

Delphi Lime Kilns

(Property Name)

NPS Form 10-900

(Rev. 10-90)

United States Department of the Interior
National Park Service

**NATIONAL REGISTER OF HISTORIC PLACES
REGISTRATION FORM**

Carroll, Indiana

(County and State)

OMB No. 1024-0018

RECEIVED 2280

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NAT. REGISTER OF HISTORIC PLACES
NATIONAL PARK SERVICE

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This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in How to Complete the National Register of Historic Places Registration Form (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Delphi Lime Kilns

other names/site number _____

2. Location

street & number N/A not for publication

city or town Delphi vicinity

state Indiana code 015 IN county Carroll zip code 46923

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property meets does not meet the National Register Criteria. I recommend that this property be considered significant nationally statewide locally. (See continuation sheet for additional comments.)

Signature of certifying official _____ Date _____

Indiana Department of Natural Resources
State or Federal agency and bureau

In my opinion, the property meets does not meet the National Register criteria. (See continuation sheet for additional comments.)

Signature of commenting or other official J.C. St Date 4-24-02

State or Federal agency and bureau _____ Date _____

4. National Park Service Certification

- I, hereby certify that this property is:
- entered in the National Register
- See continuation sheet.
- determined eligible for the National Register
- See continuation sheet.
- determined not eligible for the National Register
- removed from the National Register

Edson H. Beall
Signature of the Keeper

Date of Action
6/27/02

Delphi Lime Kilns
(Property Name)
other (explain): _____

Carroll, Indiana
(County and State)

5. Classification

Ownership of Property
(Check as many boxes as apply)

- private
- public-local
- public-State
- public-Federal

Category of Property
(Check only one box)

- building(s)
- district
- site
- structure
- object

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
_____	_____	buildings
6	_____	sites
_____	_____	structures
_____	_____	objects
6	_____	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register

None

6. Function or Use

Historic Functions
(Enter categories from instructions)

Industry -- Manufacturing Facility

Current Functions
(Enter categories from instructions)

Recreation and Culture -- Outdoor Recreation

7. Description

Architectural Classification
(Enter categories from instructions)

See continuation Sheets

Materials
(Enter categories from instructions)

foundation See Continuation Sheets
walls _____
roof _____
other _____

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

See Continuation Sheet

8. Statement of Significance

Applicable National Register Criteria

(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- A Property is associated with events that have made a significant contribution to the broad patterns of our history.
- B Property is associated with the lives of persons significant in our past.
- C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- D Property has yielded, or is likely to yield information important in prehistory or history.

Criteria Considerations

(Mark "X" in all the boxes that apply).

Property is:

- A owned by a religious institution or used for religious purposes.
- B removed from its original location.
- C a birthplace or a grave.
- D a cemetery.
- E a reconstructed building, object, or structure.
- F a commemorative property.
- G less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance

(Enter categories from instructions)

Architecture – Industrial

Archaeology – Historic/Non-Aboriginal

Period of Significance

1850-1870

Significant Dates

1850s

Significant Person

(Complete if Criterion B marked above)

Cultural Affiliation

Euro-American

Architect/Builder

Narrative Statement of Significance

(Explain the significance of the property on one or more continuation sheets)

Delphi Lime Kilns
(Property Name)

Carroll, Indiana
(County and State)

9. Major Bibliographical References

Bibliography

(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

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

Primary Location of Additional Data

- State Historic Preservation Office
- Other State agency
- Federal agency
- Local government
- University
- Other

Name of repository:

See Continuation Sheet

10. Geographical Data

Acreege of Property 3.5 (approximately)

UTM References

(Place additional UTM references on a continuation sheet)

1 16 527620 to 4493620 to
Zone Easting Northing

3 _____ _____ _____
Zone Easting Northing

2 16 527200 4493740
Zone Easting Northing

4 _____ _____ _____
Zone Easting Northing

____ See continuation sheet.

Verbal Boundary Description

(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification

(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Dr. Wayne Bischoff

organization Hemisphere Field Services date June 10th, 2001

street & number 4562 Ottawa Rd. telephone 517-347-0718

city or town Okemos state MI zip code 48864

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

- A USGS map (7.5 or 15 minute series) indicating the property's location.
- A sketch map for historic districts and properties having large acreage or numerous resources.

