

82009 rpt

CRUISE REPORT: NE-82-1

VESSEL: R.V. NEECHO
CRUISE NO.: NE-82-1
PROJECT: South Atlantic Environmental (51821)

AREA OF OPERATIONS: ALBEMARLE SOUND, N.C.
CRUISE DATES: APRIL 15-29, 1982
PORT STOPS: 15-21: Elizabeth City, N.C. (Eliz. City Shipyard Marine)
21-24: Manteo, N.C. (Salty Dog Marina)
24-25: Elizabeth City, N.C. (E.C.S.M.)
25-27: Edenton, N.C. (Edenton Marina)
27 pm: Elizabeth City, N.C. (E.C.S.M.)
28: Great Bridge, Va. (Coast Guard dock)

CHIEF SCIENTISTS: Peter Popenoe and Rusty Tirey
PERSONNEL: Dave Nichols (Chief Technician)
Jack Connell (Boat Operator)
Dave Mason (Onshore support)
Frank Jennings (5/15-5/18)
Greg Miller (5/15-5/20)

CRUISE OBJECTIVES:

The cruise was conducted for the Reactor Hazards Research Program to gain knowledge on structural elements of the southeastern margin. The cruise was also aimed at gathering stratigraphic information in the Cape Hatteras area.

A secondary objective of conducting shallow seismic and sidescan sonar surveys within Albemarle Sound as a sedimentation study was aborted when sparker data was found to interfere (cross talk) with the deeper airgun records.

NAVIGATION: Mini Ranger System (5/20-5/22)
Northstar Loran-C tied to buoys (5/22-5/28)

EQUIPMENT: DFS-V Texas Instruments multi-channel system
Fairfield Industries 120 m, 12 channel streamer with 10 m hydrophone spacing.
Seismic Systems, Inc. 15 in³ water gun
Bolt 40 in³ airgun with wave shaper
EPC 3200 Graphic recorder (near-trace monitor)
Innerspace micro-sparker
DE-719 fathometer
Streamer depth = 5 feet

TABULATED DATA: see attached Table

CHIEF SCIENTISTS' NOTES:

Although the NEECHO was launched at Elizabeth City on April 15, the mini-ranger system required several days to set up, and some equipment had been damaged in transit, therefore surveying did not begin before April 19. Ranger A and B worked well on April 19, and these were the

primary navigation systems used, although Loran-C was taken as a back-up. We found that a 4 knot speed over the bottom was approximately correct to maintain the 10 m shot-point spacing. Line 1 was placed down the axis of Albemarle Sound as a test, and it was found that soft bottom and gas greatly affected penetration of the 15 in³ water gun.

On April 20, we tested the 40 in³ airgun to try to hammer more signal into the soft and gassey bottom. This did not give as much penetration as the 15 in³ water gun, so after a one half hour test we switched again to the water gun. Penetration appeared to be poor, however several "windows" of hard bottom were crossed where short segments of excellent records were obtained. Most of the Pasquotank River was run, and line no. 2 ended in Albemarle Sound. It took almost three hours to return to Elizabeth City up the Pasquotank River. Both ranger A and B worked for this day, however ranger C did not work.

On April 21, we left the E.C. Marina at 0800 EST (Eastern Standard Time) and arrived on line 3 hours and 10 minutes later. This was a continuation of line 2 across Albemarle Sound, and was planned to extend the length of the Alligator River. After testing the mini-rangers, none were working, so we proceeded on Loran C and buoy navigation only. We had been told there was a place to tie the boat at the Alligator River bridge, so we worked 5 hours on line #2, getting good penetration over hard bottom and poor penetration over soft bottom.

On talking with the Alligator Bridge operator, we learned that there were no places to tie a boat overnight on the Alligator River, or in the area. Therefore, we broke off the line early and proceeded to Manteo, the closest harbor, arriving at 1930 EST. We drove back to Elizabeth City arriving at 22:30.

April 22 was spent taking down the miniranger off the blimp hanger (350' high), getting supplies, checking harbors, fueling the boat and moving the operation to Manteo, N.C.

