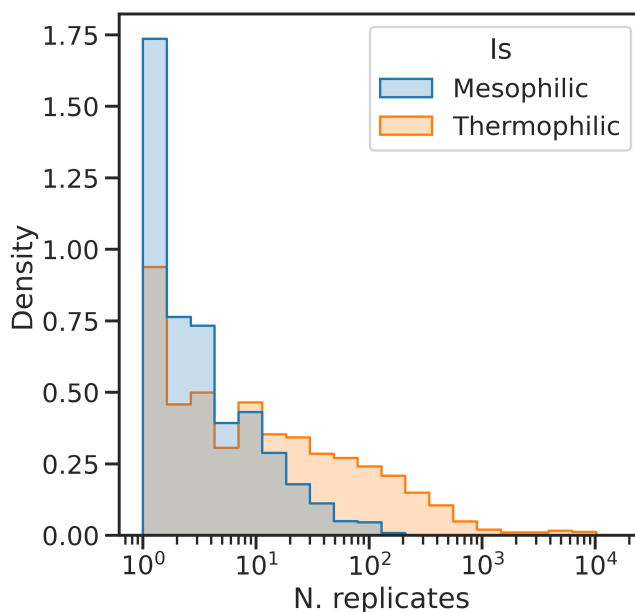


# Supplementary Information for “*Neural network conditioned to produce thermophilic protein sequences can increase thermal stability*”

Dataset used



*Figure S1: Density of replicate counts for mesophilic and thermophilic sequences occurring in the training set.<sup>1</sup> Orange is the number of mesophilic counterparts per thermophile, and blue vice versa. The most common number of replicates for both the input and the target sequences is one, however the majority of proteins occur multiple times (paired to a different homolog) in the training set. Thermophilic replicates are right skewed, as homologous protein pairs were identified for a much larger group of mesophilic sequences to a smaller set of thermophilic ones.*

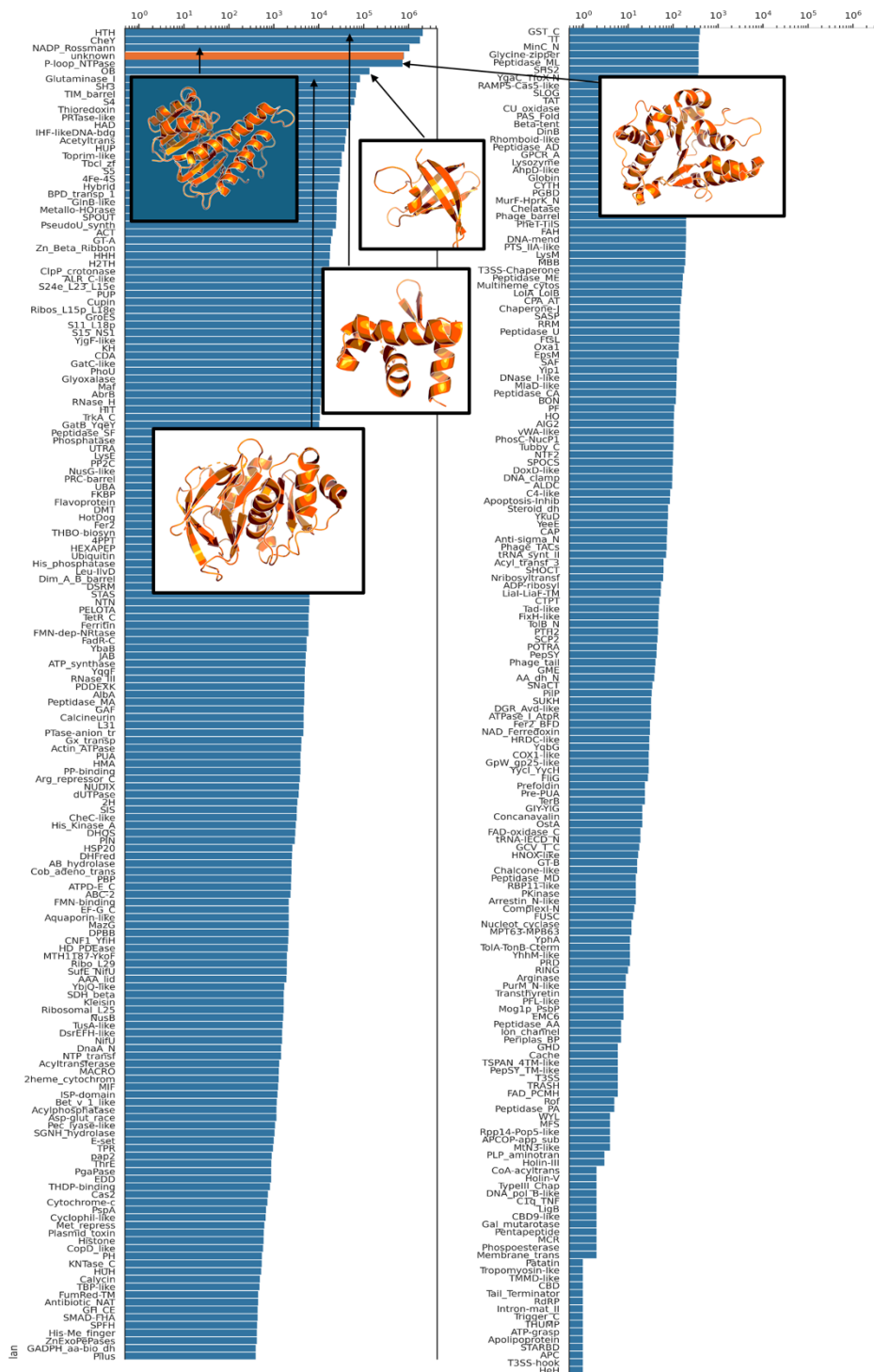


Figure S2: Counts of Pfam clans observed in the dataset for NOMELT, with structures for some of the highest represented shown (HTH, NADP\_Rossmann, P-Loop NTPase, OB, Glutaminase

