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PROJECT COMPLETION REPORT

COASTAL MAPPING PROGRAM

PROJECT CM-8703

ALASKA

PLOVER ISLANDS - NORTH SLOPE

Point Barrow to Tangent Point
Maps: TP-01504, TP-01505, TP-01506

AGENCY VAULT COPY

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Point Barrow to Tangent Point
Maps: TP-01504, TP-01505, TP-01506

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES

Agency Vault Copy

PROJECT COMPLETION REPORT

COASTAL MAPPING PROGRAM

PROJECT CM-8703

Alaska

Plover Islands - North Slope

Point Barrow to Tangent Point

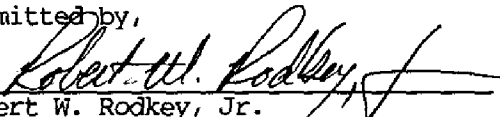
Maps: TP-01504, TP-10505, TP-01506

Approvals and Clearance

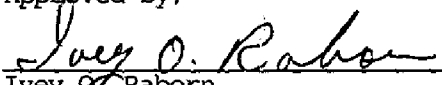
The maps, this report and associated project data meet the requirements and standards of the National Ocean Service Coastal Mapping Program.


This report summarizes the photogrammetric operations related to the completion of the project and is submitted for final approval. Clearance for project registration is requested.

Submitted by,


Robert W. Rodkey, Jr.
Chief, Coastal Mapping Unit
Photogrammetric Production Section

Approved by,


Ivey O. Raborn
Acting Chief, Photogrammetric Production Section
Photogrammetry Branch


Commander A. Y. Bryson, NOAA
Chief, Photogrammetry Branch
Nautical Charting Division

PROJECT COMPLETION REPORT

COASTAL MAPPING PROGRAM PROJECT CM-8703

Alaska

Plover Islands - North Slope

Point Barrow to Tangent Point

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COASTAL MAPPING PROGRAM PROJECT CM-8703

Introduction

Coastal Mapping Program Project CM-8703 was planned to provide three shoreline maps depicting the shoreline and cartographic features of mapping interest of the Arctic coastline from Point Barrow southeasterly to Tangent Point, Alaska. The photogrammetric survey is of the seaward islands known as the Plover Islands and does not cover the coastline of the mainland of this region of Alaska, which is known as the North Slope. Refer to FIGURE 1 for a graphic reference of the project site. The maps were originally given the designation of "Map A", "Map B" and "Map C" and were scheduled to be treated as special purpose maps which are generally handled differently from standard maps of a coastal mapping project. In July 1987, the maps were assigned standard shoreline map identifiers and the project was to be completed as a standard coastal mapping project with a few exceptions and procedure departures as noted later in this summary. Map TP-01504 depicts the island chain from Point Barrow to Tapkaluk Island. Map TP-01505 depicts the island chain from Tapaluk Island southeasterly to Martin Island. Map TP-01506 depicts the island chain from Martin Island southeasterly to Kulgurak Island. All maps were prepared at 1:24,000 scale with the Transverse Mercator Projection based on the North American Datum of 1983 (NAD 83).

The purpose of the project is consistent with the Coastal Mapping Program, which is to provide contemporary coastal survey data for the maintenance of the National Ocean Service Nautical Charting Program. The project data will also be of interest to special interest groups concerned with boundary studies within the North Slope region of Alaska. Refer to Appendix A for information on one of the inquiries addressing the need to survey this region of Alaska. As a result of that memo and the standing Nautical Charting Program requirement for contemporary data, the planning phase of the project was initiated and a "requirements memorandum" was issued by the Chief of the Photogrammetry Branch on April 6, 1987. The "requirements memorandum" is bound in this document as Appendix B.

Field Operations

Field operations for this photogrammetric survey project consisted of aerial photography and the recovery, establishment and placement of geodetic control necessary for aerotriangulation.

The recovery, establishment and placement of geodetic control was accomplished in July 1986 by personnel of the National Geodetic Survey Division (NGSD) of the National Ocean Service (NOS). Logistical support for the field operation was provided by the Minerals Management Service (MMS) of the Department of Interior. All horizontal control required for aerotriangulation was pre-marked (paneled). Geodetic positions of the horizontal control were determined through the application of the Global Positioning System (GPS) and were

based on the NAD 83. The geodetic field work was processed by personnel of the NGSD and preliminary coordinates were furnished for new geodetic stations required for aerotriangulation. Refer to LISTING 1 for information on the geodetic control used in this photogrammetric survey. The references to station Cresent in most of the source documents for this project spell the station name as Cressent. Upon reading the station description, it was determined that the proper spelling is Cresent, which is the spelling used in this document and as annotated on map TP-01506.

The photography required for this photogrammetric survey was originally scheduled to be acquired through the High Altitude Photography program. This could not be accomplished and, as a result, the necessary photographs were acquired by NOS personnel on September 20, 1986 between 11:35 to 11:58 Alaskan Standard Time. The photographs were acquired at 1:24,000 scale using a Wild RC-8 camera with "E" cone, which has a calibrated focal length of 152.71 mm. Panchromatic film was used in the photographic operation. Photographic coverage is primarily of the offshore island areas and does not extend over the entire mainland area or that of the area defined by the map limits.

Aerotriangulation

The aerotriangulation phase was initiated by Mr. Gregory I. Synder in April 1987 under the direction of Mr. Don O. Norman, Chief of the Aerotriangulation Unit of the Rockville, Maryland office. The two strips of compilation photographs were bridged through application of analytical aerotriangulation procedures inherent to the Integrated Digital Photogrammetric Facility (IDPF) utilizing the National Ocean Service Analytical Plotter (NOSAP). All aerotriangulation measurements were adjusted to ground by processing the data through the General Integrated Analytical Triangulation (GIANT) program resident within IDPF. Parameter data for each aerotriangulated photograph was stored in the IDPF database for recall during the compilation phase. Based on an analysis of the adjustment data, the residual error when adjusted to ground was within the allowable tolerance for the aerotriangulation phase.

Refer to Figure 2 for information on the photographs selected for aerotriangulation and the placement of geodetic control within the project site. Not every photograph acquired as a result of the photographic field operation was processed through the aerotriangulation phase. This is due to the 80% endlap of the photographs of both strips. The Aerotriangulation Report is bound in this document as Appendix C.

Compilation

The instructions for the office phase of the project were issued on May 12, 1987. The instructions are included in this document as Appendix D.

The compilation phase was initiated in May 1987 by Mr. James W. Massey, Senior Cartographer, under the direction of Mr. Robert W. Rodkey, Chief of the Coastal Mapping Unit of the Rockville, Maryland office. The standard

coastal mapping program delineation requirements were executed through application of advanced stereographic procedures resident within IDPF utilizing NOSAP. The mean high water line was interpreted as the land/water interface at the time of photography due to the lack of tide data for this project. The periodic tide has a mean range of less than one half a foot.

The quality of the compilation photographs was judged to be adequate, although the presence of cloud imagery hindered the interpretation of potential cartographic features. The cloud covered areas are outlined on the affected maps (TP-01505 and TP-01506) and labeled accordingly. Photographs 86E(P)8162 thru 8176 were used in the compilation of map TP-01504. Photographs 86E(P)8176 thru 8180 and E(P)8191, 8193, 8194 and 8196 thru 8199 were used in the compilation of map TP-01505. Photographs 86E(P)8199 thru 8202 and 86E(P)8204 thru 8214 were used in the compilation of map TP-01506.

