(7-81)

OMB NO. 1024-0018
EXP. 12/31/84

United States Department of the Interior
National Park Service

National Register of Historic Places Inventory—Nomination Form

For NPS use only
received JAN 24 1983
date entered

See instructions in *How to Complete National Register Forms*
Type all entries—complete applicable sections

1. Name

historic Creamery Bridge (Rainbow

and/or common Creamery Bridge

2. Location

street & number FAS 456 ~~north city limits of Osawatomie~~ n/a **not for publication**

city, town Osawatomie n/a **vicinity of** ~~congressional district~~

state Kansas **code** 20 **county** Miami **code** 121

3. Classification

Category	Ownership	Status	Present Use	
___ district	x public	x occupied	___ agriculture	___ museum
___ building(s)	___ private	___ unoccupied	___ commercial	___ park
x structure	___ both	___ work in progress	___ educational	___ private residence
___ site	**Public Acquisition**	**Accessible**	___ entertainment	___ religious
___ object	___ in process	___ yes: restricted	___ government	___ scientific
	___ being considered	x yes: unrestricted	___ industrial	x transportation
	n/a	___ no	___ military	___ other:

4. Owner of Property

name Miami County

street & number Courthouse

city, town Paola n/a **vicinity of** **state** Kansas

5. Location of Legal Description

courthouse, registry of deeds, etc. Register of Deeds

street & number Miami County Courthouse

city, town Paola **state** Kansas

6. Representation in Existing Surveys

title Inventory of Marsh Arch Bridges--Kansas Department of Transportation **has this property been determined eligible?** ___ yes x no

date 1980 ___ federal x state ___ county ___ local

depository for survey records Kansas State Historical Society

city, t Topeka **state** Kansas

7. Description

Condition		Check one	Check one
___ excellent	___ deteriorated	___ unaltered	X original site
X good	___ ruins	X altered	___ moved date _____
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

The Creamery bridge in Osawatomie, Kansas spans the Marais Des Cygnes river on FAS 456. The structure is composed of a central 140 foot "rainbow arch" (or "Marsh arch") span with an 80 foot rainbow arch span on each end.

With piers and approach decks the total length is 346 feet 6 inches.

The bridge's piers rest on solid rock approximately 50 feet below grade. Its abutments rest approximately 15 feet below grade on creosoted piles. Low water level is 36 feet below grade.

The best description of a rainbow arch span is contained in James Marsh's 1911 patent application. The bridge consists of ". . . two abutments (which could be piers), a pair of arches disposed between and springing from the abutments, the floor carried by and between the arches and reaching from one abutment to the other where it alines with the parapets or rails along opposite sides of the floor line." The original patents called for slideable wear plates to be moulded into the concrete where the bridge floor came into contact with the beams and abutments. This is of importance as one of the main benefits of this design was to allow for the expansion and contraction of the reinforced concrete bridge under varying conditions of temperature and moisture.

There were two basic rainbow arch designs, fixed and tied. The original patent application describes the fixed type such as the Creamery bridge in which case the arch flowed below the bridge deck and was "fixed" directly into the abutment. This massive abutment (or pier) resisted both the horizontal and the vertical thrust of the arch. In a tied design the arch did not flow below the deck line and was not fixed directly into the abutment. It was secured atop the abutment or pier by the use of steel rocker or expansion rocker bearings. Vertical thrust was resisted by the pier and bearing, while horizontal thrust was resisted by the addition of a lower chord.

The Creamery bridge's 20 foot wide roadway has been resurfaced periodically but this has not significantly compromised its integrity. Marsh's plans allowed for whatever filling material, between the bridge deck curbs, that locality might desire. The bridge's light fixtures (two on each approach and one on each overhead thru strut) are no longer in operation.

