Appendix 1

Fermi 1 Chronology (Courtesy Detroit Edison Company)

October 30, 1950	Formation of Dow Chemical-Detroit Edison Study Group.
March 10, 1955	Incorporation of Atomic Power Development Associates (APDA).
March 30, 1955	Detroit Edison Company, on behalf of several power companies, filed proposal to develop a fast breeder reactor under Atomic Energy Commission (AEC) Demonstration Program.
August 8, 1955	Proposal to AEC accepted during First Geneva Conference.
August 30, 1955	Incorporation of Power Reactor Development Company (PRDC).
January 6, 1956	PRDC filed application for construction permit to erect a fast breeder reactor at Lagoona Beach, Michigan.
April 30, 1956	Grade and fill work started at site.
June 6, 1956	Advisory Committee on Reactor Safeguards reported to AEC with qualified approval of Fermi.
August 4, 1956	AEC issued construction permit to PRDC.
August 8, 1956	Groundbreaking ceremony.
August 31, 1956	United Auto Workers (UAW), International Union of Electrical, Radio, and Machine Workers (IUE), and International Union of, United Paperworkers of America (UPA) filed petition for intervention before AEC; case docketed as F-16.
October 1, 1956	Excavation for Fermi Foundations began.
January 8, 1957	Hearings in Docket F-16 began and continued until August 7, 1957.
March 26, 1957	PRDC contracted with AEC for research services and for waiver of use charges on uranium.
June 15, 1957	Joint Committee on Atomic Energy (JCAE) held hearings on Fermi.
September 21, 1957	Construction of steel reactor containment building completed and pressure tested successfully.
May 1, 1958	Reactor vessel delivered to site.

July, 1958	Criticality of Fermi core mockup at Zero Power Reactor-3 (ZPR-3) at the Idaho National Laboratory.
December 10, 1958	AEC issued order confirming previously issued construction permit.
July 12, 1959	American Federation of Labor (AFL) – Congress of Industrial Organizations (CIO) appealed to U.S. Court of Appeals asking that construction permit be set aside.
June 10, 1960	Court of Appeals by 2-1 decision set aside AEC construction permit on grounds of illegal departure from statutes and regulations.
August 12, 1960	PRDC filed petition for certiorari with U.S. Supreme Court asking that it reverse the decision of the Court of Appeals.
December 1, 1960	Sodium fill of primary system.
June 1, 1961	Non-nuclear testing of Fermi completed by APDA and ownership of all component parts of reactor transferred to PRDC.
June 9, 1961	First shipment of fuel elements delivered on site.
June 12, 1961	U.S. Supreme Court reversed Court of Appeals and confirmed AEC construction permit.
June 19, 1961	Fermi turbine/generator, owned by Detroit Edison Company, placed in operation for tests.
July 19, 1962	Ownership of steam generators transferred to Detroit Edison Company.
October 11, 1962	Advisory Committee on Reactor Safeguards (ACRS) notified AEC that Fermi could be operated up to 1 MW(th) "without undue hazard to the health and safety of the public."
December 12, 1962	Sodium-water reaction in No. 1 Steam Generator.
April 16, 1963	Atomic Safety and Licensing Board (ASLB) upheld PRDC application and directed issuance of a provisional low-power operating license.
May 10, 1963	AEC issued 1MW operating license, subject to final inspection of Division of Compliance.
August 23, 1963	First criticality of Fermi and start of low-power tests.
March 12, 1964	Application filed with AEC for license to operate up to 200 MW(th).

November 17, 1964	ACRS took favorable action on PRDC application for license.
July 13, 1965	AEC ordered public hearing on PRDC application before ASLB; board ordered license issued.
December 17, 1965	Operating license issued to PRDC by AEC Division of Reactor Licensing (DRL).
July 8, 1966	First 100 MW(th) operation.
August 5-7, 1966	Fermi operated continuously for 53 hours at 100 MW (th), 22 MW(e), and generated just over 1,000,000 kWh of electric energy.
October 5, 1966	Fuel melting incident; plant became inoperative for 3 years and 9 months.
September 11, 1967	Discovery of piece of crumpled metal in sodium inlet plenum.
March 22-December 16, 1968	Six Zirconium plates removed from plenum.
August, 1969	System filled with sodium preparatory to resuming nuclear operations.
February 10, 1970	After hearings before ACRS, the DRL issued letter granting PRDC permission to load fuel and resume operations up to 200 MW(th).
July 18, 1970	Criticality again achieved.
October 16, 1970	Reactor power level of 200 MW(th) reached with all components working well.
October 23, 1970	All plant tests at 200MW(th) completed.
November 20, 1970	During this week, reactor operated at full power with total heat generation of 25,580,000 kWh and gross electrical output of 8,160,000 kWh.
November 20-December 1, 1971	10-day high-power operation logging 1660 MWd(th).
June 9, 1972	AEC ordered PRDC to show cause; (1) why its request for extension of expiration date of Provisional Operating License DPR-9 should not be denied, and (2) why PRDC should not suspend operations at Fermi, submit dismantling plans, and prepare to implement it.
July 20, 1972	PRDC filed answer to show cause order and requested extension of expiration date of provisional operating license; PRDC requested a hearing if AEC rejected the extension.

August 28, 1972	AEC determined that PRDC was not financially qualified to warrant extension of its license and set the matter for a hearing.
September 15-22, 1972	Last plant operation at low power for operator licensing examinations.
November 27, 1972	Decision by PRDC Executive Committee to decommission Fermi.
September 24, 1973	Submission to AEC of finalized retirement plan for Fermi Plant.
1973-1974	APDA gradually phased out.
December 31, 1975	Decommissioning of Fermi completed and PRDC dissolved. The overall cost to construct, operate, and decommission Fermi was in excess of $143 million (Alexanderson 1979:91).