The final maps were smooth drafted. The geographic names applied to the final maps were provided by Mr. Charles E. Harrington, Chief Geographer of the Nautical Charting Division. Mr. Harrington provided a final geographic names sheet for each map. The final geographic names sheets are bound in this document as Appendix E. All annotation and labeling was executed in accordance with Production Procedure Memo No. 1, a copy of which is bound in this document in Appendix F. A supplemental projection based on the North American Datum of 1927 was delineated on each map in accordance with the draft policy memorandum - "Implementation of the North American Datum of 1983 (NAD 83) in the Coastal Mapping Program of the Photogrammetry Branch", a copy of which is bound in this document in Appendix F.

Final Review

The final review phase was initiated in August 1987 by Mr. Robert Rodkey. The shoreline maps and associated discrete point data of this project were evaluated as meeting the requirements of the National Standard of Map Accuracy. Refer to LISTING 2 for the final listing of discrete point data for application in the nautical charting program. The shoreline maps, this report and project data sets comply with the requirements specified in the project instructions and verbal modifications to those instructions by higher management officials. Standard procedures, except where noted in this report, were adhered to for the compilation, drafting and reproduction of the shoreline maps. All source data and photogrammetric measurement instruments meet the standards of accuracy established for the disciplines of field surveying and photogrammetry and those specified in the project instructions.

After the completion of the final review phase, a comparison was made against the following NOS nautical charts:

- 16081, 5th Edition (August 13, 1977), 1:48,149 scale,
- 16082, 5th Edition (March 13, 1976), 1:47,943 scale.

The results of the chart comparison were annotated on the Chart Maintenance Print of each map and forwarded to the Mapping and Charting Branch.

Dissemination of Project Data

The dissemination of project data is in accordance with the following:

NATIONAL ARCHIVES/FEDERAL RECORDS CENTER

Brown Jacket containing:

Printout of the database for each strip of photographs

Printout of the NGSD databank retrieval

One copy of the project diagram

One copy of the Aerotriangulation Report

One copy of this Project Completion report

AGENCY ARCHIVES

Registration Copy of Each Map

Original Project Completion Report

PHOTOGRAMMETRIC ELECTRONIC DATA LIBRARY

There is no digital data for this project maintained in the library.

MAPPING AND CHARTING BRANCH

Chart Maintenance Print of each Map

Copy of Charted Landmarks and Nonfloating Aids to Navigation

Listing - one page

OFFICE OF CHIEF GEOGRAPHER

Geographic Names Standards

REPRODUCTION BRANCH, AERONAUTICAL CHARTING DIVISION

8X Reduction Negative of Each Map

STATE OF ALASKA

A Copy of Each Map

MINERALS MANAGEMENT SERVICE, DEPARTMENT OF INTERIOR

A Copy of Each Map

All project data and materials were forwarded to Mr. Gregory L. Fromm, Acting Chief of the Production Control Unit on September 1, 1987 for registration and dissemination.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

BARROW

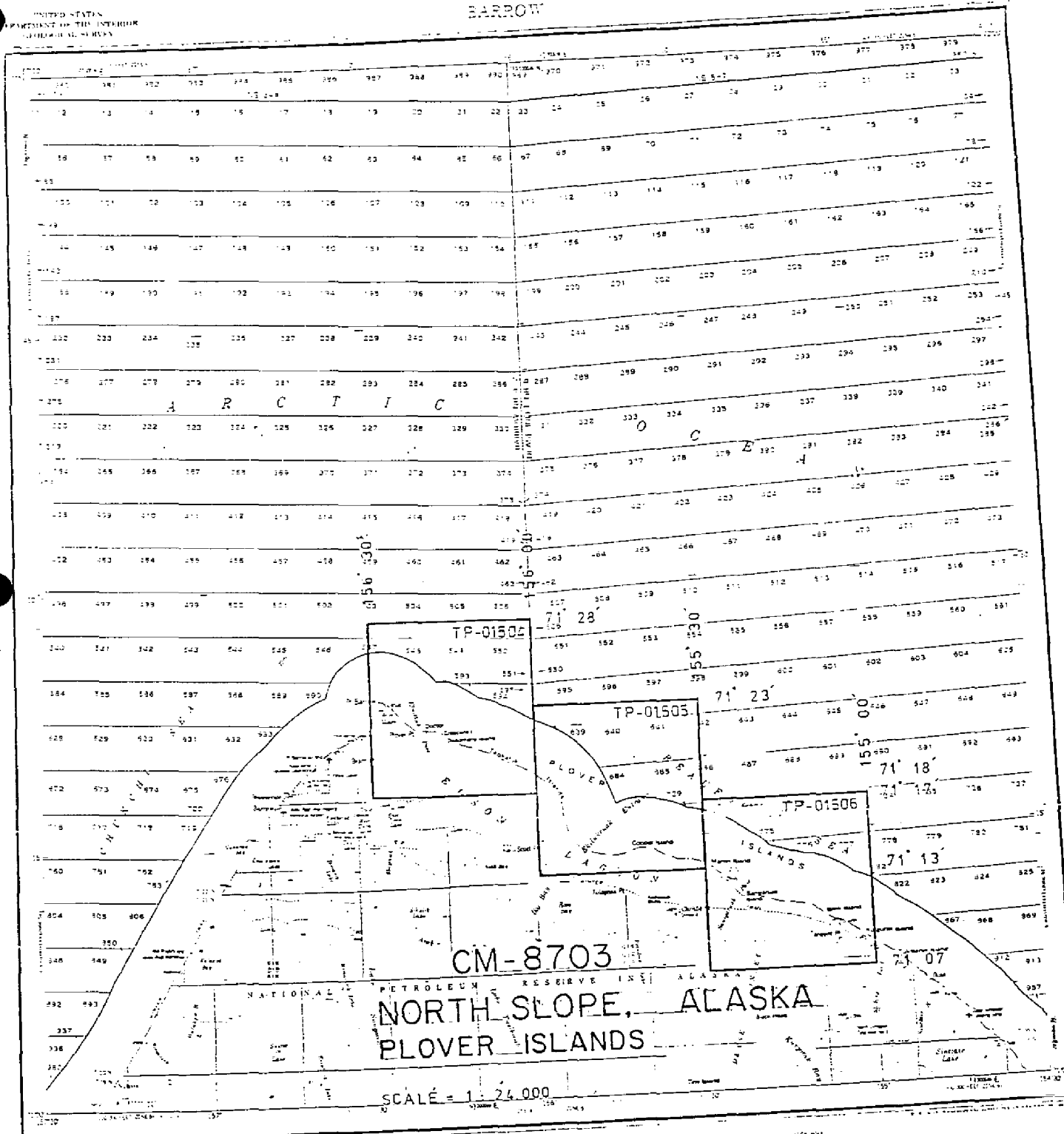


FIGURE 1 - Project Diagram of CM-8703

BARROW, ALASKA
1955

UNFILED, EDITED, AND PUBLISHED BY THE GEOLOGICAL SURVEY
 OF THE UNITED STATES DEPARTMENT OF THE INTERIOR
 WASHINGTON, D. C. 20548