Table S1: Counts of each Pfam IDs observed for meso sequences in the dataset.<sup>2</sup>

| ID         | count      | ID         | count | ID         | count | ID         | count |
|------------|------------|------------|-------|------------|-------|------------|-------|
| PF00578.24 | 10518      | PF17954.4  | 156   | PF00301.23 | 1834  | PF18931.3  | 4     |
| PF08534.13 | 10442      | PF20393.1  | 15    | PF02075.20 | 1068  | PF03367.16 | 6     |
| PF10417.12 | 870        | PF14065.9  | 3     | PF03652.18 | 4955  | PF01063.22 | 5     |
| PF04463.15 | 650        | PF02517.19 | 60    | PF00575.26 | 1193  | PF11699.11 | 35    |
| PF01257.22 | 619        | PF17144.7  | 35    | PF13275.9  | 721   | PF05952.15 | 5     |
| PF02834.19 | 1511       | PF00444.21 | 9688  | PF01259.21 | 3764  | PF07510.14 | 21    |
| PF13563.9  | 1540       | PF08069.15 | 31    | PF00269.23 | 999   | PF02680.17 | 22    |
| PF10469.12 | 355        | PF01649.21 | 7486  | PF01127.25 | 458   | PF09685.13 | 52    |
| PF00106.28 | 31064<br>2 | PF06026.17 | 637   | PF00584.23 | 230   | PF08849.14 | 6     |
| PF01073.22 | 549        | PF01192.25 | 331   | PF04472.15 | 433   | PF18480.4  | 5     |
| PF01370.24 | 45633      | PF02036.20 | 43    | PF03749.16 | 908   | PF13738.9  | 11    |
| PF02719.18 | 560        | PF02775.24 | 817   | PF17746.4  | 908   | PF06763.14 | 8     |
| PF07993.15 | 16         | PF02814.18 | 39    | PF07638.14 | 2006  | PF01876.19 | 28    |
| PF08659.13 | 25564<br>9 | PF05194.15 | 31    | PF04539.19 | 790   | PF10135.12 | 8     |
| PF13561.9  | 31064<br>9 | PF04893.20 | 49    | PF04402.17 | 116   | PF09701.13 | 4     |
| PF16363.8  | 934        | PF14164.9  | 10    | PF02146.20 | 1221  | PF09912.12 | 6     |
| PF02829.17 | 1393       | PF14256.9  | 61    | PF01380.25 | 221   | PF10730.12 | 32    |
| PF08279.15 | 4445       | PF00882.21 | 30    | PF13580.9  | 1033  | PF03745.17 | 13    |
| PF03061.25 | 1152       | PF02737.21 | 122   | PF01464.23 | 243   | PF11706.11 | 5     |
| PF14539.9  | 68         | PF13622.9  | 32    | PF02616.17 | 1682  | PF05707.15 | 9     |
| PF13279.9  | 710        | PF17837.4  | 1043  | PF01668.21 | 4449  | PF14516.9  | 1     |
| PF01812.23 | 1604       | PF00975.23 | 39    | PF01713.24 | 127   | PF04647.18 | 11    |
| PF00005.30 | 45473<br>4 | PF08386.13 | 11    | PF09335.14 | 3155  | PF01510.28 | 50    |
| PF02463.22 | 96155      | PF12746.10 | 65    | PF00081.25 | 5677  | PF08979.14 | 5     |
| PF13175.9  | 812        | PF13480.10 | 61    | PF02777.21 | 5695  | PF16277.8  | 2     |
| PF13476.9  | 4126       | PF04326.17 | 4     | PF06686.14 | 3156  | PF04967.15 | 5     |
| PF13191.9  | 9197       | PF05219.15 | 33    | PF12685.10 | 156   | PF06253.14 | 1     |
| PF13304.9  | 65167      | PF00329.22 | 20    | PF12116.11 | 416   | PF03824.19 | 7     |
| PF00406.25 | 12309      | PF04677.18 | 75    | PF01944.20 | 291   | PF01311.23 | 4     |
| PF05191.17 | 11095      | PF04290.15 | 181   | PF09548.13 | 1935  | PF07758.14 | 11    |
| PF13207.9  | 12659      | PF01487.18 | 22    | PF09580.13 | 61    | PF13803.9  | 3     |

