D-143

Historic Structure Report



Kaymoor Mine

New River Gorge National River

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Historic Structure Report
Kaymoor Mine

November 1997

by
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New River Gorge National River
West Virginia

United States Department of the Interior • National Park Service

ACKNOWLEDGMENTS

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I. MANAGEMENT SUMMARY

PREFACE

The historic structure report (HSR) of the four major mine structures at Kaymoor Mine of the New River Gorge National River was authorized by the project agreement of October 1, 1996.

The primary purpose of this historic structure report is to provide research, analysis, and evaluation at a "problem-specific" level to recommend a preferred form of stabilization treatment to the coal tipple, the powerhouse, the coke ovens at Kaymoor Bottom, and to the headhouse at the Kaymoor Bench level. The terms coal tipple and processing plant refer to the same building and are used interchangeably throughout this document. The structures at Kaymoor are in varying stages of deterioration. Without treatment, they are in danger of collapsing. These conditions threaten the safety and lives of park visitors and staff and present a liability to the park and the taxpayers. The structures are, thus, studied in this report to ensure that they are properly managed and treated, and that preservation issues are resolved. NPS-28 outlines the research methodology appropriate for these structures' level of significance as "Limited Investigation."[1] The project agreement reinforces this policy guideline.

The focus on historical data will be minimized due to the technical nature of stabilization treatment and the fact that the historical data are not crucial in the thought process used to develop the preferred form of stabilization. Stabilization, in this case, will be the ultimate treatment for these structures, with the exception of the headhouse, which will inevitably collapse due to extensive degradation, and the inability to approach the hazardous structure safely. The Value Analysis Study used to choose a preferred alternative has determined that to try to stabilize this existing ruin is not economically feasible nor structurally practicable. For the coal tipple, powerhouse and Coke Ovens, moderate stabilization actions will be taken to reinforce the major structural elements and to provide reasonable repair of the building envelope. Only minimal annual maintenance will be made. This approach makes a definitive management decision that significance will ultimately be lost over time. There are real challenges in preserving structures like these. More extensive work has not been justified from a cost/benefit point of view nor from a cultural resources point of view. The value analysis study (appendix A) and the section on integrity detail this point. Appropriate amounts of data have been gathered to fulfill the National Park Service Cultural Resource Guidelines graphic documentation requirements for structures of this category of significance. That information is contained in this report and in the HABS / HAER files.

The treatment for other extant structures at the site will not be addressed in detail here, but rather will be discussed in general and recommended for future studies. This report focusses on the treatment of historic resources within a property listed on the National Register of Historic Places, important at the state-level of significance for how they contribute to the understanding of bituminous coal mining in West Virginia. This analysis is presented in face of questionable future funding sources and limited future staffing options. The possible future acquisition of the Nuttall Mine property to the NERI holdings may extend the pertinence of treatments proposed herein to a far wider historic resource context. As that acquisition is not yet certain, the proposed treatment has the advantage of placing the buildings of concern in a stable holding pattern while the NPS considers whether the Nuttall site better relates to the park objectives. The immediate concerns are addressed and the wider issue of appropriate industrial heritage preservation may comfortably be considered without undue damage to the historic resources.

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1. NPS-28, *Cultural Resource Guidelines*, Release #4, Washington Office, chapter 2, p. 18.

The description of exterior existing conditions is based solely upon visual access to the buildings from the ground level. Description of the interior existing conditions was possible to any significant degree only in the powerhouse. Structural instability of the other structures precluded major building interior observation or any close fabric investigation. Structural timbers, and other wood finishes of the headhouse and other structures are crushed, rotted, and disintegrated. Structural and finish metals of the coal tipple, powerhouse, and other structures and machinery are heavily corroded, twisted, and collapsed. The masonry of the coke ovens and other structures are spalled and de-stabilized. Thus, the extent of observation was significantly limited by site and structure-imposed constraints.

ADMINISTRATIVE DATA

PROJECT IDENTIFICATION

Project Name: Kaymoor Mine Historic Structure Report

Number: Historic American Engineering Record # WV-38
There are 68 listed structures at New River Gorge National River. This report will focus mainly on the four entries in **boldface** of the 31 Kaymoor No. 1 Mine, specific entries. Refer to appendix C for the full list of classified structures (LCS) at the New River Gorge National River. In preparation for a special history study in 1995, the listed structures were given management categories of IIb through IIe, 3b and 4b. Initially, the LCS was organized to update earlier historical studies and field investigation reports. This revised list is intended to be a management tool in determining future historic and preservation maintenance projects. The category II (2) includes the major structures within the national register property:

Alpha Code	Struc. #	IDLCS	Structure Name
NERI		**N-093**	**80343 Kaymoor Headhouse**
NERI		**N-200**	**80390 Kaymoor Powerhouse**
NERI		**N-210**	**80348 Kaymoor Processing Plant (Coal tipple)**
NERI		**N-102/103**	**80353 Kaymoor Coke Ovens**
NERI		N-084	80372 Kaymoor Lamp House / Superintendent's Office
NERI		N-086	80374 Kaymoor Powder House
NERI		N-088	80375 Kaymoor Cap House
NERI		N-090	80378 Kaymoor Coal Car Repair Shop
NERI		N-092	80377 Kaymoor Monitor Incline
NERI		N-101	80379 Kaymoor Company Store #9
NERI		N-104	80380 Kaymoor Mountain Haulage
NERI		N-194	80382 Kaymoor Berwind Fanhouse
NERI		N-195	80383 Kaymoor Low Moor Iron Co. Fanhouse
NERI		N-196	80451 Kaymoor Low Moor Iron Co. Electrical Substation
NERI		N-197	80384 Kaymoor Blacksmith Shop and Retaining Wall
NERI		N-198	80386 Kaymoor Monitors
NERI		N-199	80387 Kaymoor Conveyor
NERI		N-204	80385 Kaymoor Covered Walkway

The remaining structures are Kaymoor ice house (4b); Kaymoor coal car (3b); and Kaymoor sand car (3b).These categories can change upon further analysis in new studies or fieldwork. Some of the LCS names changed from the first draft of the LCS data in 1990 to the most recent tabulation in Harlan Unrau's *Special History Study / Historic Context: New River Gorge National River, West Virginia* (NPS 1996), pages 46-47. This tabular summary is presented in appendix C. Since the Kaymoor No. 1 Mine was listed in 1990 as a national register property, the designated categories were not required for nomination. However, the categories give management an opportunity to reconsider some of the DCP issues and the need to place higher stabilization priorities on category II properties.

Location: The New River Gorge National River was authorized by Congress for inclusion in the national park system by title XI of PL 95-625 on November 10, 1978. Kaymoor is located upstream from the New River Bridge on Route 19. It is also 2 miles upstream from the town of South Fayette in Fayette County, West Virginia (figure 1).

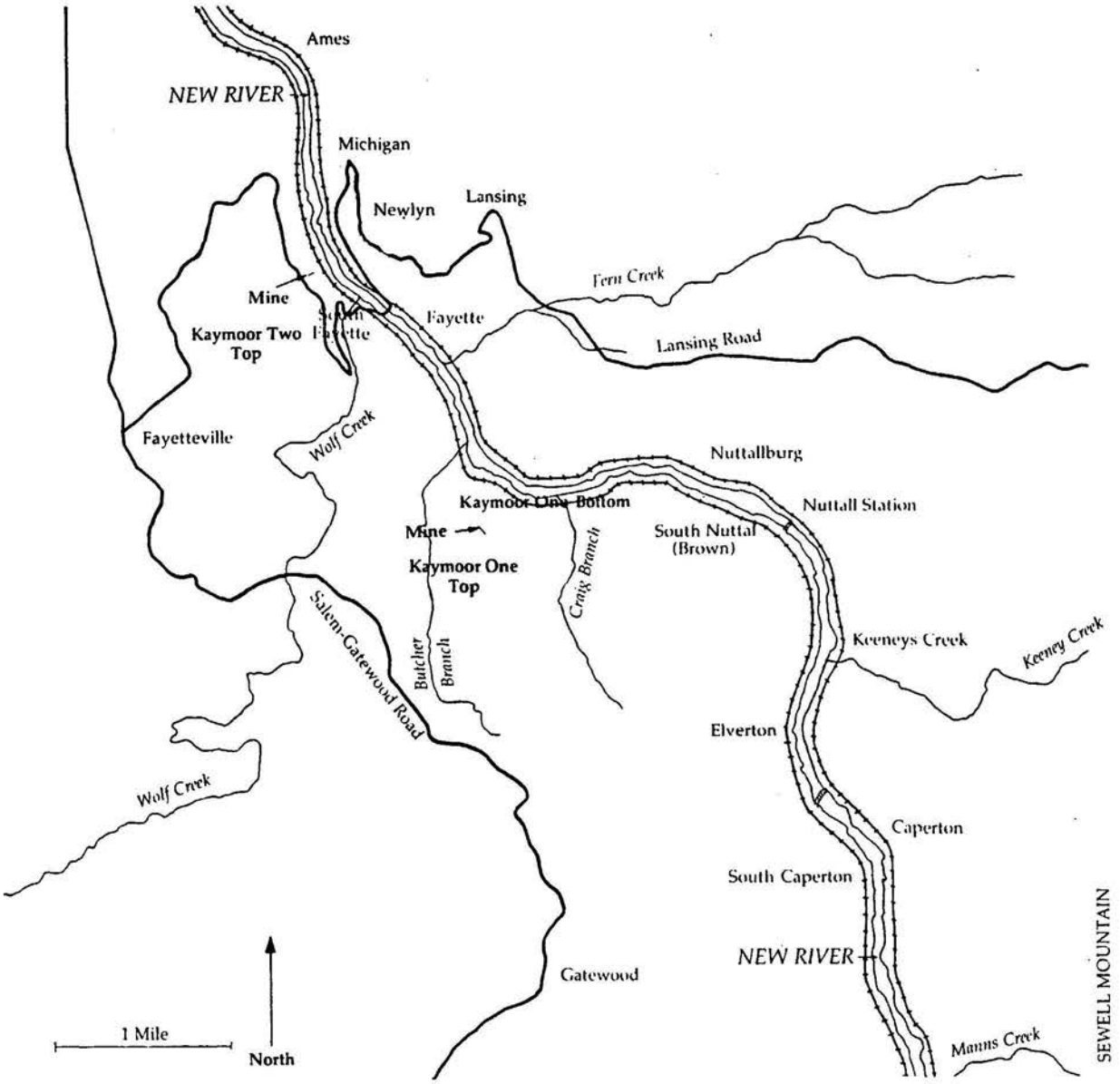


Figure 1 This map, based on one from 1928, shows the Kaymoors, surrounding towns, and major transportation routes.

Period of Significance: 1900–1940
Significant Dates: 1900, 1925, and 1928

Significance: Category III - Structures that individually or collectively qualify for the national register, and possess significance at the local level.

ORDER OF SIGNIFICANCE / HISTORICAL BACKGROUND

Order of Significance

The Kaymoor No. 1 coal mine was described as a resource of the "district" category on the National Register of Historic Places registration form prepared by Historian Sharon A. Brown, dated July 13, 1990. The property was listed on the National Register of Historic Places on November 8, 1990. The listing was amended on November 30, 1990. The historic resources study by Brown indicated that the Kaymoor No. 1 coal mine is the most intact coal mining site within the boundary of the New River Gorge National River. This complex is believed to be the most representative, relatively intact, coal mine complex remaining in the New River region of West Virginia. Kaymoor represents the park's cultural resources, which are specifically referenced in the authorizing legislation.

Historical Background

"Fayette County, West Virginia is famous for its abundant natural resource – coal. Blessed with thick seams of "smokeless" coal, Fayette County has made its living through the mining of the 2- to 5-foot seams of 70% carbon coal present in the New River Coalfield. The history of Kaymoor coal mine no.1, located on the New River within this famous coalfield, is part of the larger history of coal mining in Appalachia. New River coal contributed economically to the manufacture of low-cost iron and low-cost , high-quality metallurgical coke, and Kaymoor's history is an integral part of the Appalachian coal mining and cultural heritage.

The importance of coal to the United States in the late 19th and early 20th century cannot be overstated; 75% of the energy used in this country in 1910 was supplied by coal. There was great interest in southern West Virginia's coal because of its low sulphur content and the high heat level it produced when burned. Mines were opened in the New River Gorge as early as the 1870's –1880's, but after 1900 West Virginia's coal industry boomed. Coal was shipped on the Chesapeake & Ohio (C&O) Railroad directly to east coast markets. The area's topography provided excellent conditions for low cost mining, and the importation of immigrants and southern blacks provided a low cost labor force. Kaymoor was only one of many mines to be opened up and down the New River Gorge. The Low Moor Iron Company of Low Moor, Virginia, opened Kaymoor in 1900, along with a companion coal mine, Kaymoor no. 2, in 1903.

Miners, equipment, and townspeople were transported from the company towns at the top and bottom of the gorge by a single-track incline with a steam -powered cable hoisting drum (known as a mountain haulage). Coal from the mine was lowered to the processing plant (coal tipple) and beehive coke ovens near the railroad tracks at the bottom of the gorge on a two-track gravity incline. Both of these systems operated, with few modifications, from 1900 until 1962."[2]

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2. *National Park Service, Development Concept Plan*, Kaymoor No. 1 Mine, p.6.

Administrative History

The mines and community of Kaymoor (1899–1962) in the New River Gorge offer a historical insight into the American evolution of coal mining from the late 19th century to the mid-20th century. The *General Management Plan: New River Gorge National River* (1982) offered the promise to present the site as "the focal point for interpretation of early coal mining technology." This statement made over 15 years ago did not concern the subsequent tasks ahead to identify and implement a major stabilization and/or restoration program. This early historical analysis was presented in the initial research by Paul D. Marshall & Associates.

In the summer of 1986, the first major field documentation of the Kaymoor No. 1 Mine complex was undertaken by a Historical American Engineering Record (HAER) team. The final documentation was entered as HAER-WV-38 into the Library of Congress records. This study was followed immediately by a cooperative agreement between the National Park Service and West Virginia University to prepare the engineering data component (Physical History and Analysis section) for a historic structure report on the Kaymoor No. 1 Mine structures.

This field investigation resulted in the park contracting with the university to prepare an emergency stabilization report. Paul D. Marshall & Associates, Inc., was responsible for the structural drawings. This transitional report was completed in June 1987. Under the original agreement, the university conducted an archeological salvage project of the site during the fall of 1988.

The task directive for a Kaymoor development concept plan (NERI-128-03) was recommended for approval in February 1989. It recommended the enormous body of historical research already accomplished or in progress on the Kaymoor site. Its stated goal, however, was to resolve major issues of concern in developing the area for public enjoyment:

> public safety, resource protection/vegetation encroachment, interpretation, structural stabilization, documentation/protection of large industrial artifacts, and public access.

The final *Draft Development Concept Plan* was approved in 1990.

Through the documentation of the historic resources study (NPS 1990), the nomination of Kaymoor No. 1 Mine to the National Register of Historic Places was accomplished. This listing was determined as locally significant in 1990, with that original evaluation challenged in writing by NPS Chief Historian Edwin C. Bearss, who suggested that "state significance" was more appropriate than the level of national significance suggested by the state historic preservation office.

Following the directives of the Kaymoor DCP and other reports, the Kaymoor Mine site has received initial stabilization treatment. The completion of this historic structures report will enable park management to concentrate its efforts of preservation treatment on the extant structures most suitable for long-term stabilization. These measures will direct the future of achieving the original interpretive goal.

There is no need for archeological investigation at this time. If sub-surface disturbances occur at a later time, the need for archeological investigation will need to be reassessed. The archeological recommendation memorandum of May 1997 records this position.

Proposed Level of Treatment

As described in the *Development Concept Plan*, p. 17: "Headhouse: Demolition: Coal Tipple, Power House, Coke Ovens: Stabilization as a ruin in present condition; stabilizing selected facades in roughly their current (but more visible) condition." On page 20 of the plan, it states: "Stabilize structures for public safety throughout the site."

As proposed by this document and stated in the Kaymoor *Development Concept Plan* (June 1992), the preservation emphasis is to stabilize the remaining structures as ruins in their present condition. The coal tipple, powerhouse, and a number of coke ovens will be stabilized with their facades in their current (but more visible) condition. For the coal tipple, powerhouse, and coke ovens, moderate stabilization actions will be taken to reinforce the major structural elements and to provide reasonable repair of the building envelope. Only minimal annual maintenance will be made. (Refer to the description of alternative 2 for each structure in the "Description and Analysis of Specific Structures" section for an elaboration of this proposed action.) The headhouse stands in an unstable condition, which affects the safety of the visitors and park staff, alike. It is neither economically feasible nor structurally practicable to try to stabilize this existing ruin. The headhouse at Kaymoor will remain fenced and signed and will be allowed to collapse on its own (alternative 1). Section 106 compliance will be needed for this action.

PROPOSED ANTICIPATED DEVELOPMENT WORK

A parking lot will be developed at Kaymoor Top with a restroom trailhead and waysides. The current trail from the Kaymoor Top to the bench level will be improved and a staircase from the bench to the river level will be constructed to provide access to the tipple, powerhouse, and coke ovens. A boat landing will be established at Kaymoor Bottom to provide access from the river. Waysides will be placed at all three levels and areas where visitor safety is a concern will be fenced.

PROPOSED USE OF STRUCTURE

The remaining structures and facades will be used as backdrops to interpret and preserve the cultural scene and landscape.

OUTLINE OF COOPERATIVE AGREEMENTS

The park may enter into an agreement with CSX railroad to provide access to Kaymoor Bottom by a high rail for performing annual maintenance work.

NPS DOCUMENTATION FOR KAYMOOR NO. 1 COAL MINE AT NEW RIVER GORGE NATIONAL RIVER

The following entries list, in chronological order from the present going backward, the documents that record the decisions leading to this historic structure report and its recommendations.

Historic Resource Study, Kaymoor, New River Gorge National River, U.S. Department of the Interior, National Park Service, Denver Service Center, Sharon Brown, July 1990.

Development Concept Plan (DCP), Kaymoor, New River Gorge National River, U. S. Department of the Interior, National Park Service, June 1992. The DCP was prepared by the Denver Service Center to address preservation, interpretation, and access needs at the Kaymoor site. The GMP has been superseded by the DCP.

Study of Development Concept Alternatives Environmental Assessment, Kaymoor, New River Gorge National River, U.S. Department of the Interior, National Park Service, Denver Service Center, Draft, September 1990.

Kaymoor Coal Mine - 1900, Stabilization Project Emergency Repairs Report, Engineering Data Component, West Virginia University, 1986.

Kaymoor Coal Mine - 1900, Stabilization Project Final Report, Engineering Data Component, West Virginia University, 1989.

Progress Reports/ Kaymoor Stabilization Project, generally bi-weekly reports between 5/4/90 - 9/10/91.

Kaymoor Stabilization Project, Final Report and Recommendations, B.J. Peyton and E.L. Kemp, January 1992.

New River Gorge National River Resource Management Plan, September 1994

Further references for this section are located in the "Bibliography" section of this report.

II. DEVELOPMENTAL HISTORY AND ANALYSIS OF SITE

EVOLUTION OF SITE AND STRUCTURE

GENERAL

This section details the historic background and sets the stage for the discussion of existing conditions of the structures. "Cultural Influences and Context" discusses the cultural aspects that influenced the physical development of the structures. It elaborates on the role that labor-intensive industry, the owners and the workers had in the physical appearance of the surroundings. Within "Site Overview," the "Historic Overview and Evolution of Site" section introduces the natural context and its impact on the development at Kaymoor. The "Development of Structures" places the site and buildings into a context of development and significance from the historic and architectural and engineering points of view and details their chronological development.

CULTURAL INFLUENCES AND CONTEXT

Kaymoor Mine was built to serve one industrial purpose : to mine and process bituminous coal. It addressed an industrial need in a rugged setting. The cultural makeup of the workforce seemed to have had little influence on the physical development of the site and structures. One can make an assumption that the rough appearance of the masonry at the powerhouse relates to the need for a functional structure which was probably built by workers only modestly skilled in stonemasonry. There was probably no need for a building finished in any more elaborate style. Coal mining was not manifested by any particular stylistic treatment. Although the workers most certainly did have hopes of a better physical environment stemming from their unfortunate deprivation and denial, they probably didn't have expectations of realistically ameliorating the architectural treatment of the buildings in which they worked and lived. Had the workers' hierarchical position and stature in the operation of the community been at a higher level, this position would most likely have been reflected in the appearance of the residential architecture they inhabited. Aside from the experienced miners, many of the workers began as unskilled, poor, displaced people from the southern United States or from other countries. The residential element of Kaymoor's development does not fit within the scope of this report but is discussed here to set a general context. The majority of people did not own the land on which they lived. The coal company's attitude appeared to have been one of expediency rather than caring paternalism, judging from the working and living conditions existing at Kaymoor. Minimal comforts and activities were made available to a workforce who was largely held captive by the company store's inflated prices and debt-inducing sales practices.

The coal vein at Kaymoor was larger than most and was longer lived than most. Because Kaymoor remained in operation longer than most coal mines, with a closure date more recent than many mines, the level of interest in the mine remains high. People are still alive who have direct associations with the place. Because of the relatively long length of time that Kaymoor was open, the typical absentee landlord – property owner/worker – renter relationship evolved in some cases to a more stable company / homeowning worker relationship. These people lived outside of the boundaries of the Kaymoor Property. Nevertheless, the situation which remained exemplified the typical raping and pillaging of the land. There appears to have been no operational need to beautify the mine buildings or the landscape surrounding them.

OVERVIEW OF SITE

Historic Overview and Evolution of Site

An author describes Fayette County by exclaiming:

"The wild beauty of this canyon, known as the New River Gorge, with the clear water of the river flowing swiftly among scattered boulders at the base of its precipitous and rocky walls, has appealed to thousands of people, and has afforded ample justification for the efforts at description made by many prominent writers."[3] The town of Kaymoor lies within this landscape (see figures 2 and 3).

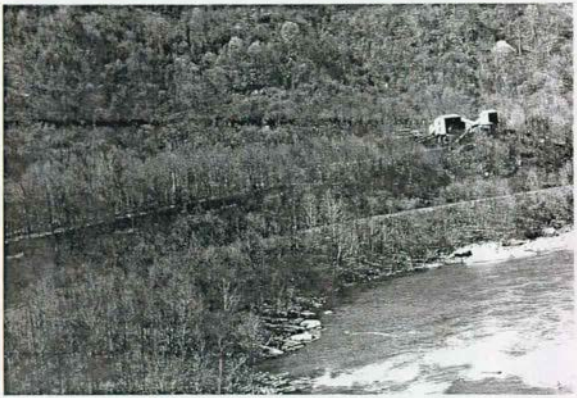


Figure 2 The Kaymoor coke ovens, tipple, and headhouse stand abandoned by the New River, 1981 NPS photo.

"Kaymoor's settlement was an adaptation to the environment. As stated, the layout of the mines and towns in New River Gorge was dictated by geography with mine workings and housing being placed as close as possible to the drift mouth wherever flat space existed. A road or railroad imposed a linear

3. J.T. Peters and H.B. Carden, History of Fayette County West Virginia, (Charleston: Jarrett Printing Company, 1926; reprint ed., Parsons, West Virginia: McClain Printing Co., 1972), pp. 1-2.



Figure 3 Kaymoor Bottom. The terrain, the location of the coal, and the railroad determined the layout of the coal community. Note Nuttallburg across the river nestled against the gorge. Photo courtesy of Virgil Burgess.

location the settlement, which, in Kaymoor's case, was affected by the narrow valley and the river front. Cultural influences also affected the settlement pattern, such as social needs, and the distance to work."[4] "Kaymoor is typical of other New River Gorge settlements as it was a linear village, was ephemeral and was a coal camp. Kaymoor was blessed with a larger area of flat land, thus, four rows of houses existed in the camp at the bottom of the gorge, forming a rudimentary grid pattern."[5] (See figure 4 and 5.)

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4. Historic Resource Study, Sharon Brown, July, 1990; National Park Service.

5. R.T. Hill, "Line Villages in Southern West Virginia: Examples in the New River Gorge, "Proceedings New River Symposium Pipestem, West Virginia, April 11-13, 1985;pp.121-124. For more information on coal mining and settlement morphologies, see: Mack H. Gillenwater, "Cultural and Historical Geography of Mining Settlements in the Pocahontas Coal Field of Southern West Virginia, 1880 - 1930" (Ph.D. dissertation University of Tennessee, 1972.), 1972, pp.47-61. Gillenwater also presented an article on the subject of New River demographics at a New River Symposium. See: Mack H. Gillenwater, " A Geographical Analysis of the Demographic Changes in the New River Basin, 1900-1980,"pp.203-217, in Proceedings New River Symposium, Blacksburg, Virginia, April 14-16, 1983.

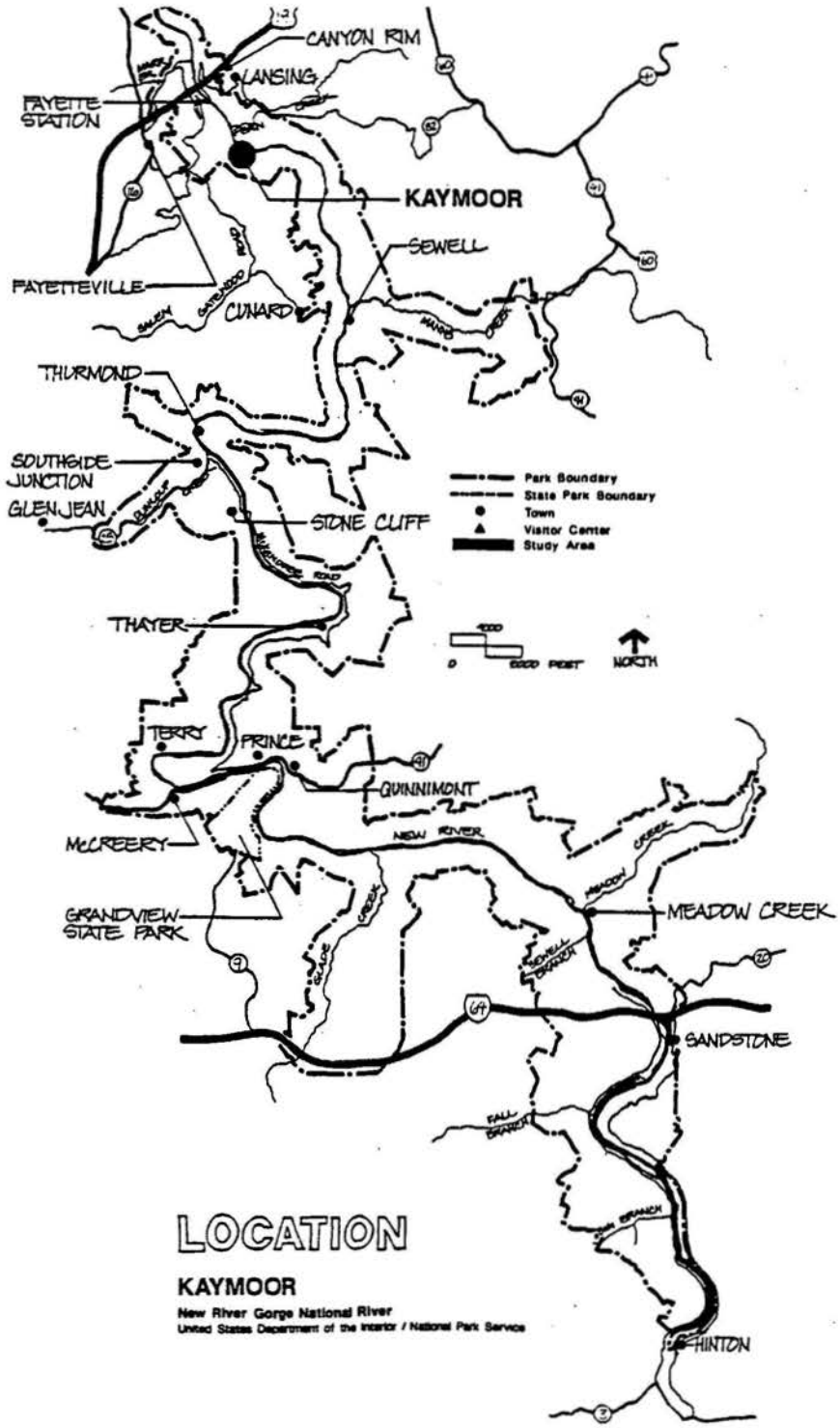


Figure 4 Kaymoor Location Map

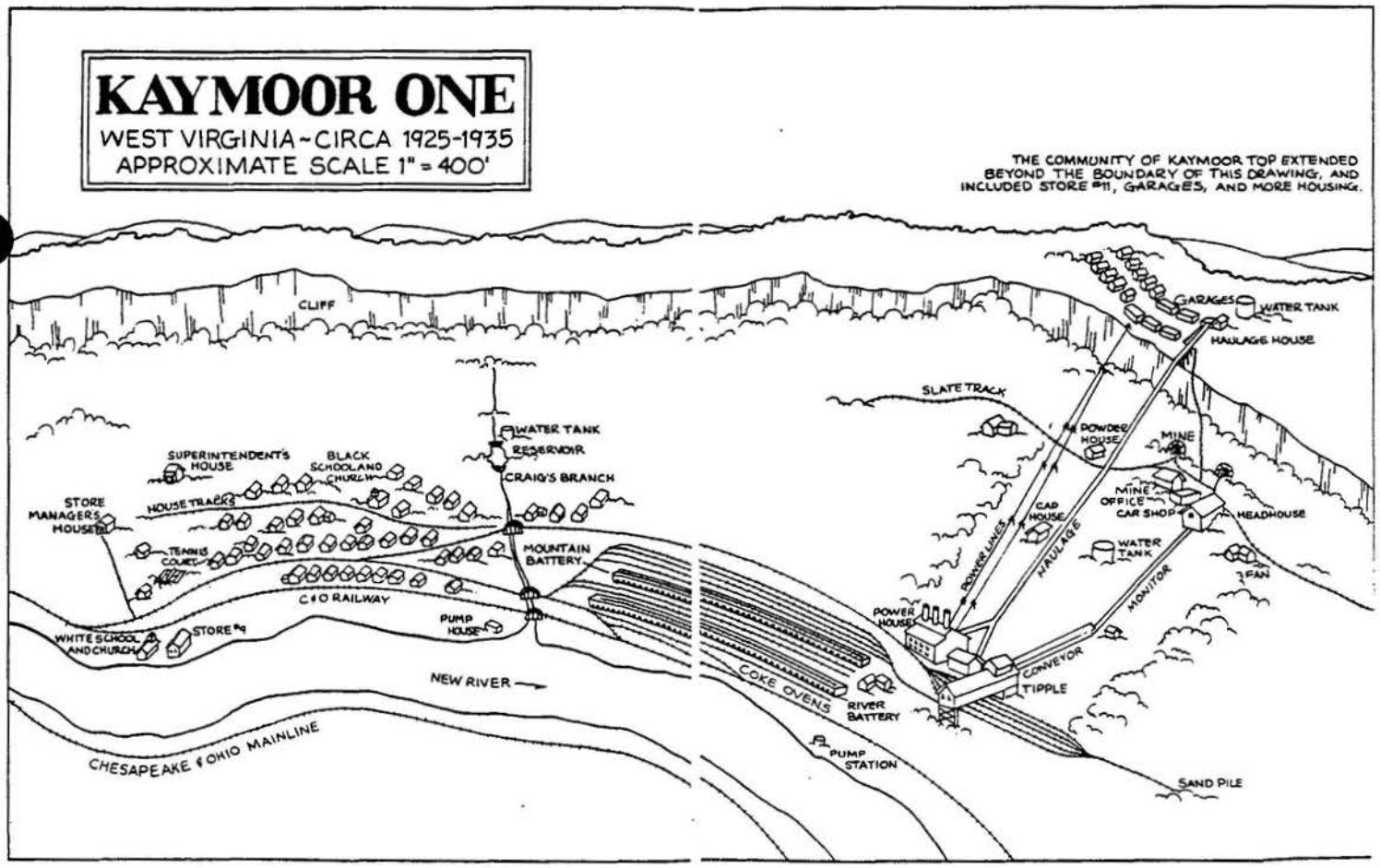


Figure 5 Kaymoor No. 1 Mine. Schematic aerial perspective depicting the site ca. 1925–1935. Not to scale. NPS drawing.

In 1863, when West Virginia came into the Union, 90% of its people were isolated and agrarian. Most of the industrial and commercial works were connected to farming in some way, but with the rise of the coal industry, transformations in the landscape occurred. Clearcutting of the forests, to make way for the railroads and the mining communities, left portions of the landscape denuded. Topsoil eroded into the river, as did the mining slag.

No written record has been uncovered that specifically describes the historic landscape at Kaymoor No. 1. Historic photographs, however, illustrate substantial clearing of all plant material around the mining operations (figure 6). There would be no reason that this would change until the mine closed in 1960. When mining operations ceased, miles of mine tunnels remained, honeycombing the land of Fayette County. As the land subsided unevenly into the empty underground spaces, the surface landform was reshaped. Natural vegetation now reclaims the landscape at Kaymoor.

The park has continued clearing a portion of the site at the bottom level twice a year. The Existing Conditions map illustrates the cleared area. The Historic Site map (figure 7) provides a plan view of the entire Kaymoor 1 area from 1922.

DEVELOPMENT OF STRUCTURES

Historical Development and Significance

> "The Kaymoor site was part of a larger economic picture; the coal and coke produced at the site fueled the Virginia iron industry from 1900–1925 and was subsequently shipped nationwide as part of the larger national and international market supplied by the New River and Pocohontas Consolidated Coal and Coke Company. The Kaymoor mine and town are examples of the coal mining system which dominated in West Virginia after the 1870's. This system was composed of mines located on a railroad, supported by a company town built and controlled by the coal operator. Few true company towns exist in West Virginia today. Private ownership, automobiles, and road all contributed to the demise of company-owned towns.
>
> The story of Kaymoor's mine and town history is representative of West Virginia's coal mining history. The traditional ways of mountain life were transformed with the coming of the railroad and coal industry. New ways of thinking and value systems were introduced by industrialists who controlled not only the coal companies and labor, but owned the land. Labor was provided by southern blacks and European immigrants who came to work the railroads and mines. In Kaymoor's case, capitalists such as Abiel Abbott Low founded the Low Moor Iron Company and purchased the New River property while Collis P. Huntington helped push the C&O Railroad through the New River Gorge, which resulted in the coalfields being opened. Charles F. Berwind, president of the Berwind-White Corporation of Philadelphia, owned Kaymoor after 1925, through the New River and Pocahontas Consolidated Coal and Coke Company, a subsidiary.

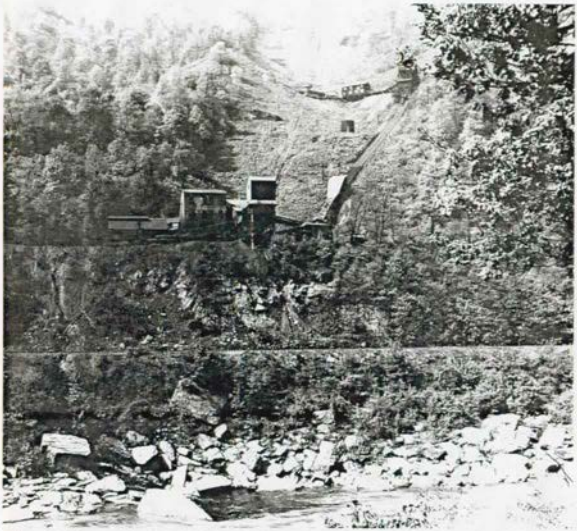


Figure 6 The Kaymoor No. 1 Mining Complex, 1947, showing the New River, C&O mainline, tipple, conveyor, monitor tracks, headhouse, haulage, and cleared landscape. Photo courtesy of C&O Historical Society Collection, Alderson, WV.

Coal was very important to the United States in the late nineteenth and early twentieth century. The growth of the bituminous coal industry occurred after 1850 to fuel steam locomotives and river steamers, and to power the burgeoning industrial order. Bituminous coal was cheaper then anthracite, more abundant, easier to mine, and soon became a more important fuel source. Another major factor influencing the development of a West Virginia coal industry was the belief that an iron boom was beginning in Virginia in the 1880's. Virginia's blast furnaces were fed by West Virginia coals. In 1910, 75 percent of the energy used in the United States was supplied by coal. Within a few decades West Virginia's cheaper and superior coals outsold the Midwestern fields. These coals were cheaper in part due to the easier drift mining and the low labor costs associated with the absence of the United Mine Workers of America on any significant scale until 1933.

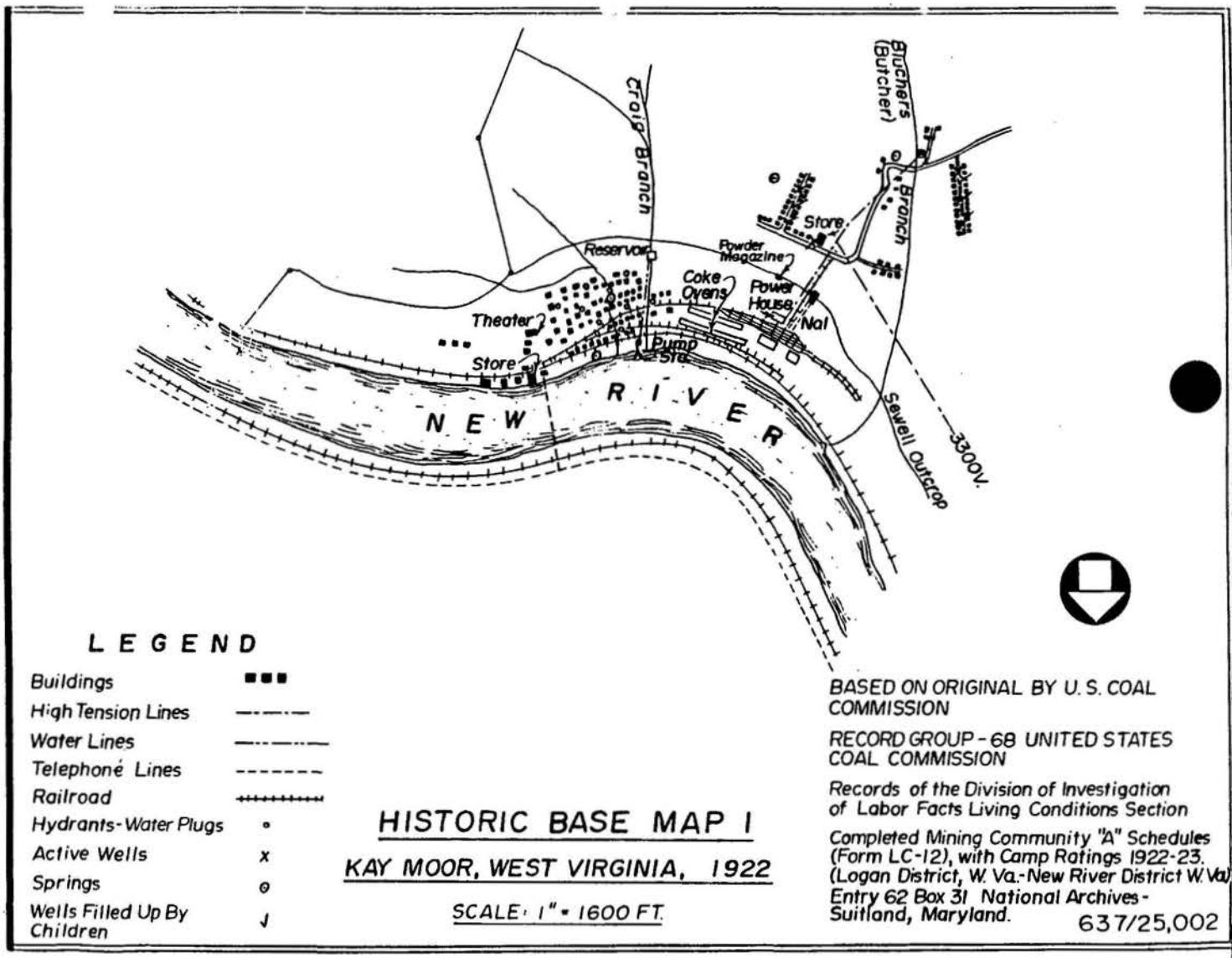


Figure 7 Historical Base Map, Kaymoor, West Virginia, 1922.

> The Kaymoor complex is unique as a district because it has been relatively isolated and its mining features are intact, although deteriorated. The pattern of events which occurred at Kaymoor, including the mine's opening and town construction by outside industrial interests, its clearly identifiable solutions to the problems of coal mining within steep gorge walls, its economic contribution to both coal an coke use, the use of immigrant an black labor, the fierce struggle to keep out the United Mine Workers of America, the observable transition from hand loading to mechanical processing from the extant equipment, and the legacy of coal town society which influenced West Virginia history to a great extent — are all nationally significant due to the impact West Virginia coal mining had upon the national scene in economic, social, industrial, and labor terms. These events reflected the fortunes of the coal mining industry in America as well as the pig iron industry in Virginia. Events involving union issues reflect the broader national struggles. The mining technology used both inside and outside the mine reflected prevalent usage in drift mining in the New River coalfields."[6]

The structures at the Kaymoor site do not share the national level of significance with the themes it represents. On August 28, 1990, William Drennen, state historic preservation officer, returned the national register nomination package to the National Park Service, Mid-Atlantic Region stating that the nominated resource was fully eligible under the national register criteria. A handwritten note in the upper corner reads, "Note: Part 8 should be marked National Significance." It is not apparent who wrote this note. The initials "C.T.9/5/90" imply that (then) Regional Historian Clifford Tobias saw the note, to whose attention it was addressed. A memorandum dated September 6, 1990, requested a determination on the part of the NPS chief historian by the regional director on whether or not the Kaymoor district should be listed as having national significance. On September 25, 1990, Chief Historian Edwin Bearss writes to the chief of registration, Interagency Resources Division, that the nomination author argues for state and local significance. As the nomination form did not address the critical issue of integrity, which would be necessary for a national historic landmark designation, the chief historian evaluated the properties to be of statewide significance. The property was listed on the National Register of Historic Places on November 8, 1990, and the listing was amended on November 30, 1990. The supplementary listing does not specifically mention the level of significance. It seems doubtful that the register would not have accepted the chief historian's recommendation to list the property at the state level. However, section 8 of the amended form still shows no box checked for the specific level of significance of the property.

Architectural/Engineering Development and Significance

"Kaymoor is a significant industrial archeological site for several reasons. Its headhouse and incline systems illustrate the special techniques employed by early 20th century american miners to wrest coal from outcrops on steep slopes. Kaymoor is a drift mine. A drift mine is one in which a horizontal, or nearly horizontal, seam of coal outcrops to the surface in the side of a hill or mountain, and the opening into the mine may be made directly into the coal seam. This type of mine is generally the easiest and cheapest to open because no excavation through rock is required. Transportation of coal to the outside may be by track haulage, belt conveyor, or by battery-powered rubber tired equipment."[7]

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6. National Register of Historic Places Registration Form, prepared by Sharon Brown, 1990, Section 8.

7. Shroeder, John L., Jr. "Modern Mining Methods - Underground", in *Elements of Practical Coal Mining*, p. 347.

Its fanhouses, powerhouse, drift openings, rail lines, and other integral elements survive, providing examples of typical mining practice of the era. The two extant inclines and headhouse are examples of specialized engineering adaptations to mining coal from the steep sloped outcrops.[8] "The processing plant with its Baum Jig Washer patented by Simon-Carves of England, shaker screens and other equipment, is exemplary of the move in the 1920s to produce mechanically cleaned coal for a general market. Kaymoor's coal was produced more cheaply because of the easier slope mining and the low labor cost associated with the absence of an established United Mine Workers of America local until 1933. The beehive coke ovens were an integral part of the captive operation. Kaymoor Top and Bottom are significant for being representative of coal towns associated with bituminous coal mining in West Virginia. Company towns were a visible symbol of the new industrial order in West Virginia, and they were the dominant institution in miners' lives. Kaymoor represents the best extant remains of a turn-of-the-century operation in the New River 'smokeless' coal field of central West Virginia."[9] Ketchum details the functioning of the jig washer, describing it fully in his book. (p. 280, *The Design of Mine Buildings*). This covers the real area of significance.[10] Important but less significant issues follow.

These are utilitarian structures built of traditional materials assembled into traditional building systems. Heavy timber framing forms the structural system of the headhouse. The coal tipple: post-and-beam steel construction; the powerhouse: random-coursed ashlar masonry. The coke ovens: firebrick and stonemasonry beehive domes built in two lines of diagonally-offset ovens with an overall rectilinear section, built in two long batteries of now abandoned coke-producing structures. A noteworthy aspect regarding their existence remains, above all, the fact that this complex was built on such an isolated site with such steep slopes.

All of the mine entries and auxiliary coal processing and administrative structures contribute to the district's statewide significance, but demonstrate nothing noteworthy from an architectural standpoint. They are small structures, variously built of concrete, brick or metal. The "Discussions and Recommendations for All Extant Structures at the Site" addresses these contributing resources in greater detail.

> "Kaymoor's major physical characteristics include extant mining machinery, buildings and other features located along the Sewell Bench, 560 ft. vertical above New River. These include openings in the gorge wall for electrical service and ventilation, fan houses, headhouse, three main drift openings, car repair shop, lamp house, superintendent's office, stairway to Kaymoor Top, mountain haulage, powder house, and electrical repair shop. Leading down the gorge wall 1,000 feet over a 30 degree slope to the railroad track and river level are monitors, conveyor , processing plant, powerhouse and two batteries of coke ovens at the bottom. Only the shell of one gutted and one collapsed house, and foundations remain of the Kaymoor Bottom town site, located next to both the river and coke ovens. . . . Even though only a few structures remain at Kaymoor Bottom townsite, including the company store ruins, the site itself provides the feeling of a company town whose access to the outside world lay only in the nearby Chesapeake & Ohio Railroad tracks."[11]

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8. HABS drawings of Kaymoor Mine No. 1, 1987, p. 1 of 16.

9. National Register of Historic Places Nomination Form, Sharon A. Brown, Section 8, p. 1)

10. The Design of Mine Buildings, p. 280.

11. National Register of Historic Places Nomination Form, Sharon A. Brown, Section 7, p. 1.

Chronology

1899 – construction of Kaymoor 1 siding, wooden tipple, headhouse and mine for drift opening.

1900 – Powerhouse built to produce compressed air needed to power the ventilation fan and compressed air coal cutters, located next to processing plant. It also contained three boilers and two steam engines.

1901–1902
Powerhouse enlarged for a new steam engine and dynamo. Additional Erie City boiler was installed.

1901 – Kaymoor's first battery of 120 coke ovens, built of fire brick and stone into beehive domes was completed in June and a foundation was laid for 120 more (figure 8). Fifty houses had been built in 1901. They all were four-room bungalow style houses, although a few shanties were located near the coke ovens. They were 34' x 34' and were constructed of board and batten on a foundation of posts.

1902 – 45 worker houses built similar in appearance to those built in 1901.

1903 – (HABS) A generating plant was installed to provide electricity for electric mine locomotives, coal cutting machinery, lighting , and other purposes.

1905 – 17 houses built similar in appearance to those built in 1902. More efficient chain breast cutting machines were being used to undercut the coal seams.

1908 – Powerhouse expanded (HABS).

1914 – (FIGURE 9) from Athey: Headhouse and Drift Entry. Building assumed to have been built in 1899.

1915 – At powerhouse, an Atlas Water Tube boiler was installed (assume conjecturally that this was in Boiler room) with two generators.

1916 – A rotary convertor for transforming AC to DC power was installed.

1917 – Fifty-nine more ovens (same as those from 1901) of the same size, shape and dimensions were built in 1917 by the Janutolo Construction Company of Fayetteville, WV.

1918 – 19 houses built. The bungalows were constructed of precut weatherboard and plastered lath interior, which set them apart from houses built earlier (figure 10).

1919 – Wooden fanhouses on site burned. Concrete and brick fanhouse and shop built. New turbine and sterling boiler installed at powerhouse.

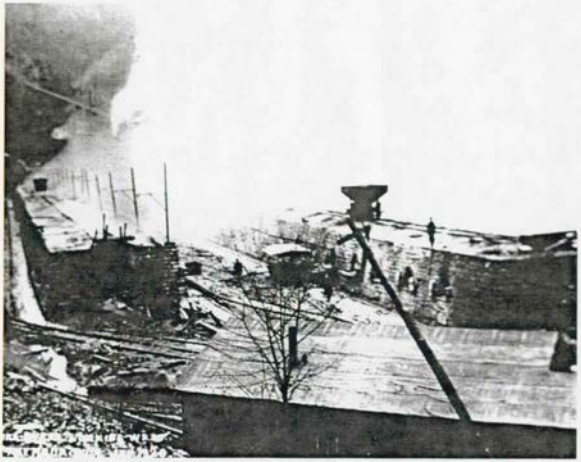


Figure 8 Kaymoor coke over batteries looking westward, January 1920. The lorry is carrying coal to the ovens at right as smoke from the ovens in black obscures the view. Photo courtesy of Wallace Bennet.

1922 – Kaymoor No. 1 - described as a major center of industrial activity. Industrial plant: tipple, monitors, monitor tracks, headhouse, fanhouse, and shed; housing, company store, theater., while on the upriver side was a car barn, shop, lamp house, offices and powder magazine. Worker housing, the haulage house, and store no. 11 shaped the village of Kaymoor Top (figure 11 - Athey: Kaymoor No. 1 Bottom 1920). The overall scene at Kaymoor is hidden partially behind the smoke billowing from the coke ovens in the foreground.

1923 – The original design of Kaymoor No. 1 and 2 had changed significantly. Store number 10 and the houses in Kaymoor 2 Bottom had closed.

1924 – Kaymoor No. 1 mining operation had suffered a terrible fire in 1924 which destroyed the tipple, crushing plant, conveyor, three storage bins, and part of the wooden trestle that carried the monitors uphill from the tipple to the headhouse (figure 12 - Monitor Trestle: 1920).

1925 – Kaymoor is sold to the New River and Pocohontas Consolidated Coal and Coke Company. A new steel (corrugated metal per HABS drawings) tipple, built by the Link-Belt Company, had facilities for washing coal and controlling dust, and it processed Kaymoor coal into four grades: slack, pea-stoker, four-inch house coal, and lump. It could load coal onto five tracks simultaneously (HABS). A new fanhouse was installed at a new ventilating shaft 2,000 feet



Figure 9 Kaymoor No. 1 Headhouse and Drift Entry in 1914 where miners entered to work the Sewell coal seam. NPS photo.

grades: slack, pea-stoker, four-inch house coal, and lump. It could load coal onto five tracks simultaneously (HABS). A new fanhouse was installed at a new ventilating shaft 2,000 feet down river from the main drift openings. The Kaymoor beehive ovens fell into disuse. (The national register form states that the ovens were closed in the 1930s. "All coal was shipped by rail to a variety of customers." (HABS drawings. p. 2 of 16)

1926 – Kaymoor 2 mine closed.

1927 – After this date, electricity was purchased from the local power company. The powerhouse is abandoned and allowed to deteriorate, with three rooms and partial roof.

1928 – Berwind installed a Simon-Carves Balm Jig Washer around 1928 (HABS): Belt coal conveyor, by Link Belt (Chicago), installed ca. 1928.

1929 – Coal production at Kaymoor increased about 8.5% in 1929, but the Great Depression hit Kaymoor hard.

1930 – Conveyors were being used, eliminating much of the hand loading, although some hand loading remained until the mine closed. Coal production dropped over 25% in 1930, then stabilized from 1930 to 1935. . . . The beehive ovens cooled, never to be reheated, and the mine water drainage system was redesigned, while the company managers followed national legislative efforts to cope with the problems of the coal industry.

1932 – Prior to 1932, cap magazine and oil tanks built.



Figure 10 The new camp at Kaymoor No. 1 "Top" consisted of 19 bungalows built in 1918 from "Readi-Cut" materials. The construction anticipated a coal boom that never occurred. NPS Photo.

1934 c. (HABS) The power plant was abandoned when Berwind-White shifted to electricity purchased from outside sources.

1950 – The population of Kaymoor Bottom in the New River gorge gradually declined in the 1950s as automobiles permitted commuting to work from afar, and the company instituted a policy of closing the community in the gorge.

c. early 1950s
Lamphouse/superintendent's office built of cinder blocks. Sandhouse built.

1952 – Kaymoor Bottom abandoned and most of the inhabitants moved out.

1960 – The Kaymoor coal community in the New River gorge, built by the Low Moor Iron Company in 1899–1900, was deserted. Minimal activity occurred in the lower tipple as coal production reached its nadir. In April 1960 a raging fire destroyed 40 vacant houses in Kaymoor Bottom, leaving only 11 houses standing in the deserted village on the banks of New River. Employees of the C&O Railway and New River Pocahontas Company fought the fire for two days before bringing it under control. The fire crept close to the tipple and destroyed a small trestle on the company's rail siding.

1962 – Kaymoor No. 1 produced coal until 1962.

1981 – (Figure 2) 1981: Kaymoor Bottom



Figure 11 Kaymoor No. 1 "Bottom," February 1920. In the background the powerhouse, tipple, and headhouse are visible. In the foreground, the coke ovens in black cover the town with smoke. Photo by Wallace Bennet.

1981 – Kaymoor's bench level is salvaged.

1982 – Salvors pulled the roof off the headhouse.

1986 – Kaymoor safety board had fallen down.
HABS team records the structures at Kaymoor Bench Level and at Kaymoor Bottom. (See HABS drawings at end of this chapter.) These drawings do not represent the present-day condition of the structures. Instead, they present more of functional analysis of the structures at the time when the mine entered into operation (1900) and at important periods in the site's history (1919 and 1925).

1987– 88
The office of surface mining closed the drift opening with roof bolts, the fanhouse drift opening, the right main drift entry, the left drift entry, and the main left drift entry.

1989 – The National Park Service provided funding that was used in 1989 to stabilize several mining features at Kaymoor, including the powder house, headhouse, fanhouse, and processing plant. The mine entrances have been sealed off for visitor safety. The coke oven batteries are still intact, as is a portion of Kaymoor Top, most notably the New Camp. Only foundations and two dilapidated houses remain of the community at Kaymoor Bottom. Stabilization efforts were undertaken to prevent the headhouse's collapse. Clearing and stabilization crews



Figure 12 The monitor trestle supported the tracks that ran 1,000 feet from the headhouse (upper left) to the tipple in the right foreground. 1920. Photo by Clyde J. Simpson.

constructed the safety board by standing it up, painting it, and placing it alongside the Mary Draper Ingles Trail. The board was moved about 25 ft. upslope due to ongoing stabilization efforts. Cap Magazine stabilized.[12]

1989–1991

Bench Level

After clearing and reseeding, work concentrated on stabilization of structural remains. This work included re-roofing, repointing, and repairing the powderhouse and caphouse, as well as shoveling several tons of coal dust and slurry from on, in, beneath, and around the headhouse and 1-2 tons of sand from a sandcar left standing on the headhouse. Removal of the coal and sand helped lighten the structural load and prolonged the life of members that were slowly being eaten away by an acid coal bath in which they stood for 60 years. The sills and support beams were particularly affected. It also removed the stabilizing coal pile that supported the headhouse. This resulted in accelerated racking to the east (upstream) side due to gravity. One headhouse wall, 8' x 10,' was salvaged and reconstructed of simple board-and-batten construction.

12. The following chronology entries draw from Progress Reports on the Kaymoor Stabilization Project as well as the Stabilization Project Emergency Repairs and Final Reports, by the B.J. Peyton and E.L. Kemp team over the period of 1989 - 1992.

Plans for a house mover to jack up the headhouse and place cribs underneath were abandoned when the contractor defaulted on his contract. A limited number of cribs were subsequently placed by Kaymoor crew members in select areas where it was safe to do so. Thirty timbers of a 8" x 8" x 6' size were salvaged from a wooden railroad trestle with the intent to splice them into the deteriorated support members. How many of these were used is not known. The goal to install 400 cribs in lieu of the contractor jacking up the structure was never attained.

A 2"x 4" framed gable roof was fabricated over the headhouse and then covered with Visqueen reinforced plastic. This cover lasted 2–3 years before vandals punctured it with rocks. Heavy snow loads eventually collapsed the roof framing in 1994. The roof frame rested upon the existing structure, which was already severely racked. Even though the intention behind building the protective covering was good, the load it produced plus the added snow load may have damaged the headhouse more than if a frame had been built and its loads supported independently of the headhouse (figure 13).

Masonry remains of the fanhouse and power station were capped to keep moisture from invading them. With New River Gorge and the state historic preservation office approval, the crew demolished a large fanhouse hood of unreinforced concrete. The crew took this action with proper clearance from the Park Service and the state historic preservation office because the hood had a number of visible fractures and was ruled an imminent safety hazard.

The crew sanded and primed the remains of the car repair shop (concrete slab), lamphouse/office (block), water tanks (2), and haulage gantry; erected portions of the frame blacksmith shop; repainted lettering on the gantry; reconstructed and lettered the mine safety board; and installed temporary stairs to Kaymoor bottom.

BOTTOM Crew members cleared Kaymoor bottom and, then, reseeded. Loose corrugated metal siding was reattached to the tipple. Holes in the corrugated tin roof were repaired. Several tons of stored coal were removed from the tipple storage bin, loose belts and other attachments were either removed or secured in such a way as to minimize potential danger, and temporary jack supports were placed in the tipple and on the ground under failed or failing supports (figures 14 and 15).The powerhouse roof was cleaned and secured, and large trees were removed from inside and near the structural remains.

Crew members removed several dozen large trees growing on, near, and beneath the coke ovens. With permission from the Park Service and the West Virginia Division of Forestry, the crew burned felled trees and vegetation onsite. A lory car was retrieved from a nearby embankment and displayed near the coke ovens. A wire rope fence surrounded the area and an NPS-approved seed formula was spread throughout. Little or no work was done on the monitor system, conveyor, or remains of the haulage, with the exception of general clearing around them. (Kaymoor Stabilization Project Detail prepared for DSC on July 31, 1996, by Billy Joe Peyton.) Although work was done to other structures during this period, the scope of this report does not permit to cover these structures in any detail.

1996–1997

Wooden stair and viewing landings were constructed from Kaymoor Bench Level to Kaymoor. Bottom level over haulage rails. Boardwalk and fencing were installed by park as part of maintenance budget.

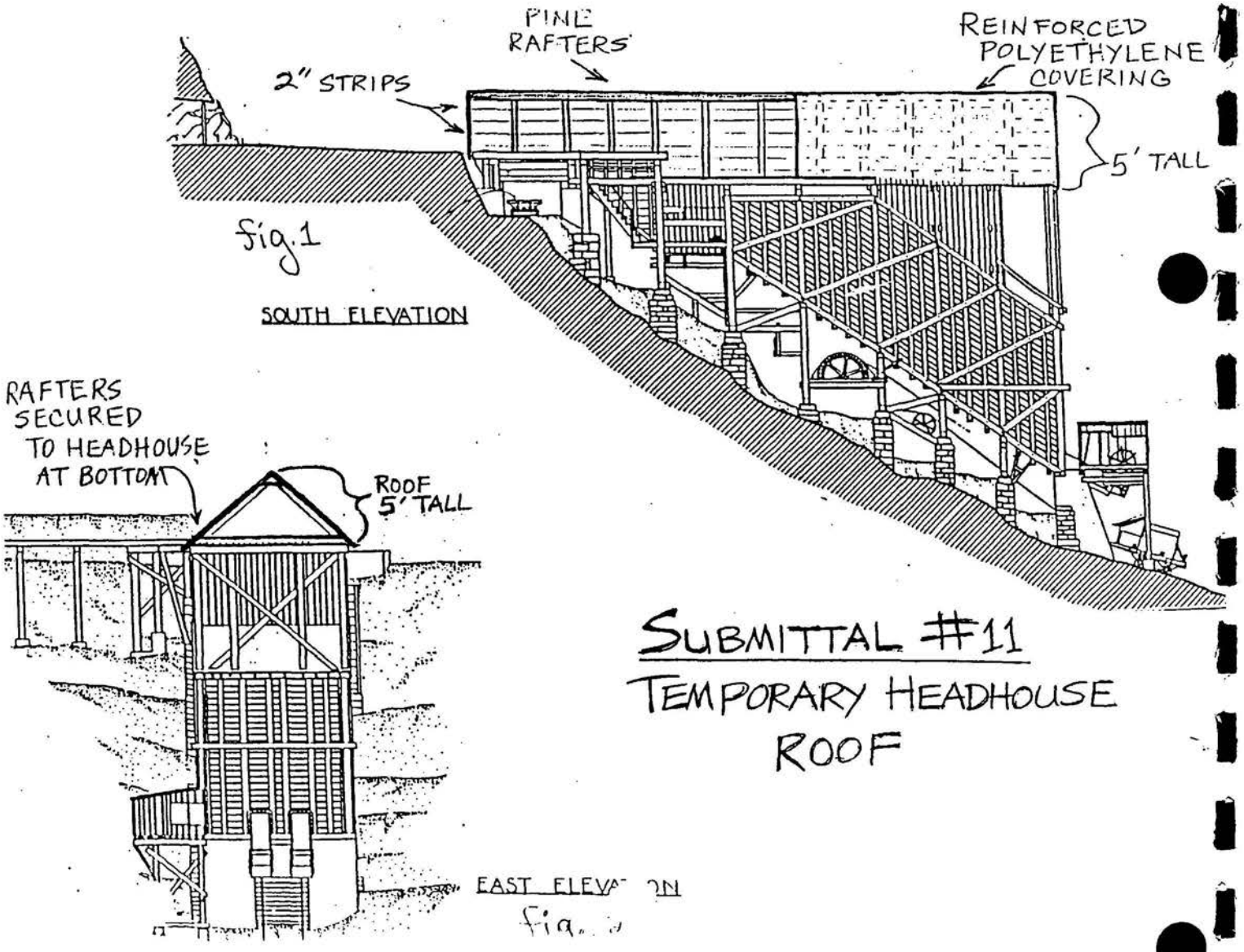


Figure 13 Submittal # 11 Temporary Headhouse Roof, drawn for the stabilization work completed in 1989.