THIS MAP IS A PART OF THE NORTH SLOPE BOUNDARY TOPOGRAPHIC SERIES
 AND IS AVAILABLE FOR REPRODUCTION BY OTHER AGENCIES
 ON A NON-EXCLUSIVE BASIS. THE GEOLOGICAL SURVEY
 ASSUMES NO LIABILITY FOR THE USE OR MISUSE OF THE
 INFORMATION CONTAINED HEREIN. THE GEOLOGICAL SURVEY
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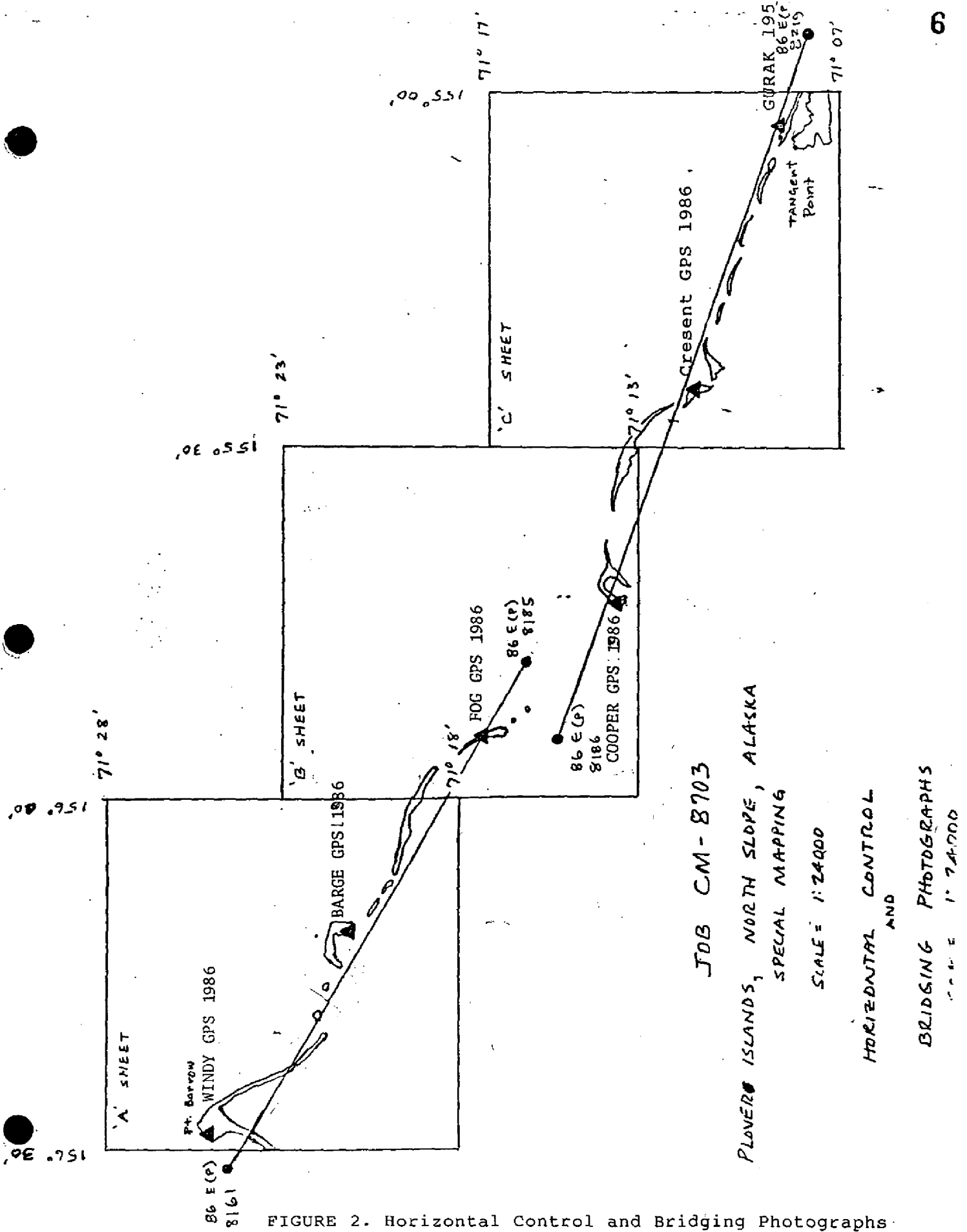


FIGURE 2. Horizontal Control and Bridging Photographs.

PROJECT GEODETIC CONTROL LISTING

PROJECT: CM-8703; Point Barrow to Tangent Point, Plover Islands - North Slope, Alaska

GEODETIC DATUM: North American Datum of 1983

The following permanent geodetic control was recovered or established during photogrammetric operations. Data pertaining to stations is resident in the National Geodetic Survey Division (NGSD) Horizontal Control Databank.

Refer to Nautical Charting Division Standard Digital Data Exchange Format documentation for quality code (QC) criteria.

STATION NAME	STA NO	Geodetic Coordinates (°-'-")		QC	Location Day/Year
		Latitude	Longitude		
WINDY GPS 1986	N001	71-23-12.199	156-28-44.817	4	182/1986
BARGE GPS 1986	N002	71-20-58.500	156-16-25.122	4	182/1986
FOG GPS 1986	N003	71-16-41.562	155-55-47.035	4	182/1986
COOPER GPS 1986	N004	71-13-51.160	155-45-32.097	4	182/1986
CRESENT GPS 1986	N005	71-12-18.136	155-26-04.905	4	182/1986
GURAK 1951	N006	71-09-28.528	155-05-40.022	3	001/1951
- end -					

Remarks:

Station data is resident in NGSD Databank File No. 6378135.000-298.2600000.

All geodetic survey operations were performed by NGSD personnel in July, 1986.

Listing approved by: Robert W. Rodkey August 5, 1987
Final Reviewer Date

CHARTED LANDMARKS AND NONFLOATING AIDS TO NAVIGATION LISTING

Page 1 of 1

PROJECT: CM-8703; Plover Islands - North Slope, Alaska

MAP NUMBER (Scale); Locality: TP-01504 (1:24,000); Point Barrow to Tapkaluk Island

GEODETTIC DATUM: North American Datum of 1983

The following charted landmarks and nonfloating aids to navigation have been measured and or confirmed during photogrammetric operations. Refer to Nautical Charting Division Standard Digital Data Exchange Format documentation for quality code (QC) criteria and clarification of cartographic codes (CC).

FEATURE DESCRIPTION	NCD Geographic Coordinates("'-")		NCD Location	
	CC	Latitude	Longitude	QC Day/Year
TOWER (RACON) - end -	210	71-23-11.35	156-27-28.70	4 263/1986

Listing approved by:

Final Reviewer

Robert Rodley

Date

August 5, 1987

LISTING 2. Charted Landmarks and Nonfloating Aids to Navigation

APPENDIX A

Mapping Request Memorandum



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

1986 APR -8 A 7 07
NAUTICAL CHARTING DIVISION

Joseph D. D'Onofrio
3601 C Street, Suites 900-934
Anchorage, Alaska 99503
(907) 762-2407

April 3, 1986

TO: N/CG - John D. Bossler
FROM: N/CG 1x9 - J. D. D'Onofrio
SUBJECT: Positioning and Charting the Plover Islands (Alaska)

[Handwritten signature]

N/CG1
N/CG2
Action
coordinate

The Plover Islands and west to Drew Point (long. 154°W) is the last section of the north slope of Alaskan shoreline which has not been recharted since the 1950's with the exception of a small area in the vicinity of Prudhoe Bay. The Boundary Working Group is requesting NOS to provide the necessary support for updated charting of this portion of the North Slope. The purpose of this effort is to support upcoming oil and gas lease sale boundaries. Specifically, the BWG would like NOS to plan and execute a GPS survey and to provide funding in the amount of \$15K to support the NASA Alaska High Altitude Photography (AHAP) program which will attempt to obtain aerial photographs of the area in question. Significant details about the AHAP program (e.g., aircraft, cameras, film, etc) are attached.