8. Significance

Period	Areas of Significance—Check and justify below				
___ prehistoric	___ archeology-prehistoric	___ community planning	___ landscape architecture	___ religion	
___ 1400–1499	___ archeology-historic	___ conservation	___ law	___ science	
___ 1500–1599	___ agriculture	___ economics	___ literature	___ sculpture	
___ 1600–1699	___ architecture	___ education	___ military	___ social/ humanitarian	
___ 1700–1799	___ art	_x_ engineering	___ music		
___ 1800–1899	___ commerce	___ exploration/settlement	___ philosophy	___ theater	
_x_ 1900–	___ communications	___ industry	___ politics/government	_x_ transportation	
		___ invention		___ other (specify)	

Specific dates 1931 **Builder/Architect** James B. Marsh, Engineer

Statement of Significance (in one paragraph)

The Creamery "rainbow arch" (or "Marsh arch") bridge in Osawatomie retains its integrity of location, design, setting, materials, feeling, and association. It is associated with the life of James B. Marsh, pioneer in steel and concrete bridge construction. The bridge embodies the distinctive characteristics of a type and method of construction that is no longer used, and, as such may yield information important to the history of engineering. Although 72 rainbow arches are currently known to exist in Kansas they are quickly becoming a thing of the past due to the ever-changing needs of modern transportation. Of these 72, only eight have three spans.

James Barney Marsh was born in 1856 at North Lake, Wisconsin. He went to Iowa at the age of 18 to enter preparatory school at Fredericksburg. Marsh graduated in 1882 from Iowa State College of Agriculture and Mechanical Arts in Ames, with a B.M.E. degree. In March of 1883 he began his professional career in the Des Moines office of the King Bridge Company of Cleveland, Ohio. With King, Marsh was involved in the design, sales and actual erection of metal bridges. While he continued to work with the King Company, he also became head of the Northern Agency for the Kansas City Bridge and Iron Company. In this capacity, he both designed and superintended the actual construction work done by the company. By March of 1889, Marsh had become general western agent and contracting engineer for the King Bridge Company and was placed in charge of the general western office in Des Moines. In the spring of 1896, he formed his own company, the Marsh Bridge Company, and was its sole proprietor. In private practice as a contracting engineer, Marsh was able to more fully develop his own designs. He also constructed the designs he developed, usually using steel as a medium. At the turn of the century, Marsh initiated the use of both concrete and steel in his bridge design. In April of 1904, the Marsh Bridge Company was incorporated with Marsh as president and chief engineer. In 1909, the company was reorganized as the Marsh Engineering Company.

It was not until the introduction of the "rainbow arch" by Marsh, that Kansas made widespread use of reinforced concrete spans for major stream crossings. Marsh canvassed the midwest, selling his arches in direct competition with the steel trusses at that time.

On December 12, 1930 the Osawatomie Graphic reported that the town was to have a new bridge. The contract for a rainbow arch bridge over the Marais Des Cygnes had been let to the Maxwell Construction Company on December 8, 1930 for a bid of $36,087.84. The existing bridge had been condemned several times.

The last mention of the bridge was in the May 21, 1931 issue of the Graphic when county engineer Harold J. Abbey predicted seven more working days were needed to complete the structure.

9. Major Bibliographical References

See Continuation Sheet, Item #9.

10. Geographical Data

Acreage of nominated property .5

Quadrangle name Paola West **Quadrangle scale** 1:24,000

UMT References

	Zone	Easting	Northing		Zone	Easting	Northing
A	15	32 9530	4261 3210	B			
C				D			
E				F			
G				H			

Verbal boundary description and justification

That property on and over which the bridge is built in Osawatomie, Kansas. S10, T18S, R22E. Includes bridge superstructure plus supporting piers and abutments.

List all states and counties for properties overlapping state or county boundaries

state	n/a	code	county		code
state		code	county		code

11. Form Prepared By

name/title Larry Jochims, Research Historian and Michael Snell

organization Kansas State Historical Society **date** 7/22/82

street & number 10th and Jackson Streets **telephone** (913) 296-2973

city or town Topeka **state** Kansas

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is:

___ national x state ___ local

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

State Historic Preservation Officer signature Joseph W. Snell

title Executive Director, Ks. State Historical Society **date** January 4, 1983

For NPS use only

I hereby certify that this property is included in the National Register

date

Keeper of the National Register

Attest: date

Chief of Registration

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

9. Bibliography

"To Have New Bridge," Osawatomie Graphic, December 12, 1930, p. 1, c. 2.