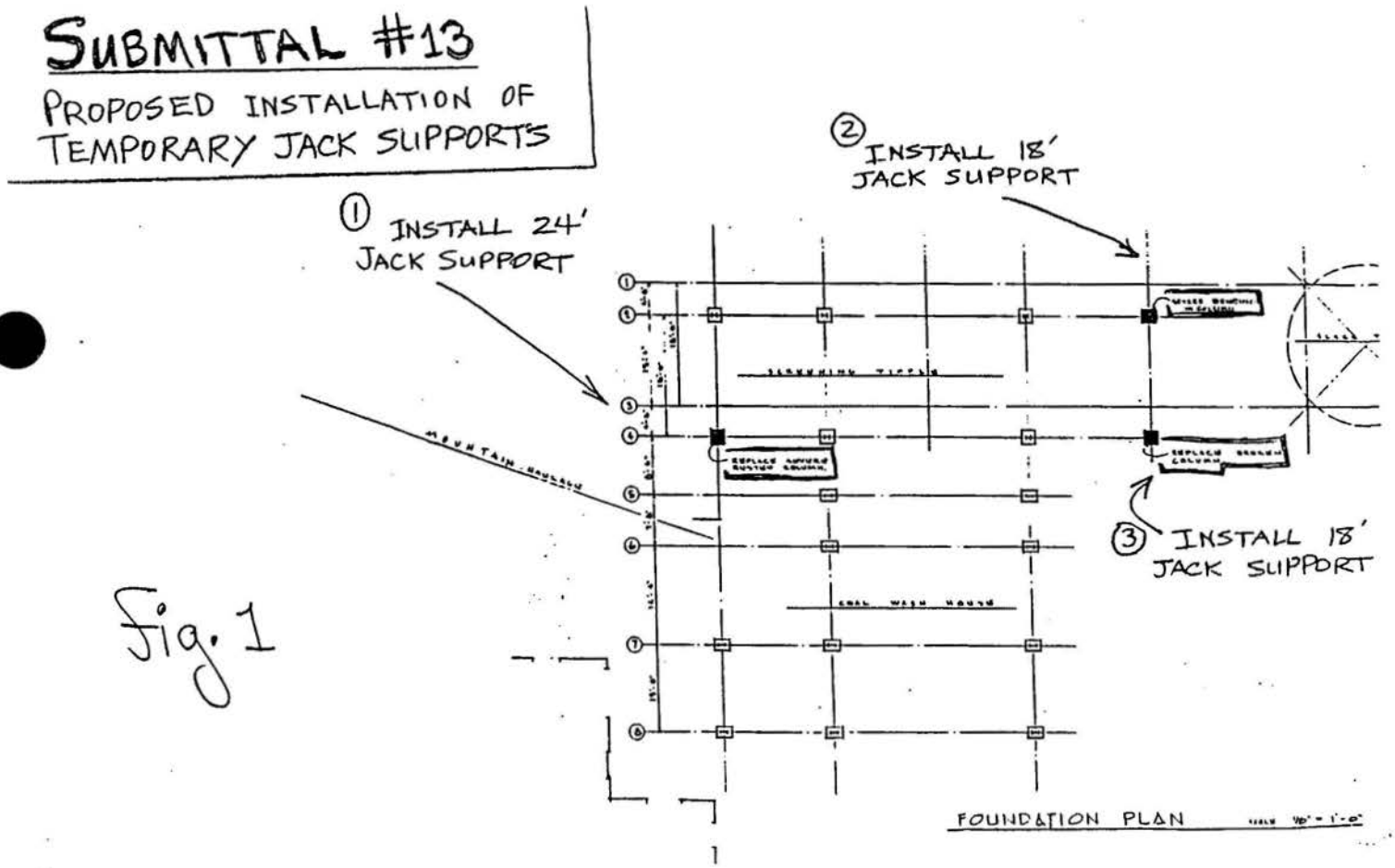


Fig. 1

Figure 14 Submittal # 13 Proposed installation of temporary jack supports as shown on the foundation plan of the coal tipple, January 2, 1990.

PROPOSED INSTALLATION OF TEMPORARY JACK SUPPORTS

fig. 2 - TOTAL OF FIVE JACKS INSTALLED

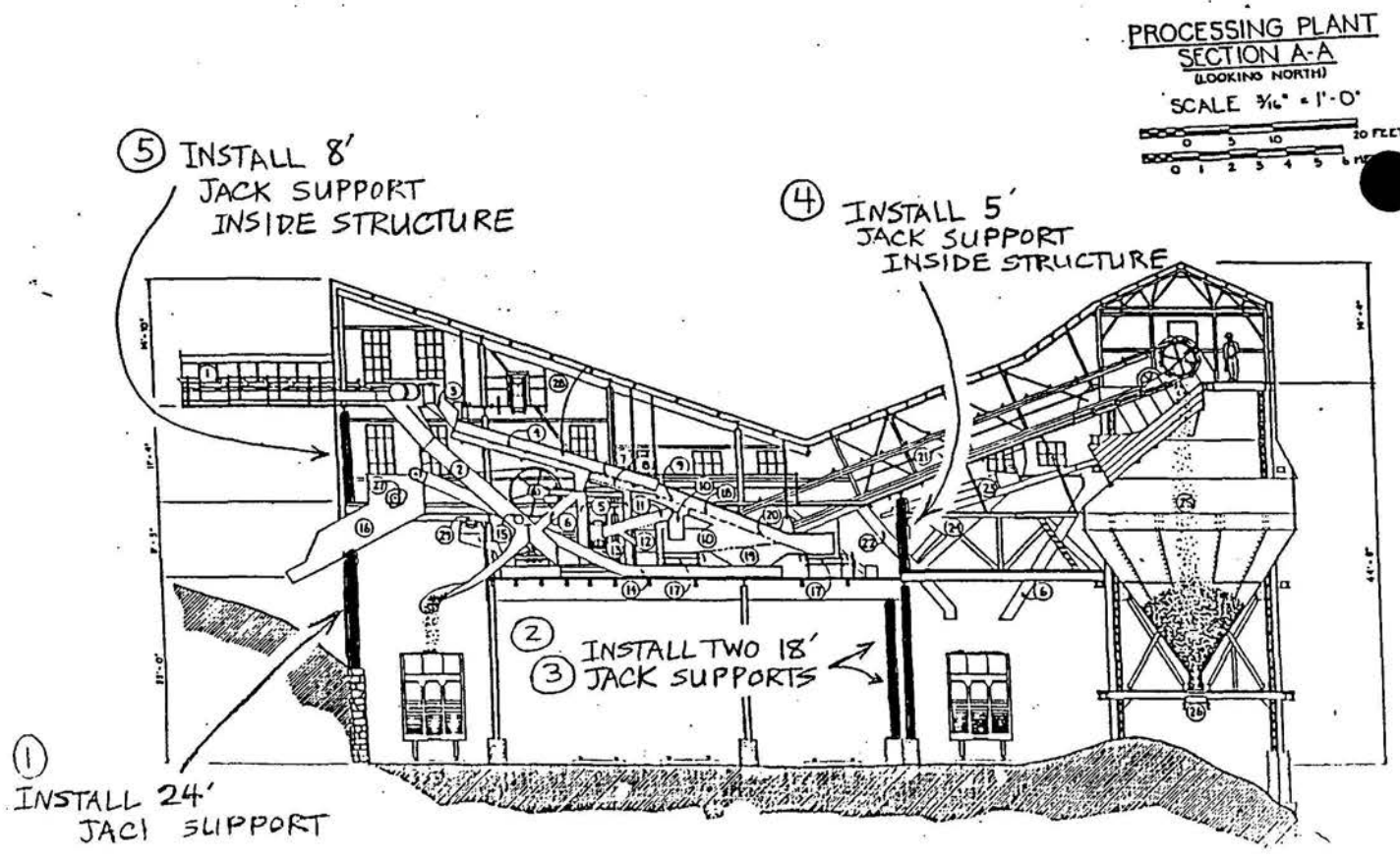


Figure 15 Submittal # 13 Proposed installation of temporary jack supports as shown on coal tipple section, January 2, 1990.

ANALYSIS AND EVALUATION OF EXISTING SITE AND STRUCTURES

GENERAL

Although Kaymoor No. 1 Mine consisted of numerous structures, which survive in various stages of decay as stated in the Preface, this document focuses on three structures (coal tipple, powerhouse, and headhouse) in detail, and the others only in general terms. The coke ovens, although significant structures, will be treated in terms of vegetation management and site movement, rather than in quantified terms of their architectural and structural integrity. The "Description and Analysis of Site" section addresses the physical nature of the site in its existing state. The "Environmental Influences and Impacts" cites planning documents and the commitments made for required actions meant to follow the historic structures report. Hazardous materials, floodplain issues, and endangered species form the balance of that section. The "Identification and General Discussion and Recommendations for All Extant Structures" addresses the auxiliary structures condition and treatment in a general way. Structures at the Bench Level treated in a general way include the electrical substation, the powderhouse, the mine office, the car shop and the fanhouse. The headhouse will be treated in depth. Two structures lie on the slope of the hill: the cap house and the water tank. Extending from Kaymoor Top to Kaymoor Bottom, one finds the former haulage route, the monitor tracks and trestle, and the conveyor shed leading to the coal tipple. The powerhouse and coal tipple lie at Kaymoor Bottom and will be treated in depth below.

DESCRIPTION AND ANALYSIS OF SITE

Existing Conditions

The Kaymoor area is one of the most remote and undeveloped stretches of this national river. The wild character of the river, the steep gorge walls, the vertical cliffs at the rim, and a blanket of thick deciduous vegetation constitute the scenic resources. When the trees have leaves, it is difficult to see most of the ruins from the gorge. When the leaves are off the trees, visibility increases. From the Mary Draper Ingles Trail, which runs through the site, the Kaymoor ruins on the bench level are highly visible throughout the year. The tipple is always highly visible from the river. The coke ovens and townsite are not visible from the river when the leaves are on the trees (figures 2 and 3).

Access to the site is generally limited to foot traffic, however the hoist house at Kaymoor Top can be reached by public roads. From here, a steep and winding foot trail leads to the bench level. Another foot trail leads to the bench level from the intersection of Fayette Station Road and Wolf Creek. While travel on this generally level trail is easier, it is much longer at approximately 2.5 miles. This trail is also used by park personnel using 4WD vehicles. Access to Kaymoor bottom is by a set of steps, which follows the previous mountain haulage incline, from the bench level. The park staff is currently repairing these stairs, as well as adding landings and benches along the way. Many visitors gain access to the bottom by walking the CSX railroad tracks from Fayette Station. Using the tracks is prohibited by both the Park Service and CSX Transportation. These sites are not mobility-impaired accessible.

At the bench level, gates close off the mine openings. Fences enclose the headhouse and the structures at Kaymoor bottom. Warning signs alert visitors to the inherent dangers at the site. The gorge drops steeply off the rim at a fairly constant slope down to the river, with slopes generally at a 40 percent grade or greater. The elevation is about 1,920 feet above sea level at Kaymoor Top and about 900 at the

river. The headhouse is located at an elevation of about 1,450 feet. The coal tipple is at about 1,000 feet in elevation. The coke ovens and townsite are at 960 feet in elevation.

In general, very steep slopes (40–70%) in the Kaymoor area place severe restrictions on development. Other potential limitations on development include the presence of bedrock 2 to 3 feet below the surface (Dekalb-Gilpin soils) and a moderately slow permeability in combination with a seasonally high water table. The soils have a high erosion hazard. The natural face of the slope has generally been covered with mine tailings from the active years of the Kaymoor mines. Through natural erosion, talus deposits have developed.

The flora of the Kaymoor area is a combination of native and introduced species. Common trees include species of the red and white oak groups, red maple, black locust, basswood, tulip poplar, buckeye, beech, hickory, and eastern hemlock. Royal Paulownia, an introduced species valued for its wood, is common in some parts of the Kaymoor area. A variety of low trees and understory shrubs, including dogwood, redbud, witchhazel, magnolia, persimmon, and rhododendron, also cover the area. Poison ivy is abundant and nettles are present in the Kaymoor area. Kudzu is covering some structures and trees are growing inside the foundation walls. During the dry season, the undergrowth present a fire hazard.

Currently, the park staff routinely mows the grasses in the vicinity of the structures on an annual basis. The herbicide, Roundup, is used by the park staff, as well as mechanical methods to remove vegetation. Broad-leaf herbicides are currently being examined by regional staff to see if one would be acceptable for park use. A broad-leaf herbicide will not kill the grasses on site, thereby preventing erosion.

CSX Transportation maintains a right-of-way through the Kaymoor area and controls vegetation through manual cutting and herbicide application. Herbicides are applied with equipment mounted on trains, using various combinations of 2,4-D, Roundup, Oust, Arsenal, and Karmex in mid-May and again in August, if needed.

Archeological evaluation of the site, testing, and possible mitigation will be required prior to implementation of any development.

Environmental Influences and Impacts

The *Development Concept Plan* for Kaymoor (1992) used the resource management and visitor use strategies described in the 1982 *General Management Plan* (GMP) and the philosophical framework of the 1988 *Management and Development Guidelines* to establish those site-specific developments necessary to tell the story of mining within the New River Gorge. The *Draft Study of Development Concept Alternatives/ Environmental Assessment* (DCA/EA) for the Kaymoor mine site was released for public review on November 26, 1990. On June 3, 1992, the acting regional director, Mid-Atlantic Region, signed a Finding of No Significant Impact (FONSI) indicating that the proposed action in the 1992 DCP was not a major federal action significantly affecting the quality of the human environment as defined by the National Environmental Policy Act of 1969 (NEPA) and that an environmental impact statement would not be prepared. This DCA/EA and FONSI provide the primary NEPA documentation for stabilization of the historic structures. Commitments were made in the FONSI that relate to actions that will follow the historic structures report:

> An archeological inventory and evaluation of the site will be programmed prior to plan implementation.

Stabilizing the coal tipple (processing plant), powerhouse, and coke ovens and allowing other structures to deteriorate unless they become a safety hazard will require further state historic preservation officer/advisory council for historic preservation review prior to plan implementation.

Impacts on riparian vegetation will be minimized.

Prior to implementation, a field review with the West Virginia Department of Natural Resources (WVDNR) nonpoint source coordinator will be conducted to determine whether a sediment and erosion control plan is required for the protection of water quality.

The principal environmental issue of concern at the Kaymoor Mine is the presence of contaminants in the form of total petroleum hydrocarbons (TPH) — diesel range organics (DRO), small amounts of PCBs, and asbestos-containing siding. According to the Level 1 study, "Phase II Environmental Sampling and Analysis of Kaymoor Mines, New River Gorge National River" prepared by Environmental Solutions, Inc. of Charleston, West Virginia, August 14, 1995, "the only contamination of significance found was TPH-DROs." Because the historic structures report' alternatives 2, 3, and 4 for the powerhouse include removal of small amounts of nonfriable, asbestos-containing materials, and alternative 4 for the headhouse includes demolition of that building, the presence of asbestos is another concern. Based on an analysis of soil samples by toxic characteristic leaching procedure (TCLP), contaminated soils at Kaymoor are not considered hazardous wastes for disposal purposes.

The report did not discuss the coal dust at the coal tipple. Based on 40CFR261.4(b), "Solid waste from the extraction, beneficiation, and processing of ores and minerals (including coal, phosphate rock and overburden from the mining of uranium ore)" are excluded from the definition of hazardous waste.

The presence of contaminants is a concern for visitor, employee, and contractor safety; plant and animal health; and the welfare of the environment. According to the report, "action levels for these contaminants would be decided prior to completing any further investigative work. Once the action levels are determined, a meaningful investigation program can be designed. Remediation of the tanks, which contain hydrocarbons, could commence once access means to the site is determined." An action level is the exposure level one is willing to have "receptors" such as humans exposed to before undertaking cleanup. Action levels must be determined through NPS consultations with the state of West Virginia and perhaps the Environmental Protection Agency. EPA action levels apply only if the state has none for a contaminant.

An environmental issue related to hazardous materials is water quality. Fern Creek flows into the New River downstream of Kaymoor on the east bank of the river. There is some seepage from gated mine entrances on the bench level north of the main portion of the site. This seepage eventually drains into Butcher Branch. The eroding mine dumps and refuse piles drain into the river. As stated above, it is not clear whether there are hazardous materials present on the Kaymoor site that will adversely affect the water quality. There is no water quality data for the river in the vicinity of Kaymoor Mine. Studies done in 1987 by the West Virginia Department of Natural Resources showed the overall water quality of the New River at Thurmond (above study site) and Fayette station (below study site) to be in the good range. Decisions about what water quality permits may be required cannot be made until additional information is obtained regarding the presence of hazardous materials and potential construction activity.

The majority of historic structures at Kaymoor lie above the 100-year floodplain and do not require special flood protection measures. The ruins of the company store (not a focus of this study) lie on the

riverbank and are within the 100-year floodplain. There are no wetlands as defined by the U.S. Fish and Wildlife Service National Wetlands Inventory, 1990. There are riparian areas adjacent to the New River.

According to the FONSI, the project would result in no impacts to federally listed, proposed or candidate threatened or endangered species of plants or animals. Species lists would need to be rechecked prior to construction.

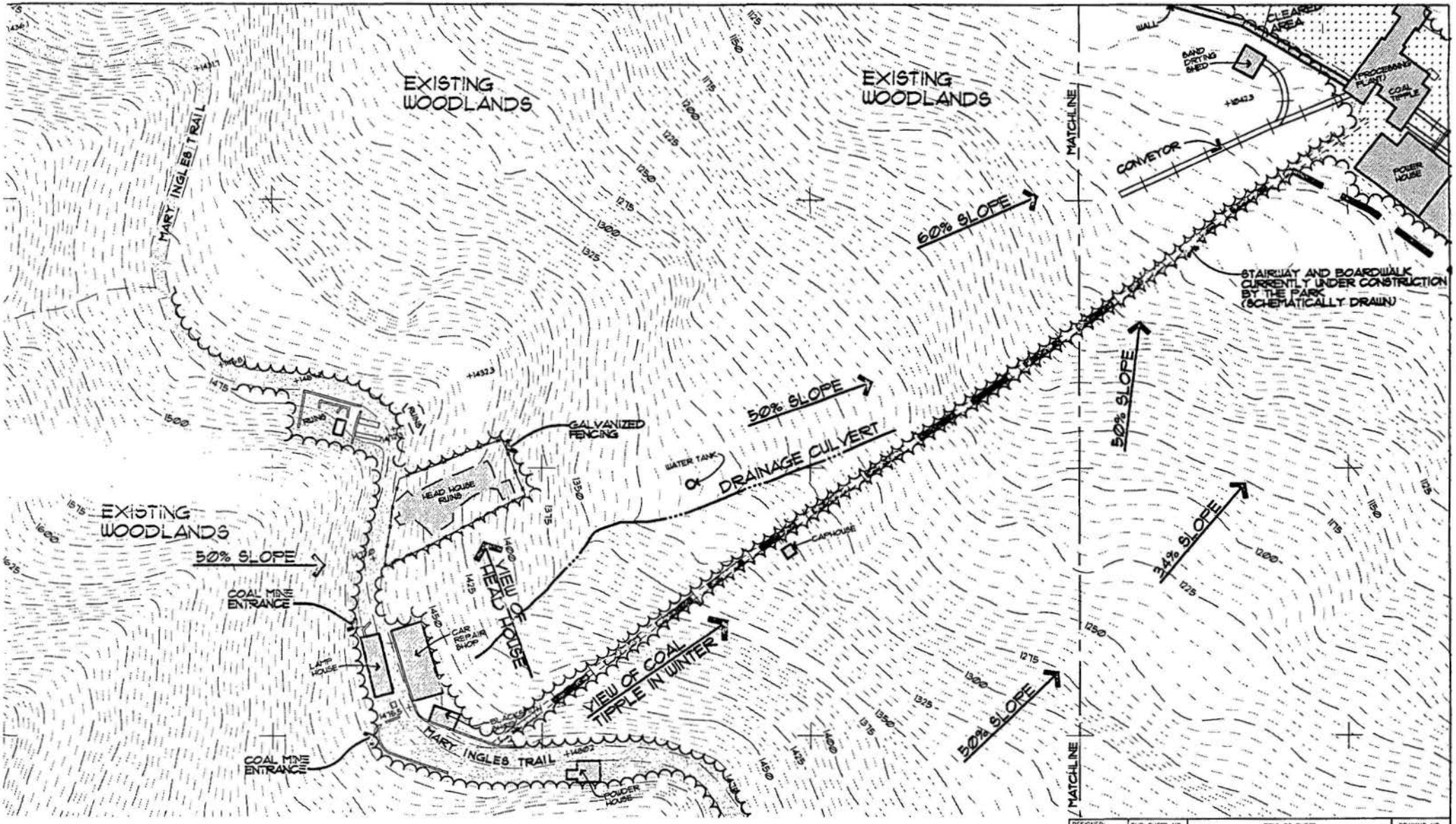
The state of West Virginia does not have threatened or endangered species legislation that accords listed species legally protected status. However, NPS policy does take into account any state species of special concern and treats such species as it would federally listed species. State lists would need to be rechecked prior to construction.

IDENTIFICATION AND GENERAL DISCUSSION AND RECOMMENDATIONS FOR ALL EXTANT STRUCTURES AT THE SITE

Although the site was thoroughly cleared during the stabilization work of 1980–1990, the understory has fully re-established itself. Even a cursory onsite examination of the structures enveloped by vegetation is not possible at this time. For those structures that are accessible, the following presents a succinct view of their current condition. These structures were not examined in detail. However, a general inspection has revealed their general condition and has prompted general recommendations.

EXISTING STRUCTURE	CONDITIONS	GENERAL RECOMMENDATIONS
Bench Level		
Fanhouse	Brick and stone wall ruins fenced in, stone foundation - mortar missing in some places, unbraced stone and brick walls crumbling.	Repoint masonry and stabilize bases and tops of walls against moisture migration and overturning.
Mine Openings	1. Closest to powderhouse and stairs: solid steel gate, locked, water dripping from hillside, wall on the right of retaining wall crumbling. 2. Closest to headhouse: Steel gate solid, surface rusted, concrete frame cracked at upper corners.	Partially regrade above openings to divert water flow away from deteriorating concrete.
Powder House	Stabilized during the 1989–1990 campaign. Walls mortared solid, no cracking, stair solid, roof doesn't leak.	Maintain a cyclic maintenance program that checks basic elements on a yearly basis.
Blacksmith Shop (presumed)	Concrete slab and skeleton of three stud walls (no wall sheathing) without a roof reorganized in 1989.	Ensure visitor safety is not compromised. Check on annual basis for structural integrity.

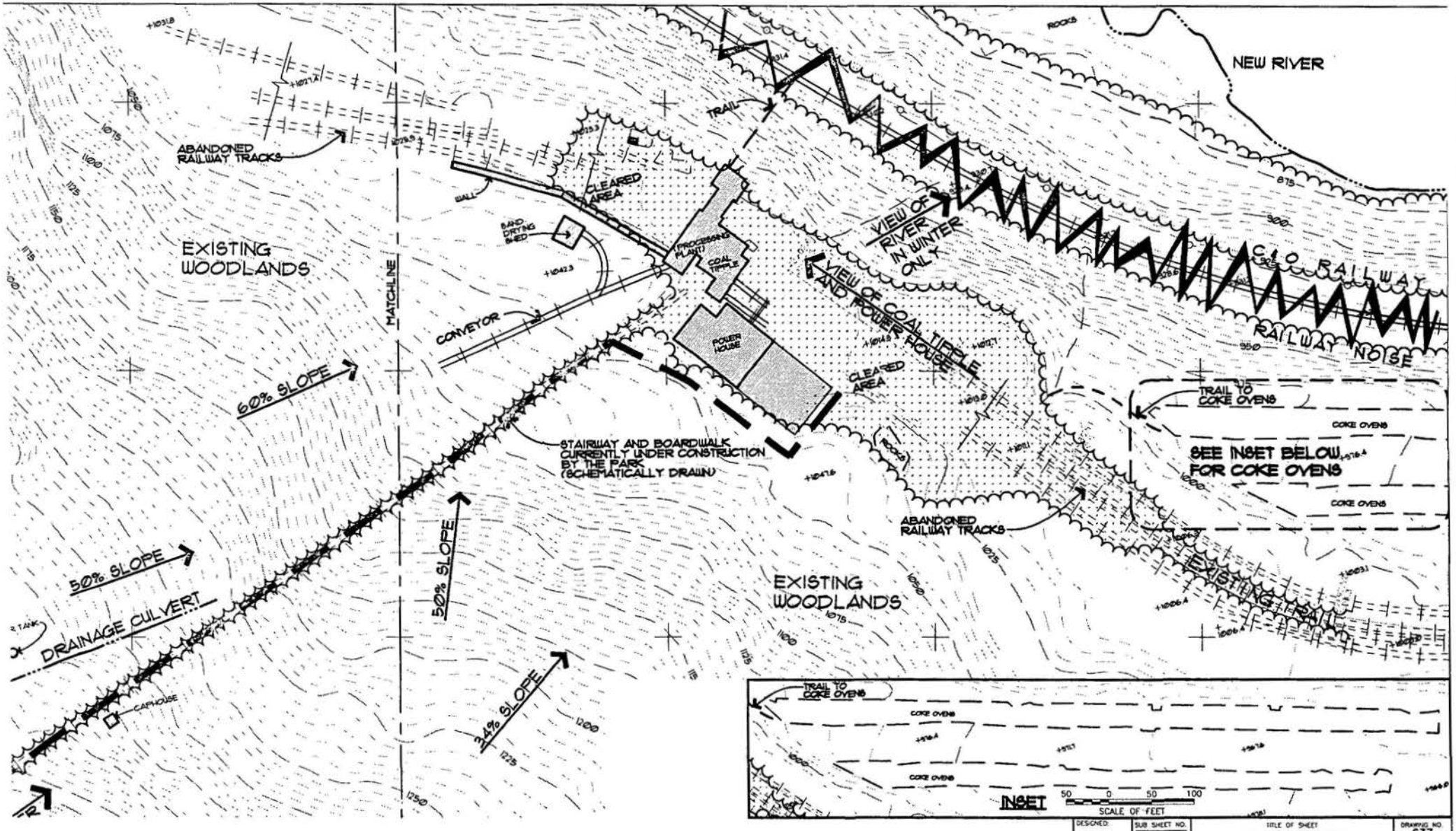
EXISTING STRUCTURE	CONDITIONS	GENERAL RECOMMENDATIONS
Mine Car Repair Shop	Concrete slab on steel truss frame. Supported by concrete piers, 1' x 1'. Concrete crumbling at iron rails, No structure above slab exists, broken timbers lying on slab.	Check on annual basis for structural integrity.
On the Slope		
Cap House	Tiny building (5' x 5' approx.) with corrugated metal roof. Brick and mortar intact and minimally functional.	Check on an annual basis for structural integrity.
Water Tank	Cylindrical metal tank, rusted, but appears to be in functional condition, no top on structure.	Check on an annual basis for structural integrity.
Haulage	Stairs being rebuilt by the park	Finish stairs and boardwalk.
Monitor Track	Not accessible to study team.	Check on an annual basis for structural integrity.
Bottom Level		
Monitor Trestle	This structure consists of seven individual steel-framed bents, each supported by a concrete pier. A corrugated metal roof covers the conveyor only, (not the catwalk). The structure is visibly rusted, and a thorough check of individual components was not performed.	Devise treatment strategy if visitor safety seems to be in danger.
Pump Station	Not accessible to study team.	Examine and check on an annual basis for structural integrity. Devise treatment strategy if visitor safety seems to be in danger.
Kaymoor Bottom town ruins	Not accessible to study team.	Examine and check on an annual basis for structural integrity. Devise treatment strategy if visitor safety seems to be in danger.



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NOTE

- THIS SURVEY WAS DRAWN FROM AERIALS. A GROUND SURVEY WILL NEED TO BE COMPLETED IF MORE ACCURACY IS REQUIRED FOR FURTHER WORK.

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SCALE OF FEET

DESIGNED: K. VANCE DRAWN: LEIDECKER TECH. REVIEW: DATE: 1/97	SUB SHEET NO.	TITLE OF SHEET SITE ANALYSIS AND EXISTING CONDITIONS NEW RIVER GORGE NR	DRAWING NO. 637 20,089 PKG. NO. 158 SHEET ___ OF ___

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III. DESCRIPTION AND ANALYSIS OF SPECIFIC STRUCTURES

INTRODUCTION

The following is an account of the current physical condition of the coal tipple, headhouse, and powerhouse. The text is based on the photography, video recordation, and professional observations of Historical Architect Bonita Mueller, Landscape Architect Karen Vaage, Structural Engineer Nellie Lance, and Project Manager/Historical Architect John Marsh made during the site visits on July 23– 26, and November 19–22, 1996. The existing conditions, integrity, and proposed alternatives with estimates are discussed for each structure.

COAL TIPPLE

EXISTING CONDITIONS

General

The Link Belt Company built this structure in 1925 for the Low Moor Iron Company to process coal. The steel post-and-beam coal tipple is actually two individual buildings that have merged into one functional structure. From a distance, two entirely separate roof systems with distinct rooflines can be observed. But from below, in the working space formerly occupied by the rail cars, the structures meld together as one because of the floor framing up high that provides continuity between the separate buildings. Both are heavy steel post-and-beam construction with the columns supported on individual concrete piers. The structure is sheathed with a corrugated metal with roofs and walls pierced by projected steel windows. This screening and washing took place in a steel-framed, multilevel building measured to be approximately 59' high, equivalent in height to a five- to six-story building. When projected to the ground plane, the tipple occupies a space approximately 107' x 70'. The national register nomination form mentions that it is not known if the coal washing plant is part of the original plant or was added no earlier that 1928.[13] The building operated mainly along diagonal conveyor belt planes, moving the product to coal chutes and railroad box cars along five railroad tracks. The facility used a large flight conveyor and has a slack coal bin for storage (HABS Drawings 9, 10, 11, 12, 13; figures 16–22).

Dr. Emory Kemp described the coal tipple prior to the work of 1989–1990 as being in danger of imminent collapse. He said it needed to be secured at the earliest possible moment and without delay. The precarious nature of the structure could not be overstated. Stabilization measures taken at that time extended the life of the coal tipple by three to five years. Now, at the end of that period, the structure requires treatment as part of a long-term preservation plan. Otherwise, the structure will become just another industrial ruin. The plan will need to respond to the existing conditions discussed herein. In general terms, the coal tipple is suffering from moderate to severe rusting of the corrugated metal cladding, and exhibits several failed structural members. The condition of the building components jeopardize the building's structural integrity, creating an unsafe condition. Individual components are significantly affected and are discussed further in the sections below.

Character-defining elements include the overall shape of a building, its materials, craftsmanship, decorative details, interior spaces and features, and the various aspects of its site and environment.

Character-Defining Elements

Mining produced utilitarian structures here that responded directly to functional requirements of an industrial process. Availability of material, transportation, industry standards, and ultimately cost certainly influenced material choices and building design of these vernacular structures. The arrangement of the structures on the site additionally responded to the drift nature of the mine, the 560 feet of vertical drop between the Bench Level and the New River, and the narrow, string-like quality of the available level ground.

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13. National Register of Historic Places Nomination Form, Dr. Sharon A. Brown, Section 7, p. 10.



Figure 16 Coal Tipple Existing Condition Photograph. Coal tipple south elevation with powerhouse on the left.

It is important to understand the character of a structure and its site before treatments or interventions are proposed or recommended. By understanding the characteristics of the existing structure and site, the effect of the proposed treatments can be evaluated. The prioritization of the character-defining features represents an important step in planning both the treatments themselves and the way these treatments will affect the existing and the historic character.

The following list describes the character-defining elements of the coal tipple as it is now. The greatest difference between the historic period and the existing characteristics of the building is the change in the contrast of structure to site, the elimination or changed position of the conveyors, the deterioration of building materials, and the localized failure of structural members.

Existing Characteristics of the Coal Tipple

- Building isolated and submerged in the surrounding vegetation.
- Industrial ruin with multiple rooflines and varied vertical forms.
- Presence of monitor line and conveyor trestle: building as machine grounded to site and railroad tracks.
- Stilt-like quality of ensemble of processing plant elements; visual flow disrupted by undergrowth at grade level. Appearance of steel columns, steel cross bracing and wooden under-belly in decay.
- Steel-framed windows, all with glazing broken out. Contrast of dark window openings to rusty color of overall planar, corrugated metal facades.



Figure 17 Coal Tipple west elevation. View from uphill on the haulage route.

- Relative absence of roof penetrations.
- Severely rusted, dented corrugated metal siding without base trim. Horizontal panels apparent.
- Presence of coal and coal underlying the abundant vegetation.
- Absence of coal-burning smell and smoke in the air.
- Noise of freight trains passing by below site.

Existing Character-defining Features of Coal Tipple Interior

No investigation of the interior has been attempted to date by the Denver Service Center (DSC) design team.

Site

Vegetation has been partially cleared from the perimeter of the structure. Neither steep slopes nor soil erosion is an issue at this particular structure.



Figure 18 Coal Tipple Existing Condition Photo: West elevation. Rusted roof sheathing and broken windows. Note monitor conveyor at upper left.

Exterior Envelope - General Appearance Summary

Roof. Corrugated metal covers the multitude of roof slopes at the coal tipple. Holes were repaired during the 1989–90 building work, but current roof conditions have not been assessed at close range. As seen from a distance, the roof surfaces are severely rusted. Breaches in the roof may exist, although these were not perceived from the ground level or by cursory interior inspection except as noted below. The roof connection between the wash house and the screening house has holes, with the resulting infiltration causing deterioration in the wood flooring below. All of the shed-type awnings are completely rusted.

Walls. Exterior walls of corrugated metal are dented and severely rusted near openings, to the point of failure. The wholly mottled effect of the rust on the walls' otherwise neutral painted surfaces testifies to this condition. Most of the bottom edges of the base course of corrugated metal on the south elevation are loose and deteriorated at their point of attachment. As much as 12 inches of the bottom edges of the metal have disintegrated. Several metal panels directly to the south side of the slack coal chute are completely missing. A close-up investigation will be required to identify the depth of rust over the rest of the building skin. If the rust is too deep, the sheeting would need to be replaced to limit water infiltration and further material degradation.

Windows. The steel frame windows, for the most part, consist of three lights in width and either two or four lights in height. A closer inspection will be required to identify exact operation and hardware type. Several irregularly sized window frames seem to be wooden, although their height from the ground precludes definitive identification. The glass, certainly industrially produced sheet glass, is broken



Figure 19 Coal Tipple Existing Condition Photograph: North elevation. July 1996. NPS photo.

in every window on every elevation. When looking from the ground plane, the frames appear to be minimally broken or bent.

Doors. Openings in the form of exterior doors were not part of the original design except at the entrance to the coal conveyor. The door formerly at that location is missing now.

Structural System

There are two separate structural systems for two buildings: The columns of the screening tipple (the building at the base of the Haulage) consist of rolled steel wide flange sections, measuring 8" in both depth and width. This would correspond approximately to an 8 WF x 33, according to the nomenclature provided in the Iron and Steel Beam Manual for the time period 1873 –1952.[14] These columns occur at building grid lines 2 and 4. The diagonal bracing in this section of the building is provided by single angles (rather than pairs) connected by plates to the web of each column. The column base plate for the screening tipple consists of plates and angles bolted to the concrete pier (figure 20).

14. Ferris, W. Herbert., ed. *Historical Record Dimensions and Properties Rolled Shapes Steel and Wrought Iron Beams and Columns As Rolled in U.S.A. , Period 1873 to 1952 With Sources as Noted*. New York: American Institute of Steel Construction, 1953.



Figure 20 Coal Tipple Existing Condition Structural Detail: Column base showing severe rust and exfoliation of web and connection plates. November 1996. NPS photo.

The coal wash house (closer to the powerhouse) is supported by rolled steel wide flange columns, 12" - 12½" deep by 6½" - 6 ¾" wide. This steel section is roughly 12 WF x 36,[15] and occurs at building grid lines 5, 6, 7 and 8. The diagonal bracing between these columns consists of a pair of angles (2 ½" x 3 ½") with plates bolted between for each bracing member. This bracing is much stiffer than the bracing provided for the screening tipple. The base plate detail for the columns in the coal wash house portion of the building is distinctly different from the base plate detail for the screening tipple.

Structurally, these two separate buildings will respond to load differently, since the components and their layout are separate and distinct. Historically speaking, the types of loads and uses they were subjected to was individual to each building. The screening action subjected the screening tipple to severe shaking, while the wash house probably caused more of the corrosive chemical reaction with the wastewater from washing. The separateness of the structural systems is evident in examining the concrete piers, the columns, the base plate connections, and the cross bracing.

Field observations of the tipple bring as many questions to mind as answers. For example, why are only certain areas of steel so severely rusted and exfoliated, while others are fairly intact with little to no rust at all? At column 4E, the caustic coal mining by-products completely dissolved an entire steel column section, but this seems to be a rather isolated incident. Another question that looms overhead when viewing the failed building members is: How much does the existing condition of the structure depend on the factors of safety that have been built into the raw materials and the overall design? How have load paths changed over time as certain elements have experienced failure?

15. Ibid.



Figure 21 Coal Tipple Existing Condition Structural Detail: Failed cross-bracing between columns 7A and 8A. Note powerhouse in background.

The foundation system and the lower column sections were inspected much more thoroughly than the rest of the building since they were fully visible to view without erecting scaffolding or climbing inside a building of unknown stability. Unfortunately, much information about the foundation is still missing. For example, it is unknown if the concrete piers were reinforced with deformed bars. The elevation of the footing bottom, the concrete design strength, and the soil bearing strength are also unknown.

It is not known how well the roof would perform under full wind and snow loading without further investigation. The corrugated metal walls were examined only from the ground below, and the upper beams and columns were inspected as well as possible from the safety of the ground. The corrugated metal roof and walls appear from a distance to be in fair condition, with some rusting, minor holes and evidence of leaking. However, one observation that seemed true in almost every case: rust and deterioration of the steel is worse near the column bases and/or close to the source of the erosive chemical contained in the coal mining by-products.

Another general field observation is that the decay and deterioration of the steel members is worse by far than any concrete or masonry building element. The chemical reaction between steel and coal mining extracts is strikingly noticeable as compared to the negligible reaction with concrete. The stone block retaining wall supporting the haulage structure at the uphill edge of the tipple has weathered significantly better than the steel also. The mortar between the blocks has been damaged by moisture, however. One location on the tipple structure where the concrete appears to be weakened is on the "river" side of the tank-like "slack coal tipple" at the base. This concrete pier has rusting steel members embedded in the concrete. The concrete cover over the rusting and exfoliated steel is causing "oxidation jacking," breaking the concrete because of the rusting and corrosion of the embedded steel. Again, the steel seems to be the cause for this failure rather than the concrete.

Failure of the members appears to be due more to exposure to harsh coal mining elements rather than excessive loading or poor design. One implication of this generalization is that one level of treatment could require complete removal of the caustic coal mining by products causing the deterioration. This rather extreme measure would be desirable if the building were deemed valuable enough to warrant a "restoration" type approach to treatment.



Figure 22 Coal Tipple Existing Condition Structural Detail: Column 4E column failure due to weak axis buckling and broken cross bracing. Two temporary pipe columns to the right. Nov. 1996. NPS photo.

The steel rails lying on the ground are rusted on the surface only. No major exfoliation from rusting was observed on the rails; this phenomenon was evident mostly on the steel superstructure of the coal tipple.

The structure in its existing state has five temporary pipe support columns; two at column line 4E, two at column line 2E, and one close to column line 4A (see drawings.) These columns were strategically placed at the locations of the most severe column and bracing failures by the state of West Virginia in an emergency intervention effort in 1990. The original column at location 4E is so severely rusted and exfoliated that the section has been reduced to almost nothing. It has clearly failed due to weak axis buckling.

Failed cross bracing was observed in four locations: between columns 4E and 2E; between columns 4A and 2A; and two separate bracing systems, one above the other, between columns 7A and 8A. The failed bracing consists of rusted and broken angle sections.

Several beam failures were noticed; these all support wood flooring in the enclosed space some 20 feet above the ground. Again, the steel has rusted and exfoliated to the point that beam sections have been severely reduced, and column connections are completely incapable of transferring load. Although a thorough examination of the upper floor beams was not performed, several beams could be seen from below: the floor beam between columns 2E and 4E was visibly failed as was the floor beam between columns 4F and 4G.

The temporary pipe columns installed in 1990 are 2-inch diameter steel. Four of these columns are approximately 18 feet long, one is somewhat shorter. The slenderness ratio of the longer columns is a concern; common steel design practice would require the slenderness ratio of load bearing columns to be less than 200. Unfortunately, the 18-foot tall columns have a significantly higher slenderness ratio. A reasonable solution would be to substitute a 3-inch diameter pipe column for each of the 2-inch pipe columns currently in place.

Interiors

The interiors were minimally inspected. However, most of the observations were made looking up from the ground plane. The inspection revealed that the wood flooring boards (wood planks) were severely

deteriorated over one-quarter to one-half of the surface, and some were missing or about to fall to the ground. Parts of the surface had already been replaced. This was evident from the warm blond color of the nonweathered boards compared to the grey color of the older material.

Interior floors were observed to be made of wood flooring planks. Interior walls consist of the interior faces of exterior corrugated metal walls. Interior ceilings consist of the inside face of the roof covering, corrugated metal. The interior spaces are of an industrial nature, flowing according to the industrial process along conveyor belts and past machinery, with no type of interior partitions except those necessary for structural support or for the work being accomplished.

Utility Systems. It is currently not possible to confirm the existence of plumbing, electrical, or HVAC systems, nor to describe them if they are present.

Fire/Life/Health/Safety. Because of the concern for safety and because of the limited access to inside the structure, it was not practical to assess the fire egress at the coal tipple. Similarly, one could not confirm the existence of an intrusion system, a fire detection/smoke control system, nor a fire suppression system. Seismic issues have not been addressed for this site.

Machinery

Only some elements of the coal processing plant are visible from the exterior of the structure. Two loading booms descending to the south from the coal tipple for coal greater than 3-3/4" have fallen to the ground. The top surfaces of all of these conveyors are severely rusted. They had probably been fixed above the ground by metal cable during the 1989–1990 stabilization work. However, the frayed nature of the cable may point to the booms having been in position since the closure of the plant in 1962. Another two booms, located closer to the powerhouse than the other two, are currently held above the ground by a variety of questionable structural supports.

INTEGRITY FOR POTENTIAL TREATMENT AND USE

NPS-28 defines integrity as the authenticity of a property's identity, evidenced by the survival of physical characteristics, associated with its social value, that existed during its historic period. "Integrity is the past revealed in physical form. The nature of integrity varies from resource to resource; integrity is not the same as condition. The condition of a resource is defined in terms of deterioration; integrity is defined in terms of correspondence with associations in the past. . . .The condition of a resource during its period of significance is part of its integrity."[16] In addition to that, the national register criteria relate historical significance with integrity in the following way. Significance is present in sites, structures, buildings and structures that possess integrity of location, design, setting, materials, workmanship, feeling, and association.

To thoroughly appraise the structure's integrity, one would need to ascertain what aspect of the property's identity remains from the historic period. This would necessitate a largely exhaustive onsite examination of the structure together with a comparison of relevant examples of contemporary mining and construction practices. Within the confines of a "limited investigation," the only type warranted by the significance of the structure and the scope of the project, one can discuss an impression of the

16. NPS-28: Cultural Resource Guidelines, Release 4, Washington Office, Chapter 1, pp. 10 - 11.

original construction intent, an interpretation of how the intent was executed, and a present-day general appraisal of what remains. One can make a comparison between the structures of record and other similar structures and make the conjecture that they were designed similarly. However, the point must be raised that the type of intervention involved, stabilization minus the continued maintenance, does not even warrant a historic integrity assessment. Our concern remains not to maintain historic character or to slow the rate at which historic material is lost, but rather, principally to provide for the safety of the park and general public. Relative to the factors used to assess servicewide priorities, and in this case, to perform the value analysis, the structure requires emergency stabilization to protect the public health, safety, and welfare. Only secondarily does the structure's condition and status warrant resource protection and preservation based upon the overall historic, and proposed interpretive, visual scene. It was only the third overall advantage in the value analysis study that placed some importance on the advantage of extending the life of the resources and cultural landscape, albeit while reducing the authenticity of the scene. The following discussion is set within the framework just described. Because there will be some intervention, this section will, nevertheless, address the areas in which integrity relative to the national register criteria is concerned.

The "location" of the structure remains the same as when it was built in 1925. We cannot comment on the design elements that create the form, plan, space, structure, and style of the historic property. The "setting" or physical environment and character of the place in which the property played its historical role remains the same as it was in some ways. The overall character is not the same as when the property was used and inhabited. This gets back to the historical versus existing condition character defining elements. Because of the simple absence of the working industry, so much of what gave the setting its specific character is gone. Although most historic period industrial records of the property have been destroyed, per Historian Sharon Brown, the existence of noncurrent structural members and deteriorated exterior materials leads one to believe that the building is from the historic period. We have not differentiated between "materials" that remain from the historic period and those that exist from a later period. The depth of investigation did not permit such a approach. One can, however, comment on the general visual character. The building systems' current condition reflect a general consistency of appearance. If there has been adaptation to technology change, it has occurred in a natural evolution, which has given the whole building a homogenous appearance. This is typical of the industrial process. In terms of "workmanship," the methods used to erect this structure were fairly standard. With the proximity of the working railroad line and spurs at the time, the methods probably related more closely to the typical construction methods than those required for a current day structural stabilization. The "feeling" remains, necessarily, somewhat intangible. The overgrowth of the site and the deteriorated state of repair of the resources limits the property's ability to express the aesthetic or historic sense of the historic period of time. Still, with the building's bulk remaining, one may imagine the historic feeling. The sounds and smells that would so convincingly contribute to the feeling are absent. However, an informed imagination can fill in the gaps relatively well. The "association" between the historic activity (bituminous coal mining in West Virginia) and the cultural resource is still amply evident. However, the number of those persons who can claim the direct association of having worked at Kaymoor is rapidly dwindling. The date of Kaymoor's closure rapidly approaches 40 years. If most of those who remained at Kaymoor up until the mine's closure were even 40 years old, they would be in their 70s now. This tangible connection to the human resource at Kaymoor will obviously not last.

The structure does have integrity. Given its condition, however, the form of stabilization treatment can certainly affect the authenticity or integrity of the scene. Beyond existing conditions and integrity, other factors exist which lead this report to the discussion of the stabilization level alternatives. These factors include cost, availability of funding sources, and the existence of park personnel resources. All of these factors contribute to the formation of alternatives that the following section presents.

ALTERNATIVES FOR TREATMENT AND USE

The following treatments and uses were considered but rejected for various reasons:

Using fiberglass corrugated siding instead of metal corrugated siding: Fiberglass was considered to be a cost-saving measure, but the impact on the integrity of the historic fabric and scene is not acceptable.

Removing all of the siding and just leaving a structural frame with the concept of a ghost of the former industrial picture. As the idea was to stabilize the structure, removing the building's skin posed greater potential threat to the longevity and structural integrity (through increased deterioration) of the building than was acceptable. Although this approach was ruled out in the DCP process, representatives from the park were interested in exploring the issue.

Demolition followed by a working model of the former building and other interpretive media or by the construction of a representative frame to show shape (ghosting). Enough historic fabric existed in a good enough state of repair (albeit still poor) to not warrant complete demolition. The loss of the historic resource was not acceptable since there were other means to address the issues.

The possibility of conducting a full architectural and structural appraisal of the building, which would include cataloging machinery and deciding what should stay and what could be taken away. The threat to worker safety due to structural instability of the building made any more detailed investigation impossible to consider. The significance level of the individual structure, too, eliminated this possibility, as such in depth work was not warranted.

Check on drainage from roof to divert it from wall surfaces, to avoid further oxidation of the metal. As the upper reaches of the building were not reachable, this direction could not be pursued.

The following alternatives were considered viable:

Alternative 1

- Continue twice-a-year vegetation clearing by park (park to estimate)
- Remove faulty downspout.
- Replace downspout.
- Replace 2" diameter temporary pipe columns with 3" diameter temporary pipe columns
- Warning signs, vegetation removal, removal of hazardous pieces of hanging corrugated siding that pose a particular threat to the curious visitor.

Impact (36 CFR). Continued clearing of vegetation would reduce potential degradation of structure due to growth of vegetation that destroys building fabric.

Construction of the boardwalk would keep some visitors away from the structure and potential vandalism or loss of building fabric.

Replacement of temporary pipe columns would minimally stabilize parts of the structure, which would slow its deterioration and eventual loss. Replacement of the downspout would direct water away from the structure, slowing its current rate of deterioration and eventual loss. Removal and/or replacement of

pieces of the structure would be a loss of original building fabric and the introduction of nonhistoric elements.

Alternative 2

Alternative 2 would be the same as alternative 1 plus: board up windows with exterior grade plywood, including active ventilation in windows and in roof.

Structural Stabilization:

Replace four pairs of cross bracing
Replace two W8x columns (at 4A and 4E) including connections.
Replace beam sections (between 4F and 4G and between 4E and 2E)
Supplement existing rusted members that have experienced significant section loss due to rust and exfoliation. This would occur primarily on the web of columns at 5D, 6D, 7A, 8A, 6B and the connection plates at the base of column 2A. The proposed treatment would require sandblasting for rust removal, welding or bolting supplemental plates in place, and painting over the new steel. Include cost of OSHA requirements for removal of lead paint.

Wayside. A wayside would be installed that would provide interpretation for the site.

Impact (36 CFR). Everything described under alternative 1 plus addition of plywood to open window frames would reduce the amount of weather impacts (moisture) and dirt currently affecting the structure, while resulting in a visual intrusion due to the addition of the new nonhistoric elements.

The addition of new structural elements (cross bracing, columns, and beams) would provide additional stabilization to the deteriorated structure, prolonging its life before eventual loss. The introduction of these new structural elements, however, would result in the addition of nonhistoric materials to the historic structure. Removal of some rust and the addition of some supplemental plates would change the existing historic fabric but would somewhat prolong the life of the whole structure.

Alternative 3

Alternative 3 would be the same as alternative 2 plus:

Keep metal sheathing, but refinish it:

Remove the parts of the siding which are not salvageable, sand blast or wirebrush the loose paint on the remaining majority of the exterior metal corrugated sheathing, including precautions for OSHA requirements used in removing red lead paint. If lead paint is found and does not present a suitable substrate, abate lead paint down to bare metal.

Prime the metal surface.

Paint the metal with antirust metallic coating.

Remove deteriorated wood floors.

Install 3/4" plywood floor sheathing.

Remove existing roof.

Replace roof in kind with primed and painted corrugated metal siding.

Clear interior of coal dust debris that is putting more load on the structure than necessary and that may be exacerbating the caustic decay of the steel members. Methodology needs to be investigated.

Impact (36 CFR). The impact would be the same as alternative 2 plus:

Removing existing paint and repainting would result in the minimal loss of historic fabric and the longer term protection of much of the whole structure.

Removing and replacing the existing roof would result in the loss of historic fabric and the introduction of nonhistoric materials to the structure. This action would, however, prolong the life of the structure longer than alternative 2. [Replacement in kind may not be accurate here since the structure is not being restored. The description does need to indicate that the roof will be replaced with similar or different materials.]

Removing existing flooring and installing plywood flooring would result in the loss of historic fabric and the introduction of nonhistoric materials to the structure.

Removing coal dust debris and the resultant reduction of load on the structure may allow the structure to remain stabilized longer.

Alternative 4

This alternative would be the same as alternative 3, with the addition of ongoing cyclic maintenance.

Impact (36 CFR). The impact would be the same as alternative 3 except that ongoing maintenance would result in the structure lasting for a longer period. However, eventual loss of the structure would most likely occur.

TABLE 1: ESTIMATED COSTS FOR THE COAL TIPPLE BY ALTERNATIVE

TREATMENT	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Architectural	$ 238.00	$ 238.00	$ 8,338.00
		8,100.00	213,245.00
Structural	2,460.00	2,460.00	21,268.00
		18,808.00	
Landscape	27,800.00	27,800.00	31,300.00
		3,500.00	
Subtotal	**30,498.00**	**60,906.00**	**274,151.00**
Contingency 15%	4,575.70	9,135.90	41,122.65
Logistics 10%	3,049.80	6,090.60	27,415.10
Remote Location 10%	3,049.80	6,090.60	27,415.10
Contractor 6%	1,829.88	3,654.36	16,449.06
NET TOTAL	**$43,002.18**	**$85,877.46**	**$386,552.91**

POWERHOUSE

EXISTING CONDITIONS

General/Character-defining Elements

The powerhouse has been sitting idle since ca. 1934 when Berwind-White shifted to electricity purchased from outside sources. Although documentation of the powerhouse has not been found from that period, one can presume that the series of buildings has deteriorated at least from that moment on. The powerhouse is a rectangular stone block building with a concrete foundation, and corrugated metal roofing supported by steel roof trusses and steel purlins. The series of stone buildings adjoining each other include 1) a central structure that was the compressor room (52' x 51'), 2) a structure to the southeast without a roof, which was once the old boiler room (61' x 51'), and 3) a small shed-like structure that was the generator room (21' x 37'). An interior wall made of hollow clay masonry units separates the compressor room from the old boiler room. The generator room, which design team investigation shows was added after the rest of the building was finished, has similar construction with a concrete foundation, stone walls, and steel roof framing, but no roof trusses. With the exception of the missing roof section, the powerhouse building has survived fairly well over its utilitarian lifespan, with expected levels of deterioration from the elements and from neglect.

Since 1989, when the powerhouse roof was cleaned and secured, and large trees were removed from inside and near the structural remains, the structure has continued to suffer (figures 23–29). This ensemble can be stabilized, although it is on the whole, in poor condition. Breaches in the roof due to rust and missing pieces of the roof sheathing, the absence of roof over the boiler room, uncontrolled drainage from uphill, and the general deterioration of the mortar and stonemasonry are the causes of this building's problems. Because the construction materials consist of stonemasonry, the powerhouse would probably last longer than the coal tipple without any intervention. Still, the intervening



Figure 23 Powerhouse Existing Condition Photo: East elevation. Roof missing over boiler room (to left). November 1996. NPS photo.

deterioration factors would likely cause the demise of some portions of this structure in as shortly as five years.

Existing Characteristics of the Powerhouse:

- Building half hidden behind vegetative growth. Intrusion of plant materials into structure.
- Horizontal mass of building.
- Relationship of masonry walls to metal corrugated roof.
- Arched openings partially- or fully-bricked in. No closure materials on door and window openings.
- Absence of roof over old boiler room. Perforated, leaking, dented roof over compressor room. Light and precipitation entering through holes in roof.
- Random ashlar stonemasonry walls.
- Old boiler room overgrown by plants and trees. Compressor room filled with refuse piles of old machinery.
- Absence of sound from machinery. Sounds of surrounding fauna and flora.



Figure 24 Powerhouse Existing Condition Photo: North elevation. Roof over generator room in the foreground. Nov. 1996. NPS photo.

Site

Vegetation has reclaimed this structure. Trees are currently growing within the structure walls, as well as outside. The steep slope on the south side of the structure has slowly, with time, deposited soil against the wall, causing a severe draining problem around the building.

Envelope

Roof. Two of the three buildings composing the powerhouse still have roofs. The compressor room with its gable roof with light monitor above remains only moderately sheltered from the weather because its corrugated metal roof contains many holes (figure 28). The water infiltration through the severely rusted corrugated metal roof has led to deterioration of other building elements. Missing metal roof panels adjacent to the uphill wall contribute significantly to the disintegration of mortar joints and wall integrity by the water that passes through them. The roof overhang facing the river bends towards the ground. Some roof monitor pieces lie on the main roof surface separated from their original position. The lean-to corrugated metal roof over the generator room leaks over its entirety.

The old boiler room lies roofless, and in such a state, provides sheltered, excellent space for unwanted plant growth. The room's walls are deteriorated beyond the point of being able to support a new roof (figure 23). The existing roofs are in poor condition.

Walls. The rough-cut irregular coursed stonemasonry walls have suffered badly in several places and need to be stabilized. Since the 1989 building repairs were made, the top of the east-facing unroofed wall has deteriorated with diagonal cracks originating at the upper surface (Digital photo images: 29, 31, and 89).



Figure 25 Powerhouse Existing Condition Photo: East elevation of boiler room. Note crumbling upper wall surfaces, brick infill, deteriorated wall base and sill at right. Nov. 1996. NPS photo.

Stone is completely missing over the middle northeast-facing window opening over the northwest most door opening in the old boiler room. Vines and other deciduous plants currently grow out of the top and sides of the old boiler room walls. If this situation remains untreated, one may expect the continued deterioration of this unbraced part of the building. The uphill-side wall of the powerhouse suffers from buckling induced by poor drainage and hydrostatic pressure trying to overturn it. The freeze-thaw mechanism compounds the deterioration problem. Mortar joints are loose in some places. As the lower portion of the wall remains damp, the combined presence of humidity and the freeze/thaw phenomenon has in some cases caused the joints to be left without mortar. The wall segments directly below roof openings have been washed clean of mortar. This condition testifies to the water's destructive power on unprotected masonry.

The wall between the old boiler room and the compressor room contains many holes in the hollow clay tile which fills the spaces between the steel columns. The compressor room side appears to be parged most of the height of the wall. This layer has fallen off in the area surrounding the breaks in the wall. The largest area of breakage lies to the immediate southwest of the door between the two spaces towards the uphill side. The cause of this breakage remains unknown at this time (figure 29).

Windows. All of the windows lack glazing. The wood frames currently remain in a dilapidated state of repair with the vertical elements of the sash pulled away from the vertical plane and with adjacent masonry beginning to suffer from the lack of bracing at the openings. All of the sills need to be replaced. They are in poor condition.

Doors. Five door openings face out towards the river without any doors actually closing them off. No documentation exists to the knowledge of the design team which dates the disappearance of the doors from their openings. Of course, no documentation exists which shows the existence of doors, either. The assumption that doors did exist stems from the existence of frames and blocking spaces missing from the stone wall next to where the door casing and hinges can be expected to have existed. Of the two door openings facing this direction from the old boiler room, brick blocks in the demi-lunette of the south easternmost opening, which is supported by a wood lintel in fair condition. An unlevel stone sill course marks the further deterioration of this opening. A square opening in the bricked-in arch of the southeastern door opening remains from the time when the boiler room was in use. Brick fully fills the other opening.

Two door openings face towards the river from the compressor room. Both of these are open, although the south easternmost one has its arch bricked in with a wood lintel below the brick.

One door opening separates the old boiler room and the compressor room. There is no door present. Another door opening stands at the north corner of the building leading to the outside of the generator room. The door here is also missing.

The generator room itself has one door opening, which like all of the others, is missing its door. Because of the conditions of the frames and the total absence of doors, the doors are considered to be in poor condition.

Structural System

The overall structural system is incapable of supporting lateral load in its current condition because the walls surrounding the old boiler room are completely unbraced at the top edge, where support would normally be provided by a roof. These 20-inch thick limestone block walls are probably unreinforced



Figure 27 Powerhouse Existing Condition Photo: Structural detail. View from interior of boiler room. Notice lack of roof, missing sections of back wall, and vegetation growing inside the building. Nov. 1996. NPS photo.