|                   |       |            |     |            |       |            |    |
|-------------------|-------|------------|-----|------------|-------|------------|----|
| <b>PF13238.9</b>  | 7047  | PF04342.15 | 13  | PF09579.13 | 156   | PF18910.3  | 14 |
| <b>PF13671.9</b>  | 3819  | PF13743.9  | 37  | PF14034.9  | 125   | PF20548.1  | 9  |
| <b>PF01202.25</b> | 1765  | PF07610.14 | 15  | PF02590.20 | 6738  | PF04068.18 | 19 |
| <b>PF00485.21</b> | 1490  | PF09891.12 | 7   | PF00588.22 | 10681 | PF06855.15 | 55 |
| <b>PF02224.21</b> | 7927  | PF10946.11 | 15  | PF08032.15 | 3144  | PF01637.21 | 20 |
| <b>PF13189.9</b>  | 4901  | PF10958.11 | 15  | PF13782.9  | 124   | PF10882.11 | 1  |
| <b>PF12399.11</b> | 22294 | PF04214.16 | 1   | PF03862.16 | 3627  | PF08269.14 | 3  |
| <b>PF01656.26</b> | 500   | PF14076.9  | 4   | PF14097.9  | 104   | PF17200.7  | 3  |
| <b>PF13500.9</b>  | 232   | PF14084.9  | 91  | PF04026.15 | 422   | PF07027.15 | 3  |
| <b>PF02223.20</b> | 4315  | PF04322.15 | 17  | PF04232.15 | 4797  | PF01629.19 | 7  |
| <b>PF13521.9</b>  | 1965  | PF01949.19 | 17  | PF02586.17 | 1103  | PF10704.12 | 27 |
| <b>PF13555.9</b>  | 4915  | PF03372.26 | 122 | PF00436.28 | 2604  | PF09985.12 | 1  |
| <b>PF13604.9</b>  | 450   | PF02943.18 | 21  | PF08141.15 | 383   | PF18933.3  | 6  |
| <b>PF00142.21</b> | 44    | PF10646.12 | 56  | PF14098.9  | 193   | PF12788.10 | 1  |
| <b>PF02374.18</b> | 33    | PF13506.9  | 10  | PF01740.24 | 3214  | PF09824.12 | 12 |
| <b>PF06564.15</b> | 42    | PF07449.14 | 74  | PF13466.9  | 3127  | PF04229.17 | 14 |
| <b>PF09140.14</b> | 127   | PF11209.11 | 6   | PF01300.21 | 562   | PF07747.14 | 1  |
| <b>PF10609.12</b> | 240   | PF04390.15 | 37  | PF04143.17 | 66    | PF04207.15 | 11 |
| <b>PF13614.9</b>  | 268   | PF03956.16 | 28  | PF01975.20 | 172   | PF05845.15 | 10 |
| <b>PF00696.31</b> | 10687 | PF05430.14 | 42  | PF00923.22 | 8543  | PF02697.17 | 1  |
| <b>PF01061.27</b> | 556   | PF09754.12 | 17  | PF01925.22 | 406   | PF17334.5  | 20 |
| <b>PF12679.10</b> | 396   | PF13263.9  | 20  | PF01361.24 | 718   | PF04341.15 | 7  |
| <b>PF06182.14</b> | 7     | PF05036.16 | 13  | PF14552.9  | 458   | PF00459.28 | 2  |
| <b>PF09819.12</b> | 118   | PF01841.22 | 23  | PF07331.14 | 133   | PF06713.14 | 6  |
| <b>PF03215.18</b> | 224   | PF03686.16 | 5   | PF03741.19 | 419   | PF05400.16 | 2  |
| <b>PF08352.15</b> | 163   | PF14043.9  | 19  | PF00440.26 | 7901  | PF08734.14 | 15 |
| <b>PF00583.28</b> | 10471 | PF14068.9  | 92  | PF16859.8  | 284   | PF03672.16 | 36 |
| <b>PF08445.13</b> | 2181  | PF02591.18 | 156 | PF08361.14 | 32    | PF14140.9  | 8  |
| <b>PF13302.10</b> | 6899  | PF00910.25 | 40  | PF17932.4  | 2820  | PF13115.9  | 13 |
| <b>PF13420.10</b> | 4842  | PF12568.11 | 3   | PF17938.4  | 239   | PF09873.12 | 5  |
| <b>PF13508.10</b> | 6490  | PF01989.19 | 37  | PF08359.14 | 798   | PF11906.11 | 1  |
| <b>PF13673.10</b> | 6310  | PF00165.26 | 88  | PF08362.14 | 15    | PF14340.9  | 29 |
| <b>PF13527.10</b> | 573   | PF02805.19 | 13  | PF13977.9  | 392   | PF19788.2  | 4  |
| <b>PF13523.9</b>  | 1218  | PF12833.10 | 94  | PF01910.20 | 1981  | PF03928.17 | 19 |
| <b>PF00694.22</b> | 3499  | PF00025.24 | 78  | PF07615.14 | 11    | PF04140.17 | 41 |
| <b>PF01648.23</b> | 6505  | PF16554.8  | 67  | PF00899.24 | 679   | PF04191.16 | 36 |
| <b>PF01842.28</b> | 7840  | PF07565.16 | 21  | PF13899.9  | 271   | PF00497.23 | 20 |
| <b>PF10369.12</b> | 4300  | PF01145.28 | 3   | PF02597.23 | 6069  | PF10613.12 | 17 |
| <b>PF13291.9</b>  | 2355  | PF02617.20 | 30  | PF06738.15 | 433   | PF03787.18 | 5  |

|                   |             |            |       |            |       |            |    |
|-------------------|-------------|------------|-------|------------|-------|------------|----|
| <b>PF13710.9</b>  | 4188        | PF01983.19 | 35    | PF12821.10 | 461   | PF02676.17 | 9  |
| <b>PF03315.18</b> | 1602        | PF19769.2  | 12    | PF00121.21 | 1347  | PF00775.24 | 1  |
| <b>PF00571.31</b> | 4349        | PF14358.9  | 29    | PF00265.21 | 651   | PF08551.13 | 4  |
| <b>PF13740.9</b>  | 1132        | PF01578.23 | 153   | PF02581.20 | 1548  | PF04016.15 | 32 |
| <b>PF00708.21</b> | 1161        | PF07311.15 | 208   | PF04263.19 | 2050  | PF14126.9  | 23 |
| <b>PF01553.24</b> | 1329        | PF07187.14 | 18    | PF04265.17 | 1941  | PF13746.9  | 2  |
| <b>PF03352.16</b> | 664         | PF07423.14 | 16    | PF00590.23 | 2396  | PF20028.2  | 3  |
| <b>PF04008.17</b> | 80          | PF11387.11 | 48    | PF01709.23 | 12135 | PF06056.15 | 8  |
| <b>PF03435.21</b> | 960         | PF11151.11 | 24    | PF01980.19 | 88    | PF02926.20 | 1  |
| <b>PF13460.9</b>  | 12353       | PF11167.11 | 35    | PF04073.18 | 990   | PF18489.4  | 6  |
| <b>PF04321.20</b> | 483         | PF13056.9  | 9     | PF01746.24 | 3727  | PF06938.14 | 7  |
| <b>PF05988.15</b> | 106         | PF04242.16 | 8     | PF02583.20 | 1902  | PF10694.12 | 11 |
| <b>PF00085.23</b> | 10352       | PF14359.9  | 12    | PF01371.22 | 778   | PF13938.9  | 6  |
| <b>PF13098.9</b>  | 7590        | PF20020.2  | 5     | PF01509.21 | 6     | PF19651.2  | 7  |
| <b>PF13905.9</b>  | 3610        | PF20567.1  | 5     | PF16198.8  | 6     | PF13579.9  | 4  |
| <b>PF13728.9</b>  | 462         | PF03151.19 | 3     | PF00814.28 | 4065  | PF02190.19 | 10 |
| <b>PF14595.9</b>  | 2267        | PF01269.20 | 37    | PF02367.20 | 1139  | PF01969.20 | 8  |
| <b>PF01987.20</b> | 188         | PF19579.2  | 5     | PF01206.20 | 1536  | PF11964.11 | 1  |
| <b>PF01168.23</b> | 8724        | PF16784.8  | 10    | PF02580.19 | 15754 | PF13400.9  | 1  |
| <b>PF01081.22</b> | 2611        | PF12645.10 | 97    | PF03167.22 | 1116  | PF14182.9  | 1  |
| <b>PF00596.24</b> | 3604        | PF00475.21 | 13206 | PF03649.16 | 102   | PF07947.17 | 8  |
| <b>PF00072.27</b> | 17988<br>28 | PF02505.17 | 14    | PF01894.20 | 3529  | PF02594.19 | 19 |
| <b>PF03861.17</b> | 812         | PF05521.14 | 69    | PF03653.16 | 319   | PF06790.14 | 2  |
| <b>PF01583.23</b> | 399         | PF07929.14 | 40    | PF02021.20 | 1503  | PF04101.19 | 12 |
| <b>PF01261.27</b> | 158         | PF01948.21 | 141   | PF04297.17 | 547   | PF02996.20 | 4  |
| <b>PF03079.17</b> | 69          | PF02748.18 | 141   | PF03698.16 | 262   | PF03911.19 | 6  |
| <b>PF01316.24</b> | 3874        | PF06271.15 | 57    | PF00547.21 | 892   | PF16083.8  | 3  |
| <b>PF02863.21</b> | 3850        | PF03876.20 | 39    | PF01730.19 | 328   | PF19620.2  | 11 |
| <b>PF00011.24</b> | 1398        | PF01172.21 | 47    | PF00582.29 | 12057 | PF13040.9  | 6  |
| <b>PF17886.4</b>  | 1188        | PF09377.13 | 47    | PF02151.22 | 1945  | PF00361.23 | 3  |
| <b>PF01037.24</b> | 5224        | PF20268.1  | 47    | PF06257.14 | 205   | PF01920.23 | 20 |
| <b>PF13404.9</b>  | 3672        | PF10747.12 | 20    | PF02706.18 | 518   | PF19785.2  | 18 |
| <b>PF13412.9</b>  | 4993        | PF01922.20 | 6     | PF01797.19 | 533   | PF13768.9  | 1  |
| <b>PF01047.25</b> | 2124        | PF02657.18 | 44    | PF07873.14 | 726   | PF06339.15 | 19 |
| <b>PF09339.13</b> | 1472        | PF03592.19 | 29    | PF02575.19 | 5393  | PF07279.14 | 2  |
| <b>PF12802.10</b> | 3569        | PF05256.15 | 29    | PF02130.20 | 1793  | PF10027.12 | 11 |
| <b>PF12840.10</b> | 2199        | PF01050.21 | 25    | PF01906.20 | 1736  | PF11042.11 | 8  |
| <b>PF03780.16</b> | 3473        | PF01476.23 | 190   | PF02620.20 | 1334  | PF08882.14 | 9  |

