Close Enough For Government Work?

Prepared by

Paul Rogers

MMS, Mapping and Boundary Branch

Minerals Management Service

Gulf of Mexico OCS Region

Spatial Data Workshop

September 14, 2000

New Orleans, LA

Mapping & Boundary Branch Responsibilities:

- Baseline Development
- Boundary Development (Domestic & National)
- Supplemental Official OCS Block Diagrams (SOBD's)
- Official Protraction Diagrams & Leasing Maps (OPD's & LM's)
- Areal Measurements
- Development and Maintenance of an Official Offshore Cadastral Database
- In Cooperation, Develop and Maintain Planning Area Legal Descriptions and Coverages
- Preparation and Maintenance of Metadata

To Support:

- Ownership Determination
- Mapping
- Navigation Requirements
- Domestic & National Interests
- Resource Management
- Law Enforcement
  - National Environmental Policy Act (NEPA)
  - Oil Pollution Act (OPA)
  - Submerged Lands Act (SLA)
  - Outer Continental Shelf Lands Act (OCSLA)
  - Safe Drinking Water Act (SDWA)
  - Coastal Zone Management Act (CZMA)
  - Endangered Species Act (ESA)
  - Coastal Barrier Resources Act (CBRA)
  - National Wildlife Refuge Administration Act
  - As well as State laws, regulations, and law enforcement actions
- Etc.

Under National Guidance and Authority Of:

- Presidential Proclamation No. 2667, 28-SEP-1945, *Policy of the United States With Respect to the Natural Resources of the Subsoil and Seabed of the Continental Shelf*
- *Submerged Lands Act of 1953,* as amended 43 USC 1301
- *Outer Continental Shelf Lands Act of 1953,* as amended, 43 USC 1331
- Presidential Proclamation No. 5030, 10-MAR-1983, *Exclusive Economic Zone of the United States of America*
- Presidential Proclamation No. 5928, 27-DEC-1988, *Territorial Sea of the United States of America*
- Presidential Proclamation No. 7219, 02-AUG-1999, *Contiguous Zone of the United States*
- U.S. Supreme Court Decrees
- Other

Under International Guidance and Authority Of:

- Law of the Sea Conventions 1958, 1982
- International Court of Justice (ICJ)
- International Agreements
- Treaties

Milestones in the MMS Adoption/ Implementation of NAD 83

March 1989 **A second issue paper on implementing NAD 83 in MMS is distributed to all MMS Program Directors and OCS Regions. The MOSG is tasked with drafting an implementation plan and an implementation team is established.**

May 1989 **At the request of the National Ocean Industries Association, MMS and the National Geodetic Survey (NGS) meet with industry representatives to discuss coordinate transformations on the OCS. The first NAD 83 Implementation Team meeting is held to advise regional and OSC representatives of the issues associated with the datum change.**

August 1989 **The MMS publishes a Federal Register Notice 54 FR 31737 stating that (1) the Agency will develop a NAD 83 implementation plan, (2) current offshore cadastre coordinates are referenced to NAD 27, and (3) future MMS cadastre-related documents will include a reference datum.**

Milestones in the MMS Adoption/ Implementation of NAD 83 Continued

November 1989 **The NOS indicates that conversion of all nautical charts from NAD 27 to NAD 83 is targeted for 1997.**

December 1989 **Attendees at the 10th Annual Gulf of Mexico Information Transfer meeting are briefed on the MMS plans for implementation of NAD 83. The FGCC approves the use of an NGS software package named "North American Datum Conversion" (NADCON) to transform coordinate values. A second meeting of the MMS NAD 83 Implementation Team is held.**

February 1990 **The MMS publishes Federal Register Notice 55 FR 3494 stating that NADCON would be used for OCS coordinate transformations and that lessees' rights issued under NAD 27 legal descriptions will continue to be protected as warranted under that description. Additional NAD 83 tests and implementation alternatives were provided to the Implementation Team and the OCS Regions.**

Milestones in the MMS Adoption/ Implementation of NAD 83 Continued

March 1990 **The MMS NAD 83 Implementation Team met to develop a draft implementation plan. They were unable to reach a consensus in several areas, necessitating a revised approach to develop the implementation plan.**

April 1990 **A draft implementation plan was sent to Team members for review.**

May 1990 **The MMS NAD 83 Implementation Plan issue paper is revised and sent to the OCS Regions and Program staffs for review.**

August 1990 **Revised draft Implementation Plan distributed by the MMS Deputy Associate Director for Offshore Leasing for official review and comment.**

Milestones in the MMS Adoption/ Implementation of NAD 83 Continued

November 1990 **Attendees at the 11th Annual Gulf of Mexico Information Transfer meeting are updated on the MMS plans for implementation of NAD 83. The MMS publishes Federal Register Notice 55 FR 48929 requesting comments on the proposed draft MMS NAD 83 Implementation Plan.**

May 1991 The MMS publishes Federal Register Notice 56 FR 20020 advising that the agency will be initiating a three-phase implementation of NAD 83 on the OCS. The Alaska OCS Region hosts a MMS NAD 83 Implementation Forum.

October 1991 **The Chukchi Sea Planning Area (Alaska) is converted from NAD 27 to NAD 83.**

November 1991 **"The Minerals Management Service's Implementation of the North American Datum of 1983 in the EEZ" is presented in Portland, OR, at the 1991 EEZ Symposium on Mapping and Research.**

Milestones in the MMS Adoption/ Implementation of NAD 83 Continued

December 1991 **At the request of NOIA headquarters, representatives of the MMS Mapping & Survey Group met in Houston, TX, with their Navigation and Positioning Subcommittee.**

February 1992 The MMS publishes Federal Register Notice 57 FR 5168 stating that the Agency has adopted NADCON v2.00 as its transformation software.

September 1992 MMS NAD 83 Implementation Team meeting.

May 1993 "Project Plan for Implementing NAD 83 in the Minerals Management Service" approved and adopted by the Agency.

MMS NAD 83 Implementation Team
August 1990

- Alaska OCS Region --Tom Warren
- Atlantic OCS Region -- Fred Grey
- Gulf of Mexico OCS Region -- Homer Benton
- Pacific OCS Region -- Fred White, Boyd Bosserman
- Offshore Systems Center -- Mary Coats, Paul Rasmus
- HQ, Br. Of Sales Activities -- Dave Bornholdt, Yvonne Morehouse
- HQ, Resource Evaluation -- David Zinzer
- HQ, Strategic & International Minerals -- Ed Krause, Barry Drucker
- HQ, Rules & Operations -- Mark Fleury
- OCS Survey Group -- Leland Thormahlen, Gary Boyack, Richard Naito, Paul Rogers
- Royalty Management -- Boh Walker
- Solicitor's Office -- Susan Hoven Cason
- NOS/NGS -- LCDR Warren Dewhurst

MMS/Industry NAD 83 Discussions January 1989 - May 1991

- BP Exploration, Inc. -- Roger Lott
- Chevron Geosciences Company -- James Morgan
- CONOCO, Inc. -- Grady Lewis
- GPS Technology Corporation -- L. Harold Spradley
- Mobil Oil -- John P. Gay
- National Ocean Industries Association -- Robert J. Moran
- Phillips Petroleum Company -- Susan Robb
- Shell Oil Company -- Henk Krynen
- Texaco -- David Thomas
- Information Transfer Meeting, Gulf of Mexico OCS Region, December 1989
- Information Transfer Meeting, Gulf of Mexico OCS Region, November 1990
- NAD 83 Implementation Forum, Alaska OCS Region, May 1991

MMS NAD 83 Industry Mailing List

Alaska Map Service, Inc.
Amerada Hess Corp.
AMOCO Production Co.
Anadarko Petroleum Corp.
Anadrill Schlumberger
ARCO Alaska, Inc.
Atlantic Richfield Co.
F.R. Bell & Associates
BP America
BP Exploration, Inc.
Challenger Minerals, Inc.
Chance, John E. & Assoc.
Chevron U.S.A., Inc.
Chevron E&P Services Co.
Columbia Gas Development Corp.
COMSAT
CONOCO, Inc.
Diamond Chemicals Co.
Digicon Geophysical Corp.
Elf Aquitaine, Inc.
Exploration Sciences Corp.
EXXON Exploration Co.
Halliburton Geophysical Services
Hamilton Brothers Exploration Co.
IDB-A, Aeronautical Communications
Jackson Oil Corp.
Kerr-McGee Corp.
LCMF, Ltd.
Louisiana Land & Exploration Co.
Louisiana Offshore Oil Port, Inc.