"New Water Mains Are Ready For Use," Osawatomie Graphic, January 4, 1931, p. 3, c. 2.

"To Finish New Bridge Soon," Osawatomie Graphic, May 21, 1931, p. 1, c. 5.

Nichols, C.S., Comp. Directory of Graduates of Division of Engineering, Iowa State College of Agriculture and Mechanical Arts, Ames, Iowa.

The Alumnus of Iowa State. Alumni Association of Iowa State College, Ames, Volume XXXII, #1, July 1936.

Marsh, James B., Specification of Letters Patent, Number 1,035,026, patented August 6, 1912, United States Patent Office, Washington, D.C.

Plans and files. Design Department, Kansas Department of Transportation, Topeka, Kansas Microfilm Roll #29, frame #359+.

NPS Form 10-900-a
(3-82)

OMB No. 1024-0018
Exp. 10-31-84

United States Department of the Interior
National Park Service

National Register of Historic Places Inventory—Nomination Form

For NPS use only
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date entered

Continuation sheet | Item number | Page 141

Multiple Resource Area
Thematic Group

dnr-11

Name Rainbow Arch (Marsh Arch) Bridges of Kansas Thematic Resources
State Kansas

Nomination/Type of Review			Date/Signature
1. Cedar Creek Bridge	Entered in the National Register	for Keeper	3/10/83 Antonia Byers
		Attest	
2. Brush Creek Bridge	Entered in the National Register	for Keeper	3/10/83 Antonia Byers
		Attest	
3. Neosho River Bridge	Entered in the National Register	for Keeper	3/10/83 Antonia Byers
		Attest	
4. Conroe Bridge	Entered in the National Register	for Keeper	3/10/83 Antonia Byers
		Attest	
5. Mine Creek Bridge	Entered in the National Register	for Keeper	3/10/83 Antonia Byers
		Attest	
6. Soden's Grove Bridge	Substantive Review	Keeper	for Linda McClelland 3/10/83
		Attest	
7. Creamery Bridge	Entered in the National Register	for Keeper	3/10/83 Antonia Byers
		Attest	
8. Pottawatomie Creek Bridge	Entered in the National Register	for Keeper	3/10/83 Antonia Byers
		Attest	
9. Dewlen-Spohnhauer Bridge	Entered in the National Register	for Keeper	3/10/83 Antonia Byers
		Attest	
10. Blacksmith Creek Bridge	Entered in the National Register	for Keeper	3/10/83 Antonia Byers
		Attest	

NATIONAL REGISTER OF HISTORIC PLACES — EVALUATION / RETURN SHEET

United States Department of the Interior
National Park Service

Creamery Bridge (Rainbow Arch (Marsh Arch)
Bridges of Kansas TR)
Miami County
KANSAS

Working No. JAN 24 1983
Fed. Reg. Date: 2.7.84
Date Due: 2/24/83 - 3/10/83
Action: ✓ ACCEPT 3/10/83
___ RETURN
___ REJECT

Entered in the National Register

___ resubmission
___ nomination by person or local government
___ owner objection
___ appeal

Federal Agency: _____

Substantive Review: ___ sample ___ request ___ appeal ___ NR decision

Reviewer's comments:

Recom./Criteria _____
Reviewer _____
Discipline _____
Date _____
___ see continuation sheet

Nomination returned for: ___ technical corrections cited below
___ substantive reasons discussed below

1. Name

2. Location

3. Classification

Category	Ownership	Status	Present Use
	Public Acquisition	Accessible	

4. Owner of Property

5. Location of Legal Description

6. Representation in Existing Surveys

has this property been determined eligible? ___ yes ___ no

7. Description

Condition		Check one	Check one
___ excellent	___ deteriorated	___ unaltered	___ original site
___ good	___ ruins	___ altered	___ moved date ____
___ fair	___ unexposed		

Describe the present and original (if known) physical appearance

___ summary paragraph
___ completeness
___ clarity
___ alterations/integrity
___ dates

8. Significance

Period Areas of Significance—Check and justify below

Specific dates Builder/Architect

Statement of Significance (in one paragraph)