|                   |       |            |     |            |       |            |    |
|-------------------|-------|------------|-----|------------|-------|------------|----|
| <b>PF02261.19</b> | 1733  | PF05425.16 | 101 | PF04264.16 | 447   | PF09902.12 | 35 |
| <b>PF01177.25</b> | 1154  | PF08905.14 | 7   | PF03795.17 | 326   | PF11255.11 | 6  |
| <b>PF03477.19</b> | 4638  | PF09413.13 | 22  | PF02542.19 | 6668  | PF04009.15 | 6  |
| <b>PF00119.23</b> | 927   | PF10006.12 | 53  | PF02325.20 | 115   | PF04609.15 | 8  |
| <b>PF00430.21</b> | 1040  | PF12758.10 | 23  | PF01809.21 | 875   | PF05440.15 | 4  |
| <b>PF00137.24</b> | 711   | PF04238.15 | 169 | PF11068.11 | 67    | PF04985.17 | 7  |
| <b>PF00401.23</b> | 2436  | PF14947.9  | 69  | PF04296.16 | 445   | PF13453.9  | 8  |
| <b>PF02823.19</b> | 2800  | PF04356.15 | 20  | PF14162.9  | 22    | PF00173.31 | 10 |
| <b>PF02310.22</b> | 2379  | PF00478.28 | 39  | PF09424.13 | 10140 | PF18899.3  | 5  |
| <b>PF02607.20</b> | 1405  | PF13240.9  | 69  | PF14166.9  | 32    | PF14385.9  | 19 |
| <b>PF00216.24</b> | 26123 | PF04930.18 | 4   | PF14115.9  | 7     | PF04208.17 | 15 |
| <b>PF18291.4</b>  | 14524 | PF04186.16 | 133 | PF05164.16 | 89    | PF01877.20 | 9  |
| <b>PF01313.22</b> | 3152  | PF04982.16 | 13  | PF01258.20 | 434   | PF12800.10 | 11 |
| <b>PF02397.19</b> | 192   | PF13551.9  | 217 | PF02535.25 | 574   | PF06434.16 | 1  |
| <b>PF02577.17</b> | 772   | PF07071.14 | 8   | PF09723.13 | 257   | PF08679.14 | 4  |
| <b>PF00364.25</b> | 3419  | PF00384.25 | 42  | PF04298.15 | 2261  | PF04340.15 | 13 |
| <b>PF13533.9</b>  | 1028  | PF01568.24 | 14  | PF01712.22 | 500   | PF01886.19 | 4  |
| <b>PF02632.17</b> | 777   | PF00900.23 | 39  | PF06414.15 | 45    | PF12773.10 | 35 |
| <b>PF12822.10</b> | 1293  | PF08071.15 | 39  | PF13401.9  | 1822  | PF05729.15 | 2  |
| <b>PF01722.21</b> | 74    | PF05433.18 | 37  | PF03379.16 | 366   | PF11307.11 | 8  |
| <b>PF00528.25</b> | 25647 | PF08501.14 | 39  | PF00326.24 | 225   | PF10764.12 | 8  |
| <b>PF03099.22</b> | 32    | PF09345.13 | 11  | PF00561.23 | 474   | PF07437.14 | 7  |
| <b>PF02559.19</b> | 5476  | PF04386.16 | 133 | PF05728.15 | 6     | PF06342.15 | 1  |
| <b>PF02570.18</b> | 2260  | PF07811.15 | 48  | PF12146.11 | 811   | PF02796.18 | 16 |
| <b>PF02571.17</b> | 145   | PF19344.2  | 42  | PF12697.10 | 554   | PF00015.24 | 4  |
| <b>PF08220.15</b> | 1455  | PF14246.9  | 94  | PF19304.2  | 88    | PF13340.9  | 9  |
| <b>PF02754.19</b> | 1408  | PF13414.9  | 62  | PF13840.9  | 64    | PF14367.9  | 11 |
| <b>PF02457.19</b> | 9     | PF04892.15 | 36  | PF08643.13 | 1014  | PF03413.22 | 16 |
| <b>PF19293.2</b>  | 8     | PF13519.9  | 48  | PF08327.14 | 266   | PF02086.18 | 8  |
| <b>PF06153.14</b> | 3824  | PF03853.18 | 15  | PF00731.23 | 3042  | PF13635.9  | 1  |
| <b>PF01066.24</b> | 4670  | PF09643.13 | 35  | PF01918.24 | 38    | PF20116.2  | 4  |
| <b>PF04509.15</b> | 2253  | PF03899.18 | 33  | PF01520.21 | 421   | PF18423.4  | 13 |
| <b>PF13690.9</b>  | 1027  | PF12431.11 | 87  | PF02558.19 | 102   | PF07385.15 | 4  |
| <b>PF03975.16</b> | 2117  | PF13668.9  | 13  | PF03869.17 | 2     | PF01939.19 | 7  |
| <b>PF01584.22</b> | 1499  | PF08123.16 | 16  | PF01951.19 | 92    | PF14177.9  | 15 |
| <b>PF02417.18</b> | 1905  | PF01982.19 | 22  | PF03960.18 | 1102  | PF12654.10 | 13 |
| <b>PF01467.29</b> | 18575 | PF08859.14 | 1   | PF00733.24 | 564   | PF04289.15 | 8  |
| <b>PF08218.14</b> | 3319  | PF09626.13 | 1   | PF01990.20 | 255   | PF04900.15 | 8  |
| <b>PF00574.26</b> | 16752 | PF09885.12 | 19  | PF01171.23 | 192   | PF18477.4  | 12 |

