



**PUBLIC  
SERVICE  
INDIANA**

October 3, 1978

James Coughlin  
Vice President  
Nuclear

Mr. Harold R. Denton, Director  
Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

Docket Nos. STN 50-546  
STN 50-547

Dear Mr. Denton:

As per the request of Dr. S. Kirslis, Environmental Project Manager, Marble Hill Nuclear Generating Station Units 1 & 2, enclosed is a copy of the correspondence from Public Service Indiana to the State of Indiana on July 25, 1978.

Sincerely,

*James Coughlin*  
James Coughlin

DLO:gbr

cc: Elizabeth S. Bowers, Esq.  
Lawrence Brenner, Esq.  
Gustave A. Linenberger  
Robert Gray  
Dr. Quentin J. Stober  
Michael J. Walro, Esq.  
George T. Mouser  
Mrs. Marie Morine  
Robert C. Slover  
Joseph B. Helm, Esq.  
Thomas M. Dattilo, Esq.  
Ralph C. Pickard  
Ted R. Todd, Esq.  
Peter F. Manning  
Mrs. David G. Frey  
Donald L. Cox, Esq.  
J. Bruce Miller, Esq.  
Docketing and Service Section  
David K. Martin, Esq.  
George A. Leininger, Jr., Esq.  
Walter C. Cunningham, Jr., Esq.  
Atomic Safety and Licensing  
Appeal Panel

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# UNCONTROLLED COPY

July 25, 1978

Mr. Joseph D. Cloud, Director  
Department of Natural Resources  
State Office Building  
Indianapolis, Indiana 46204

Dear Mr. Cloud:

The Advisory Council on Historic Preservation has recently accepted archaeological sites 12JE119/120 at our Marble Hill site for eligibility to the National Register. Your letter of September 13, 1977 had previously concurred that these sites were eligible for the National Register based on recommendations of the Glenn Black Laboratory of Archaeology. Insofar as these sites in their present condition would be adversely affected by construction of the intake and discharge structures, mitigation of these sites is needed before construction can proceed.

PSI has prepared the attached draft Preliminary Case Report (PCR) and Memorandum of Agreement which seeks approval of mitigation planned for the sites. Comments from Dr. Kellar of the Glenn Black Laboratory have also been incorporated in this plan.

As shown in Part E of the PCR, we are hopeful of completing this work this summer so that serious delay will not result in our construction schedule. It is our understanding, based on discussions with the NRC, that these documents will next be forwarded to the Department of Interior for final concurrence before work can proceed. Therefore your prompt review and, if possible, approval of these documents would be appreciated.

Please call if there are any questions.

Sincerely,  
DAVID L. ODOR

D. L. Odor  
Supervising Engineer-Environmental

ADP:bag

cc: J. U. Bott  
H. H. Voigt  
J. H. Kellar

PRELIMINARY CASE REPORT  
MARBLE HILL NUCLEAR GENERATING STATION PROJECT  
MITIGATION PLAN FOR ARCHAEOLOGICAL SITES 12JE119/120

I. Description of Project

In 1975, Public Service Indiana (PSI) filed an application with the U.S. Nuclear Regulatory Commission (NRC) for permission to construct a two-unit Marble Hill Nuclear Generating Station. These units will have a combined net electrical output of 2260 megawatts (MWe). In April, 1978 the NRC issued the construction permit for this project. Prior to issuance of the permit, the Marble Hill site underwent a complete environmental review in accordance with the National Environmental Policy Act.

The Marble Hill Station site occupies 987 acres in Jefferson County about 10 miles southwest of Madison, Indiana. Figure 1 shows the location of the Station with respect to the surrounding states. Figure 2 shows its location in Jefferson County. The Ohio River flows from north to south at the eastern boundary of the site. Along the river is a relatively flat and narrow floodplain or bottom land which occupies less than about 10% of the site area. Most of the rest of the site is a relatively flat plateau (uplands) area approximately 300 feet above the river.

II. Summary of Archaeological Work At Marble Hill

Since 1974 the site of the Marble Hill Station has been subjected to extensive archaeological surveys in order to comply with the National Environmental Policy Act, Archaeological and Historic Preservation Act (Public Law 93-291), and Executive Order 11593. All work has been performed for Public Service Indiana by the Indiana University Glenn A. Black Laboratory of Archaeology. A summary of the major studies is as follows:

1. A Phase I survey of the entire site was conducted in July-August 1974. Although several archaeological sites were identified, none of them were considered to be potentially eligible for the National Register of Historic Places (NRHP). However, the report identified certain areas of the river floodplain which could not be adequately surveyed due to overgrown vegetation.

In correspondence dated April 23, 1975 (Enclosure 1), the State Historic Preservation Officer (SHPO) concurred with the Phase I findings that the archaeological sites found at Marble Hill were not eligible for the National Register. The SHPO required additional surveys in previously unsurveyed areas of the bottom lands which would be affected by construction. The SHPO also identified two buildings on the site which should undergo further evaluation by an architectural historian to determine their NRHP eligibility.

2. A survey of the potentially historical buildings on the site was conducted by an architectural historian. The report concluded that the buildings were of little historical value and were not considered eligible for the National Register.

In correspondence dated February 4, 1976, the SHPO concurred with findings of the architectural historian. The NRC in the Final Environmental Statement (September, 1976) also concurred with this opinion.

3. A Phase II subsurface survey was conducted during July-August 1976 in the area of the bottom lands to be affected by construction of the potable wells and the intake and discharge structures. The Phase II report is attached (Enclosure 2). Site 12JE108 in the area of the wells did not reveal significant cultural material; however, previously untested sites 12JE119 and 12JE120, at the intake and discharge locations respectively, did have resources which made the site potentially eligible for the National Register. The report also recommended that a Phase III mitigation plan be developed for 12JE119/120 so that additional cultural information could be retrieved from these sites prior to construction activity.

In correspondence dated September 13, 1977 the SHPO concurred with the findings of the Phase II report. This letter is provided as Enclosure 3.

4. In addition to the archaeological surveys on the Marble Hill site proper, two similar surveys were conducted in the 10-mile long corridor for a railroad spur connecting the Marble Hill site with a main track at Nabb, Indiana. In the first survey certain areas of the corridor could not be surveyed because the land had not yet been purchased by PSI. However, two sites (12JE117 and 12S10) were identified which would require further study to determine National Register eligibility. The second survey conducted Phase II work at those two sites as well as completing Phase I survey work over the entire corridor. The archaeologist's report concluded that there were no sites in the entire railroad corridor which were considered eligible for the National Register.

In correspondence dated August 19, 1977 (Enclosure 4) the SHPO concurred with the archaeologist's report on the railroad corridor. The NRC has also concurred with this opinion (Enclosure 5).

As can be noted from these summaries, the only sites considered to have potential for National Register eligibility are 12JE119 and 12JE120. Consequently, based on nomination documents filed by the Nuclear Regulatory Commission, the National Register has accepted sites 12JE119/120 for inclusion on the list of property eligible for the National Register. Insofar as construction of the Marble Hill intake and discharge structures will adversely affect these sites unless an appropriate data recovery plan is implemented, this mitigation plan is designed to systematically study and retrieve sufficient cultural information from the sites so the construction activity can proceed as scheduled.



### III. Summary of Findings at 12JE119/120

The Phase II subsurface testing in the area of the planned locations of the intake and discharge structures led to the discovery of buried cultural resources which do not appear to have been disturbed by past cultivation. Resources recovered from these sites included charcoal, chert flakes, two projectile points, one biface/knife, four cores and observation of fire pits. This material was judged to be the product of Late Archaic occupation(s) which occurred between 1,000 and 2,000 B.C. These deposits appear to cover approximately 101,600 ft<sup>2</sup> of the floodplain area in a pattern which parallels the Ohio River for a distance of 800 feet south from an intermittent stream near the intake structure location and extending westward for up to 200 ft. The cultural stratum is between ca. 1.0 foot and ca. 4.0 feet below the present surface. The maximum depth of cultural materials was found at 8.0 feet and occurred in a limited area approximately 20 feet from the edge of the eroded bank.

The cultural deposits were initially designated as two archaeological sites (12JE119, 12JE120) on the basis of the topography of the region, but may represent a single habitation site which was occupied at regular intervals for the purpose of exploiting seasonally available resources in the Ohio River bottom lands. An erosional channel which now separates 12JE119 and 12JE120 may have been formed after the prehistoric occupation(s) which formed cultural deposits had occurred. The similarities in the content and appearance of the cultural deposits exposed at both locations during the Phase II operations would support the conclusion that the deposits should be considered a single archaeological site.

It was not possible to adequately determine the range of resources which were being exploited by the prehistoric occupants of the site during the Phase II excavations. Poor bone preservation, a characteristic of the silts of the Ohio River bottom lands in this region, may account for the lack of faunal remains. Charcoal from what appears to be several species of woody plants was present in small quantities and charred nut hulls indicate the utilization of hickory nuts. Although local chert resources were being utilized to the near exclusion of imported types, the low densities of lithic debris would not indicate that the function of the site was focused upon the procurement of this resource.

A single projectile point was recovered in situ in association with cultural features at a depth of 2.0 feet below the present surface and adjacent to the proposed location of the blowdown-discharge structure. The projectile point is morphologically similar to those associated with the Late Archaic "Riverton Culture" of the Wabash River Valley which were manufactured between 1,000 B.C. and 2,000 B.C. No additional cultural debris of determinable cultural affiliation were recovered in direct association with the cultural level.

Testing methods employed during the Phase II excavations included digging trenches two feet in width from west to east across the floodplain. Trenching was done by backhoe and was augmented by hand (trowel) excavation when deemed necessary. Periodically, samples were taken of the backdirt for inspection by hand or sieving through a 1/2 inch mesh.

The compact nature of the excavated soils made screening operations extremely difficult and time consuming. An attempt was made to apply water screening techniques in order to increase the efficiency of processing the quantities of soil involved, but it was found that a two to three hour "presoaking" stage was required to sufficiently breakdown the silts to allow passage through a 1/2 inch wire mesh. The time which would have been required to construct the equipment necessary for the presoaking of the soils prohibited extensive use of water screening during the Phase II operations.

#### IV. Phase III Mitigation Plan

The site to be excavated may be expected to yield significant new data regarding the culture history of the Ohio Valley and the Midwest, particularly for the Archaic Period. The Phase III mitigation of 12JE119/120 will attempt to obtain information pertaining but not limited to the following areas of interest:

- 1) Riverton materials are present which are outside their presently documented geographic range.
- 2) The recovered cultural data suggests that 12JE119/120 represents a specialized habitation situation which has substantial bearing upon the settlement-subsistence practices of the prehistoric people involved.
- 3) The temporal placement of the occupation(s) is not clearly defined, therefore, radiocarbon samples shall be collected wherever possible.
- 4) The Archaic adaptation of this portion of the Ohio Valley is poorly known, therefore, the relationships between the material at 12JE119/120 and the physical environment here and other Ohio Valley areas should be explored in detail.
- 5) Knowledge of subsistence resource utilization and scheduling is desirable. Therefore, water separation and the analysis of the derived flotation samples is a requirement, along with the customary biological data identification.
- 6) The suggestion that differential activity loci are present will require the development of a sampling procedure sufficient in scope to test this possibility.

The amount of data recovered during the Phase II subsurface survey indicated that a 5% sample of these sites should be adequate to answer questions pertaining of archaeological site function and human adaption. Therefore, approximately 1,200 ft.<sup>2</sup> of 12JE119 and 5,000 ft.<sup>2</sup> of 12JE120 will be subjected to systematic Phase III mitigation.

Data recovery will be conducted in accordance with "Professional Standards for Data Recovery". Excavation units will be placed so as to sample all areas of the site(s) and these will be carried to a depth sufficient to insure that the limit of the culture bearing strata has been attained. The use of power equipment is mandated combined with hand methods in areas having cultural materials.

The Indiana University Glenn A. Black Laboratory of Archaeology will be employed to direct all field and laboratory work during this study. The supervisory archaeologist will meet the "Proposed Department of Interior Qualifications for the Supervisory Archaeologist (Field Work Project)".

All artifacts retrieved during the study will be retained by the Glenn A. Black Laboratory of Archaeology. A report will be prepared by the archaeologists detailing methods and findings of the study.

Public Service Indiana will commence construction of the intake structure in October 1978 and the discharge structure in July 1979. To meet this schedule, field archaeological work will need to be performed during July-August 1978. A final report of the Phase III mitigation will be submitted to the SHPO.

PROPOSED  
MEMORANDUM OF AGREEMENT  
Between  
PUBLIC SERVICE INDIANA  
and the  
INDIANA STATE HISTORIC PRESERVATION OFFICER

WHEREAS, construction of the intake and discharge structures for the Public Service Indiana Marble Hill Nuclear Generating Station will occur at the location of archaeological site 12JEL19/120;

WHEREAS, archaeological site 12JEL19/120 has been accepted for inclusion on the list of properties eligible for the National Register of Historic Places, in accordance with 10CFR Part 63;

WHEREAS, site 12JEL19/120 satisfies the Part I Criteria issued by the Advisory Council on Historic Preservation for making determinations of "adverse effect" and "no adverse effect", as follows:

1. The site is not a National Historic Landmark, a National Historic Site in non-federal ownership, or a property of National Historic significance so designated within the National Park Service.
2. The SHPO has determined that in-place preservation of property is not necessary to fulfill purposes set forth in the State Historic Preservation Plan.
3. The SHPO agrees that
  - a. The property has minimal value as an exhibit in-place for public understanding and enjoyment.
  - b. Above and beyond scientific value, the property is not known to have historic or cultural significance to a community, ethnic, or social group that would be impaired by the retrieval of data.
  - c. Currently available technology is such that the significant information contained in the property can be retrieved.
4. Funds and time have been committed by Public Service Indiana to adequately retrieve the data.

WHEREAS, the Mitigation Plan for site JEL19/120, as specified in the Preliminary Case Report, satisfies the Part II Data Recovery Requirements issued by the Advisory Council on Historic Preservation, as follows:

1. The Data Recovery will be conducted under the supervision of an archaeologist who meets the "Proposed Department of Interior Qualifications for the Supervisory Archaeologist (field work project)".
2. The Data Recovery will be conducted in accordance with "Professional Standards for Data Recovery Programs".



3. A final report of work performed under the Mitigation Plan will be prepared.
4. Artifacts retrieved during the mitigation will be retained as appropriate by the Glenn A. Black Laboratory of Archaeology, Indiana University.
5. Regarding the status of the affected property, documentation of the condition and significance of the property after Data Recovery will be provided to the SHPO for forwarding to the National Register of Historic Places for action to include boundary change or removal from National Register eligibility status, in accordance with National Register procedures (36CFR, Part 60.16 and 60.17).

NOW THEREFORE, a determination of "no adverse effect" is made pertaining to the mitigation of sites 12JEL19/120, thereby permitting construction activity related to the Marble Hill Station to proceed following completion of the field work required in the Mitigation Plan.

Public Service Indiana and the Indiana State Historic Preservation Officer accept the provisions of this agreement, as indicated by the signatures of their duly authorized officers.

PUBLIC SERVICE INDIANA, INC.

INDIANA STATE HISTORIC  
PRESERVATION OFFICE

By: \_\_\_\_\_

By: \_\_\_\_\_

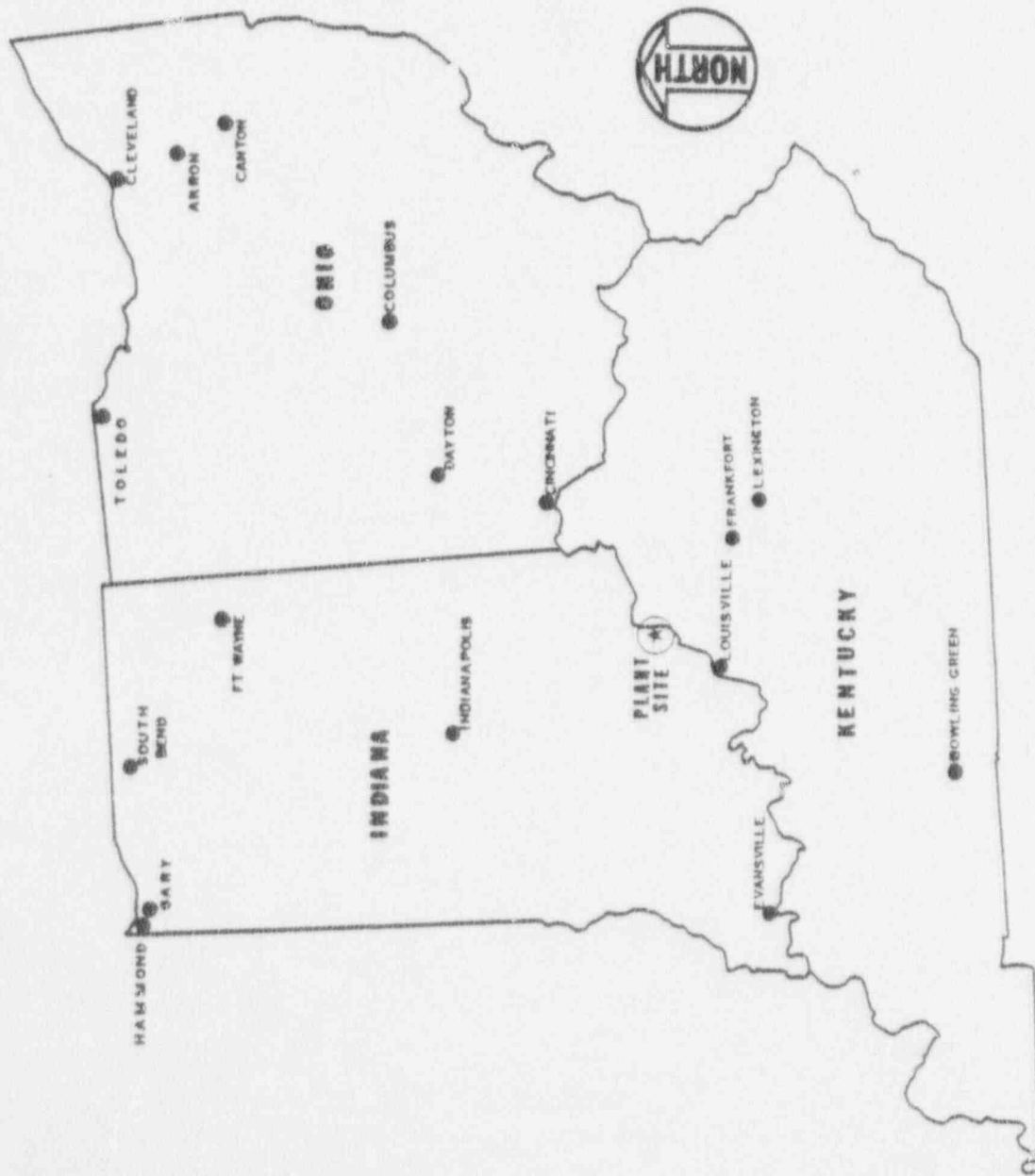
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Date: \_\_\_\_\_