MMS NAD 83 Industry Mailing List Con't.

Marathon Oil Co.
Maxus Exploration Co.
Mesa Petroleum Co.
Mobil Oil Exploration & Producing Southwest, Inc.
Mobil Oil Corp.
Murphy Oil USA, Inc.
National Ocean Industries Assn.
Newfield Exploration Co.
Odeco Oil & Gas Co.
Offshore Navigation
Oryx Energy Co.
OXY USA, Inc.
PanCanadian Petroleum, Inc.
Pennzoil Exploration & Production Co.
Petrofina Delaware, Inc.
Phillips Petroleum Co.
Pogo Producing Co.
Santa Fe Minerals, Inc.
Satellite Positioning Co.
Shell Oil Co.
Shell Development Co.
Shell Offshore, Inc.
Shell Western E&P, Inc.
Sonat Exploration Co.
Sun Operating Limited Partnership
Texaco U.S.A., Inc
Texaco Producing, Inc.

MMS NAD 83 Industry Mailing List Con't.

Texas Eastern Exploration
TXP Operating Co.
Union Oil Company of California
Union Texas Petroleum Corp.
United Gas Pipeline Co.
Unocal Exploration Corp.
Williams Exploration Co.
Western Geophysical
Wimpol, Inc.

MMS NAD 83 State Mailing List

Alabama, State of
Alabama Geological Survey
Alabama Oil & Gas Board
Alaska Dept. Nat. Resources
California St. Lands Commission
Connecticut Dept. Env. Protection
Delaware Geological Survey
Florida, State of
Florida Geological Survey
Georgia Geological Survey
Louisiana Dept. of Trans.
Louisiana, State of
Maine Geological Survey
Maryland Geological Survey
Massachusetts CZM
Massachusetts Geological Survey
Mississippi Geological Survey
New Hampshire Dept. Envir. Services
New Jersey Dept. Envir. Protection
New York Geological Survey
North Carolina DNR
Oregon Div. State Lands
Pennsylvania Geological Survey
Rhode Island Geological Survey
South Carolina Geological Survey
Texas General Land Office
Virginia Div. Mineral Resources
Washington Div. Aquatic Lands

*MMS NAD 83 Draft Implementation Plan August 10, 1990**

"Datum References for Information Provided to the Public by the MMS. The public was notified (54 FR 31737, 8/1/89) that the MMS references its offshore coordinate values to NAD 27. Now, since multiple datums are in use, the MMS will cite the appropriate reference datum on pertinent documents."

This draft implementation plan contained the final recommendations of the MMS NAD 83 Implementation Team prior to the Agency's adoption "Project Plan For Implementing NAD 83 in the Minerals Management Service Part I: Responsibilities and Timeframes" and "Part II: Technical Aspects of Implementation," May 3, 1993.

MMS NAD 83 Implementation Plan
May 3, 1993

1. Executive Summary

"...Second, MMS employees must become datum conscious and verify datum references. Prior to 54 FR 25318 most Agency employees did not have to relate coordinates to a specific datum. MMS coordinate and associated data referenced NAD 27, and although other datums existed, MMS did not develop data tied to them. However, the United States adoption of NAD 83 directly or indirectly affects every aspect of the Agency's mission. Since the adoption of NAD 83, every locational coordinate (e.g., shot points) and areal measurement (e.g., the number of 8(g) hectares on a Supplemental Official OCS Block Diagram (SOBD)) must carry a specific datum reference. Do they reference NAD 27? Do they reference the original NAD 83 adjustment--NAD 83 (1986)? Do they reference a HARN--NAD 83 (199x)? **Assumptions are no longer acceptable**; the mixing of datum-referenced data can cause major problems and expense for the Agency."

MMS NAD 83 Implementation Plan
May 3, 1993

3. DATUM REFERENCING

In 54 FR 31737, August 1, 1989, the MMS advised the public that:

! The Agency had been referencing NAD 27 for all offshore coordinate and areal measurement computations.

! The Agency would cite the appropriate reference datum on pertinent documents.

Some examples of appropriate datum citations are:

! "The coordinate values appearing on/in this document were derived using NAD 27."

! "The coordinate values appearing on/in this document were derived using NAD 83 (1986)." See Part II, section 2.1.5.

! On maps, place NAD 27 or NAD 83 (1986) directly under the bar scale.

! On non-B&B, TIMS generated SOBD's, add "Datum: NAD 27" directly under "State Lease No." in the upper right corner of the block.

Ensuring the integrity of datum-dependent data developed, received, and/or disseminated by the MMS is an Agency-wide responsibility.

MMS NAD 83 Draft Implementation Plan
August 10, 1990

"Datum References for Information Provided to the MMS. It is recommended that industry supply data to MMS on the NAD 83 datum to eliminate errors caused by the use of disparate industry or company transformation programs. Further, if the data has been transformed or converted, copies of the raw data must also be provided to the MMS. (For authority, see 30 CFR 250.17). This policy will allow the MMS to maintain consistency and compatibility within all national database systems. (See Appendices E and J.)"

MMS NAD 83 Implementation Plan
May 3, 1993

3.1. OCS Regions

The OCS regions must:

! Ensure that datum citations are an integral part of all pertinent documents, maps/graphics, and digital data provided to the public or other Federal/State government agencies.

! Identify and document the datum of all datum-dependent information held by the OCS regions.

! Incorporate datum identification into non-national computer systems containing datum-dependent data.

! Ensure that newly received data is compatible with existing data.

Current (1992) OCS regional policies for submission of datum-dependent data to the Agency can be found in Figure 3. (The regional policies were identified by regional Team representatives at the September 15-17, 1992, Team meeting.)

MMS NAD 83 Implementation Plan
May 3, 1993

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- Ensure that newly received data is compatible with existing data.

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OCS Region	NAD 27	NAD 83	Datum of Survey
Alaska	Yes	Yes	Not Required*
Atlantic	Yes	Yes	Not Required*
Gulf of Mexico	Yes	Yes	Not Required*
Pacific	*	*	Required*

*Only the Pacific OCS Region requires datum-dependent data submissions on the original datum of survey--i.e., when NAD 27 is the original survey datum, NAD 27 data is acceptable. The other OCS Regions will accept transformed data when the transformation method has been identified.

Figure 3. Acceptable survey datums for datum-dependent data received by the MMS.

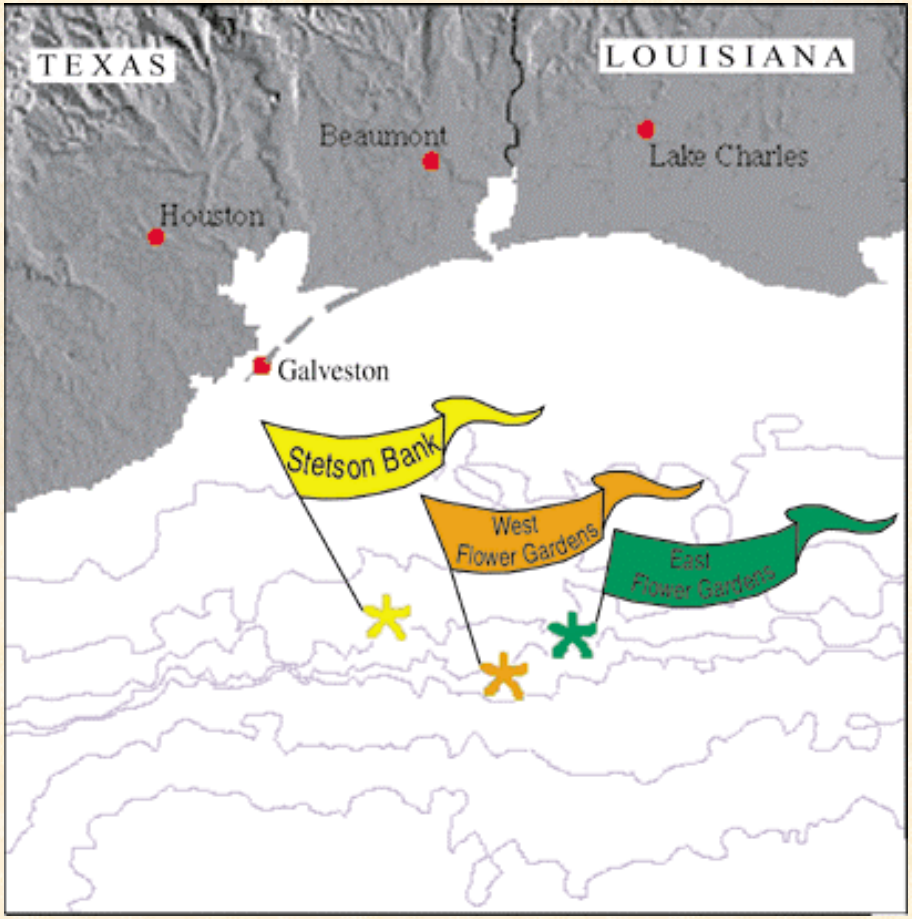
"Since the MMS adopted NADCON in 1990 I have advised BP to do the same for all of our offshore activities, to remain consistent. I have just gone through a series of discussions aimed at getting our contractors similarly aligned … only to be told that there is a rumor that MMS is about to issue some other sort of datum shift for different areas in the Gulf of Mexico. Do you know anything about this?"