The BWG will provide the following: travel, transportation, per diem and miscellaneous costs for NGS GPS personnel and equipment; helicopter support for the GPS teams, monumentation (stainless steel class B rod markers) at pre-selected sites; panelling of GPS and other desired points as deemed necessary; and, tide gaging operations in the vicinity of the project. I would appreciate your early review and hope for your approval. Aspects of this project have been discussed with N/CG1 (Mitchell) and N/CG2 (Yeager and Brewer). Float equipped helicopters are limited in number. Early approval will help us secure one for the project.

A triangulation diagram (WAC 63) is attached for NGS. It indicates the approximate location where the BWG desires GPS control. Two USGS 1:250,000 quad sheets (Barrow and Teshekpuk) are attached for N/CG2. These can be used to plan the flight maps to be provided to NASA. Nautical Charts (not attached) which cover the area are 16067, 16081 and 16082.



N/CG - John D. Bossler

Page 2

April 3, 1986

The benefits are several. Knowing that the shoreline is receding (a review of 1977 and 1979 AHAP photography by Ron Lowrimore, N/CG2), we (NOS) will be using more updated data for the planned revision of charts 16081 and 16082. There will be correlation between proposed 1986 GPS observations for salient points and the newly revised charts. This precludes additional problems between State and Federal leasing agencies. The support of the AHAP program at a modest (in my opinion) level might be beneficial in future years in other western and northern Alaska areas where charting is outdated. This support will also enhance our continued good working relation with the USGS National Mapping Office here in Alaska.

JDD:eg

cc: (letter only)

N/CG1 - Kaula
N/CG1x10 - Mitchell
N/CG2 - Yeager
N/CG22 - Brewer

7834H

APPENDIX B

Project Requirements Memo



11

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

April 6, 1987

N/CG2321:GLF

MEMORANDUM FOR: Distribution

FROM: Commander A. Y. Bryson, NOAA /s/ **A. Y. BRYSON**
Chief, Photogrammetry Branch, NCD

SUBJECT: CM-8703, Plover Islands, North Slope, Alaska,
Special Mapping

This project is intended to provide new shoreline information for updating existing nautical charts. New shoreline data will be of special interest to many independent groups outside this agency which are involved in boundary studies of this region.

Requirements

1. The production of three 1:24,000-scale special purpose maps is required; project diagram is attached. All data collection and processing will be based on NAD 83.
2. Aerotriangulated control will be adjusted to ground using field established geodetic control (unadjusted NAD 83 field positions).
3. Compilation will be based on aerotriangulated control that meets the National Standards of Map Accuracy and office interpretation of aerial photography. Detail will be compiled using stereo instrument methods and will be limited to the shoreline.
4. Final maps will depict Transverse Mercator Projection (full line) based on NAD 83; the state grid will not be shown. To assist the subsequent users of these maps, 10 mm dashed ticks that indicate same projection and twice the interval based on NAD 27 will also be displayed. The Coastal Planning Unit, N/CG2313, will obtain the NAD 27 projection coordinates.
5. A detailed Aerotriangulation Report will be required. A Compilation Report for each map will not be required; the compilation unit will prepare a project completion report that will include a discussion of the processes and source materials used in the production of these maps.



2^o

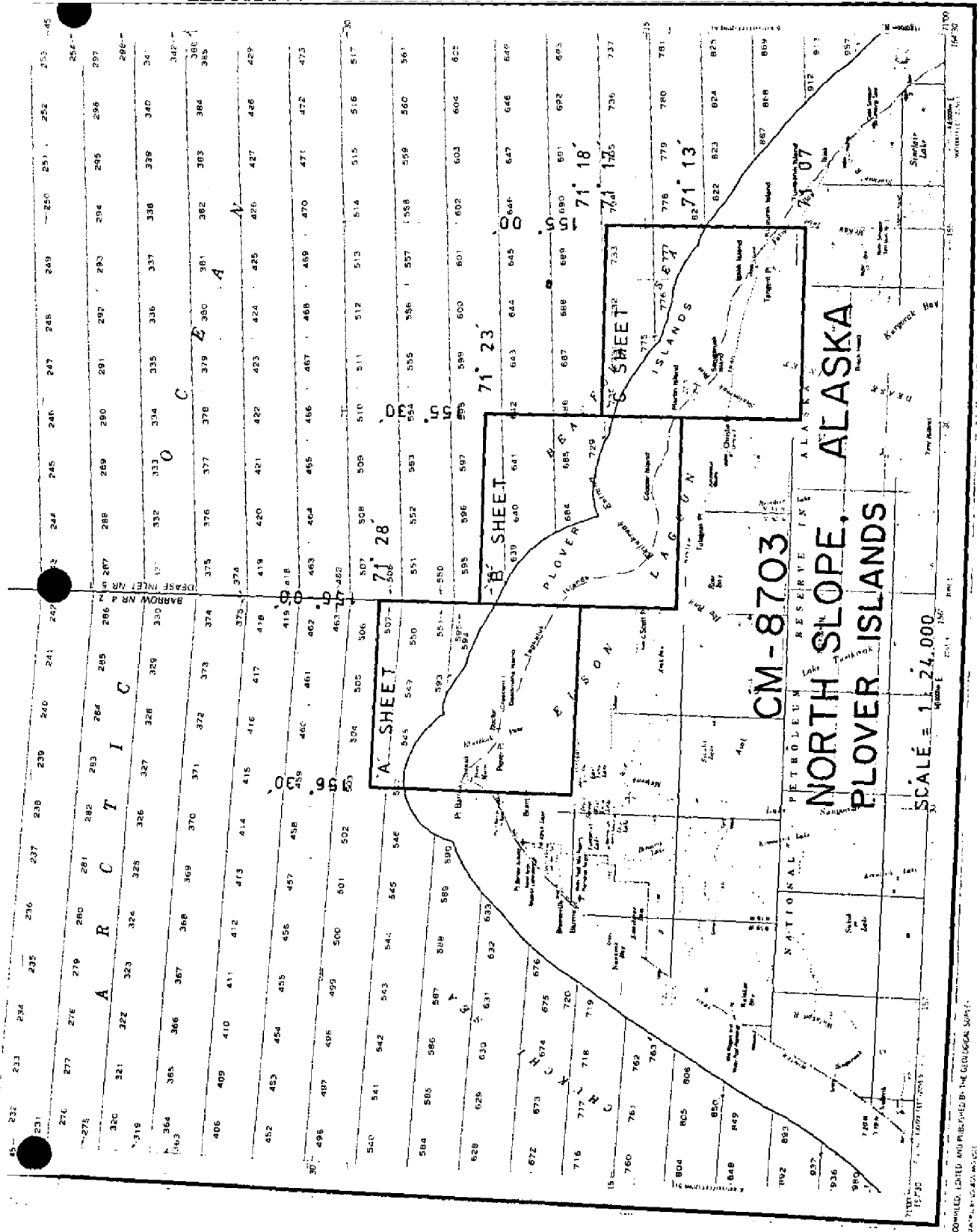
6. Deposition of data will be as follows:

- a. The original maps will be forwarded to the Marine Chart Branch and assigned as blueprints.
- b. All pertinent reports, listings of production data, and one reduced negative of each map will be maintained on file by N/CG232; data will not be forwarded to the National Archives.