FIGURE 1



MARBLE HILL NUCLEAR GENERATING  
STATION - UNITS 1 & 2  
ENVIRONMENTAL REPORT - CONSTRUCTION PERMIT STAGE

FIGURE 2.1-2

LOCATION OF MARBLE HILL STATION  
IN RELATION TO INDIANA, KENTUCKY,  
AND OHIO

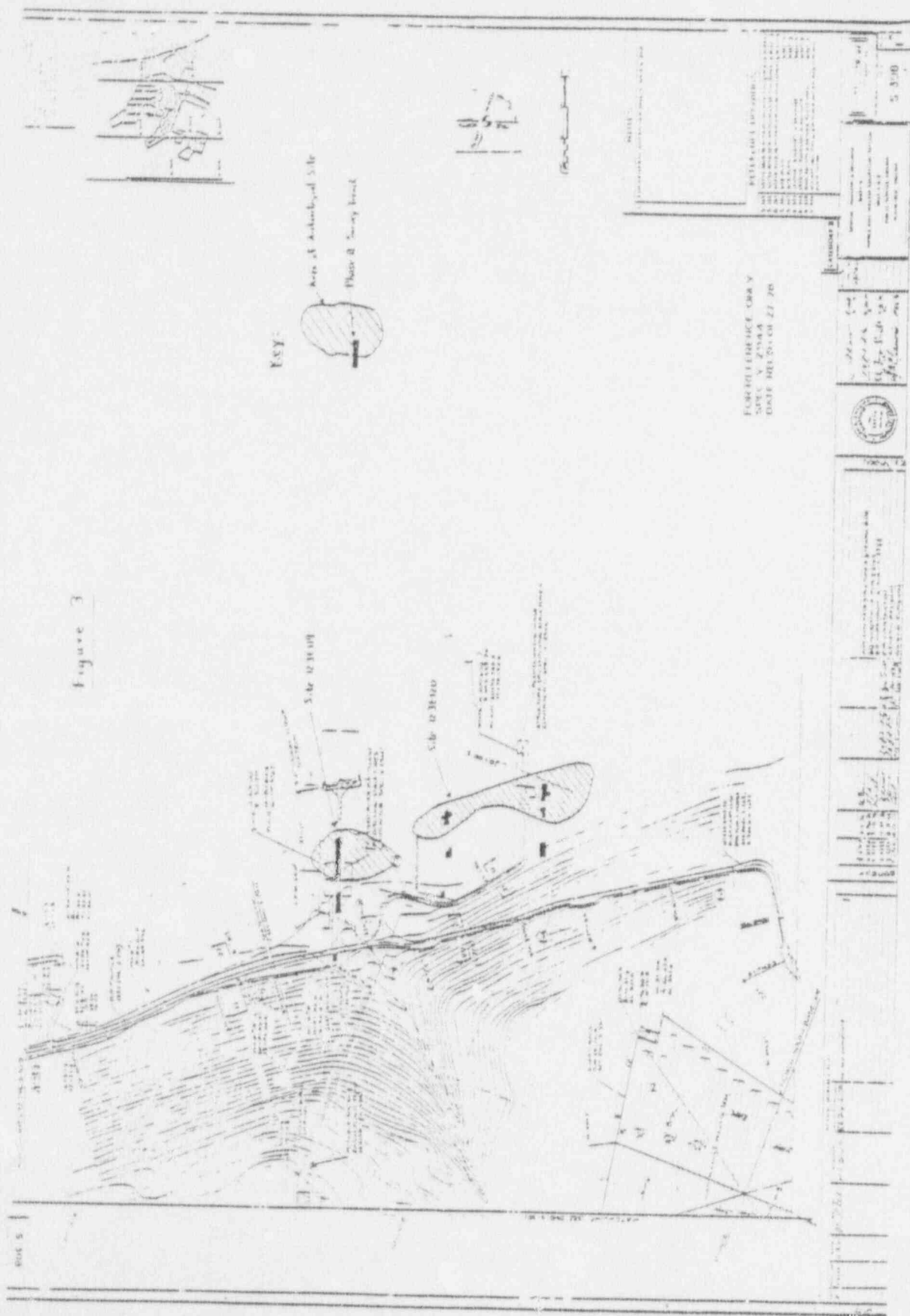
FIGURE 2



MARBLE HILL NUCLEAR GENERATING  
STATION - UNITS 1 & 2  
ENVIRONMENTAL REPORT - CONSTRUCTION PERMIT STAGE

FIGURE 2.1-3

LOCATION OF MARBLE HILL STATION  
WITHIN SALUDA TOWNSHIP AND  
JEFFERSON COUNTY





## STATE OF INDIANA

APPENDIX 2B

DEPARTMENT OF NATURAL RESOURCES

JOSEPH D. CLOUD  
DIRECTOR

INDIANAPOLIS, 46204

April 23, 1975

Ms. Colleen W. Comerford  
Cultural Resource Analyst  
Sargent & Lundy Engineers  
55 East Monroe Street  
Chicago, Illinois 60603

Dear Ms. Comerford:

Our office has reviewed the information and maps you sent for the Marble Hill Nuclear Generating Station in Jefferson County.

We found that although this project does not effect any sites that are now listed on the National Register, there are two structures with local architectural significance and archeological sites listed in the report you included which should be taken into consideration in the construction of the facility.

The archeological report was well done and gave consideration to all the necessary factors. It should be noted that the survey conditions did not permit an investigation of all the sites. Because of this, care should be taken during any excavation that sites previously covered by vegetation are reported. Any sites that may be destroyed should be evaluated by an archeologist and salvaged as needed.

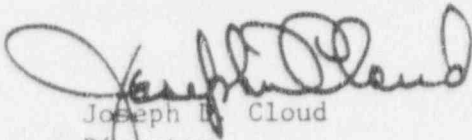
The two buildings in the project area (see attached map) do not appear to be in the construction area but some provision should be made to insure that they are not destroyed or allowed to deteriorate. The small brick house along the road near the bluff (A) is of a very pleasing vernacular Federal design with an interesting roof line. The brick two-story, five bay Federal Style house (B) is a good example of early, substantial, rural architecture. These were discovered in an on-site inspection by our staff. Both probably date from prior to 1850.

Ms. Colleen W. Comerford  
April 23, 1975  
Page 2

Future evaluations would be expedited if a study of the historical and architectural features of the area were done with the same professional quality as the archeological study presented for this project.

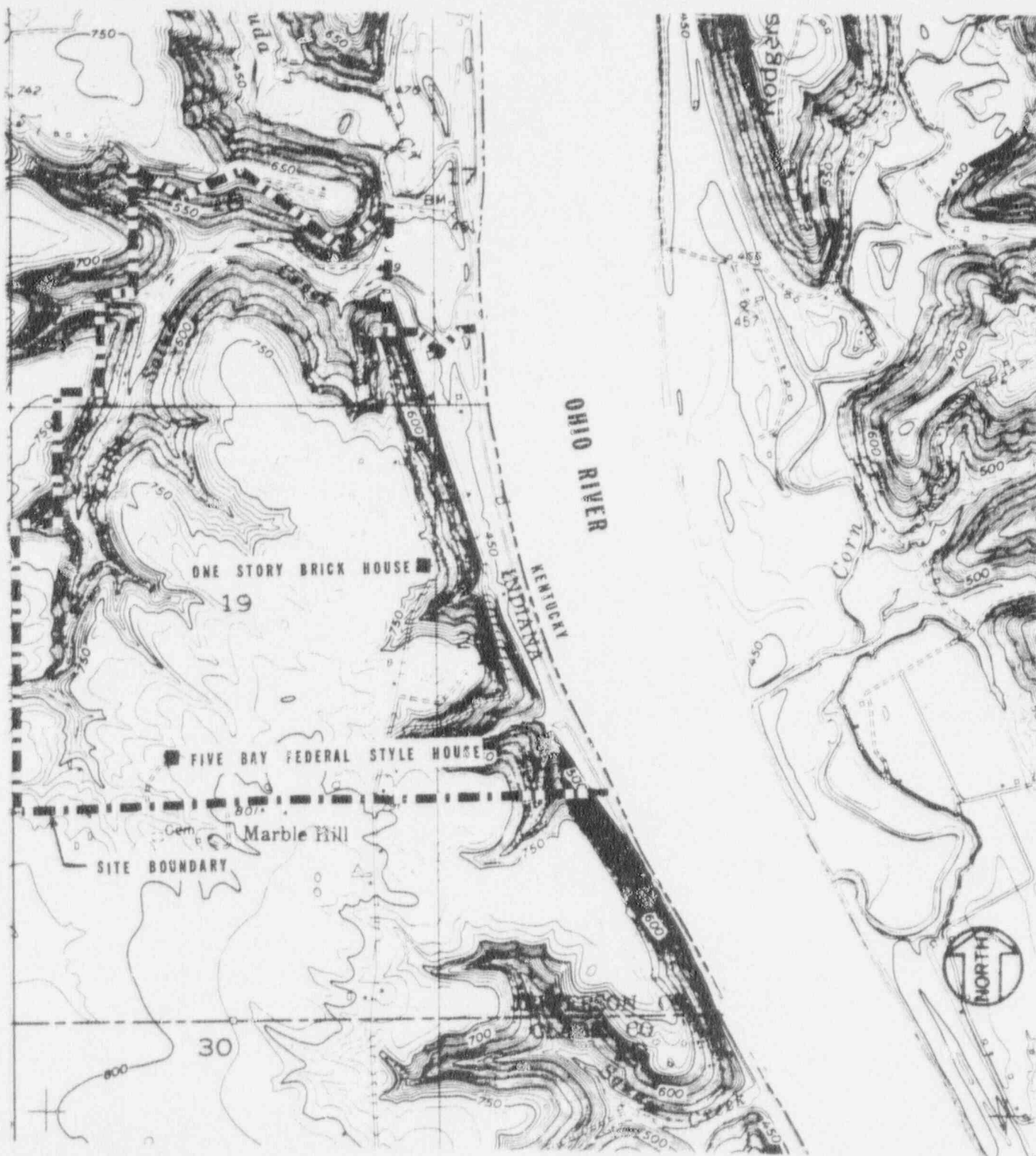
Should you need suggestions on avoiding adverse effects on the sites and structures mentioned in the archeological report or this letter, we would be willing to help as time permits.

Very truly yours,



Joseph B. Cloud  
Director  
Department of Natural Resources

JDC:EG:lh



NOTE: FIGURE DERIVED FROM TOPOGRAPHIC  
MAP SUPPLIED BY JOSEPH D. CLOUD  
IN HIS LETTER OF APRIL 23, 1975

**MARBLE HILL NUCLEAR GENERATING  
STATION - UNITS 1 & 2**

ENVIRONMENTAL REPORT - CONSTRUCTION PERMIT STAGE

FIGURE 2B-1  
HOUSES IDENTIFIED DURING THE  
ARCHAEOLOGICAL SURVEY OF THE  
MARBLE HILL SITE

A Phase II Assessment of Prehistoric Cultural  
Resources at the Locations of Proposed  
Construction Activity in the Ohio River Bottomlands  
at the Site of the Marble Hill Nuclear Generating Station  
Jefferson County, Indiana

Prepared for  
Public Service Indiana  
Plainfield, Indiana

By

John W. Richardson

Glenn A. Black Laboratory of Archaeology  
Indiana University

Dr. James H. Kellar  
Director

Cheryl A. Munson  
Staff Archaeologist

March, 1977



## TABLE OF CONTENTS

Introduction.....	1
The Natural Environment .....	4
The History of Archaeological Studies in The Marble Hill Area .....	13
Testing Methods .....	15
The Cultural Resources Encountered and their Significance.....	23
12 Je 108.....	24
Excavation.....	24
Material Culture.....	27
Summary .....	30
Significance and Recommendations.....	30
12 Je 119/120.....	31
Trench 13.....	32
Features .....	34
Material Culture.....	36
Trench 14.....	37
Trench 12.....	38
Trench 9.....	38
Features.....	40
Material Culture.....	41
Trench 6.....	41
Material Culture .....	42
Summary.....	43
Significance and Recommendations.....	45
Conclusion.....	49

## Introduction

In order to comply with the requirements of the National Historic Preservation Act, the National Environmental Policy Act, Public Law 93-291, and Executive Order 11593, the Glenn A. Black Laboratory of Archaeology, Indiana University, conducted a Phase II subsurface reconnaissance and assessment of the prehistoric cultural resources of portions of the bottomlands of Marble Hill Nuclear Generating Station, Jefferson County, Indiana. The Phase II investigations were accomplished between July 12 and August 21, 1976 under contract with Public Service Indiana (P.O. No. 1065-89) by a field crew consisting of six individuals under the direction of the author.

A Phase I surface reconnaissance of exposed cultural resources at the Marble Hill Plant Site was accomplished in 1974. At the time of the Phase I reconnaissance the bottomlands located within the boundaries of the plant site were covered by extremely dense vegetation which effectively concealed surface indications of past human activities and, at some bottomland locations, considerably impeded access. During the reconnaissance, the location of cultural deposits well below the present surface of the floodplain, where they would have not been discovered had it not been for localized erosional activities, added to the difficulties in obtaining an adequate reconnaissance of the cultural resources of the bottomlands. In light of the information recovered during the Phase I reconnaissance and difficulties discussed above, it was recommended that "any activities in the bottomlands which could result

in the destruction of prehistoric (archaeological) sites would require (the implementation of) a preliminary archaeological testing program" (Richardson 1974:12). In other words, any construction activities which may adversely affect known or unknown cultural resources in the bottomlands at the Marble Hill Plant Site would require the implementation of a Phase II subsurface testing program in order to both locate and adequately assess the potential significance of those prehistoric resources.

Consultations between the National Park Service, Public Service Indiana, and the Glenn A. Black Laboratory of Archaeology (Conference call between D. Odor, PSI; C. McKinney, NPS; and J. Kellar, GBLA April 12, 1976) determined that the limited nature of the proposed bottomland construction associated with the Marble Hill Nuclear Generating Station required only those areas to be directly affected by the construction to be subjected to Phase II assessment. It was determined that potential adverse effects will be confined to the proposed locations of Well Sites 1 and 2 and the area extending between the proposed locations of the blowdown-discharge and screenhouse structures. Under agreements reached during these consultations, Phase II subsurface testing operations were confined to these locations.

Under the conditions of the contract, subsurface testing operations were implemented at the above locations with the dual purpose of locating any prehistoric cultural resources present and determining their potential significance. The subsurface tests were accomplished by the excavation of deep trenches by backhoe and by controlled hand operations. Data recovered during trenching operations were augmented through the procurement of a number of subsurface soil cores and a limited number of shovel

probes obtained throughout the areas under consideration.

The subsurface testing program produced indications of prehistoric human activities at all construction sites examined. Three archaeological sites have been designated from data obtained during the Phase I and II operations: 12 Je 108, 12 Je 119, and 12 Je 120 (see Map 1). 12 Je 108 was originally located during the Phase I reconnaissance (Richardson 1974:9, map), but 12 Je 119 and 12 Je 120 were not known prior to the implementation of Phase II operations. Based upon the results of the Phase II excavations these cultural deposits have been assessed as to their potential to contribute significant information relating to the prehistory of the region and to the potential eligibility of each to be nominated for inclusion in the National Register of Historic Places.

The cultural deposits encountered at the well sites (12 Je 108) were found to have been completely disturbed by past cultivation and do not appear to have the potential of producing additional significant information. Cultural deposits encountered in the region between the blowdown-discharge and screenhouse structures (12 Je 119, 12 Je 120) were found to be undisturbed and are considered to have the potential to contribute significantly to the present understanding of the prehistory of the Marble Hill region and, therefore, appear to be eligible for nomination to the National Register of Historic Places. Upon compliance with the procedures recommended by the President's Advisory Council on Historic Preservation to mitigate the effects of the proposed construction upon the cultural resources at 12 Je 119 and 12 Je 120, it is recommended that the construction of the blowdown-discharge and screenhouse structures be allowed to proceed.



### The Natural Environment

The Marble Hill plant site is located about ten miles south and west of Madison, Indiana, near the Clark/Jefferson County line. The Ohio River flows from north to south at the eastern boundary of the plant site where it is separated from high bluffs overlooking the river valley by a relatively narrow and flat bottomlands. The plant site is located within the Muscatatuck Regional slope physiographic province as defined by Malott (1922) and Schneider (1966).

The uplands of the plant site and immediate vicinity are characterized by a low relief (20 to 25 ft.) and are dissected by short narrow stream valleys which contain small intermittent streams which flow to the Ohio River. This drainage pattern results from the proximity of a major watershed divide separating those regions drained by tributaries of the Ohio River from those drained by tributaries of the Wabash River located at the western edge of the state.

A number of streams enter the Ohio River floodplain within the boundaries of the plant site, but only three carry water during the greater part of the year: Little Saluda Creek, an unnamed stream at the proposed location of the screenhouse structure, and an unnamed stream 800 feet north of the southern property line of Public Service Indiana (see Map 1). Little Saluda Creek, the largest of these, drains over a square mile of upland surface, most of which is adjacent to the northern boundary of the Marble Hill plant site, but all other streams drain less than a fourth of a square mile of the upland area.

The uplands at the Marble Hill plant site end abruptly in a steeply sloped bluff line which overlooks the Ohio River valley floor 300 feet below. At an elevation of 720 feet AMSL, 30 feet below the bluff tops,

vertical limestone cliffs up to fifty feet in height are common. The cliffs make movement between the uplands and valley floor difficult when on foot and could be easily bypassed only at the location of stream channels prior to the construction of the roads which exist today. The cliffs terminate at an elevation of ca. 670 feet AMSL in talus slopes which have a high relief and show considerable surface indications of the downhill movement of soils.

The bottomlands of the Marble Hill plant site are widest at the mouth of Little Saluda Creek (ca. 900 ft.) and steadily diminish in width as one moves south until the bluff line meets the Ohio River 600 feet south of the property currently owned by Public Service Indiana. The mean width of the bottomlands is around 400 feet. Surface soils are mainly alluvial silts and silt loams containing varying amounts of sand and clay. Adjacent to the talus slopes of the bluffs colluvial deposits are predominant. There is no marked terrace formation in the bottomlands similar to that found in other portions of the Ohio Valley (c.f. Ray 1974). With the exception of areas which have undergone considerable stream erosion, the bottomlands tend to slope gently from the base of the talus slopes (460 feet AMSL) to the edge of a steeply eroded river bank, located ca. 30 feet from the Ohio River. The elevation of the floodplain at the upper edge of the riverbank varies from 430 to 440 feet AMSL, 10 to 20 feet above the normal pool of the river (420 feet AMSL).

Heavy rainstorms are known to rapidly fill the stream channels of the Marble Hill plant site creating high discharge rates. Soil profiles exposed during Phase II excavations in an alluvial fan at the proposed location of the screenhouse structure (Map 1, Trenches 8, 11 and 16)

produced slabs of fossiliferous limestone which were up to a foot in diameter and three inches thick. The slabs had been transported to that location by stream action from the deposits of the Dillsboro Formation on the slopes of the bluffs. Softball sized chert cobbles were also common in the alluvial soil deposits. The cobbles have their source in the upland soils where these "Marble Hill Cherts" are found as a residual element.