E-mail message to Paul Rogers, MMS, from Roger Lott, British Petroleum, 19 June 1997

"The rumor came from a surveyor working on one of our offshore projects… Offshore operators like stability in the protraction. We don't care what numbers are assigned to lease block boundaries as long as the lease areas on the surface of the earth are not changed… But because there are so few people in the industry who fully understand coordinate systems, any change causes great confusion and therefore is not welcomed if unnecessary."

E-mail message to Paul Rogers, MMS, from Roger Lott, British Petroleum, 23 June 1997

Flower Garden Banks National Marine Sanctuary

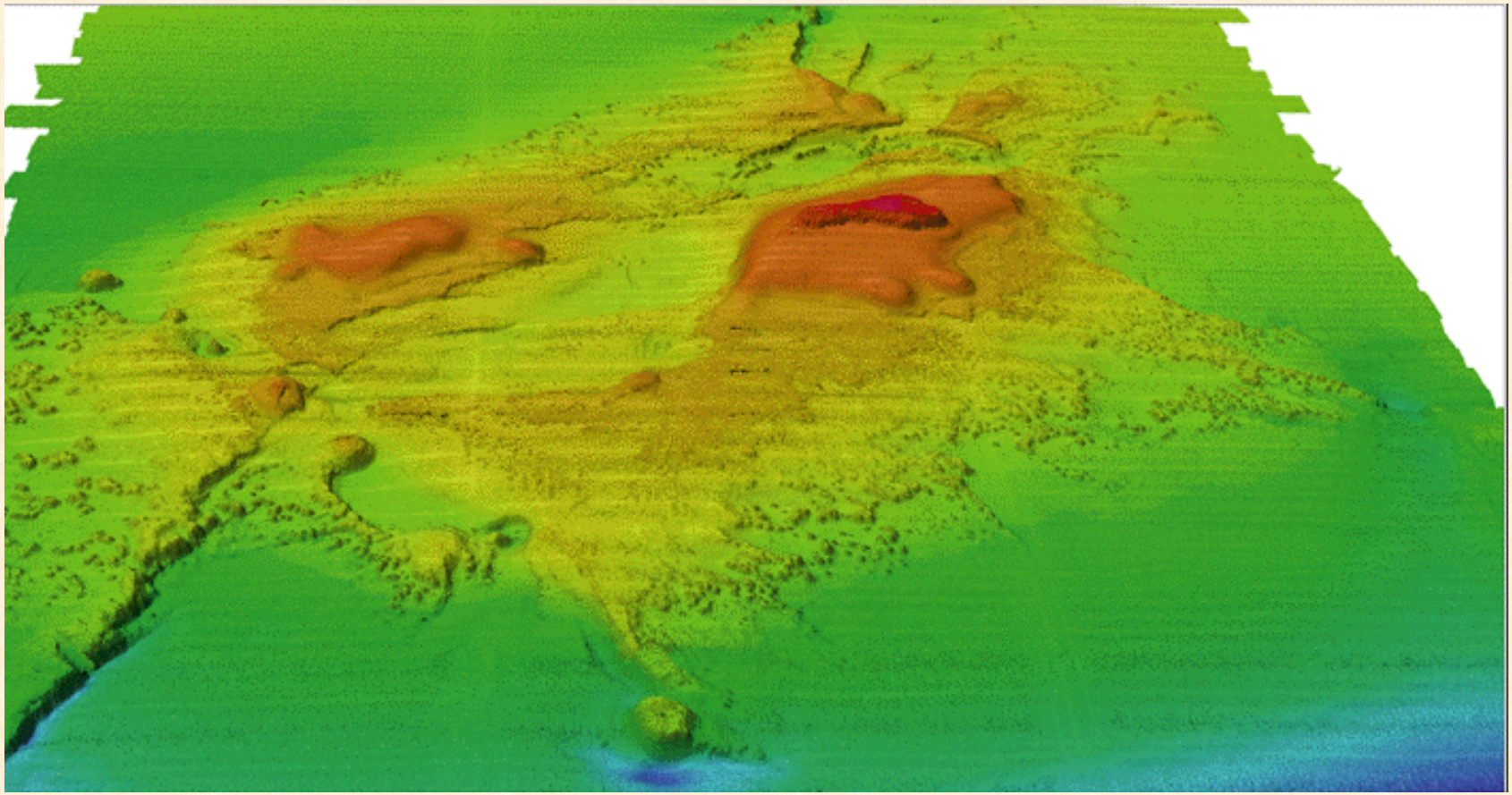


http://walrus.wr.usgs.gov/pacmaps/gm_index.html

http://walrus.wr.usgs.gov/pacmaps/wf_index.html

USGS
science for a changing world
Western Region Coastal and Marine Geology

Flower Garden Banks National Marine Sanctuary



Oblique view of West Flower Garden looking north. Colors indicate relative depths. Reds are shallower, while blues are deeper.

USGS
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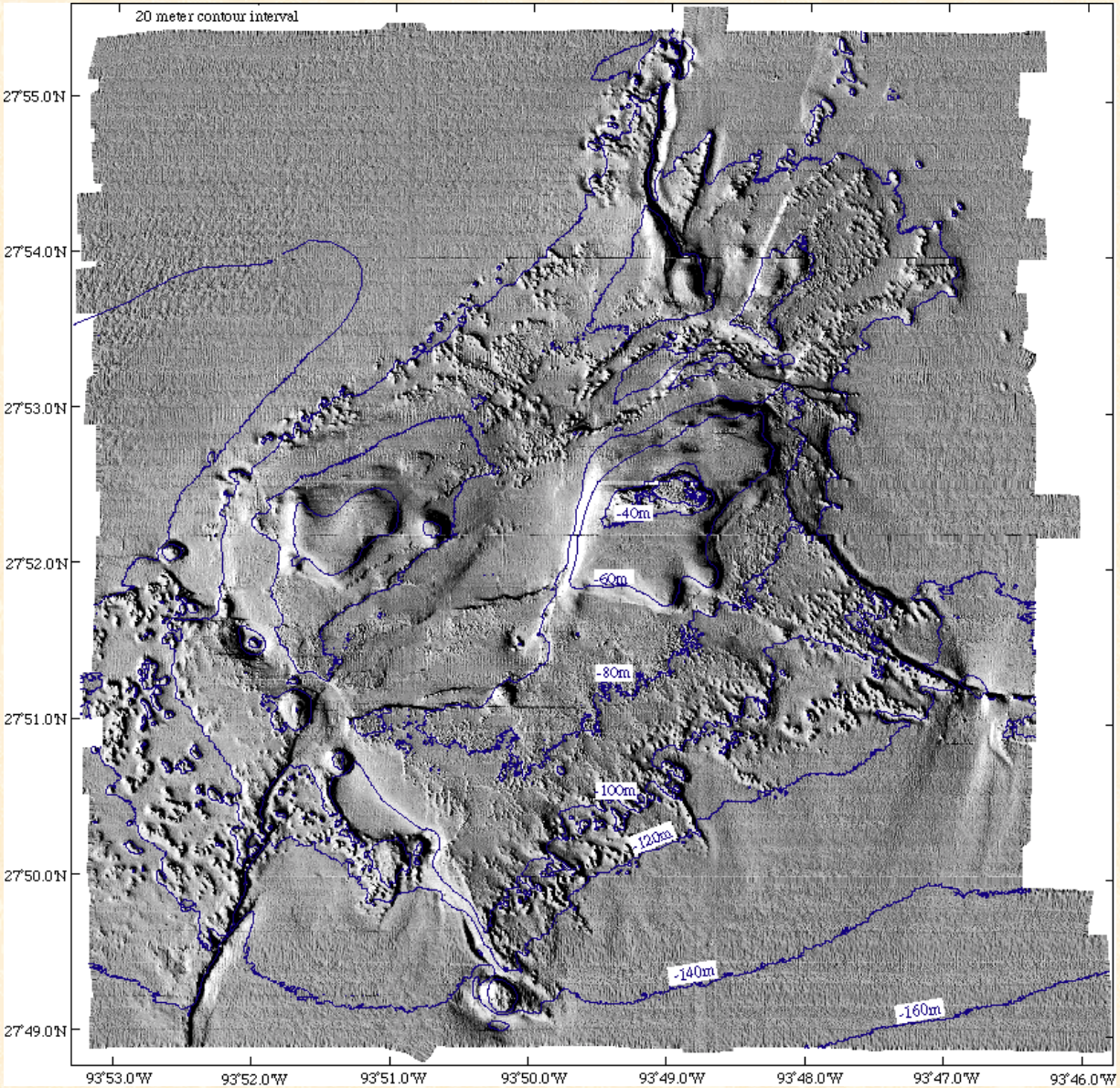
Western Region Coastal and Marine Geology