Photographs

Delphi Lime Kilns
(Property Name)

Carroll, Indiana
(County and State)

Representative black and white photographs of the property.

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name City of Delphi

street & number N/A telephone (765) 564-2258

city or town Delphi state IN zip code 46923

Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C. 470 et seq.). Estimated Burden Statement: Public reporting burden for this form is estimated to average 18.1 hours per response including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding this burden estimate or any aspect of this form to the Chief, Administrative Services Division, National Park Service, P.O. Box 37127, Washington, DC 20013-7127; and the Office of Management and Budget, Paperwork Reductions Project (1024-0018), Washington, DC 20503.

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National Park Service

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NARRATIVE DESCRIPTION

The Delphi Lime Kilns are comprised of six remnants of "pot kiln" type lime kilns used from the 1850s up to 1970 by the Hubbard & Co. lime quarrying and processing company. The area currently is a community park, owned by the City of Delphi, and known as the "Canal Park Annex." The terrain is lawn, with sloping toward the Wabash and Erie Canal to the west. The canal has recently been dredged and watered. Though this activity has not impacted the six lime kiln remnants spread along the canal, it has opened up the area to more public use and trail activity. A single lime kiln is visible to trail walkers, with a large square stone outer wall (Photo 1) rising a foot above a large rubble and earthen mound (the collapsed pile of the lime kiln), and a short circular inner wall (Photo 2) of bricks that is only an inch or so high. Two other lime kilns are represented by fused brick interior sections, which gives testimony to the incredible heat originally needed to fire and power the lime. Other, less visible remnants of the lime kilns are found throughout the park, including a large rubble pile where lime kiln material was moved to make way for a railroad.

Archaeology during the summer of 1996 proved that the six lime kilns shown along the Wabash and Erie Canal north of Washington Street were of the "pot kiln" type. Blatchly notes that Hubbard & Co. used these types of kilns from the 1850s until 1870, and that they held 1000 to 1200 bushels of lime, were filled in one day, and took about three days to burn before being emptied in a day or two. He notes that about 20 of these kilns were once operated by the company until they were replaced by perpetual burners soon after the "Delphi Lime Company" was formed in 1870 (Blatchly, 1903). Several historic maps (see Section 8) also indicated the historic presence of six lime kilns within the canal park area.

At some date after 1870, the railroad spur (known locally as the "Belt Railroad") was constructed across the canal, through the middle of the "pot kilns" along the canal towpath, and westward toward a number of Delphi industries, including an ice plant, a coalyard, and the Harley & Bros. quarry and kiln site (personal communication with Dan McCain). This quarry was used until 1917, and can still be seen today by following the railroad trail west from the Delphi Canal Park Annex. The construction of this railroad demolished most of two of the six lime kilns located along the canal north of Washington Street. Archaeological evidence suggests that the remainder of the kilns were allowed to collapse upon themselves through disuse (Bischoff, 1997).

Archaeology was conducted at the lime kilns site in the summer of 1995 by two graduate students from Michigan State University under the direction of the Carroll County Wabash and Erie Canal Association (Bischoff, 1996). At that time, all six kilns were identified, evaluated, and mapped. The site map generated is presented as Figure 1. The canal had experienced major silting and runoff in the Canal Park Annex area, making the slope down toward the canal bed more shallow than it would have been during the canal-era. Forest lined the canal back berm for 75 feet south of the railroad tracks where presently a historic iron bridge has been placed where the tracks crossed the canal. A few scrub trees occupied the rest of the back berm slope.

To test the Canal Park Annex, a transect of shovel tests was placed in a general north-south direction along the canal margin, roughly 20 to 30 feet east of the canal back berm slope (see Figure 1 for all archaeology work). Ten shovel tests were placed in all, with a 25 foot interval. The Canal Park Annex lawn made surface observation impossible. Modern gravel road was just to the east of this transect. Sterile soil was reached in these shovel tests at an average of 0.5 feet in depth. Closer to the railroad tracks, cinder and coal fragments were found in the shovel tests. Several shovel tests found cinder and ash middens or lenses from railroad operation. No diagnostic canal-era artifacts were located by any of these shovel tests.