The formation of the alluvial fan discussed above was not a continuous process. Profiles from trench excavations into the alluvial fan deposits (Figs. 7 and 8) determined that they contain layers of lithic debris derived from the talus slopes, bluffs and uplands which alternate with clayey silt deposits containing little or no lithic debris. The former represents high velocity discharge rates associated with the small stream which today occupies a channel which passes between Trench 8 and Trench 16 to the latter represents the depositional activities of the Ohio River.

The floodplain deposits adjacent to the alluvial fan did not contain water carried stone of the types or quantities found in the alluvial fan. Phase II excavations revealed that, other than the plowzone, the deposits of river laid clayey silts were homogeneous to a depth of 13 feet and did not contain any stratigraphic indications of sequential periods of depositional or erosional activity.

Subsurface borings made by the Sargent and Lundy Corporation indicate that the clayey silts of the bottomlands range from 29 to 42 feet in depth. It is possible to estimate the age of the initial deposition of clayey silts in the region from their geological position and in relation to Pleistocene events. They are stratigraphically

superimposed over glaciofluvial deposits at the Marble Hill Plant Site (A. Canepa, geologist, Sargent and Lundy, per. comm.). Assuming that the glaciofluvial deposits are associated with the maximum extent of the Wisconsin glaciation, the initial deposition of clayey silts would have occurred at a late Wisconsin or post Wisconsin date. A. Canepa (per. comm.) has assigned the silts to the Martinsville Formation (Wayne 1963). Radiocarbon dates derived from organic materials recovered from the lower portions of Martinsville Formation deposits in other regions suggest that initial silt deposition would have occurred between 11,000 B.C. and 12,000 B.C. (Wayne 1963:80-5). Information obtained during archaeological surveys in Jefferson and Clark counties indicates that the deposition of the silts is continuing in some areas today. Given the accepted date for man's entry into the Ohio Valley (ca. 12,000 B.C.), the period during which the earliest Martinsville silts were deposited may coincide with its earliest human occupations.

Glaciofluvial deposits found below the clayey silts of the Martinsville Formation at Marble Hill are assumed to belong to the Atherton Formation (A. Canepa, per. comm.). From the base of the Martinsville Formation (29 to 42 feet below the surface), the coarser Atherton soils extend as deep as 95 feet below the surface where they directly overlay the interbedded limestone and shale of the Dillsboro Formation (A. Canepa, per. comm.). Radiocarbon dates suggest that the Atherton Formation was deposited between 21,000 and 16,000 B.C. (Wayne 1963:80-5) and would predate the earliest human occupation of the area.

In areas adjacent to the Marble Hill Plant Site historical

materials (ca. 1870's) have been recovered which were overlain by two to three feet of river deposited silts (Richardson, unpublished data). This observation and the reported losses of up to four feet of river bank a year by some local farmers indicate that the river is still quite actively altering its floodplain. The significance of such floodplain alterations to the archaeologist is obvious. Depositional activities effectively preserve prehistoric cultural resources through burial. With this preservation, however, the ability to locate and assess prehistoric cultural resources by standard surface reconnaissance techniques becomes considerably diminished and may require the application of deep testing techniques. Conversely, the erosional activities of the river lead to the destruction of vast quantities of non-renewable archaeological data each year.

The presence of geologically sealed cultural deposits in bottom-lands of the Ohio River which would appear to have depositional histories similar to that of Marble Hill has been established in many instances (Glenn A. Black Survey Records, Reidhead n.d., Granger and DiBlasi 1975, Richardson 1974:120). A number of buried cultural deposits have been found to produce information which has made significant contributions in the study of prehistoric human adaptations. Unless exposed by erosion or other disturbances, such sealed deposits would be impossible to detect during a surface reconnaissance and, without the application of the techniques of subsurface reconnaissance prior to construction, would likely be destroyed.

The soil profiles exposed during Phase II excavations at the Marble Hill Plant Site provide indications of the rates of deposition



(e.g. ca. 0.2 feet per 100 years at 12 Je 120), but when comparisons are made between data derived from these excavations and information derived during surface reconnaissance of bottomlands located in the general Marble Hill region it is found that depositional rates are not consistent over larger regions. Cultural debris recovered from the plowzone and surface of archaeological site 12 Je 108 (Wells 1 and 2) indicate that the site was occupied between 1000 and 4000 B.C. During Phase II excavations at the proposed location of the blowdown discharge structure, cultural materials which may post date the occupation of 12 Je 108 were found between 0.8 and 4.0 feet below the present surface. A quarter of a mile to the north of the Marble Hill Plant Site cultural deposits thought to be nearly contemporary with those of 12 Je 108 have been found 14 feet below present surface at archaeological site 12 Je 41 (Glenn A. Black Laboratory of Archaeology files). Other contemporaneous cultural deposits are known from 12 Je 109 at a depth of three feet below the present surface (Richardson 1974.) The variation in depositional rates indicated by these observations severely limits the ability to predict the locations or densities of archaeological sites from Phase I surface data alone. The lack of stratigraphic detail in the Martinsville Formation silts at the Marble Hill Plant Site and changing topography of river bottoms related to changing patterns of aggradation and degradation further complicate the problem. At the present time systematic subsurface testing is the only means at hand to locate and assess prehistoric cultural deposits in the Ohio Valley floodplain. As will be discussed later, problems relating to the adequacy of available techniques are yet to be solved.

The plant communities found in the Marble Hill region today are dominated by secondary forests, pasture, and brush and bear little resemblance to those present prior to the European settlement of the region. At this time no detail reconstruction of the presettlement vegetation of the Marble Hill region has been attempted. An evaluation of floral resources which would have been available to the early inhabitants of the area is quite important to the understanding of prehistoric settlement-subsistence patterns and the nature of prehistoric economic activities in general. Reidhead (1972), Green (1972), and others have demonstrated the feasibility and utility of presettlement vegetation as reconstructed from the original land surveys to the interpretation of the archaeological record in other portions of the state.

Although the vegetal patterns of the Marble Hill region have undoubtedly undergone considerable change on the micro<sup>V</sup>environmental level during the long period of prehistoric occupation, current evidence suggests that prior to European occupation of the general Marble Hill region, change in species composition at the level of macroenvironment has been relatively slight over the last 6000 years (Bailey 1972, Williams 1971). The brief outline of bottomland communities presented by Reidhead (n.d.), Zawacki and Hausfater (1969), Munson, Parmalee, and Yarnell (1971) and others for other Midwestern areas would suggest that a considerable supply of seasonally exploitable plant resources, especially nuts, would have been available to prehistoric inhabitants of the area and would have been important in their subsistence economy.

Abundant faunal resources would also have been present in the Marble Hill region prior to the European settlement of the area. Groundhog, raccoon, opossum, deer, and muskrat are quite common in the region yet today. Deer populations would have been of importance to all pre-historic inhabitants of the region as a source of food, clothing, and raw material for tools. They are known to follow fixed paths from the uplands through the narrow valleys to reach the browsing resources of the bottomlands. This patterned behavior would allow deer to be obtained with comparative ease. During the winter snows deer would be available as they "yard" at the headwaters of the larger creeks.

Although the Marble Hill Plant Site is not located on a major flyway, waterfowl are common and seasonally abundant on the Ohio River today and they were probably more so in the past.

The aquatic resources of the Marble Hill region include a number of species of fish, fresh water mussels, and turtles. Fresh water mussels abound in shoals which are found today less than two miles north of the Marble Hill Plant Site. Large quantities are readily gathered by hand in a short period of time. It is probable that similar mussel resources were available in closer proximity to Marble Hill prior to the impoundment of the river. Fish could be caught by hook, net, spear, or hand from the Ohio or Little Saluda. As water receded from periodic floodings of the bottomlands masses of fish entrapped in slight surface depressions would become available. A similar situation would be found in low-water pools of streams. The harvest of large quantities could be easily accomplished under such conditions in relatively short periods of time.

At the headwaters of streams in the uplands blocks of residual tabular cherts, normally fine grained and marked by thin gray and white

bands, are exposed. The importance of this "Marble Hill chert" to the prehistoric inhabitants of the area is demonstrated by an examination of lithic debris recovered from archaeological sites located in the vicinity of the Marble Hill Plant Site. Nearly 60% of the lithic debris recovered from seven archaeological sites in the immediate vicinity of Marble Hill was found to be flakes and cores of Marble Hill chert. The proportion by site ranged from slightly greater than 20% to near 80%. Another 15% of all lithic debris from the sites was determined to be derived from chert pebbles available today at local gravel bars as redeposited glaciofluvial materials. Reliance upon local and pebble chert resources has also been noted at the archaeological sites in the falls of the Ohio region by Janzen (1971) and would appear to be the rule for nearly all prehistoric groups which inhabited the banks of the Ohio River in Indiana east of Louisville (M. Seeman, per. comm.; Richardson, unpublished data).

For the greater part of his existence, man has utilized the resources of the regions in which he lived without manipulating those resources in ways which would allow the establishment of permanent settlements at fixed locations. Limited seasonal availability and localized geographic dispersal of food sources required the development of patterns of seasonal movement which would allow him to maximize his productive capabilities. Resource exploitation was, therefore, an inextricable part of the settlement strategy of the group. From this perspective the location of functionally specific villages or camps becomes a product of past reasoning and logic which should be subject to reconstruction. Archaeologically, the evidence will be in the form of a systematic patterning of prehistoric sites and the cultural debris they

contain. It follows that, without the ability to view an archaeological sites in relation to the larger settlement-subsistence system of which it is a part, it becomes nearly impossible to comprehend the relative significance of data obtained. Therefore, it becomes apparent that an extensive archaeological data base for a region is required to comprehend the significance of potential contributions of archaeological sites to the understanding of prehistoric adaptations.

#### Archaeological Studies in the Area

The interpretation and evaluation of archaeological data is based in part upon knowledge accumulated during previous studies in the general region from which the data was obtained. Despite a long history of archaeological research in the vicinity of Marble Hill, relatively little is known of the prehistory of the Ohio Valley from Louisville to the confluence of the Ohio and Miami Rivers. A systematic survey of exposed cultural resources of Jefferson and Clark counties was not conducted until 1973 (Glenn A. Black Laboratory Files). Although some scientific work has been accomplished in adjacent counties (Janzen 1972), the archaeological record of Trimble County, Kentucky remains poorly documented at this time.

The late Professor Glen Culbertson of Hanover College maintained an active interest in the cultural resources of Jefferson and adjacent counties throughout his lifetime. He participated in the excavation of a number of mounds in the early 1900's (1902, 1922) and had gathered together a large quantity of artifacts which had been collected from a number of prehistoric sites in the vicinity of Madison and Marble Hill. Unfortunately, when a fire destroyed all of his notes and the majority of his collections in the 1940's, the archaeological data base for the region was totally destroyed.



In Clark County a few excavations have taken place which shed some light upon the prehistory of the region. E. I. Guernsey's (1939) work at the Clarksville Site, at the Falls of the Ohio, is among the earliest documented excavations in the county. Janzen (1971) has recently re-examined this archaeological site and reported on studies of a number of others in the Falls of the Ohio region. In the immediate vicinity of Marble Hill no archaeological investigations have been reported. There has been considerable interest in the antiquities of the region by local amateurs, but despite the rather large number of amateur excavations known to have taken place, none of this information has been preserved in the form of reports and the collections of recovered cultural materials have been scattered or lost.

In 1973 the Glenn A. Black Laboratory of Archaeology independently financed a surface reconnaissance of the Ohio River bottomlands of Jefferson and Clark Counties in order to help fill the relative void existing in the archaeological record. Although this reconnaissance furnished a quantity of archaeological data from the river bottomlands of the two county area a paucity of information from the uplands and the lack of professional excavation remain a serious handicap in the interpretation and evaluation of individual sites.

As part of an environmental impact study, an initial Phase I surface reconnaissance of the proposed Marble Hill Nuclear Generating Station Site was conducted in 1974 during which eleven exposed prehistoric sites were located within the plant site boundaries (Richardson 1974). Although some cultural deposits were found along eroding river banks, the bottomlands were totally overgrown with weeds and scrub at the time of the survey and did not present suitable conditions for an adequate

assessment of those exposed cultural resources encountered. The presence of geologically sealed cultural deposits in the bottomlands adjacent to the Marble Hill Plant Site and the problems encountered during surface reconnaissance of the bottomlands located within the plant site area indicated that a Phase II deep testing program was required if cultural resources were to be adequately located and assessed as to their potential significance (Richardson 1974:12). The testing program implemented in 1976 was designed to make such determinations within those portions of the bottomlands which are presently scheduled to be disturbed by construction activities.

A general summary of the prehistory of the Marble Hill region was presented in the report of the Phase I reconnaissance (Richardson 1974) and will not be iterated here. The assessment of the cultural resources encountered during the testing program is made within a framework of generalizations concerning prehistoric environmental and cultural relationships. Within such a framework, the evaluation of the information potential of each site can then be made in terms of human adaptation to the environment of the greater Marble Hill region.

#### Testing Methods

The methods utilized during the subsurface testing program at the Marble Hill Plant Site follow those proposed by Munson (n.d.) with alteration to fit the nature of the construction plan. Within that portion of the bottomlands to be disturbed by construction of the screen-house and blowdown discharge structures three trench lines were initially established at intervals of 300 feet. Trenches two feet in width were excavated from west to east across the floodplain with a backhoe augmented by hand excavation when deemed necessary (see map 1). The "teeth" were

removed from the backhoe bucket in order to maximize the ability to observe contextual relationships during backhoe operations. An additional trench line was established midway between the two most southerly trenches in an attempt to determine the lateral extent of cultural debris which had been encountered during the initial trenching operations. Land surface disturbances from the construction of Wells 1 and 2, are to be confined to the immediate vicinity of the wells. This allowed the concentration of archaeological testing at the construction sites themselves. Two trenches were excavated at each well site and 740 square feet of plow-zone was removed from a small area between well sites. All trenching operations were tied to a common grid system established specifically for the archaeological subsurface testing program using standard surveying techniques.

An arbitrary datum point for the grid system was established west of the juncture of the "Old River Road", which follows the base of the talus slope, and the access road which currently leads to the proposed location of Well 2 (see Map 1). The point was permanently marked by the construction of a concrete marker topped with a galvanized bolt, the center of which served as the base for all subsequent measurements. The coordinates of the datum point were arbitrarily designated as 2000 feet south and 1000 feet west (S2000/W1000) of an unmarked 0/0 point. The elevation of the datum was determined to be 469.8 feet above mean sea level from known elevations at the sites of subsurface borings and various structural features in the immediate area. A steel rod was driven flush with the ground in line with the datum 90 degrees east of magnetic north at S2000/W449 to serve as a permanent marker of the

eastern extremity of the line S2000/W449-1000. This line served as an east-west "base line" for establishing all trench lines during the project.

The dense overgrowth of scrub and weeds in the bottomlands was a constant problem in establishing accurate grid locations. In order to minimize the number of man hours spent in removing vegetal cover during the surveying phase of the project, a second cement marker was placed at grid location S3960/W449 to serve as the datum for all measurements taken to the south of that point. This marker is located approximately twenty feet to the west of the "Old River Road" and 400 feet north of the bridge found to the south of the proposed location of the screen-house structure. The elevation of the marker was determined to be 456.7 feet above mean sea level. All point locations determined during the surveying operations are considered accurate to  $\pm 0.5$  feet.

Map 1 depicts the locations of the subsurface tests relative to the proposed construction activities, the archaeological grid, and the plant grid. The width of the trenches (two feet) has been exaggerated on the map in order to ease visual inspection. A list of the trenches excavated during the testing program is as follows:

- Well Site Construction Area (12 Je 108)
  - Well 1
    - Trench 1 (S1475-1477/W683-727)
    - Trench 2 (S1505-1507/W686-742)
  - Well 2
    - Trench 4 (S1893-1895/W625-685)
    - Trench 3 (S1918-1920/W635-685) (Fig. 6)
  - Plowzone Removal only
    - Trench 5 (S1592-1550/W690-710)
- Screenhouse/Blowdown-Discharge Construction Area
  - Trench 6 (S3962-3964/W3-78) (Fig. 9)
  - Trench 7 (S3962-3964/W97-124)

10

Trench 8 (S3962-3964/W143-218) (Fig. 7)  
Trench 16 (S3962-3964/W335-351)  
Trench 9 (S4262-4264/E0-58)  
Trench 10 (S4262-4264/W100-112) (Fig. 8)  
Trench 11 (S4262-4264/W150-167)  
Trench 12 (S4412-4414/E50-95)  
Trench 13 (S4562-4564/E119-162) (Fig. 10)  
Trench 14 (S4562-4564/E26-53) (Fig. 11)  
Trench 15 (S4562-4564/W6-50)

A total of 670 linear feet (1340 square feet) of trench was excavated by the backhoe and hand operations. Plowzone was removed from 740 square feet of the surface of 12 Je 108 between the proposed well sites (S1555-1592/W690-710). Lateral extensions of trenches at the locations S4564-4574/W134-141, S4263-4273/E34-41, and S4251-4261/E31.7-33.7 involved a combined area of 160 square feet of land surface. The total surface area excavated during the archaeological testing program was, therefore, 2240 square feet plus a minor area excavated to expose Feature 1 (Fig. 4).

In the region to be disturbed by construction of the screenhouse and blowdown-discharge structures the proportion of land surface subjected to deep testing and associated hand excavation constituted 0.3% of the area bounded to the north and south by the structures, to the west by the talus slope, and to the east by the Ohio River. At the well sites the proportion of land surface subjected to testing operations was substantially higher if one considers only those areas to be directly effected by the construction of the well structures themselves, but considerably less if the entire area producing indications of cultural activities (eg. 12 Je 108) are considered. Trenches were excavated to a maximum depth of thirteen feet. The average depth was approximately four feet.

At least one member of the crew was present during all backhoe operations and would stop the backhoe operator immediately upon the recognition



of cultural deposits. Periodically samples were taken of the backdirt to be inspected by hand and/or put through a 1/2 inch wire mesh in order to check observations made during the backhoe excavation. Upon distinguishing cultural horizons, the backhoe was moved to a new location and work proceeded by hand until the nature of the deposits had been discerned.

The compact nature of the excavated soils made screening operations extremely difficult and time consuming. An attempt was made to apply water screening techniques in order to increase the efficiency of processing the quantities of soil involved, but it was found that a two to three hour "presoaking" stage was required to sufficiently breakdown the silts to allow passage through a 1/2 inch wire mesh. The time which would have been required to construct the equipment necessary for the presoaking of the soils prohibited extensive use of water screening during the Phase II operations.

Much of the data which relate to the subsistence economy of the prehistoric inhabitants of the Marble Hill Plant Site are too small or fragile to be recovered by 1/2 inch wire mesh. Small seeds, charcoal, bone fragments, etc. are particularly subject to loss. In order to compensate for this loss five gallon samples of both screened and unprocessed soils from all levels of the trenches and controlled extension units were subjected to mechanical water separation techniques (Limp 1974). The total fill of all features encountered was also processed by this recovery technique. The processing and

analysis of the data recovered by the water separation technique are incomplete at this time, but the preliminary observations which have been made are adequate to meet the demands of the Phase II assessment of the prehistoric cultural resources encountered.