http://walrus.wr.usgs.gov/pacmaps/wf_persp.html

Flower Garden Banks National Marine Sanctuary



Shaded Relief of West Flower Gardens

USGS science for a changing world

Western Region Coastal and Marine Geology

http://walrus.wr.usgs.gov/pacmaps/wf_shd.html

USGS does not state what datum the latitude and longitude coordinates reference.

Does it make any difference?

Hibernia Gravity Base Structure Platform

Location: The Grand Banks, 315 km (170 nautical miles) east southeast of St. John's, Newfoundland.

Water Depth: 80 meters/ 262 feet.

GBS: 106 meters/348 feet in diameter, 85 meters/ 279 feet high; with topside support shafts (26 meters/ 85 feet), 111 meters/364 feet high.

Total Platform Height: 225 meters/738 feet.

Weight: 600,000 tons during tow; with ballast 1.2 million tons.

http://www.hibernia.ca/html/about_hibernia/pg_13.html
http://www.gov.nf.ca/exec/premier/hibernia.htm

Hibernia Gravity Base Structure Platform

Maximum Positioning Tolerance on Sea Floor: 10 meters (33 feet).
Actual Platform Positioning: Within 2.5 meters (8 feet) of target touchdown point.

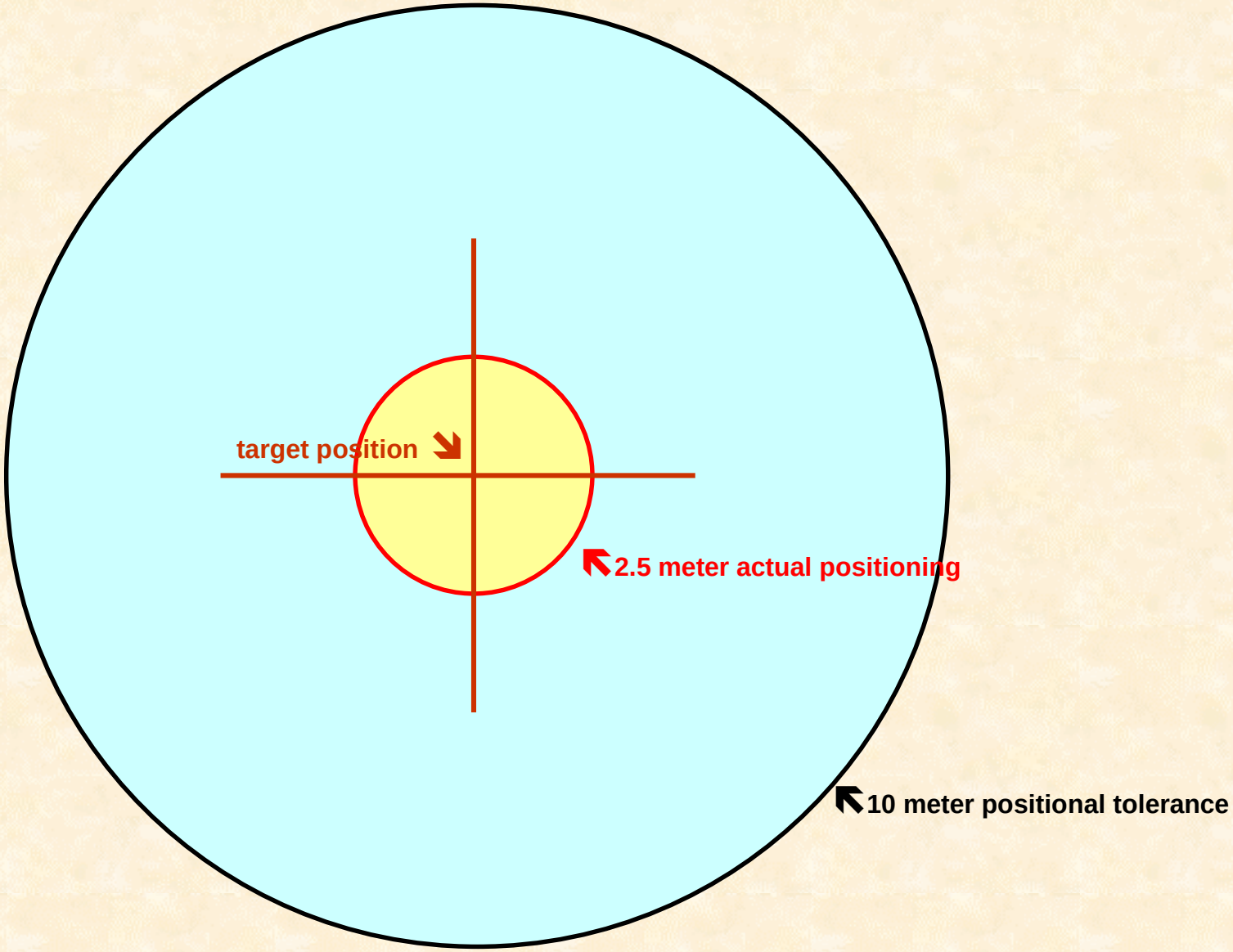
http://www.phudpucker.com/images/tx%20images/hmdc01.jpg
http://www.gasandoil.com/goc/news/ntn72602.html

Excerpt from "Hibernia Positioned"

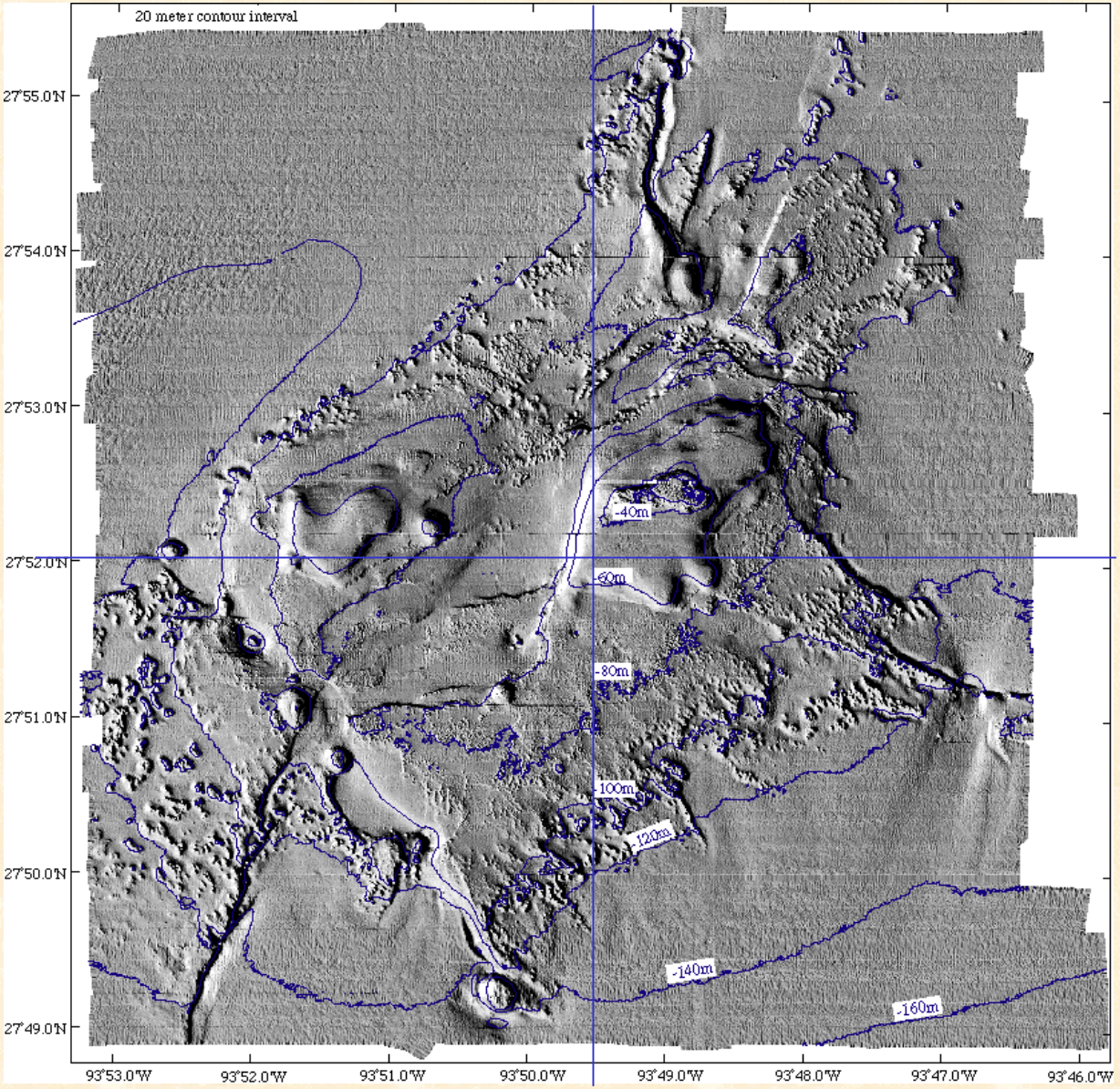
"June 6, 1997 The Hibernia platform has been successfully positioned at the Hibernia field, officially bringing the tow-out operation to an end… On June 5 the weather forecast was favourable and the nine Maersk tugs slowly moved the 600,000 tonne platform into position. **'Our satellite positioning system allowed us to install the platform to within 2.5 metres (7.5 feet) of the target touch-down point,'** said Henk van Zante, Construction General Manager with Hibernia Management and Development Company Ltd. (HMDC). **'We had a maximum tolerance of 10 metres (30 feet) for the touch-down.** This has been a superbly executed marine operation. The last 10 kilometres (6.25 miles) of the tow were the most delicate part of the operation, and we would not move forward from the holding area until weather conditions were acceptable,' van Zante said. 'At times there was only 3 metres (9 feet) clearance between the bottom of the platform and the ocean floor, so we had to move very slowly and carefully. Our average speed during this last leg was 0.5 knots or less.'"