Attachment

Distribution:

N/CG231 - Brewer
N/CG2313 - McNamera
N/CG232 - Raborn
N/CG2322 - Norman
N/CG2323 - Rodkey



COMPILED, EDITED AND PUBLISHED BY THE GEOLOGICAL SURVEY
 UNITED STATES DEPARTMENT OF THE INTERIOR

SCALE = 1:24,000

ROAD CLASSIFICATION: _____

BARROW, ALASKA
 1955
 WORK NUMBER 181

FAIRBANKS, ALASKA: PUBLISHED BY THE GEOLOGICAL SURVEY OF THE UNITED STATES DEPARTMENT OF THE INTERIOR

SCALE: 1:24,000

SECTION AREA: 100 ACRES

SECTION NUMBER: 507-512

SECTION LETTERS: A, B, C

SECTION NUMBERS: 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

APPENDIX C

Aerotriangulation Report

AEROTRIANGULATION REPORT
CM-8703
PLOVER ISLANDS, NORTH SLOPE, ALASKA
SHORELINE MAPPING

April 1987

21. AREA COVERED

This report covers the Plover Islands, Alaska, area from Point Barrow southeast to Kulgurak Island. The project consists of three 1:24,000-scale sheets.

22. METHOD

Two strips of 1:24,000-scale panchromatic photographs were measured on the NOS Analytical Plotter (NOSAP) using IDPF software. The GIANT analytical aerotriangulation program was used to bridge the two unconnected strips. The very narrow strip of land that comprises the islands offered less than ideal geometric strength. Due to the sparse horizontal control, horizontal corrections applied to control by the adjustment were well under 1 foot, while vertical corrections generally were 1 foot or less. The overall RMS standard error for all triangulated points was approximately 2.5 feet in elevation, 6 feet in Y and 9 feet in X, based on the results of error propagation.

Ratio values are 1.00 since bridging and compilation scale are the same. The data base and GIANT output files for the two strips were triangulated and saved as separate jobs on mag tape; PLVRS is the west strip and PVRSE is the east strip. Bridged photos are as follows: West strip, 86-E(P) 8163, 64, 66, 67, 69, 70, 72, 73, 75, 77-81; east strip 8191, 93, 94, 96, 97, 199 200, 202 204-206, 208-210, and 212-214.

23. ADEQUACY OF CONTROL

Control consisted of six paneled stations (three on each strip) determined by GPS surveys. The horizontal positions are referenced to NAD 1983.

The GPS elevations would not fit with the shoreline vertical control points. The tide range is less than 0.5 foot, and these shoreline points were given an elevation of 0.0 foot.

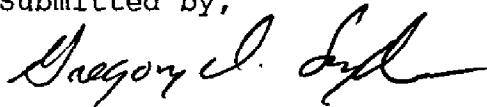
The adjustment indicates that the project will meet the National Map Accuracy Standards.

24. SUPPLEMENTAL DATA - None

25. PHOTOGRAPHY

The coverage was good and the overlap was nearly 80 percent. However, light cloud cover obscured some land areas presenting minor problems. During photo registration on NOSAP, fiducial #8 consistently produced large residuals (7-10 microns) versus 1-3 microns for the others after fitting to calibrated data. Cause unknown.

Submitted by,

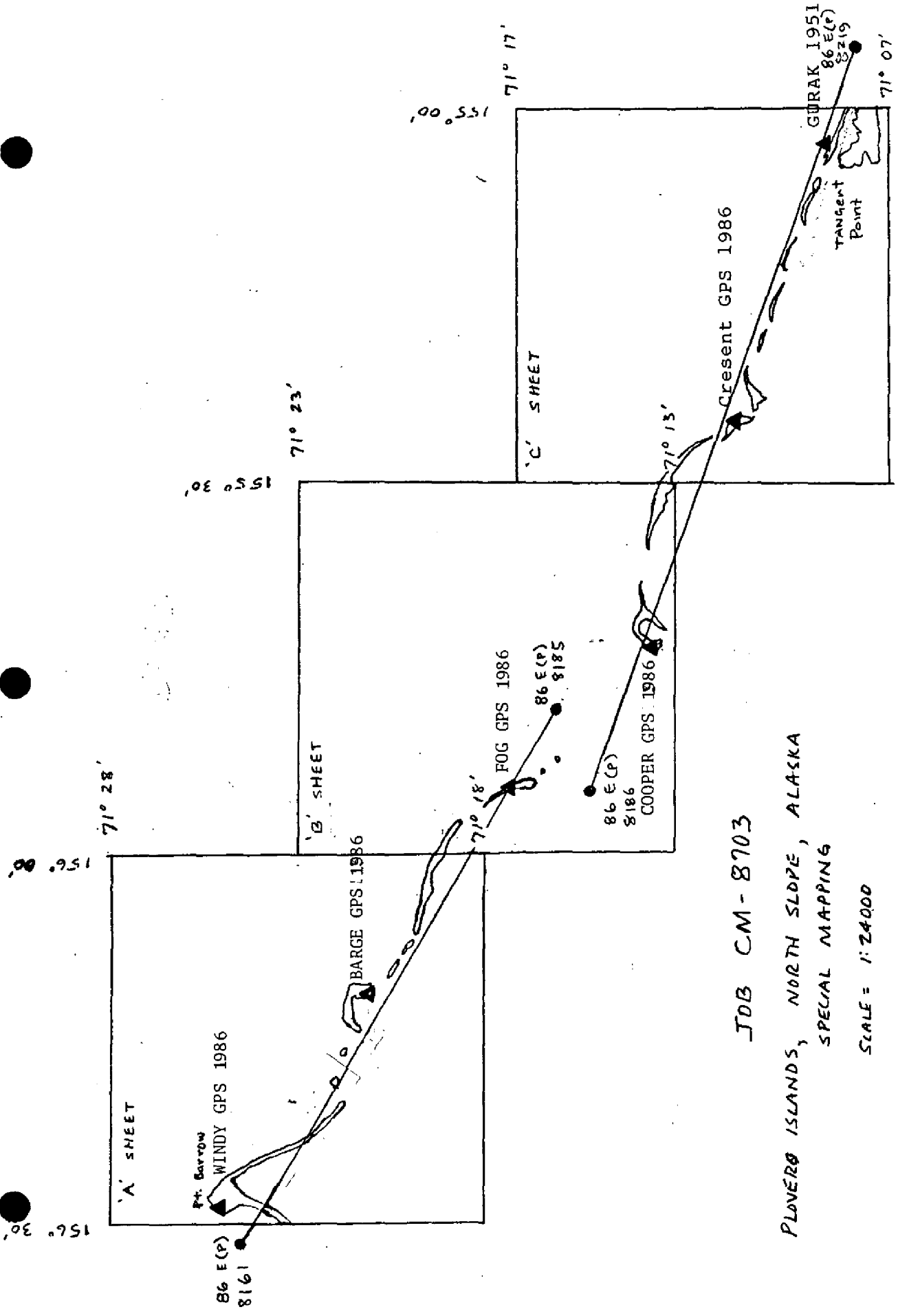


Gregory I. Snyder

Approved and Forwarded:



Don O. Norman
Chief, Aerotriangulation Unit



JOB CM-8703

PLAVERO ISLANDS, NORTH SLOPE, ALASKA
SPECIAL MAPPING

SCALE = 1:24000

HORIZONTAL CONTROL
AND

BRIDGING PHOTOGRAPHS
SCALE 1:24000

APPENDIX D

Project Instructions: Office Phase



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

May 12, 1987

N/CG2321:GLF

TO: N/CG232 - Ivey O. Raborn
FROM: N/CG23 - Commander *A. Y. Bryson* A. Y. Bryson
SUBJECT: PROJECT INSTRUCTIONS: OFFICE - Job CM-8703,
Plover Islands, North Slope, Alaska, Special Mapping,

Subject instructions are forwarded for issue to the Chief,
Coastal Mapping Unit.