The next transect of shovel tests (ST11 through 14) were placed at 25 foot intervals east of Shovel Test 7. A third transect of shovel tests (ST15 through 21) were placed north-south off of Shovel Test 12 (see map). Many of these shovel tests found small amounts of cinder or coal beneath the surface, but no middens, features, or canal-era artifacts. Sterile soil was consistently reached between 0.7 and 1.0 feet in depth.

Not finding any evidence of the lime kilns in the Canal Park Annex lawn, six additional shovel tests (ST22 through 27) were placed along the wooded slope south of the railroad trestle. These tests were set at 20 foot intervals, roughly 20 feet west of the lawn edge. An additional two shovel tests (ST28 and 29) were placed 10 feet west of ST24 and ST27.

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Shovel Test 22 located two lime ash layers, the lower one consisting of lime ash with limestone cobbles. Shovel Test 23 had pure limestone ash and small cobbles from 1.1 feet to the shovel test bottom at 1.5 feet. Shovel Test 24 did not find any lime ash, locating sterile soil instead at 0.8 feet in depth. Shovel Test 28 located the lime ash and limestone cobble layer from 0.5 to 1.0 feet in depth, with some brick fragments in the soil. This shovel test could not be excavated deeper than 1.0 feet because of a great many limestone rocks. Shovel Test 25 had brick fragments and bricks in loam from 0.3 to 0.7 feet in depth. Sterile soil was beneath. Shovel Test 26 also located a layer of brick rubble, except with some lime ash included, from 0.4 feet to 1.1 feet in depth. Both ST27, ST28, and ST29 had only small limestone fragments, with sterile being found at 1.0 feet.

In addition to the shovel tests in this wooded area, surface observation located a number of bricks and limestone cobbles on the ground around ST27 and ST29. One brick recovered was melted on one side. It probably once was an interior-facing brick from the central wall of a lime kiln.

The lime kiln from this area (**Lime Kiln 1**) appeared to have been thoroughly demolished by the railroad trestle construction, with demolition rubble being spread along the ridgeline. Shovel Tests 22 and 23 may have located the interior portion between the inner brick wall and the outer limestone block wall. Studies of Lime Kiln 3 had shown that this area of the kiln was filled with lime ash and limestone cobbles of the same type as found by ST22 and ST23 (see discussion below).

Lime Kiln 3 had the most intact structural features remaining of all the lime kilns. Five feet of outer wall (Photo 1) still existed on the northern side of the kiln, and shallow clearing of the topsoil revealed an intact circular interior wall (Photo 2) of fire bricks. These bricks had been heated to the point of fusing together, and had been coated on the interior side with a thick layer of emerald-green lime glaze. Original dimensions for Lime Kiln 3 could be determined from these structural remnants. The exterior of the kiln was square and 27 feet across. The cut limestone wall which made up the outside of the kiln was two feet thick and mortared. The interior brick wall was circular, with mortared fire bricks placed with their ends facing inwards. This inner brick circle was 11 feet across at the center, where limestone blocks and fuel would have been stacked to make lime.

Between both walls was a mixture of lime ash and limestone cobbles, some being very large in size. This interior fill probably acted to contain heat and add strength to the structure, as pot kilns could reach three stories in height. For two feet outward from the interior brick wall, this ash-cobble fill was colored orange from the heat.

The center of Lime Kiln 3 was filled with kiln wall fall; many glazed and warped brick fragments, coal, limestone cobbles, and lime ash. The rest of the kiln material fell down the slope toward the canal. The discovery of coal in this central chamber indicated that in the latter period of use for this kiln, coal was used as fuel for the lime-making process instead of exclusively wood. This change to coal most likely speeded up the demise of the kilns, as the higher temperature tended to destroy the kiln, eventually consuming the kiln bricks and collapsing the structure inward (Blatchly, 1903).

Along the canal on the back berm slope was a lens of lime ash which had been exposed by erosion (Photo 3). This ash lens outlined where the opening to Lime Kiln 3 would have been. Limestone and fuel once were loaded through an arched opening, where lime ash would also have been sifted out. This large ash lens was probably the waste from this process, accumulated over the years the lime kiln was in use. Fuel came to the lime kilns on wagons from the surrounding countryside. Processed lime was taken in carts or barrows from the kiln to a small loading basin south of the lime kilns where canal boats waited to take the lime north or south along the Wabash and Erie Canal.