Alexander's Gas & Oil Connections
http://www.gasandoil.com/goc/news/ntn72602.htm

Comparison of Hibernia Positional Tolerance and Its Actual Positioning



Flower Garden Banks National Marine Sanctuary



USGS science for a changing world

Western Region Coastal and Marine Geology

http://walrus.wr.usgs.gov/pacmaps/wf_shd.html

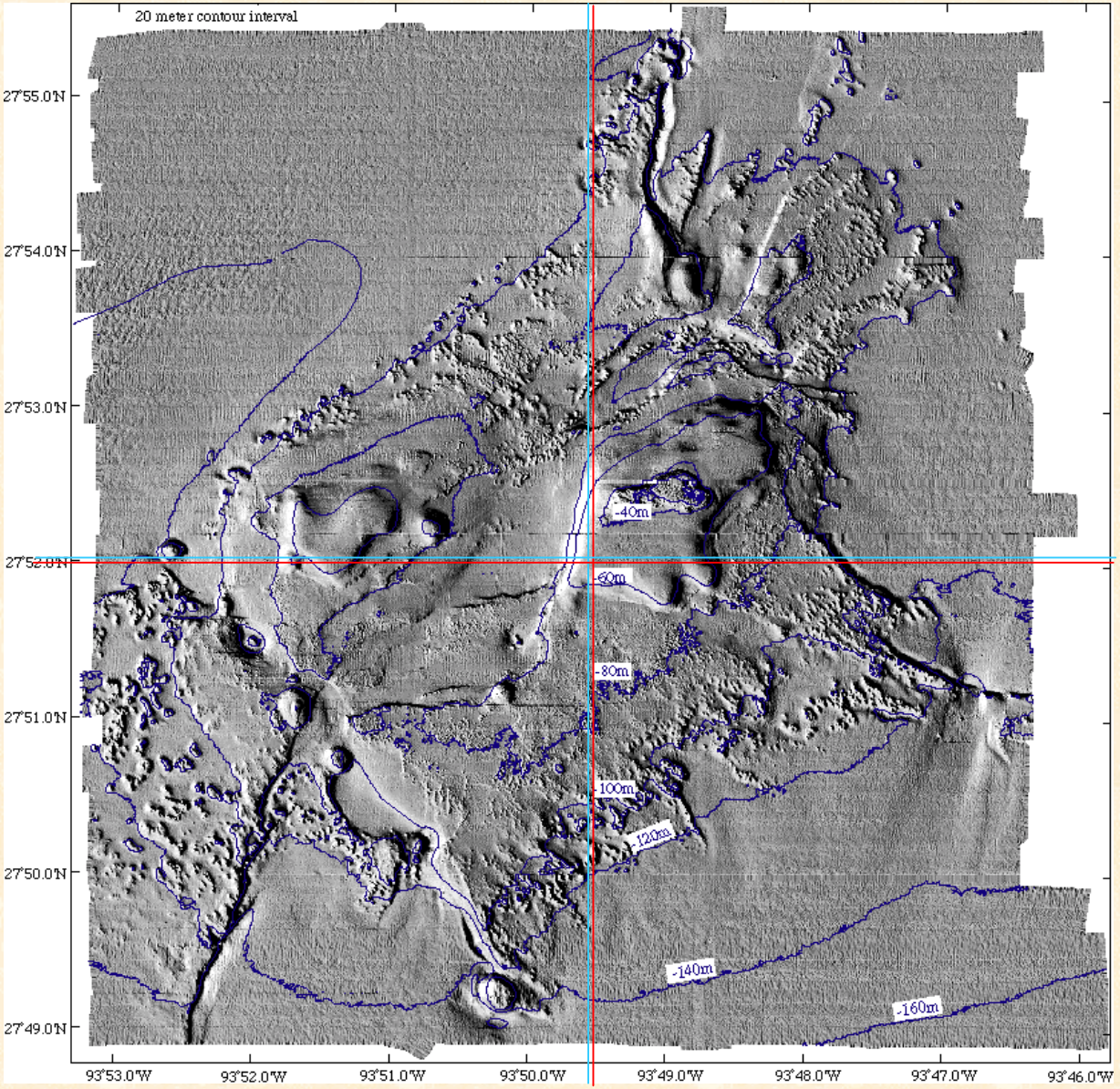
The approximate center of the image (blue lines) is 27°52'00"N 93°49'30"W.

Shaded Relief of West Flower Gardens

West Flower Garden Banks NMS

CORPSCON v5.11.08 & NADCON* v2.10			GEOTRANS v2.0** & MADTRAN		
NAD 83/WGS 84 Latitude/Longitude	NAD 27 Latitude/Longitude	Datum Shift (meters/feet)	NAD 83/WGS 84 Latitude/Longitude	NAD 27 Latitude/Longitude	Transformation Error (meters/feet)
27°52'00.00000"N 93°49'30.00000"W	27°51'59.02358"N 93°49'29.43786"W	Lat.=30.057m/98.612' Long.=15.378m/50.453'	27°52'00.00000"N 93°49'30.00000"W	27°51'58.9"N 93°49'29.3"W	Lat.= ><3m/9.84' Long.= ><5m/16.40'
NAD 83/WGS 84 X/Y, UTM Zone 15 (meters)	NAD 27 X/Y, UTM Zone 15 (meters)		NAD 83/WGS 84 X/Y, UTM Zone 15 (meters)	NAD 27 X/Y, UTM Zone 15 (meters)	
X = 418 782.702 Y= 3 082 705.812	X = 418 796.329 Y = 3 082 504.576		X = 418 783 Y = 3 082 706	X = 418 800 Y = 3 082 502	
*Officially adopted as the transformation software used by the MMS			**Uses the Molodensky method for datum transformation		
NADCON was developed and is maintained by the NGS. CORPSCON, GEOTRANS, and MADTRAN were developed by the U.S. Army Topographic Engineering Center. MADTRAN is no longer available, and has been replaced by GEOTRANS.					