April 23. Because of winds gusting to 40 mph, (15-25 normally) we deadheaded south to Stumpy Point on the Croaton Sound to start work, leaving Manteo at 0800 and arriving at Stumpy Point at 11:05 EST. Winds had abated slightly so we deployed equipment to survey line #3. The bottom was hard within Croaton Sound and excellent records were obtained most of the day showing the spectacular channel that has been mapped offshore, cut on mid-Miocene rocks and filled with Pliocene sediments. We terminated the line at the Roanoke Island Bridge at 1620 EST and tied up at Manteo at 17:45.

April 24. Line #3 was continued from the Roanoke Island Bridge into Albemarle Sound. Records were good at the start of the day over Croaton Sound but deteriorated due to soft bottom to the north in Albemarle Sound. Because of poor records we ended line 3 at 14:30 EST and headed to Elizabeth City arriving at 1600 EST. We fueled the boat and determined that to get better records, we should avoid the center of the Sounds, trying instead to cross areas of hard bottom near shore.

April 25. Departed Elizabeth City at 0800 (DST) Daylight Savings Time arriving at the mouth of the Pasquotank River at 9:30. Discontinuous good records were obtained over hard bottom near the start

of line 4 but many fish nets and restricted areas were encountered near shore as we proceeded up Albemarle Sound, forcing us into the center of the channel where the bottom was soft. At Laurel Point we snagged a fish net with the boat, and had to pull the streamer to keep it off the net. We freed ourselves and redeployed, losing only about 18 minutes. In late afternoon we pulled equipment and proceeded to the Edenton, N.C. Marina for the night, arriving at 1800 (DST).

April 26. Rain and blowing hard. Worked on mini-ranger systems all day to try to fix them. Found that the trouble was in the transmitter on the boat.

April 27. Left the dock at 0810 DST in heavy fog (vis. appr. 1/3 mi) and proceeded to the far end of the line planned for the day in the Chowan River, arriving at 11:08. By this time the fog had cleared and we began the survey at 11:10. Bottom in this area was hard, and the airgun signals were clearly heard in the boat, proving very hard bottom. However, records were poor, showing strong reverberations. We surveyed until about 1300 where we broke off line and pulled equipment. Records for the day appear unuseable. In order to save one day of time we left for Elizabeth City directly from the survey area, arriving at about 20:00 DST. We filled the gas tanks on the boat and docked for the night.

April 28. Left the dock at 0800 to transit to Great Bridge, south of Norfolk. On the trip we deployed the 15 cu in airgun and single channel streamer in the Dismal Swamp Canal as a test. Data did not appear useable so we deployed the multi-channel streamer on the surface and recorded 1/2 hour of data (probably not useable due to strong reverberations). We docked at the Great Bridge Coast Guard base at 17:00, discovering a hydraulic leak as we closed the boat up. We traced the leak to a pressure gauge during the next hour.

COMMENTS:

I consider the cruise quite successful, due in large part to the efforts of Dave Nichols, Jack Connell, and Dave Mason who tirelessly gave their best efforts. Thanks are also extended to Rusty Tiry for making all preliminary arrangements and trouble shooting the equipment.

OBSERVATIONS:

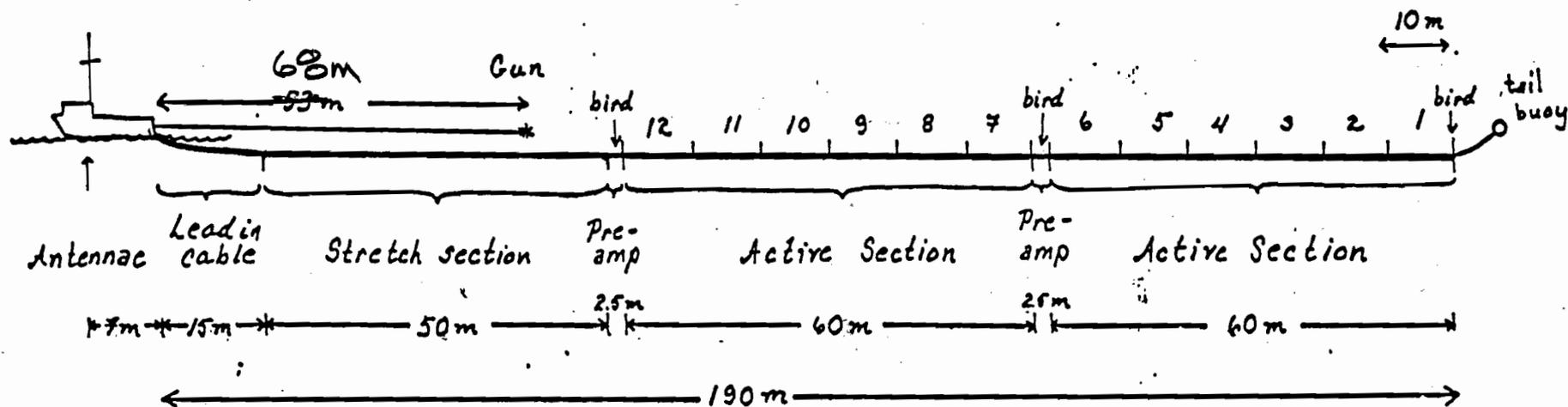
1. Three crew members, Chief Scientist, Technician, and Boat Operator appear to be ideal for this type of survey. Shore support is also necessary.
2. In an area as remote as Albemarle Sound, a thorough investigation of harbors should be conducted prior to the cruise. At least 1/2 of our time was spent in transit to and from survey areas.
3. Because of soft bottom conditions future surveys should be laid out to cross as many areas marked as hard bottom on the charts as possible. Unfortunately, in the Albemarle Sound area those were near shore where shallow water, fish nets, and crab pots were a problem. We found that going to the far end of the survey planned for the day and working back toward the harbor helped in locating obstructions to be avoided in the survey.

TABULATED DATA

| Line | Date | TIME (Z) | | SHOT | POINT | TAPES | Total km |
|---------------|---------|----------|------|------|-------|--------|----------|
| | | SOL | EOL | SOL | EOL | | |
| 1 | 4-19-82 | 1700 | 1930 | 001 | 1801 | 1-5 | 19 |
| 2 | 4-20-82 | 1708 | 2000 | 001 | 2000 | Voided | 27 |
| 2 | 4-21-82 | 1537 | 1952 | 001 | 1952 | 12-19 | 30 |
| 3 | 4-23-82 | 1649 | 2104 | 001 | 3057 | 20-27 | 36 |
| 3 | 4-24-82 | 1506 | 1830 | 3058 | 5517 | 28-34 | 28 |
| 4 | 4-25-82 | 1350 | 2014 | 001 | 4405 | 35-46 | 45 |
| 5 | 4-27-82 | 1510 | 1721 | 001 | 1643 | 47-51 | 19 |
| Dismal | | | | | | | |
| Swamp | 4-28-81 | | | 001 | | 52 | 4 |