A single shovel test (ST55) was placed within this ash lens, 40 feet west of the lime kiln outer wall remnant. Shovel Test 55 discovered multiple layers of lime waste down to a 1.25 foot level. Non-uniform pockets of lime, charcoal, and kiln slag were identified. Limestone cobbles and brick fragments were also found throughout the shovel test. Sterile soil could not be reached, and no artifacts other than brick and charcoal were found.

To further test Lime Kiln 3, a test trench (**Test Trench 1**) of 2 ft x 4 ft was placed across the canal side area where the inner brick wall would have been. It was hoped that evidence of the kiln opening or of the iron grate used to separate the fuel from the ash could be found. The stone rubble fill and collapse material was very thick on the slope. The trench reached the 3.0 foot mark before digging became too difficult and dangerous. Some of the bricks recovered by this trench were facing

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the wrong way (melted end outward) and had no lime glaze, suggesting that they were originally higher up in the structure. It was speculated that many more feet of rock and brick would have to be moved to find the kiln bottom.

The center point of Lime Kiln 3 was located by measuring off of the inner wall curvature. From this point, the center point of **Lime Kiln 4** was measured, it being 30 feet and 40 degrees north of Kiln 3. Kiln 4 was represented by a large hummock, created by extensive structural collapse directly onto the kiln feature instead of down the slope, as was the case with Lime Kiln 3. Brick and limestone cobbles covered this hummock. No wall features were observable above the surface.

Lime Kiln 5 still had much of its interior wall visible above the surface. The bricks in this kiln were even more consumed than those of Kiln 3. This suggested that an even higher temperature was reached. The center point of Kiln 5 was measured from the center point of Kiln 4, it being 30 feet and 350 degrees north. Kiln 5 also had an interior core diameter of 11 feet. No outer wall remnant could be identified.

From the center point of Lime Kiln 5, the center point of **Lime Kiln 6** was measured, it being 62 feet and 35 degrees to the north. Kiln 6 consisted of a large hummock of structural collapse. Several rodent holes were burrowed into the space between the inner and the outer walls. This seemed to be a favorite location for burrowing animals in the park area, as several of the kilns demonstrated similar holes with the burned lime ash fill from between the walls being kicked out onto the surface.

Lime Kiln 6 had no inner wall sections visible on the surface, but three feet of outer wall still existed. The distance from the center of the hummock to the wall remnant was 13.5 feet; the same measurement demonstrated by Kiln 3. Near Lime Kiln 6 was a shallow ravine, which was suspected as being where the lime would have been taken out of Kiln 6. To test for lime ash similar to that associated with Kiln 3, a shovel test (ST46) was placed within this ravine, 25 feet from the Kiln 6 center point. Sterile soil was encountered at 1.2 feet in depth, and no lime ash layer was located.

A single shovel test (ST45) was also placed half way between Lime Kiln 5 and Lime Kiln 6. This shovel test found no artifacts or features, with sterile soil being reached at 0.9 feet in depth.

Lime Kiln 2 was the most difficult to locate. The ground between Kiln 3 and the railroad trestle showed no elevation differences, nor were there any brick fragments or limestone cobbles on the surface as was found around Lime Kiln 1. Observation in this area did discover a small lime ash lens on the surface exposed by erosion. Three shovel tests (ST52-54) were placed at 10 foot intervals between the trestle and Lime Kiln 3.

Shovel Test 52 located many kiln bricks and limestone fill, and sterile soil at 1.2 feet in depth. This material was similar to that which filled the center chamber of Lime Kiln 3. Shovel Test 53 found pure lime kiln fill in the form of several fire bricks, limestone cobbles, and orange-colored lime ash. This shovel test apparently found the fill between the inner and outer wall of Kiln 2. Shovel Test 54 actually located, at a 0.8 foot depth, part of the limestone block outer wall. This section of wall was made up of flat limestone slabs, placed in a north-south direction.

A single shovel test (ST56) was placed within the second ash lens, at 30 feet west of ST53. Again, many layers of limestone ash and slag were found down to 1.25 feet in depth. Non-uniform pockets of lime, charcoal, and kiln slag were also identified. Brick fragments and charcoal pieces were found throughout. Sterile soil was not reached, and no artifacts other than brick and charcoal were recovered.