Flower Garden Banks National Marine Sanctuary



Shaded Relief of West Flower Gardens

USGS science for a changing world

Western Region Coastal and Marine Geology

http://walrus.wr.usgs.gov/pacmaps/wf_shd.html

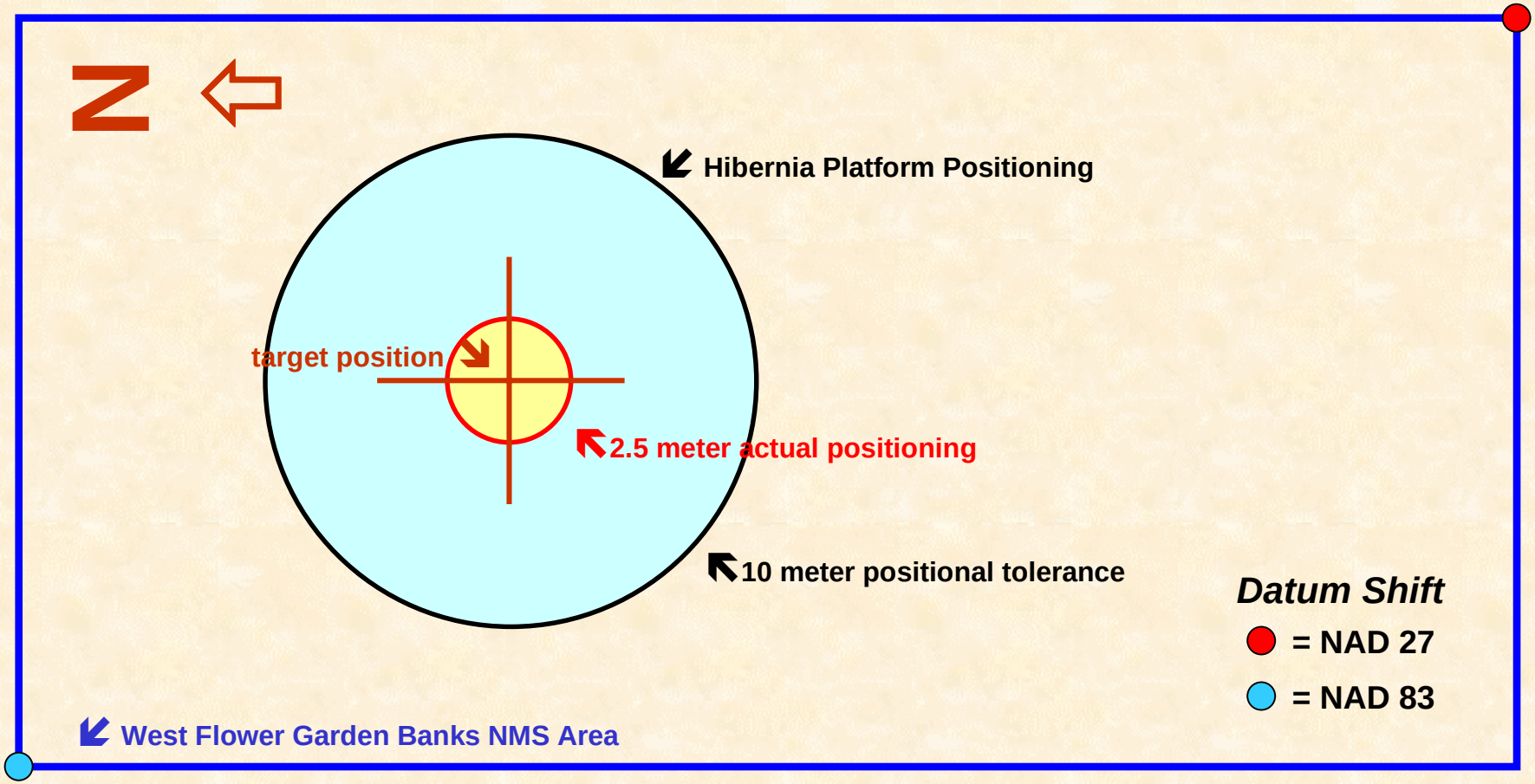
The approximate center of the image (blue lines) is 27°52'00"N 93°49'30"W. The difference between these coordinates on NAD 83/WGS 84 and NAD 27 is 30.057 meters (98.612 feet) in latitude and 15.378 meters (50.453 feet) in longitude.

Approximation of Shift

Blue lines = NAD 83/WGS 84
Red lines = NAD 27

1+second north in latitude (99 feet)
1/2 second west in longitude (50 feet)
Area = 4950 sq ft = .1+ acres

Comparison of the Positioning of Hibernia & the NAD 27/83 Shift in the GOM
West Flower Garden Banks NMS Area



Mars Tension Leg Platform

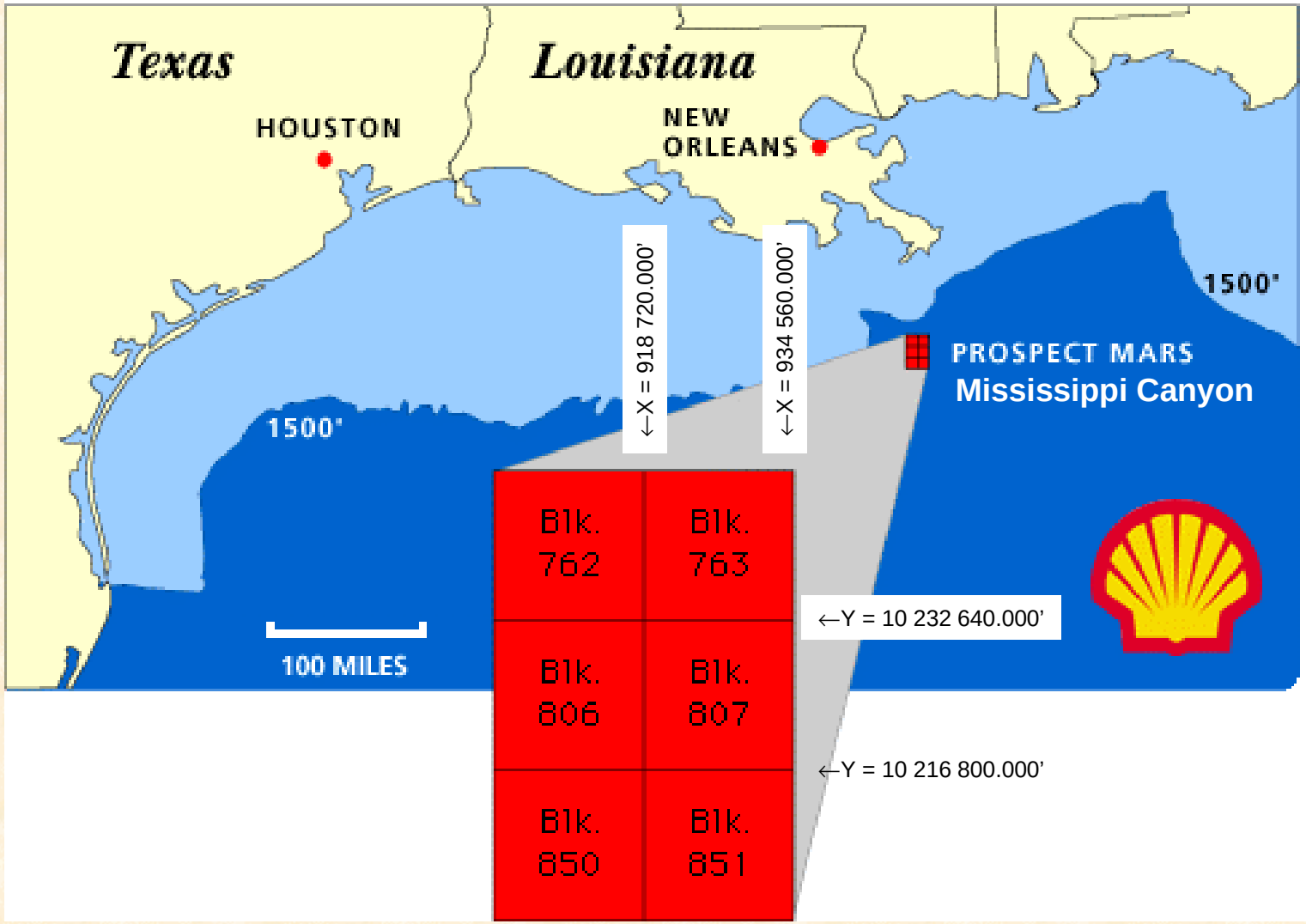
Location: Mississippi Canyon Block 807 in 2940 feet of water.