Appendix 2

Nuclear Power Chronology

1789	German chemist, Martin Heinrich Klaproth, discovers the element of uranium and names it after the recently discovered planet Uranus.
1841	Pure uranium metal is first refined by Eugene-Melchior Peligot, a French chemist.
1903	French physicist Henri Becquerel wins the Nobel Prize for his discovery that uranium had natural properties, no matter what the chemical compound, which caused photographic negatives to become cloudy. Marie and Pierre Curie share Bequerel's Nobel Prize for continuing Bequerel's observations and discovering thorium, an element exhibiting similar properties to uranium. They coin the term "radioactive" to describe this property.
1905	Albert Einstein develops his Theory of Relativity with which he demonstrated that mass can theoretically be converted into energy. Einstein wins the Nobel Prize in 1921 for his work.
1911	Frederick Soddy discovers that naturally occurring radioactive elements come in a variety of forms which are chemically identical but varied in weight. His discovery reveals that atoms have a distinct structure and radioactivity results when the structure of the atom changed.
1932	British physicist, John Cockcroft along with his Irish partner, Ernest Walton successfully split the atom with high speed protons. They win the Nobel Prize for their work in 1951.
1939	German physicists, Otto Hahn and Fritz Strassmann, together with Austrian physicist, Lise Meitner and her nephew, Otto Frisch, split uranium atoms with fission. During the fission process, some of the uranium's mass is converted into energy confirming Einstein's Theory of Relativity.
1939-1945	The United States Army operates a top secret project known as the Manhattan Project to develop the United States' nuclear abilities. J. Robert Oppenheimer leads scientists at Los Alamos, New Mexico, in the development of the first atomic bomb. Two other facilities, Hanford, Washington, and Oak Ridge, Tennessee, operate to produce the uranium-235 and plutonium required for atomic weapons and later for nuclear power plants. Following World War II, the Manhattan Project continues to control the production of atomic weapons until the formation of the Atomic Energy Commission (AEC) in 1947.
1942	Enrico Fermi, an Italian-born physicist who had won the Nobel Prize in physics in 1938, oversaw the first controlled, self-sustaining nuclear chain reaction in a lab located under the University of Chicago's football stadium. Fermi went to work

in Los Alamos following this successful experiment and helps Oppenheimer develop the atomic bomb.

July 16, 1945 The first atomic bomb is detonated at the Trinity site located on what is now White Sands Missile Range in New Mexico. The yield of the plutonium implosion bomb is equal to approximately twenty kilotons of TNT. This event is widely considered the beginning of the nuclear age.

August 6, 1945 The first atomic bomb utilized against an enemy target is dropped over the Japanese city of Hiroshima. The bomb, "Little Boy," is an untested uranium gun-type bomb that detonates successfully with a yield of approximately 13 to 18 kilotons of TNT.

August 9, 1945 "Fat Man," a plutonium implosion bomb, is dropped over the Japanese city of Nagasaki. The bomb detonates with a yield of approximately 21 kilotons of TNT, but Nagasaki's hilly terrain provides the city more protection than Hiroshima.

August 1946 President Harry S. Truman signs the Atomic Energy Act of 1946 into law. This act establishes the Atomic Energy Commission, which replaced the Manhattan Project on January 1, 1947. This switches oversight of the United States nuclear programs from military to civilian control.

1948 Plans to commercialize nuclear power are developed by the United States government's Argonne National Laboratory and the Bettis Atomic Power Laboratory operated by the Westinghouse Corporation. The production of electricity for consumers by using nuclear power appears as a possible solution to the growing demand for energy in the United States.

December 1951 The Experimental Breeder Reactor I located at the Idaho National Engineering and Environmental Laboratory becomes the first nuclear reactor in the world to successfully produce electricity. The first electrical output lit only four 200-watt light bulbs, but would be increased to eventually power the entire building. Along with electricity, the reactor produces more fissionable fuel materials during its operation.

April 1953 The Atomic Industrial Forum is incorporated under New York State law. The Forum served as the industry's policy organization, and its creation signaled the beginning of the nation's commercial nuclear power industry. First President of the organization was Walker L. Cisler, President of the Detroit Edison Company (National Energy Institute [NEI] 2003).

December 1953 President Dwight David Eisenhower outlines his "Atoms for Peace" program before the United Nations:

> America will demonstrate to people everywhere the peacetime use of atomic energy harnessed for the improvement of human living. . . .

> The United States knows that peaceful power from atomic energy is no dream of the future. That capability, already proved, is here—now—today. Who can doubt, if the entire body of the world's scientists and engineers had adequate amounts of fissionable material with which to test and develop their ideas, that this capability would rapidly be transformed into universal, efficient and economic usage (NEI 2003).

Eisenhower's program resulted in a significant reorientation of research from military to peacetime uses of atomic energy.

1953 The United States Navy develops its first reactor, the Mark 1 Naval Reactor (NEI 2003).

January 1954 The Navy launches its first nuclear submarine, the *USS Nautilus*, at Groton, Connecticut. The pressurized water reactor of the vessel was patterned after the Mark 1 (NEI 2003).

August 30, 1954 The Atomic Energy Act of 1954 is signed into law. The primary purpose of the act is to "make our nation's legislative controls better conform with scientific, technical, economic, and political facts as they exist today" (Alexanderson 1979:98). This act is passed to amend the Atomic Energy Act of 1946. It expands private involvement in the nuclear industry while establishing the strictest Federal Government regulations over any single industry in the United States.

January 1955 The AEC launches its Power Demonstration Reactor Program to spark private interest in constructing nuclear power plants.

July 1955 Arco, Idaho, becomes the first U.S. town powered by nuclear energy. The town of 1,000 people got power from the experimental boiling water reactor, BORAX III (NEI 2003).

1956 The Power Regulator Development Company (PRDC) with support from the Atomic Power Development Associates (APDA) begins construction on the Fermi Fast Breeder Reactor located at Lagoona Beach, Michigan.

September 1957 The Price-Anderson Act is signed into law. The act establishes an industry-funded insurance program to protect the public in the event of an accident (NEI 2003).

December 1957 The first full-scale reactor constructed by a joint government private-sector effort is completed at Shippingport, Pennsylvania. The 60MW(e), pressurized water reactor was completed as a demonstration project and remained in operation until 1982. The reactor was based on the Navy's design for submarines (NEI 2003; World Nuclear Association [WNA] 2008).

October 1959 The first nuclear reactor built entirely by private financing is completed. Located near Morris, Illinois, the boiling water reactor, Dresden 1 Nuclear Power Station, began operating in 1960 and was retired in 1978 (NEI 2003).

1960 The third full-scale nuclear reactor is completed at Rowe, Massachusetts. The 185MW(e) plant is constructed by a consortium of 11 power companies. It is the first nuclear power plant in New England. The pressurized water reactor came online in 1961 and was intended to operate for only six years; the plant continued to generate electricity until 1992 (Yankee Rowe 2007).

August 23, 1963 The Fermi Fast Breeder Reactor reaches criticality for the first time, and the reactor begins low-power testing.

October 5, 1966 The Fermi reactor suffers a partial fuel melting incident. The reactor is safely shut down and no injuries result. The cause of the problem was eventually determined to be a zirconium metal plate which had broken free and clogged the coolant system. The broken plate as well as five other identical plates which could also potentially break loose was removed from the reactor.

July 18, 1970 The Fermi reactor is repaired and once again reaches criticality.

June 1973 The first reactor to exceed 1,000 megawatts, the 1040MW(e) Zion 1 in Illinois, enters service (NEI 2003).