A transect of shovel tests was placed north-south within the forest east of the lime kilns. This transect was oriented so that Shovel Test 30 was 170 feet from the 125 foot- from-trestle mark in the middle of the canal bed at 105 degrees north. A total of twelve shovel tests were completed at 20 foot intervals from the property line to the railroad trail. Shovel Test 30 found no artifacts and encountered sterile soil at 1.0 feet in depth. Shovel Test 31 found some small brick and limestone fragments, but again encountered sterile soil at 1.2 feet in depth. Shovel Tests 32 through 34 located a deep brick midden which was represented above the surface by the raised area mentioned previously.

Shovel Test 32 impacted an edge of the brick midden, with 0.5 to 1.0 feet having brick fragments in loam, and 1.0 feet to 1.6 feet consisting of a mottled black ash matrix. Beneath this black ash layer was sterile soil. Shovel Test 33 found layers of brick fragments and ash of various colors. Shovel Test 34 also encountered the edge of this brick midden.

Shovel Tests 35 through 37 and Shovel Tests 47 and 48 were placed so as to bisect east-west the slight rise which signified the brick midden. These shovel tests were also placed at 10 foot intervals. Shovel Test 35 located complex

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stratigraphy within the brick midden. Shovel Test 36 had the same stratigraphy as that of ST35. Shovel Test 37 found coal-burning furnace slag, orange-colored loam, and a wire nail. Beneath this material was lime kiln ash and limestone cobbles to the end of the shovel test at 1.7 feet in depth. Shovel Test 47 found less cinder in the upper 0.5 feet, but much more lime kiln material (brick fragments, limestone cobbles, and lime ash) down to 1.6 feet in depth. Sterile soil was not located. Shovel Test 48 found more of the brick midden, but in a greatly reduced density, from 0.4 to 1.1 feet in depth. Sterile soil was beneath this layer.

Three additional shovel tests (ST49 through 51) were placed on the south side of the railroad track to test for a continuation of the brick midden in that direction. Shovel Test 51 found more limestone kiln materials (brick with emerald-green lime glazing, limestone cobbles, and lime ash) from 0.6 feet to the shovel test end at 1.4 feet. Shovel Test 50 found no evidence of either brick or lime kiln deposits. Shovel Test 49 found a continuation of the brick midden, with the same stratigraphy as that found in ST48.

It appeared from the shovel tests east of the lime kilns that, when the railroad was constructed in the late 1800s, the path was graded and filled using construction material from Lime Kilns 1 and 2, and by using large quantities of brick waste. In the process, Kilns 1 and 2 were demolished. The railroad track was then laid over this filled and graded path. Periodically, coal burner waste from the train engines was dumped alongside the railroad track, and possibly along the canal in the Canal Park Annex.

North of the brick midden, Shovel Tests 38 through 42 and Shovel Test 44 did not locate any midden features. Shovel Test 43 found a midden of brick, limestone cobbles, and lime ash; probably another filling of the landscape using lime kiln rubble. The area along the property line had also been used as a dump for 20th Century materials from the residency located on the next property north.

No other archaeological work has been conducted at the lime kiln site since 1996. The City of Delphi and the Wabash and Erie Canal Association have actively preserved and protected the lime kiln site as a locally- important cultural resource. Interpretive signs have also been added. The completion of this National Register form identifies the regional and state-level significance of the lime kilns as an archaeological site which should be preserved and protected into the future.

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NARRATIVE STATEMENT OF SIGNIFICANCE

The Delphi Lime Kilns meet the National Register criteria A and C in the themes of Industrial Architecture and Economic Development. One of the principle industries of 19th Century Delphi was the quarrying and processing of limestone. A series of lime kilns once faced the Wabash and Erie Canal north of Washington Street and east of the canal (Figure 2). At this location the canal widens into a larger turn basin. A number of other kilns were located throughout the county, but constructing kilns along the canal appears to have been the favored location, probably for lowering transportation costs. The 1868 map of Delphi and Pittsburg (Figure 2) shows six kilns, oriented in a row along the canal, in the Washington Street area, and two kilns south along the canal near the Delphi Paper Mills. A much larger kiln is shown farther along Washington Street toward Delphi, but still in the vicinity of the canal. A number of these kilns are also shown on the 1874 Carroll County Atlas map (Figure 3), the 1876 map of Delphi and Pittsburg (Figure 4), and the 1868 Birdseye view of Delphi (Figure 5).