Total km of 12 channel data = 208

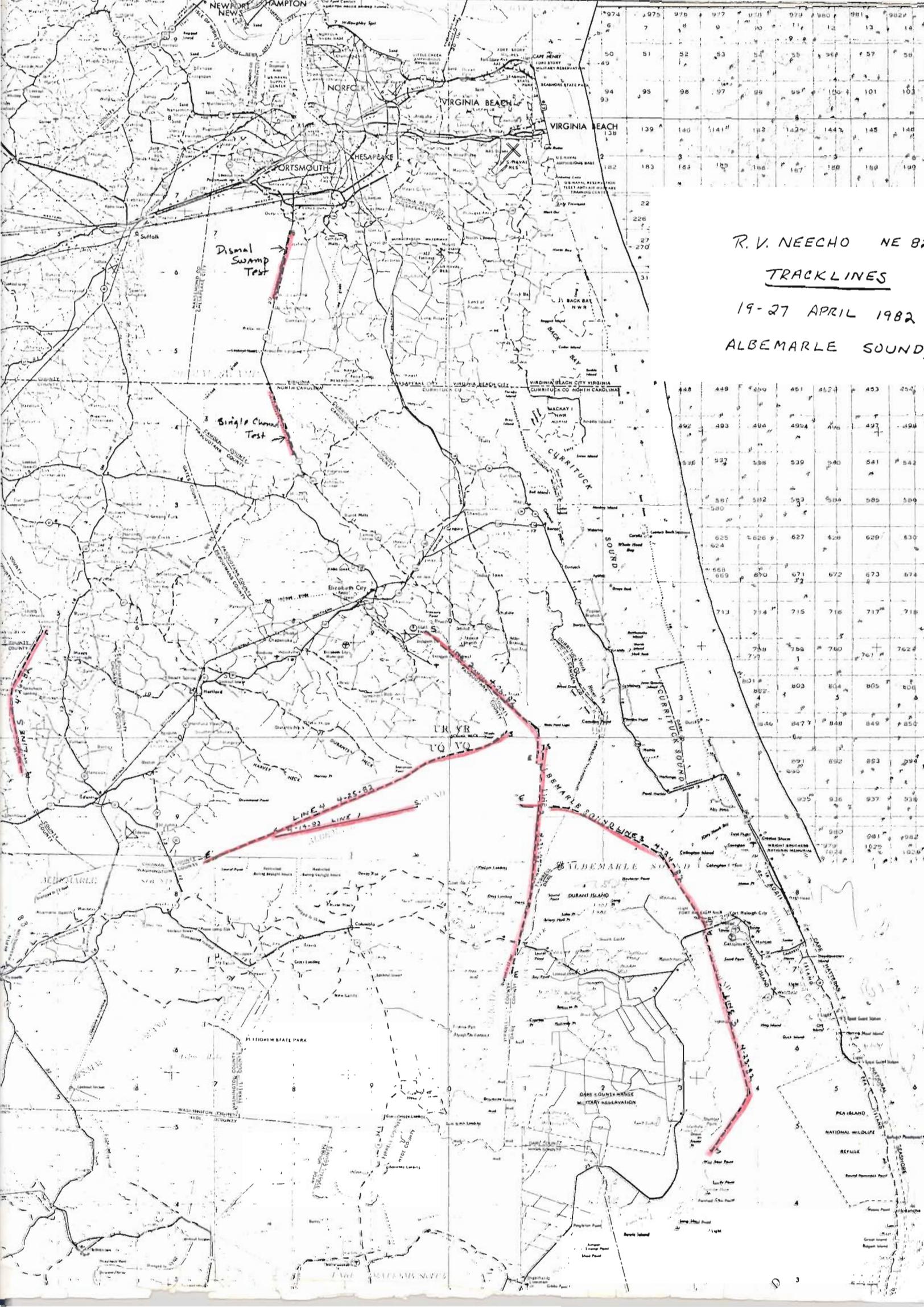
Figure 1: Streamer Configuration



Hydrophone depth: 3.05 m ⁵ (10 ft)

Offset distance: ~~19.5 m~~ ^{30 m} (Gun to center of trace 12)

Shot interval: by time, as close as possible to 10 m spacing using the LORAN C speed-over-bottom readout to adjust the shooting interval. Shot intervals ranged from 4-5 sec (3.6-5.0 kts).