The copies required for distribution by this office have been
retained.

Attachment

TO: N/CG2323 - Robert W. Rodkey
FROM: N/CG232 - *Ivey O. Raborn* Ivey O. Raborn
SUBJECT: PROJECT INSTRUCTIONS: OFFICE - Job CM-8703,
Plover Islands, North Slope, Alaska, Special Mapping,

Forwarded for your compliance.





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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
OFFICE OF CHARTING AND GEODETIC SERVICES
ROCKVILLE, MARYLAND 20852

May 12, 1987

N/CG2321:GLF

Chief, Coastal Mapping Unit
Photogrammetry Branch
Rockville, Maryland 20852

PROJECT INSTRUCTIONS: OFFICE - Job CM-8703, Plover Islands,
North Slope, Alaska, Special Mapping

1.0. PURPOSE

These instructions outline basic mapping requirements that will provide new shoreline data for updating existing nautical charts. New shoreline data will be of special interest to many independent groups outside this agency which are involved in boundary studies within this region. Compilation will be based on aerotriangulation that has met the requirements of National Standards of Map Accuracy and on an office interpretation of aerial photographs.

2.0. GENERAL

2.1. Scope. This survey will provide limited mapping along the north slope area from Point Barrow eastward to Tangent Point. Mapping will cover most of the offshore islands and only small segments of the mainland shoreline area. Three special purpose 1:24,000-scale maps will be produced. Data collection and processing will be based on NAD 83.

2.2. Field Operations. Field operations consisted of aerial photography and the recovery, establishment, and placement of geodetic control necessary for aerotriangulation.

2.3. Photography. Photography was taken at 1:24,000 scale using the Wild RC-8 (E) camera with panchromatic film. Coverage is primarily of the offshore island areas and does not extend over the entire mainland area or that of the area defined by the map limits. Date of photography is September 20, 1986.

2.4. Aerotriangulation. Panchromatic photographs selected for mapping were bridged using analytical aerotriangulation methods. Unadjusted NAD 83 geodetic control was used; this control was



premarked. Shoreline points used were as vertical control. Aerotriangulated control was adjusted to ground on NAD 83; the amount of control established proved adequate and meets National Standards of Map Accuracy criteria.

2.5. Charts Affected. Charts 16081, 16082, 16004, and 16005 cover shoreline areas that are common to this survey.

3.0. ASSIGNMENT

You are assigned office operations to effect mapping. Compilation, processing, and distribution of all data shall be in accordance with the requirements specified in these instructions.

4.0. DATA FURNISHED

- a. Nautical charts
- b. Control and job diagrams
- c. Panchromatic film positives/contact prints
- d. Geodetic control data
- e. Field records
- f. Magnetic tape containing data base files
- g. Aerotriangulation Report
- h. Magnetic plot tape for preparing base map

5.0. COMPILATION

5.1. Delineation

5.1.1. Delineation will be accomplished using analytical stereo methods based on interpretation of the bridged photographs. Compilation will be performed using the NOSAP system. Data base files were generated during the aerotriangulation phase and contain the information required for absolute model orientation using the NOSAP system; file codes are identified in the Aerotriangulation Report. Feature delineation will be limited to the shoreline.

5.1.2. Base manuscripts will depict the Transverse Mercator Projection (full line) based on NAD 83; interval requirement is 2½' latitude and 5' longitude. Final maps shall also display all recoverable NAD 83 geodetic control and NAD 27 projection intersections. The offset for NAD 27 projection intersections will be shown at twice the NAD 83 interval by 10mm ticks; i.e., 5' latitude and 10' longitude. A magnetic tape for preparing the base manuscripts will be provided. The identifier and limits for each map are indicated on the project diagram.

5.2. Miscellaneous

5.2.1. The following information shall be included on each map:

- a. Title Block (Locality Name, Datum, Projection, and Horizontal Scale)
- b. Project Number
- c. Map identifier; e.g., Survey A, B, or C
- d. Class III notation
- e. Date of Photography

5.2.2. Add this statement to each map: "Offset intersections for the map projection based on NAD 27 are indicated by unlabeled 10mm ticks".

5.3. Geographic Names. Selected names shall be shown for reference purposes. Use the most recently published nautical charts as a reference guide.

5.4. Geodetic Control. Refer to memorandum instructions "Listing and Plotting of Control Stations on Shoreline Manuscripts," dated July 23, 1968, and "Labeling Triangulation Station Field Positions on NOS Maps and in NOS Descriptive Reports," dated November 3, 1978.

5.5. Drafting. Manuscripts will be drafted in accordance with Photogrammetric Instruction No. 55, Revision 2. The use of type (stick-up), in lieu of standing requirements, will be permitted for lettering.

5.6. Reports. An individual compilation report for each map will not be required. Prepare a detailed project summary report; include a discussion of the processes and listings of data used in the production of these maps. Duplicates of all transmittal letters shall be maintained on file.

5.7. Deposition of Data. Final maps will be forwarded to the Marine Chart Branch and assigned as blueprints; make record of blueprint numbers and include in project file. All pertinent reports, field records and data, letters of transmittal, listings of production data, and two reduced negatives of each map shall be maintained on file.

6.0. SCHEDULE

Schedule project completion by September 14, 1987. Inform this office immediately if this schedule cannot be met.

7.0. MODIFICATION OF INSTRUCTIONS

If any changes in procedures and methods seem advisable, please make appropriate recommendations to this office.

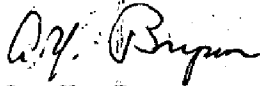
7.2. Departures from basic specifications, as necessitated by unique characteristics and special requirements for this mapping project, shall be contained in supplementary instructions or described in the text of the project summary report.

8.0. COST

Charge all costs to 8K6C01.

9.0. RECEIPT

Acknowledge receipt of these instructions.



Commander A. Y. Bryson
Chief, Photogrammetry Branch
Nautical Charting Division

R E C E I P T

TO: N/CG23 - Commander A. Y. Bryson
THRU: N/CG232 - Ivey O. Raborn *IOR*

Receipt of Project Instructions OFFICE - Job CM-8703,
Plover Islands, North Slope, Alaska, Special Mapping, dated
May 12, 1987, is acknowledged.

Robert W. Rodkey Jr.

