and monthly for the next nine months. Water quality monitoring should be performed weekly for the first month after the face has passed, and monthly for the next year. The timetable should be modified to the Panel 5 North mining schedule when it approaches within 500 feet of the pond.

House Spring

RAG will immediately begin monthly monitoring of the quantity and quality of the spring water. When the face of Panel 5 North comes within 500 feet of the spring, RAG will begin daily monitoring of the spring using the same quality criteria as the pond. Monitoring will continue on a daily basis for a week after the mining face has passed under the spring house, and monthly after for a year, or until a permanent replacement water supply is provided, if required.

Archaeological Resources

RAG will consult with PHMC and a professional archaeologist, approved by PHMC, to develop a specific plan for the investigation, identification and retrieval of historical artifacts that may be encountered while installing the subsidence mitigation plan. Persons responsible for the excavation shall be made aware of the possibility of uncovering historical artifacts, and provided training regarding the proper techniques to use in

excavation to minimize potential damage to artifacts, and techniques to recover and protect any artifacts found. A professional archaeologist/historian will be on site to monitor excavation activities. All features and artifacts uncovered shall be documented to professional standards. Any artifacts recovered shall, upon completion of documentation, be turned over to the Williams unless other arrangements are made.

Details:

The Williams, RAG Emerald, and PHMC, and an historical architect, and appropriate skilled craftsman, suitable to the parties will consult and document steps that will be taken to protect specific historical features, and how repairs to these features will be made. If architectural features are removed from the house for protection during the subsidence process, they must be labeled and stored in a dry, secure place away from the site. Labeled items shall be cross matched with the measured drawings and photographs to assure exact positions are maintained. They should be replaced only after the danger of further subsidence has passed. The process of removal and replacement of the architectural features must be under the care or supervision of a person with significant experience and skill in the restoration of properties of similar age and character.

Repair/Restoration

Structures:

Any restoration or repair needed in the structures of the Kent Farm as a result of mining activities must be undertaken in a manner consistent with the Secretary of the Department of the Interior's *Standards for the Treatment of Historic Properties* and associated guidelines, regardless of how the previous rehabilitation was undertaken. Repairs must be undertaken by craftsmen with significant experience in working on structures of similar age and type, and proven skills in the required areas of expertise. The PHMC shall be consulted on the selection of the craftsmen who will be responsible for restoration/repair activities at the Farm. The repair/restoration standards include but are not limited to the following:

Brick Masonry: If brick crack, break, or spall, and removal is determined to be necessary, replacement brick must match the existing historic brick in size, color, firing and texture, and preferable be from the same era.

Mortar: Damaged mortar will be repointed in accordance with Preservation Brief # 2, *Repointing Mortar Joints in Historic Brick Buildings*. New mortar must match the historic high lime mortar, in color, texture, and joint profile.

Wood Trim and Wood Surfaces: Any wooden feature, or finish damaged as a result of the mining activity, must be replicated in kind, matching the historic/existing profile and surface treatment.

Interior Surfaces:

Plaster: Damage to plaster surfaces and walls, must be removed, and new plaster must be applied in accordance with Preservation Brief #21, *Repairing Historic Flat Plaster - Walls and Ceilings*.

Gypsum Wallboard: Gypsum wallboard must be removed to assess the damage to frescoed plaster wall surfaces. These decorative wall surfaces must be repaired by skilled craftsmen specializing in Decorative Arts Restoration. After restoration, new gypsum board should be applied so as not to damage the historic plaster surfaces, in accordance with recommendations in the *Gypsum Construction Handbook* published by United States Gypsum, or approved equal.

Water Resources:

Farm Pond: The pond is identified as a contributing feature to the historical property. As such it needs to be maintained both as a visual aspect of the property and as an agricultural water for the cattle operation. RAG will take the necessary steps to compensate for differential settlement, and any loss of water due to bottom cracking. RAG will also be responsible for replacing any loss of water in flow as a result of mining, which is significant enough to adversely affect the use or appearance of the pond.

House Spring: Should the spring, serving the personal water needs of the Williams, be damaged or lost, the water supply will be replaced on a temporary and permanent basis, in accordance with the requirements of Pennsylvania and Federal Law. The spring house must be maintained/repaired/restored as an historic structure.

Overall Appearance and Use of the Property

RAG will be responsible for correcting any damages to the land surface which adversely affect the appearance or use of the property. Damages could include side hill slips and cracks in the surface of the land. Shrubs, trees, grass, and other landscaping around the buildings damaged as a result of the mitigation measures, or repairs, shall be replaced or repaired with similar plant materials as directed by the Williams.

Administrative Conditions

The Council, and PHMC may monitor activities carried out pursuant to this MOA, and the ACHP will review such activities if so requested. PADEP and OSM will cooperate with ACHP, and PHMC in carrying out their monitoring and review responsibilities.

Any party to this MOA may request that it be amended, whereupon the parties will consult in accordance with 36 CFR § 800.6, to consider such amendment.

Any signatory party to this MOA may terminate it by providing thirty days notice to the other parties, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, OSM will comply with 36 CFR § 800.6 with regard to the individual undertakings covered by this MOA.

**United States Department of The Interior
Office of Surface Mining Reclamation and Enforcement**

By: _____

Date: _____

Name/Title

Pennsylvania Historical and Museum Commission

By: _____

Date: _____

Name/Title

Advisory Council on Historic Preservation

By: _____

Date: _____

Name/Title

Pennsylvania Department of Environmental Protection

By: _____

Date: _____

Name/Title

RAG Emerald Resources Corporation

By: _____

Date: _____

Name/Title

Murray and Laurine Williams

By: _____

Date: _____

National Trust for Historic Preservation

By: _____

Date: _____

Name/Title

By: _____

Date: _____

Name/Title