The walls are in fair condition in most locations with loss of mortar due to moisture. Some replacement of wall material is necessary for the building to continue to stand. This loss of material is most prevalent on the back side of the building, and to some extent on the front wall as well. The wall sections that have broken off are the beginnings of the type of failure one can expect to see because of the lack of a roof. These problems may also be compounded by water damage to the mortar between the stonemasonry units.

Drainage on the back side of the building is a problem which should be addressed because of the hazard moisture poses to the mortar holding the stone block walls together. Investigation of the back side of the building revealed mostly industrial debris (machinery and building parts) and vegetation that has accumulated over time. Although no standing water was observed while walking on the back side of the building, one can conclude that the vegetation and debris traps enough water to create a problem. The interior of these stone walls shows efflorescence and moss growth caused by moisture damage. In these areas, the loss of mortar was evident. Significant wall decay can be expected in the future if moisture problems are not addressed.

Interiors

The utilitarian nature of this structure led to no interior finishes being used. The ceiling is merely the underside of the metal corrugated roof. The walls are the bare inside face of stonemasonry, or in one case, parged hollow clay tile. The floor is what remains of a concrete slab, although significant damage has occurred, probably due to the destructive effect the industrial process can have on building materials.

The concrete slab contains many holes, some perhaps from the previous placement of heavy machinery. Currently, they appear to serve no useful purpose and only present a hazard to the unsuspecting visitor. The interior space is one vast cavern. Remnants of obsolete knob and tube wiring hang on the inside face of the southwest wall of the compressor room. No plumbing or HVAC systems were observed.

Fire/Life/Health/Safety. Fire egress would occur through the openings facing the railroad tracks.



Figure 28 Powerhouse Existing Condition Photo: Structural detail. Interior of compressor room. Roof damage visible, view towards north. Noted later brick infill at base of wall. Nov. 1996. NPS photo.

There seems to be no fire hazard in the building itself, since the building materials of stone, hollow clay brick, steel, and corrugated metal are nonflammable. Neither an intrusion system, a fire detection/smoke control system, nor a fire suppression system is at this structure. Seismic issues have not been addressed regarding this site.

Machinery

The machinery inside the powerhouse remains unidentified.

INTEGRITY FOR POTENTIAL TREATMENT AND USE

Refer to the section on "Integrity for Potential Treatment and Use for the Coal Tipple" for the philosophical framework upon which this discussion is based.



Figure 29 Powerhouse Existing Condition Photo: Structural detail. Hollow clay tile wall between compressor room and old boiler room looking towards building east. July 1996. NPS photo.

The "location" of the structure remains the same as when it was built in 1925. The design of the powerhouse is fairly consistent from one section to another. The powerhouse represents a level of design consistent with utilitarian industrial buildings. No ornament or suggestions of a particular architectural style adorn the structure. The "setting" or physical environment and character of the place in which the property played its historical role remains the same as it was, only in some ways. The overall character is not the same as when the property was used and inhabited. This gets back to the historical versus existing condition character-defining elements. Because of the simple absence of the working industry, so much of what gave the setting its specific character is gone. Although most historic period industrial records of the property have been destroyed, per Historian Sharon Brown, the existence of structural members and deteriorated exterior materials that do not date from the present day leads one to believe that the building is from the historic period. We have not differentiated between "materials" that remain from the historic period and those that exist from a later period. The depth of investigation did not permit such an approach. One can, however, comment on the general visual character. The building systems' current condition reflect a general consistency of appearance. If there has been adaptation to technology change, it has occurred in a natural evolution, which has given the whole building a fairly homogenous appearance. Only the wall between the compressor room and the generator room presents evidence of the obviously posterior construction of the generator room. Wall openings filled in with brick and mortar which, from visual inspection, is different than the mortar used everywhere else. In terms of "workmanship," the methods used to erect this structure were fairly standard. With the proximity of the working railroad line and spurs at the time, the methods used were probably consistent with the typical construction methods of the day. The "feeling" remains, necessarily, somewhat intangible. The overgrowth of the site and the deteriorated state of repair of the resources limits the property's ability to express the aesthetic or historic sense of the historic period of time. Still, with the building's bulk remaining (although minus one roof), one may imagine the historic feeling. The sounds and smells which would contribute so convincingly to the feeling, are of course absent. However, an informed imagination can fill in the gaps relatively well. The "association" between the historic activity (bituminous coal mining in West Virginia) and the cultural resource is still amply evident. However, the number of those persons who can claim the direct association of having worked at Kaymoor is rapidly dwindling. The date of Kaymoor's closure rapidly approaches 40 years

ago. If most of those who remained at Kaymoor up until the mine's closure were even 40 years old, they would be in their 70s now. This tangible connection to the human resource at Kaymoor will obviously not last.

There are enough components or fabric left to render the structure serviceable in the sense of a stageset. If the structure were to be observed from a closer distance than from the boardwalk as is planned, the existing condition would need to be ameliorated before the building could be considered serviceable. This ensemble of three spaces can be stabilized, although it is on the whole, in poor condition. It is probably the most easily stabilized of the main structures discussed in this report.

Restoring the historic character of the landscape, is clearly feasible. Clearing the vegetation to re-create the historic scene, can be done at a minimal cost, but the continued maintenance could prove to be costly.

The structure does have integrity. Given its condition, however, the form of stabilization treatment can certainly affect the authenticity or integrity of the scene. Beyond existing conditions and integrity, other factors exist which lead this report to the discussion of the stabilization level alternatives. These factors include cost, availability of funding sources, and the existence of park personnel resources. All of these factors contribute to the formation of alternatives which the following section presents.

ALTERNATIVES FOR TREATMENT AND USE

The following treatments and uses were considered but rejected:

Using fiberglass corrugated roofing instead of metal corrugated roofing.

Demolition, followed by a working model of the former building and other interpretive media or by the construction of a representative frame to show shape. The possibility of conducting a full architectural and structural appraisal of the building, which would include cataloging machinery and deciding what should stay and what can be taken away.

Check on drainage from roof to divert it from wall surfaces to avoid further oxidation of the metal.

Catalog machinery in the interior, decide what should stay, what should be discarded.

All of the above have been philosophically addressed under the coal tipple discussion preceding the alternatives.

Alternative 1

Park continues twice-a-year vegetation clearing (park to estimate).

Warning signs and removal of small amounts of nonfriable asbestos containing materials (bag and remove) and vegetation.

Impact (36 CFR). Continued clearing of vegetation would reduce potential degradation of structure due to growth of vegetation that destroys building fabric.

Construction of boardwalk would keep some visitors away from structure and potential vandalism or loss of building fabric.

Alternative 2

Alternative 2 would be the same as alternative 1 plus:

Repoint all masonry wall surfaces as necessary.
Replace steel in roof truss, building line E.
Repair/replace missing wall sections of roughly cut, mortared rubble stonemasonry on front and back side of boiler room.
Three new roof trusses, including bracing and purlins to match compressor room.
Remove dirt and debris from old boiler room.
Install French drain and backfill around back and sides of building and daylight it beyond.

Impact (36 CFR). The impact would be the same as alternative 1 plus:

The addition of a new roof truss or other wall supports would help to stabilize the unsupported walls, thereby prolonging the historic condition of the structure. The use of these support elements would introduce nonhistoric elements to the historic structure.

Improving drainage around the structure would protect the foundation and the building's condition, reducing its current rate of deterioration.

Repointing and repair of masonry wall surfaces would prolong the structural integrity of the walls and reduce its current rate of deterioration.

Alternative 3

Alternative 3 would be the same as alternative 2 plus:

Board up doors and windows with plywood (exterior grade). Vent boarded-up window openings and roof with active ventilation.

Re-establish roof over the boiler room side of building (no roof currently) with new corrugated metal roof sheathing over entire roof of boiler room.

Compressor room and generator room: Replace roof with corrugated fiber sheathing.

Wayside

Impact (36 CFR). The impact would be the same as alternative 2 plus:

Introduction of a new roof will be a visual intrusion into the visual scene and the historic structure. The addition of the roof, however, will protect the condition and stability of the structure for a longer period of time than alternative 2.

Addition of plywood to open window frames will reduce the amount of weather impacts (moisture) and dirt presently affecting the structure, while resulting in a visual intrusion due to the addition of the new nonhistoric elements.

Alternative 4

Alternative 4 would be the same as alternative 3, except ongoing building maintenance would be provided.

Impact (36 CFR). Alternative 4 would be the same as alternative 3 plus ongoing maintenance would result in a longer existence of the structure.

TABLE 2: COST ESTIMATES FOR THE POWERHOUSE BY ALTERNATIVE

TREATMENT	ALTERNATIVE 1	ALTERNATIVE VE 2	ALTERNATIVE 3
Architectural		$ 24,336.00	$ 24,336.00
			10,271.00
Structural		89,920.00	89,920.00
			86,695.00
Landscape	$38,300.00	38,300.00	57,800.00
		19,500.00	
Subtotal	**38,300.00**	**172,056.00**	**269,022.00**
Contingency 15%	5,745.00	25,808.40	40,353.30
Logistics 10%	3,830.00	17,205.60	26,902.20
Remote Location 10%	3,830.00	17,205.60	26,902.20
Contractor 6%	2,298.00	10,323.36	16,141.32
NET TOTAL	**$54,003.00**	**$242,598.96**	**$379,321.02**

LANDSCAPE TREATMENT AND EMERGENCY STABILIZATION

The linear rows of coke ovens lie just upstream (south) of the tipple and powerhouse structures. (figures 30 - 33). This style of oven, now long surpassed by more efficient methods of coking coal, "was an adaptation of an oven first used to make charcoal from hardwood. . . . The beehive process requires the



Figure 30 Coke Ovens Existing Condition Photo: Double battery of coke ovens. Vegetation partially cleared in between. July 1996. NPS photo.

use of high-grade coking coal and a long coking time (2–3 days). The coke produced is hard, dense, large in size, and suited for foundry use."[17] It was precisely for the purposes of making iron and steel for the Low Moor Iron company that the coke ovens at Kaymoor were kept in use.

> "In 1900, coke was mainly produced by beehive oven, a dome-like shaped circular brick structure with a diameter of about 12 ft. and a height of 7 ft; rows of such ovens were constructed in long single or double lines. The gases and volatile matter were allowed to escape into the atmosphere, and when the process was over, part of the brick structure was broken open, the coke was 'watered' and then drawn out by laborers using long-handled scrapers. It was heavy and unpleasant work and it took about ½ tons of coal to make a ton of coke in 48 hours. The alternative process, the by-product oven or the 'retort' oven, as it was sometimes called, had been known since at least the 1860's, but only in Germany, France and Belgium had it become widely established in the last decades of the century. From 1880

17. Wilbur C. Heat, "Uses of Coal", *Elements of Practical Coal Mining*, Samuel M. Caseate, ed. Society of Mining Engineers of The American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc. New York, New York, 1973, p. 59.

to 1900 there was rapid progress in by-product recovery in these countries, particularly in Germany, where Otto Company, developing a design of the Belgian no-recovery Copped system (which went back to 1861), built 5,000 by-product and 7,000 non by-product ovens. Britain lagged behind. In 1901 there were less than 1,000 by-product ovens and over 26,000 beehive ovens. The U.S.A. was also backward: in 1900 over 95 percent of its coke was produced by beehive ovens."[18]

The existing beehive masonry ovens are hollow half-spheres, approximately 13' in diameter and 6' high. They were built in 1901 and 1917 in the form of two batteries, each consisting of 101 ovens. Materials consist of firebrick and stone, with the stone fashioned into semicircular arched doorways with metal handles. The railroad tracks beside and on top of the ovens no longer exist. Although the

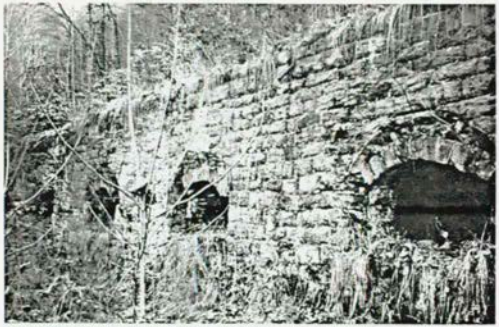


Figure 31 Coke Ovens Existing Condition Photo: Semicircular arched opening with fallen voussoirs. Vegetation and lack of historic oven doors is accelerating arch failure.

coke oven batteries contain 202 ovens, few still remain in a good state of repair. Perhaps one fourth of the original ovens are still visible in some form. Most have begun to cave in, either from the top or at the crown of the arched opening. All are becoming filled with debris and vegetation from the inevitable toll of time and gravity. Mostly overcome by runaway thorny bushes, paulownia trees, and the countless other species of vegetation and snakes, the coke ovens become visible only when the observer stands directly in front of the arched openings of the individual ovens.

18. Trevor I. Williams, ed., "Iron and Steel, by M.L. Pearl, from *A History of Technology, Vol. VI The Twentieth Century c. 1900 to c. 1950, Part 1*, Clarendon Press, Oxford, 1978, p.467

INTEGRITY FOR POTENTIAL TREATMENT AND USE

Refer to the section on "Integrity for Potential Treatment and Use for the Coal Tipple" for the philosophical framework upon which this discussion is based.

The "location" of the structure remains the same as when it was built in 1925. The "design" of these structures was quite out of date, even when built. European by-product coke ovens far outpaced the beehive ovens, and had been in use for over forty years. There is nothing significant about these ovens



Figure 32 Coke Ovens Existing Condition Photo: Notice arched openings amidst the vegetation. July 1996. NPS photo.

regarding the concept of design. The "setting" or physical environment and character of the place in which the property played its historical role does not remain the same as it was. The overall character is not the same as when the property was used. This gets back to the historical versus existing condition character defining elements. Because of the simple absence of the working industry, so much of what gave the setting its specific character is gone, which obviously does not even touch upon the structural integrity or the lack thereof. These are little short of archeological ruins. The existence of a few historic photos testifies to the structures being consistent with construction methods dating from the historic period. We have not differentiated between "materials" that remain from the historic period and those that exist from a later period. The depth of investigation did not permit such a approach. One can, however, comment on the general visual character. The ovens reflect a general consistency of appearance. If there has been adaptation to technology change, it has occurred in a natural evolution, which has given the batteries of ovens a homogenous appearance. In terms of "workmanship," the methods used to erect the ovens were fairly standard. With the proximity of the working railroad line and spurs at the time, the methods used were probably consistent with the typical construction methods of the day. The "feeling" remains, necessarily, somewhat intangible. The overgrowth of the site and the deteriorated state of repair of the resources limits the property's ability to express the aesthetic or historic sense of the historic period of time. The overgrowth especially hides the overall scale of the structures. The inability to perceive the magnitude of the structures hinders the observer from imagining

the historic feeling. The sounds and smells that would contribute so convincingly to the feeling are absent. However, an informed imagination can fill in the gaps relatively well. The "association" between the historic activity (bituminous coal mining in West Virginia) and the cultural resource is still amply evident. However, the number of those persons who can claim the direct association of having worked at Kaymoor is rapidly dwindling. The date of Kaymoor's closure rapidly approaches 40 years ago. If most of those who remained at Kaymoor up until the mine' closure were even 40 years old, they would be in their 70s now. This tangible connection to the human resource at Kaymoor will obviously not last.

There are enough components or fabric left to render the structure serviceable in the sense of a stageset. The existing condition will need to be ameliorated before the ovens can be considered safe and serviceable as a visitable cultural resource. This ensemble of oven batteries can be stabilized, although it is nearly in a state of ruin. This would require excessively large amounts of money, however. Stabilization of the ovens will require further investigation, as mentioned elsewhere.

Restoring the historic character of the landscape is clearly feasible. Clearing the vegetation to recreate the historic scene could be done at a minimal cost, but the continued maintenance could prove to be costly.

The structure has integrity. Given its condition, however, the form of stabilization treatment could certainly affect the authenticity or integrity of the scene. Beyond existing conditions and integrity, other factors lead this report to the discussion of the stabilization level alternatives. These factors include cost, availability of funding sources, and the existence of park personnel resources. All of these factors contribute to the formation of alternatives which the following section presents.

ALTERNATIVES FOR TREATMENT AND USE

Alternative 1

Continue twice-a-year vegetation clearing by park (park to estimate).

Choose a certain number (probably three) of coke ovens to stabilize.

Fence across the ensemble of structures from one side to the other on the side closest to the tipple.

Provide warning signs, fencing, and circulation, and remove hazardous pieces of machinery and debris that pose a particular hazard to the curious visitor.

Clearing woody plant material by herbicide use and manual removal a depth of 230' from the front to approx. oven 16, for the entire width of the alley.

Impact (36 CFR). Continued clearing of vegetation would reduce potential degradation of structure due to growth of vegetation that destroys building fabric.

Construction of the boardwalk would keep some visitors away from the structures and potential vandalism or loss of historic fabric.

The addition of the fencing becomes a minor "close-up" visual impact to the historic scene.

Alternative 2

Alternative 2 would be the same as alternative 1 plus:

Minimally stabilize the vertical oven openings by closing them with wood shoring on the three best-preserved ovens, and with metal grating to keep heads and other objects out of the openings. It would be desirable to be able to see through this material to the interior of the ovens.

The alley way would be fenced in along the interior alley way to the chosen oven 16, across from one side to the other between ovens 16 and 17, and come back along the other side to the front.

Wayside Exhibit

Impact (36 CFR). The impact would be the same as alternative 2 plus:
Minimal stabilization of several vertical oven openings would protect their historic condition, and introduce nonhistoric materials to the coke oven openings.

Alternative 3

Alternative 3 would be the same as alternative 2 plus:

Additional clearing of woody plant materials around coke ovens (with herbicides and by manual removal) from oven 16 back to the end of the coke oven batteries (the entire alley between the two batteries of ovens would be cleared) with native grasses remaining to eliminate the threat of soil erosion.

Additional fencing along interior of alley way from oven 16 to end of ovens and back along the other side opposite of oven 16.

Partially remove soil behind coke ovens for the length of ovens 1–16 on uphill side of mountain battery to remove hydrostatic pressure against the structure and help preserve the resource.

A space 10 feet wide extending from ovens 1–16 would be cleared on the river side of the river battery to eliminate the large trees and woody growth growing in and around the structures, which are contributing directly to structural deterioration. Tree roots and trunks may currently have grown into a position to actually support portions of the coke ovens. When these trees were cut, their remains would decay and could cause parts of the ovens to subside. If this occurs, a decision would need to be made to stabilize the ovens more, or to leave them as they are.

Impact (36 CFR). The impact would be the same as alternative 2 plus:
Additional clearing of vegetation and soil from coke ovens would reduce the current rate of deterioration of these structures.

Alternative 4

This alternative would be the same as alternative 3 plus:

Stabilize three ovens: One oven would be completely restored, and the two flanking it would be filled in.

The park would maintain the structure in its stabilized state.

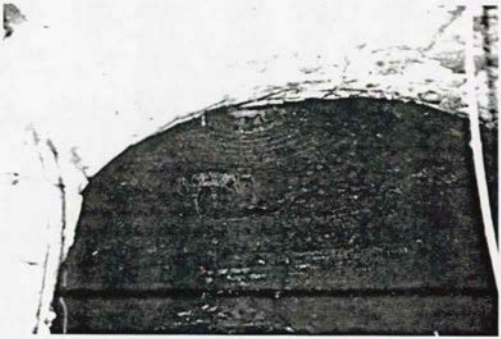


Figure 33 Coke Ovens Existing Condition Photo: Interior of oven, fire brick masonry in beehive dome construction. Notice opening at top of dome. Nov. 1996. NPS photo.

Impact (36 CFR). Clearing of coke ovens and ongoing vegetation removal would reduce the destruction of the historic structure (depending upon current condition). This also potentially increases the loss of the coke ovens due accessibility and the invitation of these remains to vandalism.

TABLE 3: COST ESTIMATES FOR THE COKE OVENS BY ALTERNATIVE

TREATMENT	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4
Architectural	0	$ 8,200.00	$ 8,200.00	$ 8,200.00
Structural				
Landscape	$42,700.00	91,200.00	256,050.00	256,050.00
Subtotal	**42,700.00**	**91,200.00**	**256,050.00**	**318,050.00**
Contingency 15%	6,405.00	13,680.00	38,407.50	47,707.50
Logistics 10%	4,270.00	9,120.00	25,605.00	31,805.00
Remote Location 10%	4,270.00	9,120.00	25,605.00	31,805.00
Contractor 6%	2,562.00	5,472.00	15,363.00	19,083.00
NET TOTAL	**$60,107.00**	**$128,592.00**	**$361,030.50**	**$448,450.50**

HEADHOUSE

HEADHOUSE

EXISTING CONDITIONS

General/ Character-defining Elements

As the coal came out of the mine, it was brought into the headhouse. There, it was weighed, stored temporarily, and then dumped into the structure's large storage bin, where it was fed directly into a 100-ton capacity storage chute. A reciprocating feeder then distributed the coal onto a horizontal conveyor which led into the coal tipple, also known as the processing plant.



Figure 34 Headhouse Existing Condition Photo: Remains of 1990 stabilization efforts and reroofing.

The headhouse owes its current deplorable condition not only to the predatory nature of climate and years of neglect but also to the unforseen repercussions of well-meaning intervention strategies and to the actions of vandals. The heavy timber of this structure suffers from severe rot and decay caused by moisture and insect damage. The massive timber headhouse is the most prominent and important structure on the bench level of the Kaymoor site. (HABS Drawings 4, 5, and 6 – plans, elevations, sections; figures 34– 43). This building cascades down the hill, with a series of stone foundation piers supporting heavy timber columns on horizontal sills. At the lowest point down the hill, the east facade is measured to be 83' 1" high. The structure extends 127' in plan, projected to a horizontal plane, from the coal mine side to the point where the headhouse meets the monitor control house (east to west). The narrow dimension in plan is measured to be 27' from north to south. Now surrounded by chain-link fencing erected to maintain visitor safety, the massive headhouse leans precariously along its weak axis, threatening to collapse at any time. The obvious danger imposed by entering even the lower portions of the structure allowed a building investigation only from a distance. The steeply sloping site and the uncontrollable vegetation surrounding the headhouse make investigation difficult, even from a distance. Observations were made regarding some specific building components, but the overall condition portrays a bigger and bleaker picture of a structure headed toward catastrophic failure.



Figure 35 Headhouse existing condition photo: South elevation as viewed from haulage route/ steps. July 1996. NPS photo.

Existing Characteristics of the Headhouse

- Horizontal, stick-like roof skeleton all but obscured by the surrounding, heavy vegetative growth.
- Wooden structure in ruin following the descending line of hillside.
- Vertical mass of building not visible from below because of vegetative regrowth.
- Absence of monitor trestle.
- Wooden cross bracing below horizontal surface of railroad tracks, supported by stone foundation piers descending the hillside completely obscured by vegetation while leaves are present.
- Absence of finish roof material on frame.
- Absence of most of wall finish materials.
- Curved, tangled mass of disjointed pieces of rotten wood.
- Intrusion of plant materials (including poison ivy) up through the structure.

Existing Characteristics of the Headhouse Interior

The building is structurally dangerous. Any investigation of the current interior would be a life-threatening exercise, and therefore has not been completed and is not advised.

Site

Vegetation has reclaimed this structure. It appears that no clearing has taken place in quite some time. The headhouse is located on a steep slope where erosion could be a potential problem.



Figure 36 Headhouse Existing Condition Photo: Collapse of roof structure. View toward river. 1986. Photo courtesy of West Virginia University.

Envelope

Roof. The remains of a temporary roof remind one of a spider web disturbed by the hand of an irritated passer-by (figure 36). The emergency roof, meant to last no more than three to five years from its 1990 construction date, collapsed in 1994. The gabled roof sat on a steeply pitched frame of 2" x 4" x 14' pine rafters and 2" x 1/4" strips, in turn covered by polyethylene sheeting. Unexpectedly heavy snowloads and vandal-pierced sheeting hastened the roof's collapse. These factors coupled with setting the new roof structure on an already weak heavy timber structure below may possibly have accelerated the racking to the east. A better solution would have been to span the roof so that it would not bear on the historic structure itself. Water infiltration caused the decay of the wood members, which finally led to the structural failure and collapse below.

The part of the building above the bench level was more lightly framed than the rest of the building. The roof was framed with heavy trusses and covered with rough-sawn timber sheeting followed by rolled asphalt roofing. Board-and-batten siding covered the walls.

Walls. The board-and-batten system of walls at the headhouse was an expedient way to enclose the machinery moving the coal from the mine down to the coal tipple. The whole portion of the building level with the mine opening which used to contain the tracks, weigh station, cradle dump, cross-over dump, and inclined switchback no longer exists. Vertical wood planks were used to cover the space between the roll roofing and the triangular wedge of building following the slope down the hill. (see figure 9). The diagonal wood siding on the wedge portion of the building seems to be about 75% intact on the south elevation. The north side was not visible due to the overgrowth of surrounding vegetation. The overall condition of the walls is poor.

The monitor control house below the headhouse still stands but has weakened walls and a completely rusted roof. Pieces of wood have fallen on to it from the headhouse structure above.

Windows. Openings in the walls existed when the walls themselves at the track level were standing. A historic photo indicates that these openings were not glazed. Where walls still stand, the openings remain.

Doors. Doors did not figure among the historic elements of this building.

Structural System

The headhouse foundation material is stacked stone block piers below each heavy timber frame, or bent, running parallel to the contours of the hillside. The capacity of the foundation, like that of most other building elements, is unknown. However, it is likely that the foundation and superstructure above are not anchored, using the materials and methodologies that are required in modern construction. This condition prohibits any lateral-load carrying capacity of this structure.

The creosote treated heavy timber framed headhouse consists of a series of bents: timber columns on sill plates, diagonal bracing, and beams supporting the working spaces once occupied by the coal mining equipment. Some of the original columns have moved at the base, indicating a general shifting of the building and also a lack of connection between the column and its foundation. Several horizontal members have failed, but he reason for failure and extent of this kind of failure is undetermined due to the lack of a thorough investigation and virtually no information gained from inside the structure.

A general condition of all the heavy timber is the state of decay and rot caused by moisture and insects. Repair of this type of damage, since it is so thoroughly entrenched in the structure, would require that each piece of timber be examined for rot, evaluated for its load carrying capacity, and repaired or replaced as necessary. Obviously, this much work could only be warranted if the structure is deemed to be of such value to be able to justify the expense and effort.

The original headhouse roof is gone, and all that remains is the substitute roofing materials put up there in 1990 in a well-intentioned, but damaging attempt to protect the building from snow and rain. All that remains of this wood framed emergency roof is the collapsing rafters without sheathing material to provide the shelter that was intended.



Figure 38 Headhouse Existing Condition Photo: Structural Detail. Collapse of roof structure. View toward mine opening. 1986. Photo courtesy of West Virginia University.

Machinery

The cradle dump chute has fallen in. Rusted elements of the cradle dump leading from the drift opening sit on the crumbling remains of the track-level floor. The counter weight for the crossover dump, the apron conveyor and the reciprocating feeder were not visible through the maze of racked and fallen structural members. The existence of these as well as of the flight conveyor, main storage bin, monitor cable drum, the sheave for the monitor cable and any monitor cars in not known (HABS drawing 5).

INTEGRITY FOR POTENTIAL TREATMENT AND USE

Refer to the section on "Integrity for Potential Treatment and Use for the Coal Tipple" for the philosophical framework upon which this discussion is based.

The "location" of the structure remains the same as when it was built in ca.1899, although it is slowly racking and sliding downhill. The design of a structure can be rated for integrity in terms of the combination of elements that create the form, plan, space, structure, and style of the historic property.

This structure relates specifically to the task it was built to perform. It lacks one major element that one sees in the historic photograph from 1914. The entire roof and wall descending from the roof to the diagonal wood bracing no longer exists. This represents approximately one-third of the total historic period building fabric. The building plan as it was designed is not recognizable except in the broadest



Figure 39 Headhouse Existing Condition Photo: Structural detail. Typical column/sill joint showing severe rotting of members. 1986. Photo courtesy of West Virginia University.

terms of it being rectangular in nature with numerous structural elements. The issue of architectural style does not enter into the discussion, as there is no application of the concept on the structure. The headhouse represents a level of design consistent with utilitarian industrial buildings. No ornament or suggestions of a particular architectural style adorn the structure. The original direction and specific connections of these elements remains indiscernible. As so many parts are either missing or in complete structural and functional disarray, one concludes that this structure does not possess integrity of design. The "setting" or physical environment and character of the place in which the property played its historical role remains the same as it was in only some ways. The overall character is not the same as when the property was used and inhabited. This returns to the comparison between historical versus existing condition character defining elements. Because of the simple absence of the working industry, so much of what gave the setting its specific character is gone. Although most historic period industrial records of the property have been destroyed, per Historian Sharon Brown, the existence of structural members and deteriorated exterior materials which do not coincide with those of the present day leads one to believe that the building is from the historic period. We have not differentiated between "materials" that remain from the historic period and those that exist from a later period. The depth of investigation did not permit such a approach. One can, however, comment on the general visual character. The building systems' current condition reflect a general consistency of appearance. If there has been adaptation to technology change, it has occurred in a natural evolution, which has given the whole building a fairly homogenous appearance. In terms of "workmanship," the methods used to erect this structure were fairly standard, albeit industrial and heavy duty in nature. With the proximity of the

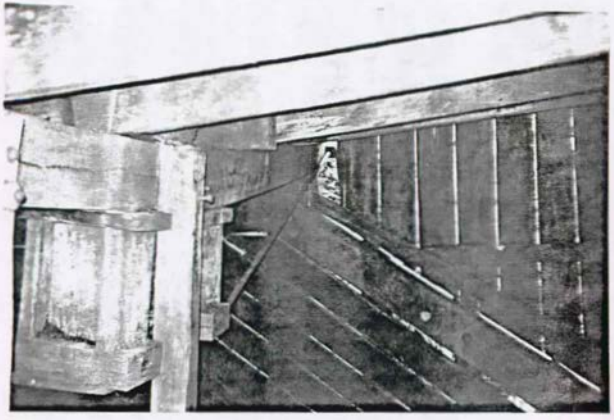


Figure 40 Headhouse Existing Condition Photo: Structural Detail. Failure of interior beam showing excessive deflections. 1986. Photo courtesy of West Virginia University.

working railroad line and spurs at the time, the methods used were probably consistent with the typical construction methods of the day in terms of supply method and handling. The "feeling" remains, necessarily, somewhat intangible. The overgrowth of the site and the deteriorated state of repair of the resources limits the property to express the aesthetic or historic sense of the historic period of time. Still, with two thirds of the building's bulk remaining, one may imagine the historic feeling. The sounds and smells which would so convincingly contribute to the feeling, are of course absent. However, an informed imagination can fill in the gaps relatively well. The "association" between the historic activity (bituminous coal mining in West Virginia) and the cultural resource is still amply evident. However, the number of those persons who can claim the direct association of having worked at Kaymoor is rapidly dwindling. The date of Kaymoor's closure rapidly approaches forty years ago. If most of those who remained at Kaymoor up until the mine's closure were even 40 years old, they would be in their 70s now. This tangible connection to the human resource at Kaymoor will obviously not last.

There are not enough components or fabric left to render the structure serviceable. It has no structural or historical integrity. The building poses a serious threat to the health, safety and welfare of the public and the park staff. The only logical direction to follow for this structure is the way to its demise. Restoring the historic character of the landscape, however, is feasible. Clearing the vegetation to re-create the historic scene, can be done at a minimal cost, but the continued maintenance could prove to be costly.

Given the headhouse's condition, the form of demolition will certainly affect the authenticity or integrity of the scene. Beyond existing conditions and integrity, other factors exist which lead this report to the discussion of the stabilization level alternatives. These factors include cost, availability of

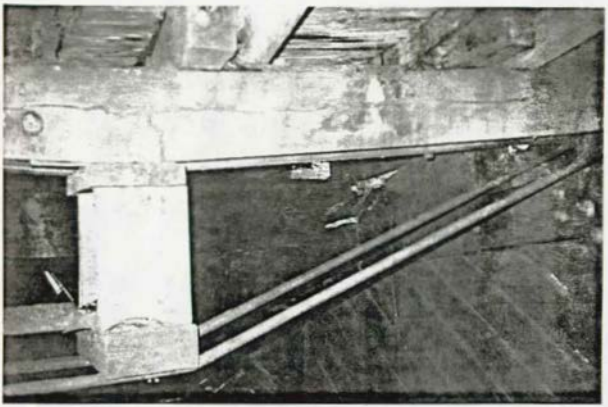


Figure 41 Headhouse Existing Condition Photo: Structural detail of sag rods and beam failure. 1986. Photo courtesy of West Virginia University.

funding sources, and the existence of park personnel resources. All of these factors contribute to the formation of alternatives which the following section presents.

ALTERNATIVES FOR TREATMENT AND USE

The following alternatives were considered but rejected:

Demolition followed by a working model of the former building.

The possibility of conducting a full architectural and structural appraisal of the building, which would include cataloging machinery and deciding what should stay and what can be taken away.

Erecting a temporary roof over the structure to protect it from infiltration.

Alternative 1

Allow natural collapse (estimated to occur within 5 years).
Expand 12-foot barbed wire fence to control area of potential fall.
Sign and fence debris.
Potential Asbestos in debris — no abatement chosen.
No vegetation clearing except a 10-foot swath to facilitate placement of new fence.



Figure 42 Headhouse Existing Condition Photo: Structural detail. Flexural failure of interior beam on Bent G. 1986. Photo courtesy of West Virginia University.

Impact (36 CFR). Allowing the structure to continue to deteriorate would result in the eventual loss of the historic structure. The historic structure would continue to remain as a ruin.

Alternative 2

Initiate active demolition — limited control

Evaluate/retain selected building elements; i.e., foundation/piers, heavy timbers

Sign and stack remaining salvage material

Potential Asbestos — hazardous material procedures required

Vegetation clearing at ruins

Impact (36 CFR). Actively controlling the structure to collapse would result in the loss of the historic structure. Some foundations or building elements could be retained at ground level. Clearing vegetation would protect foundations.

Alternative 3

This alternative would be the same as alternative 2, plus the following:

Remove all salvage materials

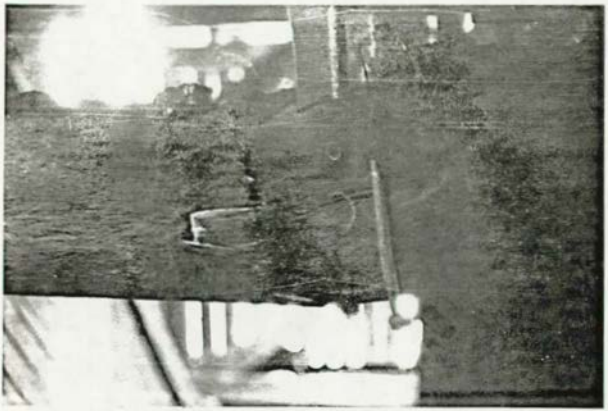


Figure 43 Headhouse Existing Condition Photo: Structural Detail. Flexural failure of interior beam on Bent E. 1986. Photo courtesy of West Virginia University.

Potential Asbestos – Hazardous material procedures required. Demolish the structure. Dismantle and remove from site heavy timber framing, connectors and stone pier foundations. OSHA regulations state that this structure is presumed to contain asbestos since it was built prior to 1980 and is not structurally sound enough to investigate at present. Demolition will be conducted as close to dust-free as possible, with amended water to keep the structure wet during demolition by a supervisor and crew trained and licensed in asbestos removal. Asbestos testing will occur when the structure is safe to do so. Asbestos-containing material is assumed to be approximately 20% of the total volume of materials. Asbestos-containing materials will be disposed of at a site licensed to accept those materials.

Ghost structural members with a steel tubular frame. Maintain ghost structure.

Vegetation clearing at ruins and selective clearing to open up viewsheds from the bench level to Kaymoor Bottom.

Impact (36 CFR). The impact would be the same as alternative 2 plus:

Introduction of ghost elements would be a visual impact on the historic scene and district.

TABLE 4: COST ESTIMATES FOR THE HEADHOUSE BY ALTERNATIVE

TREATMENT	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Architectural		$ 53,100.00	$ 53,100.00
			85,200.00
Structural		237,150.00	237,150.00
			100,000
Landscape	$43,420.00	4,000.00	172,800.00
Subtotal	**6,513.00**	**36,172.50**	**75,772.50**
Contingency 15%	4,342.00	24,115.00	50,515.00
Logistics 10%	4,342.00	24,115.00	50,515.00
Remote Location 10%	2,605.20	14,469.00	30,309.00
Contractor 6%	2,605.20	14,469.00	30,309.00
NET TOTAL	**$61,222.20**	**$340,021.50**	**$712,261.50**

KAY MOOR COAL MINE - 1900

FAYETTEVILLE VICINITY WEST VIRGINIA

LOCATED ON THE PRECIPITOUS SLOPE OF THE NEW RIVER GORGE, IN THE HEART OF WEST VIRGINIA'S FAMOUS "SMOKELESS COAL FIELD", KAY MOOR COAL MINE OPERATED FROM 1900 TO 1962, PRODUCING APPROXIMATELY 17,000,000 TONS OF COAL. NAMED FOR JAMES KAY, WHO OVERSAW CONSTRUCTION, KAY MOOR WAS ORIGINALLY A CAPTIVE MINE OPENED BY THE LOW MOOR IRON COMPANY TO PROVIDE COKE FOR ITS HOT BLAST IRON FURNACES 100 MILES EAST IN THE COVINGTON, VIRGINIA IRON REGION.

THE SEWELL SEAM OF THE NEW RIVER GORGE, INTO WHICH KAY MOOR'S 10 FOOT DRIFT OPENING WAS DRIVEN, CONTAINED LOW VOLATILE BITUMINOUS COAL (HENCE THE NAME "SMOKELESS") WHICH PRODUCED THE BEST BLAST FURNACE COKE IN THE COUNTRY. BUT THE ELEVATION OF THE SEAM, 510 FEET ABOVE THE FLOOR OF THE GORGE AND THE TRACKS OF THE CHESAPEAKE AND OHIO RAILWAY, POSED SPECIAL ENGINEERING CHALLENGES. TO MOVE MEN AND EQUIPMENT FROM COMPANY TOWNS AT BOTH THE TOP AND BOTTOM OF THE GORGE TO THE DRIFT OPENING, A "MOUNTAIN HAULAGE". A SINGLE TRACK INCLINE WITH A STEAM POWERED CABLE HOISTING DRUM, WAS BUILT. TO QUICKLY AND SAFELY LOWER COAL TO THE PROCESSING PLANT AND BEEHIVE COKE OVENS AT THE FLOOR OF THE GORGE, A TWO TRACK GRAVITY INCLINE WAS INSTALLED. WITH FEW MODIFICATIONS, BOTH SYSTEMS REMAINED IN SERVICE THROUGHOUT KAY MOOR'S 62 YEARS OF OPERATION.

AS THE ERA OF THE BEEHIVE COKE OVEN AND THE MERCHANT PIG IRON INDUSTRY WANED, SO DID THE FORTUNES OF LOW MOOR. WHEN ITS TIPPLE BURNED IN 1924, KAY MOOR WAS SOLD TO THE NEW RIVER AND POCAHONTAS CONSOLIDATED COAL COMPANY, A SUBSIDIARY OF BERWIND-WHITE CORP. OF PHILADELPHIA. BERWIND INSTALLED A NEW PROCESSING PLANT IN 1925 AND A SIMON-CARVES BAUM JIG WASHER AROUND 1928, BOTH BUILT BY LINK BELT CO. OF CHICAGO.

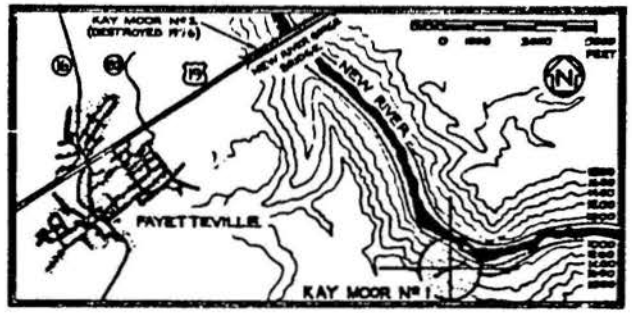
KAY MOOR IS A SIGNIFICANT INDUSTRIAL ARCHEOLOGICAL SITE FOR SEVERAL REASONS. ITS HEADHOUSE AND INCLINE SYSTEMS ILLUSTRATE THE SPECIAL TECHNIQUES EMPLOYED BY EARLY 20TH CENTURY AMERICAN MINERS TO WREST COAL FROM OUTCROPS ON STEEP SLOPES. ITS BAUM JIG WASHER, PATENTED BY SIMON-CARVES OF ENGLAND, IS EVIDENCE OF THE MAJOR TRANSITION TO THE PRODUCTION OF WASHED COAL THAT BEGAN IN THE UNITED STATES IN THE LATE 1920s. ITS FAN HOUSES, POWER HOUSE, DRIFT OPENINGS, AND OTHER INTEGRAL ELEMENTS SURVIVE, PROVIDING EXAMPLES OF TYPICAL MINING PRACTICE OF THE ERA.

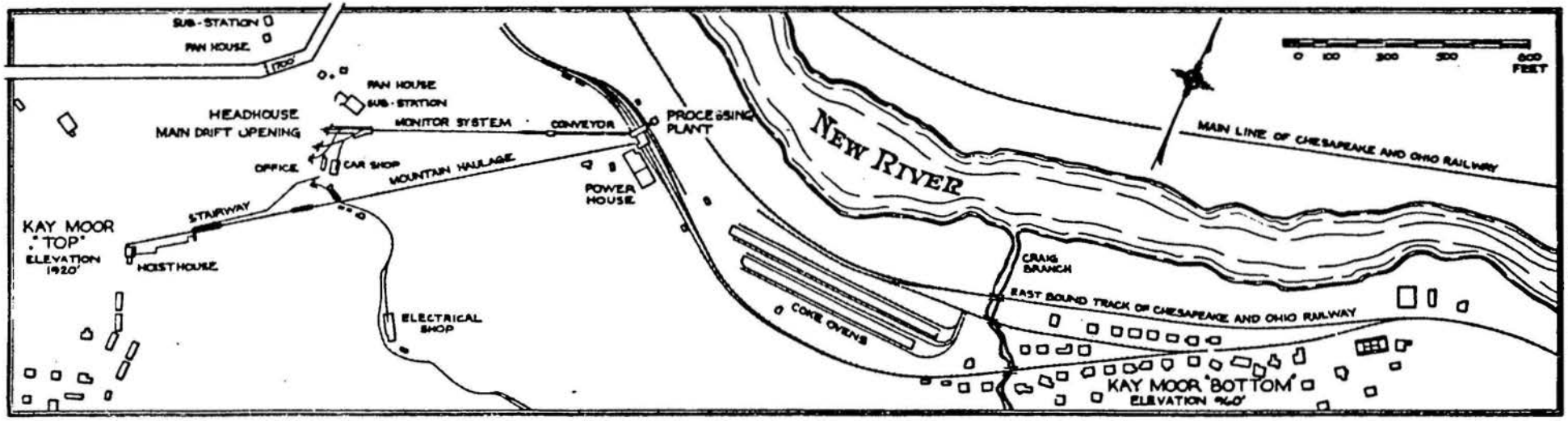
THE KAY MOOR COAL MINE RECORDING PROJECT WAS UNDERTAKEN BY THE HISTORIC AMERICAN ENGINEERING RECORD (HAER), AN AGENCY OF THE NATIONAL PARK SERVICE, U.S. DEPARTMENT OF THE INTERIOR, DURING THE SUMMER OF 1986. THE PROJECT WAS CO-SPONSORED BY THE NEW RIVER GORGE NATIONAL RIVER, OAK HILL, WEST VIRGINIA, JIM CARRICO, SUPERINTENDENT, AND THE HISTORIC AMERICAN BUILDINGS SURVEY / HISTORIC AMERICAN ENGINEERING RECORD (HABS/HAER), ROBERT J. KAPSCH, CHIEF. THE FIELD TEAM, UNDER THE DIRECTION OF ERIC DE LONY, PRINCIPAL ARCHITECT, HAER, CONSISTED OF DONALD KRAFT, PROJECT CO-SUPERVISOR AND ENGINEER (COLUMBIA UNIVERSITY), JACK BERGSTRESSER, PROJECT CO-SUPERVISOR AND HISTORIAN (AUBURN UNIVERSITY), ARCHITECTURAL TECHNICIANS MABEL A. BAGES (KANSAS STATE UNIVERSITY), BENITA C. WELCH (UNIVERSITY OF ILLINOIS), AND MICHAEL P. O'BOYLE (US/ICOMOS AND UNIVERSITY COLLEGE, DUBLIN, IRELAND), AND GRAPHIC DESIGNER RICHARD SARIAN (CLEVELAND INSTITUTE OF ART). FORMAL ON-SITE PHOTOGRAPHY WAS DONE BY JET LOWE, HAER STAFF PHOTOGRAPHER. SPECIAL CONSULTING SERVICES WERE PROVIDED BY JOHN A. BOWIE, AIA (WALLINGFORD, PA.).

LOCATION MAP TAKEN FROM USGS 7.5' SERIES FAYETTEVILLE QUADRANGLE (PHOTOREVISED 1976). UTM LOCATIONS:
17.494190.4210640 (HEADHOUSE)
17.494460.4211020 (PROCESSING PLANT)

SITE PLAN FROM "INSURANCE MAP OF KAY MOOR No. 1", PREPARED FOR NEW RIVER AND POCAHONTAS CONSOLIDATED COAL CO., KAY MOOR DIVISION, 1926. (FROM BERWIND-WHITE LAND COMPANY, CHARLESTON, WEST VIRGINIA)

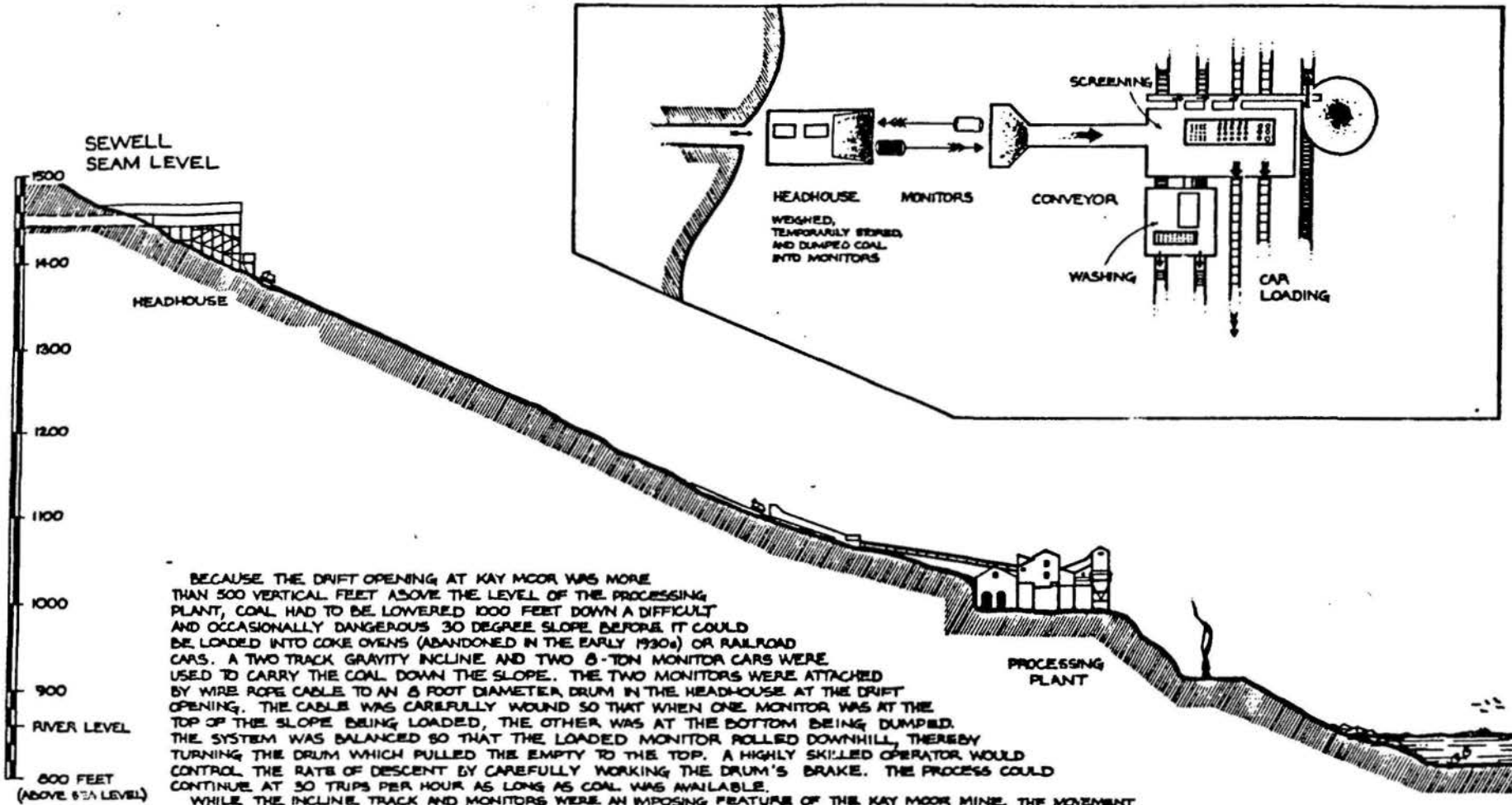






DONALD KRAFT, 1986

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25006
1986



BECAUSE THE DRIFT OPENING AT KAY MOOR WAS MORE THAN 500 VERTICAL FEET ABOVE THE LEVEL OF THE PROCESSING PLANT, COAL HAD TO BE LOWERED 1000 FEET DOWN A DIFFICULT AND OCCASIONALLY DANGEROUS 30 DEGREE SLOPE BEFORE IT COULD BE LOADED INTO COKE OVENS (ABANDONED IN THE EARLY 1930s) OR RAILROAD CARS. A TWO TRACK GRAVITY INCLINE AND TWO 8-TON MONITOR CARS WERE USED TO CARRY THE COAL DOWN THE SLOPE. THE TWO MONITORS WERE ATTACHED BY WIRE ROPE CABLE TO AN 8 FOOT DIAMETER DRUM IN THE HEADHOUSE AT THE DRIFT OPENING. THE CABLE WAS CAREFULLY WOUND SO THAT WHEN ONE MONITOR WAS AT THE TOP OF THE SLOPE BEING LOADED, THE OTHER WAS AT THE BOTTOM BEING DUMPED. THE SYSTEM WAS BALANCED SO THAT THE LOADED MONITOR ROLLED DOWNHILL, THEREBY TURNING THE DRUM WHICH PULLED THE EMPTY TO THE TOP. A HIGHLY SKILLED OPERATOR WOULD CONTROL THE RATE OF DESCENT BY CAREFULLY WORKING THE DRUM'S BRAKE. THE PROCESS COULD CONTINUE AT 30 TRIPS PER HOUR AS LONG AS COAL WAS AVAILABLE.

WHILE THE INCLINE TRACK AND MONITORS WERE AN IMPOSING FEATURE OF THE KAY MOOR MINE, THE MOVEMENT OF COAL WAS A HIGHLY ORGANIZED ROUTINE THAT BEGAN AT THE LEVEL OF THE DRIFT OPENING AND CONTINUED DOWN TO THE TRACK LEVEL. AS THE COAL WAS TAKEN FROM THE MINE, IT WAS BROUGHT INTO THE HEADHOUSE. THERE, IT WAS WEIGHED AND THEN DUMPED INTO THE STRUCTURE'S LARGE STORAGE BIN, WHERE IT WAS FED DIRECTLY INTO THE MONITOR CARS THROUGH TWO CHUTES. AT THE BASE OF THE MONITOR INCLINE, THE COAL WAS DISCHARGED INTO A 100 TON CAPACITY STORAGE CHUTE. A RECIPROCATING FEEDER THEN DISTRIBUTED THE COAL ONTO A HORIZONTAL CONVEYOR WHICH LED INTO THE PROCESSING PLANT.

INSIDE THE PROCESSING PLANT, COAL WAS EITHER SCREENED, OR WASHED AND THEN SCREENED. THE BASIC SCREENING PROCESS WAS DESIGNED TO SORT THE COAL BY SIZE BEFORE IT WAS LOADED INTO RAILROAD CARS. THE WASHING AND SCREENING PROCESS, WHICH WAS CONFINED TO MEDIUM OR SMALLER SIZES OF COAL, WAS DESIGNED TO REMOVE IMPURITIES BEFORE BEING SORTED BY SIZE AND LOADED INTO RAILROAD CARS.

DURING THE PERIOD THAT KAY MOOR SERVED AS A CAPTIVE MINE OF THE LOW MOOR IRON COMPANY, MUCH OF THE SMALLER COAL WAS COKED IN BEEHIVE COKE OVENS A SHORT DISTANCE FROM THE PROCESSING PLANT. LATER, AFTER KAY MOOR WAS PURCHASED BY THE BERWIND-WHITE CORPORATION, THE COKE OVENS WERE ABANDONED AND ALL COAL WAS SHIPPED BY RAIL TO A VARIETY OF CUSTOMERS.

SITE SECTION
AND PROCESS SCHEMATIC
(LOOKING NORTHWEST)

0 50 100 500 1000 FEET

KAY MOOR COAL MINE - 1900

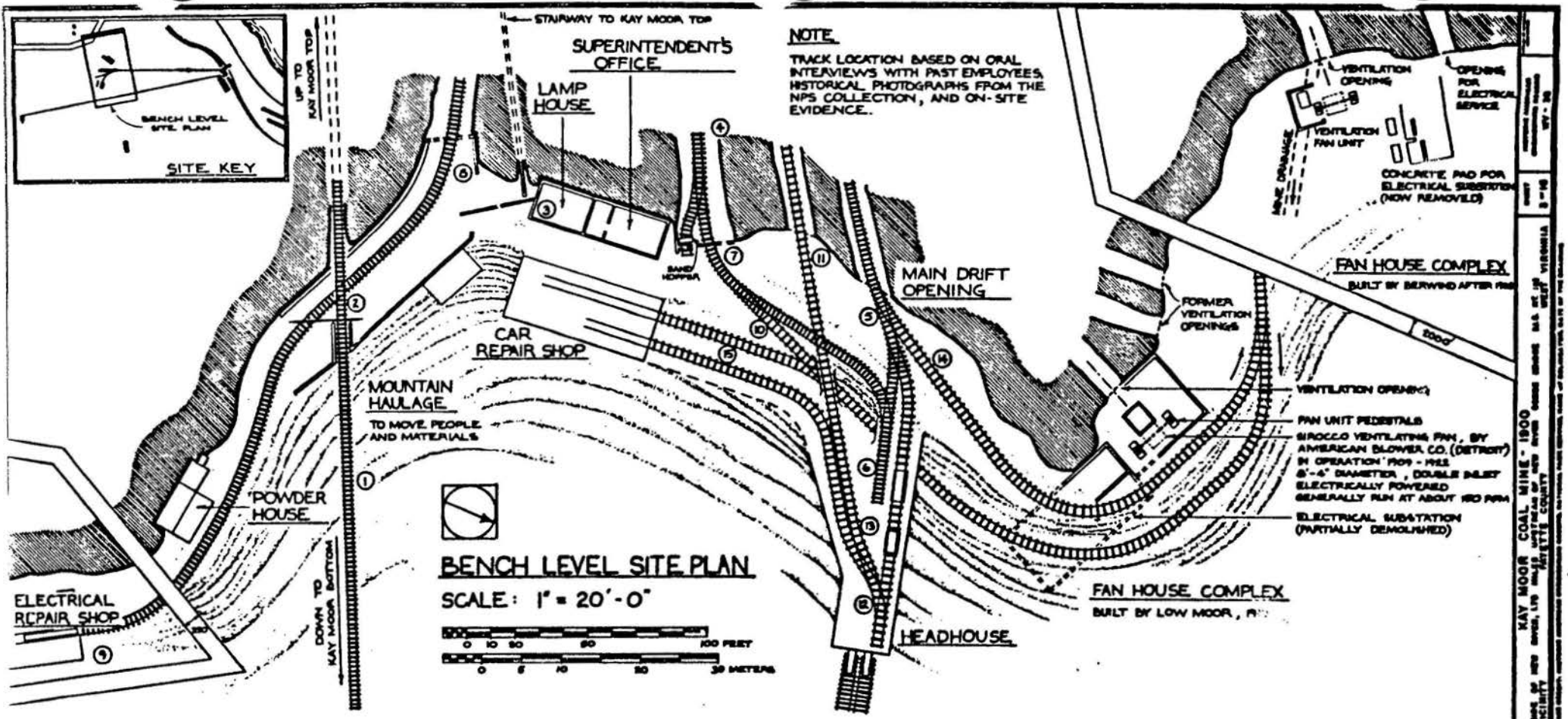
SOUTH SIDE OF NEW RIVER, 1/2 MILE SW OF CRUMPLER, FAYETTE COUNTY, WEST VIRGINIA

HISTORIC AMERICAN ENGINEERING RECORD

DELINEATED: MABEL A. BAGGS, 1984

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THE MOVEMENT OF MEN, COAL CARS, AND MINE LOCOMOTIVES ALONG THE BENCH AT THE DRIFT OPENINGS, 540 FEET ABOVE THE FLOOR OF THE GORGE, WAS A COMPLICATED PROCESS PERFORMED IN A NARROW AREA. MINERS WERE SHUTTLED TO THE BENCH FROM COMPANY TOWNS AT THE TOP AND BOTTOM OF THE GORGE VIA THE "MOUNTAIN HAULAGE" (1), A SINGLE TRACK INCLINE POWERED BY A HOISTING ENGINE AND CABLE DRUM AT THE TOP OF THE GORGE. THE MINERS MOVED FROM THE HAULAGE DROP-OFF POINT (2), NEAR THE DRIFT OPENING, TO THE LAMPHOUSE (3), WHERE THEY PICKED UP THEIR LAMPS AND OTHER EQUIPMENT. THEY THEN ENTERED A WAITING ROOM JUST INSIDE THE DRIFT OPENING (4), AND AWAITED A MINE LOCOMOTIVE PULLING EMPTY CARS THAT WOULD TRANSPORT THEM TO THEIR WORK PLACES DEEP WITHIN THE MINE.

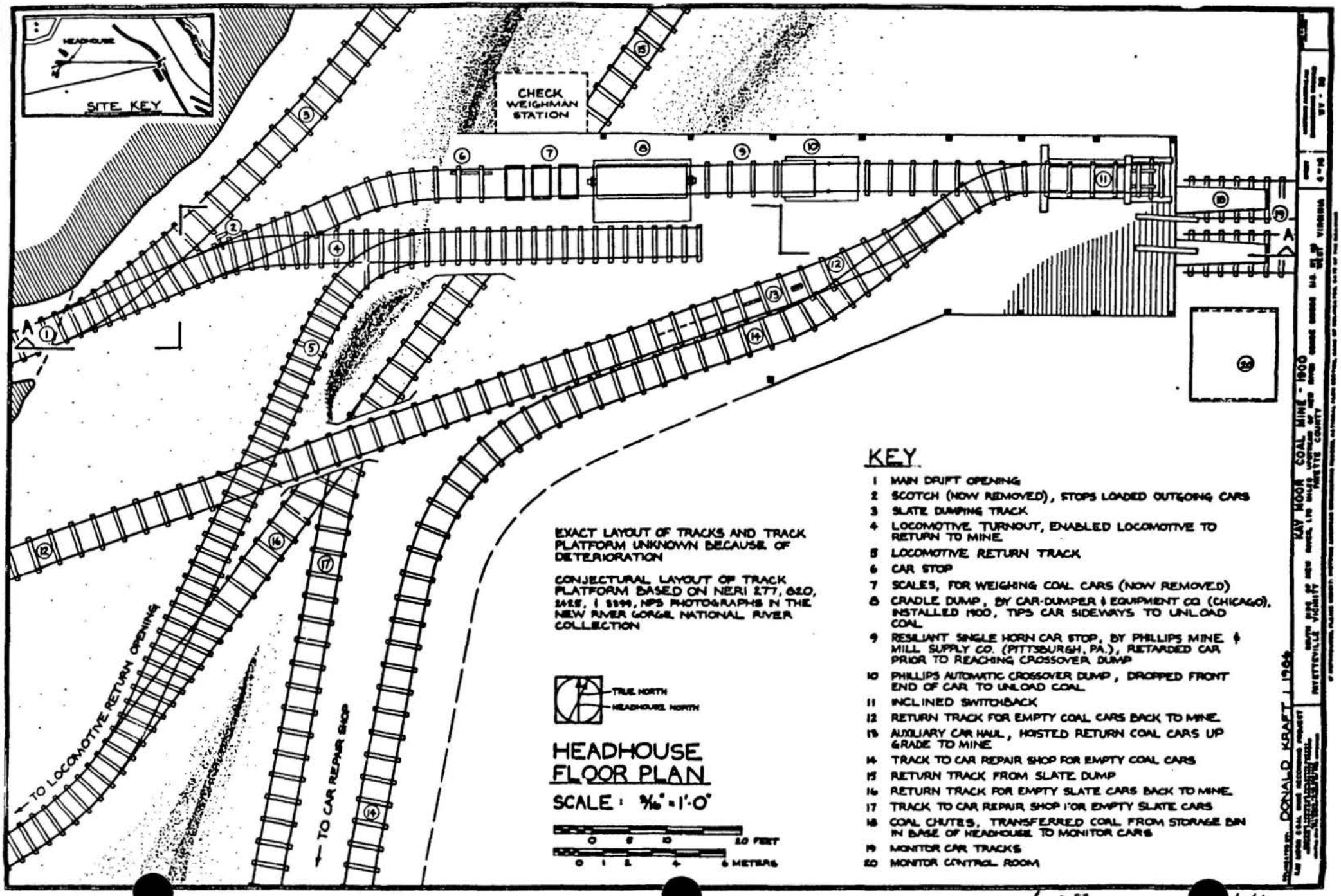
ONCE AT WORK IN ROOMS ON EITHER SIDE OF THE MAIN LOCOMOTIVE TRACK, MINERS BEGAN LOADING CARS EITHER WITH COAL OR SHALE. WHEN LOADED, THESE CARS WERE HAULED TO THE MAIN LOCOMOTIVE TRACK TO BE TRANSPORTED OUT OF THE MINE. DURING KAY MOOR'S EARLY YEARS, MULES PERFORMED THIS INTERMEDIATE HAULAGE, BUT THEY SOON WERE REPLACED BY GATHERING LOCOMOTIVES, SMALLER VERSIONS OF THE ELECTRIC LOCOMOTIVES THAT TRAVELED IN AND OUT OF THE MINE.