1973 U.S. Utilities place orders for 41 nuclear reactors, the highest single-year total (NEI 2003).

December 31, 1975 The Fermi reactor is decommissioned, and PRDC is dissolved because of financial difficulties encountered while trying to upgrade the reactor.

1976 Ft. St. Vrain nuclear power plant goes into service in Colorado. The 300MW(e) plant used the nation's only high temperature, gas cooled reactor. It remained in service until 1989 (WNA 2008).

March 28, 1979 The Three Mile Island Nuclear Generating Station located near Harrisburg, Pennsylvania suffers a partial core meltdown with a release of radiation into the environment. Public outcry over the accident halts virtually all United States nuclear power plant projects.

October 1979 The nuclear power industry creates the Institute of Nuclear Power Operations (INPO) in response to the Three Mile Island event. Part of the mission of the INPO includes plant evaluations, training and accreditation programs, and events analysis. The mission broadened in 1985 with the creation of the National Academy for Nuclear Training that accredited plant training programs (NEI 2003).

1983 Electrical generation by nuclear power plants surpasses gas-fired plants for the first time. The following year, nuclear power plants produced more electricity than hydro-electric plants and became the second highest producer of electricity after coal (NEI 2003).

1984 *Superphénix* fast breeder reactor enters service in France. To date, it is the world's largest fast breeder rated at 1,200 megawatts. The plant was shut down in 1997 after producing very little electricity in its history.

April 26, 1986 The Chernobyl Nuclear Power Plant located in the Soviet Union explodes resulting in the largest and most destructive nuclear accident in history. More explosions and fires at the plant result in the release of massive amounts of radioactive materials into the environment. The radioactive plume deposited radioactive materials across much of the northern hemisphere but primarily in Belarus, Ukraine, and Russia. Citizens near the disaster are still experiencing the effects of the disaster.

1992 Production of electricity with nuclear energy supplies 20 percent of the nation's needs for the first time (NEI 2003).

1997 Unplanned automatic reactor shutdowns, an indicator of safe operating procedures, drops to zero for the first time (NEI 2003).

July 2002 Congress approves President Bush's recommendation to create a national used-fuel repository at Yucca Mountain, Nevada (NEI 2003).

2002 In the preceding fifty years, commercial nuclear plants in the United States produced 13.7 trillion kilowatt-hours of electricity. Generating this amount with fossil fuel power plants would have generated 3.1 billion metric tons of carbon, 73.6 million tons of sulfur dioxide, and 35.6 million tons of nitrogen dioxide; greenhouse gases contributing to global warming (NEI 2003).

Attachment 7
NRC3-09-0013

Response to RAI letter related to Fermi 3 ER

RAI Question HH3.6.3-1

NRC RAI HH3.6.3-1

Explain how the EPA Tier 4 emission standards and fuel sulfur content standards would be met for the standby diesel generators and diesel fire pumps.

Supporting Information

Emissions for the standby diesel generators and diesel fire pumps, presented in ER Tables 3.6-3 and 3.6-5, exceed the EPA Tier 4 emission standards. In addition, the sulfur content of the fuel is presented in the ER as 3% by weight (ER Section 3.6.3.1). The EPA has mandated reductions in sulfur content to 15 ppm effective June 2010 for non-road fuel. The 15 ppm sulfur content standard is also mentioned in 40 CFR 80.520. The requested information will be used in developing the human health assessment.

Response

Fermi 3 will have two 17.1 MW standby diesel generators (SDG), two 1650 kW ancillary diesel generators (ADG), and two 200 kW diesel-driven fire pumps, each a source of gaseous effluents during operation. Manufacturers of diesel engines are required to meet emission standards that are defined in 40 CFR 60, Subpart IIII. Therefore, the diesel engines proposed for Fermi 3 will meet the emission standards in place at the time of purchase. In addition, the non-road diesel fuel used for operation of the proposed diesel engines at Fermi 3 will be required by 40 CFR 80.510 to meet sulfur content levels of 15 ppm effective June 2010.

The emission estimates shown in ER Tables 3.6-3 and 3.6-5 are based on engines that could be purchased today. However, since the diesel engines proposed for Fermi 3 have not yet been purchased, the emission estimates in those two tables for the aforementioned diesel engines are not indicative of the emissions for engines that would be purchased in the future. Therefore, in an effort to bound the maximum emissions expected from the proposed Fermi 3 diesel engines, emission standards defined in 40 CFR 60, Subpart IIII for future model years will replace the emission estimates provided in ER Tables 3.6-3 and 3.6-5. The following tables reflect these standards.

Standby Diesel Generators

	Emissions per SDG (g/kWh)*	Annual Emissions per SDG (lb)
Particulates	0.15	271.4
Sulfur dioxide**		
Nitrogen oxides	1.6	2895.3

* Emissions standards listed in CFR 60.4205
** Sulfur dioxide emissions will be controlled by the use of diesel fuel that meets 40 CFR 80.510

Ancillary Diesel Generators

	Emissions per ADG (g/kWh)*	Annual Emissions per ADG (lb)
Particulates	0.03	0.87
Sulfur dioxide **		
Carbon monoxide	3.5	101.9
Hydrocarbons	0.19	5.5
Nitrogen oxides	0.67	19.5

* Emissions standards listed in Table 1 of 40 CFR 1039.101
** Sulfur dioxide emissions will be controlled by the use of diesel fuel that meets 40 CFR 80.510

Diesel-Driven Fire Pump

	Emissions per ADG (g/kWh)*	Annual Emissions per ADG (lb)
Particulates	0.2	4.2
Sulfur dioxide **		
Carbon monoxide	3.5	74.1
Hydrocarbons and Nitrogen Oxides	4.0	84.7

* Emissions standards listed in Table 4 to Subpart IIII of Part 60 – Emission Standards for Stationary Fire Pump Engines referred in 40 CFR 60.4202(d)
** Sulfur dioxide emissions will be controlled by the use of diesel fuel that meets 40 CFR 80.510

Attachment 8
NRC3-09-0013

Response to RAI letter related to Fermi 3 ER

RAI Question HY2.3.1-10

NRC RAI HY2.3.1-10

Provide maps that show the full extent of the 100-year floodplains of Swan Creek and Lake Erie in the vicinity of the entire Fermi site.

Supporting Information

The extent of the 100-year floodplain was not characterized as far as Swan Creek and along the shore of Lake Erie near the Fermi site in the ER.