|                   |       |            |     |            |      |            |    |
|-------------------|-------|------------|-----|------------|------|------------|----|
| <b>PF02353.23</b> | 1147  | PF09922.12 | 64  | PF05437.15 | 217  | PF03929.19 | 4  |
| <b>PF08241.15</b> | 6539  | PF10029.12 | 2   | PF03483.20 | 198  | PF16357.8  | 2  |
| <b>PF13489.9</b>  | 5765  | PF10047.12 | 8   | PF04519.16 | 99   | PF03872.16 | 4  |
| <b>PF13649.9</b>  | 10142 | PF10988.11 | 9   | PF00936.22 | 1197 | PF11553.11 | 11 |
| <b>PF01209.21</b> | 4761  | PF14276.9  | 44  | PF04972.20 | 116  | PF05973.17 | 9  |
| <b>PF08242.15</b> | 5467  | PF19803.2  | 37  | PF09704.13 | 99   | PF14122.9  | 11 |
| <b>PF13847.9</b>  | 12546 | PF14382.9  | 8   | PF01881.19 | 176  | PF01757.25 | 4  |
| <b>PF05175.17</b> | 7867  | PF00736.22 | 36  | PF18011.4  | 143  | PF09919.12 | 6  |
| <b>PF08003.14</b> | 238   | PF10662.12 | 18  | PF00125.27 | 159  | PF00218.24 | 3  |
| <b>PF07736.14</b> | 1894  | PF04723.17 | 255 | PF00808.26 | 174  | PF15601.9  | 3  |
| <b>PF00027.32</b> | 9575  | PF07739.16 | 9   | PF15511.9  | 120  | PF06028.14 | 3  |
| <b>PF13545.9</b>  | 9809  | PF08712.14 | 19  | PF01955.21 | 8    | PF20434.1  | 8  |
| <b>PF00325.23</b> | 1394  | PF05105.15 | 30  | PF03918.17 | 88   | PF09871.12 | 6  |
| <b>PF01121.23</b> | 4919  | PF13797.9  | 5   | PF13380.9  | 474  | PF18978.3  | 8  |
| <b>PF07875.15</b> | 137   | PF01981.19 | 47  | PF02674.19 | 350  | PF06995.14 | 4  |
| <b>PF02629.22</b> | 2831  | PF20161.2  | 20  | PF06133.14 | 590  | PF05406.18 | 2  |
| <b>PF06971.16</b> | 2757  | PF00428.22 | 50  | PF04378.16 | 234  | PF09838.12 | 24 |
| <b>PF01144.26</b> | 1611  | PF02556.17 | 45  | PF00116.23 | 214  | PF13780.9  | 4  |
| <b>PF02572.18</b> | 2033  | PF07070.14 | 15  | PF02348.22 | 699  | PF01832.23 | 2  |
| <b>PF02654.18</b> | 644   | PF09578.13 | 61  | PF13443.9  | 1321 | PF12852.10 | 1  |
| <b>PF02283.19</b> | 3323  | PF05119.15 | 31  | PF03091.18 | 317  | PF16155.8  | 9  |
| <b>PF02492.22</b> | 702   | PF00092.31 | 53  | PF02560.17 | 51   | PF19776.2  | 5  |
| <b>PF01923.21</b> | 2496  | PF02625.19 | 11  | PF05103.16 | 260  | PF01900.22 | 4  |
| <b>PF10719.12</b> | 169   | PF02618.19 | 35  | PF04657.16 | 353  | PF01078.24 | 15 |
| <b>PF03602.18</b> | 6862  | PF14120.9  | 53  | PF00226.34 | 145  | PF00205.25 | 2  |
| <b>PF06325.16</b> | 1593  | PF10116.12 | 17  | PF04364.16 | 120  | PF02552.19 | 5  |
| <b>PF02475.19</b> | 623   | PF18856.4  | 17  | PF01323.23 | 832  | PF13709.9  | 23 |
| <b>PF09445.13</b> | 1255  | PF14487.9  | 36  | PF06949.14 | 119  | PF13858.9  | 6  |
| <b>PF01170.21</b> | 164   | PF07315.14 | 18  | PF07098.14 | 12   | PF04965.17 | 1  |
| <b>PF05971.15</b> | 183   | PF09946.12 | 3   | PF07457.14 | 57   | PF00586.27 | 9  |
| <b>PF12652.10</b> | 209   | PF13785.9  | 1   | PF07561.14 | 84   | PF03796.18 | 9  |
| <b>PF00510.21</b> | 790   | PF20202.1  | 4   | PF07892.14 | 590  | PF09897.12 | 8  |
| <b>PF00166.24</b> | 15021 | PF13510.9  | 42  | PF08818.14 | 360  | PF10050.12 | 6  |
| <b>PF02537.18</b> | 3820  | PF06923.14 | 2   | PF13376.9  | 197  | PF12459.11 | 10 |
| <b>PF09827.12</b> | 722   | PF13184.9  | 30  | PF08830.13 | 117  | PF17326.5  | 7  |
| <b>PF01985.24</b> | 1580  | PF04039.16 | 21  | PF08984.14 | 274  | PF17910.4  | 1  |
| <b>PF00313.25</b> | 29375 | PF00114.22 | 97  | PF02641.18 | 106  | PF14493.9  | 3  |
| <b>PF02599.19</b> | 294   | PF03309.17 | 30  | PF08924.14 | 5    | PF15985.8  | 3  |
| <b>PF05848.14</b> | 2318  | PF04608.16 | 146 | PF09218.13 | 4    | PF01427.20 | 1  |