Chief, Coastal Mapping Unit
Photogrammetry Branch

May 12, 1987

Date

APPENDIX E

Geographic Names - Final Names Sheets

GEOGRAPHIC NAMES

FINAL NAME SHEET

CM-8703 (Plover Islands, Alaska)

~~Map A~~ TP-01504 *RWR*

Barrow, Point
Beaufort Sea
Deadmans Island
Elson Lagoon
Eluitkak Pass

Moore, Port
Nuwik
Plover Islands
Plover Point
Tapkaluk Island

Approved:

Charles E. Harrington

Charles E. Harrington
Chief Geographer
Nautical Charting Division
Charting and Geodetic Services

MAY 28 1987

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GEOGRAPHIC NAMES

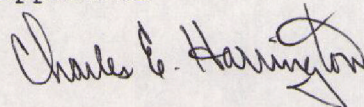
FINAL NAME SHEET

CM-8703 (Plover Islands, Alaska)

~~Map B~~ TP-01505 *RNR*

Beaufort Sea
Cooper Island
Ekilukruak Entrance
Elson Lagoon
Martin Island
Plover Islands
Tapkaluk Island

Approved:



Charles E. Harrington
Chief Geographer
Nautical Charting Division
Charting and Geodetic Services

MAY 28 1987

25

GEOGRAPHIC NAMES

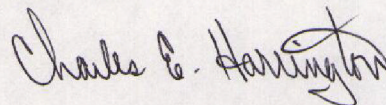
FINAL NAME SHEET

CM-8703 (Plover Islands, Alaska)

~~Map C~~ TP-01506 *RHR*

Beaufort Sea
Dease Inlet
Igalik Island
Kulgurak Island
Plover Islands
Sanigarauak Island
Sanigarauak Pass

Approved:



Charles E. Harrington
Chief Geographer
Nautical Charting Division
Charting and Geodetic Services

APPENDIX F

Procedure Departure Documentation

COASTAL MAPPING PROGRAM PRODUCTION PROCEDURE MEMO NO. 1



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
 NATIONAL OCEAN SERVICE
 OFFICE OF CHARTING AND GEODETIC SERVICES
 ROCKVILLE, MARYLAND 20852

December 10, 1986

MEMORANDUM FOR THE RECORD

FROM: Robert W. Rodkey, Jr.
 Chief, Coastal Mapping Unit
 Photogrammetry Branch, NCD

SUBJECT: COASTAL MAPPING PROGRAM PRODUCTION PROCEDURE MEMO NO. 1 -
 The Annotation of Fixed Aids to Navigation, Charted Landmarks,
 Cartographic Features of Possible Landmark Value and Geodetic
 Stations on Shoreline Maps

PURPOSE

The purpose of this Production Procedure Memo (PPM) is to establish a more contemporary method of annotating fixed aids to navigation, charted landmarks, cartographic features of possible landmark value and geodetic stations on shoreline maps. The procedures outlined in this memo have greater clarity and are more in concert with established charting practices than previous photogrammetric methods.

Authority for the establishment of this PPM is specified in Section 7.0., MODIFICATIONS of each project office instructions.

This memo supersedes the corresponding sections of Photogrammetric Instruction No. 78, "Listing and Plotting of Control Stations on Shoreline Maps", dated July 23, 1968 and "Labeling Triangulation Station Field Positions on NOS Maps and in NOS Descriptive Reports", dated November 3, 1978.

RULES OF COMPILATION

Lettering:

1. Lettering shall be applied using waxed back stripper film. Only in special cases or situations will lettering be applied via hand drafting.
2. The size of the lettering shall be no larger than 8 point. Usually 7 point presents the best image in contemporary size.

Fixed Aids to Navigation:

1. The designated charting name will comply with that specified in the United States Coast Guard Light List for the year of the photography.



2. The designated charting name shall be depicted in capital letters. Refer to Figure 1 of the attachment for an example.
3. The channel or range identifier shall be included with the fixed aid to navigation identifier for the first and last aid of said channel or range within the limits of the map. Refer to Figure 2 of the attachment for an example.
4. If the fixed to navigation is also a geodetic station, the full National Geodetic Service(NGS) data base name shall be depicted under the charting name in capital letters with the year of establishment, if known, enclosed in parenthesis. Refer to Figure 3 of the attachment for an example.

Charted Landmarks:

1. The designated charted name must agree with that specified in the data base, AIS or DIP.FIL, and on the nautical chart.
2. The designated charting name shall be depicted in capital letters. Refer to Figure 4 of the attachment for an example.
3. If the charted landmark is also a geodetic station, the full NGS data base name shall be depicted under the charting name in capital letters with the year of establishment, if known, enclosed in parenthesis. Refer to Figure 5 of the attachment for an example.
4. Clarifying descriptions of landmarks, especially in congested areas, is encouraged and completed by adding a descriptive phrase depicted in upper and lower case letters, enclosed in parenthesis. Refer to Figure 6 of the attachment for an example.

Cartographic Features of Possible Landmark Value(PLM):

1. The designated charting name shall be clear and concise based on interpretation of mapping photography. The compiler and office reviewer must agree on the nomenclature.
2. The designation of a cartographic feature as a PLM shall be based on a stereographic analysis of the feature's prominence as perceived to be viewed from the area of nautical navigation.
3. The charting name shall be depicted in upper and lower case letters. Refer to Figure 7 of the attachment for an example.

4. If the PLM is a geodetic station, the full NGS data base name shall be depicted in capital letters with the year of establishment, if known. The NGS name shall be enclosed in parenthesis and placed under the charting name. Refer to Figure 8 of the attachment for an example.
5. Clarifying descriptions of PLMs shall be depicted in upper and lower case letters enclosed in parenthesis. Refer to Figure 9 of the attachment for an example.
6. In order to avoid confusion with abbreviated charted landmark names, the charting name for PLMs may not be abbreviated. If the charting name can not be fully displayed, the lettered objects option is automatically invoked.

Geodetic Stations:

1. All geodetic stations recovered during photogrammetric operations must be depicted on the appropriate shoreline maps as well as accounted for in the Descriptive Report documentation.
2. The designated NGS data base name shall be depicted in capital letters with the year of establishment, if known. Refer to Figure 10 of the attachment for an example.
3. Geodetic stations established during field operations, which have an unadjusted position at the time of report, shall have the descriptor "Field Position", enclosed in parenthesis, added to the proper name. Refer to Figure 11 of the attachment for an example.

Cartographic Features Mapped But Not of PLM Value:

There are occasions when a compiler determines selected discrete point features should be mapped even though they may not be of PLM value. Examples of such features are transmission towers, telephone poles and light standards. The rule of compilation is "the charting name shall be depicted with vertical lower case letters". Refer to Figure 12 of the attachment for an example.

DESCRIPTION OF SYMBOLS

A charted landmark, fixed aid to navigation or PLM confirmed and measured during the aerotriangulation or compilation phases shall be symbolized on shoreline maps with a 2.5 mm diameter circle with center dot. The line weight shall be equal to .13 mm. This is an established specification.

PPM No. 1
Page 4

A charted landmark, fixed aid to navigation or PLM, which is a geodetic station, confirmed during any photogrammetric operational phase or established in the field, shall be symbolized on shoreline maps with an equilateral triangle with center dot. The sides of the triangle shall be equal to 4.5 mm in length and have a line weight equal to .13 mm. Within a reasonable tolerance, the center dot shall have a diameter equal to .13 mm. This is an established specification.