Lateral extensions of the backhoe trenches were excavated under tight control in order to better define the nature of cultural deposits encountered during the backhoe operations and to better determine the types of information which are potentially available from the cultural strata. In all of the extensions the backhoe was utilized to remove the overburden from the cultural zones. The excavation of cultural deposits proceeded by hand. Other than the samples maintained for water separation, all hand excavated soils were passed through a 1/2 inch wire screen mesh.

Four inch cubes of soil were also obtained at one foot levels in each excavated profile. The soil samples will serve as a permanent record of soil types encountered and as a possible source of fossil pollen for the study of vegetal/climatological changes which have occurred in the region. Descriptions of soil profiles exposed during the program were made with the assistance of A. Canepa, Sargent and Lundy Corp., Chicago, Illinois. Soil type descriptions and interpretations were recorded on profile maps and, with more detail, in field notes.

The procedures described above are adequate to determine the types of information which are potentially available from buried cultural deposits and at a level which meets the requirements of Phase II assessments. However, some rather obvious limitations are inherent

in the use of backhoe trenching and other subsurface sampling procedures currently in use which are important to the broader goals of archaeological research. In larger areas potentially containing buried cultural deposits it may be necessary to sacrifice a portion of the rigorous control ideally desired in archaeological excavation for methods which allow the maximization of speed and efficiency in order to minimize the probability of obtaining a sample of the region which is of inadequate size. Since the development of subsurface sampling techniques is still in its youth, it is necessary that the limitations imposed by backhoe trenching, a method employed during Phase II operations at the Marble Hill Plant Site, be made explicit.

Backhoe trenching is a highly efficient method for the location of buried cultural deposits which allows the sampling of subsurface deposits within large tracts of land in a relatively short input of time and manpower. Ideally, trenches should be located in a manner that insures the procurement of adequate samples from all micro-environmental situations existing in the present and that have existed in the past within the sampling universe. Although mathematically based sampling procedures are often employed in an attempt to eliminate sampling biases (see Mueller 1975), the use of such procedures implies some prior knowledge of the nature of the populations under consideration. Since the population of micro-environmental situations in the Ohio River bottomlands at the Marble Hill Plant Site have undergone considerable change in the past and the nature of such changes is not possible to determine at this time, the use of such techniques would not be supported (see Cowgill 1975:260). In a situation in which the nature of the

population is not known, it has been suggested that a more directed strategy be employed which has been described as "a sort of preliminary exploring" or "probing" followed or augmented by more exacting sampling strategies (ibid.) For the purposes of Phase II assessment of the cultural resources at the locations of proposed construction activities in the bottomlands of the Marble Hill Plant Site, an adequate portion of significant data was obtained through the augmentation of the data derived from trenching operations with selective samples.

Evenly spaced trenching operations minimize the time required in moving equipment and locating units to be excavated in the field. The establishment of the interval between trenches is of extreme importance to the adequacy of this technique. If the interval is too large, cultural deposits may be missed. If the mechanically dug trenches are placed close to each other, more of the cultural deposits may be disturbed than is necessary for Phase II assessment. During backhoe operations in cultural deposits which are highly dispersed, as where those in the area to be disturbed by the construction of the blowdown-discharge and screenhouse structures at the Marble Hill Plant Site, the tendency of the backhoe bucket to smear soil profiles and obscure detail may render the recognition of cultural deposits during trenching operations difficult or impossible. The removal of all "teeth" from the backhoe bucket will minimize this problem, but will not eliminate it. In short, the augmentation of backhoe trenching with hand excavation is a necessary condition for the Phase II assessment of cultural resources when the former method is utilized as the major data recovery technique in Phase II operations.

It was possible to determine the east-west limits of cultural deposits encountered during the Phase II excavations from the trench profiles. North-south limits were determined by obtaining soil cores of one inch in diameter. The maximum depth from which cores were obtained was five feet, but the soil was found to be too compact in some areas to be penetrated below the plowzone by the available equipment. As a consequence, the horizontal limits of the cultural deposits were subject to speculation at some points. Those portions of archaeological site boundaries which are not thought to be well defined at this time are indicated by a dashed red line on Map 1.

#### The Cultural Resources Encountered and their Significance

The cultural resources encountered during the subsurface testing program are discussed and the potential significance of the information contained within the cultural deposits is detailed in the following section of the report. Recommendations are made for the mitigation of the effects of proposed construction upon cultural resources which, from the results of Phase II operations, would appear to be eligible to be nominated for inclusion in the National Register of Historic Places.

On the basis of trench profiles, subsurface cores, shovel tests, surface indications, and topography three archaeological sites have been designated within those portions of the bottomlands which were subjected to subsurface testing: 12 Je 108, 12 Je 119, and 12 Je 120. Evidence will be given below which indicates that 12 Je 119 and 12 Je 120 may represent a single archaeological site which has been dissected into



two topographically distinct areas by the actions of stream erosion after prehistoric occupation. Therefore, these cultural deposits will be discussed as a unit: 12 Je 119/120.

### 12 Je 108

The proposed locations of wells 1 and 2 are well within the geographic boundaries of archaeological site 12 Je 108 as established from evidence gathered during the Phase I investigations (Richardson 1974). Recent surface exposure resulting from mowing operations and the removal of large quantities of vegetation in order to establish the archaeological grid considerably improved the ability to discern the limits of the cultural deposits. Considerable amounts of thermally cracked stone and chert debris associated with prehistoric activities were exposed at locations outside the original site boundaries as defined in 1974. The mapping of exposed cultural deposits and the results of series of shovel tests and subsurface cores led to the redefinition of the geographic limits of 12 Je 108.

Current data indicates that cultural deposits extend to the 450 foot contour to the north and west, the 446 foot contour to the east, and ca. 300 feet south of the access road which presently leads to the proposed location of well site 2 (see Map 1). The total area over which indications of prehistoric activity have been found to occur is, therefore, ca. 120,000 square feet.

### EXCAVATION

The subsurface tests were concentrated in those portions of the archaeological site which are to be disturbed by the construction of

the two wells. Two deep trenches (trenches 1, 2, 3, and 4) were excavated at each well site (see Map 1) to a maximum depth of 13 feet. The grid locations of those excavated at well site 1 are S1475-1477/W683-727 and S1505-1507/W686-742. At well site 2 trenches were excavated at S1893-1895/W625-685 and S1919-1920/W635-685.5.

All trenches produced evidence of prehistoric human activity, but in no instance were culturally derived materials found in the profiles at depths greater than the bottom of disturbed plowzone deposits. No prehistoric cultural features were encountered during the operations and no indications of redeposition or water sorting were encountered.

The soil profiles exposed during the excavation of the four deep trenches at 12 Je 108 were nearly identical in all aspects. Figure 6, the south profile of Trench 3, exemplifies the stratigraphic situation encountered. The plowzone (0.0 to ca. 0.8 feet below the surface) consisted of a noncalcareous clayey silt loam which contained both historic and prehistoric debris. The plowzone of all trenches contained large quantities of charcoal which is thought to have resulted from the periodic burning of tobacco fields in the recent past. The bottom of the plowzone was easily distinguished by an abrupt change in color, texture, and content of the soils.

Below the plowzone the soils were entirely sterile of cultural debris. A homogeneous reddish-brown clayey-silt was characteristic of the profiles to a depth of ca. 20.0 feet below the surface. A number of small water-worn pebbles and an occasional cobble were found within this level, but at an extremely low density. From ca. 2.0 to 4.0 feet

below the surface the soils were found to be more compact. Mottled gray and yellow-brown soils with a high clay content often occurred in small pockets or as vertical streaks in reddish-brown clayey-silts of this zone which were otherwise indistinguishable from the level above. The change in soils is thought to represent the downward movement of clays and minerals from the level above along small fissures in jointed soils. It is thought to represent a process of soil development and not a depositional history.

The clayey-silts were found to contain discontinuous layers and pockets of peagravels and to have a slightly higher sand content from the base of the mottled clayey silts to the maximum depth of excavation. Larger cobbles were found to be present in a slightly higher density in this level and, in one instance, glacial striations were present.

At all levels the soils were noncalcareous and found to contain small nodules of hematite or manganese less than 1/2 inch in diameter. In the excavated profiles, the nodules appeared to increase in frequency and size with depth below surface.

Shovel tests in the vicinity of a barn located between the two well sites produced cultural debris from levels well below the base of the plow-zone indicating that intact subsurface deposits exist in some portions of the archaeological site. Thermally cracked stone and chert flakes were found to a depth of 1.5 feet below the surface in a dark soil matrix which may represent intact midden deposits or subsurface cultural features.

In order to obtain a better estimate of the potential of the

archaeological deposits of the site as a whole the plowzone was removed from 740 square feet of the surface at S1555-1592/W690-710 (Trench 5), an area which appeared on the surface to contain a concentration of indications of prehistoric activities. A relatively large quantity of cultural materials was recovered in the plowzone deposits, but only three chert flakes were found to occur below the base of the plowzone (ca. 0.5 ft.). Each of the flakes recovered from subplowzone deposits was within 0.1 feet of the plowzone base and can easily be accounted for by the actions of roots and animals. It would appear that any intact cultural deposits which may be present at 12 Je 108 are quite localized. The small area excavated between the locations of the two well sites (Trench 5) was continued to the 1.5 foot level. The presence or absence of deeply buried cultural deposits in areas other than the well sites, therefore, has not been definitely established at this time.

#### MATERIAL CULTURE

Table 1 is a summary of the culturally derived materials recovered during excavations at 12 Je 108. The majority were recovered from the plowzone of trench 5 and, therefore, were not associated with the well sites themselves. However, they do contribute significantly to an interpretation of the nature of the prehistoric occupation of the archaeological site and allow the assessment of the significance of the archaeological deposits found at the well sites to rest on firmer ground.

Five relatively complete projectile points were recovered from 12 Je 108. They exhibit considerable morphological variability and may represent the successive occupation of the site by more than one

Table 1: Cultural materials recovered from 12 Je 108

Category	Number	Chert Type	Figure
Projectile Points			
McWhinney Heavy Stemmed	1	Harrodsburg	Fig. 1A
Unclassified Late Archaic Side Notched	2	Marble Hill	Fig. 1C, E
Unclassified Late Archaic Stemmed	1	Indeterminate	Fig. 1B
Unclassified Late Archaic Expand. Stemmed	1	Harrodsburg	Fig. 1D
Unclassified Fragmentary	2	Harrison County(1) Marble Hill(1)	
Hafted End Scrapers	4	Marble Hill(1) Indeterminate(3)	Fig. 1F, G, H
Endscrapers	3	Marble Hill(1) Upper Mercer(1) Indeterminate(1)	Fig. 2G, H
Biface Knife	6	Harrodsburg(1) Marble Hill(4) Indeterminate(1)	Fig. 2A, B, C, D, E
Unifacial Knife	1	Marble Hill	
Utilized Flakes			
Terminal	17	Marble Hill(4) Harrison Co.(1) Indeterminate(12)	
Lateral	10	Marble Hill(5) Indeterminate(5)	
Spokeshave	5	Marble Hill(4) Indeterminate(5)	
Flakes			
Primary	96		
Secondary	86		
Cores	56	Marble Hill(49) Upper Mercer(2) Indeterminate(5)	
Bell Pestle	1	Granite	Fig. 2F
Fire-Cracked Stone	8591 gm.		
Unaltered Stone	9357 gm.		



culturally distinct group. All projectile points are thought to have been manufactured during the Late Archaic Period (ca. 1000 B.C. to 4000 B.C.) on the basis of formal similarities to projectile points which have been recovered in dated context in other portions of the Eastern United States or from the consideration of their specific characteristics.

Of the projectile points which have marked similarities to dated specimens, only one (Fig. 1A) has been assigned to an established projectile point type. It is indistinguishable from the McWhinney Heavy Stem projectile point which has been defined in Ohio and is thought to have been manufactured between 1000 B.C. and 4000 B.C. (Vickery 1973).

The remaining projectile points (Fig. 1B, C, and D) were determined to have Late Archaic affiliations from an examination of their formal characteristics. All are common in Late Archaic sites in the Jefferson/Clark County area (Glenn A. Black Laboratory of Archaeology Collections). Only one projectile point (Fig. 1B) was recovered during trenching operations at the well sites (Well Site 1).

In all but one case the hafted endscrapers recovered at 12 Je 108 (Fig. 1F, G, H) had been manufactured from broken McWhinney Heavy Stemmed projectile points (Vickery 1973). The former(not depicted) was made from a variant of a Merom Expanding Stem projectile point which has been associated with cultural deposits dated between 1000 and 2000 B.C. (Winters 1969:107). The Merom Expanding Stem projectile point appears to represent a distinctive cultural group in the area and may not be associated with the other materials recovered from 12 Je 108.

Other categories of artifacts recovered from 12 Je 108 do not serve as good temporal or cultural markers, but they do add considerable data which allow the determination of some of the activities which were performed at the site. The projectile points noted above and the number of bifacially flaked chert knives are suggestive of hunting and butchering. Following the methods detailed by Tringham et. al. (1974), microscopic examination of the hafted endscrapers and those having no haft elements indicates that all but one appear to have been used to alter soft materials. Hide working is suggested. Edge damage on the remaining unhafted endscraper suggests use with somewhat harder materials, possibly wood. Woodworking activities are also associated with the spokeshaves recovered from the site.

A large number of chert cores and flakes were recovered. Ninety percent of the chippage from the excavations is of the local Marble Hill Chert or varieties which are available from local gravel bars. Fabrication of stone tools would appear to have been one of the major tasks performed at the site. Cherts from sources outside the Marble Hill region include Harrodsburg (Tomak 1970), Harrison County (Seeman 1975), and Zaleski (Converse 1974:27), but constitute less than two percent of all chert debris recovered during the testing of 12 Je 10. Zaleski is present in only two instances and Harrodsburg was found to be largely present in the form of finished artifacts and very small flakes which could result from resharpening stone tools made elsewhere.

The relatively large quantities of thermally cracked stone recovered from the excavations and found on the surface of the site probably represent the remains of the cooking technology of the site's inhabitants. Unfortunately,

very little study of cracked stone has been attempted to date and little can be said concerning the behavior patterns to which cracked stone distribution relate. The lack of faunal remains and disturbed nature of the cultural deposits do not allow further interpretation of site activities related to the cracked stone deposits.

The presence of a ground stone pestle suggests seed and/or nut processing, but again no direct evidence of either subsistence activity was encountered. A pitted mano was recovered from the surface of 12 Je 108 adjacent to well site 1 and may also indicate seed and/or nut processing.

#### SUMMARY

Deep tests at the proposed locations of well sites 1 and 2 produced a considerable quantity of debris which were the result of the activities of prehistoric occupants of the area between 1000 and 4000 B.C. However, no culturally derived materials were found in an undisturbed context below the bottom of the plowzone (ca. 0.5 ft.). No cultural features were located at either of the well sites.

Plowzone deposits were removed from 740 square feet of the site surface between the well sites in an attempt to locate intact subsurface deposits which were indicated to be at least locally present during a series of shovel tests in adjacent areas of the site. The removal of plowzone deposits resulted in the recovery of a number of artifact categories, but failed to demonstrate the presence of intact cultural deposits below the base of the plowzone.

#### SIGNIFICANCE AND RECOMMENDATIONS

The remains of prehistoric occupations at 12 Je 108 appear to have been totally disturbed by past cultivation. The resulting loss of data

concerning the relationships between artifacts and other contextual information has greatly reduced the potential yield of significant information concerning the activities of the prehistoric inhabitants of the archaeological site. Phase II excavations at the proposed locations of the well sites, therefore, would not indicate that the cultural resources encountered meet the criteria for eligibility to be nominated for inclusion in the National Register of Historic Places and that the construction of the wells can take place without adversely affecting prehistoric cultural resources.

12 Je 119/120

Intact cultural deposits were encountered from 1.0 to 4.0 feet below the present surface during the excavation of trenches in the area to be adversely affected by the construction of the blowdown-discharge and screenhouse structures. Trench profiles and soil cores obtained during Phase II operations indicated that the cultural deposits extend over an area of ca. 101,600 square feet (see Map 1) in a pattern which parallels the Ohio River for a distance of 800 feet south from the mouth of an intermittent stream near the proposed location of the screenhouse structure. From the edge of the river bank, the cultural deposits were found to extend to a maximum of 200 feet to the west. Present data indicate that the cultural remains are the product of Late Archaic occupation(s) which occurred between 1,000 and 2,000 B.C.

Two archaeological sites, 12 Je 119 and 12 Je 120, were initially designated in the area on the basis of the results of a series of sub-surface cores, the distribution of lithic debris along the eroded river-

bank, and topography (see Map 1). An erosional channel of unknown age currently separates the two areas. No cultural deposits were found below the surface of the channel or along the riverbank at its juncture with the Ohio River. The physical similarities in the contents of the buried deposits of 12 Je 119 and 12 Je 120 indicate that they may represent a single archaeological site. From the data recovered during Phase II operations it is not possible to determine the relative ages of the archaeological deposits and the time of the formation of the channel. The channel had been formed after the occupation of the sites. In the absence of any conclusive evidence to the contrary, 12 Je 119 and 12 Je 120 will be considered a single archaeological site (12 Je 119/120) in the following discussion.

Of the eleven trenches excavated in the area which is to be disturbed by the construction of the blowdown-discharge and screenhouse structures, five produced evidence of prehistoric cultural activities: Trenches 6, 9, 12, 13 and 14. All prehistoric cultural remains were found below the disturbed plowzone and often below undisturbed silt deposits which were found to be sterile of culturally derived debris. The fact that no prehistoric cultural remains were recovered from either the floodplain surface or the excavated plowzone deposits indicates that the cultural levels have not been disturbed by past cultivation or other activities. In the following, the cultural remains encountered in each trench will be discussed in turn.

#### Trench 13(S4562-4564/E119-162)

Backhoe operations at the proposed location of the blowdown-discharge



structure encountered evidence of prehistoric activities between ca. 1.0 and 4.0 feet below the present surface (see Fig. 10). Due to considerable disturbance of the upper two feet by past cultivation and the actions of tree roots, it was difficult to determine the top of the cultural level in the exposed profile. The absence of cultural debris in the plowzone, however, does indicate that cultivation has not disturbed the cultural deposits.

The cultural deposits were contained in a matrix of clayey-silts which were not distinguishable from the soils above or below. The only indication of cultural activities encountered in the profile was a very thin scatter of charcoal flecks, chert flakes, and thermally cracked stone. In controlled excavations the mean density of charcoal fleck in the cultural deposits was found to be 27 charcoal flecks per cubic foot of soil. Chert flakes were present at the considerably lower density of 0.5 flakes per cubic foot.

A cultural feature (Feature 1) was encountered during backhoe excavation at a depth of 2.1 feet below the present surface. A controlled test unit was excavated at S4564-4574/E134-141 in order to obtain an estimate of the density and variety of cultural features in the area and to obtain controlled samples of the contents of the general cultural deposits. The backhoe was utilized to remove the plowzone and sterile overburden cultural deposits were excavated by hand to a depth of 2.0 feet. At this depth four additional cultural features were encountered. All soil from the fill of the cultural features was transported to the laboratory to be processed by water separation techniques (Limp 1974).