|                   |      |            |     |            |     |            |    |
|-------------------|------|------------|-----|------------|-----|------------|----|
| <b>PF17727.4</b>  | 2288 | PF10262.12 | 53  | PF09393.13 | 88  | PF04071.15 | 5  |
| <b>PF02682.19</b> | 217  | PF17918.4  | 37  | PF09917.12 | 18  | PF04999.16 | 10 |
| <b>PF01381.25</b> | 4749 | PF06265.14 | 62  | PF09953.12 | 46  | PF01052.23 | 5  |
| <b>PF07883.14</b> | 3461 | PF17032.8  | 103 | PF10105.12 | 309 | PF01907.22 | 7  |
| <b>PF12844.10</b> | 3856 | PF13479.9  | 29  | PF10751.12 | 25  | PF14178.9  | 3  |
| <b>PF13560.9</b>  | 3677 | PF04376.16 | 31  | PF10934.11 | 28  | PF03400.16 | 2  |
| <b>PF13744.9</b>  | 67   | PF04377.18 | 31  | PF11208.11 | 46  | PF12986.10 | 15 |
| <b>PF00529.23</b> | 80   | PF03703.17 | 90  | PF11953.11 | 271 | PF02077.18 | 4  |
| <b>PF13437.9</b>  | 342  | PF10133.12 | 98  | PF04025.15 | 812 | PF03729.16 | 7  |
| <b>PF16576.8</b>  | 339  | PF07609.14 | 10  | PF12670.10 | 90  | PF18935.3  | 2  |
| <b>PF03932.17</b> | 91   | PF08838.13 | 36  | PF12953.10 | 114 | PF01210.26 | 11 |
| <b>PF04199.16</b> | 2862 | PF08922.14 | 11  | PF13155.9  | 23  | PF09650.13 | 4  |
| <b>PF00033.22</b> | 410  | PF10752.12 | 14  | PF13511.9  | 21  | PF01780.22 | 8  |
| <b>PF01292.23</b> | 279  | PF10827.11 | 15  | PF14114.9  | 35  | PF01935.20 | 1  |
| <b>PF13631.9</b>  | 412  | PF11848.11 | 28  | PF01588.23 | 686 | PF06847.14 | 3  |
| <b>PF13442.9</b>  | 357  | PF12227.11 | 31  | PF14794.9  | 200 | PF13559.9  | 3  |
| <b>PF01219.22</b> | 549  | PF12438.11 | 8   | PF04343.16 | 156 | PF18823.4  | 1  |
| <b>PF01569.24</b> | 508  | PF19573.2  | 13  | PF04359.17 | 101 | PF16955.8  | 1  |
| <b>PF02734.20</b> | 1008 | PF04919.15 | 13  | PF04634.15 | 16  | PF11155.11 | 6  |
| <b>PF01113.23</b> | 421  | PF02108.19 | 19  | PF20099.2  | 5   | PF05908.14 | 3  |
| <b>PF05173.17</b> | 405  | PF10294.12 | 63  | PF20114.2  | 26  | PF14497.9  | 4  |
| <b>PF00132.27</b> | 4954 | PF04350.16 | 41  | PF20353.1  | 24  | PF03685.16 | 9  |
| <b>PF08503.13</b> | 1328 | PF04247.15 | 76  | PF01904.21 | 246 | PF20068.2  | 1  |
| <b>PF14602.9</b>  | 2389 | PF00080.23 | 83  | PF06041.14 | 69  | PF03668.18 | 1  |
| <b>PF00692.22</b> | 3166 | PF08179.15 | 17  | PF06103.14 | 13  | PF00302.21 | 2  |
| <b>PF06559.14</b> | 470  | PF02342.21 | 19  | PF00563.23 | 8   | PF10819.11 | 2  |
| <b>PF00383.26</b> | 6971 | PF00515.31 | 60  | PF00892.23 | 484 | PF20221.1  | 5  |
| <b>PF08211.15</b> | 2862 | PF13181.9  | 8   | PF09512.13 | 74  | PF05066.16 | 10 |
| <b>PF14437.9</b>  | 4035 | PF13424.9  | 54  | PF12787.10 | 3   | PF01870.21 | 8  |
| <b>PF01230.26</b> | 5456 | PF13432.9  | 60  | PF10576.12 | 214 | PF14369.9  | 5  |
| <b>PF11969.11</b> | 5336 | PF14559.9  | 61  | PF03319.16 | 488 | PF06754.15 | 7  |
| <b>PF13358.9</b>  | 33   | PF05753.17 | 1   | PF09439.13 | 29  | PF18552.4  | 7  |
| <b>PF01791.12</b> | 5731 | PF14168.9  | 52  | PF10955.11 | 126 | PF03744.16 | 6  |
| <b>PF00455.25</b> | 607  | PF19842.2  | 13  | PF12682.10 | 84  | PF10869.11 | 3  |
| <b>PF01880.21</b> | 484  | PF12841.10 | 137 | PF12724.10 | 271 | PF17881.4  | 24 |
| <b>PF06397.15</b> | 344  | PF02129.21 | 19  | PF03963.17 | 177 | PF05370.14 | 4  |
| <b>PF00186.22</b> | 1141 | PF00837.20 | 8   | PF13860.9  | 127 | PF07878.14 | 3  |
| <b>PF01872.20</b> | 1445 | PF01808.21 | 45  | PF13861.9  | 119 | PF01997.19 | 4  |
| <b>PF10418.12</b> | 298  | PF12895.10 | 20  | PF04316.16 | 146 | PF03852.18 | 6  |