An elevated object mapped which does not meet the definition of charted landmark, fixed aid to navigation or PLM shall be symbolized on shoreline maps with a 1 mm diameter circle. The line weight shall be .13 mm. This is an established specification.

PROCEDURE IMPLEMENTATION

Production procedures specified in this memo shall be implemented as of the date of this memo and shall be applied to all projects in the compilation phase. Projects which are in the final review phase as of the date of this memo and older field edit projects are exempt from implementation.

Attachment

cc: Coastal Mapping Unit Members
Coastal Mapping Program Coordinator

Figure Reference	CASE	EXAMPLE OF SYMBOL AND NOMENCLATURE
1	Photogrammetrically Located Fixed Aid to Navigation	⊙ LIGHT 10
2	Fixed Aid to Navigation Nomenclature with Designated Range or Channel Name	NORFOLK SHIP CHANNEL ⊙ LIGHT 10
3	Fixed Aid to Navigation which is also a geodetic station	NORFOLK SHIP CHANNEL LIGHT 10 (SHIP CHANNEL LIGHT 10 1984) △
4	Photogrammetrically Located Charted Landmark	⊙ STACK
5	Charted Landmark which is also a geodetic station	△ STACK (NORFOLK BRICK CO STACK 1934)
6	Charted Landmark Nomenclature with Annotation	⊙ STACK (Most Northern of Six)
7	Photogrammetrically Located Cartographic Feature of Possible Landmark Value (PLM)	⊙ Stack
8	PLM which is also a geodetic station	△ Stack (NORTH SHORE REFINERY 1945)
9	PLM Nomenclature with Annotation	⊙ Stack (Northerly of Two)
10	Geodetic Station recovered during photogrammetric field operations (not an aid, landmark or PLM)	△ MARTIN 1947
11	Geodetic station established during operations; whose position is "unadjusted"	△ MARTIN 1986 (Field Position) or △ MARTIN 1986 (Field Position)
12	Elevated Cartographic Feature mapped which is not a charted landmark, aid or PLM	◦ light standard

TABLE OF FIGURES FOR PRODUCTION PROCEDURE MEMO NO. 1

Draft Policy Memo: "Implementation of the North American
Datum of 1983 (NAD 83) in the Coastal Mapping Program of
the Photogrammetry Branch

DRAFT

MEMORANDUM FOR: Distribution

FROM: Commander A. Y. Bryson, NOAA
Chief, Photogrammetry Branch, NCD

SUBJECT: Implementation of the North American Datum of
1983 (NAD 83) in the Coastal Mapping Program
(CMP) of the Photogrammetry Branch (PB)

BACKGROUND

On May 13, 1985, the Director, Charting and Geodetic Services, approved a report by the Marine Chart Branch (MCB), titled "Recommendations for Implementation of NAD 83 in the Nautical Charting Program." With the approval of that report, the need for the Hydrographic Surveys Branch (HSB) and PB to address the issue of NAD 83 implementation was identified. On November 12, 1986, the Chief, HSB issued a memo outlining the implementation of NAD 83 in the Hydrographic Surveys Program. After examining

the requirements for photogrammetric data by the two principal users, the following implementation policy is established for graphic products of the CMP.

POLICY

Graphic products for coastal mapping projects, which are based on horizontal control provided in NAD 83 coordinates, will be provided with the primary projection based on NAD 83. The shift between NAD 83 and NAD 27 will be depicted graphically by providing supplemental projection intersections at twice the interval of the NAD 83 projection intersections, e.g., NAD 83 at 1' x 1' with NAD 27 at 2' x 2'. The NAD 83 projection will be graphically portrayed with a full line. The NAD 27 projection intersections will be depicted with 10mm ticks. The NAD 27 coordinate values will be annotated in the southwestern and northeastern corners of the map with the NAD 27 identifier enclosed in parenthesis, i.e., (NAD 27). The depiction of a state plane coordinate system grid is no longer a requirement of the CMP.

Graphic products for coastal mapping projects, which are based on horizontal control provided in NAD 27 coordinates, will be provided with the primary map projection based on NAD 27. The shift between NAD 27 and NAD 83 will be depicted graphically by providing supplemental projection intersections at twice the

interval of the NAD 27 intersections, e.g., NAD 27 at 1' x 1' with NAD 83 at 2' x 2'. The NAD 27 projection will be graphically portrayed with a full line. The NAD 83 projection intersections will be depicted with 10mm ticks. The NAD 83 coordinate values will be annotated in the southwestern and northeastern corners of the map with the NAD 83 identifier enclosed in parenthesis, i.e., (NAD 83). The depiction of a state plane coordinate system grid is no longer required.

The following note will be used in place of the current projection reference in the title block for the map when supplemental projections are depicted:

The primary projection of this map is _____ based on the North American Datum of 1983 (NAD 83) and is depicted with a full line. The supplemental projection of this map is _____ based on the North American Datum of 1927 (NAD 27) and is depicted with projection ticks.

The following note will be added in the bottom margin of the map:

PLOTTING ADJUSTMENT

Geographic positions based on NAD 27 may be plotted on this map utilizing the NAD 83 projection by applying the following average corrections:

4

Latitude: (±)XX.XX or (±)XX.X meters.

Longitude: (±)XX.XX or (±)XX.X meters.

Reference to NAD 83 or NAD 27 would, of course, be reversed in the notes above based on whether NAD 83 or NAD 27 is the basis for the primary projection. The shift information is obtained from the standard printout being provided by the National Geodetic Survey Division (NGSD). The average will be based on the mathematical averaging of the shift values provided by NGSD for the coordinates within the limits of the map. The number of shift values used in the mathematical averaging shall be at least seven and shall be a representative distribution of shift within the map limits.

Supplemental projection ticks (NAD 27 or NAD 83) will not be depicted if the average shift from NAD 83 to NAD 27 (or vice versa) is equal to or less than 0.2mm in latitude and longitude in map measurement. In this situation, the Plotting Adjustment note will not be applied to the map and the projection notation will be specified in the title block as NAD 83 without reference to a supplemental projection.

The following note will be used in place of the current projection reference in the title block of the map when the shift

between NAD 83 and NAD 27 is equal to or less than 0.2mm in latitude and longitude in map measurement:

The projection of this map is _____
based on the North American Datum of 1983 (NAD 83). Geographic positions based on the North American Datum of 1927 (NAD 27) do not require conversion to NAD 83 for plotting on this map.

The point of contact for NAD 83 shift data is the Coastal Planning Unit. PB will not be responsible for applying supplemental NAD 83 projection ticks to any map which has been registered or is currently in the office review phase.

SUMMARY

A synopsis of the implementation plan is as follows:

1. If horizontal control for photogrammetric surveys is provided in NAD 83 or NAD 27 coordinate values, the appropriate primary projection will be based on NAD 83 or NAD 27, respectfully. A supplemental projection based on NAD 27 or NAD 83 will be provided for as long a period of time as required by the Marine Charting and Hydrographic Surveying Programs of NOS.

DRAFT

6

2. The depiction of a state plane coordinate system grid is no longer a requirement of the CMP.

Distribution:

N/CG21 - Fritz

N/CG22 - Simmons

N/CG24 - Matsushige

N/MOA - Moses

N/MOP - Sandquist

CLEARANCE:**SIGNATURE AND DATE:**N/CG2: CAndreasen