Response

ER Figure 2.3-16 shows the Federal Emergency Management Agency (FEMA) flood map for the Fermi Site. Additional mapping of the entire Fermi Site, including Swan Creek and the Lake Erie shore, is shown on the FEMA Flood Insurance Rate Maps for Monroe County, Michigan, Panels 256, 257, 258, 259, and 270 of 510. Hard copies of these maps are included as an enclosure to this response.

NRC3-09-0013
RAI Question HY2.3.1-10

Enclosure 1

FEMA Flood Insurance Rate Maps
(following 5 pages)

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations and therefore may not exactly reflect the flood elevation data presented in the FIS report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in the FIS report in conjunction with the data shown on this FIRM.

Elevation Reference Mark (ERM) elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at WWW.NGS.NOAA.GOV. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal base flood elevations apply only landward of the National Geodetic Vertical Datum of 1929 (NGVD), and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Corporate limits shown on this map are based on the best data available. The user should contact appropriate community officials to verify the corporate limit delineations shown on this map.

For community map revision history prior to countywide mapping, see Section 6.0 of the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

DIGITAL DATA AVAILABILITY: Digital files containing the thematic floodplain information shown on this map can be made available on CD-ROM by request. The files are currently archived in [illegible] format referenced to the Universal Transverse Mercator (UTM) projection and the North American Datum of 1927 (NAD27). To obtain the digital files send a written request to Flood Insurance Information Specialist, 3977 Pickett Road, Fairfax, Virginia 22031. Telephone (703) 876-[illegible], FAX (703) 876-0073.

NOTE: The coordinate system used for the production of this Flood Insurance Rate Map (FIRM) is Universal Transverse Mercator (UTM), North American Datum of 1927 (NAD27), Clarke 1866 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to the Universal Transverse Mercator projection, NAD27. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of the information shown on the FIRM.

ATTENTION: Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, contact the National Geodetic Survey at the following address:

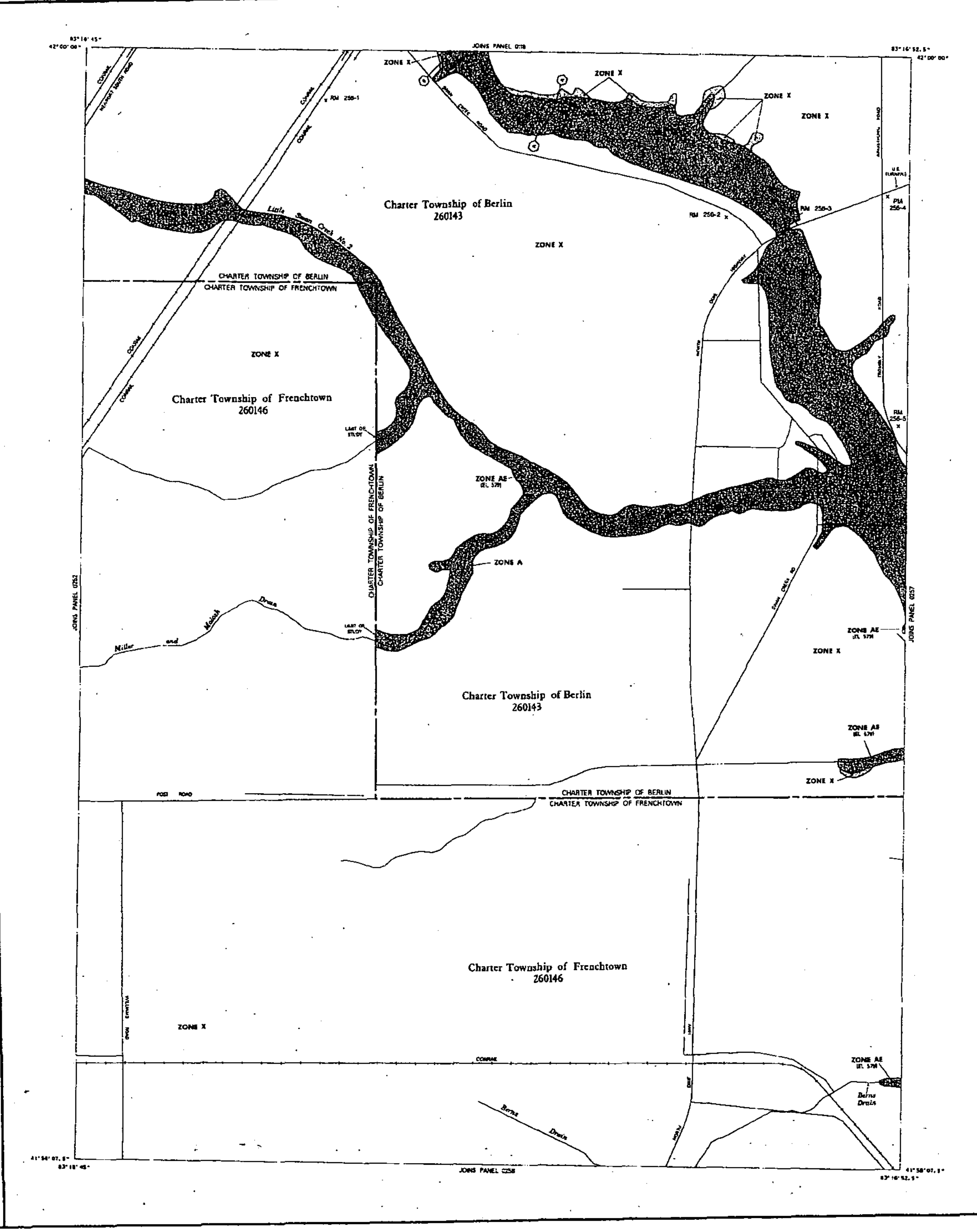
Vertical Network Branch, N/CG13
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

BASE MAP SOURCE: Planimetric base map files were provided in digital format by the Michigan Department of Natural Resources. These files were compiled at a scale of 1:24,000 from U.S. Geological Survey (USGS) 7.5-Minute Series Topographic Maps and updated using aerial photographs. Additional information may have been derived from other sources. Users of this FIRM should be aware that minor adjustments may have been made to specific base map features.

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION IN FT. (NGVD)[1]	DESCRIPTION OF LOCATION
RM 256-1	[illegible]	U.S. Coast and Geodetic Survey disk on concrete post, approximately 30 feet northwest of [illegible] and approximately [illegible] feet southwest of Swan Creek Road.
RM 256-2	[illegible]	Bronze disk in wall just east of northeast corner of school building on south side of Swan Creek Road, approximately 400 feet northwest of U.S. Turnpike.
RM 256-3	[illegible]	Chiseled square in top of concrete headwall at northeast corner of U.S. Turnpike bridge over Swan Creek.
RM 256-4	[illegible]	Top southeast corner of square concrete manhole cover at southeast corner of intersection of U.S. Turnpike and Trombly Road.
RM 256-5	[illegible]	Nail in south side of power pole on east side of Trombly Road, approximately 2,500 feet south of U.S. Turnpike.