The first lime kilns in Carroll County were operated in 1825 by David and Daniel Baum, with the lime being shipped down river on flat boats. When the Wabash and Erie Canal was constructed through Delphi, the canal became the principle transport route outside of the area (1863 Atlas of Carroll County). The construction of the canal through Delphi allowed for the exploitation of the high quality limestone upon which the town rests. When the industry started on a small scale in 1840, a number of crude kilns were put into use. A number of other manufacturers operated lime kilns in the Delphi area; most of whom sold out to the firm of Hubbard and Company by 1857. Hubbard and Company was owned by E.W. Hubbard, D.R. Harley, and Robert Mitchell, with Lewis B. Sims, Daniel McCain, James McCain, and Hiram Sampson buying into the firm in 1871. This lime company was at the forefront of the Carroll County lime industry; an industry that would be known throughout the Indiana and Illinois as producing some of the best lime products available.

Carroll County limestone was for the most part processed into lime for wall plaster and white wash. Delphi lime was known for its superior quality and workability. The earliest detailed account of the Delphi lime industry comes from a "Professor" Cox, working for the State of Indiana in 1872:

"E.W. Hubbard & Co. mine their stone from the lower number of the Pentamerous limestone, at their location, about twenty feet thick. The strata dip in every direction, and, at one part of the mine, are nearly vertical. A band of porous stone is seen near the water level, containing petroleum, which oozes out on exposure to the warmth of an October sun. Hubbard & Co. have twenty common kilns and two "Monitor Perpetual Burners." Pelton's patent. The capacity of the common kilns amounts to 150,000 bushels (seventy pounds) per annum. The common kilns are now only occasionally at work. The capacity of the two "Monitor Kilns" is estimated at 500 bushels a day, and intended to run nine months in a year. The greatest product in one year is reported at 150,000 bushels...

"The expense of mining is 35 cents per yard: of burning by common kiln, 16 cents per bushel, and by patent kiln, 10 cents per bushel of seventy pounds" (1882 Atlas of Carroll County).

Cox provides the kiln capacity of several other Delphi companies in his report; none coming close to the number of kilns operated by the Hubbard company. The authors of the 1882 Atlas of Carroll County noted several changes since Cox wrote his report, mainly several new partners joining the Hubbard company, and the Harley brothers starting their own lime processing company known as "Harley & Brother".

Dan McCain, ancestor of several men involved with Delphi's 19th Century lime industry, gives a personal history of the lime kilns operated along the canal north of Delphi. He provides the following account, published by the Carroll County Wabash and Erie Canal Association (2001):

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"LIME KILNS ON THE HARLEY & HUBBARD PROPERTY

"The lime kilns in and around Delphi shipped the finished product (plaster, whitening and mortar) in barrels on the canal boats. My great great grandfather David Rogers Harley started a kiln operation in 1857 along with his partner (who was my great great uncle Erastus Hubbard) the site was back along the canal right where the restored 1873 Iron Bridge is now located.

"They had bought the land from Dr. Sam Grimes after he had failed in his effort to develop the property as a dozen large 2-4 acre building lots (enough space for a home, barn and pasture for your horse or cow). I now live on one of those lots.

"Dr. Grimes also built a hotel (also just behind my home) on a rise that overlooked the canal at a distance. There was supposed to be a canal slip or sidecut come off the main waterway back at the boat turnaround (where the City Well is now) but that never was constructed. The hotel was located too far for passengers to conveniently walk from the boats to the hotel. Boats could be tied up at the docks along the edge of the turnaround. The hotel venture failed and became known as "GRIMES' FOLLY". It stood vacant for several years. I have a picture of it

"Then when Harley and Hubbard bought all the land comprising Grimes' Second Addition (about 30 acres) for the Lime Kilns, it included the vacant Hotel. They converted it to a Cooper Shop and they proceeded to make wooden barrels for shipping the lime products on the canal beside the kilns. David Harley owned a canal boat that he sent north on the canal to secure logs for fuel in the kilns. The woods they cleared was land beside the towpath following the Wabash Lake below the Carrollton crossing. The land comprised a farm where my grandfather Luther McCain grew up as a boy.