http://www.offshore-technology.com/projects/mars/mars1.html

Mars Tension Leg Platform

Location Map

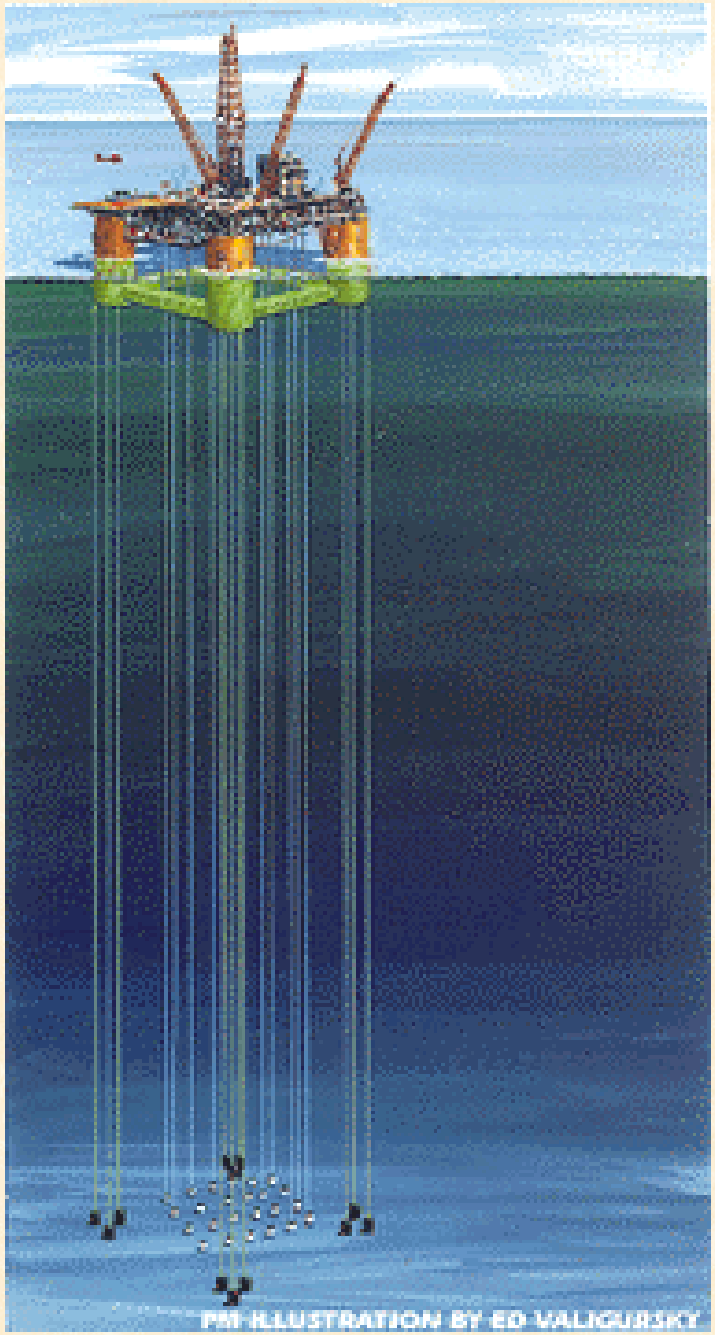
- Fact Sheet
- Home
- Photos



http://www.shellus.com/home_fs.html

Mars Tension Leg Platform

CORPSCON v5.11.08 & NADCON* v2.10			**GEOTRANS v2.0** & MADTRAN**		
NAD 83/WGS 84 Latitude/Longitude	NAD 27 Latitude/Longitude	Datum Shift (meters/feet)	NAD 83/WGS 84 Latitude/Longitude	NAD 27 Latitude/Longitude	Transformation Error (meters/feet)
28°10’11.20842”N 89°13’22.45485”W	28°10’10.28640”N 89°13’22.35360”W	Lat.=28.383m/93.120’ Long.=2.762m/9.062’	28°10’11.50000”N 89°13’22.70000”W	28°10’10.3”N 89°13’22.4”W	Lat.= ≈7m/9.84’ Long.= ≈5m/16.40’
NAD 83/WGS 84 X/Y, UTM Zone 16 (feet)	NAD 27 X/Y, UTM Zone 16 (feet)***		NAD 83/WGS 84 X/Y, UTM Zone 16 (feet)	NAD 27 X/Y, UTM Zone 16 (feet)	
X = 924 379.418 Y= 10 229 668.949	X = 924 373.000 Y =10 229 010.000		X = 924 358.017 Y = 10 229 698.801	X = 924 368.912 Y = 10 229 011.566	
*Officially adopted as the transformation software used by the MMS ***Coordinates from the MMS TIMS database.			**Uses the Molodensky method for datum transformation		
NADCON was developed and is maintained by the NGS. CORPSCON, GEOTRANS, and MADTRAN were developed by the U.S. Army Topographic Engineering Center. MADTRAN is no longer available, and has been replaced by GEOTRANS.					



NAD 83/WGS 84 ➔➔ NAD 27 (West Flower Garden NMS)

Datum Shift Latitude = 99 feet to the South
Datum Shift Longitude = 50 feet to the East
Area = 4950 sq. ft. = .1+ acres

NAD 27 ➔➔ NAD 83/WGS 84 (Mars Tension Leg Platform)

Datum Shift Latitude = 93 feet to the North
Datum Shift Longitude = 9 feet to the West
Area = 837 sq. ft. = .02 acres

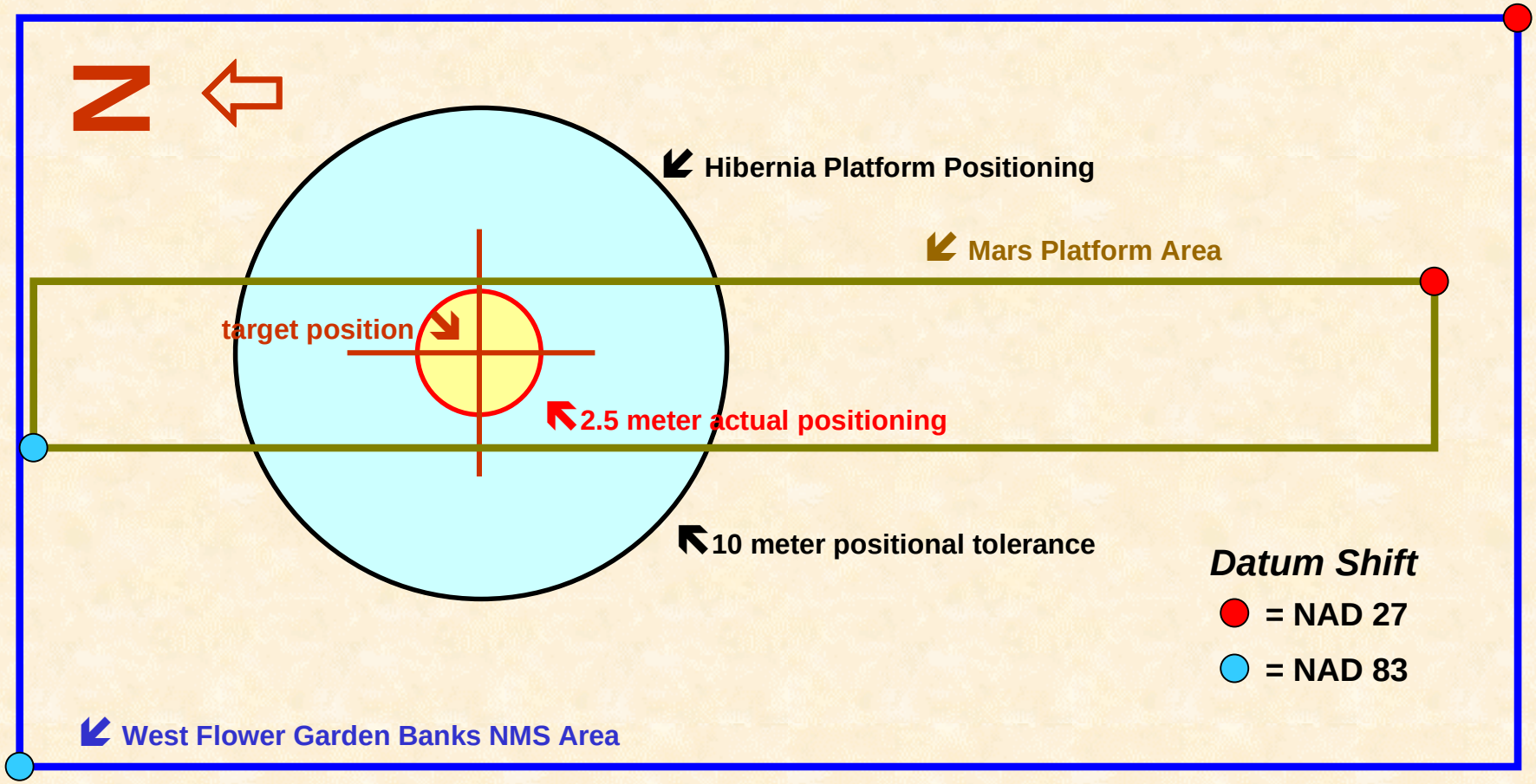
Mars Tension Leg Platform

Steel Columns (4 legs) = 66.5 feet diameter (ea) = 3473 sq. ft. (ea)
Piles (3/leg) = 7 feet diameter (ea) = 38.5 sq. ft.(ea)
Tendons (3/leg) = 2.33 feet diameter (ea) = 4.3 sq. ft. (ea)