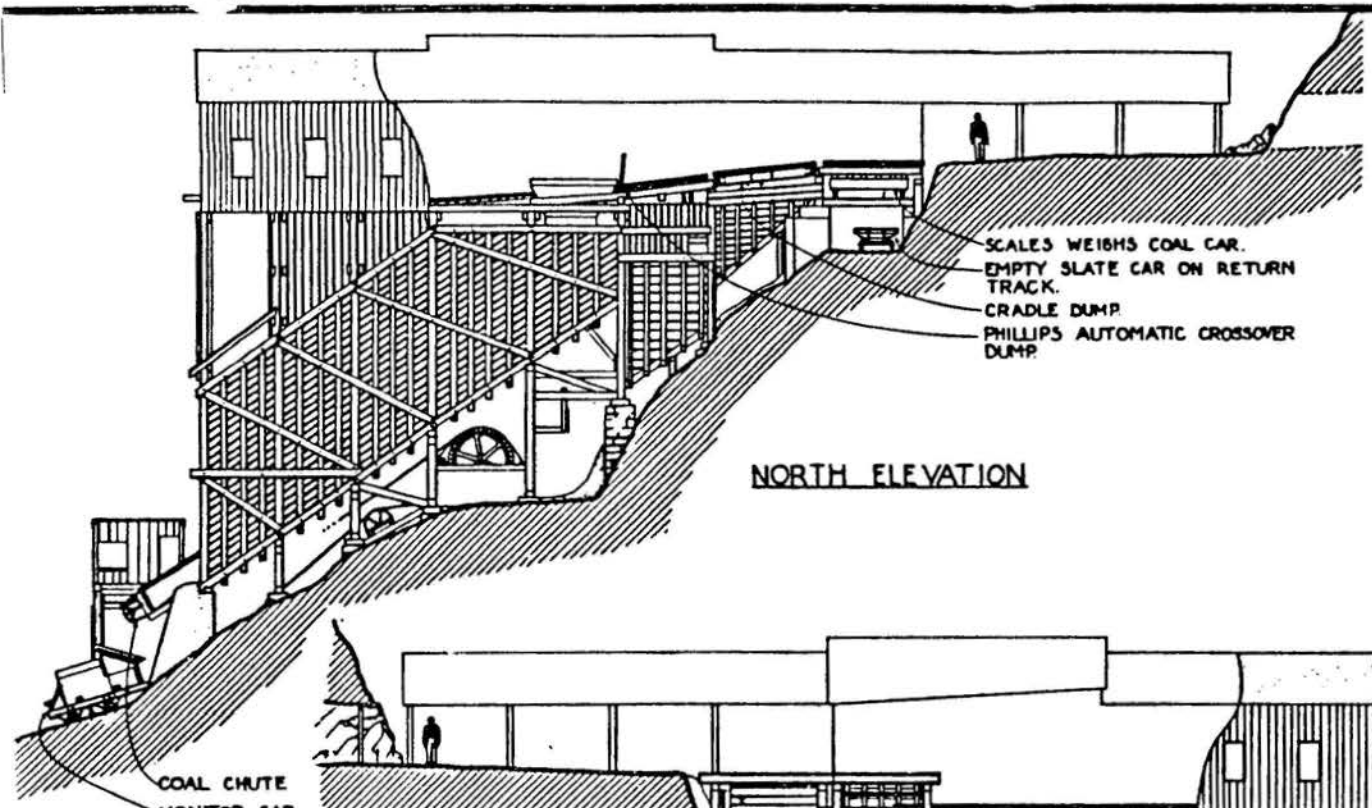
ONCE A MAIN HAULAGE LOCOMOTIVE HAD PICKED UP A FULL STRING OF COAL CARS AND "SLATE" CARS (COAL CARS FILLED WITH SHALE), IT PROCEEDED TO THE SURFACE. AT THE DRIFT OPENING, THE LOCOMOTIVE, COAL CARS, AND SLATE CARS DIVERGED AND FOLLOWED ONE OF THREE SEPARATE TRACKS. THE LOCOMOTIVE STOPPED MOMENTARILY TO ALLOW A "SCOTCH MAN" (5) TO DISCONNECT THE STRING OF MINE CARS. IT THEN SWITCHED OFF THE MAIN TRACK, PROCEEDED ONTO A SIDING IN THE HEADHOUSE (6), REVERSED ITS MOTOR, AND RE-ENTERED THE MINE THROUGH A SEPARATE LOCOMOTIVE OPENING (7). IF THE LOCOMOTIVE NEEDED REPAIRS, IT COULD PROCEED A FEW HUNDRED FEET INTO THE MINE, SWITCH OVER TO ANOTHER TRACK, REVERSE ITS MOTOR, AND EXIT THROUGH A THIRD MINE OPENING, THE LOCOMOTIVE REPAIR EXIT (8), TO THE ELECTRICAL SHOP (9). GATHERING LOCOMOTIVES NEEDING REPAIR USED THE SAME EXIT. IF REPAIRS WERE NOT NECESSARY, THE MAIN HAULAGE LOCOMOTIVE WOULD PICK UP ANY EMPTY SLATE CARS THAT MIGHT BE WAITING ON THEIR SEPARATE TRACK (10) OUTSIDE THE MINE NEAR THE LOCOMOTIVE RETURN OPENING. IMMEDIATELY INSIDE THE MINE, THE LOCOMOTIVE PICKED UP ANY WAITING EMPTY COAL CARS THAT HAD BEEN BROUGHT BACK INTO THE MINE THROUGH A FOURTH OPENING, THE EMPTY COAL CAR ENTRANCE (11).

THE COAL AND SLATE CARS THAT HAD BEEN DETACHED FROM THE LOCOMOTIVE AT THE MAIN DRIFT OPENING WERE RELEASED INDIVIDUALLY ONTO ONE OF TWO TRACKS. THE COAL CARS WERE ALLOWED TO ROLL DOWN A SLIGHT GRADE INTO THE HEADHOUSE, WHERE THEY WERE STOPPED, WEIGHED, AND DUMPED. THEY WERE THEN SWITCHED BACK ONTO ANOTHER TRACK IN THE HEADHOUSE (12), WHERE THEY WERE ENGAGED ONTO WHAT THE MINERS REFERRED TO AS A CREEPER (13). THIS CHAIN MECHANISM SNAGGED THE CARS AND PULLED THEM BACK INTO THE MINE THROUGH THE EMPTY COAL CAR ENTRANCE.

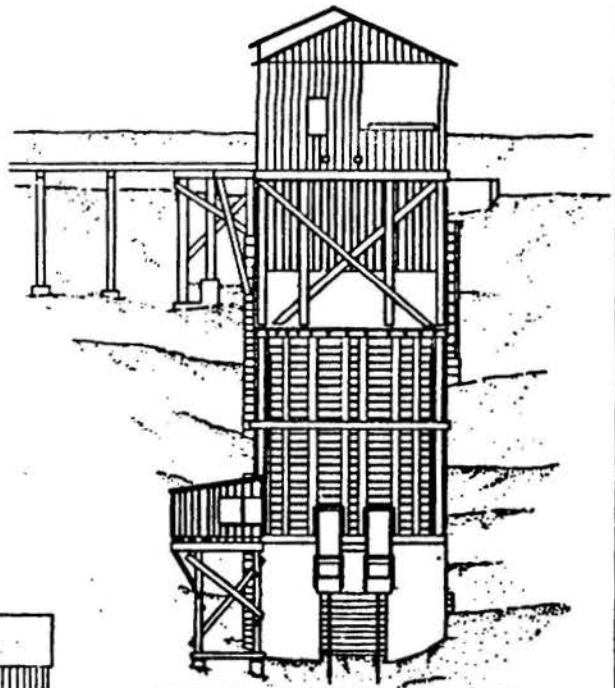
THE SLATE CARS WERE SWITCHED BY THE SCOTCH MAN ONTO A SEPARATE TRACK (14) AND ROLLED DOWNHILL AROUND THE NORTH SIDE OF THE BENCH. THEY WERE THEN CONNECTED TO A CABLE AND PULLED TO THE TOP OF THE GORGE BY AN ENGINE DRIVEN HOISTING DRUM. AFTER BEING DUMPED WELL AWAY FROM THE SLOPE, THE CARS RETURNED TO THE BENCH LEVEL, PASSED UNDER THE SCALES IN THE HEADHOUSE, AND CAME TO A STOP. THEY WERE THEN READY TO BE HAULED BACK INTO THE MINE BY THE MAIN HAULAGE LOCOMOTIVE VIA THE LOCOMOTIVE RETURN OPENING. IF REPAIRS WERE NECESSARY, BOTH THE COAL AND SLATE CARS COULD BE SWITCHED ONTO TRACKS THAT LED INTO THE CAR REPAIR SHOP (15).

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25006


SITE KEY
HEADHOUSE
CHECK WEIGHMAN STATION
TO LOCOMOTIVE RETURN OPENING
TO CAR REPAIR SHOP
EXACT LAYOUT OF TRACKS AND TRACK PLATFORM UNKNOWN BECAUSE OF DETERIORATION
CONJECTURAL LAYOUT OF TRACK PLATFORM BASED ON NERI 277, 620, 2425, & 3399, NPS PHOTOGRAPHS IN THE NEW RIVER GORGE NATIONAL RIVER COLLECTION
TRUE NORTH
HEADHOUSES NORTH
HEADHOUSE FLOOR PLAN
SCALE: 3/16" = 1'-0"
0 5 10 20 FEET
0 1 2 4 6 METERS
KEY
1 MAIN DRIFT OPENING
2 SCOTCH (NOW REMOVED), STOPS LOADED OUTGOING CARS
3 SLATE DUMPING TRACK
4 LOCOMOTIVE TURNOUT, ENABLED LOCOMOTIVE TO RETURN TO MINE
5 LOCOMOTIVE RETURN TRACK
6 CAR STOP
7 SCALES, FOR WEIGHING COAL CARS (NOW REMOVED)
8 CRADLE DUMP, BY CAR-DUMPER & EQUIPMENT CO. (CHICAGO), INSTALLED 1900, TIPS CAR SIDEWAYS TO UNLOAD COAL
9 RESILIANT SINGLE HORN CAR STOP, BY PHILLIPS MINE & MILL SUPPLY CO. (PITTSBURGH, PA.), RETARDED CAR PRIOR TO REACHING CROSSOVER DUMP
10 PHILLIPS AUTOMATIC CROSSOVER DUMP, DROPPED FRONT END OF CAR TO UNLOAD COAL
11 INCLINED SWITCHBACK
12 RETURN TRACK FOR EMPTY COAL CARS BACK TO MINE
13 AUXILIARY CAR HAUL, HOISTED RETURN COAL CARS UP GRADE TO MINE
14 TRACK TO CAR REPAIR SHOP FOR EMPTY COAL CARS
15 RETURN TRACK FROM SLATE DUMP
16 RETURN TRACK FOR EMPTY SLATE CARS BACK TO MINE
17 TRACK TO CAR REPAIR SHOP FOR EMPTY SLATE CARS
18 COAL CHUTES, TRANSFERRED COAL FROM STORAGE BIN IN BASE OF HEADHOUSE TO MONITOR CARS
19 MONITOR CAR TRACKS
20 MONITOR CONTROL ROOM
KAY MOOR COAL MINE - 1900
DONALD KRAFT, 1984

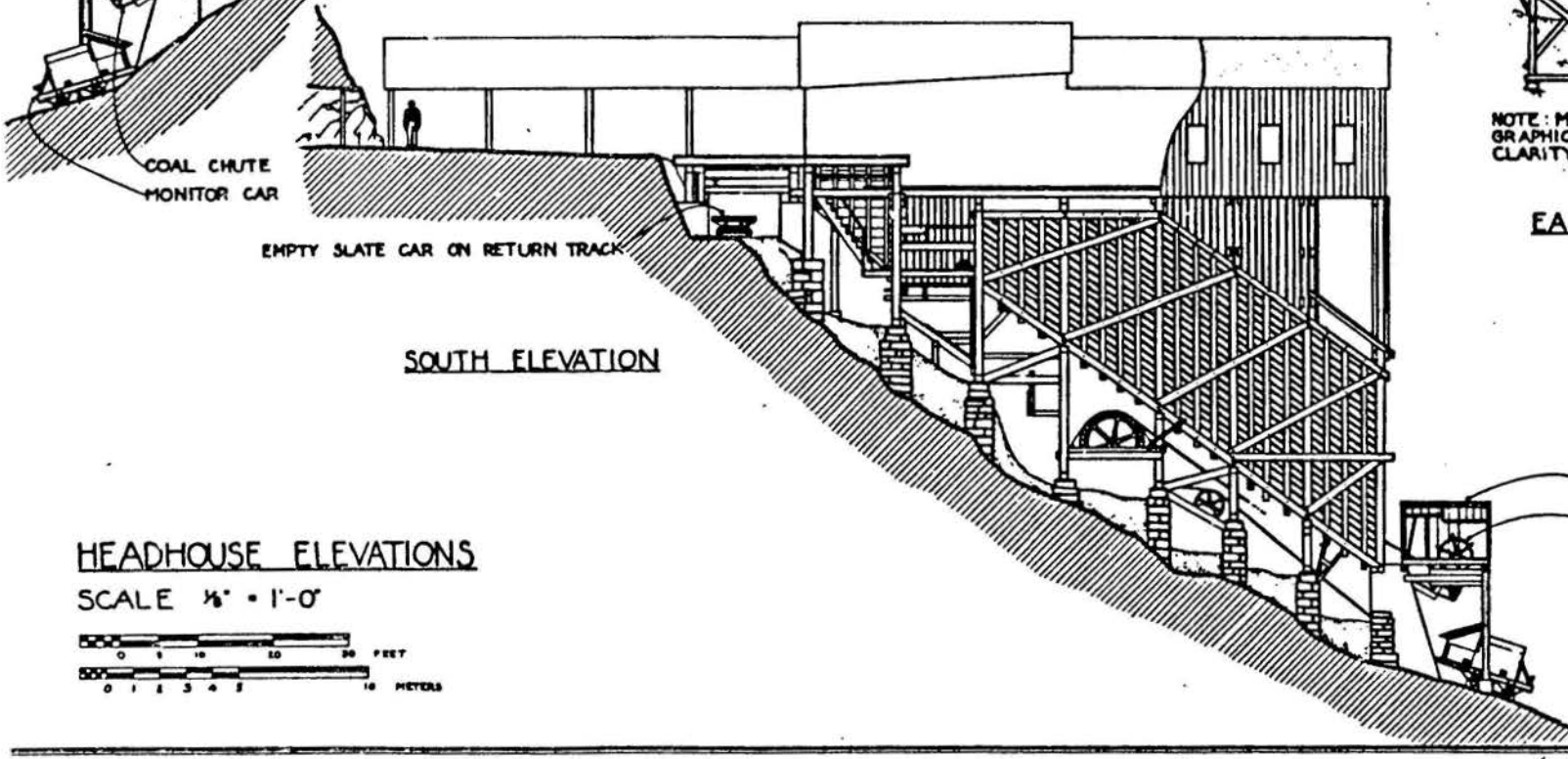


NORTH ELEVATION



NOTE: MONITOR CARS AND TRACKS GRAPHICALLY OMITTED FOR CLARITY.

EAST ELEVATION



SOUTH ELEVATION

HEADHOUSE ELEVATIONS

SCALE 1/8" = 1'-0"

KAY MOOR COAL MINE - 1900

SOUTH SIDE OF NEW RIVER, 1/2 MILES UPSTREAM OF NEW RIVER GORGE BRIDGE ON U.S. 19
FAYETTEVILLE VICINITY
FAYETTE COUNTY
WEST VIRGINIA

MICHAEL P. O'BOYLE, 1986

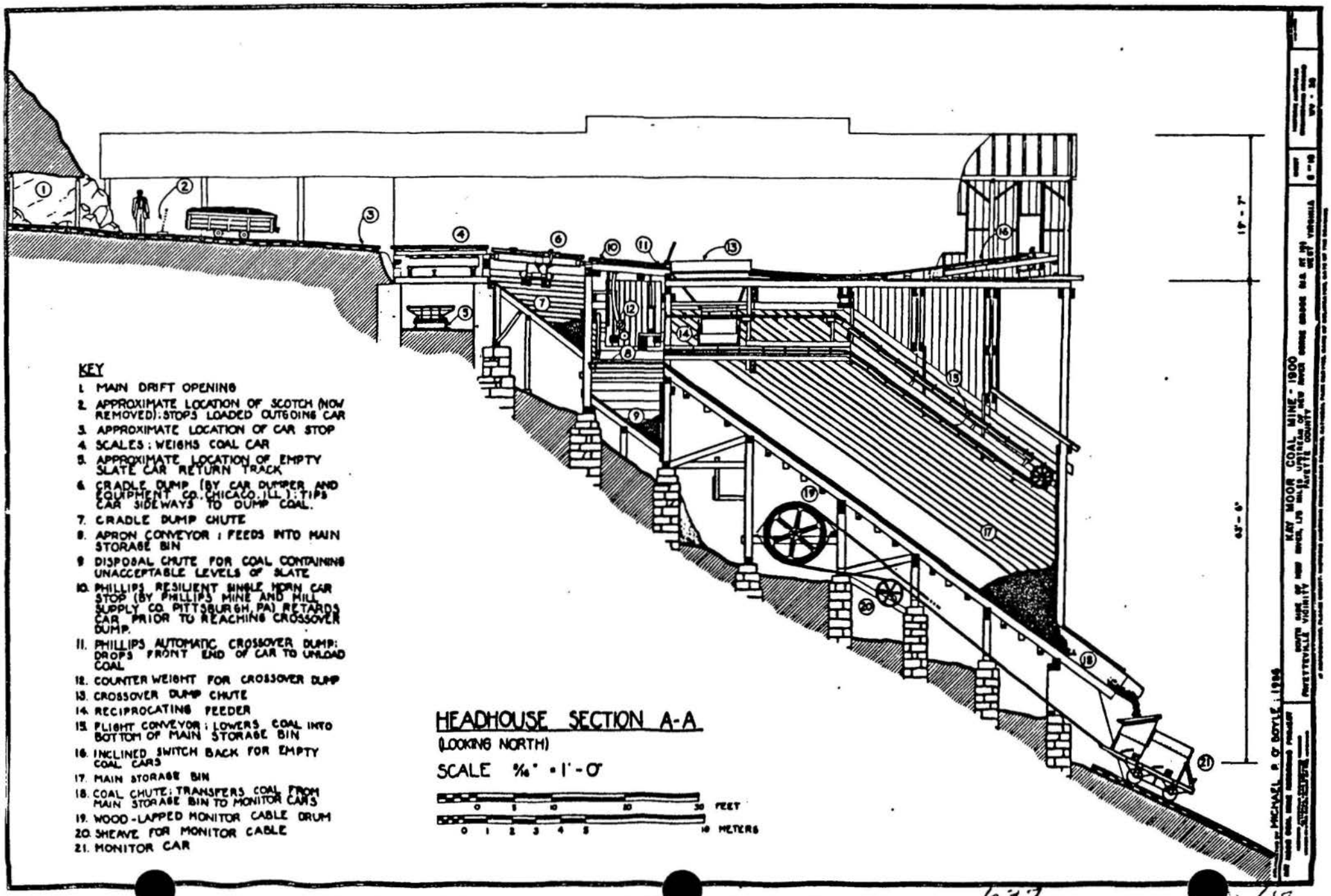
HAER WV-8

8-16

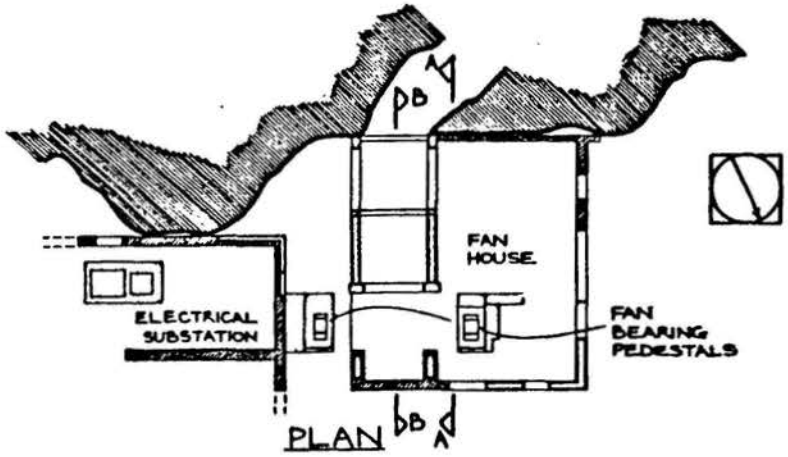
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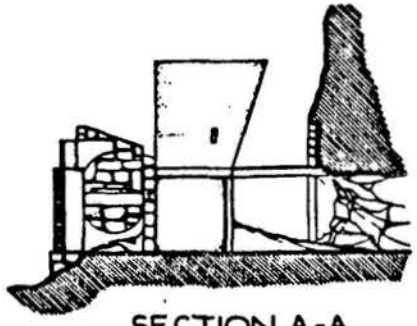
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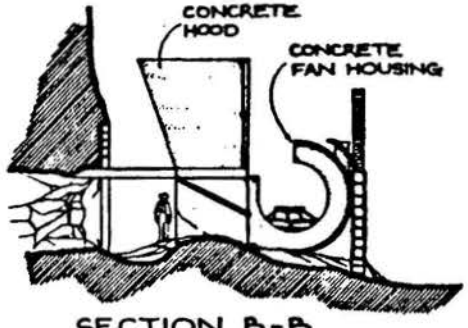
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KEY
1. MAIN DRIFT OPENING
2. APPROXIMATE LOCATION OF SCOTCH (NOW REMOVED): STOPS LOADED OUTGOING CAR
3. APPROXIMATE LOCATION OF CAR STOP
4. SCALES: WEIGHS COAL CAR
5. APPROXIMATE LOCATION OF EMPTY SLATE CAR RETURN TRACK
6. CRADLE DUMP (BY CAR DUMPER AND EQUIPMENT CO. CHICAGO, ILL.): TIPS CAR SIDEWAYS TO DUMP COAL.
7. CRADLE DUMP CHUTE
8. APRON CONVEYOR: FEEDS INTO MAIN STORAGE BIN
9. DISPOSAL CHUTE FOR COAL CONTAINING UNACCEPTABLE LEVELS OF SLATE
10. PHILLIPS RESILIENT SINGLE HORN CAR STOP (BY PHILLIPS MINE AND MILL SUPPLY CO. PITTSBURGH, PA.) RETARDS CAR PRIOR TO REACHING CROSSOVER DUMP.
11. PHILLIPS AUTOMATIC CROSSOVER DUMP: DROPS FRONT END OF CAR TO UNLOAD COAL
12. COUNTER WEIGHT FOR CROSSOVER DUMP
13. CROSSOVER DUMP CHUTE
14. RECIPROCATING FEEDER
15. FLIGHT CONVEYOR: LOWERS COAL INTO BOTTOM OF MAIN STORAGE BIN
16. INCLINED SWITCH BACK FOR EMPTY COAL CARS
17. MAIN STORAGE BIN
18. COAL CHUTE: TRANSFERS COAL FROM MAIN STORAGE BIN TO MONITOR CARS
19. WOOD-LAPPED MONITOR CABLE DRUM
20. SHEAVE FOR MONITOR CABLE
21. MONITOR CAR
HEADHOUSE SECTION A-A
(LOOKING NORTH)
SCALE 3/16" = 1'-0"
0 5 10 20 30 FEET
0 1 2 3 4 5 10 METERS
18'-3"
63'-6"
KAY MOOR COAL MINE - 1900
SOUTH SIDE OF NEW RIVER, 1/8 MILE UPSTREAM OF MOUTH OF NEW RIVER
FAYETTEVILLE VICINITY
FAYETTE COUNTY
WEST VIRGINIA
MICHAEL P. O'BOYLE, 1986
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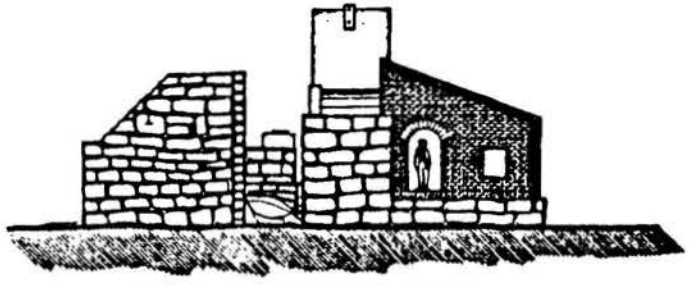
LOW MOOR - 1919



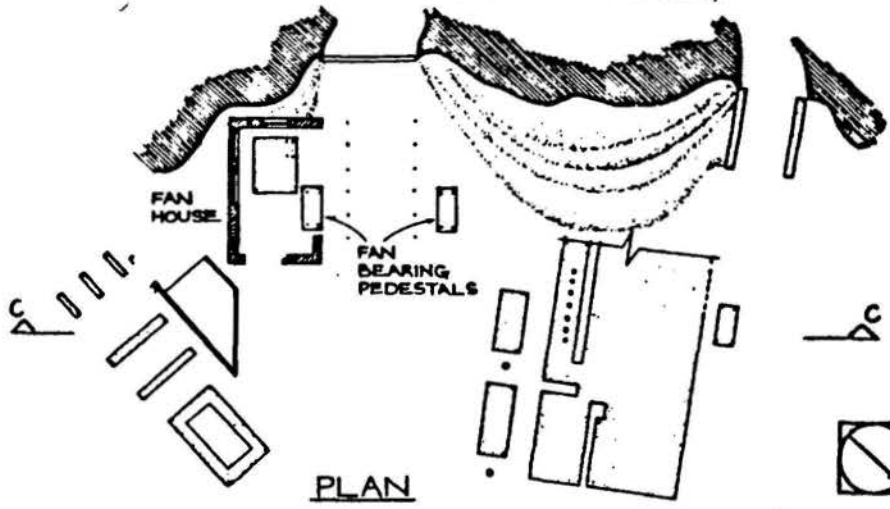

SECTION A-A

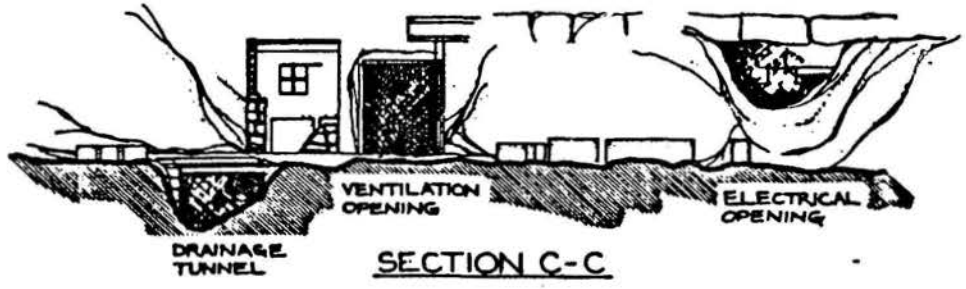


SECTION B-B


FRONT ELEVATION

BERWIND - 1925





SECTION C-C

VENTILATION STRUCTURES AND OPENINGS - LOW MOOR AND BERWIND ERAS

SCALE: 1/8"=1'-0"

THE REMAINS OF THE TWO FAN HOUSES STILL STAND AT KAY MOOR. THE BRICK AND CONCRETE FAN HOUSE ADJACENT TO THE MAIN DRIFT ENTRY WAS BUILT IN 1919 AND WAS USED THROUGHOUT THE REMAINING SIX YEARS OF LOW MOOR IRON COMPANY'S OWNERSHIP. LOW MOOR BUILT THE FIREPROOF STRUCTURE AFTER 15 YEARS OF ILL-LUCK WITH WOODEN FAN HOUSES, DURING WHICH TIME THREE FIRES OCCURRED.

WHETHER THE FAN SYSTEM SHOULD FORCE AIR INTO THE MINE AND OUT THE DRIFT OPENINGS OR PULL AIR THROUGH THE DRIFT OPENINGS TO EXHAUST VIA THE FAN HOUSE WAS A QUESTION NEVER FULLY RESOLVED DURING THE LOW MOOR ERA. LIKEWISE, ANOTHER VARYING FACTOR WAS THAT OF PROPER FAN DIAMETER AND ROTATIONAL SPEED. KAY MOOR WAS ORIGINALLY VENTILATED BY A 20 FOOT DIAMETER CRAWFORD MCCRIMMON FAN, WHICH WAS EXCHANGED FOR A 16 FOOT DIAMETER MODEL AROUND 1908. IN 1910, AN 8'-4" DIAMETER SIROCCO FAN WAS INSTALLED, AND IT CONTINUED IN USE AFTER CONSTRUCTION OF THE CONCRETE AND BRICK FAN HOUSE IN 1919. DOCUMENTARY EVIDENCE INDICATES THAT IT SERVED MOST OF ITS LIFETIME AS A FORCE FAN, BUT WAS POSSIBLY USED AS AN EXHAUST FAN FOR A TIME AROUND 1919-1920.

WHEN BERWIND ACQUIRED KAY MOOR IN 1925, THEY ABANDONED THE OLD SYSTEM AND INSTALLED A NEW FAN HOUSE AT A NEW VENTILATING SHAFT TWO THOUSAND FEET DOWN RIVER FROM THE MAIN DRIFT OPENINGS. ONLY FOUNDATIONS AND TRACES OF FORMER WALLS SURVIVE AS OF 1986.

KAY MOOR COAL MINE - 1900

MARCEL A. BAIGES, 1986

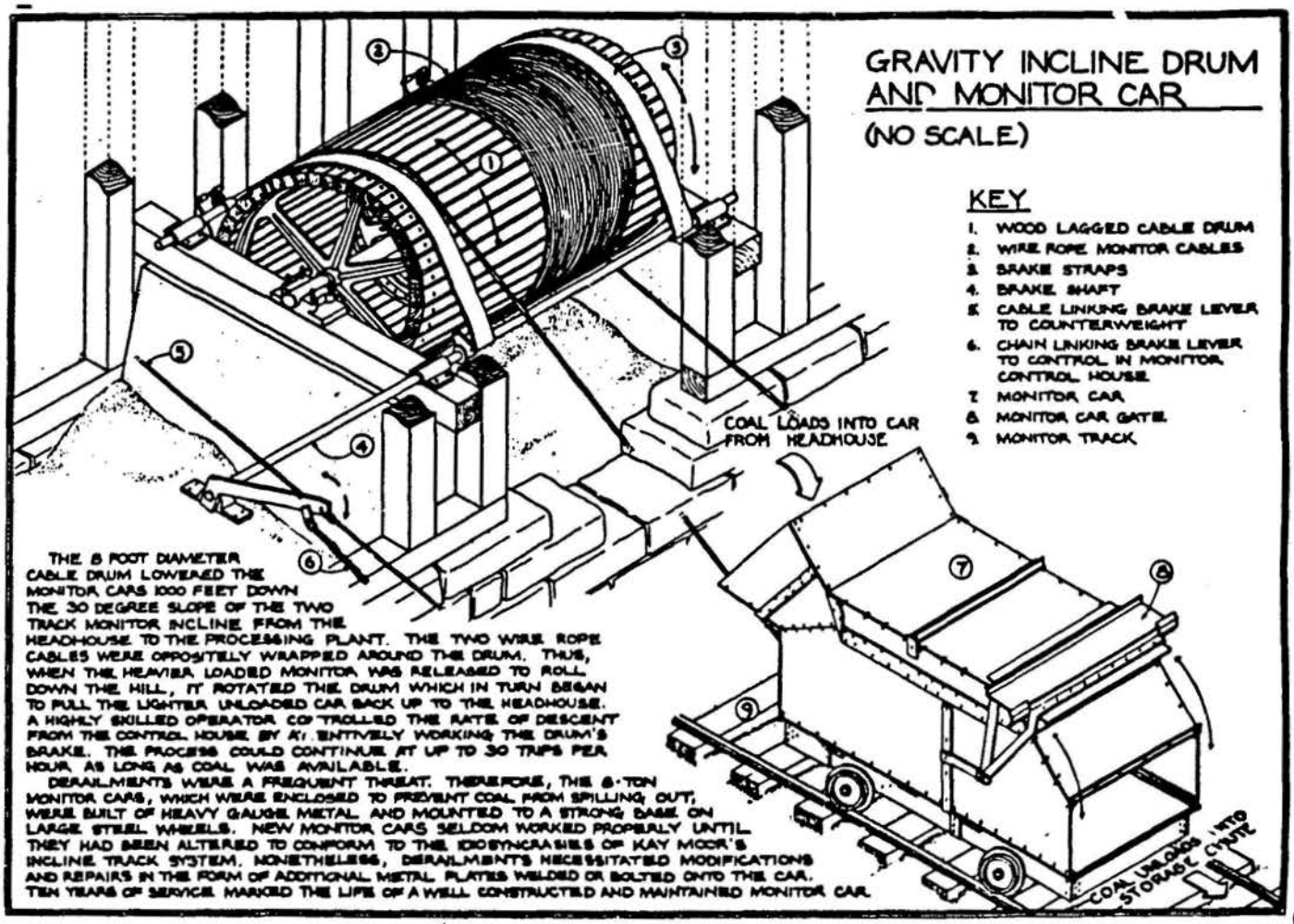
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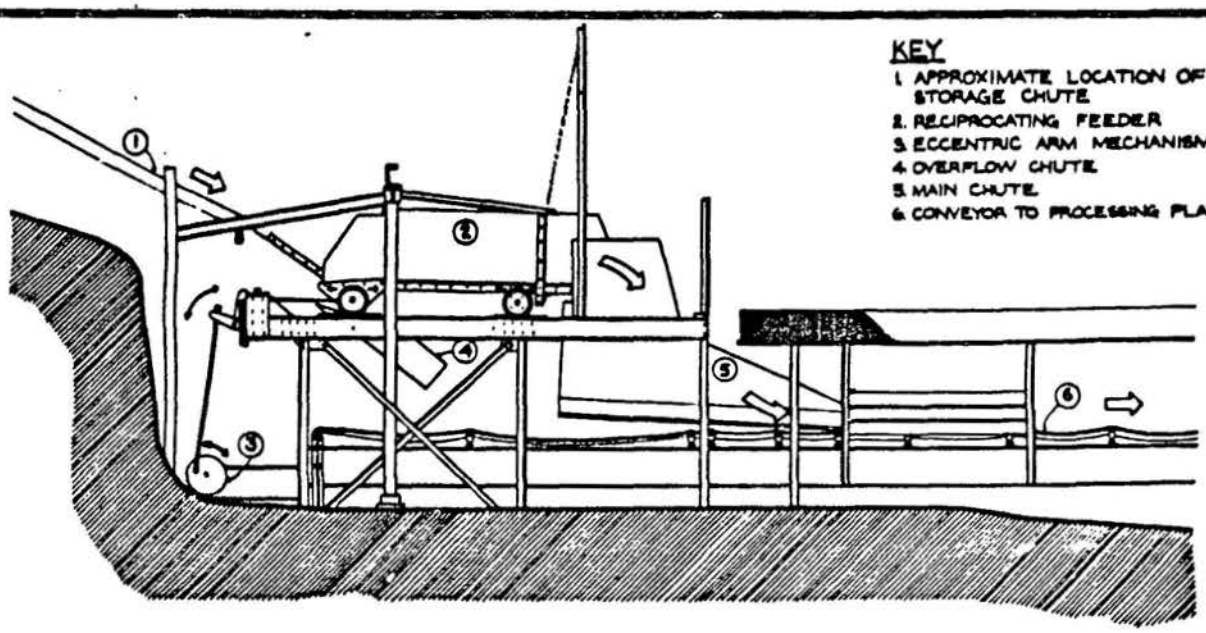
GRAVITY INCLINE DRUM AND MONITOR CAR

(NO SCALE)



THE 8 FOOT DIAMETER CABLE DRUM LOWERED THE MONITOR CARS 1000 FEET DOWN THE 30 DEGREE SLOPE OF THE TWO TRACK MONITOR INCLINE FROM THE HEADHOUSE TO THE PROCESSING PLANT. THE TWO WIRE ROPE CABLES WERE OPPOSITELY WRAPPED AROUND THE DRUM. THUS, WHEN THE HEAVIER LOADED MONITOR WAS RELEASED TO ROLL DOWN THE HILL, IT ROTATED THE DRUM WHICH IN TURN BEGAN TO PULL THE LIGHTER UNLOADED CAR BACK UP TO THE HEADHOUSE. A HIGHLY SKILLED OPERATOR CONTROLLED THE RATE OF DESCENT FROM THE CONTROL HOUSE BY ALTERNATIVELY WORKING THE DRUM'S BRAKE. THE PROCESS COULD CONTINUE AT UP TO 30 TRIPS PER HOUR, AS LONG AS COAL WAS AVAILABLE.

DERAILMENTS WERE A FREQUENT THREAT. THEREFORE, THE 6-TON MONITOR CARS, WHICH WERE ENCLOSED TO PREVENT COAL FROM SPILLING OUT, WERE BUILT OF HEAVY GAUGE METAL AND MOUNTED TO A STRONG BASE ON LARGE STEEL WHEELS. NEW MONITOR CARS SELDOM WORKED PROPERLY UNTIL THEY HAD BEEN ALTERED TO CONFORM TO THE IDIOSYNCRASIES OF KAY MOOR'S INCLINE TRACK SYSTEM. NONETHELESS, DERAILMENTS NECESSITATED MODIFICATIONS AND REPAIRS IN THE FORM OF ADDITIONAL METAL PLATES WELDED OR BOLTED ONTO THE CAR. TEN YEARS OF SERVICE MARKED THE LIFE OF A WELL CONSTRUCTED AND MAINTAINED MONITOR CAR.



RECIPROCATING FEEDER- SOUTH ELEVATION

SCALE: ½" = 1'-0"



AT THE BOTTOM OF THE MONITOR CAR'S DESCENT, ITS GATE WAS OPENED BY A MECHANICALLY ACTIVATED LATCH AND THE LOAD DISCHARGED INTO A 100 TON STORAGE CHUTE. AT THE BASE OF THE STORAGE CHUTE, A RECIPROCATING FEEDER DISTRIBUTED THE COAL ONTO THE CONVEYOR BELT WHICH LED INTO THE PROCESSING PLANT. THIS RECIPROCATING FEEDER WAS MOUNTED ON WHEELS AND ATTACHED TO AN ARM ECCENTRICALLY MOUNTED TO THE ELECTRICAL MOTOR, WHICH PRODUCED THE DESIRED BACK AND FORTH SHAKING MOTION. THE SPEED OF THIS MOTION COULD BE REGULATED, THUS INSURING A STEADY, EVEN FLOW OF COAL ONTO THE CONVEYOR BELT.

MEASURED BY MICHAEL P. O'BOYLE - 1984

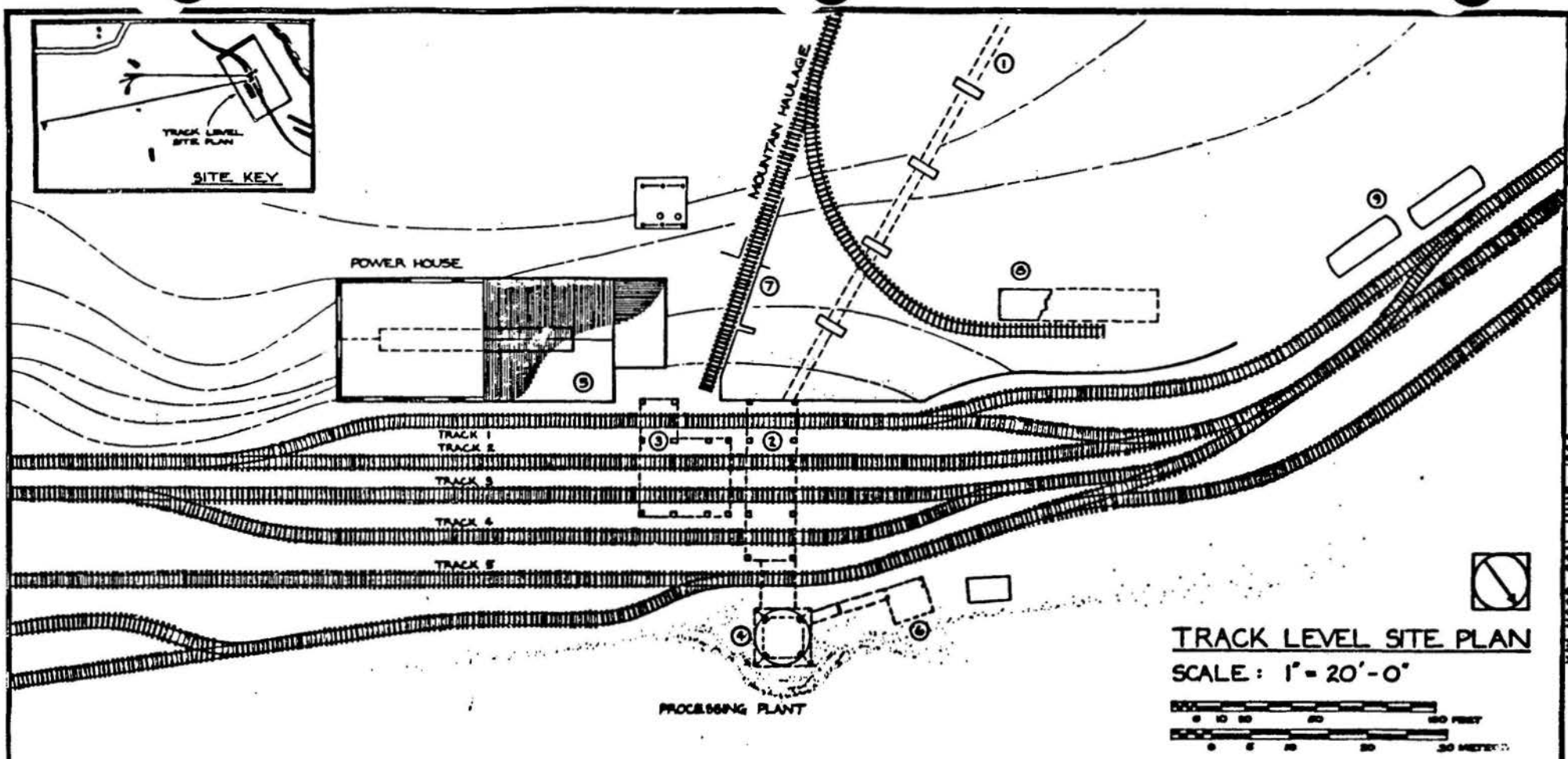
KAY MOOR COAL MINE RECORDING PROJECT

KAY MOOR COAL MINE - 1900

SOUTH SIDE OF NEW RIVER, 1.75 MILES UPSTREAM OF NEW RIVER GORGE BRIDGE (U.S. RT. 19) FAYETTEVILLE VICINITY FAYETTE COUNTY WEST VIRGINIA

DATE 8-84

HISTORIC AMERICAN ENGINEERING RECORD WV-38



AFTER BEING LOWERED DOWN KAY MOOR'S GRAVITY INCLINE, FRESHLY MINED COAL ARRIVED AT THE RAILROAD TRACK LEVEL, WHERE IT WAS DUMPED INTO A 100 TON HOPPER AND FED BY A RECIPROCATING FEEDER ONTO A HORIZONTAL BELT CONVEYOR (LINK BELT COMPANY, CHICAGO)(1). FROM THERE, IT WAS CARRIED INTO THE PROCESSING PLANT, WHERE IT WAS SORTED, WASHED IF NECESSARY, AND LOADED INTO RAILROAD CARS FOR SHIPMENT.

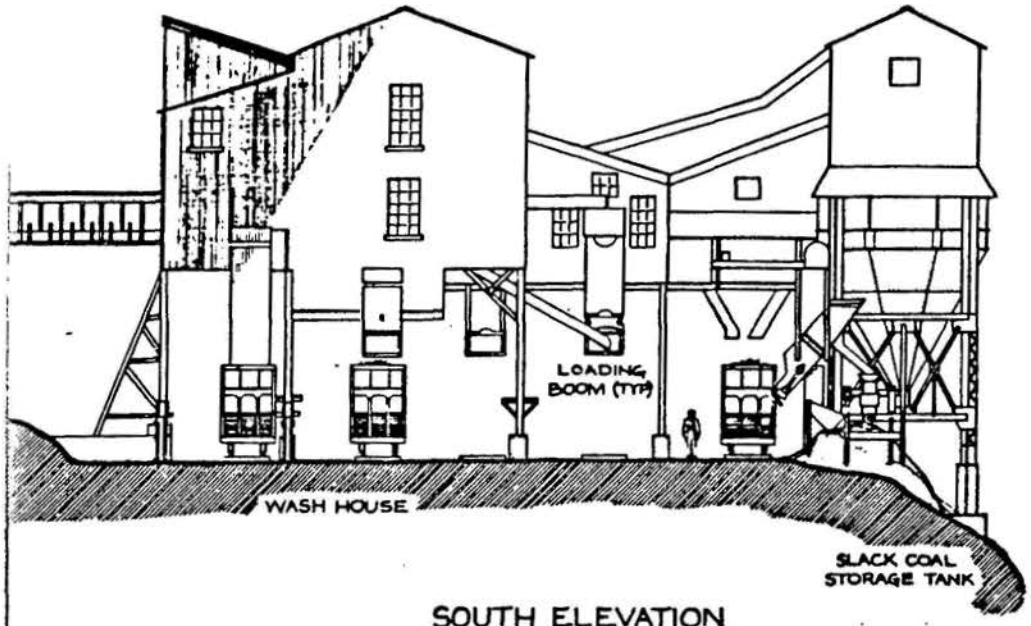
THE PROCESSING PLANT (ACTUALLY THREE FACILITIES, A COAL-SCREENING ROOM (2), A COAL WASHING AND SCREENING ROOM (3), AND A SLACK COAL STORAGE TANK (4)) IS NOT THE OLDEST BUILDING AT THE TRACK LEVEL. IT IS PREDATED BY THE POWER HOUSE (5), COKE OVENS, AND VARIOUS MINOR SUPPORT STRUCTURES. THE ORIGINAL PROCESSING PLANT, BUILT BY THE LOW MOOR IRON COMPANY IN 1900, WAS CAPABLE OF LOADING COAL ONTO THREE RAILROAD TRACKS. THE TIMBER STRUCTURE CONTAINED A COAL CRUSHER AND GRAVITY COAL SCREENS. LOADING BOOMS WERE EVENTUALLY ADDED TO REDUCE BREAKAGE WHEN COAL WAS LOADED INTO RAILROAD CARS. AFTER THE PROCESSING PLANT BURNED IN 1924, KAY MOOR WAS SOLD TO NEW RIVER AND POCAHONTAS CONSOLIDATED COAL COMPANY, A SUBSIDIARY OF BERWIND-WHITE CORPORATION OF PHILADELPHIA. THE NEW OWNERS BUILT A MODERN, FIREPROOF, CORRUGATED METAL PROCESSING PLANT SHORTLY THEREAFTER IN 1925. A SIMON-CARVES BAUM 35 COAL WASHING PLANT (LINK BELT COMPANY, CHICAGO), WHICH COULD WASH 60 TONS OF COAL PER HOUR, WAS ADDED CA. 1928.

THE NEW PROCESSING PLANT COULD LOAD COAL ONTO FIVE RAILROAD TRACKS SIMULTANEOUSLY. WHILE THE PLANT WAS EQUIPPED WITH A VARIETY OF COAL LOADING CHUTES WHICH ALLOWED NUMEROUS OPTIONS, THE ROUTINE LOADING SCHEME WAS RELATIVELY SIMPLE. COAL FROM THE WASHER ROOM, GENERALLY SIZED UNDER 3½", WAS LOADED INTO CARS ON TRACKS 1 AND 2. LARGE COAL, OVER 3½", MOVED FROM THE SHAKER SCREEN ROOM ONTO LOADING BOOMS (APRON CONVEYORS) AND INTO RAILROAD CARS ON TRACKS 3 AND 4. SLACK COAL, SMALL COAL USUALLY LESS THAN ⅛", WAS LOADED FROM THE SLACK STORAGE TANK INTO CARS ON TRACK 5. SLACK COAL WAS FREQUENTLY LOADED INTO BOX CARS VIA A MANIERRE BOX CAR LOADER (6), WHICH ALSO FED ONTO TRACK 5.

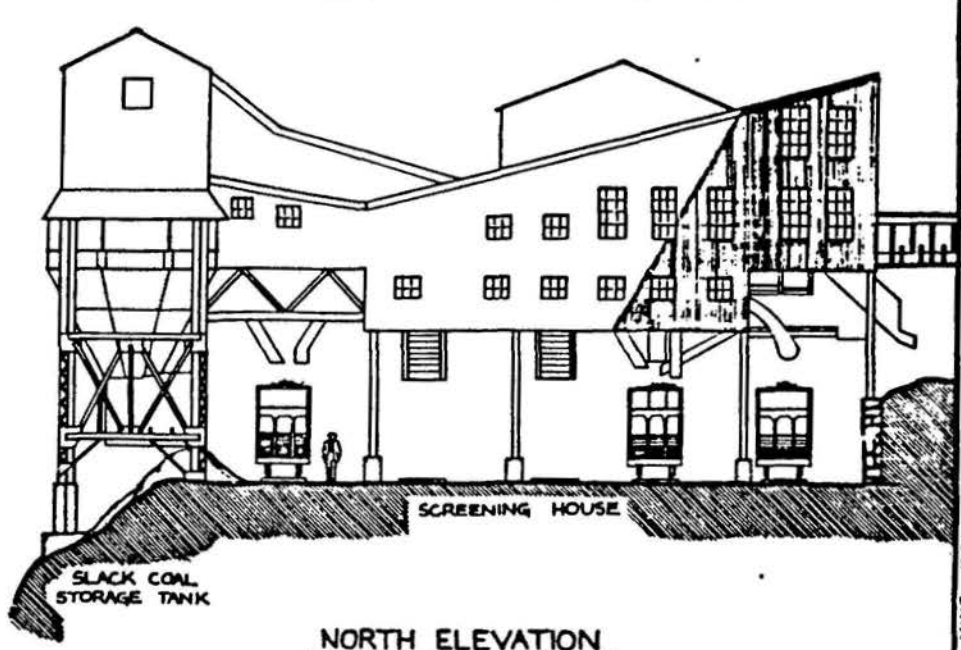
THE POWER HOUSE, WHICH WAS BUILT IN 1899-1900 AND EXPANDED IN 1908, ORIGINALLY CONTAINED THREE BOILERS, TWO STEAM ENGINES, AND AIR COMPRESSORS WHICH POWERED THE MINE'S HARRISON PICK-MACHINES. IN 1913, A GENERATING PLANT WAS INSTALLED TO PROVIDE ELECTRICITY FOR ELECTRIC MINE LOCOMOTIVES, COAL CUTTING MACHINERY, LIGHTING, AND OTHER PURPOSES. THE POWER PLANT WAS ABANDONED CA. 1934 WHEN BERWIND-WHITE SHIFTED TO ELECTRICITY PURCHASED FROM OUTSIDE SOURCES.

THE BASE OF THE MOUNTAIN HAULAGE (7), LOCATED BETWEEN THE POWER HOUSE AND THE PROCESSING PLANT, WAS THE LOADING AND UNLOADING POINT FOR PEOPLE, EQUIPMENT, AND SUPPLIES BEING TRANSPORTED TO THE MINE OPENINGS 840 FEET UP, AND TO THE TOP OF THE GORGE. SAND WAS TRANSPORTED FROM THE SAND DRYING HOUSE (8) UP TO THE MINE LEVEL, WHERE IT WAS USED TO PROVIDE TRACTION TO HAULAGE LOCOMOTIVES. TWO LARGE OIL TANKS (9) STORED OIL WHICH WAS SPRAYED ON COAL AS IT WAS LOADED INTO RAILROAD CARS TO HOLD DOWN DUST AND PREVENT THE COAL FROM FREEZING TOGETHER IN COLD WEATHER. TWO BANKS OF BEEHIVE COKE OVENS, LOCATED BETWEEN THE PROCESSING PLANT RAILROAD TRACKS AND THE EAST BOUND TRACK OF THE CHESAPEAKE AND OHIO RAILWAY, WERE ABANDONED CA. 1934.