R. V. NEECHO NE 8
TRACKLINES
 19-27 APRIL 1982
 ALBEMARLE SOUND

| | | | | | | |
|------|------|------|------|------|------|------|
| 448 | 449 | 450 | 451 | 452 | 453 | 454 |
| 492 | 493 | 494 | 495 | 496 | 497 | 498 |
| 536 | 537 | 538 | 539 | 540 | 541 | 542 |
| 587 | 588 | 589 | 590 | 591 | 592 | 593 |
| 625 | 626 | 627 | 628 | 629 | 630 | 631 |
| 668 | 669 | 670 | 671 | 672 | 673 | 674 |
| 713 | 714 | 715 | 716 | 717 | 718 | 719 |
| 768 | 769 | 770 | 771 | 772 | 773 | 774 |
| 819 | 820 | 821 | 822 | 823 | 824 | 825 |
| 870 | 871 | 872 | 873 | 874 | 875 | 876 |
| 921 | 922 | 923 | 924 | 925 | 926 | 927 |
| 978 | 979 | 980 | 981 | 982 | 983 | 984 |
| 1035 | 1036 | 1037 | 1038 | 1039 | 1040 | 1041 |
| 1092 | 1093 | 1094 | 1095 | 1096 | 1097 | 1098 |
| 1149 | 1150 | 1151 | 1152 | 1153 | 1154 | 1155 |
| 1206 | 1207 | 1208 | 1209 | 1210 | 1211 | 1212 |
| 1263 | 1264 | 1265 | 1266 | 1267 | 1268 | 1269 |
| 1320 | 1321 | 1322 | 1323 | 1324 | 1325 | 1326 |
| 1377 | 1378 | 1379 | 1380 | 1381 | 1382 | 1383 |
| 1434 | 1435 | 1436 | 1437 | 1438 | 1439 | 1440 |
| 1491 | 1492 | 1493 | 1494 | 1495 | 1496 | 1497 |
| 1548 | 1549 | 1550 | 1551 | 1552 | 1553 | 1554 |
| 1605 | 1606 | 1607 | 1608 | 1609 | 1610 | 1611 |
| 1662 | 1663 | 1664 | 1665 | 1666 | 1667 | 1668 |
| 1719 | 1720 | 1721 | 1722 | 1723 | 1724 | 1725 |
| 1776 | 1777 | 1778 | 1779 | 1780 | 1781 | 1782 |
| 1833 | 1834 | 1835 | 1836 | 1837 | 1838 | 1839 |
| 1890 | 1891 | 1892 | 1893 | 1894 | 1895 | 1896 |
| 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 |
| 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 |
| 2118 | 2119 | 2120 | 2121 | 2122 | 2123 | 2124 |
| 2175 | 2176 | 2177 | 2178 | 2179 | 2180 | 2181 |
| 2232 | 2233 | 2234 | 2235 | 2236 | 2237 | 2238 |
| 2289 | 2290 | 2291 | 2292 | 2293 | 2294 | 2295 |
| 2346 | 2347 | 2348 | 2349 | 2350 | 2351 | 2352 |
| 2403 | 2404 | 2405 | 2406 | 2407 | 2408 | 2409 |
| 2460 | 2461 | 2462 | 2463 | 2464 | 2465 | 2466 |
| 2517 | 2518 | 2519 | 2520 | 2521 | 2522 | 2523 |
| 2574 | 2575 | 2576 | 2577 | 2578 | 2579 | 2580 |
| 2631 | 2632 | 2633 | 2634 | 2635 | 2636 | 2637 |
| 2688 | 2689 | 2690 | 2691 | 2692 | 2693 | 2694 |
| 2745 | 2746 | 2747 | 2748 | 2749 | 2750 | 2751 |
| 2802 | 2803 | 2804 | 2805 | 2806 | 2807 | 2808 |
| 2859 | 2860 | 2861 | 2862 | 2863 | 2864 | 2865 |
| 2916 | 2917 | 2918 | 2919 | 2920 | 2921 | 2922 |
| 2973 | 2974 | 2975 | 2976 | 2977 | 2978 | 2979 |
| 3030 | 3031 | 3032 | 3033 | 3034 | 3035 | 3036 |
| 3087 | 3088 | 3089 | 3090 | 3091 | 3092 | 3093 |
| 3144 | 3145 | 3146 | 3147 | 3148 | 3149 | 3150 |
| 3201 | 3202 | 3203 | 3204 | 3205 | 3206 | 3207 |
| 3258 | 3259 | 3260 | 3261 | 3262 | 3263 | 3264 |
| 3315 | 3316 | 3317 | 3318 | 3319 | 3320 | 3321 |
| 3372 | 3373 | 3374 | 3375 | 3376 | 3377 | 3378 |
| 3429 | 3430 | 3431 | 3432 | 3433 | 3434 | 3435 |
| 3486 | 3487 | 3488 | 3489 | 3490 | 3491 | 3492 |
| 3543 | 3544 | 3545 | 3546 | 3547 | 3548 | 3549 |
| 3600 | 3601 | 3602 | 3603 | 3604 | 3605 | 3606 |
| 3657 | 3658 | 3659 | 3660 | 3661 | 3662 | 3663 |
| 3714 | 3715 | 3716 | 3717 | 3718 | 3719 | 3720 |
| 3771 | 3772 | 3773 | 3774 | 3775 | 3776 | 3777 |
| 3828 | 3829 | 3830 | 3831 | 3832 | 3833 | 3834 |
| 3885 | 3886 | 3887 | 3888 | 3889 | 3890 | 3891 |
| 3942 | 3943 | 3944 | 3945 | 3946 | 3947 | 3948 |
| 3999 | 4000 | 4001 | 4002 | 4003 | 4004 | 4005 |