Upon completion of the excavation of the features, the unit was taken to the bottom of the cultural deposits.

## FEATURES

A total of five features (1,2,3,8, and 9) were encountered within the cultural deposits at a depth of 2.0 to 2.2 feet below the surface. Figure 4 depicts the horizontal distribution of these features.

Feature 1. Encountered during backhoe operations, this feature was centered at grid location S-4563.5/E131 at a depth of 2.1 feet below the present surface. The feature was a shallow basin-shaped pit 0.4 of a foot in depth which measured 2.2 feet on its longest horizontal axis and 2.0 feet on its shortest. The edges of the pit had been highly oxidized by past fires. Oxidized pieces of clay were scattered throughout the pit fill, but tended to be concentrated at the periphery. Charcoal, sandstone, and limestone were present in very small quantities. A single chert flake was recovered from the fill. The color of the soil matrix was slightly darker than the surrounding soils but identical in texture. No artifacts were found in direct association with the pit and an interpretation of pit function is not possible on the basis of existing data.

Feature 2. At grid location S4567/E134.5 a second cultural feature was encountered at 2.1 feet below the surface. It consisted of a concentration of charcoal, circular in outline, with a smaller secondary concentration apparent within the first. One unmodified stone and one chert flake was found in the fill. Excavation determined that this feature was the product of root or animal activities and not associated with the prehistoric occupation of the area.

Feature 3. A basin-shaped pit, nearly identical to feature 1, was encountered at grid location S4568.3/E139. The top of the pit was defined at a depth of 2.0 feet below the surface. Excavation determined that the pit extended to a maximum depth of 2.4 feet. The fill contained the same classes of materials as Feature 1, but sandstone was present in smaller quantities. The soils of features 1 and 3 were identical. The diameter of Feature 3 was 2.2 feet and varied little on all axes.

Feature 8. Portions of feature 8 were destroyed by the backhoe during trenching operations and the collapse of a segment of the trench profile. Approximately one third of the feature was available for systematic investigation. It was a basin-shaped pit of the same form as Features 1 and 3. The pit was encountered at a depth of 2.2 feet below the present surface at grid location S4564.3/E137 and appears to have had a diameter of 2.3 feet. The fill was not characterized by as much charcoal as features 1 and 3 and was found to contain 2429.2g of small fossiliferous limestone slabs. The limestone had been burned and was found to be concentrated at the bottom of the pit. Otherwise the fills of Features 1, 3 and 8 were nearly identical in appearance and indicate that the functions were identical.

On the other hand, the margins of feature 8 did not appear to be as highly oxidized as those of the other basin-shaped pits. Oxidation was least noticeable on the more northerly portions of the pit edge which had fallen when the trench wall collapsed. All of the fill which remained intact was transported to the laboratory for water separation.

Feature 9. At grid location S4567.7/E133 and 2.1 feet below the present surface this feature appeared as a small circular concentration

of charcoal flecks. Excavation determined that the charcoal was contained in the fill of a cylindrically shaped pit 0.5 feet in diameter and 0.4 of a foot deep which had a slightly rounded bottom. The walls of the pit did not indicate past fires and no chert or stone were recovered from the pit fill. The symmetry of Feature 9 may indicate cultural origin. The shallowness of the feature would not indicate that it was a post mold and no tools were found in direct association. It is not possible to interpret the function of the feature from the available data.

The mechanical flotation of the contents of features 1, 2, 3, 8, and 9 has been completed. An initial examination of the flotation samples did not indicate that faunal remains had been preserved in any excavated portions of the cultural deposits. Poor preservation of bone is characteristic of the silts of the Ohio River bottomlands in the region and would appear to account for the lack of bone recovery. However, charcoal is present, though in small quantities. The majority of charcoal recovered during flotation appears to be the remains of various woods, but two fragments of burned hickory nut hulls were found in the flotation of feature fill and others were noted at various points in trench profiles while in the field. Although the quantity of nut remains appears to be quite small, their presence may indicate that the site was occupied during the fall.

**MATERIAL CULTURE.** Relatively little artifactual material was recovered from 12 Je 119/120. However, an examination of the surface of the eroded riverbank east of trench S4562-4564/E119-162 produced a small amount of lithic debris, two thermally cracked stones, and a projectile point midsection which had been notched on the sides for

hafting and reworked to form an endscraper. (Fig. 3B). It was not possible to determine the cultural affiliations of this material, but the position of the debris on the river bank suggest that prior to the erosion of the river bank they were associated with the buried cultural deposits located in trenching operations. A summary of the cultural debris recovered from undisturbed context is presented as Table 2.

The excavation of the trench and test unit produced only one projectile point. The projectile point was found in situ in probable association with Features 3 and 8 at grid location S4566.5/E136.6 at a depth of 2.0 feet below the surface. The point is similar to Merom Expanding Stem varieties recovered from archaeological sites of the "Riverton Culture" in the Wabash Valley. Winters (1969) has stated that the projectile point type was manufactured between 2000 B.C. and 1000 B.C. (Winters 1969). Only one site in the Marble Hill region is known to produce large quantities of Riverton-like materials (Harrel 1976), but isolated finds of similar projectile points on multiple component archaic sites are not uncommon.

#### Trench 14 (S4562-4564/E26-53)

The excavation of this trench exposed cultural deposits quite similar in appearance and content to those exposed in the operations discussed above. Figure 11 depicts the south profile of the trench.

No cultural features were encountered in the excavation of the trench and two utilized flakes were the only artifacts recovered. Soil cores obtained between this trench and trench 13 (66 feet to the east) indicate that the cultural levels exposed in the two trenches represent



Table 2: Cultural materials recovered from 12 Je 119/120

Category	Number	Chert	Figure
Projectile Points Merom Expanding Stemmed	1	Indeterminate	Fig. 3D
Biface/Knife	1	Marble Hill	Fig. 3C
Utilized Flakes Terminal Lateral	2 2	Indeterminate Marble Hill	
Flakes Primary Secondary	76 74		
Cores	4	Marble Hill	
Fire Cracked Stone	7710 gm		
Unmodified Stone	6386 gm.		
Sandstone	1467 gm.		
Burned Limestone	2428 gm.	Marble Hill	

two areas of a single cultural stratum.

Trench 12 (S4412-4414/E50-95)

Evidence of prehistoric activity was encountered in trench excavations 130 feet north of those discussed above, but could be recognized only by a detailed examination of the trench profile. Charcoal flecks appeared at 1.2 feet below the surface separated from a disturbed plowzone by 0.2-0.4 of a foot of sterile clayey silts. The level containing charcoal flecks was found to extend to a depth of 4.4 feet where it was superimposed upon culturally sterile clayey-silts.

Four chert flakes and three thermally altered stones were found associated with the charcoal in the southern profile of the trench but no utilized flakes or artifacts were present. No cultural features were indicated.

The low density of charcoal (ca. 20 flecks/cubic foot) and paucity of lithic debris indicate that the cultural deposits are continuations of those encountered in the trenching operations to the south. Further excavation will be required to establish such a relationship with any certainty.

Trench 9 (S4262-4264/E0-58)

Evidence of past cultural activity was present in this trench profiles from ca. 0.8 of a foot to 4.0 feet below the present surface. Cultural debris was recovered directly below the base of the plowzone in a number of instances, but the plowzone itself was not found to contain cultural materials. There is no indication that the cultural deposits have been disturbed by past cultivation or other activities which would lead to loss of context.

Culturally derived materials were scattered throughout the cultural level of the profile, but again in low densities. As before, charcoal fleck distribution (ca. 26 flecks per cubic foot) was used as the most reliable indicator of the vertical limits of the cultural zone. The density of chert flakes in the cultural level was found to vary from .93 to .32 flakes per cubic foot of soil in controlled excavations and cracked stone, etc. was extremely rare.

An area of highly oxidized soil was encountered during trenching operations at grid location S4262/E39.5 (Feature 4) and two small circular concentrations of charcoal were found at S4261.3/E37 (Feature 6) and S4261.5/E35.4 (Feature 5). All were located at a depth of 2.4 feet below the surface.

In order to better determine the nature of the deposits a test unit was excavated at S4262-4273/E34-41. Another cultural feature was located and a controlled sample of the contents of the cultural zone was obtained for comparative purposes. A second test unit was excavated at S4251-4261/E31.7-33.7 to increase the total sample of the cultural zone available for analysis and to attempt to establish the cultural affiliations of the deposits.

Both test units were excavated to the base of the plowzone by the backhoe. The eastern half of S4263-4273/E34-41 was then excavated to the bottom of the cultural level by hand. The west half was excavated to 2.4 feet below the surface (the level of the features encountered in the trench) by the backhoe in 0.3 of a foot levels. The excavation of this portion of the unit was then completed to the base of the cultural deposits by hand.

The second test unit, was excavated totally by the backhoe, in 0.3 of a foot levels to the base of the cultural deposits. All soils from the test units were screened with the exception of samples recovered from cultural features which were transported to the laboratory for flotation.

FEATURES. Figure 5 depicts the horizontal distribution of features and cultural materials encountered in this area at a depth of 2.4 feet. Upon excavation Features 5 and 6 were found to be root casts and, therefore, not of cultural origins. Three features were found which were determined to be the products of prehistoric cultural activities. Features were found which were determined to be the products of prehistoric cultural activities, Features 4, 7, and 10.

Feature 4. A small area of heavily oxidized soil was found during trenching operations at a depth of 2.4 feet below the surface. The red discoloration had a maximum diameter of 1.7 feet and a minimum diameter of 1.5 feet. It was centered at grid location S4262/E39.5 and irregular in shape. The oxidized soil had a vertical depth of 0.18 of a foot. A small amount of charcoal was scattered at random throughout the oxidized area and one chert flake was found in direct association. The flake had been subjected to heat after its deposition indicating that it was present in the soil prior to the building of the fire which created the soil discoloration. Feature 4 is thought to represent an unprepared fire hearth. Similar features are reported in Late Archaic context by Winters (1969).

Feature 7. A feature nearly identical to feature 4 was encountered 2.1 feet below the surface at grid location S4271/E40. No lithic debris was found in unquestionable association with the oxidized soils. The matrix of the feature was identical to that of Feature 4. Other than a small amount of scattered charcoal, no culturally derived materials were present in the feature soils. Feature 7 is also thought to be an unprepared fire hearth. The maximum and minimum diameters of the feature were 1.8 and 1.0 feet respectively. The oxidized soil defining the feature extended from 2.30 feet to 2.33 feet below the surface.

Feature 10. A smaller area of burned soil was destroyed by the backhoe at S4263/E1. The feature was between 2.0 and 2.2 feet below the surface, and is assumed to have represented a third unprepared firehearth.

MATERIAL CULTURE. No "diagnostic" artifacts were recovered from the excavation of the trench or test units. A biface or blank fragment was recovered 2.1 feet below the surface at grid location S4265/E50 and, a utilized flake was also recovered at S4263/E44 at a depth of 1.1 feet.

A controlled sample of 40 cubic feet of the general cultural level from the second test unit (S4251-4261/E31.7-33.7) produced 43 chert flakes. This represents a flake density of .93 flakes per cubic foot. A second controlled sample of equal volume from the first test unit produced a flake density of only .32 flakes per cubic foot.

Charcoal recovered from features and samples of the general cultural level by mechanical flotation has been found to represent at least two unidentified species of woody plants. No nut fragments or other seeds were identified during initial sample sorting and no faunal remains were recovered.

#### Trench 6 (S3962-3964/W3-78)

Backhoe excavation of this trench exposed cultural deposits from a



depth of 2.0 feet to 4.5 feet below the present surface (see Fig. 9). Approximately 20 feet west of the river bank the cultural deposits were found to extend to a maximum depth of 8 feet below the surface. The reason for the greater depth of cultural deposits at this position is not known, but may relate to the processes of silt deposition taking place at the time the site was occupied. Whatever the reason, it appears that cultural deposits extend to their greatest depths near the river bank in all exposed profiles.

The definition of the vertical limits of the cultural deposits was again accomplished largely on the basis of presence and absence of flecks of charcoal in a reddish-brown, clayey-silt matrix which was otherwise identical to culturally sterile levels above and below. The upper limits of the cultural zone were relatively easy to distinguish and no past disturbance of cultural deposits appears to have taken place.

No features were encountered during the excavation of the trench. Lithics and other cultural debris were, however, more common in the cultural levels and profiles than the other trenches excavated in the 12 Je 119/120 area when the total of the debris recovered from trenching and hand operations is considered as a unit. Charcoal was found to be present in the control units at a density of ca. 40 flecks per cubic feet and chert flakes at .5 per cubic foot.

Floation of soil samples obtained from the cultural level indicates that the majority of the charcoal represents the remains of wood fires. Three hickory nut fragments and a charred fragment of a seed of an unidentified plant species were also observed during the sorting of the recovered data.

**MATERIAL CULTURE.** The surface of the eroding river bank east of the trench produced a small quantity of lithic debris and cracked stone.

Near the river's edge a trianguloid projectile point (Fig. 3A) was recovered which would suggest a relatively late occupation of the site (post A.D. 800). The association of the projectile point and the excavated cultural deposits is not, however, possible to establish. It is possible that the point was carried to this position by the river or was originally deposited in soils above the cultural zone. The similarities in the content and depth of the cultural deposits with those found at 12 Je 120 would indicate that the occupation occurred considerably earlier than A.D. 800. The actual temporal position of the deposits can only be determined by additional excavation.

Twenty chert flakes and four cores which had been derived from local Marble Hill cherts were found in the excavation of the trench. Two additional chert flakes were recovered which were derived from unknown sources. The only artifact recovered from the cultural level was a utilized flake at 2.4 feet below the surface.

#### SUMMARY

Subsurface testing in the region of the proposed locations of the blow-down-discharge and screenhouse structures led to the discovery of buried cultural resources which do not appear to have been disturbed by past cultivation. On the basis of excavated trench profiles, subsurface cores, and intensive inspection of the eroded river bank, the cultural deposits appear to cover ca. 101,600 square feet of the Ohio River bottomlands. The cultural stratum is located between ca. 1.0 foot and ca. 4.0 feet below the present surface. The maximum depth of cultural materials, 8.0 feet, was found to occur in a limited area approximately 20 feet from the edge of the eroded river bank.

The cultural deposits were initially designated as two archaeological sites (12 Je 119, 12 Je 120) on the basis of the topography of the region, but may represent a single habitation site which was occupied at regular intervals for the purpose of exploiting seasonally available resources in the Ohio River bottomlands. The presence of nuts in the cultural deposits would indicate a fall occupation.

The erosional channel which now separates 12 Je 119 and 12 Je 120 may have been formed after the prehistoric occupation(s) which formed cultural deposits had occurred. The similarities in the content and appearance of the cultural deposits exposed at both locations during the Phase II operations would support the conclusion that the deposits should be considered a single archaeological site. In the absence of contradictory data, the cultural deposits were assessed as a unit designated 12 Je 119/120.

It was not possible to adequately determine the range of resources which were being exploited by the prehistoric occupants of the site during the Phase II excavations. Poor bone preservation may account for the lack of faunal remains. Charcoal from what appear to be several species of woody plants was present in small quantities and charred nut hulls indicate the utilization of hickory nuts. Although local chert resources were being utilized to the near exclusion of imported types, the low densities of lithic debris would not indicate that the function of the site was focused upon the procurement of this resource.

A single projectile point was recovered in association with cultural features at a depth of 2.0 feet below the present surface and adjacent to the proposed location of the blowdown-discharge structure. The projectile point is morphologically similar to those associated with the Late Archaic "Riverton Culture" of the Wabash River Valley which were manufactured

between 1000 B.C. and 2000 B.C. No additional cultural debris of determinable cultural affiliation were recovered in direct association with the cultural level.

#### SIGNIFICANCE AND RECOMMENDATIONS

The results of the Phase II subsurface testing program at 12 Je 119/120 indicate that proposed construction activities may adversely affect non-renewable cultural resources which have the potential to contribute significant information to the study of the prehistory of the Ohio Valley and the region of the Marble Hill Plant Site. The potential importance of these cultural resources and some general recommendations concerning the mitigation of the effects of the proposed construction are discussed below.

The cultural deposits encountered at 12 Je 119/120 do not appear to have been disturbed subsequent to the final occupation of the site. The resulting potential for the recovery of contextual relationships between artifact and feature classes may allow the determination of differential activity areas and the function of the archaeological site in the subsistence strategy of its prehistoric occupants. Upon excavation, unprepared firehearth were found to occur in the central portion of the site while basin-shaped pits and cylindrical pits were found to occur in association in the southern portions of the site. This distinct spatial distribution would support the contention that specialized activity areas are present, but may also result from sampling biases created by the relatively small portion of the subsurface deposits exposed during Phase II operations. An indication of the number of activities carried on at the site is obtained from an examination of the categories of artifacts recovered from the

excavated trenches. These were limited to utilized flakes, scrapers, bifaces, and projectile points. The small number of tool categories would indicate that the number and variety of activities carried on at the site were quite limited. If a limited number of activities were carried on at the site, it may ultimately be possible to determine task specific artifact associations. Any step in this direction would be a significant contribution to the ability of the archaeologist to interpret the prehistoric record of the region and to the study of prehistoric subsistence strategies.

At this time no archaeological deposits are known from the Marble Hill region which supply data which is comparable to that potentially available from 12 Je 119/120. Little data are available concerning Late Archaic sites in the Ohio Valley which produce similar projectile points and very little is known of the adaptive functions of small prehistoric archaeological sites located at the river's edge at any point in time. The part that 12 Je 119/120 played in the subsistence strategy of its prehistoric occupants becomes of considerable importance for the development of subsistence-settlement models of Late Archaic populations in the Ohio Valley. Therefore, on the basis of the subsurface tests, the site is felt to contain data which is of significance to the study of human adaptation in the prehistory of the greater Ohio Valley. Under criteria established by the National Park Service, 12 Je 119/120 would appear to be eligible for nomination to the National Register of Historic Places. The determination of eligibility rests with the President's Advisory Council on Historic Preservation. Assuming that the criteria are met, the Advisory Council, following established guidelines (U.S. Government



1974), will consider alternatives for the mitigation of any adverse effects on the cultural resources which would result from proposed construction activities and, finally, recommend procedures to accomplish that mitigation.

Although recommendations concerning research procedures to be employed during Phase III operations at 12 Je 119/120 are the responsibility of the President's Advisory Council on Historic Preservation, the Phase II subsurface testing has supplied a body of information which indicates a minimal level of data recovery that would be necessary in order to answer questions pertaining to archaeological site function and human adaptation.

Phase II operations indicate that the types of information potentially available at 12 Je 119/120 include differential activity loci within the archaeological site, various tool categories associated with subsistence activities, data concerning the trajectories of tool manufacture, flora and fauna exploited, season(s) of occupation, lithic resources exploited, etc. In order to obtain an adequate sample of the data base and maximize the efficiency of Phase III mitigation it is recommended that a mixture of strategies be employed. A systematic sampling strategy would insure that the archaeological site as a whole is subjected to adequate sampling. However, specific questions generated during Phase II operations (e.g. the relative temporal position of the erosional channel between 12 Je 119 and 12 Je 120 and the cultural deposits) would lend themselves to the application of purposive selection in the location of excavation units. Such a mixed strategy Phase III program would require flexibility in the research design if the recovery of data is to be maximized. With a flexible research design

hypotheses generated during the field work which concern the internal structure of the archaeological site could then be tested as work is in progress and opportunistic data could be recovered with no loss in other aspects of the Phase III operations.