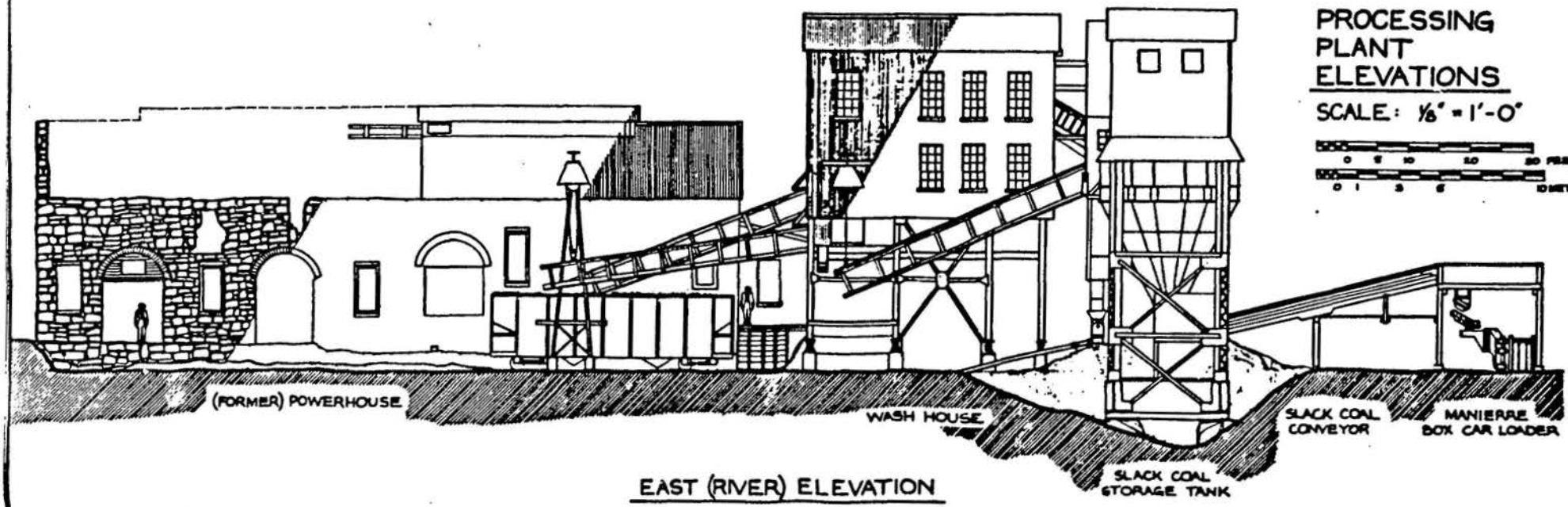
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SOUTH ELEVATION



NORTH ELEVATION



EAST (RIVER) ELEVATION

PROCESSING PLANT ELEVATIONS

SCALE: 1/8" = 1'-0"

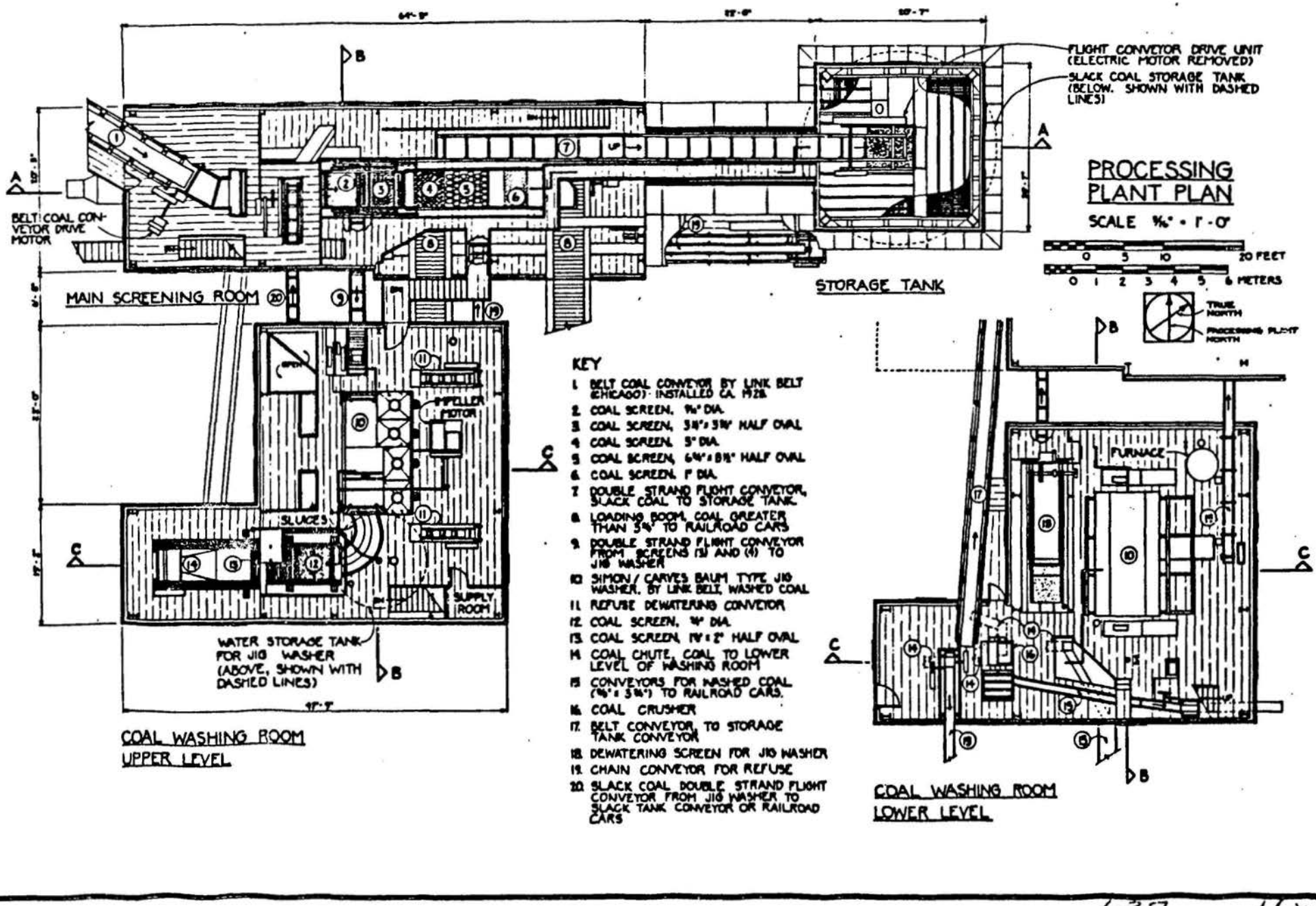
0 5 10 20 30 FEET

0 1 2 3 4 METER

KAY MOOR COAL MINE - 1900

SOUTH FORK OF NEW RIVER, 1.75 MILES UPSTREAM OF MOUTH OF DAVIS RUN
FAYETTE COUNTY
VICINITY
OAKWOOD
FAYETTEVILLE
WEST VIRGINIA

637



PROCESSING PLANT PLAN

SCALE 1/16" = 1'-0"

0 5 10 20 FEET

0 1 2 3 4 5 6 METERS

KEY

1. BELT COAL CONVEYOR BY LINK BELT (CHICAGO) INSTALLED CA. 1928
2. COAL SCREEN, 9/16" DIA.
3. COAL SCREEN, 5/16" x 3/16" HALF OVAL
4. COAL SCREEN, 3" DIA.
5. COAL SCREEN, 6 1/4" x 8 1/2" HALF OVAL
6. COAL SCREEN, 1" DIA.
7. DOUBLE STRAND FLIGHT CONVEYOR, SLACK COAL TO STORAGE TANK.
8. LOADING BOOM, COAL GREATER THAN 5/16" TO RAILROAD CARS
9. DOUBLE STRAND FLIGHT CONVEYOR FROM SCREENS (3) AND (4) TO JIG WASHER
10. SIMON / CARVES BAUM TYPE JIG WASHER, BY LINK BELT, WASHED COAL
11. REFUSE DEWATERING CONVEYOR
12. COAL SCREEN, 1/4" DIA.
13. COAL SCREEN, 1/4" x 2" HALF OVAL
14. COAL CHUTE, COAL TO LOWER LEVEL OF WASHING ROOM
15. CONVEYORS FOR WASHED COAL (9/16" x 3/16") TO RAILROAD CARS.
16. COAL CRUSHER
17. BELT CONVEYOR TO STORAGE TANK CONVEYOR
18. DEWATERING SCREEN FOR JIG WASHER
19. CHAIN CONVEYOR FOR REFUSE
20. SLACK COAL DOUBLE STRAND FLIGHT CONVEYOR FROM JIG WASHER TO SLACK TANK CONVEYOR OR RAILROAD CARS

COAL WASHING ROOM
UPPER LEVEL

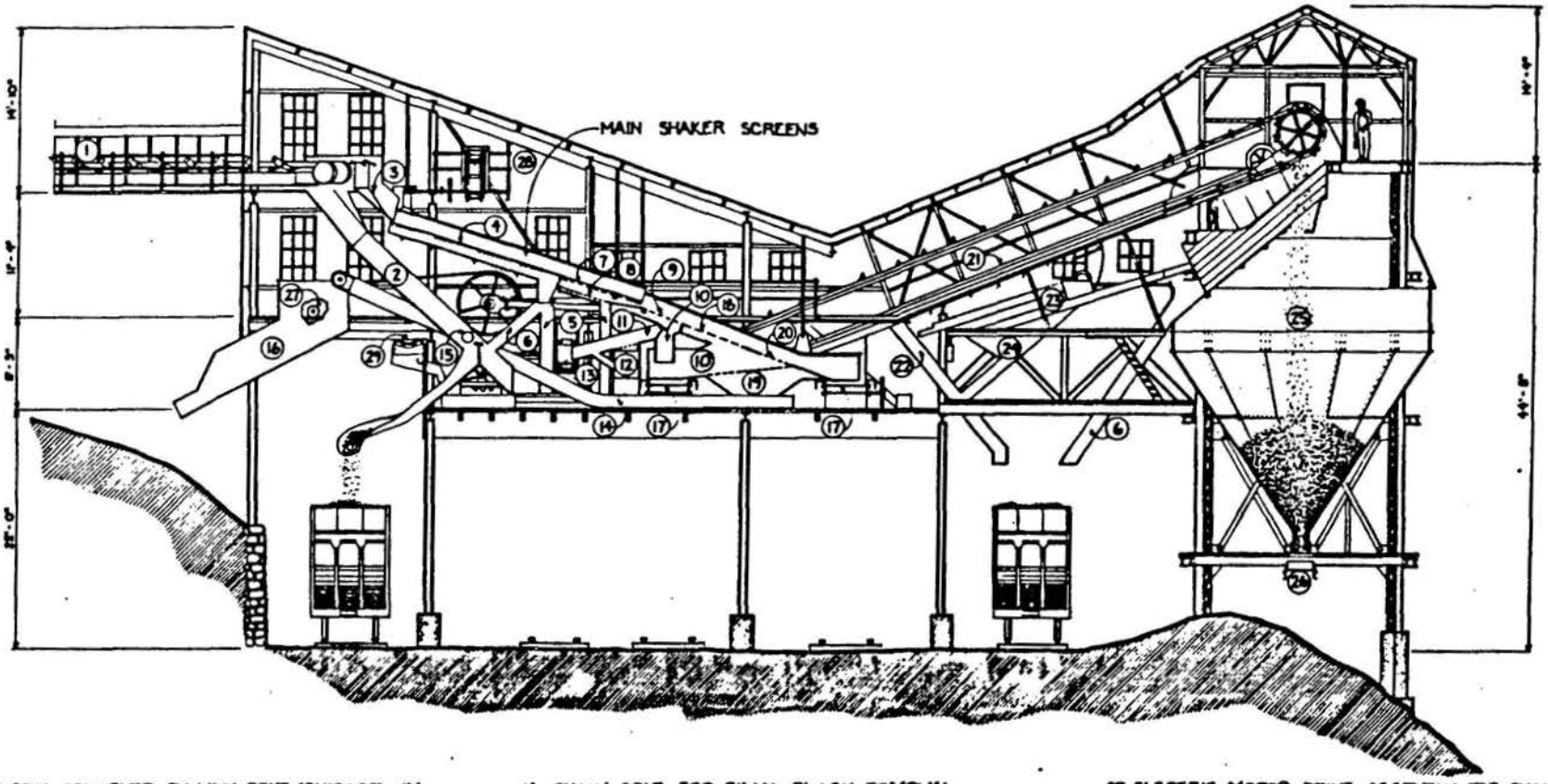
COAL WASHING ROOM
LOWER LEVEL

KAY MOOR COAL MINE - 1900

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KEY

1. BELT COAL CONVEYOR, BY LINK BELT (CHICAGO), INSTALLED CA 1928
2. CHUTE FOR DIVERTING RUN OF MINE COAL (ROM) DIRECTLY INTO RAILROAD CARS
3. CHUTE FROM BELT CONVEYOR (1) TO COAL SCREEN
4. COAL SCREEN, 9/16" DIA.
5. CHUTE FROM 9/16" AND 3/8" SCREENS TO STORAGE TANK FLIGHT CONVEYOR (21)
6. SLACK CHUTE TO RAILROAD CARS
7. COAL SCREEN, 5 1/4" x 3 1/4" HALF OVAL
8. COAL SCREEN, 3/8" DIA.
9. COAL SCREEN, 3" DIA.
10. CHUTE TO LOADING BOOM (17)
11. CHUTE FROM SCREENS (7) AND (9) TO WASH HOUSE FLIGHT CONVEYOR (13)
12. CHUTE OFF OF 9/16" SCREEN LEADING TO CHAIN BELT (14)
13. DOUBLE STRAND FLIGHT CONVEYOR TO WASH HOUSE
14. CHAIN BELT FOR FINAL SLACK REMOVAL
15. GATE OFF OF CHAIN BELT (14) TO SLACK CHUTE (19)
16. CHUTE FOR UNDETERMINED PURPOSE
17. LOADING BOOM, TO RAILROAD CAR, FOR COAL GREATER THAN 3 1/4" DIA.
18. COAL SCREEN, 6 1/4" x 8 1/4" HALF OVAL
19. CHUTE (FOR UNDETERMINED PURPOSES) OFF OF 2 1/2" SCREEN
20. SHAKER SCREEN, 1" DIA.
21. DOUBLE STRAND FLIGHT CONVEYOR, SLACK COAL TO STORAGE TANK
22. CHUTE TO RAILROAD CAR FOR UNSCREENED SLACK OFF STORAGE TANK FLIGHT CONVEYOR (21) OR SCREENED SLACK OFF OF VIBRATING SCREEN (23)
23. WIRE MESH VIBRATING SCREEN
24. DUST HOPPER
25. SLACK COAL STORAGE TANK
26. BELT CONVEYOR FROM STORAGE TANK (25) TO BOX CAR LOADER
27. ELECTRIC MOTOR DRIVE ASSEMBLY FOR SHAKER SCREENS
28. SLACK COAL DOUBLE STRAND FLIGHT CONVEYOR FROM JIG WASHER TO STORAGE TANK CONVEYOR
29. BELT CONVEYOR FROM WASH HOUSE TO STORAGE TANK FLIGHT CONVEYOR (21)

PROCESSING PLANT
SECTION A-A
(LOOKING NORTH)

SCALE 3/16" = 1'-0"

0 5 10 20 FEET

0 1 2 3 4 5 6 METERS

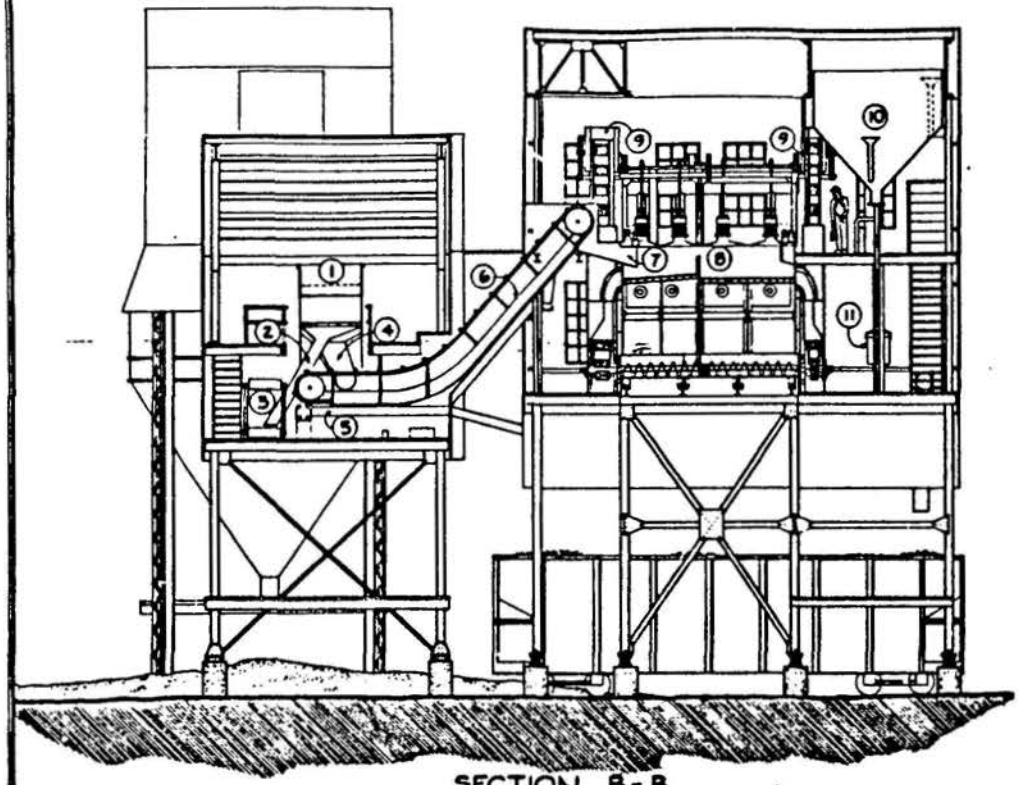
KAY MOOR COAL MINE - 1900

PINEVILLE VICINITY

RENITA C. WELCH: 1986

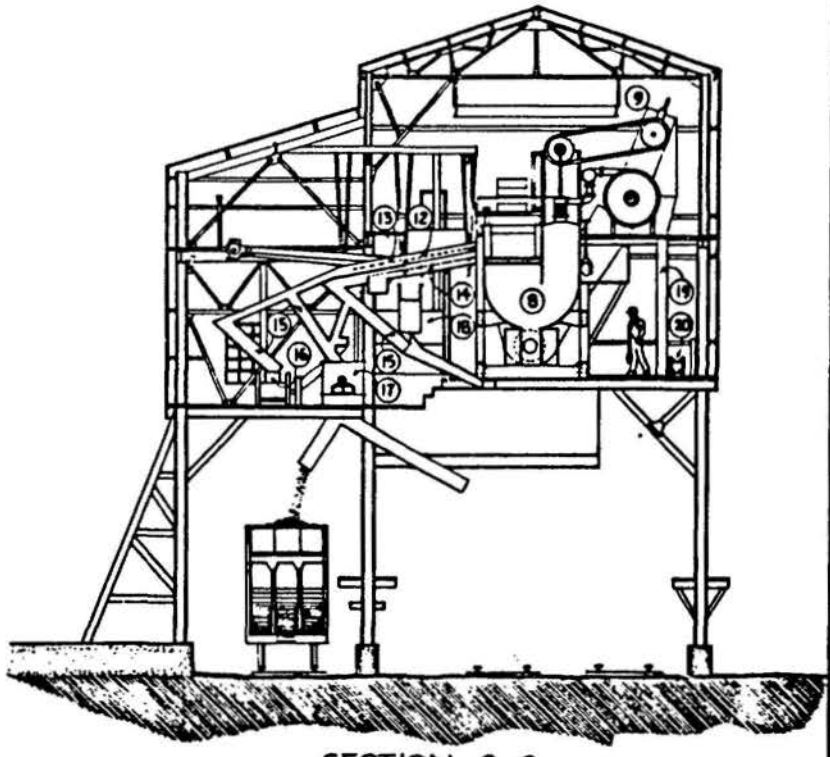
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SECTION B-B

THROUGH MAIN SCREENING ROOM
AND COAL WASHING ROOM
(LOOKING EAST)



SECTION C-C

THROUGH COAL WASHING ROOM
(LOOKING NORTH)

KEY

1. MAIN SHAKER SCREEN
2. CHUTE OFF OF 1½" SHAKER SCREEN LEADING TO SLACK TANK FLIGHT CONVEYOR (5)
3. DOUBLE STRAND FLIGHT CONVEYOR, SLACK COAL TO STORAGE TANK
4. CHUTE OFF OF 3" SHAKER SCREEN TO WASH HOUSE FLIGHT CONVEYOR (6)
5. LOADING BOOM, TO RAILROAD CAR, FOR COAL GREATER THAN 3¼"
6. DOUBLE STRAND FLIGHT CONVEYOR TO WASH HOUSE
7. CHUTE FROM WASH HOUSE FLIGHT CONVEYOR (6) TO JIG WASH (8)
8. SIMON-CARVES BAUM. TYPE JIG WASHER
9. REFUSE DEWATERING CONVEYOR
10. WASHERY RESERVOIR
11. HOIST
12. COAL SCREEN, 14" DIA.
13. COAL SCREEN, 1½" x 2" HALF OVAL
14. COAL SCREEN, ⅜" DIA.
15. CHUTE FROM SHAKER SCREENS TO LOWER LEVEL
16. CHAIN CONVEYOR TO RAILROAD CARS
17. COAL CRUSHER
18. DEWATERING SCREEN
19. REFUSE CHUTE
20. CHAIN CONVEYOR TO TRANSPORT REFUSE

SCALE 3/16" = 1'-0"

0 5 10 20 50 FEET

0 1 2 3 4 5 10 METERS

KAY MOOR COAL MINE - 1900

SOUTH SIDE OF NEW RIVER, 1½ MILES UPSTREAM OF MOUTH OF PAYNE GLADE, 2 MILES NW OF FAYETTEVILLE, FAYETTE COUNTY, WEST VIRGINIA

SHEET 13-16

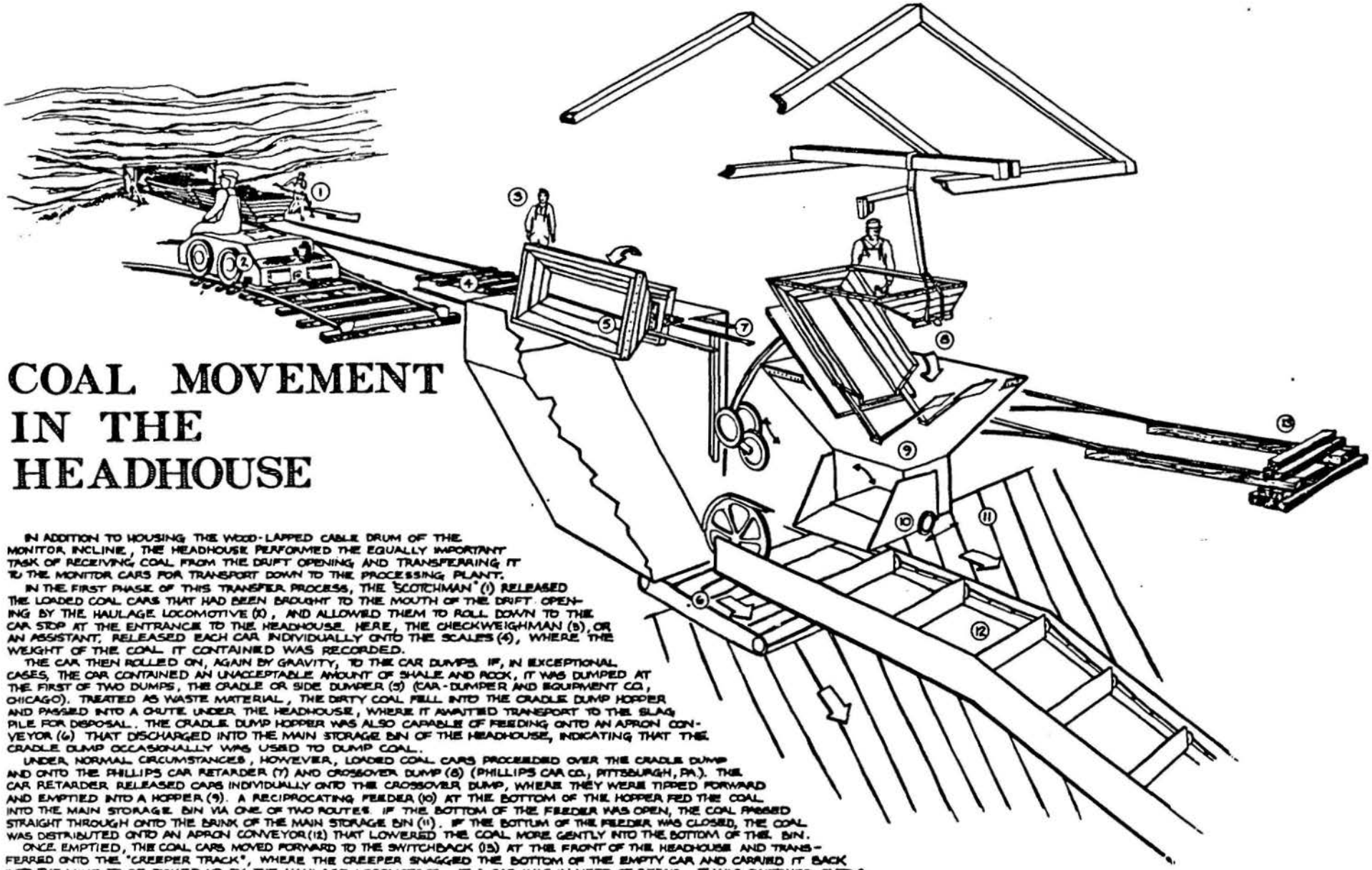
HAER WV-38

DELINEATED BY BENITA G. WELCH, 1984

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COAL MOVEMENT IN THE HEADHOUSE

IN ADDITION TO HOUSING THE WOOD-LAPPED CABLE DRUM OF THE MONITOR INCLINE, THE HEADHOUSE PERFORMED THE EQUALLY IMPORTANT TASK OF RECEIVING COAL FROM THE DRIFT OPENING AND TRANSFERRING IT TO THE MONITOR CARS FOR TRANSPORT DOWN TO THE PROCESSING PLANT.

IN THE FIRST PHASE OF THIS TRANSFER PROCESS, THE "SCOTCHMAN" (1) RELEASED THE LOADED COAL CARS THAT HAD BEEN BROUGHT TO THE MOUTH OF THE DRIFT OPENING BY THE HAULAGE LOCOMOTIVE (11), AND ALLOWED THEM TO ROLL DOWN TO THE CAR STOP AT THE ENTRANCE TO THE HEADHOUSE. HERE, THE CHECKWEIGHMAN (3), OR AN ASSISTANT, RELEASED EACH CAR INDIVIDUALLY ONTO THE SCALES (4), WHERE THE WEIGHT OF THE COAL IT CONTAINED WAS RECORDED.

THE CAR THEN ROLLED ON, AGAIN BY GRAVITY, TO THE CAR DUMPS. IF, IN EXCEPTIONAL CASES, THE CAR CONTAINED AN UNACCEPTABLE AMOUNT OF SHALE AND ROCK, IT WAS DUMPED AT THE FIRST OF TWO DUMPS, THE CRADLE OR SIDE DUMPER (5) (CAR-DUMPER AND EQUIPMENT CO., CHICAGO). TREATED AS WASTE MATERIAL, THE DIRTY COAL FELL INTO THE CRADLE DUMP HOPPER AND PASSED INTO A CHUTE UNDER THE HEADHOUSE, WHERE IT AWAITED TRANSPORT TO THE SLAG PILE FOR DISPOSAL. THE CRADLE DUMP HOPPER WAS ALSO CAPABLE OF FEEDING ONTO AN APRON CONVEYOR (6) THAT DISCHARGED INTO THE MAIN STORAGE BIN OF THE HEADHOUSE, INDICATING THAT THE CRADLE DUMP OCCASIONALLY WAS USED TO DUMP COAL.

UNDER NORMAL CIRCUMSTANCES, HOWEVER, LOADED COAL CARS PROCEEDED OVER THE CRADLE DUMP AND ONTO THE PHILLIPS CAR RETARDER (7) AND CROSSOVER DUMP (8) (PHILLIPS CAR CO., PITTSBURGH, PA.). THE CAR RETARDER RELEASED CARS INDIVIDUALLY ONTO THE CROSSOVER DUMP, WHERE THEY WERE TIPPED FORWARD AND EMPTIED INTO A HOPPER (9). A RECIPROCATING FEEDER (10) AT THE BOTTOM OF THE HOPPER FED THE COAL INTO THE MAIN STORAGE BIN VIA ONE OF TWO ROUTES. IF THE BOTTOM OF THE FEEDER WAS OPEN, THE COAL PASSED STRAIGHT THROUGH ONTO THE BRINK OF THE MAIN STORAGE BIN (11). IF THE BOTTOM OF THE FEEDER WAS CLOSED, THE COAL WAS DISTRIBUTED ONTO AN APRON CONVEYOR (12) THAT LOWERED THE COAL MORE GENTLY INTO THE BOTTOM OF THE BIN.

ONCE EMPTIED, THE COAL CARS MOVED FORWARD TO THE SWITCHBACK (13) AT THE FRONT OF THE HEADHOUSE AND TRANSFERRED ONTO THE "CREEPER TRACK", WHERE THE CREEPER SNAGGED THE BOTTOM OF THE EMPTY CAR AND CARRIED IT BACK INTO THE MINE TO BE PICKED UP BY THE HAULAGE LOCOMOTIVE. IF A CAR WAS IN NEED OF REPAIR, IT WAS SWITCHED ONTO A TRACK THAT BYPASSED THE CREEPER TRACK AND LED INTO THE CAR REPAIR SHOP.

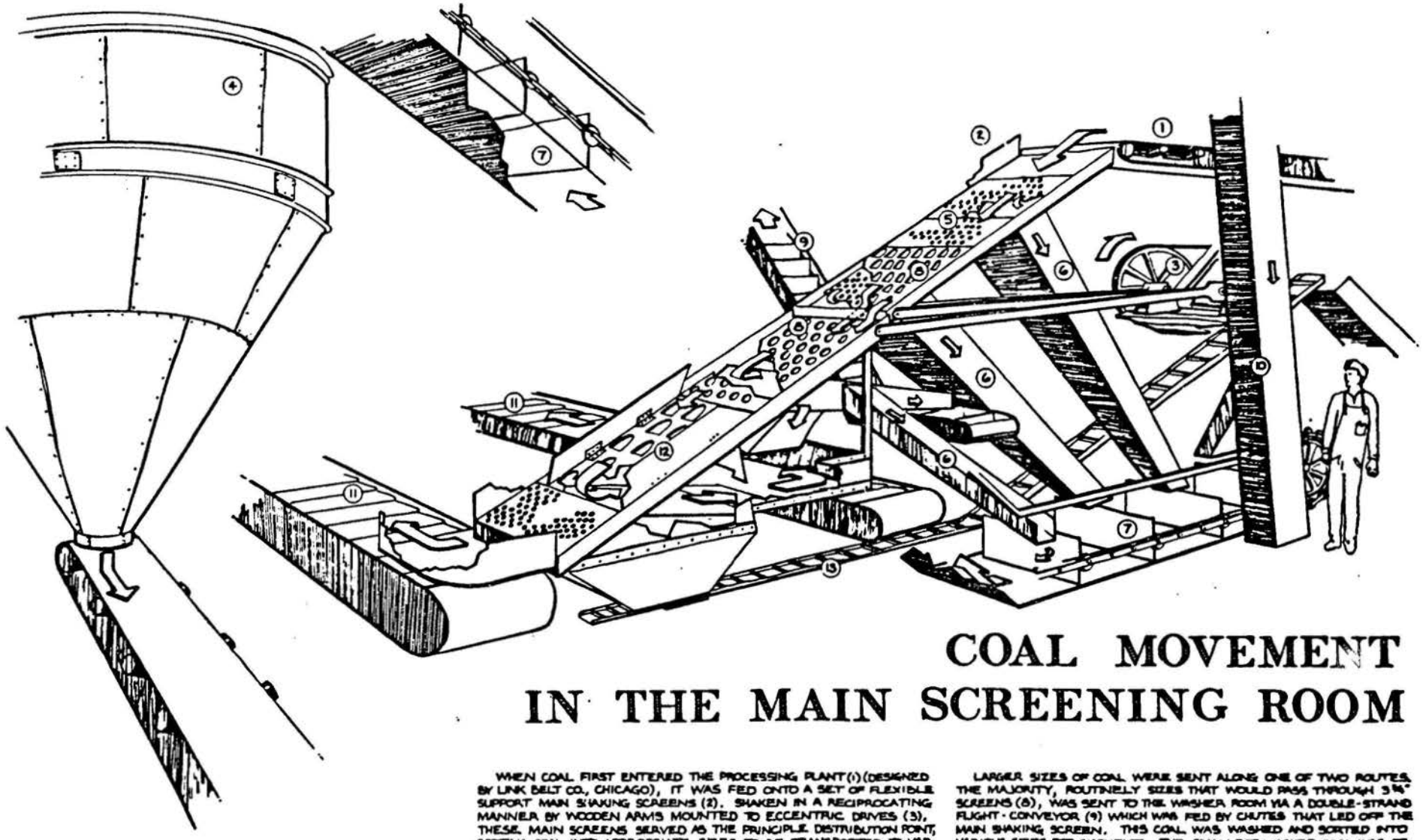
IN THE MEANTIME, COAL IN THE MAIN STORAGE BIN WAS BEING FED THROUGH CHUTES INTO THE MONITOR CARS FOR THE TRIP DOWN SLOPE TO THE PROCESSING PLANT AT THE TRACK LEVEL.

NOTE: NO SCALE

KAY MOOR COAL MINE - 1900
SOUTH SIDE OF NEW RIVER, 1.75 MILES UPSTREAM OF MTN. VIEW
FAYETTE COUNTY
WEST VIRGINIA

Photographer: RICHARD SARIAN, 1986

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COAL MOVEMENT IN THE MAIN SCREENING ROOM

WHEN COAL FIRST ENTERED THE PROCESSING PLANT (1) (DESIGNED BY LINK BELT CO., CHICAGO), IT WAS FED ONTO A SET OF FLEXIBLE SUPPORT MAIN SHAKING SCREENS (2). SHAKEN IN A RECIPROCATING MANNER BY WOODEN ARMS MOUNTED TO ECCENTRIC DRIVES (3), THESE MAIN SCREENS SERVED AS THE PRINCIPLE DISTRIBUTION POINT, SORTING COAL INTO APPROPRIATE SIZES TO BE TRANSPORTED TO VARIOUS AREAS OF THE PROCESSING PLANT FOR STORAGE, WASHING, OR LOADING.

THE FIRST OF THESE AREAS WAS THE SLACK STORAGE TANK (4). AS COAL TRAVELED DOWN THE MAIN SHAKING SCREENS, IT PASSED OVER A SERIES OF 3/16" AND 3/8" SCREENS (5). ANY COAL THAT PASSED THROUGH THESE SMALL SCREENS (TERMED SLACK COAL) WAS FED, THROUGH A NUMBER OF CHUTES (6), ONTO A DOUBLE-STRAND FLIGHT CONVEYOR (7) THAT LED UP TO THE LARGE TANK. FROM THERE, IT COULD BE LOADED INTO RAILROAD CARS – EITHER HOPPER CARS, OR BOX CARS VIA A MANIERRE BOX CAR LOADER.

LARGER SIZES OF COAL WERE SENT ALONG ONE OF TWO ROUTES. THE MAJORITY, ROUTINELY SIZES THAT WOULD PASS THROUGH 3 3/4" SCREENS (8), WAS SENT TO THE WASHER ROOM VIA A DOUBLE-STRAND FLIGHT-CONVEYOR (9) WHICH WAS FED BY CHUTES THAT LED OFF THE MAIN SHAKING SCREEN. THIS COAL WAS WASHED AND SORTED INTO VARIOUS SIZES FOR SHIPMENT. THE SMALLEST WASHED COAL WAS RETURNED TO THE MAIN SCREENING ROOM, WHERE IT WAS CARRIED ABOVE THE SHAKING SCREENS AND TRANSFERRED EITHER ONTO THE SLACK CONVEYOR OR THROUGH A CHUTE (10) INTO A RAILROAD HOPPER CAR.

THE LARGEST SIZES OF COAL, THOSE THAT DID NOT FALL THROUGH THE 3 3/4" SCREENS, PASSED DIRECTLY ONTO ONE OF TWO APRON CONVEYOR LOADING BOOMS (11). SCREENS AT THE BOTTOM END OF THE MAIN SHAKING SCREEN COULD BE UNCOVERED (12) TO SORT LARGE COAL INTO LUMP AND OTHER SIZES. AN AUXILIARY CHUTE LOCATED UNDER THESE LARGE SCREENS COLLECTED ANY SPILLAGE AND TRANSPORTED IT, VIA A CHAIN CONVEYOR (13), TO UNLOADING CHUTES.

NOTE: NO SCALE

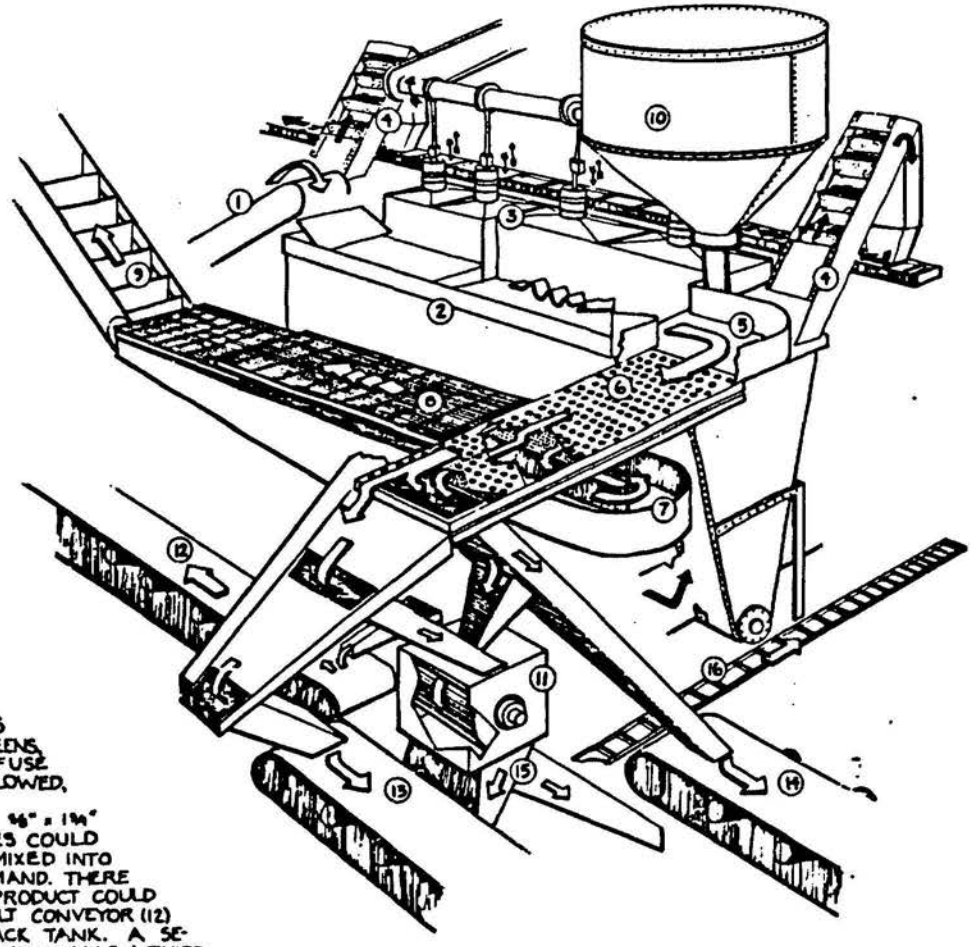
"KAY MOOR COAL MINE - 1900"

RICHARD SARIAN, 1986

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COAL MOVEMENT IN THE WASH HOUSE



ON A ROUTINE DAY, THE SIZE OF THE COAL LEAVING THE SCREENS IN THE MAIN SHAKER SCREENING ROOM AND ENTERING THE COAL WASHING ROOM WOULD RANGE BETWEEN ⅝" AND 5¾". THIS COAL WOULD PASS FROM A DOUBLE STRAND FLIGHT CONVEYOR (1) INTO THE WASH BOX OF KAY MOOR'S SIMON-CARVES BAUM JIG WASHER (2). AS IT PASSES HORIZONTALLY ACROSS THE WASH BOX, WATER PULSATIONS PRODUCED IN THE AGITATOR BY FOUR AIR PISTON JIGS (3), KEPT THE COAL SUSPENDED IN WATER WHILE HEAVIER PARTICLES OF REFUSE DROPPED TO THE BOTTOM OF THE WASHER TO BE REMOVED BY TWO DEWATERING ELEVATORS (4).

WHEN THE COAL REACHED THE FAR END OF THE WASH BOX, IT PASSED ONTO CURVED SLUICES (5) THAT CARRIED IT TO A SERIES OF SIZING SCREENS (6) EN ROUTE TO THE SIZING SCREENS. EXCESS WATER MIXED WITH FINE COAL FLOWED ONTO A LOWER SLUICE (7) THAT FED ONTO TWO DEWATERING SCREENS (8). THESE TWO SHAKER SCREENS, DRIVEN BY WOODEN CONNECTING RODS ON AN ECCENTRIC SHAFT, CONVEYED FINES AND SLACK COAL ONTO A FLIGHT CONVEYOR (9) LEADING BACK INTO THE MAIN SCREENING ROOM AND DIRECTLY INTO RAILROAD CARS OR THE SLACK STORAGE TANK. THE WATER PASSED THROUGH THE SCREENS, INTO A SUMP, AND WAS RECYCLED, ALONG WITH WATER FROM THE REFUSE DEWATERING ELEVATORS, INTO A LARGE CONICAL TANK (10), WHERE IT FLOWED, BY GRAVITY, BACK TO THE WASH BOX.

THE SIZING SCREENS SORTED THE WASHED COAL INTO ¼" x ⅝" PEA, ⅝" x 1¼" NUT, 1¼" x 3" STOVE, AND 3" x 5¾" EGG COAL. THESE VARIOUS SIZES COULD EITHER BE RUN THROUGH A CRUSHER (11). LOADED SEPERATELY, OR MIXED INTO A WIDE VARIETY OF COMBINATIONS, DEPENDING UPON CUSTOMER DEMAND. THERE WERE A SERIES OF CHUTES AND BELTS BY WHICH THE FINISHED PRODUCT COULD BE SENT TO STORAGE OR LOADED ONTO RAILROAD CARS. ONE BELT CONVEYOR (12) CARRIED COAL BACK TO THE MAIN SCREENING ROOM AND INTO THE SLACK TANK. A SECOND BELT CONVEYOR (13) LOADED COAL INTO RAILROAD CARS ON TRACK 1, WHILE A THIRD (14) LOADED RAILROAD CARS ON TRACK 2. TWO CHUTES COMING OUT OF THE CRUSHER (15) COULD LOAD COAL ONTO TRACKS ONE OR TWO. A CHAIN CONVEYOR (16) CARRIED COAL OVER TO TRACK 4 WHERE IT COULD BE MIXED WITH LARGER SIZES OF COAL COMING DIRECTLY OFF THE SCREENS IN THE MAIN SHAKER ROOM.

NOTE : NO SCALE.

ILLUSTRATED BY RICHARD R. SARIAN, 1984

KAY MOOR COAL MINE - 1900

SOUTH SIDE OF NEW RIVER, 1.75 MILES UPSTREAM OF NEW RIVER GORGE BRIDGE (U.S. ROUTE 19)
FAYETTEVILLE VICINITY
FAYETTE COUNTY
WEST VIRGINIA

HISTORIC AMERICAN ENGINEERING RECORD
WV-38
SHEET 10-16

KAY MOOR COAL MINE PROJECT
HISTORIC AMERICAN ENGINEERING RECORD
NATIONAL PARK SERVICE
NEW RIVER GORGE NATIONAL RIVER
FAYETTEVILLE, WEST VIRGINIA

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IV. VALUE ANALYSIS

A value study was conducted for the historic structure report on January 14–16, 1997, for the purpose of selecting a preferred alternative for the document. The purpose of the value study was to provide guidance to the design team concerning final recommendations to be made in the historic structure report. As part of the process of developing and evaluating the alternatives, a value analysis was conducted to structure the selection of a preferred treatment approach for the four historic structures. The analysis involved a team workshop which included team members with and without experience at the Kaymoor site. The team approach allowed an independent perspective to be a part of the evaluation.

The evaluation was made using a process called "Choosing by Advantages," which weighs the differences or advantages of each alternative against a fixed set of evaluation factors and establishes a benefit or importance rating for each alternative. Cost, both life-cycle and initial, is dealt with as a special factor after the relative importance is established. While cost is a factor in selection of alternative, it is assessed in balance with factors such as protection of resources, the visitor experience and park operations.

The study team made the following recommendations:

HEADHOUSE

The headhouse is in a severe state of deterioration, verging on a ruin. The study explored a full range of options from reconstructing the building to actively demolishing the structure. It was the judgment of the study team that trying to stabilize the existing ruin was not economically feasible nor structurally practicable.

Under alternative 1 the study recommends that steps be taken to warn and direct the visitor from the structure and areas threatened by collapse and then allow the headhouse to collapse on its own. The teams estimates this will occur within five years. Active demolition of the headhouse would potentially expose workers to asbestos, which by law must be assumed to be present in structures like the headhouse, constructed before 1980. Extensive hazardous materials procedures are not required with the natural collapse of the structure. Minimal vegetation management will be done. Alternative 1 saves $357,000 over alternative 2 on an initial cost basis.

COAL TIPPLE, POWERHOUSE, AND COKE OVENS

These three structures are in better condition than the headhouse, but the National Park Service is confronted with their ongoing deterioration, with potential for the coal tipple to collapse in three years. The study explored a range of options from aggressive stabilization and replacement of building envelope components to very basic stabilization to protect the visitor from risk and actions to control visitor movement.

Under alternative 2 the study recommends that moderate stabilization actions be taken to reinforce the major structural elements and to provide reasonable repair of the building envelope. Only a minimum annual maintenance effort would be made; i.e., reattachment of slipping siding, limited vegetation clearing; with the full realization that the coal tipple can be expected to collapse in approximately 10 years. The powerhouse, because of its masonry construction, is expected to have a longer life after basic stabilization actions i.e. supporting unbraced walls and repointing. Limited vegetation clearing will help extend the life of the coke ovens.

This holding effort would provide the National Park Service opportunity to consider other resources that might better relate to the park objectives concerning the "Coal Mining Theme." It was the judgment of the study team that investment required by alternative 2 provide significant value, both in the areas of safety and extension of structure life, for the dollars expended. Moving to the next increment to more aggressive levels of stabilization did not offer the same level of value for dollars spent.

Alternative 3 represented the design group's initial preferred option, with an emphasis on cultural resource factors. Estimated cost avoided over alternative 3 are $953,000 on an initial cost basis, and $966,000 on a life-cycle cost basis.

ROOFING AND SIDING MATERIAL

The recommended alternative does not propose replacement of existing metal roofing and siding. The study team did explore several options of materials, and recommends use of metal siding, with some potential for the use of metal roof/siding with micro-zinc coating as a further refinement.

The full value analysis study can be consulted in the appendix A of this historic structure report.

V. PREFERRED ALTERNATIVE

DRAWINGS

Site Treatment for Preferred Alternative
Site Treatment for Preferred Alternative (includes coke ovens)
Coal Tipple Plan - Preferred Alternative
Coal Tipple Elevations - Preferred Alternative
Powerhouse Plan - Preferred Alternative
Powerhouse Elevations - Preferred Alternative
Headhouse Plan - Preferred Alternative
Headhouse Elevations - Preferred Alternative

RECOMMENDATIONS FOR FURTHER STUDY

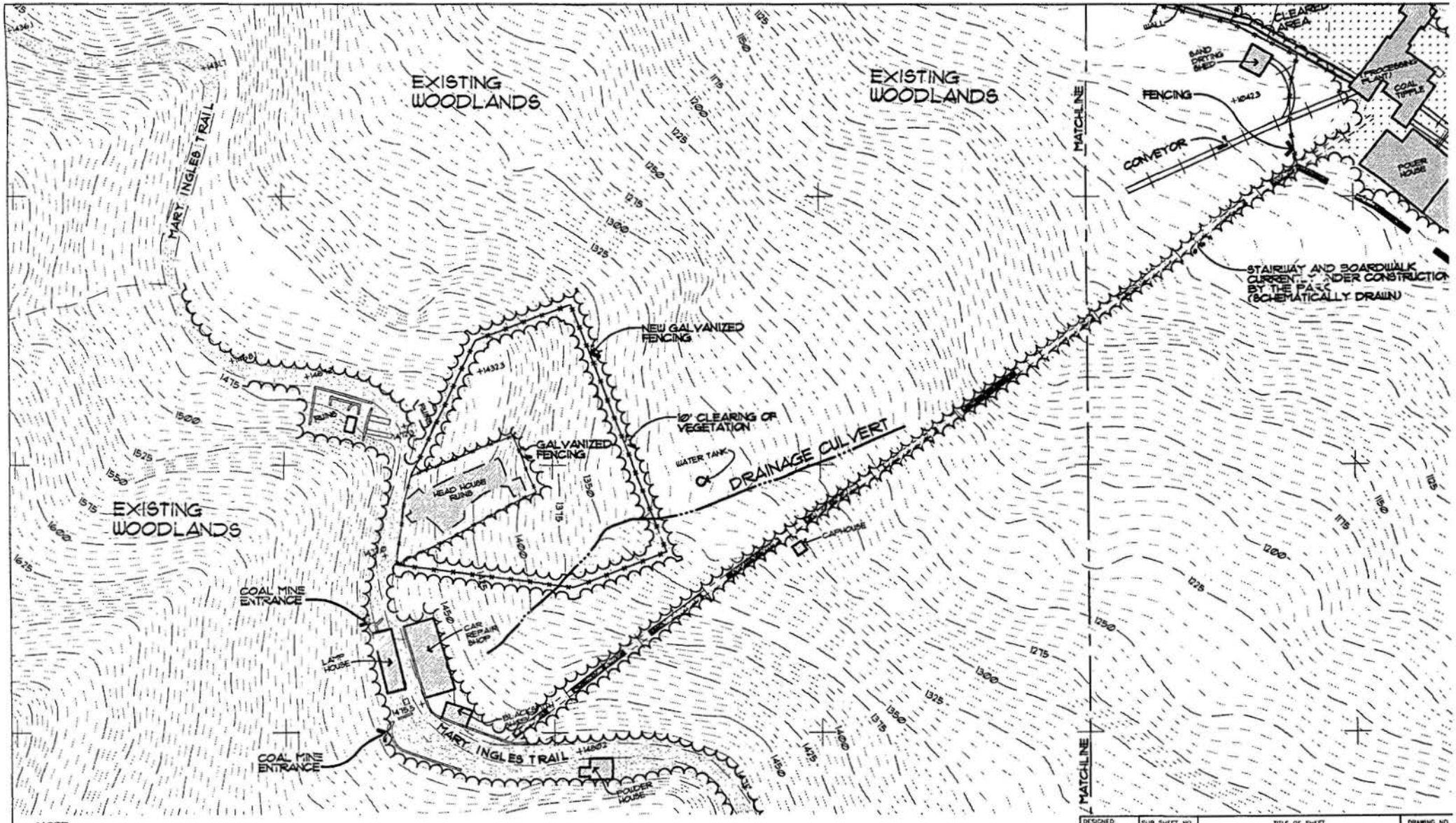
Coke Ovens

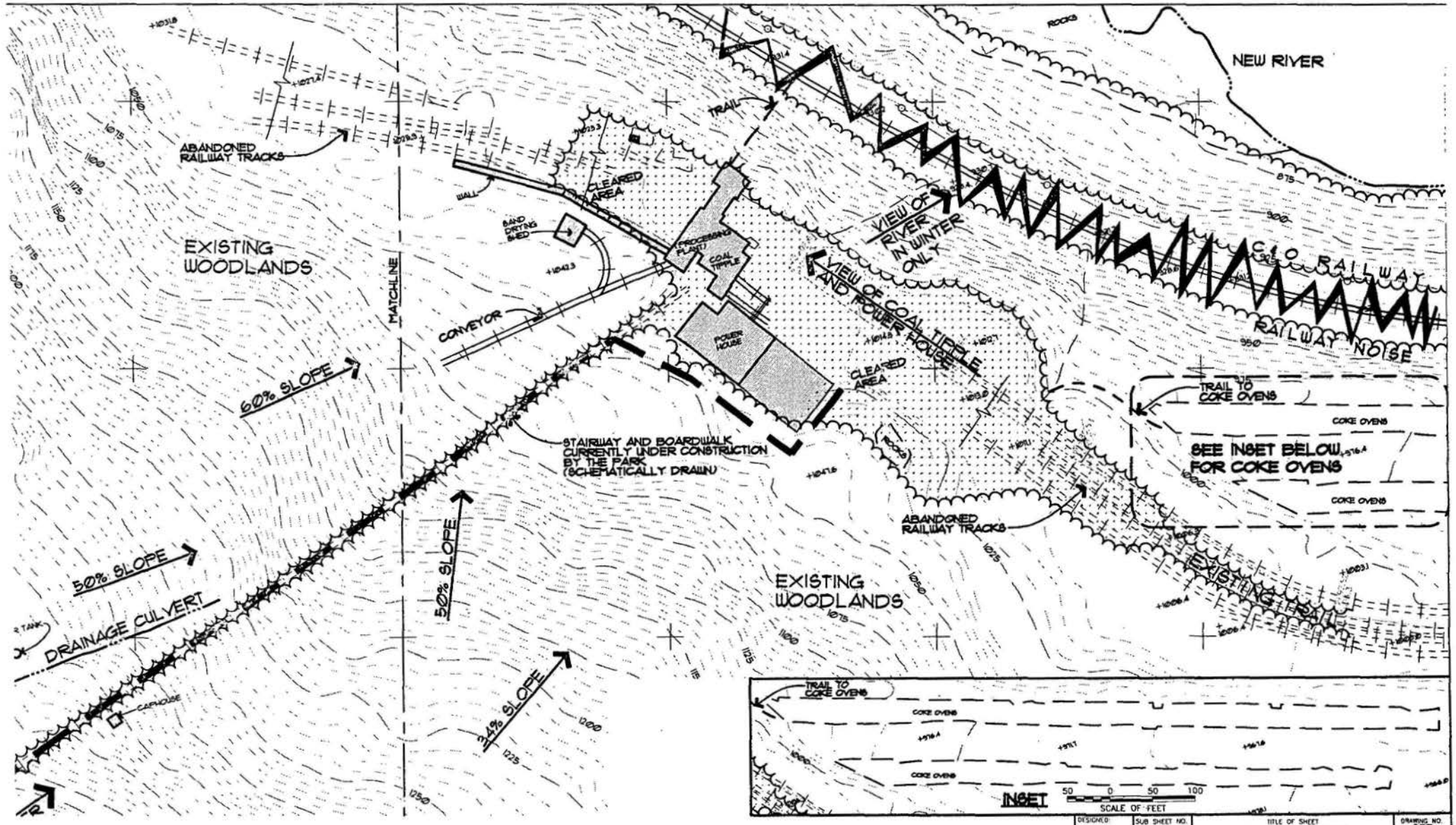
This discussion of stabilization on the coke ovens is not intended to be part of any alternative examined by this document. Before stabilization can occur, a more thorough field investigation should be performed. Alternatives could be generated after the coke ovens have been examined by a structural engineer familiar with the behavior of domes. Stabilization methods appropriate to this unusual structure may then be chosen. Nevertheless, some possibilities for future action are included in the following discussion.

Stabilizing the coke ovens while maintaining their visibility to the public would require a significant field investigation and design effort that is far beyond the scope of this document. The nature of domed masonry structures does not lend itself to simple shoring as might be accomplished with buildings, bridges, or other structures with a more linear load path.

Simply filling the coke ovens with gravel would prevent them from caving in under the self weight of the structure and the soil on top, as well as live load from pedestrian traffic. This solution might prolong the life of the masonry dome, and would certainly protect the visitor from injury, but it would eliminate the possibilities of viewing the resource. If this stabilization approach were attempted, it would also be necessary to provide a fill material inside and outside that is free draining, as well as an underdrain system to prevent hydrostatic pressure from building up around the outside of the dome and deteriorating the mortar holding the coke oven bricks together.

Supporting the coke ovens from the inside would require more than timber shoring typical of most construction and repair. Since the concentric rings of masonry depend on compressive forces to hold the bricks together, "lifting" the dome from the inside would prevent the compression from occurring, making the structure less stable. Any kind of support would have to occur in a uniform fashion, such as the support provided by air pressure if the inside were filled with a big balloon. Obviously, stabilization of this nature requires more extensive research into the behavior and repair of domes that is far beyond the scope of this document.


EXISTING WOODLANDS
EXISTING WOODLANDS
EXISTING WOODLANDS
MARY INGLES TRAIL
MARY INGLES TRAIL
NEW GALVANIZED FENCING
10' CLEARING OR VEGETATION
GALVANIZED FENCING
DRAINAGE CULVERT
WATER TANK
HEAD HOUSE RUINS
RUIN
RUIN
CAPHOUSE
COAL MINE ENTRANCE
COAL MINE ENTRANCE
LAMP HOUSE
CAR REPAIR SHOP
BLACKSMITH SHOP
BOULDER HOUSE
MATCHLINE
MATCHLINE
CLEARED AREA
WALL
BAND DRYING SHED
PROCESSING PLANT
COAL TIPPLE
FENCING
CONVEYOR
POWER HOUSE
STAIRWAY AND BOARDWALK CURRENTLY UNDER CONSTRUCTION BY THE PARK (SCHEMATICALLY DRAWN)
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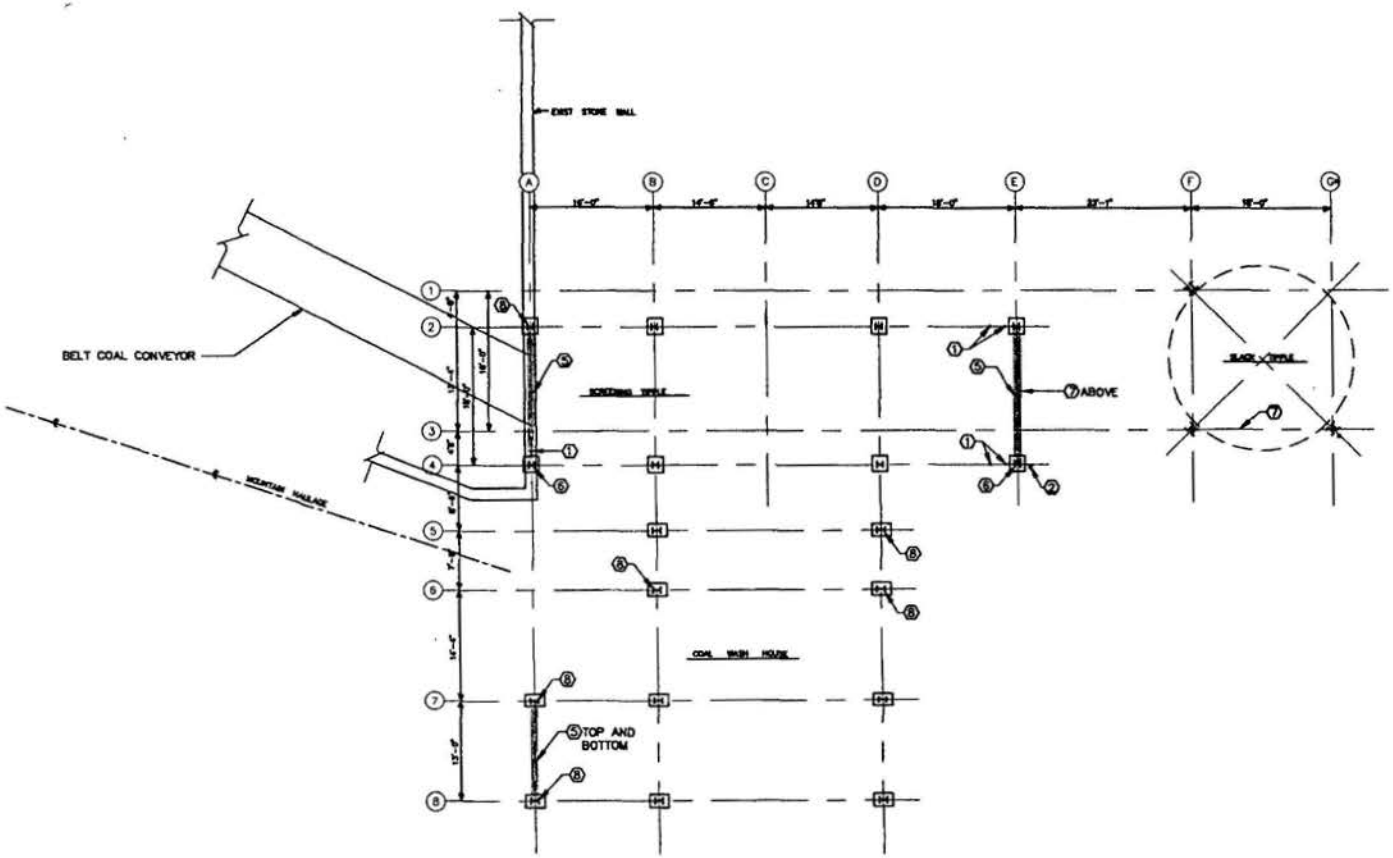
NOTE

- THIS SURVEY WAS DRAWN FROM AERIALS. A GROUND SURVEY WILL NEED TO BE COMPLETED IF MORE ACCURACY IS REQUIRED FOR FURTHER WORK.

40 0 40 80
SCALE OF FEET

DESIGNED: K. VAAGE; DRAWN: LEIDECKER; TECH. REVIEW; DATE: 1/97	SUB SHEET NO.	TITLE OF SHEET: SITE ANALYSIS AND EXISTING CONDITIONS, NEW RIVER GORGE NR	DRAWING NO. 637 20,089; PKG. NO. 156; SHEET ___ OF ___

01/21/97 (lei) P:\NERI\156\35\LA\EXIST1-2.dwg



COAL TIPPLE PLAN

SCALE Ⓐ

GENERAL NOTES:

1. KEYNOTE ITEMS DO NOT APPEAR ON ALL SHEETS.
2. KEYNOTES PERTAIN TO LEVEL ONE ONLY (GROUND ELEVATION TO SECOND FLOOR FRAMING.)
3. SEE SITE PLAN FOR BOARDWALK, SIGNING, FENCING, AND OTHER SITE DETAILS.
4. CONSULT EXISTING CONDITIONS PHOTOS FOR ACTUAL APPEARANCE OF BUILDING. THESE DRAWINGS INDICATE GENERAL APPEARANCE AS RECORDED IN 1987 WITH UPDATED NOTES AND CONDITIONS. VERIFY ALL MEASUREMENTS IN FIELD BEFORE FURTHER WORK IS UNDERTAKEN.

KEYED NOTES:

① REPLACE 2"ø TEMPORARY PIPE COLUMNS WITH 3"ø TEMPORARY PIPE COLUMNS UNTIL ALL OTHER STRUCTURAL REPAIRS ARE COMPLETED.

② REMOVE EXISTING RUSTED DOWNSPOUT AND REPLACE WITH FULL HEIGHT DOWNSPOUT.

③ REMOVE LOOSE SECTIONS OF CORRUGATED METAL SIDING.

④ BOARD UP WINDOWS, DOORS AND VERTICAL OPENINGS WITH EXTERIOR GRADE PLYWOOD, INCLUDING ACTIVE VENTILATION IN WINDOWS AND ROOF IF NEEDED.

⑤ REPLACE CROSS BRACING.

⑥ REPLACE W 8x8 COLUMN.

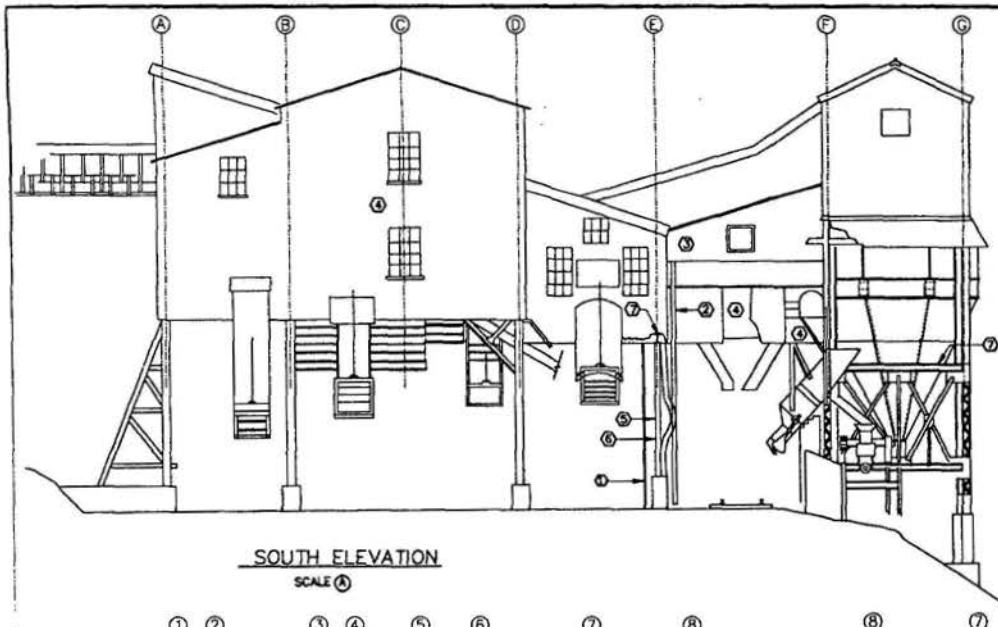
⑦ REPLACE STEEL BEAM SECTION.

⑧ SUPPLEMENT RUSTED AND EXFOLIATED COLUMN WEBS OR CONNECTION PLATES.