[1] National Geodetic Vertical Datum of 1929



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE A99	To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.
ZONE V	Coastal flood with velocity hazard (wave action); no base flood elevations determined.
ZONE VE	Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X	Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X	Areas determined to be outside 500-year floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

UNDEVELOPED COASTAL BARRIERS*

Identified 1983 — Identified 1990 or Later — Otherwise Protected Areas Identified 1991 or Later

*Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

	Floodplain Boundary
	Floodway Boundary
	Zone D Boundary
	Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
513	Base Flood Elevation Line; Elevation in Feet**
(A)—(A)	Cross Section Line
(EL 987)	Base Flood Elevation in Feet Where Uniform Within Zone**
RM7 X	Elevation Reference Mark
• M1.5	River Mile

**Referenced to the National Geodetic Vertical Datum of 1929

MAP REPOSITORY

Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

APRIL 20 2000

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

Please refer to the Listing of Communities table on the FIRM Index for NFIP Initial Identification and Post-FIRM dates for all jurisdictions shown on this map.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE

500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MONROE COUNTY, MICHIGAN (ALL JURISDICTIONS)

PANEL 256 OF 510

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BERLIN, CHARTER TOWNSHIP OF	[illegible]	[illegible]	D
FRENCHTOWN, CHARTER TOWNSHIP OF	[illegible]	[illegible]	D

MAP NUMBER
26115C0256 D

EFFECTIVE DATE:
APRIL 20, 2000

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations and therefore may not exactly reflect the flood elevation data presented in the FIS report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in the FIS report in conjunction with the data shown on the FIRM.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

DIGITAL DATA AVAILABILITY: [illegible]

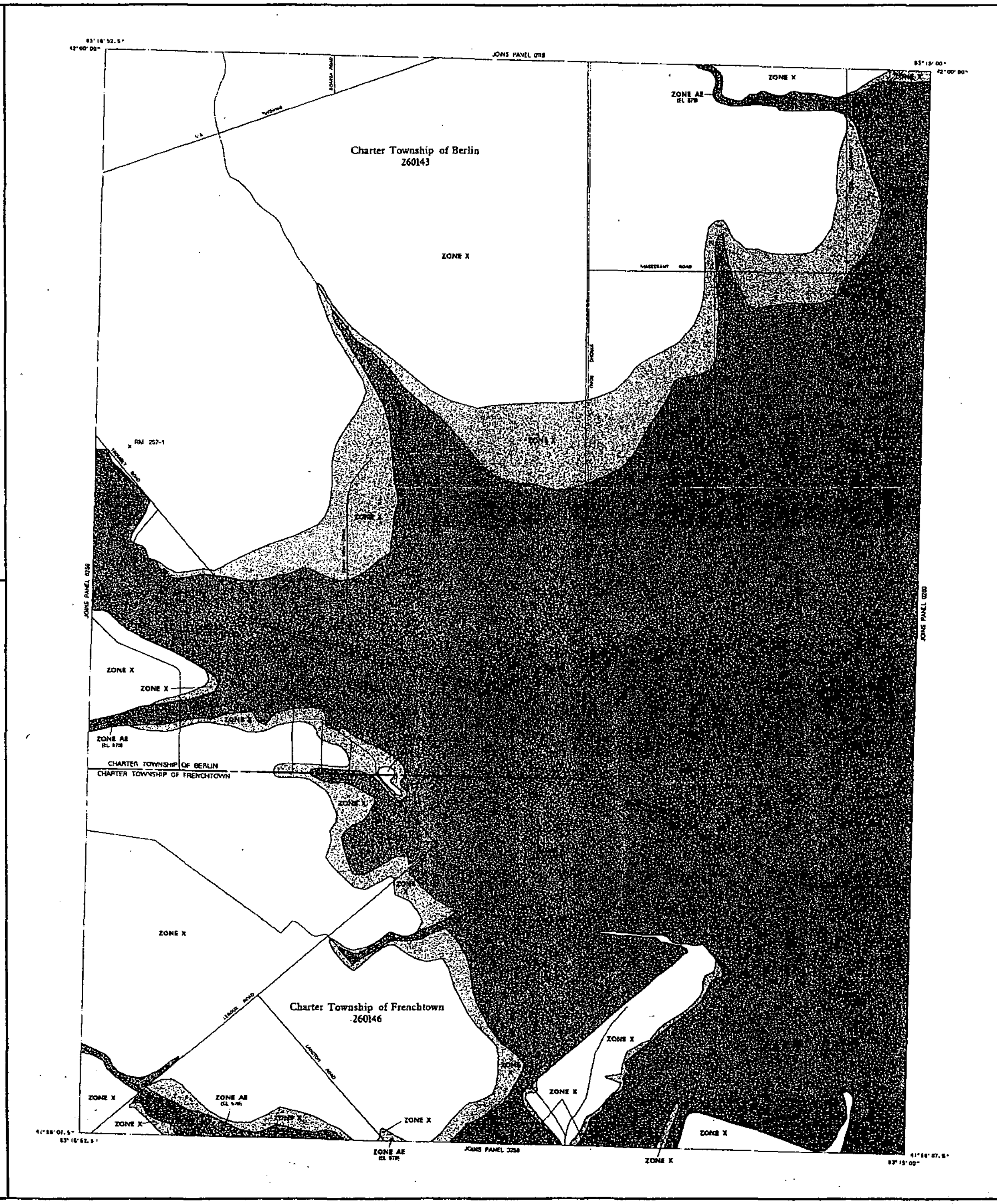
NOTE: [illegible]

ATTENTION: [illegible]

BASE MAP SOURCE: [illegible]

ELEVATION REFERENCE MARKS

[illegible]



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- ZONE A — No base flood elevations determined.
- ZONE AE — Base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

OTHER AREAS

- ZONE X — Areas determined to be outside 500-year floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

UNDEVELOPED COASTAL BARRIERS

APPROXIMATE SCALE

500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
MONROE COUNTY,
MICHIGAN
(ALL JURISDICTIONS)