|                   |       |            |     |            |      |            |    |
|-------------------|-------|------------|-----|------------|------|------------|----|
| <b>PF01220.22</b> | 3798  | PF04234.15 | 14  | PF02049.21 | 408  | PF02924.17 | 2  |
| <b>PF05163.15</b> | 114   | PF03626.17 | 48  | PF10676.12 | 265  | PF05014.18 | 1  |
| <b>PF12867.10</b> | 151   | PF01266.27 | 52  | PF02527.18 | 2830 | PF07790.14 | 3  |
| <b>PF06491.14</b> | 459   | PF02593.17 | 23  | PF13704.9  | 95   | PF08769.14 | 9  |
| <b>PF01478.21</b> | 251   | PF01472.23 | 25  | PF18029.4  | 925  | PF00990.24 | 4  |
| <b>PF06750.16</b> | 224   | PF09183.13 | 18  | PF03458.16 | 219  | PF02085.19 | 15 |
| <b>PF01965.27</b> | 10910 | PF17832.4  | 2   | PF12700.10 | 32   | PF08732.13 | 9  |
| <b>PF00117.31</b> | 28315 | PF14128.9  | 20  | PF01288.23 | 835  | PF10067.12 | 3  |
| <b>PF07685.17</b> | 17321 | PF07840.15 | 9   | PF08348.14 | 320  | PF13632.9  | 4  |
| <b>PF13507.9</b>  | 7447  | PF03646.18 | 48  | PF13309.9  | 320  | PF11738.11 | 2  |
| <b>PF00885.22</b> | 4950  | PF19581.2  | 15  | PF01614.21 | 592  | PF13739.9  | 2  |
| <b>PF01035.23</b> | 940   | PF14089.9  | 61  | PF04279.18 | 93   | PF13349.9  | 1  |
| <b>PF02635.18</b> | 874   | PF02405.19 | 40  | PF01695.20 | 141  | PF04457.15 | 6  |
| <b>PF13686.9</b>  | 557   | PF01077.25 | 97  | PF18306.4  | 144  | PF02548.18 | 7  |
| <b>PF02683.18</b> | 1835  | PF03460.20 | 91  | PF03968.17 | 12   | PF14439.9  | 16 |
| <b>PF13386.9</b>  | 956   | PF03013.17 | 40  | PF20293.1  | 4    | PF01565.26 | 6  |
| <b>PF04358.16</b> | 624   | PF00827.20 | 39  | PF09278.14 | 266  | PF00805.25 | 1  |
| <b>PF00035.29</b> | 2369  | PF13333.9  | 44  | PF05401.14 | 735  | PF13599.9  | 1  |
| <b>PF00636.29</b> | 2561  | PF13683.9  | 50  | PF01795.22 | 184  | PF16079.8  | 2  |
| <b>PF14622.9</b>  | 2369  | PF06093.16 | 33  | PF04013.15 | 24   | PF03096.17 | 7  |
| <b>PF00908.20</b> | 1198  | PF17928.4  | 5   | PF02470.23 | 120  | PF09999.12 | 5  |
| <b>PF06935.14</b> | 51    | PF17934.4  | 77  | PF20560.1  | 91   | PF14192.9  | 1  |
| <b>PF07235.14</b> | 48    | PF01938.23 | 11  | PF10057.12 | 264  | PF19991.2  | 6  |
| <b>PF02576.20</b> | 3416  | PF02830.21 | 7   | PF04093.15 | 180  | PF09243.13 | 3  |
| <b>PF17384.5</b>  | 3388  | PF09648.13 | 29  | PF13241.9  | 561  | PF17146.7  | 8  |
| <b>PF07872.14</b> | 229   | PF06052.15 | 10  | PF14824.9  | 71   | PF07485.14 | 9  |
| <b>PF02622.18</b> | 482   | PF16561.8  | 4   | PF02540.20 | 324  | PF11417.11 | 1  |
| <b>PF08827.14</b> | 173   | PF02498.20 | 11  | PF02665.17 | 131  | PF20408.1  | 3  |
| <b>PF09148.13</b> | 476   | PF03374.17 | 10  | PF14512.9  | 1145 | PF08973.13 | 7  |
| <b>PF01205.22</b> | 2147  | PF06677.15 | 3   | PF00877.22 | 91   | PF12640.10 | 5  |
| <b>PF09186.14</b> | 2084  | PF08819.14 | 36  | PF01471.21 | 224  | PF03604.16 | 1  |
| <b>PF09862.12</b> | 210   | PF02643.18 | 23  | PF07963.15 | 428  | PF02954.22 | 10 |
| <b>PF10673.12</b> | 81    | PF04325.16 | 27  | PF08334.14 | 151  | PF05618.14 | 5  |
| <b>PF11084.11</b> | 81    | PF17259.5  | 33  | PF04756.16 | 124  | PF06676.14 | 4  |
| <b>PF10966.11</b> | 45    | PF05187.16 | 57  | PF01058.25 | 307  | PF01595.23 | 2  |
| <b>PF11146.11</b> | 501   | PF09383.13 | 39  | PF03551.17 | 767  | PF14208.9  | 6  |
| <b>PF11148.11</b> | 506   | PF12801.10 | 23  | PF03740.16 | 468  | PF02634.18 | 3  |
| <b>PF11213.11</b> | 126   | PF02637.21 | 163 | PF02163.25 | 232  | PF03544.17 | 10 |
| <b>PF03625.17</b> | 650   | PF05768.17 | 58  | PF01850.24 | 660  | PF09749.12 | 6  |