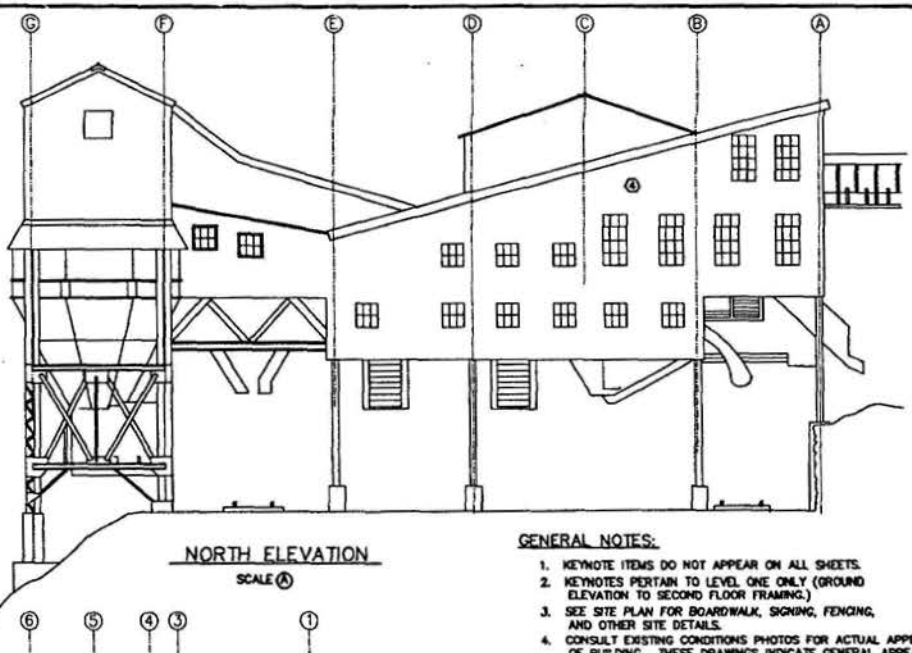
SCALE Ⓐ 0 8 16 SCALE OF FEET

DESIGNED: BJM/LLL	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO. 837 20,089
DRAWN: LLL		COAL TIPPLE PLAN PREFERRED ALT. KAYMOOR MINE HSR	PROJ. NO. 156
TECH. REVIEW:		NEW RIVER GORGE N.R.	SHEET 6 OF 11
DATE: 4/97			

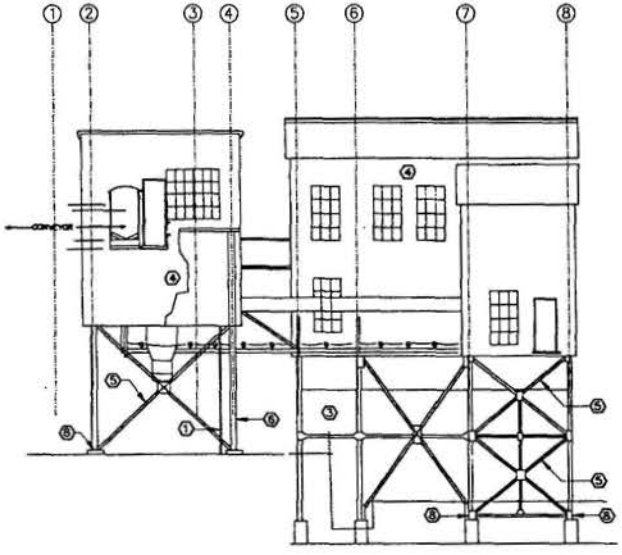
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/3/97



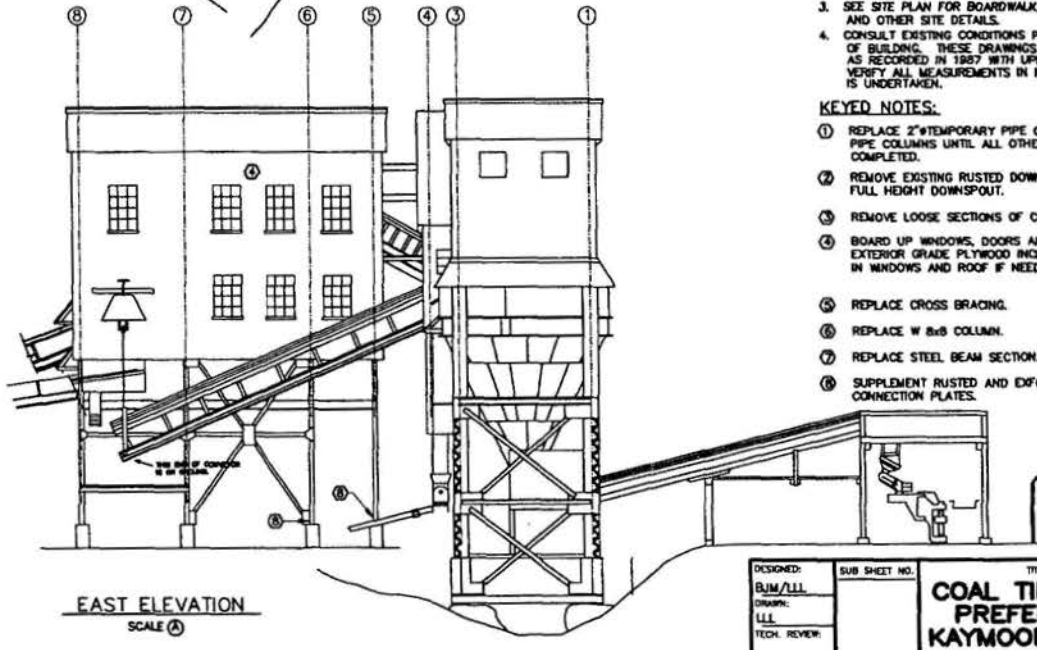
SOUTH ELEVATION
SCALE Ⓐ



NORTH ELEVATION
SCALE Ⓐ



WEST ELEVATION
SCALE Ⓐ



EAST ELEVATION
SCALE Ⓐ

GENERAL NOTES:

1. KEYNOTE ITEMS DO NOT APPEAR ON ALL SHEETS.
2. KEYNOTES PERTAIN TO LEVEL ONE ONLY (GROUND ELEVATION TO SECOND FLOOR FRAMING.)
3. SEE SITE PLAN FOR BOARDWALK, SIGNING, FENCING, AND OTHER SITE DETAILS.
4. CONSULT EXISTING CONDITIONS PHOTOS FOR ACTUAL APPEARANCE OF BUILDING. THESE DRAWINGS INDICATE GENERAL APPEARANCE AS RECORDED IN 1987 WITH UPDATED NOTES AND CONDITIONS. VERIFY ALL MEASUREMENTS IN FIELD BEFORE FURTHER WORK IS UNDERTAKEN.

KEYED NOTES:

① REPLACE 2"ø TEMPORARY PIPE COLUMNS WITH 3"ø TEMPORARY PIPE COLUMNS UNTIL ALL OTHER STRUCTURAL REPAIRS ARE COMPLETED.

② REMOVE EXISTING RUSTED DOWNSPOUT AND REPLACE WITH FULL HEIGHT DOWNSPOUT.

③ REMOVE LOOSE SECTIONS OF CORRUGATED METAL SIDING.

④ BOARD UP WINDOWS, DOORS AND VERTICAL OPENINGS WITH EXTERIOR GRADE PLYWOOD INCLUDING ACTIVE VENTILATION IN WINDOWS AND ROOF IF NEEDED.

⑤ REPLACE CROSS BRACING.

⑥ REPLACE W 8x8 COLUMN.

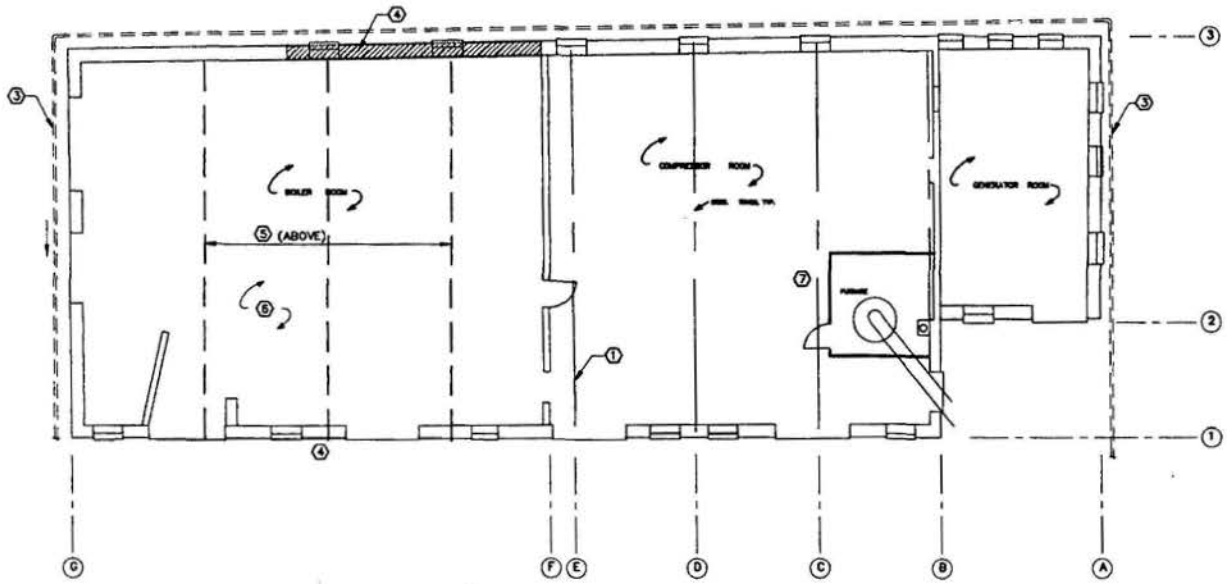
⑦ REPLACE STEEL BEAM SECTION.

⑧ SUPPLEMENT RUSTED AND EXFOLIATED COLUMN WEBS OR CONNECTION PLATES.

SCALE Ⓐ 0 8 16
SCALE OF FEET

DESIGNED: BJM/LLL	SUB SHEET NO.	TITLE OF SHEET: COAL TIPPLE ELEVS PREFERRED ALT. KAYMOOR MINE HSR	DRAWING NO. 637 20,089
DRAWN: LLL		NEW RIVER GORGE, N.P.	PROJ. NO. 156
TECH. REVIEW:			SHEET 7 OF 11
DATE: 4/97			

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4/3/97



POWER HOUSE PLAN

SCALE (A)

GENERAL NOTES:

1. KEYNOTE ITEMS DO NOT APPEAR ON ALL SHEETS.
2. SEE SITE PLAN FOR BOARDWALK, SIGNING, FENCING, AND OTHER SITE DETAILS.
3. VERIFY ALL MEASUREMENTS IN FIELD BEFORE FURTHER WORK IS UNDERTAKEN.

KEYED NOTES:

(1) REPLACE STEEL IN ROOF TRUSS.

(2) REPOINT MASONRY WALL SURFACES, INSIDE AND OUTSIDE FACES, AS NECESSARY.

(3) CONSTRUCT FOUNDATION DRAIN AND DRAIN TO DAYLIGHT. GEOTECHNICAL INVESTIGATION OF CONDITIONS ON UPHILL SIDE OF WALL SHOULD OCCUR PRIOR TO DESIGN AND CONSTRUCTION OF A FOUNDATION DRAIN.

(4) REPAIR AND/OR REPLACE MISSING WALL SECTIONS WITH ROUGH CUT, MORTARED RUBBLE STONE MASONRY. STABILIZE TOPS OF EXPOSED MASONRY WALLS AND REINFORCE ROOF TRUSS SEATS.

(5) CONSTRUCT THREE NEW STEEL ROOF TRUSSES WITH BRACING AND PURLINS TO SUPPORT UNBRACED SOUTH WALL.

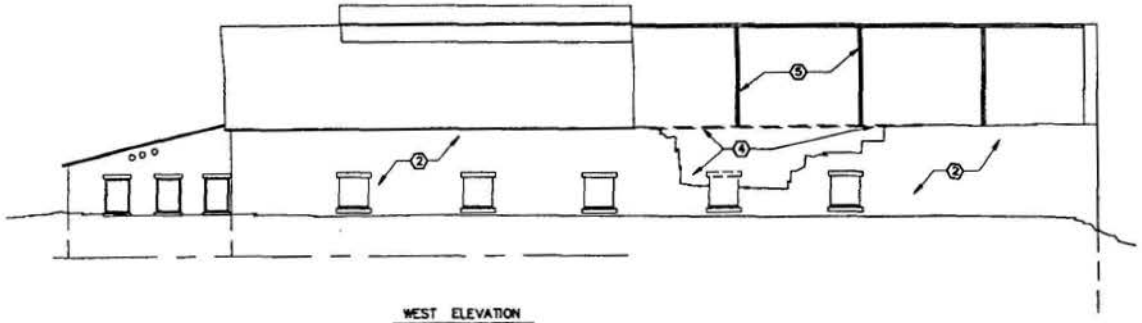
(6) REMOVE DIRT AND DEBRIS INSIDE ENTIRE BOILER ROOM TO CONCRETE SLAB SURFACE.

(7) REMOVE ALL ASBESTOS MATERIALS AS IDENTIFIED BY ENVIRONMENTAL SOLUTIONS, INC. DOCUMENT: "PHASE II ENVIRONMENTAL SAMPLING AND ANALYSIS."

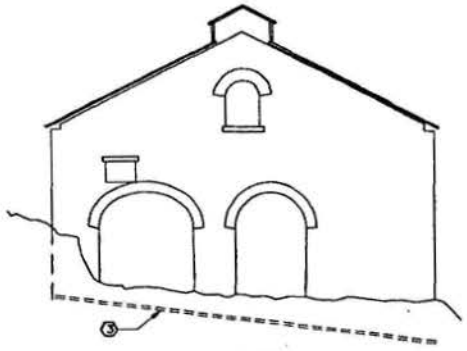
SCALE (A) 5 0 5 10 SCALE OF FEET

DESIGNED: BJM/LLL	SUB SHEET NO.	TITLE OF SHEET: POWER HOUSE PLAN PREFERRED ALT. KAYMOOR MINE HSR	DRAWING NO. 637 20,089
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TECH. REVIEW:			SHEET 8 OF 11
DATE: 4/97			

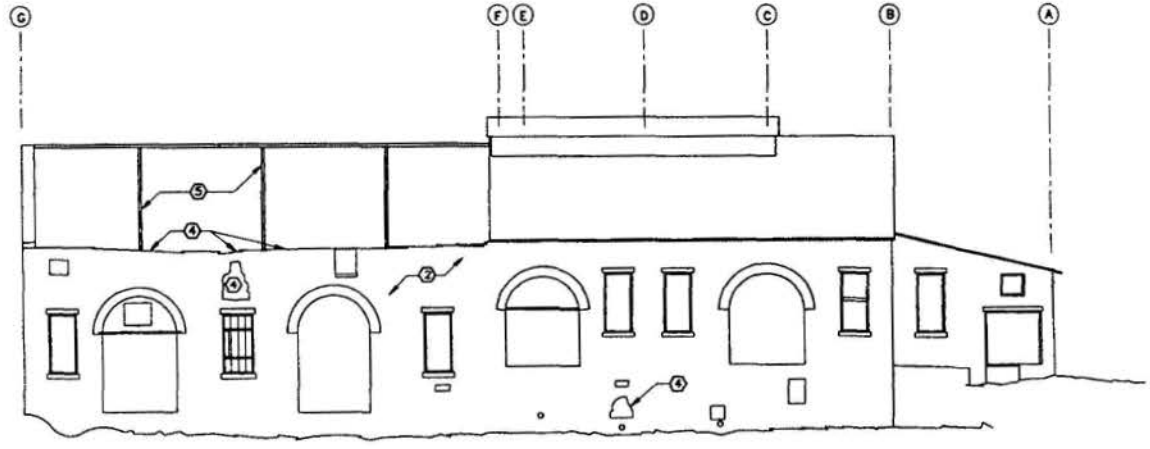
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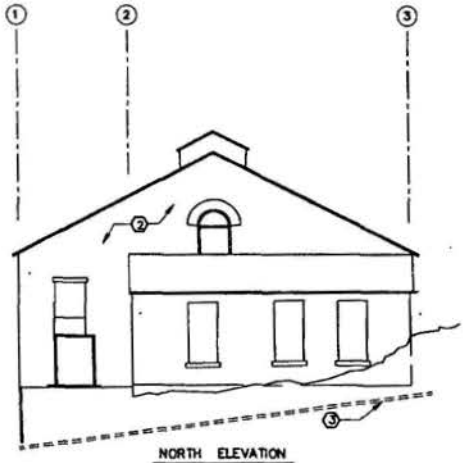
WEST ELEVATION
SCALE Ⓐ



SOUTH ELEVATION
SCALE Ⓐ



EAST ELEVATION
SCALE Ⓐ



NORTH ELEVATION
SCALE Ⓐ

GENERAL NOTES:

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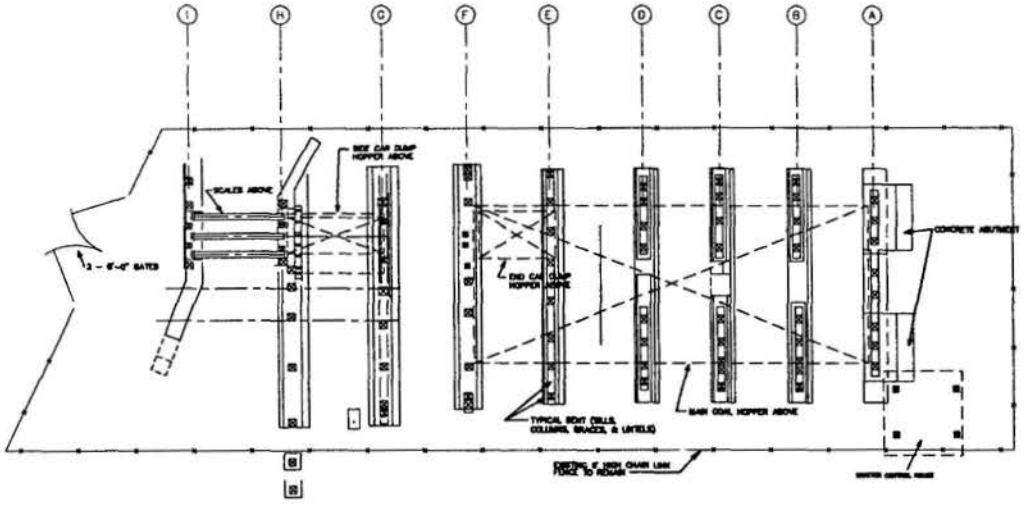
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SCALE OF FEET

DESIGNED: BJM/LLL DRAWN: LLL TECH. REVIEW: DATE: 4/97	SUB SHEET NO.	TITLE OF SHEET POWER HOUSE ELEVS PREFERRED ALT. KAYMOOR MINE HSR NEW RIVER GORGE N.R.	DRAWING NO. 837 20,089 PROJ. NO. 156 SHEET 9 OF 11

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HEADHOUSE PLAN

SCALE Ⓐ

GENERAL NOTES:

1. KEYNOTE ITEMS DO NOT APPEAR ON ALL SHEETS.
2. SEE SITE PLAN FOR BOARDWALK, SIGNING, FENCING, AND OTHER SITE DETAILS.
3. VERIFY ALL MEASUREMENTS IN FIELD BEFORE FURTHER WORK IS UNDERTAKEN.

KEYED NOTES:

1 ALLOW STRUCTURE TO COLLAPSE NATURALLY.

2 EXPAND FENCE TO CONTROL AREA OF POTENTIAL FALL.

3 SIGN AND FENCE DEBRIS.

4 NO ADDITIONAL VEGETATION CLEARING.

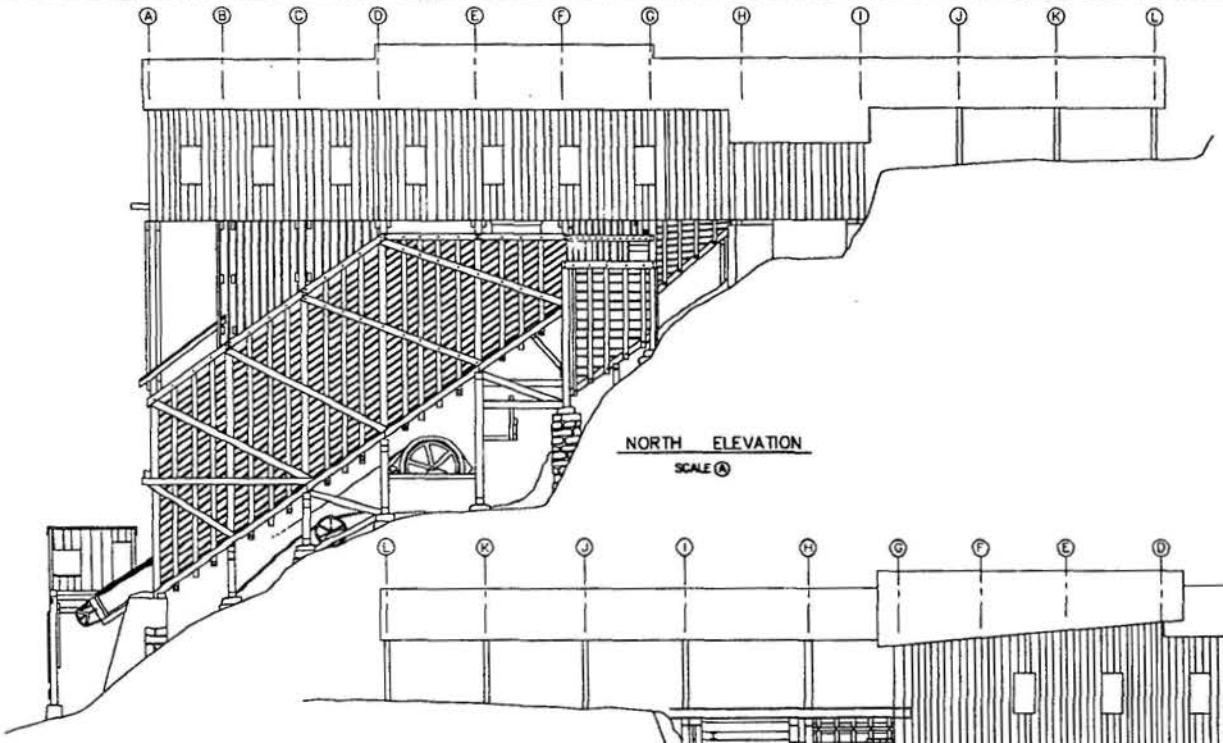
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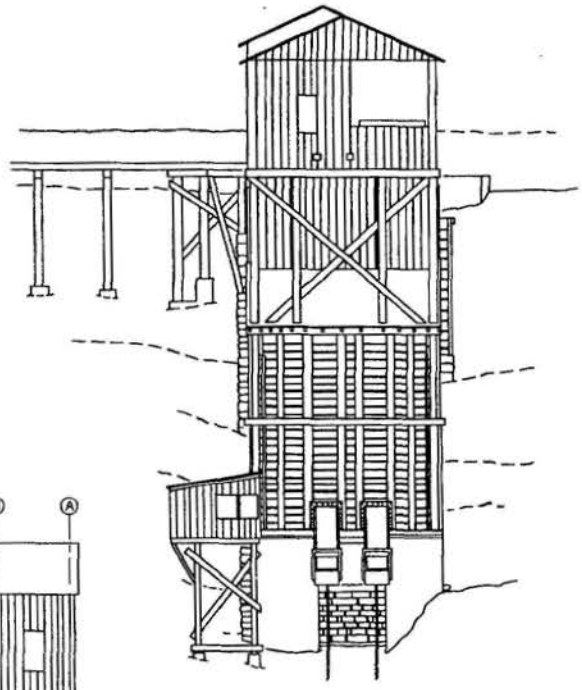
SCALE OF FEET

DESIGNED: BJM/LLL	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO. 837 20,089
DRAWN: LLL		HEADHOUSE PLAN PREFERRED ALT. KAYMOOR MINE HSR	PKG. NO. 156
TECH. REVIEW:		NEW RIVER GORGE N.R.	SHEET 10 OF 11
DATE: 4/97			

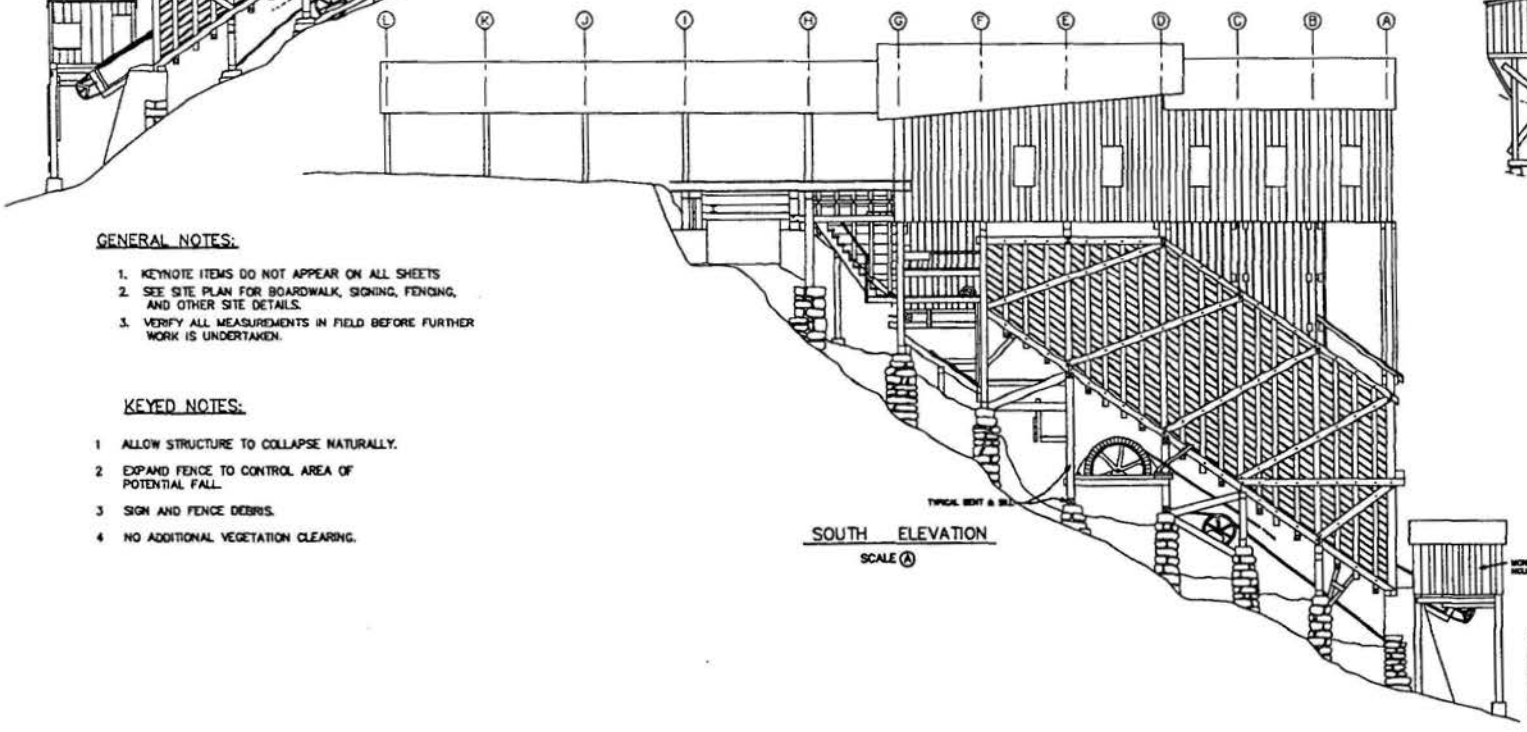
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7/31/97



NORTH ELEVATION
SCALE Ⓐ



EAST ELEVATION
SCALE Ⓐ



SOUTH ELEVATION
SCALE Ⓐ

GENERAL NOTES:

1. KEYNOTE ITEMS DO NOT APPEAR ON ALL SHEETS
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SCALE Ⓐ 0 5 10
SCALE OF FEET

DESIGNED: BJM/LLL	SUB SHEET NO.	TITLE OF SHEET: HEADHOUSE ELEVS PREFERRED ALT. KAYMOOR MINE HSR NEW RIVER GORGE, N.R.	DRAWING NO. 837 20,089
DRAWN: LLL			PROJ. NO. 158
TECH. REVIEW:			SHEET 11 OF 11
DATE: 4/97			

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4/3/97

VI. RECORD OF TREATMENT

RECORD OF TREATMENT

THIS SECTION WILL BE DEVELOPED AFTER CONSTRUCTION.

VII. APPENDIX

VII. APPENDIX

Appendix A: Value Analysis Study

Appendix B: National Register of Historic Places Nomination Form for Kaymoor Mine No. 1

Appendix C: List of Classified Structures

APPENDIX A

Value Analysis Study
for
Kaymoor Mines

New River Gorge National River

Value Analysis Study 103-97

FINAL REPORT
April 30, 1997

Management Services Group
Denver Service Center
National Park Service
January 14-16, 1997

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FOREWORD

This Value Analysis Report presents the recommendations of the Value Engineering Study for the Kaymoor Mines at New River Gorge National River.

This is to certify that the Value Analysis Study was led by the undersigned National Park Service Value Analysis Technical Expert and was conducted in accordance with National Park Service value analysis principles and guidelines.

Richard G. Turk
Architect/National Park Service
Technical Expert - Value Analysis

EXECUTIVE SUMMARY

The National Park Service is preparing a Historic Structure Report for the Kaymoor Mines area at New River Gorge National River. The project focuses on four buildings in the Kaymoor area Headhouse, Coke Ovens, Coal Tipple and Power House.

A Value Study was conducted at the Denver Service Center, January 14-16, 1997 to address several specific issues:

- Treatment Options
- Stabilization Options
- Roof and Siding Material

The value study object was to provide guidance to the design team concerning final recommendations to be made in the HSR. The starting point for the study was the work of a Denver Service Center (DSC) design team in developing preliminary.

This Kaymoor Mine site is extremely remote, with approximately 8,000 to 10,000 national park visitors per year. Visitor access is either by two miles of 4-wheel drive road and a walk down newly-built wooden over 500 vertical feet of steeply sloped hill side or by railroad and a hundred foot climb over rough but walkable terrain.

The study team makes the following recommendations:

1. Headhouse: The Headhouse is in a severe state of deterioration, verging on a ruin. The study explored a full range of options from reconstructing the building to actively demolishing the structure. It was the judgment of the study team that trying to stabilize the existing ruin was not economically feasible and quite possibly structurally impossible.

It is recommended, Alternative 1, that steps be taken to warn and direct the visitor from the structure and areas threatened by collapse and then allow the Headhouse to collapse on its own. This is estimated to occur within five years. Active demolition of the headhouse would potentially expose workers to asbestos, which by law must be assumed to be present in structures like the headhouse. Extensive hazardous materials procedures are not required with the natural collapse of the structure. Estimated cost avoided over Alternative 2 are $357,000 on an initial cost basis.

2. Coal Tipple, Power House, Coke Ovens: These three structures are in better condition than the Headhouse, but the National Park Service is confronted with

there ongoing deterioration, with the Coal Tipple to collapse in three years. The study explored a range of options from aggressive stabilization and replacement of building envelop components to very basic stabilization to protect the visitor from risk and actions to control visitor movement.

It is recommended, Alternative 2, that moderate stabilization actions be taken to reinforce the major structural elements and to provide reasonable repair of the building envelope. Only a minimum annual maintenance effort would be made i.e. re-attachment of slipping siding, limited vegetation clearance; with the full realization that the Coal Tipple can be expected to collapse in approximately 10 years. The Power House, because of its masonry construction is expected to have a longer life after basic stabilization actions i.e. supporting high walls and repointing. Limited vegetation clearance will help extend the life of the Coke Ovens.

This holding effort would provide the National Park Service opportunity to consider other resources that might better relate to the park objectives concerning the "Coal Mining Theme". It was the judgment of the study team that investment required by Alternative 2, provided significant value, both in the areas of safety and extension of structure life, for the dollars expended; but that moving the next increment to more aggressive levels of stabilization did not offer the same level of value for dollars spent.

Alternative 3 represented the design group's initial preferred option, with an emphasis on cultural resource preservation/rehabilitation actions. Estimated cost avoided over Alternative 3 are $953,000 on an initial cost basis, and $966,000 on a life-cycle cost basis.

3. **Roofing and Siding Material:** The recommended alternative does not propose replacement of existing metal roofing and siding. The study team did explore several options of materials, and recommends use of metal siding, with some potential for the use of metal roof/siding with micro-zinc coating as a further refinement.

The historic structure report team is incorporating these recommendations in the HSR, and merging them with other proposals for the treatment of the site.

ACKNOWLEDGMENTS

The value study team would like to acknowledge the support of the New River Gorge park staff to the study team during the study and the dedicated manner in which the consultant group assisted our effort.

PROJECT DESCRIPTION

PROJECT LOCATION: West Virginia

PROJECT TITLE: New River Gorge National River
Kaymoor Mines

ITEM UNDER STUDY: Mine Structures

BASIC FUNCTIONS: Retard Deterioration, Protect Visitors

VE STUDY NUMBER: 103-97

SPECIAL CRITERIA

APPLICABLE CODES:

- National Building Codes
- Americans with Disabilities Act

RESTRICTIONS:

DESIGN HISTORY: (RESPONSIBILITIES, COMMITMENTS, ETC.)

- Park constructing stair access to the Kaymoor bottom
- DCP established stabilization as the treatment for Kaymoor Mines resources

DESIGN AND CONSTRUCTION CRITERIA AND CONSTRAINTS

- Elevation change of 500 vertical feet makes construction access difficult
- Only road access is by 4-wheel drive road
- Rail access is limited because the line is a major active railline.

PROJECT BACKGROUND

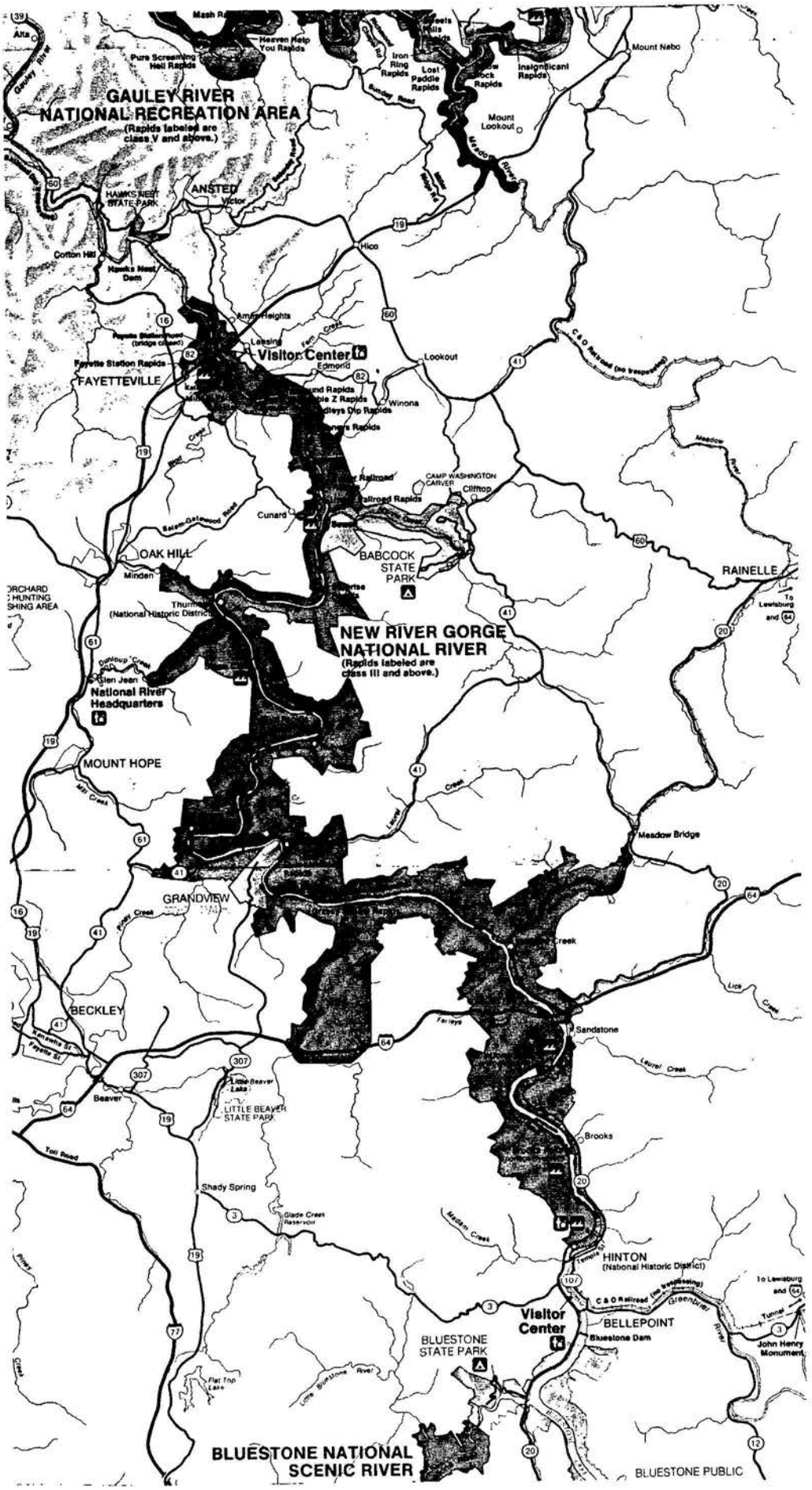
The New River Gorge National River was authorized by Congress for inclusion in the National Park System by Title XI of P.L. 95-625 on November 10, 1978. Kaymoor is located upstream from the New River Bridge, located on Rt. 19, which is considered a cultural and engineering landmark in West Virginia. It is the second highest bridge in the United States and is also a significant symbol of state pride.

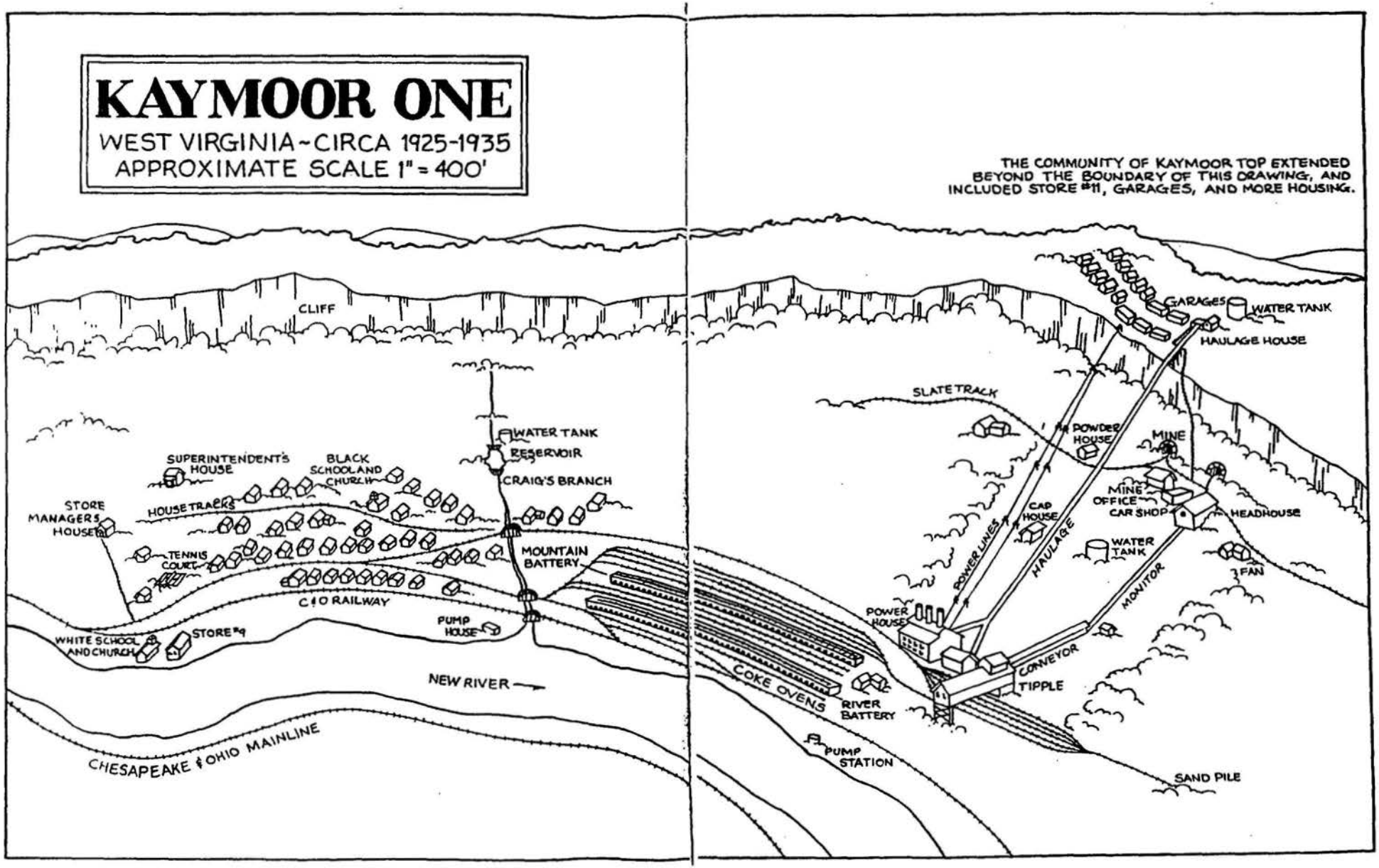
The origins of the Kaymoor mine and town can be traced to the Low Moor Iron Company of Low Moor, Virginia. founded in 1873, the company utilized in its furnaces the coal and coke mined and manufactured at Kaymoor. The town of Kaymoor, located at both the top and bottom of the New River gorge, was founded to house the mine workers. It was a company town, with all the aspects of housing

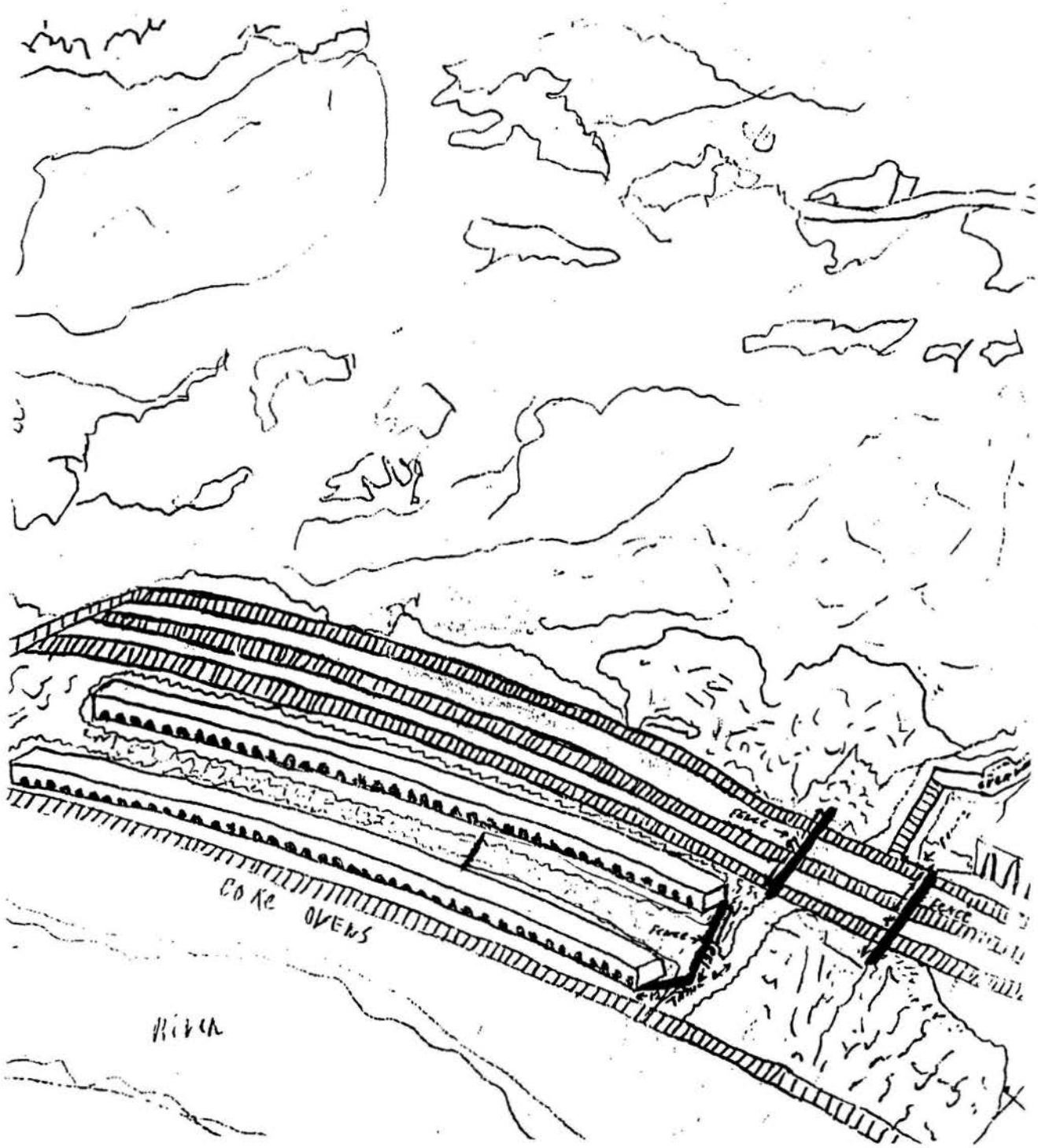
supplies, and transportation supplied by the Low Moor Iron Company. The town and mine were sold in 1925 to the New River and Pocahaontas Consolidated Coal Company. Mining continued until 1962; Kaymoor Bottom had been emptied of inhabitants by 1952, with only portions of Kaymoor Top surviving in any form. Located in the famous New River fields, producers of the legendary "smokeless coal," the Kaymoor mine and its supporting town were thus contributors to a larger economic scene.

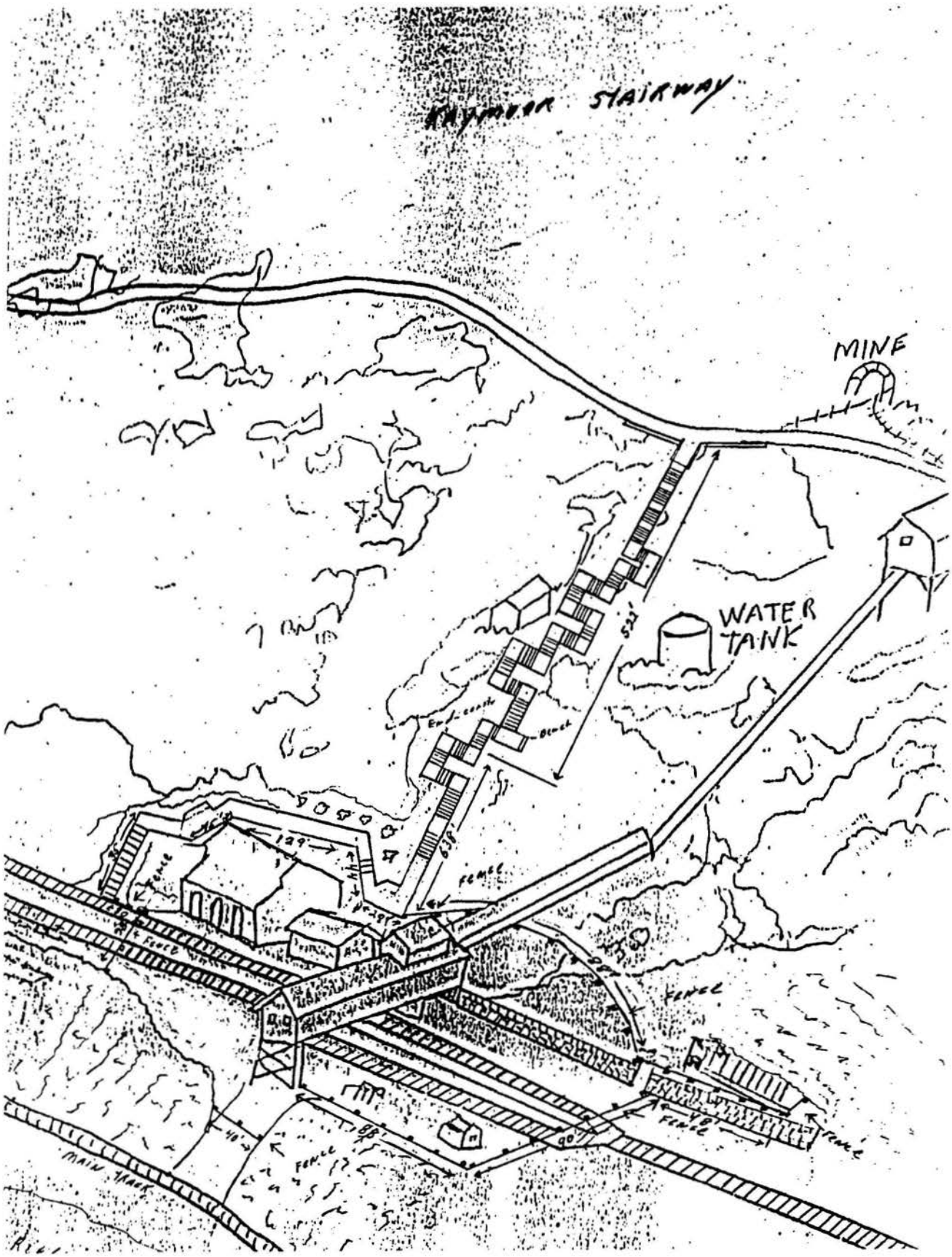
The remnants of mining activity still extant at Kaymoor offer a unique interpretive and visitor use challenge for the National Park Service. The story of bituminous coal mining in West Virginia can be interpreted at Kaymoor, with all its extant structures and machinery. (Kaymoor, National Register of Historic Places Registration Form, 1990)

The National Park Service has prepared a Development Concept Plan (DCP) for the site. The Denver Service Center is preparing a Historic Structure Report(1997) for the Kaymoor site, focused on four structures, the Headhouse, Coal Tipple, Power House and Coke Ovens. The HSR will make recomendations concerning the condition of the resources and the method for implementing the DCP recommended treatment of stabilization for the site and structures. This value study is a component of the HSR effort.


GAULEY RIVER
NATIONAL RECREATION AREA
(Rapids labeled are class V and above.)
Visitor Center
FAYETTEVILLE
Fayette Station Rapids
Pure Screaming Hell Rapids
Heaven Help You Rapids
Iron Ring Rapids
Lost Paddle Rapids
Insignificant Rapids
Mount Nebo
Mount Lookout
ANSTED
HAWKS NEST STATE PARK
Cotton Hill
Hawks Nest Dam
Hico
Lookout
Winona
CAMP WASHINGTON CARVER
Climtop
Cunard
OAK HILL
Minden
BABCOCK STATE PARK
RAINELLE
NEW RIVER GORGE
NATIONAL RIVER
(Rapids labeled are class III and above.)
Glen Jean
National River Headquarters
MOUNT HOPE
Meadow Bridge
GRANDVIEW
BECKLEY
Sandstone
Beaver
LITTLE BEAVER STATE PARK
Brooks
Shady Spring
HINTON
(National Historic District)
Visitor Center
BELLEPOINT
Bluestone Dam
BLUESTONE STATE PARK
John Henry Monument
BLUESTONE NATIONAL SCENIC RIVER
BLUESTONE PUBLIC


KAYMOOR ONE
WEST VIRGINIA ~ CIRCA 1925-1935
APPROXIMATE SCALE 1" = 400'
THE COMMUNITY OF KAYMOOR TOP EXTENDED BEYOND THE BOUNDARY OF THIS DRAWING, AND INCLUDED STORE #11, GARAGES, AND MORE HOUSING.
CLIFF
WATER TANK
RESERVOIR
CRAIG'S BRANCH
SUPERINTENDENT'S HOUSE
BLACK SCHOOL AND CHURCH
STORE MANAGER'S HOUSE
HOUSE TRACKS
TENNIS COURT
MOUNTAIN BATTERY
C & O RAILWAY
PUMP HOUSE
WHITE SCHOOL AND CHURCH
STORE #9
NEW RIVER
CHESAPEAKE & OHIO MAINLINE
GARAGES
WATER TANK
HAULAGE HOUSE
SLATE TRACK
POWDER HOUSE
MINE
MINE OFFICE
CAR SHOP
HEADHOUSE
CAR HOUSE
POWER LINES
HAULAGE
WATER TANK
MONITOR
FAN
POWER HOUSE
CONVEYOR
TIPPLE
COKE OVENS
RIVER BATTERY
PUMP STATION
SAND PILE


COKE OVENS


MINE
WATER TANK
FENCE
MAIN TRACK

VALUE STUDY

GENERAL VALUE ANALYSIS METHODOLOGY

Value analysis is not a critical review, constructability review, or cost cutting exercise. It is a problem solving and decision making technique that bypasses learned responses to produce alternative solutions achieving all required functions of the original design at the least cost over the life of the facility. It is a team effort which follows an established, organized, job plan, and problem identification format that promotes objectivity and stimulates creativity. When the value analysis methodology is followed precisely, beneficial results are ensured.

A value analysis team must be willing to challenge criteria and opinions, many of which may have been maintained by historical continuity or outdated policy. Value analysis follows a methodology of distinct phases, relies upon teamwork, and the increase in creativity resulting from the synergism of a multi-disciplined group. It searches for and uses current technology to achieve the value analysis goal: To creatively furnish technically sound alternatives to satisfy the user's needs at the lowest life cycle cost.

Value analysis examines systems of design and breaks them into components which are then described in terms of intended use. The intended use (the purpose for the component's existence) called a function, is described in just two words, an active verb, and measurable noun.

These two-word functions are separated into categories by type:

1. Higher order functions define the user's needs.

2. Basic functions present the performance feature which must be achieved to satisfy this need. Without this quality the item ceases to be useful for whatever purpose it is required.

Secondary functions result from the method chosen to accomplish the basic function or functions. These can be further categorized into essential, desired, or non-essential. Unless they are essential, they have zero value and can be eliminated without affecting the required performance of the system or design.

Functions are arranged into two word pictures describing the project under study. The result is a FAST Diagram, an acronym for Function Analysis System Technique. It verifies the correctness of the function definitions and shows their interrelationships. It identifies and separates them into higher order, basic, and required secondary functions.

A Cost Model of a design's components, including the identification of the component's function, prioritize opportunities for value improvement. A function

analysis, including cost/worth ratios, further pinpoints poor value in greater detail. When cost exceeds worth (when the cost worth ratios exceeds unity), it indicates critical areas for the Value Engineering team to concentrate on during their alternative development efforts.

Focused by the cost model and the functional analysis, alternatives are generated through brainstorming. Generally, ideas are put through two sieves: (a) an initial judgemental level screening against evaluation factors followed by and a final more rigorous evaluation using Choosing by Advantages or other decision making method. The top three alternatives surviving these procedures are identified. The top-ranked of these is developed as the recommended solution, and estimates are prepared. Redesign costs and hours are estimated to reflect implementation impacts to assist management in their decision-making process. Estimated savings resulting from the use of the recommended alternatives are calculated, using life cycle costs, recognizing the time value of money where applicable and redesign costs are subtracted to show net savings.

The Value Analysis process, described above, has been structured into a job plan that deals with six phases..

VALUE ANALYSIS JOB PLAN

Phase 1 Information Phase

The first phase is the Information Phase. This ensures that all team members completely understand the function and/or purpose of the project by gathering all information related to it. It is critical that correct information be obtained to establish the data base prior to the development of suitable alternatives.

Phase 2 Creativity Phase

The second phase is the Creativity Phase. This is the creative phase where the team "brain-storms" alternative methods of achieving the required functions of a project. At this point, ideas are not evaluated since criticism of an idea could discourage participation, decrease the flow of alternatives, and inhibit the creative endeavor.

Phase 3 Evaluation Phase

The third phase is the Evaluation Phase. This phase forces the study team to eliminate all alternatives which are not feasible or are otherwise unsuitable. The remaining alternatives are ranked in order of feasibility and cost.

Phase 4 Development Phase

The fourth phase is the Development Phase. This is the designated study phase, where the best alternatives are developed into proposals for presentation. Alternatives are developed sufficiently to (1) demonstrate technical viability, (2) permit reasonable accurate estimates of their costs, (3) determine advantages, and (4) facilitate design documentation and construction.

Phase 5 Presentation Phase

The fifth phase is the Presentation Phase. This phase consists of presenting the developed alternatives as formal proposals to decision makers. The presentation must be clear, concise and present factual data to the decision makers. The Presentation Phase should include a plan for implementation.

Phase 6 Implementation Phase

The last phase is the Implementation Phase. This phase is for follow-up and implementation during which the approved VA proposals must be converted into actions. The proposals of the VA study are actually a collection of concept designs in sufficient detail to facilitate further development into plans and specifications.

STUDY SPECIFICS AND OBJECTIVES

The Kaymoor Mine value study had two basic objectives, to provide guidance to the design team in structuring the project alternatives and to recommend a direction for stabilization treatment.

The study team was composed of a mix of professional disciplines and varied national park service design, operations and maintenance experience. Two members of the park staff grounded the team with knowledge of the intricasies of managing and working on this site. Some members of the team have experience with the project and the previous development concept planning efforts at the park, but were balanced by team members and consultants with no involvement with the project. The cultural resouce specialist participated with the objective of strongly representing cultural resource objectives supported by the State Historic Preservation Officer.

PHASE I - INFORMATION

A range of material was available to the value study team including:

- Alternative Treatment Options - Draft HSR
- Cost Estimates- Class "C"

In an effort to understand the context for this project, the study team developed a list of "stakeholders," person with an active interest in the making of project decisions or the outcome of such decisions.

Stakeholders:

#	Stakeholders	Primary Interest

1	• Visitors
	  • Hikers
	  • Mountain Bikers
	  • "Viewers"
	  • Rock Climbers
		• Visitor Experience
		• Recreation
		• Access

2	• State Historic Preservation Officer	• Cultural Resources
3	• Local Residents and former Mine Employees	• Local Economy • Cultural Resources
4	• Congressional Delegation • Senator Byrd	• Local Economy • Cultural Resources

4	• Community Groups
	  • Coal Camp - Fayetteville
	  • Beckley Mine
		• Local Economy
		• Visitation

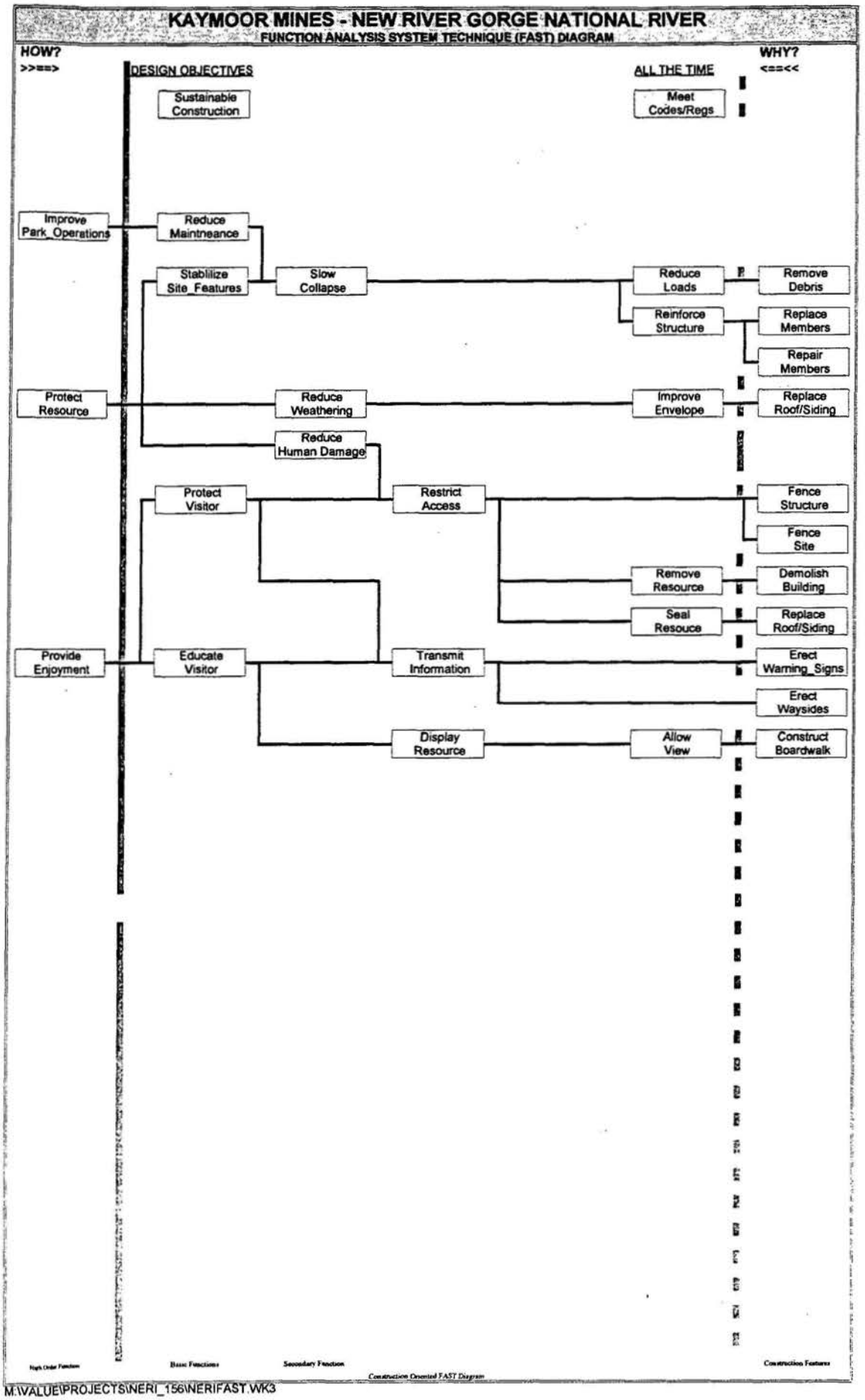
5	• Rafting Outfitters	• Local Economy • Visitor Experience • Access
6	• "Coal Heritage"Groups	• Local Economy • Cultural Resouces

7	• National Park Service
	  • New River Gorge NR
	  • Superintendent
	  • Park Maintenance
	  • Support Office
	  • Field Area
	  • Denver Service Center
		• Cultural Resources
		• Visitor Experience
		• Park Operations
		• Local Economy
		• Design Quality

The study team developed a functional analysis of the proposed stabilization actions identifying the key functional objectives and elements. The information, presented in a Functional Analysis System Technique (FAST) Diagram portrays a functional description of potential areas to be studied and reflects the design team's initial design effort. The diagram presents how and why a function exists. A cost

model summarizing the costs associated with various building components was prepared to help focus on high cost elements of the design.