It is recommended that a minimum of a 5% sample (5080 square feet) of 12 Je 119/120 be subjected to further investigation during Phase III operations. In order to increase the proportion of information produced by the mitigation procedures, the controlled use of heavy earth moving equipment would be possible during the initial phases of the operation. Mechanical earth moving operations should not, however, take the place of tightly controlled hand excavation in the sampling design. Control must be maintained in both the horizontal and vertical dimensions if significant information contained in the cultural deposits is not subject to loss.

The recovery of data pertaining to the subsistence economy of the prehistoric occupants of 12 Je 119/120 should remain a prime goal of the Phase III operations. The use of mechanical flotation (Limp 1974) allows the processing of large quantities of soils and minimizes the loss of charcoal, seeds, small bones, and other data important in the reconstruction of prehistoric economic behavior.

It is also recommended that the portions of any Phase III operation which take place in the field be scheduled to avoid adverse weather conditions. Any accumulated water in excavation units could halt work in those units for days due to the low permeability of the soils. Therefore, it is suggested that the spring rains be avoided. Likewise, the colder portion of winter should be avoided due to difficulties encountered in the

excavation of frozen soils.

### CONCLUSION

The prehistoric cultural resources at the proposed locations of wells 1 and 2, the blowdown-discharge structure, and the screenhouse structure associated with the proposed Marble Nuclear Generating Station were the subject of a Phase II assessment during the summer of 1976. Prehistoric cultural resources encountered during subsurface testing at well sites, both of which are located within archaeological site 12 Je 108, do not appear to meet the criteria established by the National Park Service by which cultural resources are declared eligible to be nominated for inclusion in the National Register of Historic Places. Consequently, no further mitigation at the well sites is recommended.

In the area to be affected by the construction of the blowdown-discharge and screenhouse structures, geologically sealed cultural deposits were encountered from ca. 1.0 to ca. 4.0 feet below the present floodplain surface. These cultural deposits were designated as archaeological site 12 Je 119/120. There were no indications of the past disturbance of the cultural deposits by cultivation or other activities. Subsurface tests indicate that 12 Je 119/120 appears to have the potential of contributing significant information to the study of Ohio Valley prehistory and, therefore, has the potential to meet the criteria for eligibility to be nominated for inclusion in the National Register of Historic Places. As provided for in the Procedures for the Protection of Historic and Cultural properties (U.S. Government 1974), the President's Advisory Council on Historic Preservation will ultimately determine the eligibility of 12 Je 119/120 and, after considering

the available alternatives, recommend procedures to mitigate the adverse effects of the proposed construction. Phase II excavations have indicated that a mixed strategy is the most economical and efficient means of obtaining an adequate sample of the archaeological data and, at the same time, has the potential to produce data which will answer specific questions concerning site function and internal variability. It is maintained that flexibility should be built into the design of any Phase III operations in order that the potential to gather opportunistic data and test hypotheses generated while work is in progress is permitted. Once the recommendations of the President's Advisory Council on Historic Preservation concerning the Phase III mitigation of the adverse effects upon the cultural resources of 12 Je 119/120 which will result from the construction of the blowdown-discharge and screenhouse structures are complied with, it is recommended that the construction be allowed to proceed.

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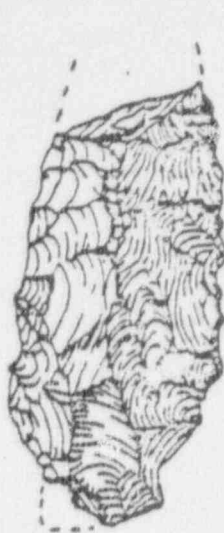
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FIGURE 1

- A. McWhinney Heavy Stemmed Projectile Point. 12 Je 108, S1555-1592/W690-710, plowzone.
- B. Late Archaic Stemmed Projectile Point. 12 Je 108, S1895/W680, plowzone.
- C. Late Archaic Side Notched Projectile Point, Indeterminate typological affiliation. 12 Je 108, S1555-1592/W690-710, plowzone.
- D. Late Archaic Stemmed Projectile Point, Indeterminate typological affiliation, 12 Je 108, S1555-1592/W690-710, plowzone.
- E. Late Archaic Side-Notched Projectile Point, Indeterminate typological affiliation. 12 Je 108, S1574/W697.2, plowzone.
- F. Hafted Endscraper. 12 Je 108, S1568.4/W703.5, plowzone.
- G. Hafted Endscraper. 12 Je 108, S1555-1592/W690-710, plowzone.
- H. Hafted Endscraper. 12 Je 108, S1555-1592/W690-710, plowzone.



A



B



C



D



E



F



G



H

FIG 1

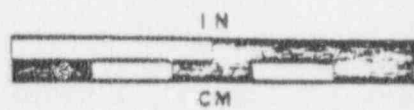


FIGURE 2

- A. Biface Knife. 12 Je 108, S1555-1592/W690-710, plowzone.
- B. Biface Knife. 12 Je 108, S1505-1507/W686-742, plowzone.
- C. Biface Knife. 12 Je 108, S1560/W698.5, plowzone.
- C. Biface Knife. 12 Je 108, S1555-1592/W690-710, plowzone.
- D. Biface Knife. 12 Je 108, S1555-1592/W690-710, plowzone.
- E. Biface Knife. 12 Je 108, S1555-1592/W690-710, plowzone.
- F. Ground Stone Pestle. 12 Je 108, S1555-1592/W690-710, plowzone.
- G. Endscraper. 12 Je 108, S1505-1507/W686-742, plowzone.
- H. Endscraper. 12 Je 108, S1555-1592/W690-710, plowzone.



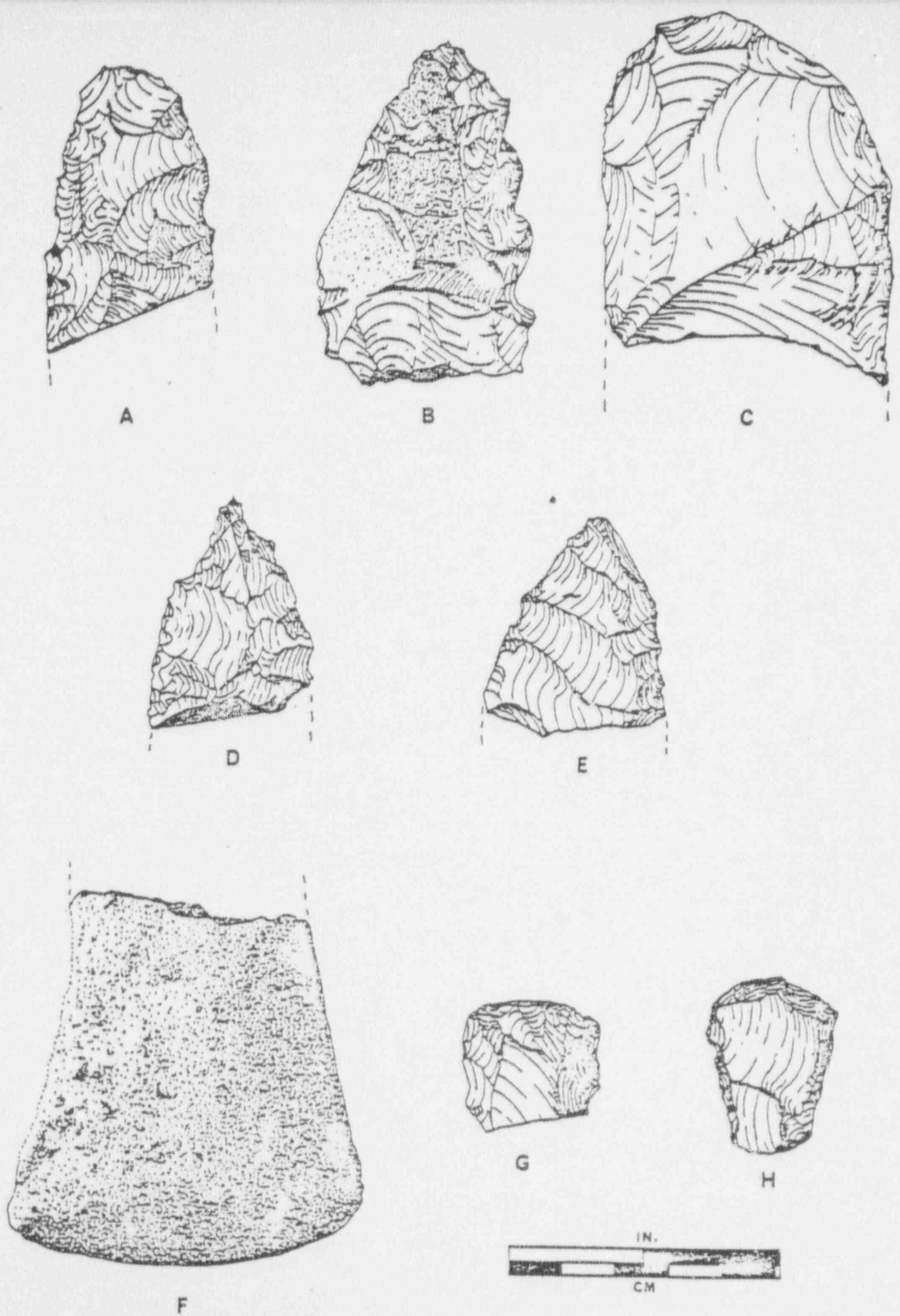


FIG 2

FIGURE 3

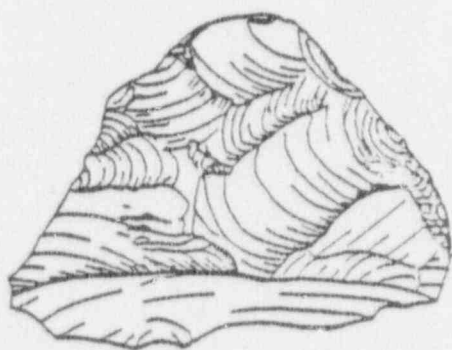
- A. Trianguloid Projectile Point. 12 Je 119, S3962-3964/W  
4-E20, Eroding river bank.
- B. Hafted end scraper made from projectile point midsection.  
12 Je 120, S4562-4564/E165-185, Eroding river bank.
- C. Biface knife. 12 Je 120, S4265/E50, 2.5 ft. BS.
- D. Merom Expanding Stem Projectile Point. 12 Je 120,  
S4566.6/E136.7, 2.0 ft. BS.



A



B



C



D

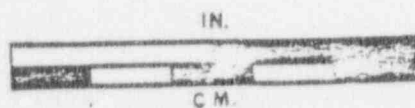


FIG. 3

FIGURE 4

Trench 13: The horizontal distribution of cultural features encountered at 2.0 feet below the floodplain surface.

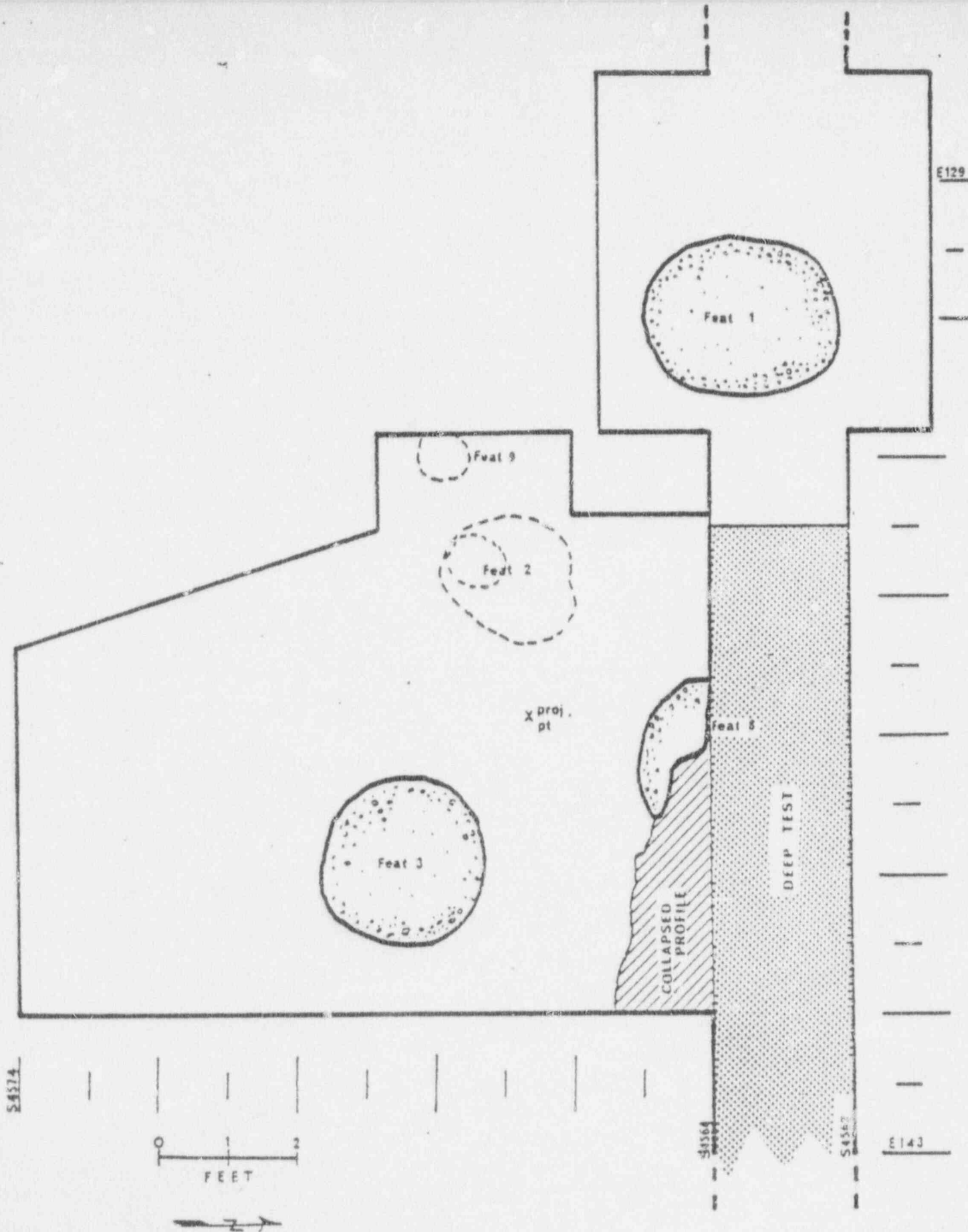


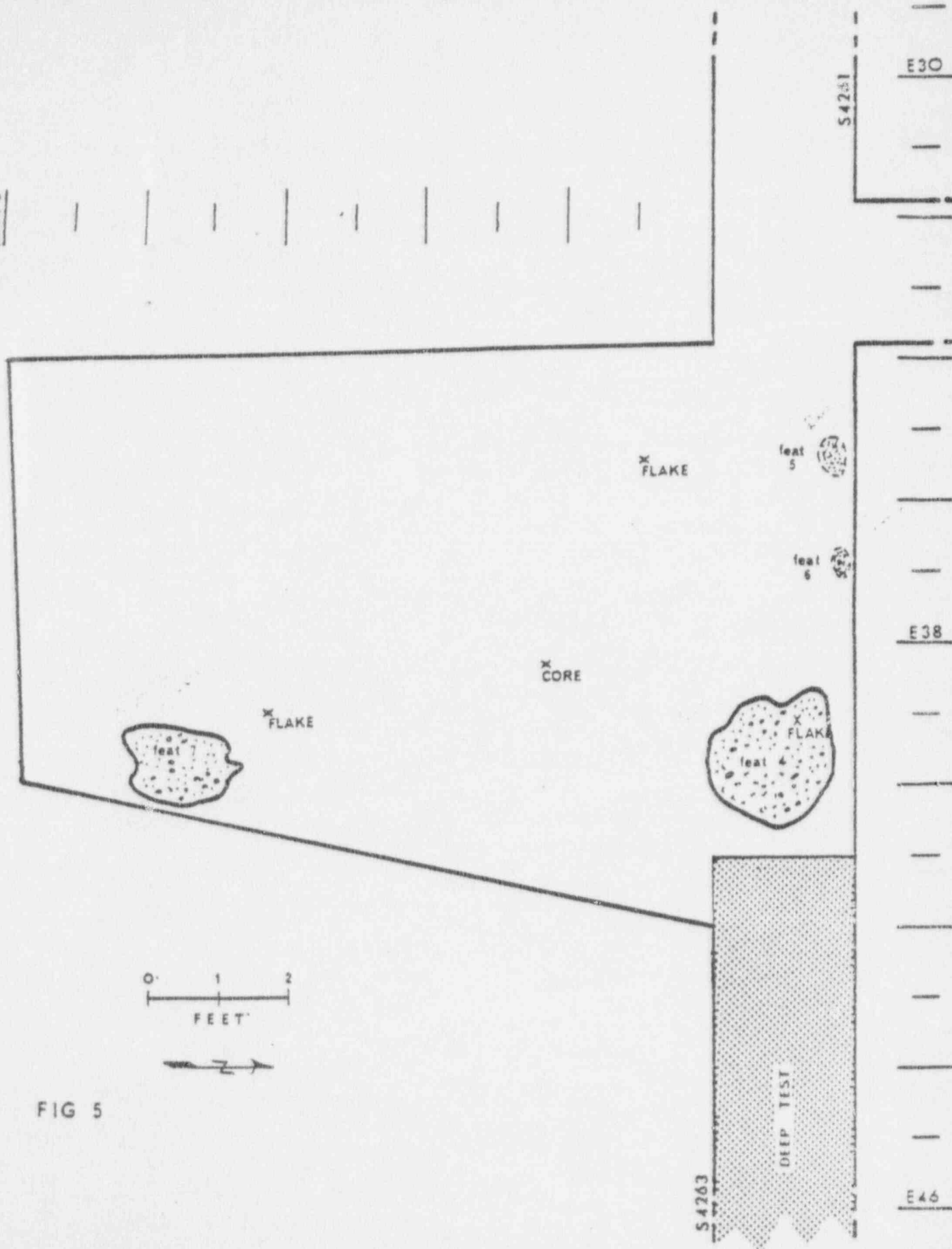
FIG 4



FIGURE 5

Trench 9: The horizontal distribution of cultural features encountered at      feet below the floodplain surface.

S4273



0 1 2  
FEET

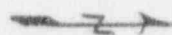


FIG 5

FIGURE 6

Trench 3: Soil profile, southern trench wall.