_____ summary paragraph
_____ completeness
_____ clarity
_____ applicable criteria
_____ justification of areas checked
_____ relating significance to the resource
_____ context
_____ relationship of integrity to significance
_____ justification of exception
_____ other

9. Major Bibliographical References

10. Geographical Data

Acreage of nominated property _____
Quadrangle name _____
UMT References

Verbal boundary description and justification

11. Form Prepared By

12. State Historic Preservation Officer Certification

The evaluated significance of this property within the state is

___ national ___ state ___ local

State Historic Preservation Officer signature

title date

13. Other

_____ Maps
_____ Photographs
_____ Other

Questions concerning this nomination may be directed to _____

Signed _____ Date _____ Phone: 202 272-350-

Comments for any item may be continued on an attached sheet

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STATE OF KANSAS

PAOLA WEST QUADRANGLE
KANSAS —MIAMI CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

6961 II NE (WELLSVILLE)
7061 III NE (SPRING HILL)
7061 III NW (ANTIOCH)
6961 II SE (RANTOUL)
7061 III SE (PAOLA EAST)
6960 I NW (LANE)
7060 IV NW (OSAWATOMIE)
7060 IV NE (FONTANA)

95°00' — 94°52'30" — 38°37'30" — 38°30' — 32'30"

R. 22 E. — R. 23 E.

T. 16 S. — T. 17 S. — T. 18 S.

3 027 000m E. — 3 030 000 FEET — 3 010 000 FEET — 3 036 000m E.

4276 000m N. — 730 000 FEET — 690 000 FEET — 4263 000m N.

RICHLAND — MARYSVILLE — STANTON — PAOLA — VALLEY — OSAWATOMIE

Turkey Cr — Granny Creek — Bull Cr — Bull Branch — Walnut Creek — Plum Creek — McFadden Branch — Marais des Cygnes River — Missouri Creek

Lone Star Sch — Centennial Sch — Paola Lake — SPILLWAY 878 — BM 979 — Radio Towers — Oil Wells — Waterworks — Oak Grove Sch — Stockwell Sch — Plum Creek Ch — Osawatomie Cem — Plum Creek Sch — Drive-in Theater — BM 882 — Osawatomie Lake — Indianapolis Cem — BM 859 — Osawatomie — St Philips Sch — Elmdale Cem — OSAWATOMIE—PAOLA AIRPORT — Trailer Park — Ringer — BM 907 — BM 853 — STATE HOSPITAL — Sewage Disposal — Pumping Sta — Oil Tanks — BM 857 — City Hall — PO — CH — CEM — South Sch — Park

PACIFIC RAILROAD — ST LOUIS — SAN FRANCISCO — MISSOURI — TEXAS — KANSAS — UNDER CONSTRUCTION

OIL FIELD — Plum — McFadden — Walnut

OTTAWA 18 MI. 5.4 MI. TO KANS. 33
SOMERSET 5.7 MI. HARRISONVILLE 33 MI.
ANTIOCH 6.8 MI.
RANTOUL 6.5 MI.
HILLSDALE 6 MI. KANSAS CITY 43 MI.
GRELEY 15 MI. GARNETT 24 MI.
HENSON 0.5 MI.

Creamery Bridge
Paolo West, Kansas

UTM Reference
15/329530/4263230

Mapped, edited, and published by the Geological Survey
in cooperation with State of Kansas agencies

Control by USGS and USC&GS

Topography from aerial photographs by Kelsh plotter
Aerial photographs taken 1947–1948. Field check 1957

Polyconic projection. 1927 North American datum
10,000-foot grid based on Kansas coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks,
zone 15, shown in blue

Red tint indicates areas in which only
landmark buildings are shown

Revisions shown in purple compiled from aerial photographs
taken 1973. This information not field checked

UTM GRID AND 1973 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

SCALE 1:24000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND STATE GEOLOGICAL SURVEY, LAWRENCE, KANSAS 66044
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

KANSAS
QUADRANGLE LOCATION

ROAD CLASSIFICATION
Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
U. S. Route — State Route

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1976

PAOLA WEST, KANS.
N3830—W9452.5/7.5

1957
PHOTOREVISED 1973
AMS 7061 III SW—SERIES V878