Using the FAST and the Cost Model the study team identified two primary components of project for the study team to examine further, and one material choice issue related to roofing and siding. It was determined that the deteriorated condition of the Headhouse demanded that it be addressed seperately and independently of the Coal Tipple, Power House, and Coke Ovens. With the identification of these study areas, the study team took each area and completed the remaining elements of the Value Analysis Job Plan.



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ALT 3a - KAYMOOR MINE - NEW RIVER GORGE NATI

VALUE STUDY

COST MODEL

COMPONENT/PERCENT PROJECT COST		PROJECT COST PROPORTION
Coal Tipple	(52.3%)	
Architectural	(30.1%)	
Hazardous Materials	(16.0%)	
Structural	(4.4%)	
Sitework	(1.8%)	
Power House	(47.7%)	
Architectural	(7.1%)	
Hazardous Materials	(0.0%)	
Structural	(32.7%)	
Sitework	(7.9%)	
Coke Ovens	(0.0%)	
Architectural	(0.0%)	
Hazardous Materials	(0.0%)	
Structural	(0.0%)	
Sitework	(0.0%)	

Money is below

ALT 3a - KAYMOOR MINE - NEW RIVER GORGE NATION

VALUE STUDY COST MODEL **705,000 Rounded**

486,744 <-Total costs (arrows summed) 705,292 Field Cost

COSTS	Column Headings (staggered)	26% Adjustments & 15% Continge
254467.0 <----	Coal Tipple	
146624.0	Architectural	
77775.0	Hazardous Materials	
21268.0	Structural	
8800.0	Sitework	
232277.0 <----	Power House	
34607.0	Architectural	
0.0	Hazardous Materials	
159170.0	Structural	
38500.0	Sitework	
0.0 <----	Coke Ovens	
0.0	Architectural	
0.0	Hazardous Materials	
0.0	Structural	
0.0	Sitework	

PHASE II - EVALUATION (Part One - Evaluation Factors)

As the first task of the evaluation phase the team developed and discussed the factors which would be used to evaluate the two major areas identified by the study team.

- Headhouse
- Coal Tipple, Power House and Coke Ovens

The NPS Objectives and Factors 1-8 shown below were established for the NPS servicewide priority setting process and grow out of National Leadership Council guidance and formed a framework for evaluation.

The study team then defined variables and subfactors to tailor the evalution factors to the needs of this project. It consolidated the three factors related to "Protection of Resources" and elected to rate them together. The evaluation factores weighed in the Choosing by Advantages process are identified by letter.

EVALUATION FACTORS AND DEFINITIONS

NPS OBJECTIVE: Protect Cultural and Natural Resources	
Factor 1: Eliminate Threats to resources (e.g. stabilization)	
Factor 2: Provide Treatment for Resources	
Factor 3: Support resource protection and preservation	
These factors were rated as one with 3 sub-factors	
Sub-factor	Definitions/Variables
(A) Visual Scene	• Internal Views • View from across the river • Site and Building Circulation
(B) Cultural Resources	• Stabilization and Preservation actions • Compliance Issues
(C) Natural Resources	• Water Quality
NPS OBJECTIVE: Provide for Visitor Enjoyment	
(D) **Factor 4: Provide visitor services and educational and recreational opportunities**	
Sub-factor	Definitions/Variables
	• Quality of Experience • Experience of Time • Resources Available
(E) **Factor 5: Protect public health, safety and welfare.**	
Sub-factor	Definitions/Variables
	• Structures/Buildings • Visitor Risk and Potential Injury • Stability of Structure • Accessibility

	• Hazardous Materials
	  • Asbestos
	  • Creosote

	• Natural Risks • Snakes, animals
NPS OBJECTIVE: Improve efficiency of park operations	
Factor 6: Improve operational efficiency and sustainability.	
Sub-factor	Definitions/Variables
(F) Constructability	• Logistics - ability to provide materials, etc. • Day Labor versus Contract • Equipment Needs
(G)Maintainability/ Sustainability	• Staff RequirementsSharing of space • Required Maintenance • Reuse of Materials
(H) **Factor 7: Protect employee heath, safety, and welfare**	
Sub-factor	Definition/Variables
	• Occupational Saftey - Risk • Exposure to Hazardous Materials
NPS OBJECTIVE: Provide cost-effective, environmentally responsible, and otherwise beneficial development for the National Park System.	
(I) **Factor 8: Provide other advantages to the National Park System.**	
Sub-factor	Definition/Variables
	• Compliance and Permitting • Stakeholder Issues/Political Concerns • Alternative Funding Sources i.e. Line-item, ONPS, etc • Phasing of work
SPECIAL FACTOR: COST	
Sub-factor	Definition/Variables
INITIAL COST (Short-term)	• Capital Costs
LIFE CYCLE COST (Long-term)	• Maintenance Costs • Operating Costs • Staffing Costs

PHASES II, and III - CREATIVITY AND EVALUATION(Components)

COMPONENT: Headhouse

Phase I - Information:

Background

The Headhouse, built in 1899, is located at the main drift opening. It is constructed primarily of wooden timbers, with metal braces and brackets. The Headhouse is in poor condition and in danger of collapse, even with stabilization actions taken in 1989.

Functional Analysis		
Control - Loss	Educate - Visitor	Protect - Visitor
Preserve - Resource	Stabilize - Structure	Extend - Life

Phase II-Creativity (Alternatives):

#	Alternative (Brainstormed)	Disposition of Alternative
1	Natural Collapse	Recommended, See CBA Evaluation
2	Demolition	See CBA Evaluation
3	Demolition and Ghost Structure	See CBA Evaluation
4	Stabilize - Cables & Bracing	Not Developed, Logistical Nightmare Economically unfeasable Safety Risk - Structure Unpredictable
4	Reconstruction	Not Developed, contrary to NPS policy
5	Completely remove and Revegetate	Not Developed, requires full abatement Interpretive potential lost
6	Controlled Burn	Not Developed, fire risk



Kaymoor Headhouse



Kaymoor Headhouse

Phase III-Evaluation

The three Headhouse alternatives were evaluated using a process called Choosing by Advantages, where decisions are based on the importance of advantages between alternatives. The evaluation involves the identification of the attributes or characteristics of each alternative relative to the evaluation criteria, a determination of the advantages for each alternative within each evaluation factor, and then the weighing of importance of each advantage.

The highest importance advantage is identified in each factor. The paramount advantage, across factors, was determined and assigned a weight of 100. Remaining advantages were rated on the same scale. Construction costs were determined to be equivalent for each alternative at the study level of development. The importance scores were divided by the estimated cost, creating an Importance to Cost ratio. Recommendations are based on a balance of cost and importance.

The evaluation sheets form the basis for presenting the developed alternatives and design sketches and cost estimates are attached. The evaluation tables show a lot of information. Attributes of an alternative are shown above the dotted line in the tables. Advantages between alternatives are shown below the dotted line. The advantage with the highest importance with in a factor is indicated by a highlight around the advantage cell. The advantages are all rated on a common scale.

NEW RIVER GORGE NATIONAL RIVER - KAYMOOR MINE

CHOOSING BY ADVANTAGES

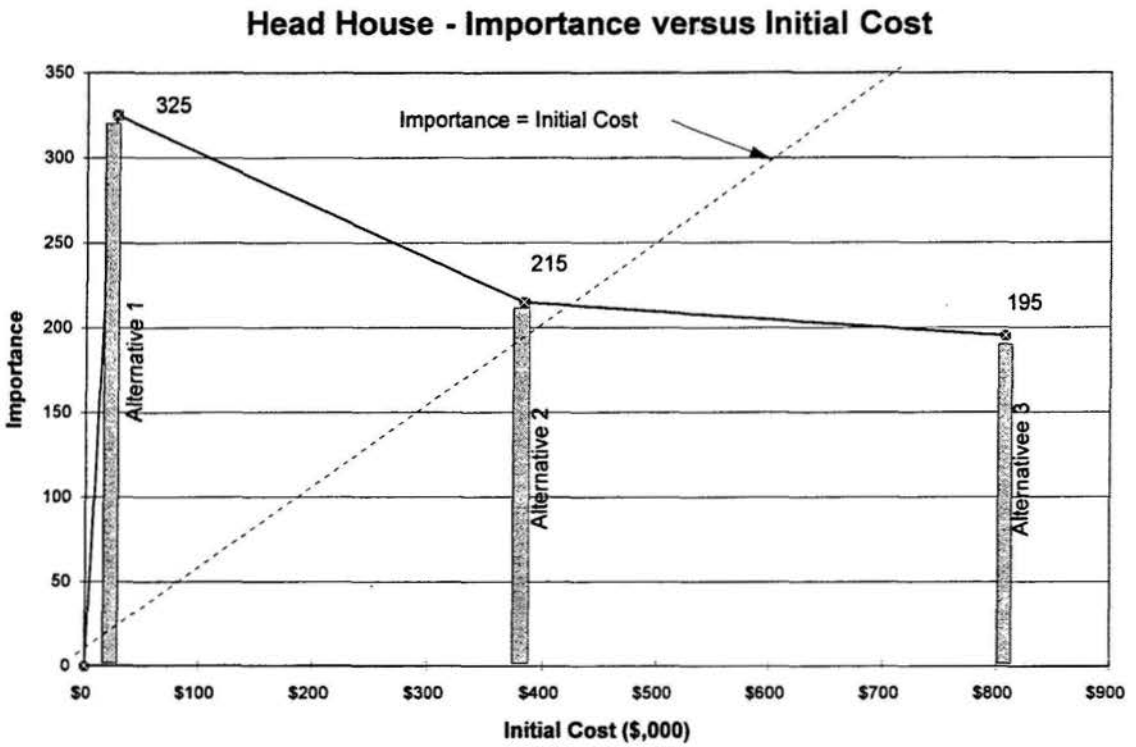
COMPONENT: Headhouse						**FUNCTION:** *Create Scene, Educate Visitor*	
FACTORS	**ALTERNATIVES**						
	Altenative 1 • Allow natural collapse (est 5 yr) • Expand Fence to control area of potential fall • Sign and Fence Debris • Potential Asbestos in Debris - No abatement • No vegetation clearing		Alternative 2 • Initiate active demolition - limited control • Evaluate/retain selected building elements i.e. foundation/piers, heavy timbers • Sign and stack remaining salvage material • Potential Asbestos - Hazardous Material procedures required • Vegetation clearing at ruins		Altenative 3 • Same as ALT 2 plus the following: • Ghost structural members • Remove all salvage materials • Potential Asbestos - Hazardous Material procedures required • Vegetation clearing at ruins and view sheds • Maintain ghost structure	
PROTECT CULTURAL AND NATURAL RESOURCES							
Factor 1: Eliminate Threats to resources							
Factor 2: Provide Treatment for Resources							
Factor 3: Support resource protection and preservation							
(A) Visual Scene							
Attributes	• Unaltered historic scene • Structures visible (long and short term)		• Scene Altered - No HH • Small Ruins remain - just barely visable		• Scene Altered - No HH • Building Ghosts new elements visable in the scene		
Advantages	Existing historic scene is maintained until collapse and ruins remain visable after collapse. No new elements introduced	**40**	Existing scene is lost earlier, while maintaining barely visable ruins on site. No new elements introduced	15	*Least Preferred Attribute*		10
(B) Cultural Resources							
Attributes	• Historic Structure remains on site in historic configuration		• Salvage material remains on site and stacked • Small piers Remain • Building is gone		• Salvage material is removed • Building is gone, possibility of limited foundations • Ghosts introduce new elements		
Advantages	Existing historic structure		Salvage material remains				

	remains on site longer and more visable remains will exist on site, while introducing no new elements	**45**	on site allowing link to orignial structure, while introducing no new elements	15	*Least Preferred Attribute*	10
(C) Natural Resources						
Attributes						
Advantages	NO SIGNIFCANT DIFFERENCE IN ADVANTAGE					
PROVIDE FOR VISITOR ENJOYMENT						
(D)Factor 4: Provide visitor services and educational and recreational opportunities						
Attributes	• Structure remains until collapse • Full ruins remain		• Collapse accelerated • Only traces of ruins remain		• Collapse accelerated • Ghost of HH built on ruins	
Advantages	Existing structure remains longer and full remains provide a sense of scale. The visitor sees the real thing	**60**	*Least Preferred Attribute*	10	Ghost provides a sense of scale of the original structure	50
(E) Factor 5: Protect public, health, safety and welfare						
Attributes	• Fencing to restrict visitor access to structure and ruins • Visitor continues to have access to unstable structure until collapse		• Fencing to restrict visitor access to stacked salvage materials • No visitor access to unstable structure		• No Debris onsite • No visitor access to unstable structure • Ghost structure attracts climbing	
Advantages	*Least Preferred Attribute*	10	Active demolition of structure removes visitor access to unstable structure and access to stacked salvage material is controlled	**100**	Active demolition of structure removes visitor access to unstable structure, but ghosts structures become a possible visitor risk	85
IMPROVE EFFICIENCY OF PARK OPERATIONS						
Factor 6: Improve Operational efficiency and sustainability						
F) Constructability						
Attributes	• Potential Damage to immediate surroundings • No control over fall • No Hazardous Material		• Potential damage to immediate surrounding • Limited control over fall • Hazardous material		• Potential damage to immediate surrounding • Limited control over fall • *Hazardous material*	

	procedures required		precedures required to protect workers		precedures required to protect workers • New Material delivered to site • Most material removed from site	
Advantages	Hazardous material procedures not reguired and materials are not required to be moved on and off the site. No new materials required.	**70**	No new materials are required, while hazardous material procedures are required.	30	*Least Preferred Attribute*	10
G) Maintainability and Sustainability						
Attributes	• Maintain fencing before and after collapse • Very limited vegetation clearance		• Maintain fencing of stored salvage material • Minimal maintainance of foundations/piers • Salvaged materials reused onsite		• No fencing • Vegetation clearing of foundations and view sheds • Maintain ghost structure and foundations	
Advantages	Only very limited maintenance is required before and after collapse with only limited sustainable reuse of materials	**20**	Limited maintenance is required with some sustainable reuse of materials	10	*Least Preferred Attribute*	5
H) Factor 7: Protect employee health, safety, and welfare						
Attributes	• Little employee exposure to hazardous conditions in unstable buildings		• Exposure of emplyees to demolition risks • Short term exposure during clean-up of salvage materials		• Exposure during demolishion and clean-up same as ALT 2 • Long-term exposure to risk maintaining ghost structures	
Advantages	Least employee exposure to risk	**55**	Limited employee exposure to risk	20	*Least Preferred Attribute*	15

PROVIDE COST-EFFECTIVE, ENVIRONMENTALLY RESPONSIBLE, AND OTHERWISE BENEFICIAL DEVELOPMENT FOR THE NPS						
Factor 8: Provide other advantages to the National Park System						
Attributes	• Requires little effort • Pile of Rubble - Resource loss more objectionable to SHPO and stakeholders • No funding source required		• NPS Action • Loss of structure & clean-up could show building outline and foundations - still may not be acceptable to SHPO • Funding sources limited		• NPS Action • Ghost structure not acceptable to SHPO and others - Why not save original for expenditure of funds involved to ghost • Funding sources very limited - Line-item construction only option	
Advantages	No actions needed for funding nor any trade-offs for other features with SHPO and politics	**25**	Some funding options exist and potentially acceptable to SHPO and others	15	*Least Preferred Attribute*	10
TOTAL IMPORTANCE OF ADVANTAGES		**325** imp/$		215 imp/$		195 imp/$
Initial Cost	$26K	**125.0**	$383K	5.6	$807K	2.4
Life-Cycle Cost	NOT EVALUATED					

Alternative 1 had the highest total importance of advantages and was also the least expensive alternative. The resulted in it having a significantly higher Importance to Cost ratio, indicating that it offered good value.



COMPONENT: Coal Tipple, Power House and Coke

Phase I - Information:

Background

The current Tipple is not the original and was built in 1925. It is built of corrugated metal, brick and concrete. It is in better condition than the Headhouse, but is still in a deteriorated condition.

The Power House was built in 1900 to produce compressed air for the processing plant. The structure is abandoned and deteriorated, with three rooms and a partial roof. The structure contains masonry arched entrances, screened and open windows with steel girder roof framing system. Mush debris is throughout the building and there is a high probability of toxic materials within the building.

Two batteries of the Coke Ovens were built in 1901 and 1917 of firebrick and stone with arched stone doorways and iron hardware. Vegetation is growing on and through the ovens with a wide range of condition from good to ruins.

The park is in the process of constructing a wooden stair, along the haulage, down to the Kaymoor Bottom to provide visitor access.

Functional Analysis		
Provide - Safety	Stabilize Resource	Protect - visitor
Set - Historic Scene		

Phase II-Creativity (Alternatives):

#	Alternative (Brainstormed)	Disposition of Alternative
1	• Basic Stabilization • Minimum Maintenance	See CBA Table
2	• Moderate Stabilization • Minimum Maintenance	See CBA Table
3	• Active Stabilization/Replacement • Minimum Maintenance	See CBA Table
4	• Active Stabilization/Replacement • Full Maintenance	See CBA Table
5	• Partial Demolition - Remove unecessary elements	Not Developed partial demo very difficult logistically and mobilization for only partial not reasonable
6	• New Envelope	Not Developed inconsistant with NPS Policy
	• Waterproof/Consolidate Major Building Elements	Not Developed safety of work crews of issue as well as cost

Four altenatives were developed out of the design team alternatives, allowing a consistancy of concept and treatment approach. The four alternatives evaluated were defined as follows:

ALTERNATIVE 1:

Coal Tipple:

- Park continues 2x / year vegetation clearing.(park to estimate)
- Remove faulty downspout.
- Replace downspout.
- Replace 2" diameter temporary pipe columns with 3" diameter temporary pipe columns
- Warning signing, Vegetation removal, Boardwalk to facilitate circulation (Park to estimate), Removal of hazardous pieces of hanging corrugated siding that pose a particular threat to the curious visitor.

Power House:

- Park continues 2x / yr. vegetation clearing. (Park to estimate)
- Warning signing,
- Boardwalk included in the park construction as discussed in site work for Alternative 1, Coal Tipple,
- Removal of small amounts of non-friable asbestos containing materials (bag and remove),
- Vegetation removal.

Coke Ovens:

- Park continues 2x / yr. vegetation clearing. (Park to estimate)
- Choose a certain number (probably 3) of coke ovens to stabilize.
- Fence across the ensemble of structures from one side to the other on the side closest to the tipple with fencing, in front of the structures and in along the interior alley way to the chosen oven (#16) and come back along the other side.
- Warning Signing, fencing, Circulation,
- Removal of hazardous pieces of machinery and debris that pose a particular hazard to the curious visitor.
- Clearing woody plant material by herbicide use and manual removal.

ALTERNATIVE 2:

Coal Tipple:

- All of Alternative 1 plus:
  Board up windows with exterior grade plywood, including active ventilation in windows and in roof
- Structural Stabilization:
  - Replace four pairs of cross bracing
  - Replace two W8x columns (at 4A and 4E) including connections.
  - Replace beam sections (between 4F and 4G and between 4E and 2E)
- Supplement existing rusted members that have experienced significant section loss due to rust and exfoliation. This would occur primarily on the web of columns at 5D, 6D, 7A, 8A, 6B and the connection plates at the base of column 2A. The proposed treatment would require sandblasting for rust removal, welding or bolting supplemental plates in place, and painting over the new steel. Include cost of OSHA requirements for removal of lead paint.

- Wayside

Power House:

- All of Alt. 1 plus:
  Repointing of all masonry wall surfaces as necessary.
- Replace steel in roof truss, building line E.
- Repair / replace missing wall sections of roughly cut, mortared rubble stone masonry on front and back side of Boiler Room.
- Three new roof trusses, including bracing and purlins to match Compressor room.
  Remove dirt and debris from Old Boiler Room.
- Site: French drain and backfill around back and sides of building and daylight it beyond.

Coke Ovens:

- Minimally stabilize the vertical oven openings by closing them with wood shoring on the three best-preserved ovens, and with metal grating to keep heads and other objects out of the openings. It would be desirable to be able to see through this material to the interior of the ovens.
- The alley way would still be fenced across from one side to the other between ovens 16 and 17.
- Wayside exhibit

ALTERNATIVE 3:

Coal Tipple:

- All of alternative 2 plus:

- 1) Keep metal sheathing, but refinish it:
  - a) Remove the parts of the siding which are not salvageable, sand blast or wire brush the loose paint on the remaining majority of the exterior metal corrugated sheathing, including precautions for OSHA requirements used in removing red lead paint. If lead paint is found to be present and does not present a suitable substrate, abate lead paint down to bare metal
  - b) prime the metal surface
  - c) paint the metal with anti-rust metallic coating
- Remove deteriorated wood floors.
  Install 3/4" plywood floor sheathing.
- Remove existing roof
- Replace roof in kind with primed and painted corrugated metal siding.
- Clear interior of coal dust debris which is putting more load on the structure than necessary and which may be exacerbating the caustic decay of the steel members. Methodology needs to be investigated.
- Site: Wayside

Power House:

- All of Alternative 2 plus:
- Board up doors and windows with plywood (exterior grade).
  Vent boarded-up window openings and roof with active ventilation.
- Re-establish roof over the Boiler room side of building (no roof currently) with new corrugated metal roof sheathing over entire roof of Boiler Room
  Compressor Room and Generator Room: Replace roof with corrugated fiber sheathing
- Site: Wayside

Coke Ovens:

- Additional clearing of woody plant materials around coke ovens (with herbicides and by manual removal) from oven #16 back to the end of the coke oven batteries (the entire alley between the two batteries of ovens would be cleared) with native grasses remaining to eliminate the threat of soil erosion.
- Additional fencing along interior of alley way from oven 16 to end of ovens and back along the other side opposite of oven 16.
- Partially remove soil behind coke ovens for the length of ovens 1 -16 on uphill side of mountain battery to remove hydrostatic pressure against the structure and help preserve the resource.

ALTERNATIVE 4:

Coal Tipple:

- All of Alternative 3 plus long-term maintenance

Power House:

- All of Alternative 3 plus long-term maintenance

Coke Ovens:

- All of Alternative 3 plus long-term maintenance plus
- Stabilize 3 ovens: One oven will be completely restored, and the two flanking it will be filled in.

Phase III-Evaluation

The four treatment alternatives were evaluated using the same used on the Headhouse, Choosing by Advantages, where decisions are based on the importance of advantages between alternatives. The evaluation involves the identification of the attributes or characteristics of each alternative relative to the evaluation criteria, a determination of the advantages for each alternative within each evaluation factor, and then the weighing of importance of each advantage.

The highest importance advantage is identified in each factor. The paramount advantage, across factors, was determined to be in Factor E, Alternatives 2-4, and was assigned a weight of 100. Remaining advantages were rated on the same scale.

The evaluation sheets form the basis for presenting the developed alternatives and design sketches and cost estimates are attached. The evaluation tables present a lot of information. Attributes of an alternative are shown above the dotted line in the tables. Advantages between alternatives are shown below the dotted line. The advantage with the highest importance with in a factor is indicated by a highlight around the advantage cell. The advantages are all rated on a common scale.

NEW RIVER GORGE NATIONAL RIVER - KAYMOOR MINE

CHOOSING BY ADVANTAGES

COMPONENT: Coal Tipple, Power House, and Coke Ovens								**FUNCTION:** Preserve Resource,
FACTORS	**ALTERNATIVES**							
	Alternative 1 • Basic Stabilization • Minimum Maintenance		Alternative 2 • Moderate Stabilization • Minimum Maintenance		Alternative 3 • Active Stabilization/Replacement • Minimum Maintenance		Alternative 4 • Active Stabilization/Replacement • Full Maintenance	
PROTECT CULTURAL AND NATURAL RESOURCES								
Factor 1: Eliminate Threats to resources								
Factor 2: Provide Treatment for Resources								
Factor 3: Support resource protection and preservation								
(A) Visual Scene								
Attributes	• *Continue* current pattern of clearing • 1/3 of CO aisles cleared • Boardwalk and stair visible • Majority of site overgrown		• PH bracing and replacement items • Windows boarded • 1/3 of CO aisles cleared		• New elements introduced - Roofing & Siding - PH, CT • Full CO aisles cleared • Major changes in scene • No major maintenance program, let resource deteriorate		• New elements introduced - Roofing & Siding - PH, CT • Full CO cleared w/ small restoration • Major changes in scene • Maintenance preserves Cultural Landscape and scene	
Advantages	*Least Preferred Attribute*		The cultural landscape is there almost as long as ALT 3 with less intrusion	**80**	The cultural landscape is there slightly longer than in ALT 2 and harmonious new elements are introduced representing the historic scene	40	The cultural landscape is there the significantly longer and harmonious new elements are introduced representing the historic scene	45
(B) Cultural Resources								
Attributes	• Deterioration continues at the present rate until ultimate loss of significant resources • CT - 2+ years		• Moderately slows rate of deterioration of resources and cultural landscape • CT - 10 years		• Significantly slows rate of deterioration of resources and cultural landscape • Authenticity lost due to intervention • CT - 10+ years		• Most significantly slows rate of deterioration of resources and cultural landscape • Authenticity lost due to intervention • CT - 15-20 years	
Advantages	*Least Preferred Attribute*		Moderately extends the life of the resource and cultural landscape	60	Significantly extends the life of the resource, while reducing authenticity of the scene	65	Most significantly extends the life of the resources and cultural landscape, while reducing the authenticity of the scene	**70**
(C) Natural Resources								
Attributes	• Clear same area of vegetation as now		• 28,000 SF more vegetation cleared		• 88,000 SF more vegetation cleared		• 130,000 SF more vegetation cleared	
Advantages	Uses the least amount of herbicides to clear vegetation and removes the least vegetation	**10**		8		6	*Least Preferred Attribute*	

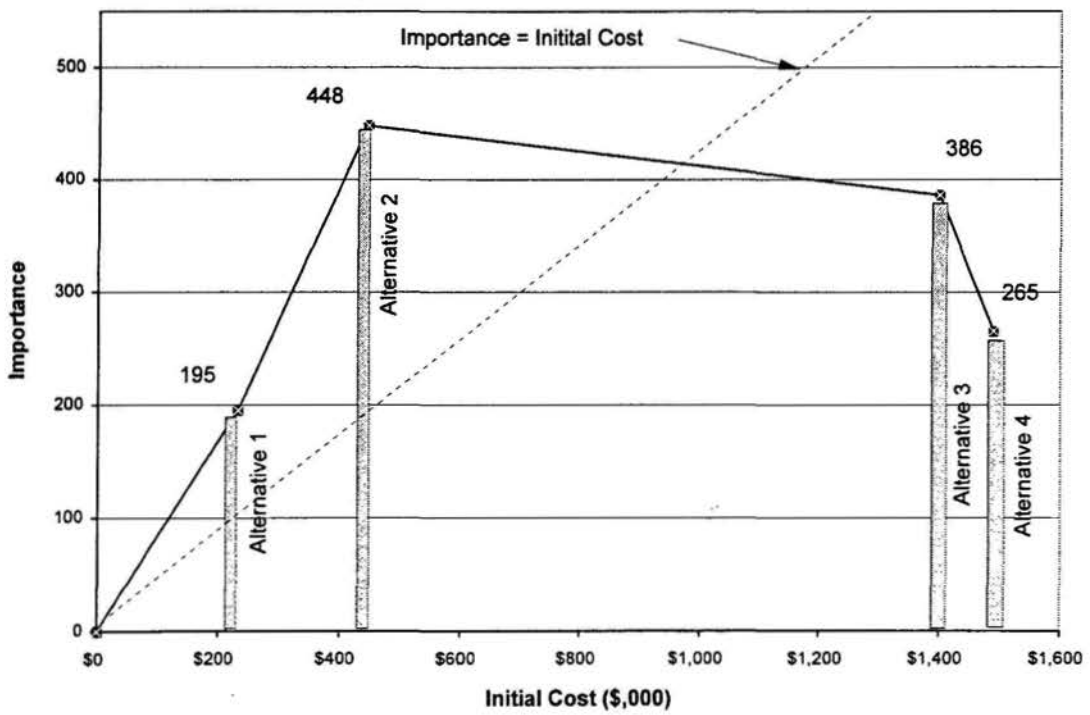
PROVIDE FOR VISITOR ENJOYMENT							
(D)Factor 4: Provide visitor services and educational and recreational opportunities							
Attributes	• Rapidly loses opportunities to interpret historic resources and scene • Limited access to unstabilized structures - signs and fencing • Very limited access to CO		• Moderate access/approach to stabliized structures and resources • Limited access to CO		• Moderate access/approach to stabliized structures and resources • Moderate access to CO		• Moderate access/approach to stabliized structures and resources • Restored CO	
Advantages	*Least Preferred Attribute*		Better access to the resource and interpretation, with the actual resource available for a longer period of time	40	Moderately better visitor access to the resource and interpretation, with the actual resource available for a longer time	45	Significantly better visitor access to the resources, for the longest time. Restoration of CO exhibit improves interpretation.	**50**
(E) Factor 5: Protect public, health, safety and welfare								
Attributes	• Potential visitor access to unstable structures - only signs and fence • Potential natural risks due to limited clearing • No significant advantage relative to visitor exposure to Hazardous Materials		• Potential access to stabilized structures • Reduced natural risk do to clearing • No significant advantage relative to visitor exposure to Hazardous Materials		• Potential access to stabilized structures • Reduced natural risk do to clearing • No significant advantage relative to visitor exposure to Hazardous Materials		• Potential access to stabilized structures • Reduced natural risk do to clearing • No significant advantage relative to visitor exposure to Hazardous Materials	
Advantages	*Least Preferred Attribute*		Significantly reduced visitor risk through the stabilization of structures and control of access	**100**	Significantly reduced visitor risk through the stabilization of structures and control of access	**100**	Significantly reduced visitor risk through the stabilization of structures and control of access	**100**
IMPROVE EFFICIENCY OF PARK OPERATIONS								
Factor 6: Improve Operational efficiency and sustainability								
(F) Constructability								
Attributes	• Limited amount of construction materials required. Materials small in size • Minimal equipment necessary • Least amount of day labor required		• Moderate materials required to stabilize buildings. Materials of larger scale than ALT 1 • Moderate equipment needs i.e. hoisting steel at PH • Moderate day labor required		• Same amount of materials required to stabilize buildings as ALT 2 with siding and roofing additional. Materials of larger scale than ALT 1 • Significantly more equipment needs i.e. hoisting steel at PH, setting siding and roof • Significantly more day labor required		• Same amount of materials required to stabilize buildings as ALT 2 with siding and roofing additional. Materials of larger scale than ALT 1 • Significantly more equipment needs i.e. hoisting steel at PH, setting siding and roof • Most day labor required	
Advantages	Requires the least material, equipment and labor in a difficult logistical site	**55**	Requires significantly less material, equipment and labor in a difficult logistical site	40	Requires less material, equipment, and labor than ALT 4 because no CO exhibit	35	*Least Preferred Attribute*	
(G) Maintainability and Sustainability								
Attributes	• Minimum maintenance required to maintain • No long-term maintenance planned		• More maintenance required to maintain stabilization actions • No long-term maintenance planned		• Significantly more maintenance required • No long-term maintenance planned		• Most maintenance required • Long-term maintenance planned	
Advantages	Least material required to maintain, least material to maintain, while being the most sustainable	**65**		55		40	*Least Preferred Attribute*	

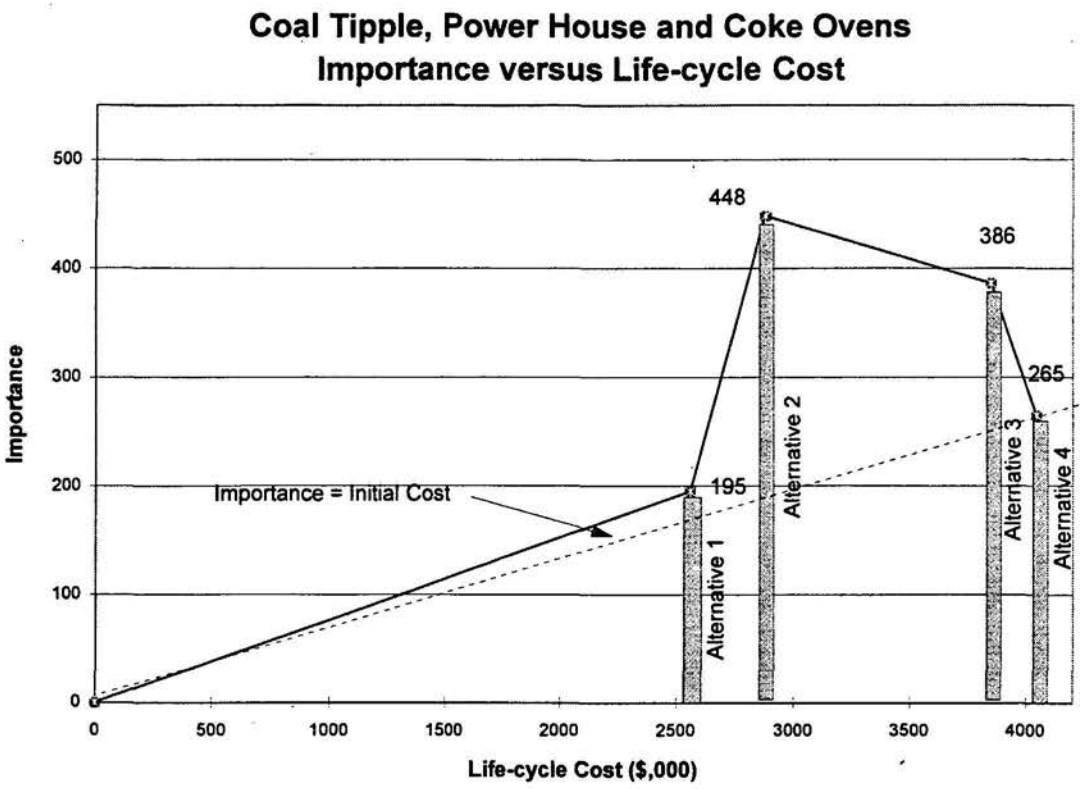
(H) Factor 7: Protect employee health, safety, and welfare								
Attributes	• Minimum maintenance access • Very limited construction exposure • Non-construction employee exposure to unstabilized structures • Least number of employee for non-construction/maintenance due to limited interpretive program		• Minimum maintenance access • Limited construction exposure • No non-construction employee exposure to unstabilized structures • More non-construction employees potentially on site		• Minimum maintenance access • Moderate construction exposure • No non-construction employee exposure to unstabilized structures • More non-construction employees potentially on site		• Ongoing maintenance access • Most construction exposure w/ ghost construction • No non-construction employee exposure to unstabilized structures • More non-construction employees potentially on site	
Advantages	Least exposure of construction/maintenance employees with the least number of non-construction employees on site	**35**		25		20	*Least Preferred Attribute*	
PROVIDE COST-EFFECTIVE, ENVIRONMENTALLY RESPONSIBLE, AND OTHERWISE BENEFICIAL DEVELOPMENT FOR THE NPS								
(I) Factor 8: Provide other advantages to the National Park System								
Attributes	• Alternate fund sources i.e. ONPS, cyclic, Line-item, maintenance, phasing of work day-labor • SHPO opposes		• Alternate fund sources i.e. ONPS, cyclic, Line-item, maintenance, phasing of work day-labor • SHPO limited support	•	• Alternate fund sources i.e. Line-item, earmark • SHPO support • Contract required - no day labor		• Alternate fund sources i.e. Line-item, earmark • Maintenance funding difficult • SHPO Prefers • Contract required - no day labor	
Advantages		30	More funding sources and acceptable to stakeholders, while possible by day labor	**40**		35	*Least Preferred Attribute*	
TOTAL IMPORTANCE OF ADVANTAGES		195 imp/$		**448** imp/$		386 imp/$		265 imp/$
Initial Cost [(Importance/$K) x 10]	$234K	8.3	$447K	**10.0**	$1,400K	2.8	$1,490K	1.8
Life-Cycle Cost [(Importance/LCC$K) x 100]	$2,560K	7.6	$2,882K	**15.5**	$3,848K	10.0	$4,045K	8.5

Initial construction costs were developed for each alternative based on estimates prepared by the design team. The study team developed life-cycle cost estimates for each alternative. The life-cycle was set at 30 years with a discount rate of 6 percent. The life-cycle analysis assesses initial costs, replacement cost that would occur periodically i.e. painting, replacement of items, and annual costs i.e. custodial maintenance, annual maintenance, site maintenance, and operations. With the help of the park staff representatives on the team each alternative was evaluated in these terms. These calculation sheets are provided at the end of this section. The importance scores were divided by the estimated cost, both initial and life-cycle, creating an Importance to Cost ratio. These figures were plotted on graphs of Importance versus cost. The ratio represents the value being realized for each dollar expended and is reflected in the slope of the line between alternatives. If the slope is greater than the estimated "Importance = Cost" that action or increment is of high value. If the slope is less, then that action or increment is consider to have poor value.

On an initial and a life-cycle cost basis Alternatives 1 and 2 are clearly superior to Altenatives 3 and 4. The primary reason is that both Alternatives 1and 2 address immediate visitor safety issues. Alternative 2 is recommended because it has the highest Importance/Cost ratio on an initial and life-cycle basis. The downward slope of the line from

Coal Tipple, Power House and Coke Ovens
Importance versus Initial Cost





Alternative 2 to Alternative 3, or the Importance/Cost ratio for that increment of work, shows that moving up to Alternative 3 cannot be justified.

VALUE STUDY - LIFE CYCLE COST ANALYSIS

USING PRESENT WORTH (PW) COSTS

Date: 08/28/96

PROJECT:
COMPONENT:
Discount Rate: 6.0%
Economic Life: 30

			ALTERNATIVE 1		ALTERNATIVE 2		ALTERNATIVE 3		ALTERNATIVE 4	
			Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth
INITIAL/COLLATERAL COSTS										
A. *Coal Tipple*			$11,277	$11,277	$53,188	$53,188	$358,798	$358,798	$358,798	$358,798
B. *Power House*			$26,790	$26,790	$210,450	$210,450	$320,460	$320,460	$320,460	$320,460
C. *Coke Ovens*			$195,567	$195,567	$203,322	$203,322	$719,015	$719,015	$806,435	$806,435
D.										
E.										
F.										
G.										
Total initial/Collateral Costs				$233,634		$466,960		$1,398,273		$1,485,693
REPLACEMENT/SALVAGE	Year	PW Factor								
(Single Expenditures)										
A. *Structural Painting*	10.0	0.5584	$5,000	$2,792	$10,000	$5,584	$10,000	$5,584	$20,000	$11,168
B. *Structural Painting*	20.0	0.3118	$5,000	$1,559	$10,000	$3,118	$10,000	$3,118	$20,000	$6,236
C. *Stair/Boardwalk*	10.0	0.5584	$8,000	$4,467	$8,000	$4,467	$8,000	$4,467	$8,000	$4,467
D. *Stair/Boardwalk*	20.0	0.3118	$8,000	$2,494	$8,000	$2,494	$8,000	$2,494	$8,000	$2,494
E. *Fencing*	10.0	0.5584	$3,000	$1,675	$1,500	$838	$1,500	$838	$1,500	$838
F. *Fencing*	20.0	0.3118	$3,000	$935	$1,500	$468	$1,500	$468	$1,500	$468
G.										
H.										
I.										
J.										
K.										
Total Replacement/Salvage Costs				$13,922		$16,969		$16,969		$25,671
ANNUAL COSTS	Escal. Rate	PWA Factor w/Escal.								
A. *Maintenance*		13.765	$35,788	$492,616	$38,680	$532,424	$41,450	$570,552	$48,860	$672,550
B. *Custodial Maintenance*		13.765	$17,394	$239,425	$17,394	$239,425	$17,394	$239,425	$17,394	$239,425
C. *Operational (Protection & Interp Season)*		13.765	$73,828	$1,016,230	$73,828	$1,016,230	$73,828	$1,016,230	$73,828	$1,016,230
D. *Site Maintence*		13.765	$40,780	$561,330	$43,860	$603,725	$43,860	$603,725	$43,860	$603,725
E.										
F.										
Total Annual Costs				$2,309,601		$2,391,804		$2,429,932		$2,531,930
TOTAL PRESENT WORTH COSTS				$2,557,157		$2,875,733		$3,845,174		$4,043,294
LIFE CYCLE (PW) SAVINGS						**($318,576)**		**($1,288,017)**		**($1,486,137)**

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VALUE STUDY - LIFE CYCLE COST ANALYSIS

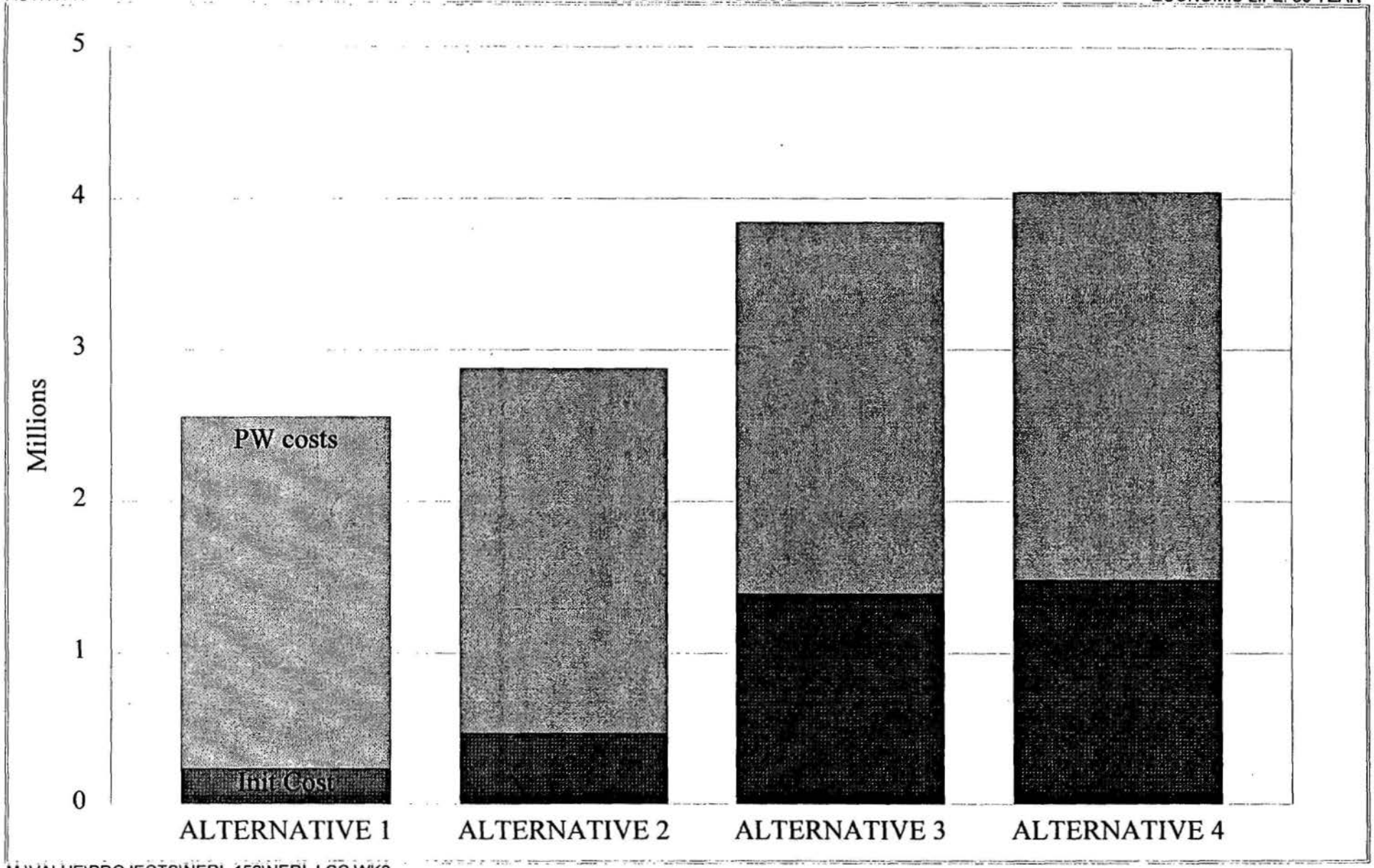
USING PRESENT WORTH (PW) COSTS

ACTIVITY:

DISCOUNT RATE: 6.0%

Date: 08/28/96

ECONOMIC LIFE: 30 YEAR



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PHASE IV - DEVELOPMENT

The alternatives developed were based on the HSR teams work. During the course of the study, the alternative were reconfigured and elaborated upon by the value study team.The detailed initial cost estimates developed by the HSR team are included in the Appendix, as are the estimates developed by the study team. The HSR team will further refine the cost estimates and the specific actions required to implement the recommended alternatives for both the Headhouse and the other buildings.

PHASE V - PRESENTATION

The value study team made a presentation of the study results to other DSC professionals:

Bob Johnston, Technical Expert-Constructibility, DSC
Billy Garrett, Functional Chief - Architecture, DSC
Edie Ramey, Functional Chief - Management Services, DSC

While agreeing with the recommendations, concern was expressed that when making such evaluations it is important for stakeholders issues to be adequately addressed. The specific compostion of the study team was discussed and how stakeholder issues had been represented.

The general value analysis and Choosing by Advantages process was discussed and that the process provided an opportunity for technical experts to be involve early and a key times in the planning and design process.

PHASE VI - IMPLEMENTATION

Implementation of the value study recommendations will rest with the design team and the client team, as the Historic Structure report is completed and work progresses on the next stages of design. Where decisions were made, the design team will need to develop the selected alternatives in more detail, addressing the comments raised during the presentation.

The park will need to take the Historic Structure Report and this value study to the various stakeholder to ensure that they understand the reasons the alternatives were selected and that there perspectives were adequately addressed by our process.

ITEMS TO BE CONSIDERED FURTHER

During the course of the value study ideas and concepts are identified which are not within the defined scope of the study or would be to complicated or the analysis too lengthy to study within the study time. Several ideas were identified which require further consideration by the design team.

- Microzinc coating of metal roofing and siding
- Relationship of the Nettle site mining resources to those protected at the Kaymoor Mine site
- Plant barriers to protect resources

VALUE STUDY TEAM

NAME	TITLE	PHONE	ADDRESS
TEAM MEMBERS			
Warren Snyder	Chief of Interpretation and Visitor Services	304/465-0508(v) 304/465-0591(f)	New River Gorge National River 104 Main Street P.O. Box 246 Glen Jean, WV 25846-0246
Jesse Bibb	Park Maintenance Services	304/574-3881(v) 304/465-0591(f)	New River Gorge National River 104 Main Street P.O. Box 246 Glen Jean, WV 25846-0246
Bonita Mueller	NPS-DSC, Architect/Job Captain	303/969-2695(v) 303/987-6608(f)	National Park Service Denver Service Center-AR 12795 W. Alameda Pky PO Box 25287 Denver, CO 80225-0287
Nellie Lance	NPS-DSC, Structural Engineer	303/969-2421(v) 303/987-2930(f)	National Park Service Denver Service Center-EN 12795 W. Alameda Pky PO Box 25287 Denver, CO 80225-0287
Linda Romola *	NPS-DSC, Cultural Resource Specialist	303/969-2413(v) 303/987-6679(f)	National Park Service Denver Service Center-RP 12795 W. Alameda Pky PO Box 25287 Denver, CO 80225-0287
Randy Copeland	NPS-DSC Quality Leader Historical Architecture	303/969-2459(v) 303/987-2930(f)	National Park Service Denver Service Center-AR 12795 W. Alameda Pky PO Box 25287 Denver, CO 80225-0287
Richard Turk	NPS-DSC, Architect Value Analysis	303/969-2470(v) 303/987-6658(f)	National Park Service Denver Service Center-MS 12795 W. Alameda Pky PO Box 25287 Denver, CO 80225-0287

*Deceased November 7, 1997

CONSULTANTS			
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Carl Wang	Technical Expert - Hazardous Materials	303/969-2746(v) 303/987-2743(f)	National Park Service Denver Service Center-EN 12795 W. Alameda Pky PO Box 25287 Denver, CO 80225-0287
Karen Vaage	Landscape Architect	303/969-2484(v) 303/987-2930(f)	National Park Service Denver Service Center-LA 12795 W. Alameda Pky PO Box 25287 Denver, CO 80225-0287
Bob Johnston	Technical Expert - Constructability	303/969-6610(v) 303/987-2930(f)	National Park Service Denver Service Center-EN 12795 W. Alameda Pky PO Box 25287 Denver, CO 80225-0287
Manny Sais	Cost Estimator	303/969-2151(v) 303/987-6645(f)	National Park Service Denver Service Center-CAP 12795 W. Alameda Pky PO Box 25287 Denver, CO 80225-0287

APPENDIX B

NPS Form 10-900 (Oct. 1990)

OMB No. 1024-0018

1 7

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

RECEIVED
SEP 28 1990
NATIONAL REGISTER

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in *Guidelines for Completing National Register Forms* (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name: Kay Moor; Kay Moor No. 1 Coal Mine

other names/site number: Kaymoor

2. Location

street & number: ____ ☐ not for publication

city, town: Fayetteville ☒ vicinity

state: West Virginia code: WV county: Fayette code: 019 zip code: 25840

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
		Contributing	*Noncontributing*
☐ private	☐ building(s)	8	____ buildings
☐ public-local	☒ district	2	____ sites
☐ public-State	☐ site	33	1 structures
☒ public-Federal	☐ structure	6	____ objects
	☐ object	49	1 Total

Name of related multiple property listing: N/A

Number of contributing resources previously listed in the National Register: N/A

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this ☑ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☑ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of certifying official — Date: 9/27/90

Chief, Interagency, National Park Service

State or Federal agency and bureau

In my opinion, the property ☒ meets ☐ does not meet the National Register criteria. ☐ See continuation sheet.

Signature of commenting or other official — Date: 9/28/90

State or Federal agency and bureau

5. National Park Service Certification

I, hereby, certify that this property is:

☑ entered in the National Register. ☐ See continuation sheet. — Patrick Andrus — 11/8/90

☐ determined eligible for the National Register. ☐ See continuation sheet.

☐ determined not eligible for the National Register.

☐ removed from the National Register.

☐ other, (explain:) ____

for Signature of the Keeper — Date of Action

6. Function or Use

Historic Functions (enter categories from instructions)	Current Functions (enter categories from instructions)
Industry/Processing/Extraction	
extractive facility	not in use
processing facility	not in use
company town	not in use

7. Description

Architectural Classification (enter categories from instructions)	Materials (enter categories from instructions)	
	foundation	Stone
Other: mining structures, town site	walls	Stone, Metal (tin, iron)
	roof	Metal (tin)
	other	Concrete

Describe present and historic physical appearance.

Kay Moor consists of an abandoned coal mine, associated extractive and processing machinery, and the site of the accompanying coal town. The town was in two locations, one on top of the New River Gorge, the other alongside the New River at the bottom of the gorge. Kay Moor's major physical characteristics include extant mining machinery, buildings and other features located along the Sewell Bench, 560 ft. vertical above New River. These include openings in the gorge wall for electrical service and ventilation, fan houses, headhouse, three main drift openings, car repair shop, lamp house, superintendent's office, stairway to Kay Moor Top, mountain haulage, powder house, and electrical repair shop. Leading down the gorge wall 1,000 ft. over a 30 degree slope to the railroad track and river level are monitors, conveyor, processing plant, power house, and two batteries of coke ovens at the bottom. Only the shell of one gutted and one collapsed house, and foundations remain of the Kay Moor Bottom town site, located next to both the river and coke ovens.

The integrity of the mine site and machinery proper is good in terms of the mine's relatively undisturbed state, protected by its isolated location within the New River Gorge. Individual structures are disintegrating due to weather and vegetation. Caustic deterioration of wood and metal is occurring because of rainwater mixing with the coal dust in the structures and on the ground. It is difficult to envision the mass and scale of the mine and its auxiliary buildings because of the foliage overgrowth, but close inspection does reveal the technological nature of the materials and workmanship involved with mining and processing of the Sewell Seam "smokeless" coal. Even though only a few structures remain at the Kay Moor Bottom townsite, including the company store ruins, the site itself provides the feeling of a company town whose access to the outside world lay only in the nearby Chesapeake & Ohio Railroad tracks. Many industrial artifacts are strewn about the mine site and side of the gorge wall; these have historical value in and of themselves, but are not counted as contributing for the purposes of this nomination.

THE MINE

Kay Moor Coal Mine No. 1 operated from 1900 until 1962. It was located within the New River Gorge, in the New River coalfields, famous for low volatile coal known as "smokeless" coal. The mine entry was made into the Sewell Seam, 560 ft. above the floor of the gorge and the southside branch of the Chesapeake and Ohio Railroad which ran along New River. Abiel Abbott Low, a founder of The Low Moor Iron Company of Low Moor, Virginia, purchased the property just after the Chesapeake and Ohio Railroad's entry into the New River Gorge in 1873. The Low Moor Iron Company kept the coal property in reserve until 1899, when it opened the Kay Moor coal mine as a source of supply of coal and coke to fuel the company's blast furnaces. The first shipment of coal was made in 1900. This company sold the Kay Moor complex in 1925 when the merchant pig iron industry waned and beehive coke ovens fell into disuse. Kay Moor was sold to

[X] See continuation sheet

the New River and Pocahontas Consolidated Coal Company, a subsidiary of Berwind-White Corporation of Philadelphia.[1]

Miners, equipment and townspeople were transported from the company towns located at the top and bottom of the gorge by a mountain haulage, a single track incline with a steam powered cable hoisting drum. Coal was lowered to the processing plant and beehive coke ovens located near the railroad tracks at the bottom of the gorge. This was a two-track gravity incline. Both of these systems operated, with few modifications, from 1900 until 1962.[2]

Kay Moor miners worked the mine in small rooms, known as the "room and pillar" system, to pick and blast the Sewell Seam coal face. They loaded the coal into cars, which were hauled to the main locomotive track and transported out of the mine. Mules were used at first to pull the cars, but were soon replaced by locomotives. Main haulage locomotives picked up the coal cars and pulled them to the surface. The mine cars were disconnected from the locomotive, which reentered the mine, and were either rolled to the headhouse or, if filled with slate, were hauled off on another incline to be dumped at the top of the gorge. Repairs were performed on the locomotives at the electrical shop while damaged coal cars and slate cars were sent to the car repair shop.[3]

The drift opening at Kay Moor was more than 500 vertical feet above the level of the processing plant. Coal was lowered 1000 feet down the 30 degree slope from the headhouse so it could be loaded into coke ovens or railroad cars. A two track gravity incline and two eight-ton monitor cars carried the coal down the slope. The two monitors were attached by wire rope cable to an eight-foot diameter drum in the headhouse at the mine opening. The cable was wound so that one monitor could be loaded at the top of the slope while the other was dumped at the bottom. The system was balanced so the loaded monitor rolling downhill turned the

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[1]Jerry Bruce Thomas, "Coal Country: The Rise of the Southern Smokeless Coal Industry and Its Effect on Area Development, 1872 - 1910" (Ph.D. dissertation, University of North Carolina, 1971), p. 101; Fayette Tribune, June 21, 1917; Lou Athey, Kaymoor A New River Community (n.p.: Eastern National Park & Monument Association, 1986), p. 2; Fayette Tribune, February 25, 1925. A major source of primary documentation on Kay Moor from 1900-1925 is the Papers of the Low Moor Iron Company, Accession 662, Manuscripts Division, Special Collections Department, University of Virginia Library.

[2]U. S. Department of the Interior. National Park Service. Historic American Engineering Record. "Kay Moor Coal Mine -- 1900 Fayetteville Vicinity West Virginia." HAER No. WV-38. Sheets 1 and 2.

[3]Ibid., Sheet 3; Keith Dix, Work Relations in the Coal Industry The Hand-Loading Era, 1880-1930 Institute for Labor Studies (Morgantown: West Virginia University, 1977), pp. 4-5.

drum which pulled the empty monitor to the top. An operator controlled the rate of descent by working a brake. Thirty trips an hour could be made.[4]

The coal was moved from the drift opening to the railroad track level through a highly organized route. When the coal was taken from the mine it was taken to the headhouse, weighed, and dumped into a storage bin where it was fed directly into the monitor cars through two chutes. At the base of the monitor incline, the coal was discharged into a 100-ton capacity storage chute. A reciprocating feeder distributed the coal onto a horizontal belt conveyor which led into the processing plant. Up until 1924 a wooden tipple stood at the site; this burned and was replaced with more technologically efficient equipment. Berwind installed a new processing plant in 1925, and a Simon-Carves Baum Jig Washer around 1928, both built by Link Belt Co. of Chicago.[5]

Inside the plant the coal was either screened, or washed and then screened. The screening sorted the coal by size before it was loaded into railroad cars. The washing and screening process served to remove impurities from the coal before being sorted by size and loaded into the cars. When the Low Moor Iron Company owned Kay Moor the finer coal was coked in the beehive coke ovens located a short distance from the processing plant. After Kay Moor was purchased by the New River and Pocahontas Consolidated Coal Company the beehive coke ovens were shut down and the coal was shipped by rail to customers.[6]

The processing plant screening process involved the coal being sorted by shaking screens which sorted the coal into appropriate sizes to be transported to different parts of the processing plant for storage, washing, or loading. Screens measuring 9/16" and 5/8" were used to gather the slack coal which was fed through chutes into the slack storage tank, from where the coal could be loaded into railroad cars. Larger sizes of coal were sent one of two ways. Sizes passing through 3 and 3/4" screens were sent to the washer room by a conveyor fed by chutes which led off the main shaking screen. This coal was washed and sorted into various sizes for shipment. The largest sizes of coal, which did not pass through the 3 and 3/4" screens, were passed onto an apron conveyor loading boom. The large coal could also be sorted into lump and other sizes. A chute located under the large screens collected spillage to be transported by a chain conveyor to an unloading chute.[7]

Coal to be washed passed from a conveyor to the washbox of the Simon-Carves Baum Jig Washer. As coal passed across the washbox water pulsations produced in the agitator by four air piston jigs kept the coal suspended in water. Heavier articles of refuse dropped to the bottom of the washer where it was removed. As the coal reached the far end of the wash box it moved into sluices which carried it to sizing screens. These two shaker screens carried the fine and slack coal onto a flight conveyor leading back to the main screening room and to the railroad cars or the slack storage tank. The screens sorted the coal into 1/2" x 5/6" pea, 5/6"

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[4]U. S. Department of the Interior. National Park Service. Historic American Engineering Record. "Kay Moor Coal Mine – 1900 Fayetteville Vicinity West Virginia." HAER No. WV-38. Sheet 2.

[5]Ibid., Sheets 2 and 9.

[6]Ibid., Sheet 2.

[7]Ibid., Sheets 9 and 11.

x 1 and 3/4" nut, 1 and 1/4" x 3" stove, and 3" by 3 and 3/4" egg coal. These sizes could be run through a crusher, loaded separately, or mixed into combinations.[8]

Kay Moor, named for its builder James Kay, a Low Moor Iron Company employee, was a captive mine from 1900-1925. The mine and its accompanying coal town were self-sufficient. A workforce was housed in the company town, a steam powered generating plant located next to the processing plant supplied power, and coal was coked before being shipped to Low Moor. Additional surplus coal was sold on the open market.