"In 1871 my great grandfather Daniel McCain became manager of all the kilns in Delphi. By then 22 kilns were operating all over the north end of town and were having a time competing and marketing so the various owners combined efforts and formed the Delphi Lime Company. Daniel was manager until his death in 1884 at the age of 53. During that time he had responsibilities for shipping. Production involved 80-100 men and the production in a good year totaled 500,000 bushels of burned lime output. It was hot and dirty work. The final product had to be sifted to remove impurities and was then placed in barrels. The product was time sensitive as it would begin drawing moisture as soon as it cooled.

"The canal shipped to as far as New York City and with its connections were lost when the canal folded in 1874. Daniel had to develop business connections with the Wabash and Monon railroads He had to work deals with different markets. Finally the Monon Railroad reached Chicago and many of the fine homes of Chicago that had burned earlier in the Great Chicago Fire were rebuilt with Delphi products. Delphi Lime was some of the finest quality plaster to be found anywhere.

"The railroad finally put in a spur called the Beltline right over the canal at the point where the Iron Bridge is today. It served the newer "patented kilns" that were then in operation by the Harley Brothers (Charles my great grandfather and George). The Monon Railroad passed through productive Oak-Hickory forests to the south of Delphi and the Harley's bought 320 acres just for the timber. Nearby Delphi woodlots were bare by that time. They needed all the fuel they could get and even had a standing offer to buy all the logs from those who were clearing land if they would deliver to the kilns site. The logs from the new land (first 80 acres bought in 1875) were placed on the Monon at a switch called "Harley" 5 miles south of town and brought in to the kilns by rail just north of my house. It took 25 men to work year around in the woods to provide the needed fuel.

"I remember as a kid going along the tracks and seeing the switch where the cars filled with logs were diverted to the three story tall kilns. As a kid I remember steam locomotives bringing coal cars up through this same Beltline to the Ice Plant where they sold coal and ice. The wooden trestle over the Canal

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floated out in a flood in the late 1940s and the trains never came back through our property again. The RR bed is now part of our 7 mile Delphi Historic Trials system—it's called the Beltline Trail. Even part of the old timber trestle is still on display by the Interpretive sign highlighting the lime business.

"The last of the lime operations ceased in 1917 when my father was a boy. Ironically it was just after the untimely death of great grandpa Charlie Harley that the business folded. George was not a business man. Charlie had been mayor, a state representative and the warden of the Indiana State Prison in Michigan City before he died. My dad's parents were the combination of this lime kingdom through a marriage of a McCain and a Harley. Most of the central operations were on property where my grandparents built their home in 1926. I was born in this house in 1940 grew up there and left in 1962, and came back to live in the same house in 1987. I am thankful that as a kid I could visualize some of the remnants of this once thriving operation. It made a great kid's outdoor playground. I am still a kid at heart, playing with what remains of the once busy industrial site."

By 1882, the older common kilns were all abandoned in favor of perpetually burning lime kilns. The 1882 Atlas of Carroll County notes that "The Delphi Lime Company (formerly Hubbard & Co.) now run six perpetual burners, and Harley & Bro. four, the aggregate products of which are equal to nearly one million bushels per annum."

W.S. Blatchly gives an account of both types of lime kilns in his 1903 book on the Indiana lime industry:

"As the population increased (in Indiana), the demand for lime became greater, and in many places permanent kilns lined with fire brick were erected. These were the old fashioned stone "pot kilns" of a quarter of a century ago. On the inside they were usually circular in horizontal section, tapering slightly, by a curve both up and down from the circle of largest diameter, which was from four to six feet above the bottom. A kiln 10 to 11 feet in greatest diameter, was 25 to 28 feet high, five to six feet in diameter at the top and seven to eight feet at the bottom. There was an arched opening on one side at the bottom, five to six feet high, through which the wood was introduced and the burnt lime removed. A horizontal grating on which the fire was built was usually placed one or two feet above the bottom..

"As wood became scarcer and the demand for lime increased, these intermittent kilns gave way to continuous or perpetual burning kilns, usually made of stone, in which the lime was burned by coal without intermission in the fires. In the first styles of these, some of which are still in use, the kiln was filled with alternate layers of coal and limestone and then fired from below with light wood. As the burning was completed in the lower portion of the kiln the finished lime was drawn out from time to time, usually twice each 24 hours, allowing the entire mass above to settle down. New layers of fuel and stone were then added at the top."