PANEL 257 OF 510

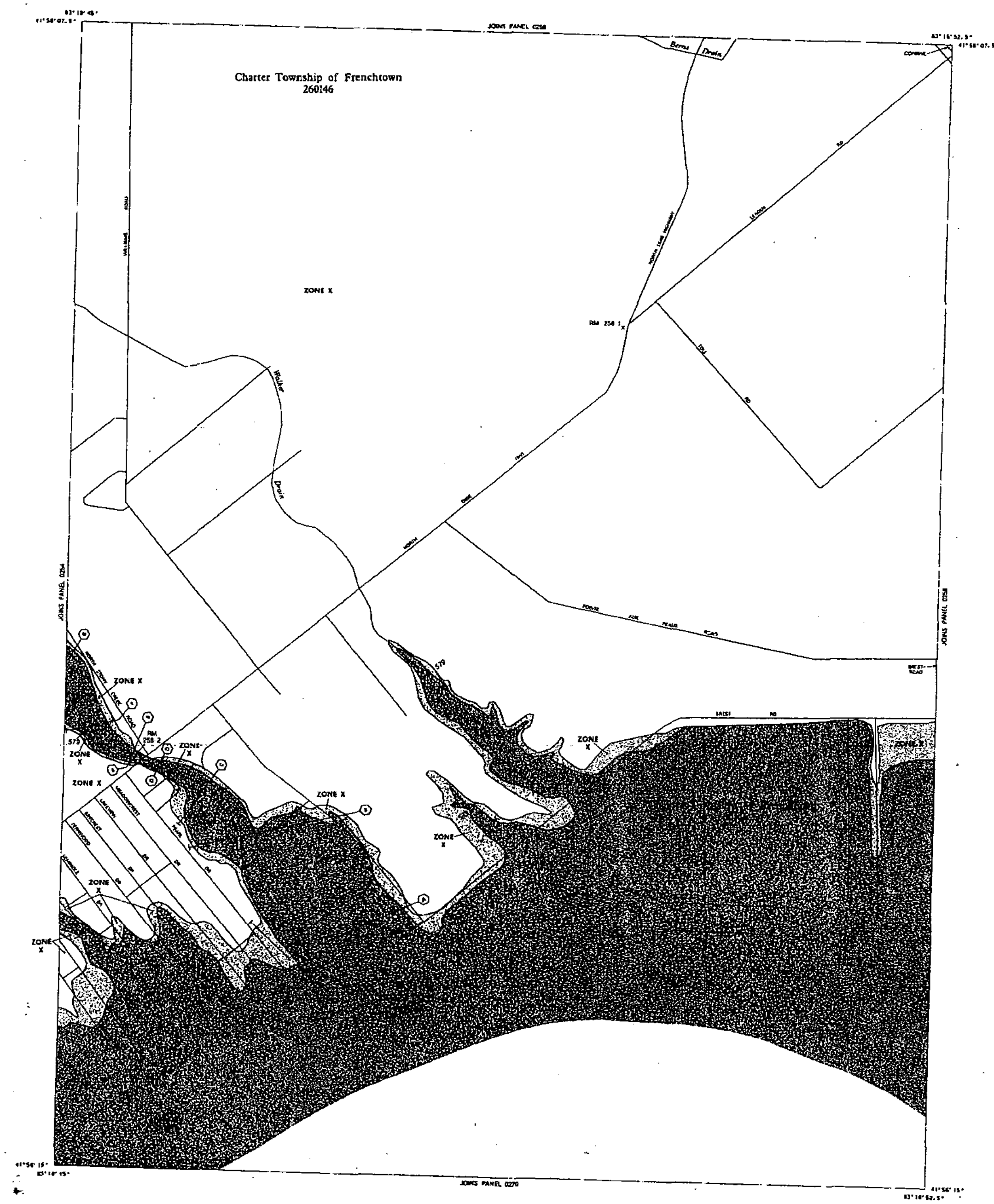
MAP NUMBER
26115C0257 D

EFFECTIVE DATE:
APRIL 20, 2000

Federal Emergency Management Agency

NOTES TO USERS

ELEVATION REFERENCE MARKS



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

OTHER AREAS

UNDEVELOPED COASTAL BARRIERS*

APPROXIMATE SCALE

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
MONROE COUNTY,
MICHIGAN
(ALL JURISDICTIONS)

PANEL 258 OF 510

MAP NUMBER
26115C0258 D

EFFECTIVE DATE:
APRIL 20, 2000

Federal Emergency Management Agency

NOTES TO USERS

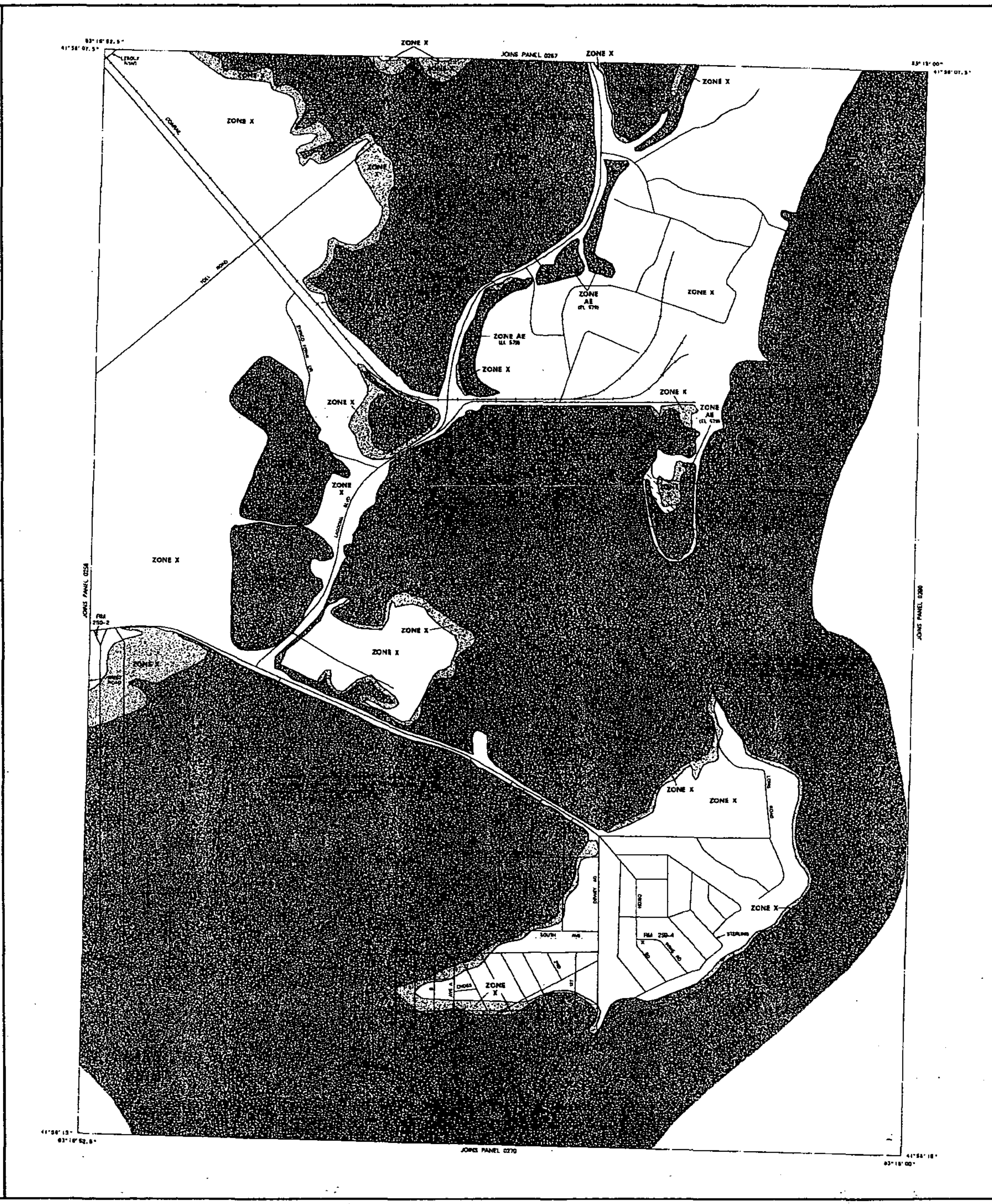
DIGITAL DATA AVAILABILITY:

NOTE:

ATTENTION:

BASE MAP SOURCE:

ELEVATION REFERENCE MARKS



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A

ZONE AE

ZONE AH

ZONE AO

ZONE A99

ZONE V

ZONE VE

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X

OTHER AREAS

ZONE X

ZONE D

UNDEVELOPED COASTAL BARRIERS

MAP REPOSITORY

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

APRIL 20, 2000

APPROXIMATE SCALE

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MONROE COUNTY,
MICHIGAN
(ALL JURISDICTIONS)

PANEL 259 OF 510

MAP NUMBER
26115C0259 D

EFFECTIVE DATE:
APRIL 20, 2000

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for possible updated flood hazard information prior to use of this map for property purchase or construction purposes.

To obtain more detailed information in areas where Base Flood Elevations (BFEs) and/or Floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations and therefore may not exactly reflect the flood elevation data presented in the FIS report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in the FIS report in conjunction with the data shown on the FIRM.

Elevation Reference Marks (ERMs) shown on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at WWW.NGS.NOAA.GOV. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal base flood elevations apply only landward of 0.0' National Geodetic Vertical Datum of 1929 (NGVD), and include the effects of wave action; these elevations may also differ significantly from those developed by the National Weather Service for hurricane evacuation planning.

Areas of special flood hazard (100-year flood) include Zones A, AE, AH, AO, A99, V, and VE.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Floodway widths are provided in the Flood Insurance Study Report.

Corporate limits shown on this map are based on the best data available. The user should contact appropriate community officials to verify the corporate limit delineations shown on this map.

For community map revision history prior to countywide mapping, see section 6.0 of the Flood Insurance Study Report.

For adjoining map panels see separately printed Map Index.

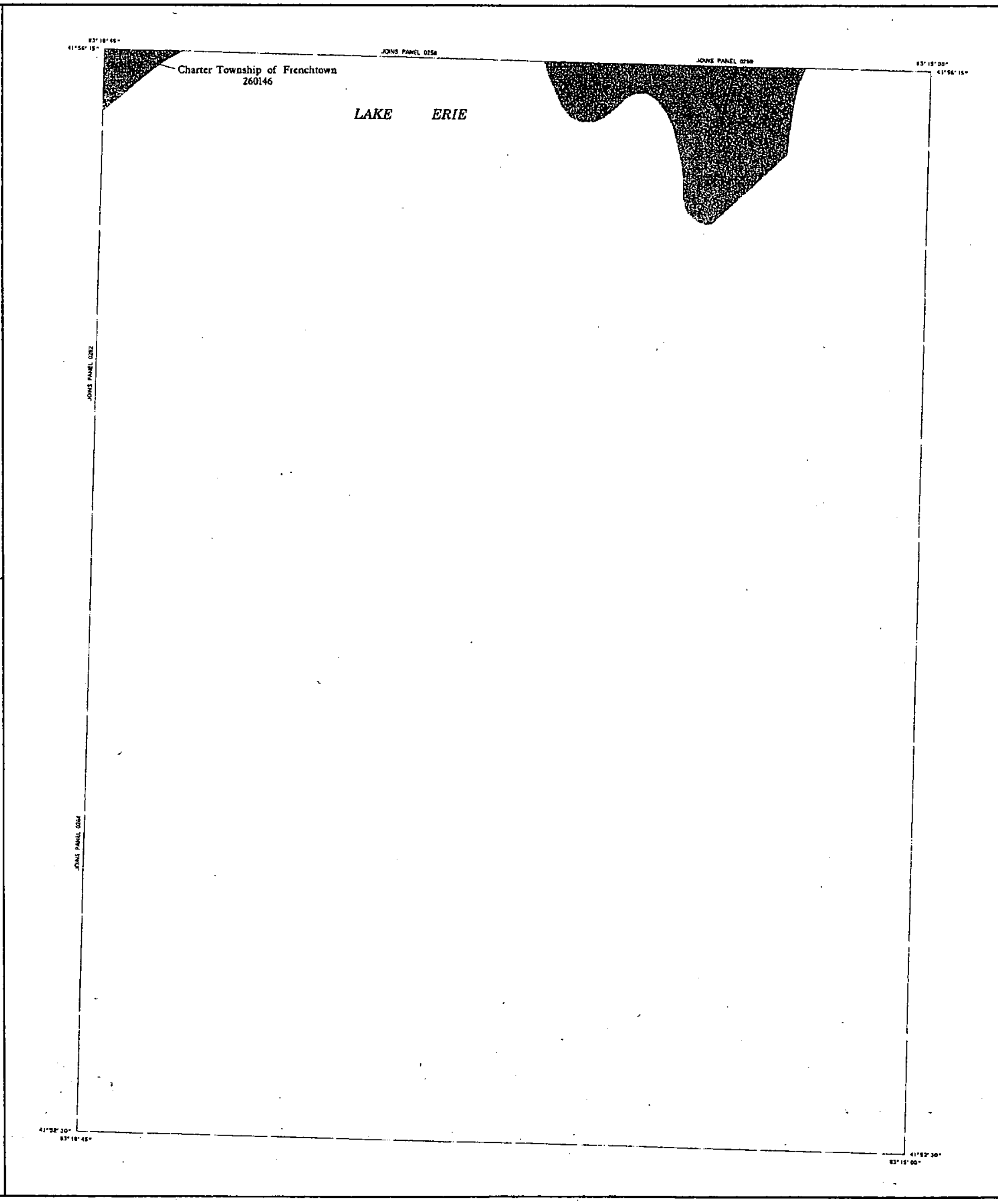
DIGITAL DATA AVAILABILITY: Digital files containing the thematic floodplain information shown on this map can be made available on CD-ROM by request. The files are currently archived in MicroStation design (DGN) file format referenced to the Universal Transverse Mercator (UTM) projection and the North American Datum of 1927 (NAD27). To obtain the digital files, send a written request to: Flood Insurance Information Specialist, 2977 Prosperity Avenue, Fairfax, Virginia 22031. Telephone (703) 876-0848, FAX (703) 876-0073