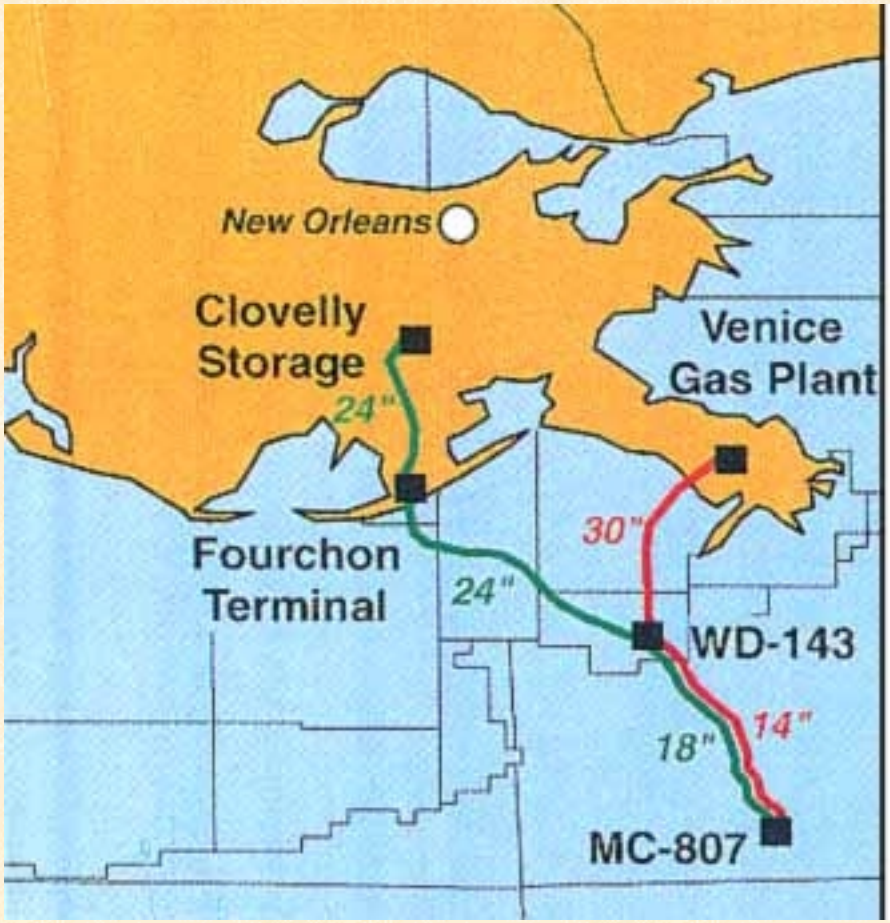
Does datum make a difference?

The Hibernia GBS Platform--the equivalent of a football field in diameter and the height of a 70 story building--was positioned within 2.5 meters (8 feet) of its target touchdown position.

Comparison of the Positioning of Hibernia & the NAD 27/83 Shift in the GOM West Flower Garden Banks NMS Area & Mars Platform Area



Mars Pipelines and Capacities



Capacities

Oil:

18" = 150 MBOPD

24" = 250 MBOPD

Gas:

14" = 150 MMCFD

30" = 600 MMCFD

Shell

http://www.offshore-technology.com/projects/mars/mars3.html

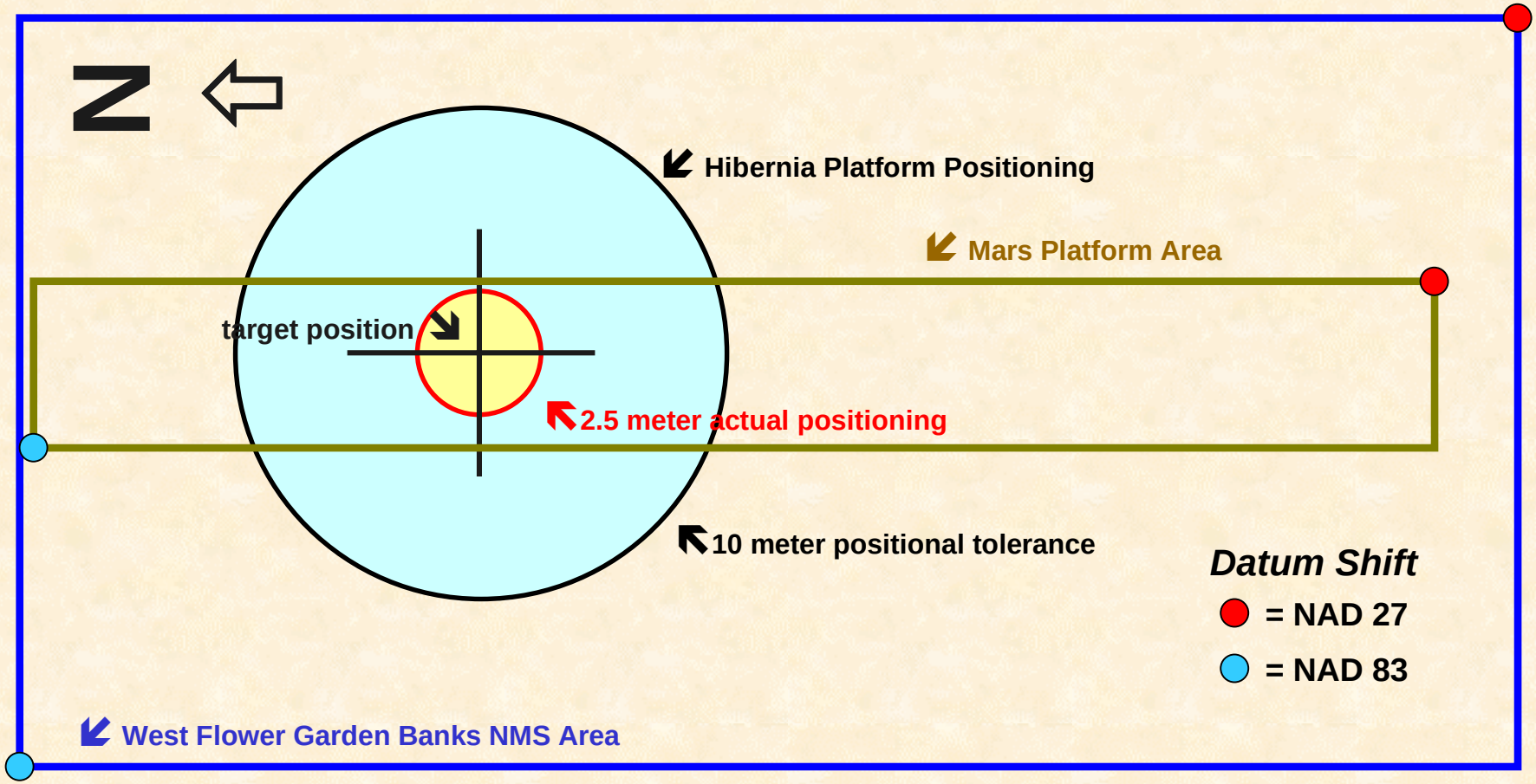
Oil Tanker Rips Pipeline; Fuel Spilled in Bay

Monday, March 18, 1991

LARRY B. STAMMER and LAURIE BECKLUND
LA TIMES STAFF WRITERS

An oil tanker chartered by Chevron, U.S.A., ripped open an undersea oil pipeline with its anchor a mile off El Segundo on Saturday night, spilling 27,720 gallons of a highly volatile oily fuel mixture into Santa Monica Bay, the U.S. Coast Guard reported Sunday...

So, back to where we started...
What ***IS*** "Close Enough For Government Work?"



Minerals Management Service
Leasing Division
Mapping & Boundary Branch

Questions and Answers

Thank You For Your Interest!