Archaeology during the summer of 1996 proved that the six lime kilns shown along the Wabash and Erie Canal north of Washington Street were of the "pot kiln" type. Blatchly notes that Hubbard & Co. used these types of kilns until 1870, and that they held 1000 to 1200 bushels of lime, were filled in one day, and took about three days to burn before being emptied in a day or two. He notes that about 20 of these kilns were once operated by the company until they were replaced by perpetual burners soon after the "Delphi Lime Company" was formed in 1870 (Blatchly, 1903).

At some date after 1870, the railroad spur (known locally as the "Belt Railroad") was constructed across the canal, through the middle of the "pot kilns" along the canal towpath, and westward toward a number of Delphi industries, including an ice plant, a coalyard, and the Harley & Bros. quarry and kiln site (personal communication with Dan McCain). This quarry was used until 1917, and can still be seen today by following the railroad trail west from the Delphi Canal Park Annex. The construction of this railroad demolished most of two of the six lime kilns located along the canal north of Washington Street. Archaeological evidence suggests that the remainder of the kilns were allowed to collapse upon themselves through disuse (Bischoff, 1997). Today, little more than a ring or two of interior wall remain above the surface of the lime kilns, though the

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potential for buried architectural features is high, especially for discovering the kiln doors where processed lime would be extracted for loading onto canal boats.

Lime production centering in Delphi, Indiana, was one of northern Indiana's first export industries besides agriculture. The six lime kilns described above represent the last visible representatives of an important commercial industry that led to the development of Delphi as a city and north-central Indiana as a non-agricultural economic center. The archaeological site representing the six lime kilns therefore meets Criteria A of the National Register, by being part of a significant event (the 19th Century lime industry) in Central Indiana.

The lime kilns are also of an older kiln construction type than that of most of Indiana's remaining 19th Century kilns that were constructed to exploit Indiana's natural lime formations. The kilns have not been significantly excavated and contain large intact deposits and engineering features. The lime kilns are therefore significant under Criteria D by retaining integrity as an archaeological site and by being able to provide unique data for future research questions. In this case, such questions would center on the engineering of lime kilns and the commercial use of such kilns. By protecting the lime kilns present in Delphi, future research into the development of Indiana's lime industry and the technology it utilized can be valuably aided.

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(artist unknown)

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VERBAL BOUNDARY DESCRIPTION

The boundary of the Delphi Lime Kilns is roughly 250 feet north-south by 150 feet east-west in Section 19, Township 25 North, Range 2 West, in Carroll County, Indiana. Geographic features also identify the boundary of the lime kilns. To the north is a property line that marks the northern edge of the Canal Park Annex. To the west is the Wabash and Erie Canal, and to the east is a forested area. The southern boundary is less defined, but can be defined as being fifty feet south of Lime Kiln 1 on the site map. The boundary is further defined by the site map and the UTM points given in Section 10 of this form.

BOUNDARY JUSTIFICATION

This boundary is the historic location of the Hubbard & Co. lime kilns located north of Washington Street in Delphi, Indiana. These kilns are visible on several historic maps and a birds-eye view of the area (see Section 8). This boundary includes all six lime kilns as a single site, allowing for comparisons between kilns and the interpretation of a variety of lime kiln features.

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Photograph Continuation Sheet

1. The Delphi Lime Kilns
2. Carroll County, Indiana
3. Wayne Bischoff
4. November, 1995
5. DHPA, 402 W. Washington, W274, Indianapolis, IN
6. Camera facing southeast; showing lime kiln outer wall of mortared limestone
7. Photo 1

1. The Delphi Lime Kilns
2. Carroll County, Indiana
3. Wayne Bischoff
4. November, 1995
5. DHPA, 402 W. Washington, W274, Indianapolis, IN
6. Camera facing east; showing lime kiln inner wall of fused brick
7. Photo 2

1. The Delphi Lime Kilns
2. Carroll County, Indiana
3. Wayne Bischoff
4. November, 1995
5. DHPA, 402 W. Washington, W274, Indianapolis, IN
6. Camera facing northeast; showing ash lens from lime kiln along canal
7. Photo 3

Figure 1: Delphi Lime Kilns Sketch Map