The making of coke began at Kay Moor soon after the mine opened. In June 1901 a battery of 120 coke ovens were completed near the processing plant next to the railroad. These ovens were beehive ovens made of firebrick. Each was a circular, vaulted chamber with a flat tile bottom. The ovens had an opening at the top and an arched door at the bottom. A fire was built inside the oven to heat the firebrick, and the coal was added from the top from a "larry" car, which ran on tracks on top of the ovens. The coal was then burned for forty-eight or seventy-two hours with low oxygen. Workers then opened the door, watered down the fire, and withdrew the brittle, grey coke. Fifty-nine more ovens of the same size, shape and dimensions were built in 1917 by the Janutolo Construction Company of Fayetteville, West Virginia. A total of 202 coke ovens operated during World War I. These ovens were closed in the 1930s.[9]

The present condition of the mine site has been altered from its condition during the mining operation because of the growth of trees and foliage. Adverse weather had deteriorated some of the buildings onsite. Trees have also grown in and among the coke oven batteries. Caustic action of water mixing with the coal dust has deteriorated both wood and metal. Otherwise, the site is relatively physically intact. The site's bench level was salvaged in 1981-1982. The presence of the Sewell Seam dictated the location of the mine entry, while the steepness of the gorge slope determined that the mine be a drift mine, and the use of conveyor and incline systems to move both coal and people up and down the gorge wall to the mine and town sites. Springs, wells and the river provided water for both the coal processing and the townspeople, while the railroad guaranteed transportation of both coal and people. The current physical environment continues to determine general characteristics of not only West Virginia coal mining, but the nature of the industry in mountain areas -- isolated, and located next to railroads and rivers or streams.

All of the mine entries and auxiliary coal processing and administrative structures contribute to the district's significance. Many industrial artifacts associated with the mining and processing tasks are strewn over the site. Most of these are in a rusted, deteriorated condition, but many are salvageable and appropriate for interpreting the coal mining industry.

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[8]Ibid., Sheet 9.

[9]Athey, Kaymoor, pp. 14-16; Thomas, "Coal Country," pp. 116-117.

THE TOWN

The coal town of Kay Moor consisted of two sections; Kay Moor Top, located at the top of the New River Gorge, and Kay Moor Bottom, located at the bottom of the gorge next to the river and the south side main line of the C&O. (Only a small portion of Kay Moor Top is located within the boundary of the New River Gorge National River; therefore, the town site will not be included within this nomination. Any change in its status will be dealt with in a later nomination. The CSX tracks next to the New River are also not included in the nomination.) The settlement of Kay Moor was an adaptation to the environment. The layout of mines and town in New River Gorge was dictated by geography, with mine workings and housing being placed as close as possible to the drift mouth wherever flat space existed. The railroad imposed a linear pattern to the settlement, which was also affected by the narrow valley and the river front. The gorge forced settlement into a linear pattern, which in Kay Moor's case, was a two-tiered effect; top and bottom of the gorge, in addition to the vertical mining operation. Kay Moor Bottom was blessed with more level space than most West Virginia coal towns.[10]

The first houses were constructed in Kay Moor in 1901. Fifty were built that year, with 45 more in 1902, and 17 in 1905. An additional settlement, called "New Camp" or "New Town," of 19-24 houses was built a short distance from Kay Moor Top in 1918-1919. Although it is located outside the New River Gorge National River boundary, New Camp represents the only extant town site connected with Kay Moor. It is not known how many houses were built at the top and bottom of the gorge during the years of house construction. Maintenance on the houses was done by the Low Moor Iron Company and presumably by the New River and Pocahontas Consolidated Coal Company.[11]

In 1923 there were 131 houses at Kay Moor. Eighteen were on the public road, 48 were located on the company road, 65 were not located on a road. All of the houses in 1923 were single family dwellings. All had four rooms, fireplaces or stoves, single floors, and were made of wood with a ground floor size of 34 ft. x 34 ft. The outside finish of the houses was board and batten, the exceptions being 17 of the 1902 houses and all of the 1918 houses being covered with weather board. The inside finish of most of the houses was wood sheath, with the 1918 houses having plastered lathe. Electricity was available in all 50 of the 1901 houses, but only in 28 of the 1902 houses. Only 25 of the 1901 houses had inside running water. All of the houses, regardless of construction date, had roofs of composition paper, rock post foundations, privy and a coal shed, but no cellars. In 1923 the Kay Moor houses were all bungalows.[12]

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[10]R. T. Hill, "Line Villages in Southern West Virginia: Examples in the New River Gorge," Proceedings New River Symposium Pipestem, West Virginia, April 11-13, 1985, pp. 123-124.

[11]Athey, Kaymoor, p. 32.

[12]Record Group-68, United States Coal Commission, Records of the Division of Investigation of Labor Facts, Living Conditions Section, Completed Mining Community "A" Schedules, (Form LC-12), with Camp Ratings 1922-23. (Logan District, W.Va. - New River District W. Va.), Entry 62, Box 31, National Archives, Suitland, Maryland.

In 1923 inhabitants were supplied with drinking water from nine hydrants, eight drilled wells, four springs, and river water. This amounted to 21 supply points for 106 houses, while 25 others had indoor plumbing. The sewage system consisted of surface privies for all 131 houses. The privies were not flyproof and had no covers or screens. Each family had its own privy, located anywhere from 20 to 100 feet from the house. Most garbage was thrown to the animals. Waste water was thrown out onto the ground or disposed of through 25 piped drains.[13]

Kay Moor's appearance in 1923 personified the typical West Virginia coal town. There were no streetlights in Kay Moor in 1923. There were no sidewalks, but hard paths led from house to house. Fences were around each house, and were generally well kept. Most families grew gardens and kept chickens, pigs and cows. There was no bank, no churches and no saloons in Kay Moor Top and Bottom proper. There was a theatre and a tennis court at Kay Moor Bottom. Other recreational facilities included a ball field and pool hall. There was no union hall or other public hall. Because the facilities at Kay Moor were segregated, there were two grade schools at Kay Moor Top and two at Kay Moor Bottom. These were segregated schools for black and white students. The post office was located in one of the company stores.[14]

Kay Moor Bottom was abandoned in 1952 and most of the inhabitants moved out. In April 1960 most of the vacant structures were destroyed by fire. Most remaining houses were dismantled. The present site of Kay Moor Bottom is intact and discernable. It is partially overgrown with brush, kudzu, and trees. Only sections of one house remains standing, while an adjacent house has collapsed. Foundations of houses are visible, with a few chimneys in ruins. The major ruin is of company store #9, located between the C&O tracks and the river.

CONTRIBUTING RESOURCES

Kay Moor Mine No. 1

1. Mine – Kay Moor No. 1, opened in 1900 and closed in 1962, was mined by the room and pillar system. The main opening is a double drift entry with two parallel openings and side openings at a 90 degree angle. Side entries were spaced at 450-foot intervals. Running parallel to the main entry were rooms, opened backward toward the main entry. The rooms were not spaced far apart, and openings into them facilitated air circulation. In 1902 the openings, or break-throughs, were 45 to 50 feet apart. The pillars, left between the rooms and break-throughs, were spaced 45 to 50 feet apart. The pillars served to support the roof. At the time Kay Moor No. 1 was opened a transition in mining techniques was occurring, from pick mining to the use of compressed air punching machines which would undercut the coal seam. By 1905 more efficient chain breast cutting machines were being used. By the 1930s conveyors were used, eliminating much of the handloading, although some handloading remained until the mine closed. The intent of the nomination is to protect what is visible at the mine openings, and to include at least first cross side openings to illustrate the room and pillar mining technique.

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[13]Ibid.

[14]Ibid.

2. Drift Opening with Roof Bolts – n.d., Located north of the main mining complex along the Sewell Bench, this opening was cut into the rock face of the gorge, 13 ft. wide and 6 ft. high at some points. The opening is oval in shape, but much material has sloughed off which prohibits an accurate idea of its former size. Metal roof bolts extend down from the natural rock roof. Much rock roof material has fallen, yet the coal seam is visible on the sides of the opening. A low concrete retaining wall extends along the right side, and timbering is visible. The Office of Surface Mining placed an iron bat gate over this opening during reclamation efforts in fall 1987-spring 1988.

3. Fan House Drift Opening – Built by New River and Pocahontas Consolidated Coal Company after 1928, located 200 ft. north of Butcher Branch. Main opening was cut into the gorge in a westerly direction. A steel channel frame is on the opening exterior, 9.8 ft. wide and 10.3 ft. high. Concrete walls, 6 inches thick, are connected to the frame and extend 6 ft. back into the opening. The walls were originally tied into the excavated rock sides, but have broken off. The roof was once lined with concrete for 20 ft., but much has fallen. The opening is visible for 50 ft. before it bends, and has a height of 15 ft. Steel beams placed perpendicular to the drift form the floor and are tied into the rock wall on each side. Rails laid on top of the beams are visible. The coal seam, 4 ft. thick, is visible. Water flows out of the opening 10 ft. beneath the steel beams. The fan house remnants consist of the corners of two walls with three window openings and a section of a concrete roof. This sits on top of a concrete slab spanning a drift opening filled with water. This opening is 6 ft. wide and 5 ft. high, with steel beams supporting the concrete roof, which also serves as a floor of the fan house. The Office of Surface Mining placed an iron bat gate, with a door for access, over this opening during reclamation efforts in 1987-1988.

4. Right Main Drift Entry – n.d., Northernmost of a three entry drift complex, cut directly into layered, weathered rock located on the Sewell Bench. The opening is 12.5 ft wide and 6 ft. high. Material from the roof has sloughed and partially covers the opening floor. Many timbers stand up from the floor but no longer support the roof. The Office of Surface Mining placed an iron bat gate over this opening during reclamation efforts in 1987-1988.

5. Right Main Drift Entry – n.d., Middle drift entrance, 12 ft. wide and 11 ft. high, the opening is visible for 18 ft., thereon it is caved in. Surrounding rock is layered and weathered. The Office of Surface Mining filled in this opening with a form core covered with soil, during reclamation efforts in 1987-1988.

6. Right Main Drift Entry – n.d., Southernmost drift entry, was cut into the gorge in a westerly direction, and is 8.5 ft. wide and 6 ft. high. Concrete blocks are placed above the opening about 5 ft. high and along the right side to retain the slope. Concrete lines the left wall for 10 ft. The right wall and roof are lined with rock for 6 ft. Beyond the opening the entry is filled with timber and caved rock. The Office of Surface Mining filled in this opening with a form core covered with soil, during reclamation efforts in 1987-1988.

7. Fan House and Shop – Built c. 1919, the first fan houses on this location were wooden, all destroyed by fires. This concrete and brick fan house adjacent to the right main drift entry complex was built by the Low Moor Iron Company. The replacement fans forced air into the mine, a change from the previous exhaust system which drew air through the main drift entry. Abandoned, allowed to deteriorate, only one wall and a portion of another remain. The foundation is of natural stone. Attached to the fan house are three extant walls of a shop building, made from natural stone. No roof remains for either building. Extending above the fan house

is a concrete exhaust chimney 10.2 ft. long and 7.4 ft. wide, with walls 14 inches thick. The concrete roof, 6 ft. high, serves as a base for a coal bin, 20 ft. above the floor of the mine opening. A concrete slab roof extends from the base of the fan exhaust to the drift opening. The slab roof is supported by steel I-beams. As this nomination form was being updated, work was underway to demolish part of the fan house because its deterioration posed a safety threat to visitors on the Mary Ingles Trail.

8. Tipple or Car Dump – n.d., Constructed of large wooden timbers and corrugated tin roof, used as a loadout facility. The structure is in very poor condition and is collapsing.

9. Electrical Substation – n.d., This structure is partially demolished, only remnants of concrete foundations remain.

10. Headhouse – c. 1899., Located at the main drift opening, served as a tipple and cable drum room for the monitor incline. Approximately 100 ft. long and 25 ft. wide, constructed primarily of wooden timbers, 18 to 24 inches in thickness. Steel plates are used as brackets and braces to join the timber framework. The roof was wood sheathing, covered with asphaltic roofing material. The structure has been modified, including replacement of coal car dumping equipment, but it probably is the original structure built in 1899-1900. The scales are missing. The first car dumpers in the headhouse were probably cradle or side dumps that tipped coal cars sideways. The headhouse is in poor condition; much of the timbering is rotted. Salvors pulled the roof off between 1981-82. In 1989 stabilization efforts were undertaken to prevent the headhouse's collapse.

11. Left Drift Entry – n.d., Located immediately across the bench level from the headhouse and upslope. The roof of the entry was falling in, rail headers were visible, and much fallen slate was visible. Most of the approximately 18-20 ft. entry was filled in, yet the back portion was intact. The Office of Surface Mining filled in this opening with a form core covered with soil, during reclamation efforts in 1987-1988.

12. Left Drift Entry – n.d., Located upslope from the bench level, this entry has minimal cave in and the entrance is clear. Remnants of railroad ties can be seen. The Office of Surface Mining filled in this opening with a form core covered with soil, during reclamation efforts in 1987-1988.

13. Main Left Drift Entry – n.d., One of the main openings of the Kay Moor complex. A concrete headwall, inscribed "1927," is on top of the opening, supported by a steel I-beam. The opening is 17 ft. wide, and 8 ft. high. Other steel I-beams are spaced 15, 14, and 12 feet apart back into the opening for 41 ft. The I-beams support the concrete roof. The concrete area was used as a waiting room for the miners. Wooden ties are on the entry floor, along with a steel hopper. Visible distance in the entry extends 60 ft. The Office of Surface Mining placed an iron bat gate, with a door for access, over this opening during reclamation efforts in 1987-1988.

14. Lamp House/Superintendent's Office – Built c. early 1950s, cinder block building, 56 ft. long and 17 ft. wide, with walls of 9 ft. high, held lamp house where miners would store their lamps, and offices. The northern and a portion of the eastern walls are missing; the roof is missing but steel I-beams are used for roof supports. Miners once hung their lamps on the extant racks. Much iron debris and racks were strewn about, and salvaged as artifactural evidence.

15. Concrete Staircase – n.d., Led from the bench level to a 30-40 foot stone escarpment, and continued up to the hoisthouse/haulage waiting area at the top of the gorge. The stairs served as an alternative to riding the mountain haulage. Extant remains include the steps, made of concrete, and sections of metal railing. The steps are covered with lichens, but were cleared of leaves and other vegetation in 1989.

16. Arched Drift Entry – n.d., Entry topped by a stone arch, 5 ft. high and 16 ft. wide. A concrete headwall sits on top of the opening. A concrete and stone wingwall retains the right side slope. A 76 ft. concrete retaining wall connects to the arch on the left side. The entry walls are lined with concrete block for 15 ft. The concrete roof is racked, broken, and supported by rails and timber. Some railroad ties remain on the floor. Visible distance in the entry is 30 ft. The Office of Surface Mining placed an iron bat gate, with a door for access, over this opening during reclamation efforts in 1987-1988.

17. Water Tank – n.d., Located up gorge wall above arched drift entry, and can be reached by stairs. The tank, approximately 20 ft. high and circular in shape, is steel and sits on T-rails and 4 sections of concrete foundation. Appears to be in good condition.

18. Mountain Haulage or Tram – n.d., Built to haul miners, townspeople, and equipment up and down the gorge. Extant remains include concrete foundations I-beam steel tracks, wooden structures with rollers, wooden ties, and bolts. Remnants of a hoist house is at Kay Moor Top.

19. Kay Moor Safety Board – n.d., Wooden bulletin board once displayed mine safety and other notices. It had fallen down and was rotting in 1986; however, in 1989, clearing and stabilization crews working at Kay Moor reconstructed the safety board by standing it up, painting it, and placing it alongside the Mary Ingles Trail. The board was moved about 25 ft. upslope due to ongoing stabilization efforts.

20. Coal Car Repair Shop – n.d., Wood frame two-story structure, bottom floor served as a repair shop for coal cars, top floor was office and storage space. Abandoned, and in very deteriorated condition. Numerous abandoned mine cars are strewn on the slope below the bench. Remnants also include a concrete platform, 61 ft. long and 28 ft. wide, with thickness of four inches, located on the downslope side of the bench between the car repair shop and the lamp house. A concrete retaining wall, seven ft. high is connected to the platform, which is supported by I-beam stringers, 12 inches deep on two ft. centers. Platform is in good condition.

21. Steel I-beam – n.d., Erected over bench level, main beam is 28 ft. long, 2.2 ft. deep with height of 15 ft. above the bench. A partial painted message is readable, "YOUR FAMILY WANTS YOU TO WORK SAFELY."

22. Powder House – n.d., Located along the Sewell Bench, south of the major drift openings, excavated into the hillside above the bench. Main building is 20 ft. x 19 ft., with walls of stone 1 ft. thick placed on a natural rock foundation, 3 ft. high. This is one of the best preserved structures, reflecting quality workmanship and materials. Black powder and fuses were stored here, later became a storage room for detonator caps and dynamite. The main building has a steel door with a circular opening for storing explosives. The ceiling is concrete supported by steel rails which extend to the walls. Wooden rafters form the roof pitch, which has a wooden subroof covered with tin shingles and corrugated metal. The north and east walls are stone, the south wall is concrete with wooden timbers and the west wall is concrete to a 3 ft. height with stone on top. The

floor consists of wooden planks. An added room, which served as a detonator storage room, about 10 ft. square, has stone walls and a flat roof installed in 1989. Outer portions of the structure are relatively intact. A temporary roof was placed over the structure in 1989.

23. Cap Magazine – n.d., Located immediately adjacent to the north, but not attached to the powder house, is this structure of brick, 4 ft. x 3.5 ft., with a steel door. Probably used as a cap magazine. The structure was stabilized in 1989.

24. Twin Drift Openings – n.d., Located 500 ft. south of the powder house on the bench level, the openings are 30 ft. apart. Loose rock has filled in so that no significant openings remain. The easternmost opening has loose rock with old mine cars and debris. Southeast of it are the remains of a wooden loadout, built by punch miners in the 1950s. The westernmost opening contained loose rock with an excavated area above it. Opposite stands a concrete retaining wall, 4 ft. high and 75 ft. long.

25. Electrical Shop – n.d., Electric locomotives were repaired in this shop. No extant remains except for a concrete slab with a rectangular concrete well recess, or trough, 24 ft. long, 6 ft. wide, which was infilled in 1989, debris, and a a stone wall on the bench slope. The trough probably served as a motor pit.

26. Slate Disposal Incline – Built as early as 1919, replaced earlier system of dumping slate down the slope near the electrical shop. The only evidence remaining are two tunnels, cut through the cap rock at the top of the gorge, through which the slate car tracks passed.

27. Cap House – Built prior to 1932, located halfway down haulage on gorge wall. The house is brick on a concrete foundation, with an iron door, handle and peephole. The roof is corrugated tin with a wooden ceiling and metal grates on 2 side vents. The house is 8 ft. tall and 15 ft deep, and is in excellent condition.

28. Water Tank – n.d., Located halfway down the gorge wall from the Sewell Bench to the conveyor, the tank is 20 ft. high. It sits on 8 "T"-rails across 4 concrete slabs and is in good condition.

29. Monitor Incline – n.d., Built by New River and Pocahontas Consolidated Coal Company, consisted of two sets of parallel tracks. The drum cable on the monitor incline lowered rather than raised coal; thus the workings inside the headhouse consisted of only the cable drum and cement moorings. The two monitors were on cables precisely wound to take advantage of the gravity. Extant remains include two sets of tracks, ties, stone support walls and support timbers. Strewn debris consists of rails and cables.

30. Monitors – n.d., Four of these remain on the site, one on the slope, one in the ruins of the conveyor house, and two at Kay Moor bottom, on a side track near the oil tanks. Each monitor carried 8 tons of coal, with a 45 degree angle open loading chute at one end, a chute on the other end, all riding on wheels. The cargo boxes are 12 ft. long 4 ft. wide, made of sheet steel with bolts. The monitor in the conveyor house ruins remains hitched onto cable.

31. Conveyor – n.d., Built by New River and Pocahontas Consolidated Coal Company, consists of house and conveyor. Monitors emptied coal into the house where it was fed onto covered conveyor. The wooden house

is in ruins, with a collapsed roof. The extant conveyor, in good condition, has rollers, corrugated tin roof, side railings, and stands on steel frames.

32. Sand House – Built c. 1950s, located west of the processing plant, the house is of concrete block with a corrugated tin roof, and is supported by steel rails and wooden beams. Much rail and machinery debris is strewn about the structure, along with a sand dryer inside. A sand car remains on rails next to the house. Sand was used for traction on the rails for the electric locomotives.

33. Oil Tanks – Built prior to 1932, located next to sand house, is small wooden pumphouse with two oil storage tanks. Both tanks sit on concrete platforms and are approximately 25 ft. long and 5 ft and 6 ft. in diameter. They are railroad tanker cars with their carriages removed.

34. Car Dropper – n.d., Located northwest of oil tanks on railroad tracks. Ruins are of a wooden shelter used to haul or drop cars into the processing plant.

35. Tin Shelter – n.d., Located next to processing plant, consists of 4 walls and roof, all corrugated tin. The structure contains wooden benches, with front and back door, a small back room, metal screens on windows, and is approximately 10 ft. wide, 15 ft. long. The shelter served as the "tipple" boss' office.

36. Processing Plant – Built c. 1925, the extant structure is a totally different one from the original. The first feed system of coal from the monitors to the processing plant is difficult to document; however, the original plant probably consisted of facilities and equipment for recovering, storing and transferring slack to the coke ovens. These facilities were dismantled after the coke ovens were abandoned. Because most of Kay Moor's output was run-of-mine coal intended for blast furnaces, no elaborate preparation, or processing equipment was probably needed. The limited number of coal sizes needed required only three loading tracks. The first track, nearest the slope wall, loaded slack, the second loaded nut and egg, while the third loaded lump. The tipple burned in 1924 and the extant structure, a corrugated metal, brick and concrete five-track processing plant, was built soon after. The Link Belt Company of Chicago supplied the belt conveyor from the monitor track, the main shaker screens and two loading booms. The facility also contained a large flight conveyor and slack storage tank. An exact date of construction is unknown. It is not known if the coal washing plant is part of the original plant or was added, no earlier than 1928. The Simon-Carves Baum Jig Washer is the most significant piece of machinery extant at Kay Moor Mine No. 1. The processing plant contains three major systems: the screening system, the slack recovery and storage system and the coal washing and sorting system. The screens could be changed to suit customer demands for different size coals.

37. Power House – Built 1900, to produce compressed air needed to power the ventilation fan and compressed air coal cutters, located next to processing plant. Steam was supplied by three 72" diameter 18-foot Erie City boilers, with a capacity of 150 horsepower each. Between 1902-1903 the power house was enlarged for a new steam engine and dynamo. An additional Erie City Boiler was installed. Electricity was produced for the mine locomotive, the mountain haulage motor, electric lights and other purposes. By 1915 an Atlas Water Tube boiler was installed with two generators. In 1916 a rotary convertor for transforming AC to DC power was installed. By 1919 a new turbine and Sterling boiler was installed. The power house also contained a Ballwood steam engine and Buckeye and Exciter engines. However, the plant never produced adequate power. After 1927 electricity was purchased from the local power company. Abandoned, and allowed to deteriorate, with 3 rooms,

and partial roof. The structure contains arched entrances, screened and open windows, and the roof in the middle room is supported by steel girders. Much debris is strewn around the building, including machinery, turbines, coal screens, rope wheels, links, and other equipment. There is high probability that toxic materials are on the site.

38. Coke Ovens – Built 1901 and 1917, stand in two batteries of 101 ovens each, built of firebrick and stone, with arched stone doorways and iron handles. The ovens are located on both sides of each battery. Several ovens are numbered. Railroad tracks are no longer located beside or on top of the ovens. Abandoned, allowed to deteriorate with foliage growing around them. Some ovens are in good condition while others are almost in ruins. Cut stone sleepers survive on top of the ovens.

NONCONTRIBUTING

39. Truck Road, built c. 1950s by unknown persons, was used to haul coal from the site by truck, rather than use the railroad. The road extends from Fayette Station Road underneath the New River Bridge, along the Sewell Bench level past the Kay Moor complex and up to the top of the gorge. The road is unpaved. The Mary Ingles Chapter of the West Virginia Scenic Trails Association of Fayetteville wishes to use the road as part of a trail system. The section of road from the Kay Moor bench level to the top of the gorge was used daily by the stabilization crew in 1989.

Kay Moor Top

CONTRIBUTING

40. Hoist House/Haulage complex – n.d., Located directly above the Kay Moor complex on top of the gorge, consists of concrete foundation and partial stone and brick walls shaped as an oblong room. Timbers and iron rails are also visible. Used as part of the haulage system, containing a hoist and rope to carry people and machinery up and down the gorge wall. The structure is in a very deteriorated condition. The haulage waiting room presently consists of a tunnel and remnants of the waiting area. Also remaining are sections of a wooden trestle over the rock escarpment, the haulage bull wheel, and stone foundations of an early hoisthouse, all located at the bottom of the steps at the cliff.

Kay Moor Bottom

CONTRIBUTING

41. Company Store #9 – n.d., Located between the railroad tracks and river, two-story stone building used as mercantile establishment. Ruins include partial walls, stone foundations and adjacent ice house.

42. Kay Moor Bottom town site – Originally built 1901, 1903, and 1905, the town site is located next to the railroad tracks and coke ovens. Stone foundations and chimneys are scattered throughout the trees at the west

end of the site. Kudzu covers remaining foundations at the east end of the site which burned in 1960 and is still largely clear of trees. Railroad tracks run through the site. Future vegetation removal and archeological work could result in the gathering of more information on the town site, i.e. placement of houses, orientation of pathways, gardens, fences, and outbuildings. Also remaining are various railroad-associated features, such as side tracks, retaining walls, and trestles.

43. Kay Moor Bottom houses – n.d., ruins of two houses remain in the trees above the railroad tracks, west of the Kay Moor Bottom town site. Both are in very deteriorated condition and one has fallen over.

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:
☐ nationally ☐ statewide ☐ locally

Applicable National Register Criteria ☒ A ☒ B ☐ C ☐ D

Criteria Considerations (Exceptions) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G

Areas of Significance (enter categories from instructions)	Period of Significance	Significant Dates
Industry	1900-1940	1900
Engineering		1925
		1928

Cultural Affiliation
N/A

Significant Person
Low, Abiel Abbott

Architect/Builder
Low Moor Iron Company, James Kay
New River & Pocahontas Consolidated Coal and Coke Company

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

Kay Moor includes a coal mine, associated machinery and physical plant for processing coal, administrative structures, and a town built for housing mine workers and their families. The mine's headhouse and incline systems illustrate the special techniques employed by early 20th century American miners to extract coal from outcrops on steep slopes. Kay Moor's fan house, power house, drift openings, rail lines, and other integral elements survive, providing examples of typical mining practice of the era. The two extant inclines and headhouse are examples of specialized engineering adaptations to mining coal from the steep sloped outcrops. The processing plant with its Baum jig washer patented by Simon-Carves of England, shaker screens and other equipment, is exemplary of the move in the 1920s to produce mechanically cleaned coal for a general market. Kay Moor's coal was produced more cheaply because of the easier slope mining and the low labor costs associated with the absence of an established United Mine Workers of America local until 1933. The beehive coke ovens were an integral part of the captive operation. Kay Moor Top and Bottom are significant for being representative of coal towns associated with bituminous coal mining in West Virginia. Company towns were a visible symbol of the new industrial order in West Virginia, and they were the dominant institution in miners' lives. Kay Moor represents the best extant remains of a turn-of-the-century operation in the New River "smokeless" coal fields of central West Virginia.

During its lifetime the coal town of Kay Moor, Top and Bottom, exhibited general characteristics of West Virginia coal town social history. In the 1920s four-fifths of West Virginia mine workers lived in company towns, which were built immediately after a mine opened to house workers as no established communities were usually nearby. Construction of houses in Kay Moor Top and Bottom began within a year of the mine's opening. The history of coal town society involved the following issues focusing on the control of almost all aspects of miners' lives by the coal town owners: the instability due to the lack of home ownership; the economic health of the town being directly related to the economic health of the mine; and the quality and availability of schools, recreation facilities, stores, churches, and sanitation being directly under the control of the operators.[15]

Kay Moor was generally typical of this pattern. The town was built within a year of the mine opening. Like most West Virginia coal towns, it was located on a railroad which offered a market for the coal and was the

[15]Ronald D. Eller, Miners, Millhands, and Mountaineers (Knoxville, University of Tennessee Press, 1982), pp. 162-163.

☒ See continuation sheet

Significant Person

Berwind, Charles F.

reason for the town's existence. Residents had easy access to outside communities and cities, but Kay Moor offered no stability in terms of property ownership or job security. Control was the key to life in a company town, and certain aspects of life were dictated by the coal mine owners. Miners were not allowed the right to join a union for many years, and the town died when the mine was closed.[16]

The Kay Moor site was part of a larger economic picture; the coal and coke produced at the site fueled the Virginia iron industry from 1900-1925 and was subsequently shipped nationwide as part of the larger national and international market supplied by the New River and Pocohontas Consolidated Coal and Coke Company. The Kay Moor mine and town are examples of the coal mining system which dominated in West Virginia after the 1870s. This system was composed of mines located on a railroad, supported by a company town built and controlled by the coal operator. Few true company towns exist in West Virginia today. Private ownership, automobiles, and roads all contributed to the demise of company-owned towns.

The story of Kay Moor's mine and town history is representative of West Virginia's coal mining history. The traditional ways of mountain life were transformed with the coming of the railroad and coal industry. New ways of thinking and value systems were introduced by industrialists who controlled not only the coal companies and labor, but owned the land. Labor was provided by southern blacks and European immigrants who came to work the railroads and mines. In Kay Moor's case, capitalists such as Abiel Abbott Low founded the Low Moor Iron Company and purchased the New River property while Collis P. Huntington helped push the C&O through the New River Gorge, which resulted in the coalfields being opened. Charles F. Berwind, president of the Berwind-White Corporation of Philadelphia, owned Kay Moor after 1925, through the New River and Pocahontas Consolidated Coal and Coke Company, a subsidiary.[17]

Coal was very important to the United States in the late nineteenth and early twentieth century. The growth of the bituminous coal industry occurred after 1850 to fuel steam locomotives and river steamers, and to power the burgeoning industrial order. Bituminous coal was cheaper than anthracite, more abundant, easier to mine,

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[16]Ibid., p. 162; Morton S. Baratz, The Union and The Coal Industry (New Haven: Yale University Press, 1955; reprint ed., Westport, Connecticut: Greenwood Press, Publishers, 1983), p. 69.

[17] David Alan Corbin, Life, Work, and Rebellion in the Coal Fields The Southern West Virginia Miners 1880-1922 (Urbana: University of Illinois Press, 1981), pp. 6-7; Kenneth R. Bailey, "A Judicious Mixture: Negroes and Immigrants in the West Virginia Mines, 1880-1917." in Blacks in Appalachia, ed. William H. Turner and Edward J. Cabbell (Lexington: University Press of Kentucky, 1985), p. 117; Athey, Kaymoor, p. 47.

and soon became a more important fuel source. Another major factor influencing the development of a West Virginia coal industry was the belief that an iron boom was beginning in Virginia in the 1880s. Virginia's blast furnaces were fed by West Virginia coals. In 1910, 75 percent of the energy used in the United States was supplied by coal. Within a few decades West Virginia's cheaper and superior coals outsold the midwestern fields. These coals were cheaper in part due to the easier slope mining and the low labor costs associated with the absence of the United Mine Workers of America on any significant scale until 1933.[18]

The Kay Moor complex is unique as a district because it has been relatively isolated and its mining features are intact, although deteriorated. The pattern of events which occurred at Kay Moor – including the mine's opening and town construction by outside industrial interests, its clearly identifiable solutions to the problems of coal mining within steep gorge walls, its economic contribution to both coal and coke use, the use of immigrant and black labor, the fierce struggle to keep out the United Mine Workers of America, the observable transition from hand loading to mechanical processing from the extant equipment, and the legacy of coal town society which influenced West Virginia history to a great extent -- are all nationally significant due to the impact West Virginia coal mining had upon the national scene in economic, social, industrial, and labor terms. These events reflected the fortunes of the coal mining industry in America as well as the pig iron industry in Virginia. Events involving union issues reflected the broader national struggles. The mining technology used both inside and outside the mine reflected prevalent useage in drift mining in the New River coalfields.

Very little data exists on West Virginia coal mines, even within the New River Gorge, against which to compare Kay Moor. The only other known extant coal mine within the gorge which has relatively intact support structures is located at Nuttalburg. The extant mining facilities associated with this mine are of a completely different type than that associated with Kay Moor. The conveyance system is of primary importance; there was no monitor system for transporting the coal from the seam to the river, but there was a button and string operation. It is not understood how many processes were developed to overcome the 630 ft. drop from the coal seam to the river; these two conveyance systems are the only two known within the New River Gorge National River even though at one time there were more than 40 mines operating within the gorge. There is no town left at Nuttalburg. It is not known where people lived, or if there was a similar haulage system, as at Kay Moor.

The state of West Virginia has no survey of coal mines in the state. There is also no cultural resource inventory of features located within the New River "Smokeless" coal fields. It is known that Kay Moor is the most intact coal mining site within the boundary of the New River Gorge National River. Dr. Kenneth Sullivan, author of "Coal Men and Coal Towns: Development of the Smokeless Coalfields of Southern West Virginia 1873-1923," Ph.D. dissertation, University of Pittsburgh, 1979, is editor of Goldenseal and Folklife Director for the Department of Culture and History, Charleston, West Virginia. In his opinion, no other comparable site to Kay Moor exists in Fayette and Raleigh counties, West Virginia. According to Dr. Sullivan, Kay Moor is representative of West Virginia coal mines; topographically the entire mining site is undisturbed and is unlikely to be disturbed.

[18]Thomas, "Coal Country," pp. 2-5; Eller, Miners, p. 128.

Dr. Emory Kemp of the Department of History, Program for the History of Science and Technology, West Virginia University, has been involved with numerous projects regarding industrial archeology in West Virginia for the past 20 years. In his opinion:

> the Kay Moor Mining Complex is the finest example of a coal mine operation in the great southern West Virginia-Virginia Coal Fields that [he has] discovered over the past two decades. It represents a unique historical resource epitomizing both the technical and social history of coal mining in the middle Atlantic Region. Other examples of mining . . . exist but none of them represent the history of coal mining from the 1870s to the Second World War, because of the extensive surviving structures which represent nearly all aspects of coal mining over more than a century.[19]

Even though no survey of coal mine properties is available against which to compare Kay Moor, it is believed to be the most representative, relatively intact, coal mine complex remaining in the New River region of West Virginia.

[19]Correspondence, Emory L. Kemp to Sharon A. Brown, December 5, 1989.

9. Major Bibliographical References

[X] See continuation sheet

Previous documentation on file (NPS):

- [ ] preliminary determination of individual listing (36 CFR 67) has been requested
- [ ] previously listed in the National Register
- [ ] previously determined eligible by the National Register
- [ ] designated a National Historic Landmark
- [ ] recorded by Historic American Buildings Survey # _____
- [X] recorded by Historic American Engineering Record # WV-38

Primary location of additional data:

- [ ] State historic preservation office
- [ ] Other State agency
- [ ] Federal agency
- [ ] Local government
- [X] University
- [ ] Other

Specify repository:
University of Virginia Library
Charlottesville, VA

10. Geographical Data

Acreage of property 71.84 acres more or less

UTM References

	Zone	Easting	Northing
A			
B			
C			
D			

[X] See continuation sheet

Verbal Boundary Description

[X] See continuation sheet

Boundary Justification

[X] See continuation sheet

Form Prepared By

name/title Sharon A. Brown
organization Denver Service Center National Park Service date 7/13/90
street & number 12795 W. Alameda Parkway telephone (303) 969-2419
city or town Denver state CO zip code 80225

Primary Sources

Manuscripts

Manuscripts Division, Special Collections Department, University of Virginia Library
Papers of the Low Moor Iron Company Accession 662

Department of Culture and History
Archives and History
U.S. Department of Commerce, Bureau of the Census, Thirteenth Census of the United States, 1910, Population, West Virginia
Mine Inspection Reports, West Virginia

National Archives, Suitland, Maryland
Record Group-68 Records of the United States Coal Commission

Interviews

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Chambers, Mrs. Celia by Jim Worsham. Minden, West Virginia, April 6, 1984.

Deloney, Eric by Sharon A. Brown (Telephone) Washington, D.C. November 9, 1989.

Eades, Mrs. William (Nellie) by Lou Athey. Ansted, West Virginia, July 27, 1985.

Mathew, Russell by William E. Cox. Oak Hill, West Virginia, August 10, 1981.

Pashion, Mrs. Rosa by Ken Sullivan. Kaymoor, West Virginia, August 17, 1985.

Sullivan, Ken by Sharon A. Brown (Telephone) Charleston, West Virginia, August 4, 1988.

Toney, William by James Worsham. Ansted, West Virginia, August 9, 1984.

Woodson, Dometrius by Paul J. Nyden. Beckley, West Virginia, November 7, 1980.

Newspapers

Fayette Journal 1902-1906 (various articles)
Fayette Tribune 1906-1940 (various articles)

Secondary Sources

Articles

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Books

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Peters, J. T., and Carden, H. B. History of Fayette County West Virginia. Charleston: Jarrett Printing Company, 1926; reprint ed., Parsons, West Virginia: McClain Printing Co., 1972.

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Thomas, Jerry Bruce. "Coal Country: The Rise of the Southern Smokeless Coal Industry and Its Effect on Area Development, 1872-1910." Ph.D. dissertation, University of North Carolina, Chapel Hill, 1971.

Reports

Skelly and Loy, Engineers and Consultants. Engineering Report and Technical Specifications for Design and Construction of Mitigating Measures of Kaymoor Mine Complex New River Gorge National River. Task 3 Report (Harrisburg, Pennsylvania: September 1985.)

_____. Field Report and Preliminary Maps For Design and Engineering of Mitigating Measures of Kaymoor Mine Complex New River Gorge National River. Task 2 Report (Harrisburg, Pennsylvania: July 1985.)

Unpublished Material

Bergstresser, Jack. "Kay Moor Coal Mine." Historic American Engineering Record. Typewritten manuscript. Copy available at New River Gorge National River.

Correspondence, Emory L. Kemp to Sharon A. Brown, December 5, 1989.

Marowitz, Matthew, P. et al., "Guide, The Low Moor Iron Company Papers #662 in the Manuscripts Department of the University of Virginia Library." Typescript collection guide, available from Manuscripts Division, Special Collections Department, University of Virginia Library.

U. S. Department of the Interior. National Park Service. Historic American Engineering Record. "Kay Moor Coal Mine – 1900 Fayetteville Vicinity West Virginia." HAER No. WV-38. HAER documentation, compiled in 1986, consisted of 16 sheets of measured and interactive drawings, 76 large-format photographs, and written data. Reproductions of all documentation are available from the Library of Congress, Division of Prints & Photographs, Washington, D. C.

UTM References

USGS 7.5' Series Fayetteville quadrangle
UTM locations:

A 17 E 493 900 N 42 10 800
B 17 E 494 140 N 42 10 580
C 17 E 494 340 N 42 10 680
D 17 E 494 280 N 42 10 880
E 17 E 494 470 N 42 10 960
F 17 E 494 700 N 42 10 860
G 17 E 495 400 N 42 10 940
H 17 E 495 410 N 42 11 240
I 17 E 494 400 N 42 11 160
J 17 E 494 380 N 42 11 000
K 17 E 494 200 N 42 10 920
L 17 E 494 140 N 42 11 020
M 17 E 493 740 N 42 11 300
N 17 E 493 690 N 42 11 300
O 17 E 493 700 N 42 11 200
P 17 E 494 060 N 42 11 000
Q 17 E 494 090 N 42 10 880

Verbal Boundary Description

All that certain tract or parcel of land lying and being situated in Plateau District, Fayette County, West Virginia, consisting of the following three (3) parcels, and being more particularly described as follows:

Parcel 1: BEGINNING at a point on the centerline of a trail, said point having West Virginia State Plane Coordinates (South Zone) of N 382,880 and E 1,979,400; thence, leaving the centerline of said trail,

South 72 degrees 16' 19" West 15.00 feet; thence
North 87 degrees 15' 56" West 95.82 feet; thence
South 00 degrees 00' 00" West 300.00 feet to a point on Butcher Branch; thence, leaving said Butcher Branch,
North 88 degrees 11' 26" East 98.29 feet; thence
North 06 degrees 44' 24" East 15.00 feet to a point on the centerline of said trail; thence, leaving said centerline,
North 51 degrees 20' 25" East 19.21 feet; thence
North 11 degrees 46' 06" West 122.58 feet; thence
North 12 degrees 30' 24" East 158.33 feet; thence
South 72 degrees 15' 19" West 15.00 feet to the centerline of said trail and the point of beginning.

The above parcel of land contains 0.71 of an acre, more or less.

Parcel 2: BEGINNING at the aforementioned point on the centerline of said trail, said point being on or near the center of Butcher Branch and having West Virginia State Plane Coordinates (South Zone) of N 382, 598 and E 1,979,390, said Parcel 2 to consist of a strip of land fifteen (15) feet to each side of a trail described approximately by the following centerline bearings and distances:

South 83 degrees 15' 36" East 110.77 feet;
South 48 degrees 20' 18" East 169.99 feet;
South 82 degrees 58' 38" East 139.04 feet;
North 59 degrees 44' 37" East 208.39 feet;
South 59 degrees 02' 10" East 87.46 feet;
South 15 degrees 45' 04" West 121.57 feet;
South 25 degrees 05' 53" East 384.28 feet;
South 86 degrees 45' 54" East 230.37 feet;
South 45 degrees 00' 00" East 193.75 feet to the end of said Parcel 2.

The above parcel of land contains 1.13 acres, more or less.

Parcel 3: BEGINNING at a point on the centerline of a trail, said point being the end point of the above described Parcel 2, having West Virginia State Plane Coordinates (South Zone) of N 381,900 and E 1,980,517; thence, leaving said centerline

South 45 degrees 00' 00" West 15.00 feet; thence
South 72 degrees 17' 28" West 80.19 feet; thence
South 22 degrees 37' 12" East 455.00 feet; thence
South 66 degrees 25' 06" West 687.41 feet; thence
South 48 degrees 44' 40" East 1,073.99 feet; thence
North 66 degrees 53' 35" East 732.82 feet; thence
North 20 degrees 22' 10" West 765.47 feet; thence
North 65 degrees 45' 08" East 652.57 feet; thence
South 63 degrees 44' 59" East 813.94 feet; thence
North 83 degrees 00' 00" East 2,325.00 feet; thence
North 10000.00 feet, more or less, to a point on the southerly edge of New River, said point also being on the westerly boundary line of that same land upon which a "flowage" easement was acquired by The Franklin Real Estate Company from the Electro Metallurgical Company by deed dated December 20, 1930, and recorded in Deed Book 72, page 277, in the Office of the County Clerk of Fayette County, West Virginia; thence along said southerly edge of New River westerly downstream 3,500 feet, more or less, to a point on the northeast extention of a line, said line referred to as "South 40 degrees 36' 05" West 230.49 feet" in that certain deed showing land acquired by Berwind Land Company from New River and Pocahontas Consolidated Coal Company, dated January 1, 1930 and recorded January 27, 1930 in Deed Book 70, page 262, in the Office of the County Clerk of Fayette County, West Virginia; thence South 40 degrees 36' 05"

West 180.00 feet, more or less, to a point on the westerly or southerly right-of-way line of the Chesapeake and Ohio Railway Company's (CSX) South Side Branch; thence continuing;

South 40 degrees 36' 05" West 230.49 feet; thence
South 48 degrees 34' 35" East 340.07 feet; thence
South 65 degrees 33' 22" West 749.15 feet; thence
North 21 degrees 55' 24" West 436.57 feet; thence
South 72 degrees 57' 11" West 185.55 feet; thence
South 45 degrees 00' 00" West 15.00 feet to the centerline of aforementioned trail and the point of beginning, excepting the reserving from the above described parcel those lands of the Chesapeake and Ohio Railway Company's (CSX) right-of-way.

The above parcel of land contains 70.00 acres, more or less.

The above bearings and distances are based upon the "West Virginia State Plane Coordinate System, South Zone."

Boundary Justification

The Kay Moor boundary includes all lands owned by the New River Gorge National River, National Park Service, containing extant features relating to the Kay Moor Coal Mine No. 1 complex. Features which visually tie together the mining operation are included. This includes remnants of the hoist house used to operate the mountain haulage at the top of the gorge, all of the mine entries and related structures located on the Sewell bench level, the monitor/conveyor systems leading down to the river level, the processing plant, power plant and coke ovens, and the Kay Moor Bottom town site. The active CSX Railroad tracks located at the bottom of the gorge between the site and the New River are not owned by the National Park Service and thus are not included in this nomination.

NPS Form 10-900-a
OMB Approval No. 1024-0018

United States Department of the Interior
National Park Service

National Register of Historic Places Continuation Sheet

Section number _____ Page ___

SUPPLEMENTARY LISTING RECORD

NRIS Reference Number: 90001641 Date Listed: 11/8/90

Kay Moor	Fayette	WV
Property Name	County	State

Multiple Name

This property is listed in the National Register of Historic Places in accordance with the attached nomination documentation subject to the following exceptions, exclusions, or amendments, notwithstanding the National Park Service certification included in the nomination documentation.

Patrick Andrus 11/30/90
Signature of the Keeper Date of Action

Amended Items in Nomination:

At the request of the Federal Preservation Officer for the National Park Service, Criterion B has been dropped as an area of consideration for this nomination. Also, building #14 Lamp House, and building #32 Sand House were constructed outside of the Period of Significance and should not be considered contributing (which changes the contributing count to 6 buildings). Finally, Criterion C should be checked on the form. The form is now officially amended to include these changes.

DISTRIBUTION:
National Register property file
Nominating Authority (without nomination attachment)

H30(418)

SEP 25 1990

Memorandum

To: Chief of Registration, Interagency Resources Division

From: Chief Historian

Subject: Listing of Kay Moor, Kay Moor No. 1 Coal Mine, New River Gorge National River, in the National Register of Historic Places

Attached please find documentation herewith submitted for listing the subject properties in the National Register.

The documentation, prepared by Historian Sharon Brown of the Denver Service Center, has been given a preliminary review by my office and our comments have been assessed and addressed.

As for the request that the subject properties be considered for possible designation as a National Historic Landmark, our staff notes:

> Kay Moor is an exciting and unusual NPS cultural resource, and this is a fine National Register nomination. However, while someone may wish to argue in support of NHL designation based on rarity and surviving technology, the case for national significance has not been made in this nomination. My reading of Brown's statement of significance is that she decided not to provide national context. Rather, she argues for state and local significance. Furthermore, before NHL designation can be considered, the nomination would have to be expanded to address the critical issue of integrity.

The State Historic Preservation Officer has reviewed and signed the form, and I, as the Federal Preservation Officer, after evaluating the properties to be of statewide significance, have signed the documentation.

Attachments

cc: 001 400 408 422 434
418 New River Gorge NR (NPS)
[redacted]
429 Dr. Kapsch

ECBearss:mg:9/21/90 kay

APPENDIX C

Park Structure #	LCS ID #	Property Name	Location	Property Category	Prop. Type	National Register Status (Date)
N-001	80364	Pugh House	Thurmond	Standing structure	5a	Listed (1-27-84)
N-002	80340	Mankin-Cox Building	Thurmond (NERI Tract 164.27)	Standing structure	5c	Listed (1-27-84)
N-003	80365	Goodwin-Kincaid Building	Thurmond (NERI Tract 164.27)	Standing structure	5c	Listed (1-27-84)
N-004	80341	National Bank of Thurmond	Thurmond (NERI Tract 164.27)	Standing structure	5c	Listed (1-27-84)
N-006	80447	Stone Structure	Thurmond (NERI Tract 164.27)	Standing structure	5c	Listed (1-27-84)
N-007	80366	Erskine Pugh House, Rental	Thurmond	Standing structure	5b	Listed (1-27-84)
N-008	80367	Thurmond Passenger Depot and Offices	Thurmond	Standing structure	3c	Listed (1-27-84)
N-009	None	Baptist Church (Black Church)	Southside Junction	Standing structure	5d	Not evaluated
N-019	80368	Vento House	Glen Jean (NERI Tract 173-71)	Standing structure	4a	Determined eligible (7-21-92)
N-020	80369	Vento Outhouse	Glen Jean (NERI Tract 173-71)	Standing structure	4a	Determined eligible (7-21-92)
N-021	80370	Vento Storage Building	Glen Jean (NERI Tract 173-71)	Standing structure	4a	Determined eligible (7-21-92)
N-022	80371	Bank of Glen Jean	Glen Jean	Standing structure	4c	Listed (2-10-83)
N-056	None	Stone Cliff Powder House/Engine House	Stone Cliff (NERI Tract 136-01)	Standing structure	2d	Not evaluated
N-061	None	Little Rock Assembly Church (Thayer Church)	Thayer (NERI Tract 166-30)	Standing structure	4c	Not evaluated
N-076	None	McKendree Hospital Ruins	McKendree	Unstabilized ruin	9	Not evaluated
N-079	None	Trestle No. 1, Thurmond-Minden Trail	Between Thurmond and Minden (NERI Tract 144-11 and/or 140-08)	Standing structure	3a	Not evaluated
N-080	None	Trestle No. 2, Thurmond-Minden Trail	Between Thurmond and Minden (NERI Tract 144-11 and/or 140-08)	Standing structure	3a	Not evaluated
N-081	None	Trestle No. 3, Thurmond-Minden Trail	Between Thurmond and Minden (NERI Tract 144-11 and/or 140-08)	Standing structure	3a	Not evaluated
N-082	None	Trestle No. 4, Thurmond-Minden Trail	Between Thurmond and Minden (NERI Tract 144-11 and/or 140-08)	Standing structure	3a	Not evaluated
N-083	None	Trestle No. 5, Thurmond-Minden Trail	Between Thurmond and Minden (NERI Tract 144-11 and/or 140-08)	Standing structure	3a	Not evaluated

Park Structure #	LCS ID #	Property Name	Location	Property Category	Prop. Type	National Register Status (Date)
N-084	80372	Kay Moor Lamp House/Superintendent's Office	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2d	Listed (11-08-90)
N-085	80373	Kay Moor Water Tanks	Kay Moor (NERI Tract 151-21)	Standing structure	2d	Listed (11-08-90)
N-086	80374	Kay Moor Powder House	Kay Moor (NERI Tract 151-21)	Standing structure	2d	Listed (11-08-90)
N-088	80375	Kay Moor Cap House	Kay Moor (NERI Tract 151-21)	Standing structure	2d	Listed (11-08-90)
N-090	80378	Kay Moor Coal Car Repair Shop	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2d	Listed (11-08-90)
N-092	80377	Kay Moor Monitor Incline	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2e	Listed (11-08-90)
N-093	80343	Kay Moor Headhouse	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2a	Listed (11-08-90)
N-101	80379	Kay Moor Company Store #9	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	4b	Listed (11-08-90)
N-102 /03	80353	Kay Moor Coke Ovens	Kay Moor (NERI Tract 151-21)	Standing structure	2f	Listed (11-08-90)
N-104	80380	Kay Moor Mountain Haulage	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2e	Listed (11-08-90)
N-168	81342	Philip McClung House	Thurmond (NERI Tract 165-09)	Standing structure	5b	Listed (1-27-84)
N-169	81343	Philip McClung House - Rental	Thurmond (NERI Tract 165-12)	Standing structure	5b	Listed (1-27-84)
N-170	81344	Philip McClung House - Home Place, Rental	Thurmond (NERI Tract 165-13)	Standing structure	5b	Listed (1-27-84)
N-179	81345	Tom Kelly House	Thurmond	Standing structure	5b	Listed (1-27-84)
N-181	81346	Sid Childers/Margie Richmond House	Thurmond	Standing structure	5b	Listed (1-27-84)
N-182	81347	Fatty Lipscomb House	Thurmond	Standing structure	5b	Listed (1-27-84)
N-182A	81354	Fatty Lipscomb's Retaining Wall	Thurmond	Unstabilized ruin	5b	Listed (1-27-84)
N-182B	81353	Fatty Lipscomb's Yard Fencing	Thurmond	Unstabilized ruin	5b	Listed (1-27-84)
N-183	81348	Marilyn Brown House	Thurmond	Standing structure	5b	Listed (1-27-84)
N-186	81349	Sidney Ward House	Thurmond	Standing structure	5b	Listed (1-27-84)

Park Structure #	LCS ID #	Property Name	Location	Property Category	Prop. Type	National Register Status (Date)
N-190	81350	Homer Nicely/Charles H. Ashley House	Thurmond	Standing structure	5b	Listed (1-27-84)
N-191	81351	Ashley Garage	Thurmond	Standing structure	5b	Listed (1-27-84)
N-192	80381	Kay Moor Berwind Electrical Substation	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2d	Listed (11-08-90)
N-193	81352	Ashley Shed	Thurmond	Standing structure	5b	Listed (1-27-84)
N-194	80382	Kay Moor Berwind Fan House	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2d	Listed (11-08-90)
N-195	80383	Kay Moor Low Moor Iron Co. Fan House	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2d	Listed (11-08-90)
N-196	80451	Kay Moor Low Moor Iron Co. Electrical Substation	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2d	Listed (11-08-90)
N-197	80384	Kay Moor Blacksmith Shop and Retaining Wall	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2d	Listed (11-08-90)
N-198	80386	Kay Moor Monitors	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2e	Listed (11-08-90
N-199	80387	Kay Moor Conveyor	Kay Moor (NERI Tract 151-21)	Standing structure	2c	Listed (11-08-90)
N-200	80390	Kay Moor Power House	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2d	Listed (11-08-90)
N-201	80391	Kay Moor Power Poles	Kay Moor (NERI Tract 151-21)	Standing structure	2d	Listed (11-08-90)
N-202	80392	Kay Moor Ice House	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	4b	Listed (11-08-90)
N-203	80393	Kay Moor Pump House	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2d	Listed (11-08-90)
N-204	80385	Kay Moor Covered Walkway	Kay Moor (NERI Tract 151-21)	Unstabilized ruin	2d	Listed (11-08-90)
N-205	80352	Kay Moor Coal Car	Kay Moor (NERI Tract 151-21)	Standing structure	3b	Listed (11-08-90)
N-206	80344	Kay Moor Concrete Staircase	Kay Moor (NERI Tract 151-21)	Standing structure	2d	Listed (11-08-90)
N-207	80345	Kay Moor Safety Board	Kay Moor (NERI Tract 151-21)	Standing structure	2d	Listed (11-08-90)
N-208	80346	Kay Moor Steel I-beam	Kay Moor (NERI Tract 151-21)	Standing structure	2d	Listed (11-08-90)
N-209	80347	Kay Moor Cap Magazine	Kay Moor (NERI Tract 151-21)	Standing structure	2d	Listed (11-08-90)

PARK STRUCTURE #	LCS ID #	PROPERTY NAME	LOCATION	PROPERTY CATEGORY	PROP. TYPE	NATIONAL REGISTER STATUS (DATE)
N-210	80348	Kay Moor Processing Plant	Kay Moor (NERI Tract 151-21)	Standing structure	2d	Listed (11-08-90)
N-212	80350	Kay Moor Sand House	Kay Moor (NERI Tract 151-21)	Standing structure	2d	Listed (11-08-90)
N-213	80351	Kay Moor Sand Car	Kay Moor (NERI Tract 151-21)	Standing structure	3b	Listed (11-08-90)
None	None	Stone Cliff Turntable Ruins	Stone Cliff (NERI Tract 136-01)	Unstabilized ruin	2e	Not evaluated
None	None	Stone Cliff Stone Building Ruins	Stone Cliff (NERI Tract 136-01)	Unstabilized ruin	2d	Not evaluated
None	None	Little Rock Assembly Church Outhouse	Thayer (NERI Tract 166-30)	Unstabilized ruin	4c	Not evaluated
None	None	Fayette County Bottling Company Ruins	Beury	Unstabilized ruin	4d	Not evaluated
None	None	Beury Ice House Ruins	Beury	Unstabilized ruin	4d	Not evaluated
None	None	Sewall Superintendent's House Ruins	Sewall	Unstabilized ruin	4a	Not evaluated
None	None	Sewall Engine House Ruins	Sewall	Unstabilized ruin	2d	Not evaluated
None	None	Sewall Cokeyard Office Ruins	Sewall	Unstabilized ruin	2f	Not evaluated
None	None	Sewall Coke Ovens Ruins	Sewall	Unstabilized ruin	2f	Not evaluated
None	None	Sewall White Church Ruins	Sewall	Unstabilized ruin	4c	Not evaluated
None	None	Fire Creek Company Store Ruins	Fire Creek	Unstabilized ruin	4b	Not evaluated
None	None	Fire Creek Coke Ovens Ruins	Fire Creek	Unstabilized ruin	2f	Not evaluated
None	None	Railroad Tracks and Ties, Thurmond-Minden Trail	Between Thurmond and Minden (NERI Tract 144-11 and/or 140-08)	Unstabilized ruin	3a	Not evaluated
None	None	Railroad Directional Markers, Thurmond-Minden Trail	Between Thurmond and Minden (NERI Tract 144-11 and/or 140-08)	Unstabilized ruin	3a	Not evaluated

Park Structure #	LCS ID #	Property Name	Location	Property Category	Prop. Type	National Register Status (Date)
None	None	Bridge Supports, Thurmond-Minden Trail	Between Thurmond and Minden (NERI Tract 144-11 and/or 140-08)	Unstabilized ruin	3a	Not evaluated
S-052	80356	Prince Brothers General Store (Berry Store)	Prince (NERI Tract 155-30)	Standing structure	5c	Listed (4-17-86)
None	None	Prince Brothers Residential Property Fence	Prince (NERI Tract 155-30)	Standing structure	5c	Not evaluated
S-054	None	Thomas Bowles Greenhouse	Quinnimont (NERI Tract 128-01)	Standing structure	5e	Not evaluated
S-055	None	Thomas Bowles Outhouse	Quinnimont (NERI Tract 128-01)	Standing structure	5e	Not evaluated
S-056	None	Thomas Bowles #1 Storage	Quinnimont (NERI Tract 128-01)	Standing structure	5e	Not evaluated
S-057	None	Thomas Bowles #2 Storage	Quinnimont (NERI Tract 128-01)	Standing structure	5e	Not evaluated
None	None	Thomas Bowles Hogpen	Quinnimont (NERI Tract 128-01)	Standing structure	5e	Not evaluated
S-058	None	Judy Bowles House	Quinnimont (NERI Tract 128-01)	Standing structure	5e	Not evaluated
S-059	None	Robert Bowles House	Quinnimont	Standing structure	5e	Not evaluated
S-060	None	Robert Bowles Chicken House	Quinnimont	Standing structure	5e	Not evaluated
S-061	None	Robert Bowles Garage	Quinnimont	Standing structure	5e	Not evaluated
S-062	None	Robert Bowles #1 Storage	Quinnimont	Standing structure	5e	Not evaluated
S-063	None	Robert Bowles #2 Storage	Quinnimont	Standing structure	5e	Not evaluated
S-064	None	Robert Bowles Outhouse	Quinnimont	Standing structure	5e	Not evaluated
S-065	None	Opal Kessler House	Quinnimont (NERI Tract 128-01)	Standing structure	5f	Not evaluated
None	None	Opal Kessler Chicken Coop	Quinnimont (NERI Tract 128-01)	Unstabilized ruin	5f	Not evaluated
None	None	Opal Kessler Water Tanks	Quinnimont (NERI Tract 128-01)	Standing structure	5f	Not evaluated
S-069	None	Samuel Plumley #1 Storage	Quinnimont	Standing structure	5f	Not evaluated
S-070	None	Samuel Plumley #2 Storage	Quinnimont	Standing structure	5f	Not evaluated
None	None	Samuel Plumley Fowl Barn	Quinnimont	Standing structure	5f	Not evaluated
None	None	Samuel Plumley Ruins/Foundations	Quinnimont	Unstabilized ruin	5f	Not evaluated

PARK STRUCTURE #	LCS ID #	PROPERTY NAME	LOCATION	PROPERTY CATEGORY	PROP. TYPE	NATIONAL REGISTER STATUS (DATE)
None	None	Samuel Plumley Walkway	Quinnimont	Unstabilized ruin	5f	Not evaluated
None	None	Quinnimont Church	Quinnimont	Standing structure	5d	Not evaluated
S-071	None	Willis House	Quinnimont (NERI Tract 128-01)	Standing structure	5f	Not evaluated

VIII. BIBLIOGRAPHY

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As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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