NOTE: The coordinate system used for the production of this Flood Insurance Rate Map (FIRM) is Universal Transverse Mercator (UTM), North American Datum of 1927 (NAD27), Clarke 1866 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to the Universal Transverse Mercator projection, NAD27. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of the information shown on the FIRM.

ATTENTION: Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, contact the National Geodetic Survey at the following address:

Vertical Network Branch, N/CG13
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

BASE MAP SOURCE: Planimetric base map files were provided in digital format by the Michigan Department of Natural Resources. These files were compiled at a scale of 1:24,000 from U.S. Geological Survey (USGS) 7.5-Minute Series Topographic Maps and updated using aerial photography. Additional information may have been derived from other sources. Users of this FIRM should be aware that minor adjustments may have been made to specific base map features.



LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE A99	To be protected from 100-year flood by Federal flood protection system under construction; no base flood elevations determined.
ZONE V	Coastal flood with velocity hazard (wave action); no base flood elevations determined.
ZONE VE	Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X	Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X	Areas determined to be outside 500-year floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

UNDEVELOPED COASTAL BARRIERS*

Identified 1983 — Identified 1990 or Later — Otherwise Protected Areas Identified 1991 or Later

*Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

———	Floodplain Boundary
— — —	Floodway Boundary
- — — -	Zone D Boundary
	Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
~~ 513 ~~	Base Flood Elevation Line, Elevation in Feet**
(A)—(A)	Cross Section Line
(EL 987)	Base Flood Elevation in Feet Where Uniform Within Zone**
RM7 x	Elevation Reference Mark
• M1.5	River Mile

**Referenced to the National Geodetic Vertical Datum of 1929

MAP REPOSITORY

Refer to Repository Listing on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

APRIL 20, 2000

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

Please refer to the Listing of Communities table on the FIRM Index for NFIP map identification and Pre-FIRM dates for all jurisdictions shown on this map.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

MONROE COUNTY, MICHIGAN

(ALL JURISDICTIONS)

PANEL 270 OF 510

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
FRENCHTOWN, CHARTER TOWNSHIP OF	260146	0270	D

MAP NUMBER
26115C0270 D

EFFECTIVE DATE:
APRIL 20, 2000

Federal Emergency Management Agency

Attachment 9
NRC3-09-0013

Response to RAI letter related to Fermi 3 ER

RAI Question TE2.4.1-1

NRC RAI TE2.4.1-1

Provide handouts used during the terrestrial ecology site audit tour.

Supporting Information

Detroit Edison used handouts during the terrestrial ecology site audit tour to show locations of terrestrial ecology survey areas and findings. Handouts will be used to complete analyses that will be presented in the EIS.

Response

During the environmental audit of the Fermi 3 project held February 2 through February 6, 2009 a handout was provided to support the discussion of the terrestrial ecology analyses performed. This handout includes a map titled "Terrestrial Wildlife Survey Locations; Figure 1" which shows the sampling locations for terrestrial wildlife and another map titled "Terrestrial Vegetation Transects; Figure 2" which shows the sampling locations for terrestrial vegetation. A copy of the handout materials is included as Enclosure 1 to this response.

NRC3-09-0013
RAI Question TE2.4.1-1

Enclosure 1

Fermi 3 Environmental Audit Handout Materials
(following 3 pages)

Fermi Nuclear Power Plant, Unit 3
Environmental Site Audit
Terrestrial Ecology Tour Agenda

- Depart for Tour (1:00 PM)
- Tour Stops:
    - Terrestrial Habitats on the Fermi Site
        - Selected representative locations in the Detroit River International Wildlife Refuge (DRIWR)
            - Wildlife Transect B and Vegetation Transects 1, 2, 15
            - Wildlife Transect C and Vegetation Transects 6 and 7
            - Wildlife Transect E, Wildlife Sample Point 6 and Vegetation Transect 14
            - Wildlife Sample Points 3 and 4
    - Habitats Adjacent to the Fermi site
        - Canal/wetland discharge to Swan Creek north of Fermi 2 Cooling Towers (east of Wildlife Sample Point A)
        - Agricultural fields west and south of Wildlife Sample Point 4
- Return to DTE Headquarters (Approximately 4:00 PM)


Terrestrial Wildlife
Survey Locations
Figure 1
LEGEND
Transect Points (Approx 300ft)
Sample Sites
Roads
Transects
Study Site
Habitats
AF Agricultural Fields
CA Canals or Ditches
DA Developed Area
DA Developed Areas
EM Emergent Wetland
LK Lakeshore
MH Mixed Hardwood
OFG Old-Field Grassland
P Ponds
RP Restored Prairie
RVR Rivers
SS Scrub-Shrub
N
W
E
S
0
600
1,200
Feet
Data source:
Washtenaw
Wayne
Monroe
Lucas
BLACK & VEATCH
RVR
EM
P
MH
EM
MH
CA
LK
DA
OFG
RP
SS
CA
OFG
AF
MH
P
EM
EM
SS
P
AF
DA
P
P EM
P
LK
OFG
SS
MH
EM
SS
A
B
C
D
E
1
2
3
4
5
6

Terrestrial Vegetation Transects

Figure 2

LEGEND

Vegetation Transects

Roads

Study Site

Habitats

AF Agricultural Fields

CA Canals or Ditches

DA Developed Areas

EM Emergent Wetland

LK Lakeshore

MH Mixed Hardwood

OFG Old-Field Grassland

P Ponds

RP Restored Prairie

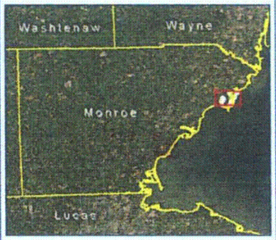
RVR Rivers

SS Scrub-Shrub

N
W E
S

0 600 1,200
Feet

Data source:
Aerials are from ESRI ArcGIS Map Service
I3_Imagery_Prime_World_2D http://services.arcgisonline.com/v92



BLACK & VEATCH