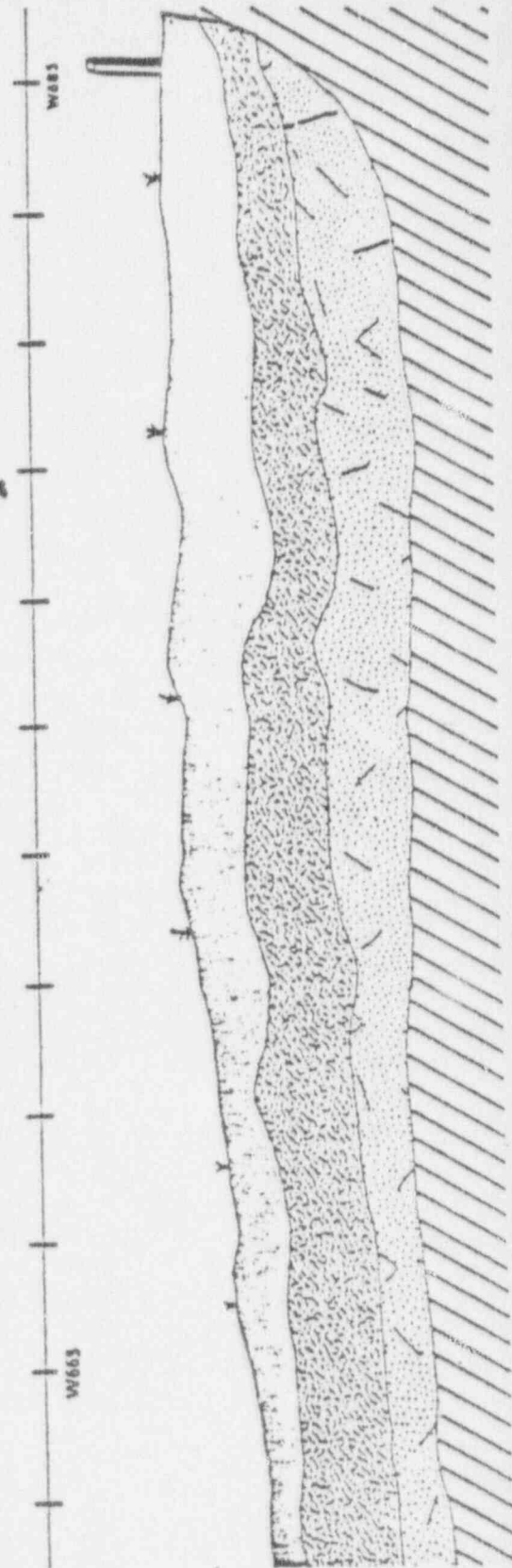
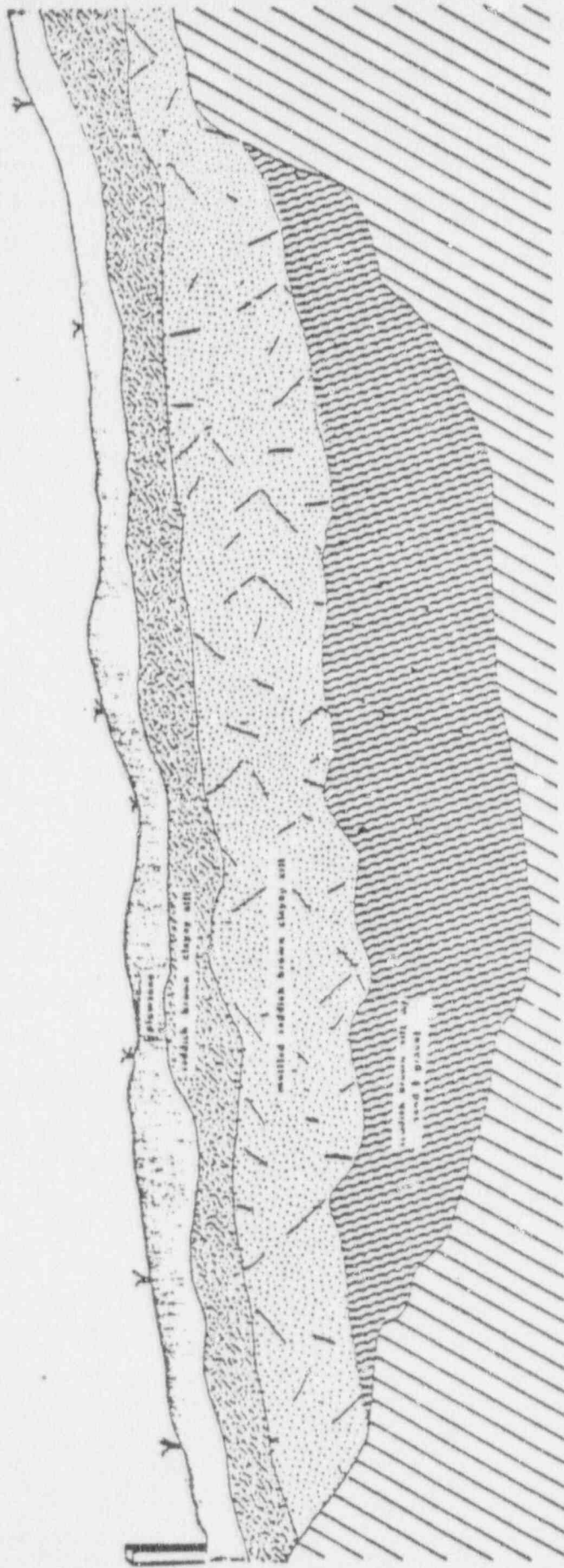


FIG 6

Profile, S1826/W635-685

FIGURE 7

Trench 3: Soil profile, southern trench wall.



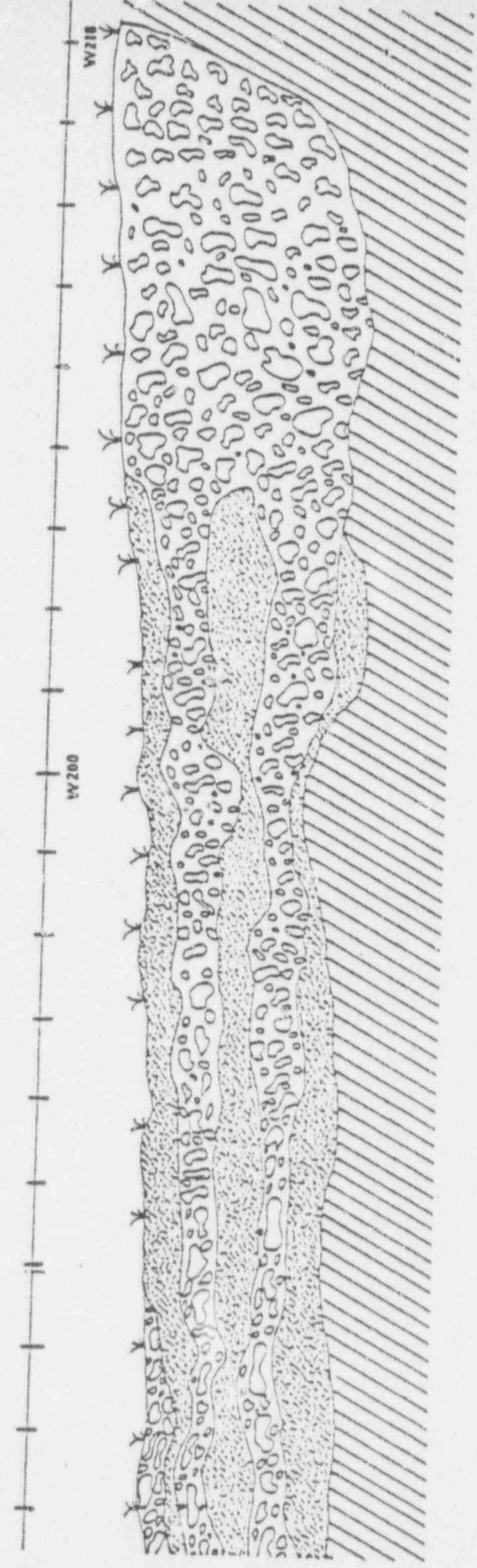
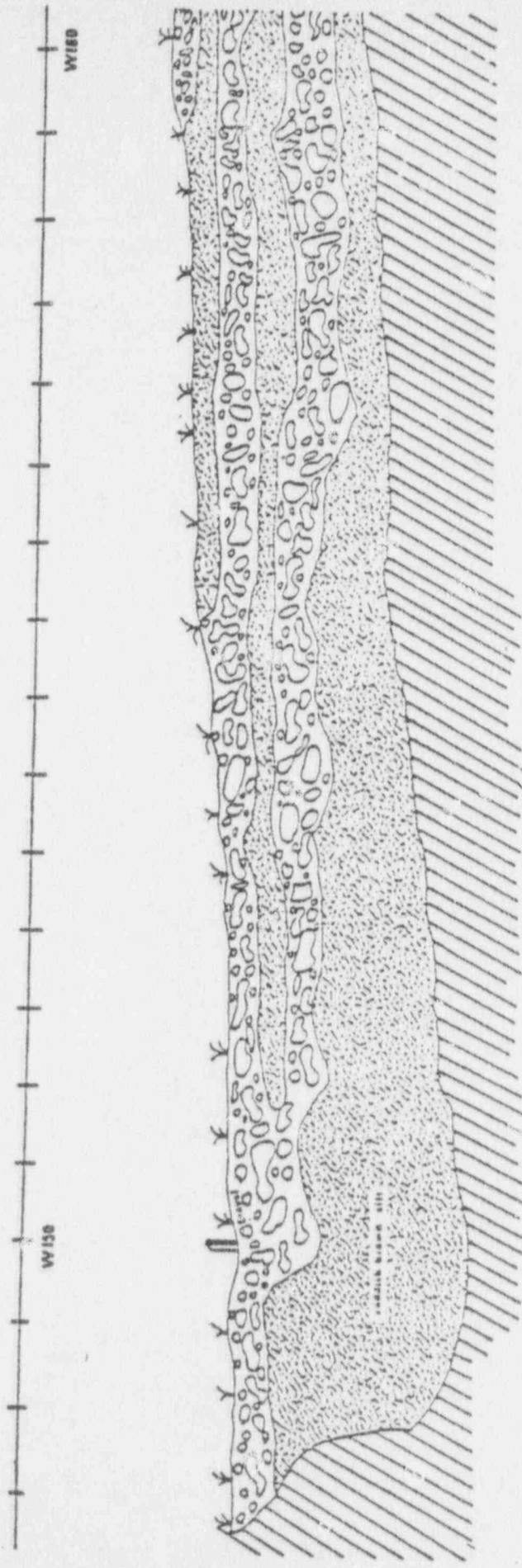


FIG 1

Profile, S 3964/W163-218

FIGURE 8

Trench 10: Soil profile, southern trench wall.

FIGURE 9 a, b

Trench 6: Soil profile, southern trench wall.

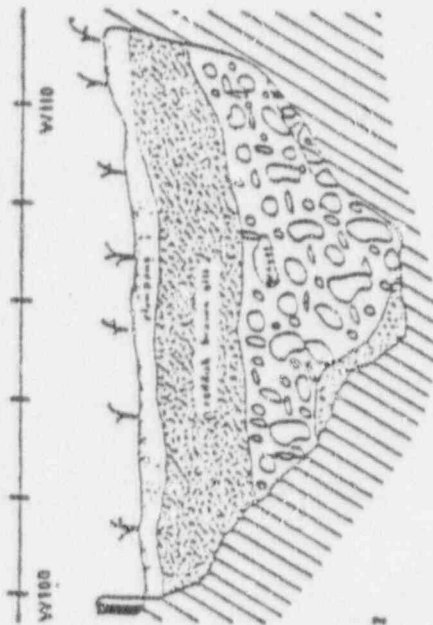


FIG 8  
Profile, S4264/W104-112

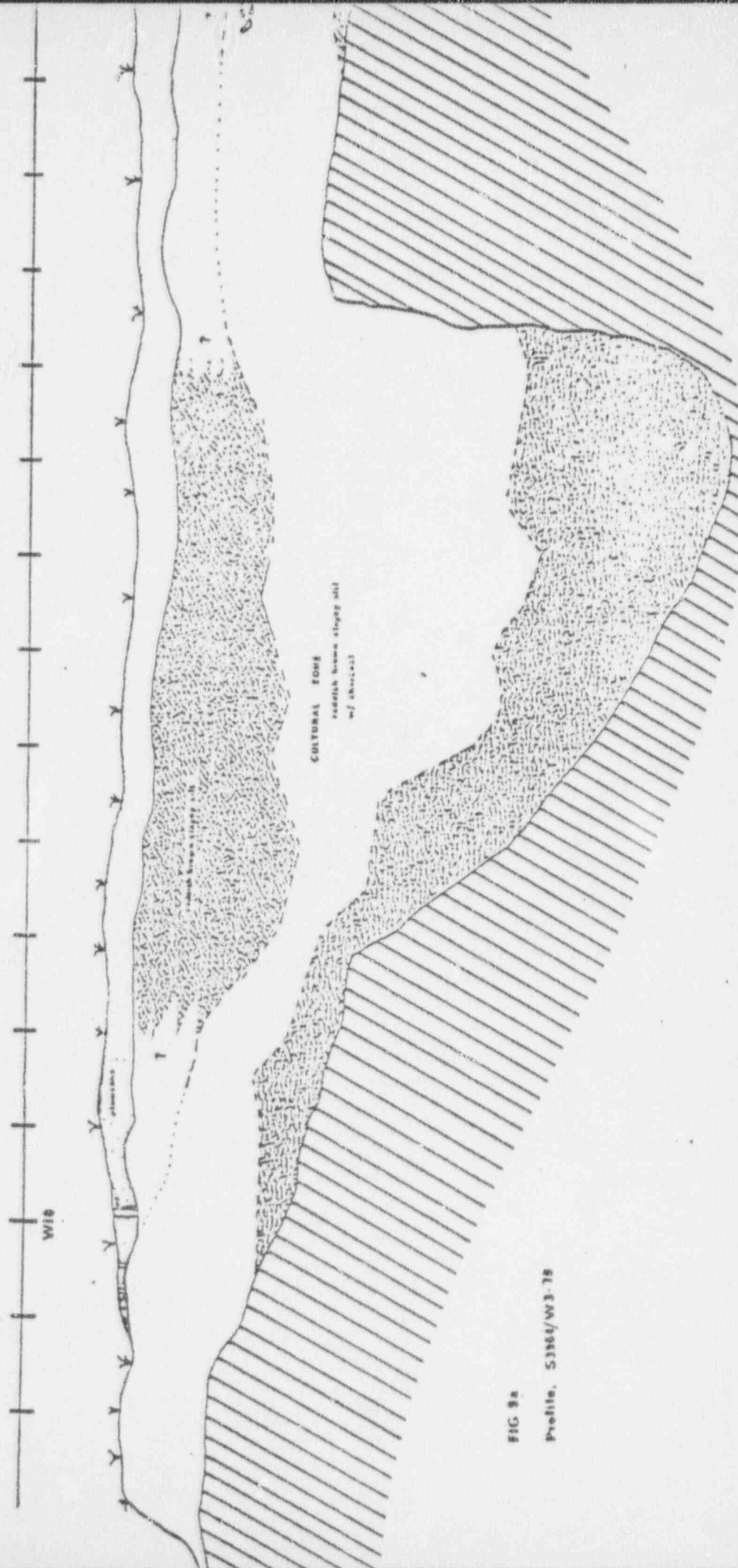
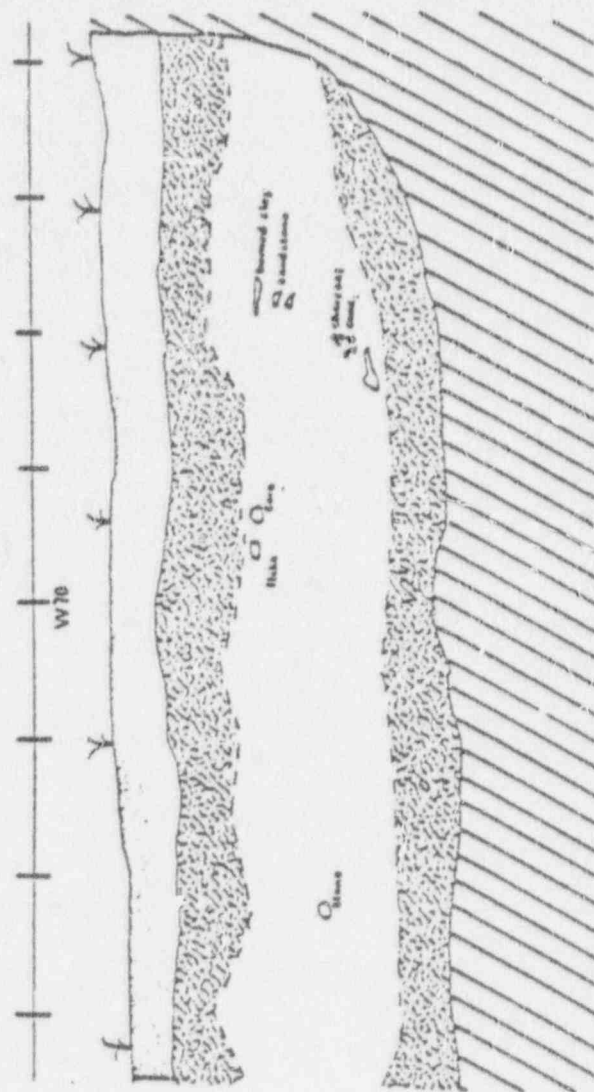
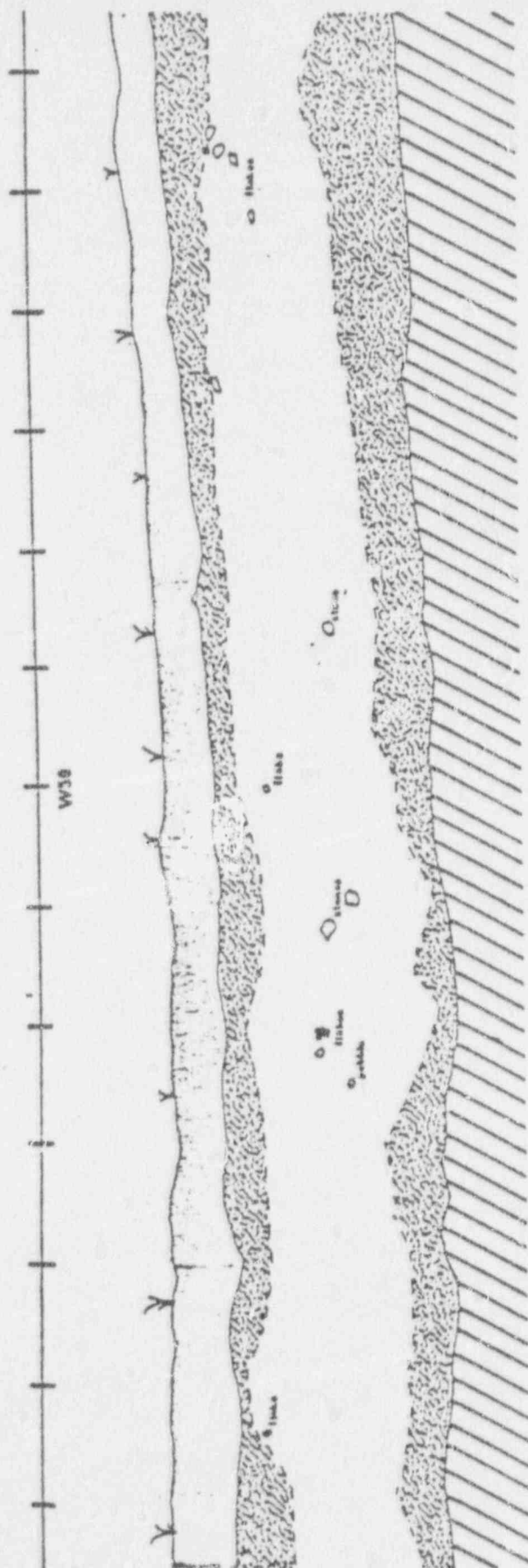


FIG 9a  
Profile, S3864/W3-78



98 013

FIGURE 10

Trench 13: Soil profile, southern trench wall.



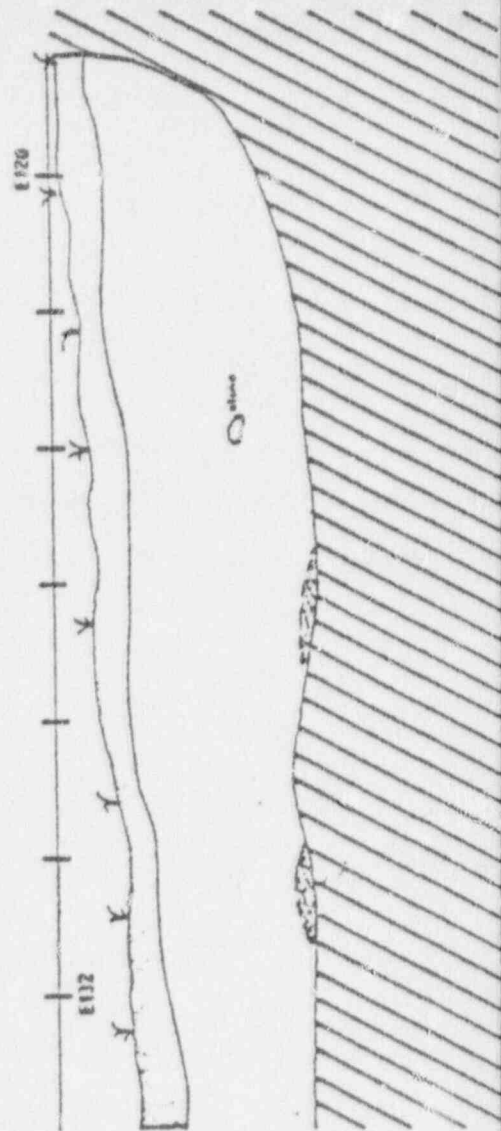
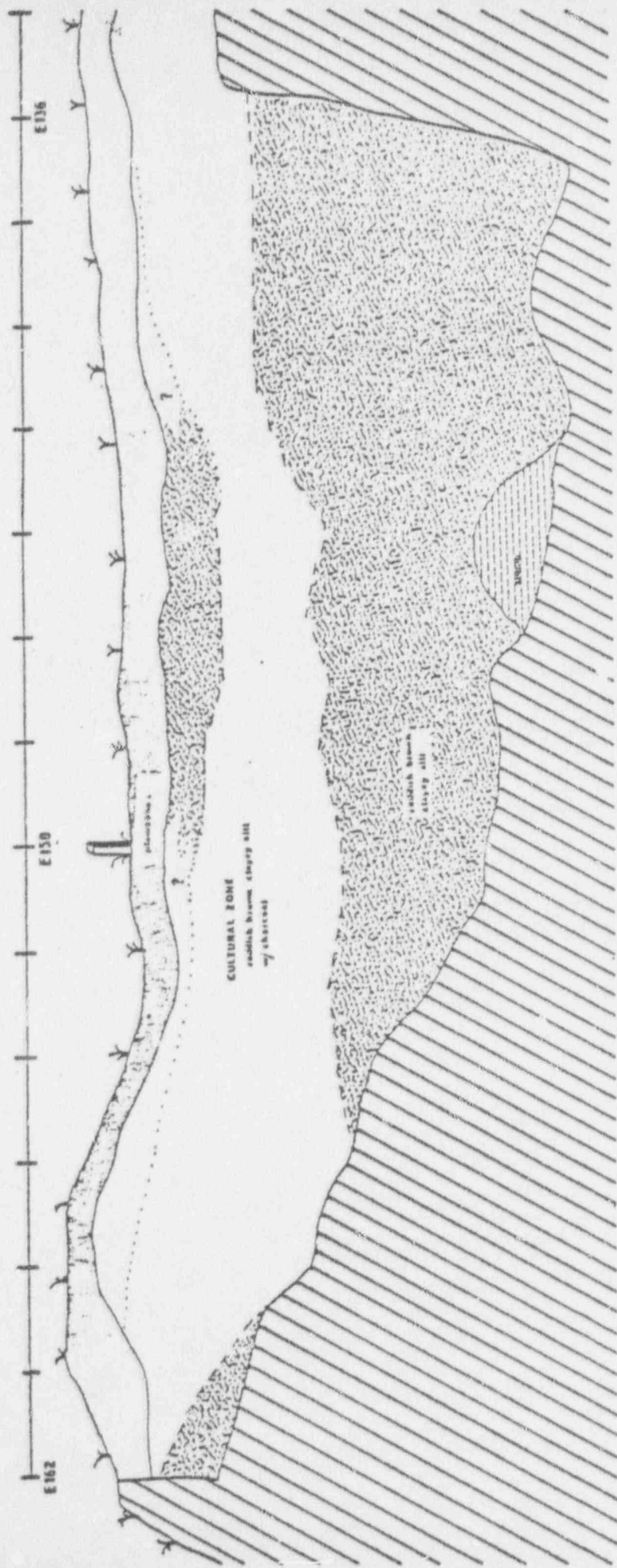


FIG 10  
Profile, S4384/E115-162

FIGURE 11

Trench 14: Soil profile, southern trench wall.

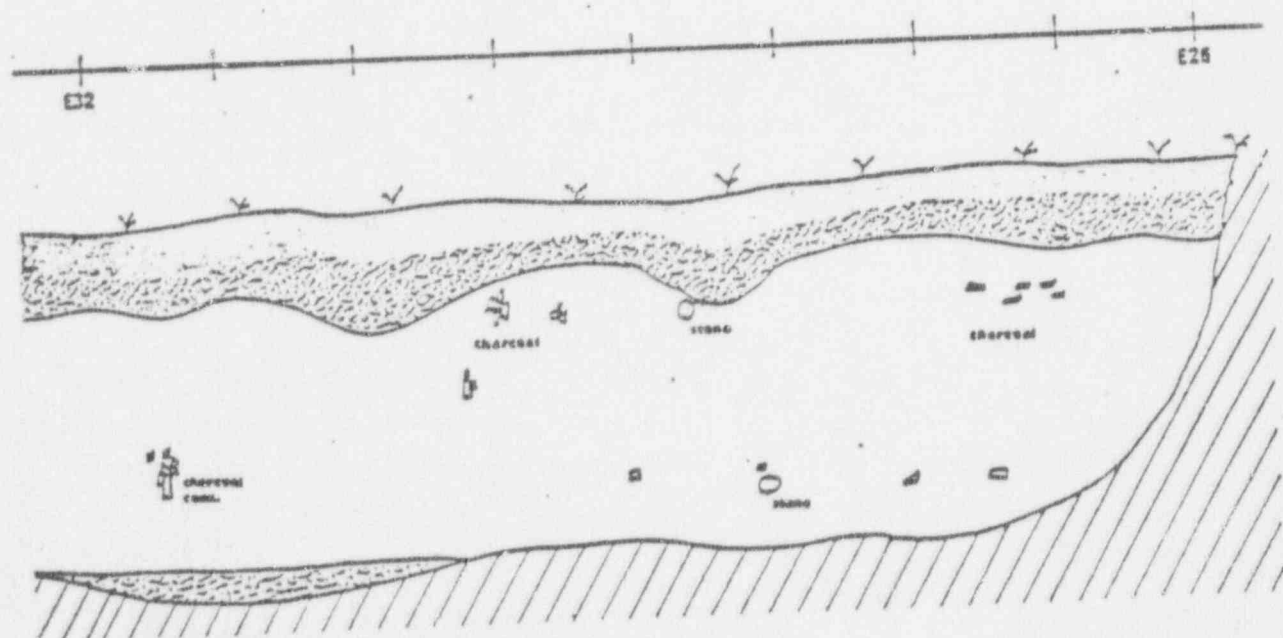
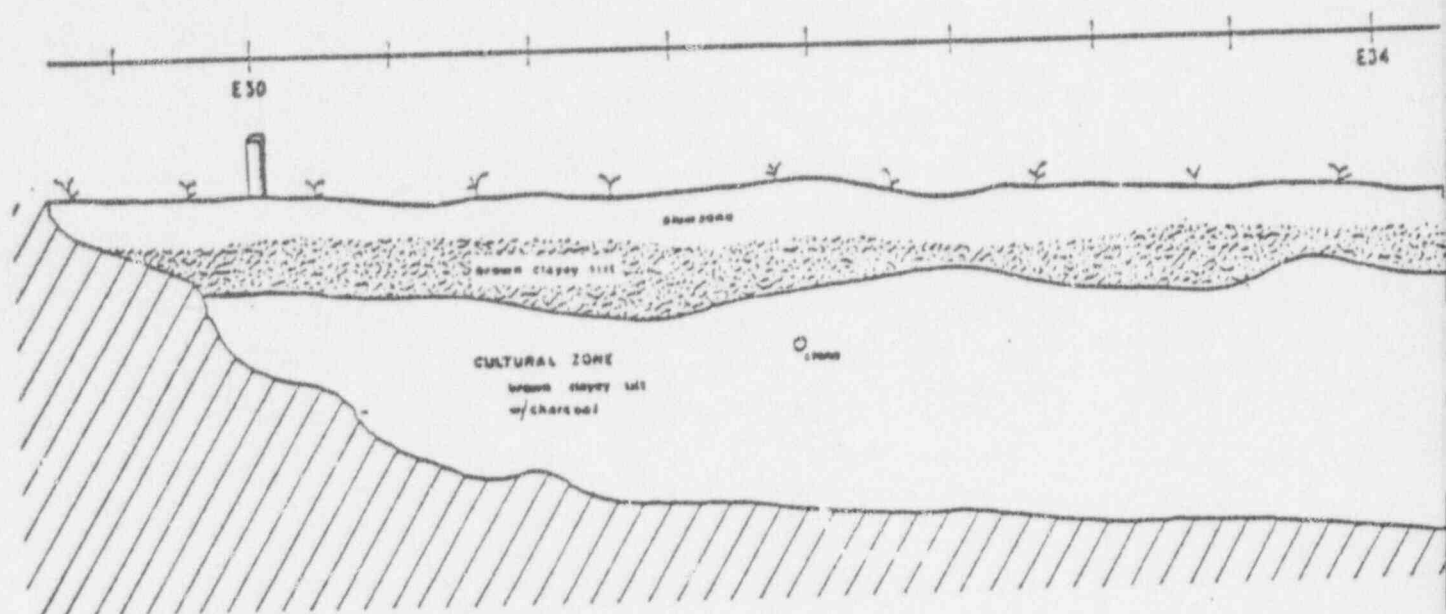
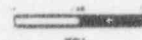


FIG 11  
Profile, S4564/ E25-53

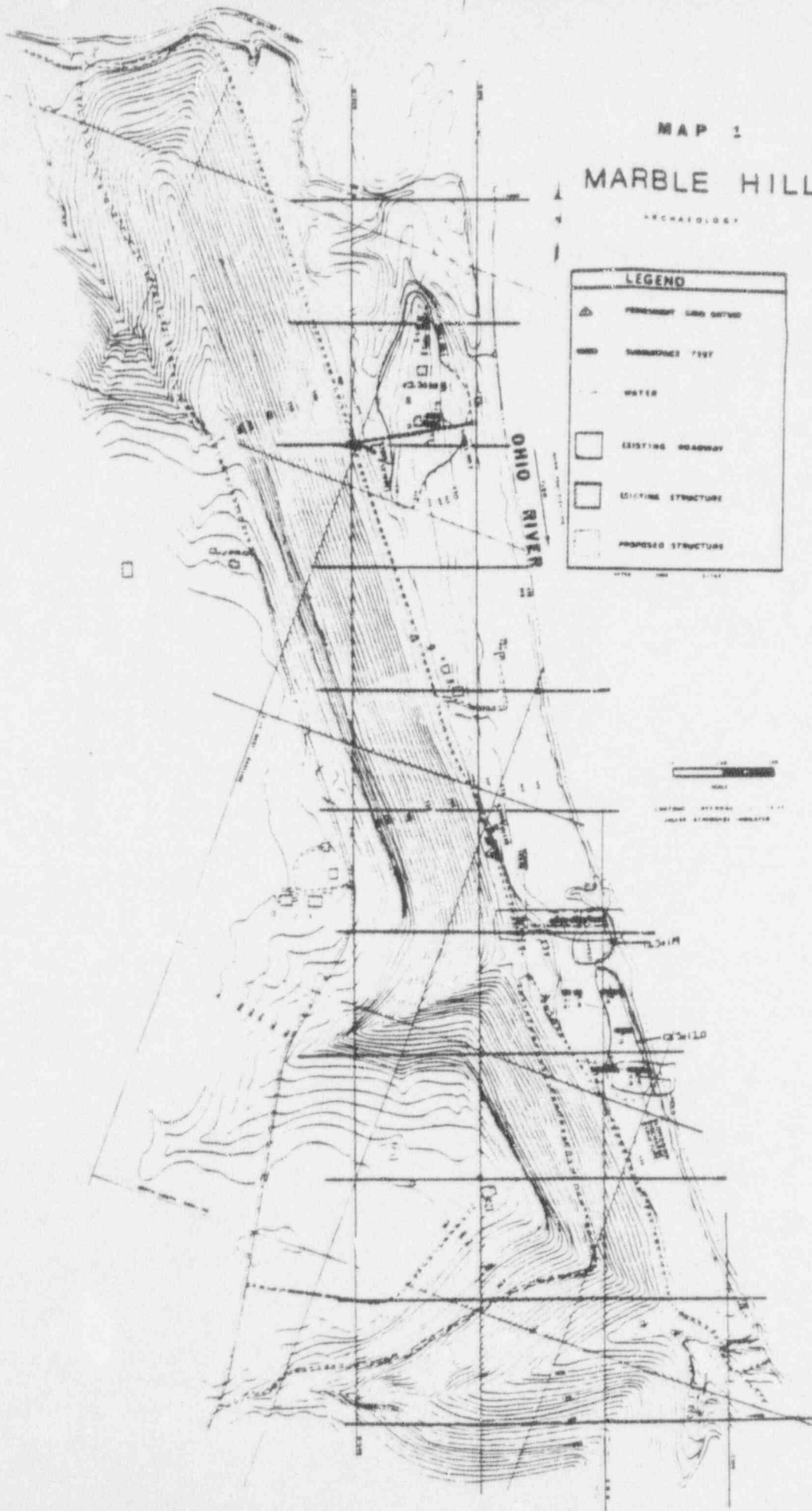
# MAP 1 MARBLE HILL

ARCHAEOLOGY

LEGEND	
	PERMANENT LAND SURVEY
	SUBMERGED LAND
	WATER
	EXISTING ROADWAY
	EXISTING STRUCTURE
	PROPOSED STRUCTURE



1:50,000  
1" = 1000'



ENCLOSURE 3

00000012

STATE OF INDIANA



INDIANAPOLIS, 46204

DEPARTMENT OF NATURAL RESOURCES

JOSEPH D. CLOUD  
DIRECTOR

September 13, 1977

Mr. David L. Odor  
Supervising Engineer/Environmental  
Public Service of Indiana  
1000 East Main Street  
Plainfield, Indiana 46168

Dear Mr. Odor:

We have reviewed the Phase II Assessment of Prehistoric Cultural Resources at the site of the proposed Marble Hill Nuclear Generating Station in Jefferson County, Indiana.

We concur with the Phase II Assessment report that archaeological site 12JE119/120 is eligible for the National Register of Historic Places. Before any construction in the area of site 12JE119/120 is undertaken, the applicant should comply with Federal Regulations 36 C.F.R., Part 800.

We have further determined that an archaeological survey of the floodplain area to be affected by the proposed construction should be undertaken and submitted for our review.

Very truly yours,

A handwritten signature in cursive script, appearing to read "J. D. Cloud".

Joseph D. Cloud  
State Historic Preservation Officer

JDC:RAG:kj



0824770010

## STATE OF INDIANA



INDIANAPOLIS, 46204

DEPARTMENT OF NATURAL RESOURCES

JOSEPH D. CLOUD  
DIRECTOR

August 19, 1977

UNCONTROLLED  
COPYMr. David Odor  
Public Service of Indiana  
1000 East Main Street  
Plainfield, Indiana 46168

Dear Mr. Odor:

The archaeological reconnaissance and the subsequent field testing for the proposed Marble Hill Railroad corridor were found to be acceptable. Consultations with the archaeological survey director, Dr. James Kellar, confirmed the Division of Historic Preservation's decision to permit construction within the railroad corridor. Although some prehistoric data will be lost, project construction can proceed without an adverse effect on the prehistoric cultural resources. No sites were determined to be eligible for the National Register of Historic Places.

This project clearance will apply solely to that area within the proposed Marble Hill Railroad corridor and will require that a qualified archaeologist be called in should prehistoric materials be uncovered during construction.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Joseph D. Cloud".

Joseph D. Cloud  
State Historic Preservation Officer

JDC:GDE:kj



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

C880770081

ENCLOSURE 5

AUG 24 1977

Packet Nos. STN 50-546  
and STN 50-547

Public Service Company of  
Indiana, Inc.  
ATTN: Dr. James Coughlin  
Vice President, Nuclear  
1000 East Main Street  
Plainfield, Indiana 46168

8/29/77

Dear Dr. Coughlin:

With reference to your letter of August 11, 1977 regarding the environmental impacts of constructing and operating the 10 1/2 mile long railroad spur to the Marble Hill Nuclear Generating Station from Nable, Indiana, the NRC staff has reviewed and evaluated these impacts as called for by Paragraph 7(b) of Subsection 4.5.2 of the Final Environmental Statement.

The staff's ecological specialists examined the terrestrial and aquatic biological effects of constructing the railroad spur. The impacts are within the range of those analyzed and considered acceptable in the staff's evaluation presented at the Marble Hill hearing and in the Licensing Board's analysis and findings in the Partial Initial Decision of August 22, 1977. The staff examined the report of the Glenn A. Black Laboratory of Archaeology, Indiana University, to evaluate the possible impact on cultural resources. The staff agreed with the assessment of the Indiana State Historic Preservation Officer that there were no sites in the railroad spur route eligible for inclusion in the National Register of Historic Places and that there was no effect on cultural resources.

This letter confirms that the requirement of the Final Environmental Statement with regard to staff review and approval of the railroad spur plans has been satisfied.

Sincerely,

*Harold R. Denton*

Harold R. Denton, Director  
Division of Site Safety  
and Environmental Analysis  
Office of Nuclear Reactor Regulation

cc w/copy of 8/11/77 ltr.:  
see next page