|                   |       |            |      |            |      |            |    |
|-------------------|-------|------------|------|------------|------|------------|----|
| <b>PF11588.11</b> | 200   | PF07754.14 | 21   | PF02887.19 | 116  | PF04488.18 | 5  |
| <b>PF03885.16</b> | 152   | PF01849.21 | 26   | PF02666.18 | 290  | PF05704.15 | 5  |
| <b>PF04167.16</b> | 323   | PF19026.3  | 23   | PF01329.22 | 192  | PF09997.12 | 13 |
| <b>PF01751.25</b> | 15229 | PF06243.14 | 12   | PF01862.19 | 41   | PF10737.12 | 11 |
| <b>PF13331.9</b>  | 995   | PF00833.21 | 11   | PF02565.18 | 1227 | PF07826.14 | 12 |
| <b>PF04239.15</b> | 1602  | PF09851.12 | 62   | PF11967.11 | 1229 | PF11085.11 | 4  |
| <b>PF14277.9</b>  | 193   | PF06695.14 | 26   | PF13114.9  | 356  | PF02985.25 | 2  |
| <b>PF04284.16</b> | 502   | PF00565.20 | 19   | PF00581.23 | 879  | PF04368.16 | 6  |
| <b>PF04361.16</b> | 105   | PF13848.9  | 5    | PF00825.21 | 945  | PF19451.2  | 3  |
| <b>PF04430.17</b> | 114   | PF17099.8  | 85   | PF01196.22 | 3863 | PF09869.12 | 11 |
| <b>PF04456.15</b> | 788   | PF02694.18 | 154  | PF00276.23 | 4621 | PF14329.9  | 3  |
| <b>PF04461.16</b> | 1499  | PF04336.15 | 77   | PF00076.25 | 130  | PF16694.8  | 4  |
| <b>PF17248.5</b>  | 36    | PF00070.30 | 2    | PF13165.9  | 392  | PF14335.9  | 3  |
| <b>PF04474.15</b> | 1597  | PF00670.24 | 1    | PF11823.11 | 76   | PF00457.20 | 21 |
| <b>PF18917.3</b>  | 54    | PF14173.9  | 3    | PF01488.23 | 57   | PF03657.16 | 4  |
| <b>PF20074.2</b>  | 240   | PF04978.15 | 24   | PF13501.9  | 62   | PF17833.4  | 4  |
| <b>PF20111.2</b>  | 79    | PF09835.12 | 99   | PF10957.11 | 17   | PF09945.12 | 5  |
| <b>PF20140.2</b>  | 24    | PF09920.12 | 1    | PF09581.13 | 245  | PF19567.2  | 5  |
| <b>PF05949.15</b> | 1314  | PF10096.12 | 14   | PF09560.13 | 80   | PF13564.9  | 3  |
| <b>PF05979.15</b> | 75    | PF11118.11 | 77   | PF12164.11 | 64   | PF12686.10 | 7  |
| <b>PF00156.30</b> | 37612 | PF11290.11 | 21   | PF00902.21 | 409  | PF04254.16 | 14 |
| <b>PF18912.3</b>  | 612   | PF03994.17 | 115  | PF16925.8  | 141  | PF00512.28 | 9  |
| <b>PF07155.15</b> | 586   | PF13799.9  | 13   | PF17940.4  | 63   | PF14343.9  | 9  |
| <b>PF09515.13</b> | 104   | PF06475.14 | 28   | PF13305.9  | 62   | PF13972.9  | 6  |
| <b>PF00378.23</b> | 18    | PF10518.12 | 21   | PF08360.14 | 156  | PF17194.7  | 1  |
| <b>PF16113.8</b>  | 17    | PF04468.15 | 2    | PF06283.14 | 338  | PF06304.14 | 2  |
| <b>PF01132.23</b> | 19222 | PF00318.23 | 2003 | PF02511.18 | 110  | PF19094.3  | 8  |
| <b>PF08207.15</b> | 19223 | PF16999.8  | 8    | PF05717.16 | 107  | PF12723.10 | 3  |
| <b>PF09285.14</b> | 19222 | PF09957.12 | 37   | PF05724.14 | 132  | PF16906.8  | 24 |
| <b>PF01176.22</b> | 17826 | PF02592.18 | 10   | PF04226.16 | 202  | PF13883.9  | 1  |
| <b>PF03608.16</b> | 116   | PF13429.9  | 9    | PF01169.22 | 359  | PF04467.15 | 5  |
| <b>PF03610.19</b> | 884   | PF17874.4  | 3    | PF00699.23 | 250  | PF08332.13 | 3  |
| <b>PF04493.17</b> | 71    | PF18175.4  | 952  | PF01991.21 | 198  | PF13474.9  | 3  |
| <b>PF01012.24</b> | 438   | PF02553.18 | 28   | PF06156.16 | 299  | PF02291.18 | 3  |
| <b>PF07110.14</b> | 230   | PF08617.13 | 10   | PF14070.9  | 36   | PF13173.9  | 4  |
| <b>PF01878.21</b> | 400   | PF03308.19 | 30   | PF14035.9  | 266  | PF02900.21 | 2  |
| <b>PF02609.19</b> | 112   | PF04038.15 | 9    | PF08741.13 | 155  | PF14682.9  | 7  |
| <b>PF07977.16</b> | 4798  | PF02603.19 | 15   | PF14116.9  | 182  | PF14689.9  | 7  |
| <b>PF00890.27</b> | 59    | PF01984.23 | 37   | PF13451.9  | 200  | PF09964.12 | 5  |

|                   |       |            |    |            |     |            |    |
|-------------------|-------|------------|----|------------|-----|------------|----|
| <b>PF01494.22</b> | 38    | PF09886.12 | 7  | PF04029.17 | 272 | PF17341.5  | 2  |
| <b>PF03486.17</b> | 26    | PF02698.20 | 42 | PF05635.14 | 33  | PF03934.16 | 2  |
| <b>PF07992.17</b> | 104   | PF11877.11 | 26 | PF03475.17 | 83  | PF10741.12 | 3  |
| <b>PF12831.10</b> | 38    | PF04070.15 | 82 | PF04476.16 | 41  | PF13689.9  | 6  |
| <b>PF00392.24</b> | 18755 | PF13548.9  | 14 | PF02096.23 | 109 | PF16123.8  | 1  |
| <b>PF07729.15</b> | 5389  | PF04475.15 | 16 | PF12698.10 | 544 | PF14152.9  | 3  |
| <b>PF01521.23</b> | 1691  | PF05598.14 | 13 | PF13338.9  | 43  | PF19824.2  | 13 |
| <b>PF04023.17</b> | 645   | PF13492.9  | 33 | PF12689.10 | 9   | PF02687.24 | 6  |
| <b>PF01926.26</b> | 2090  | PF02893.23 | 3  | PF02675.18 | 415 | PF06189.15 | 2  |
| <b>PF02421.21</b> | 1934  | PF09585.13 | 15 | PF02311.22 | 248 | PF04969.19 | 15 |
| <b>PF03193.19</b> | 272   | PF12535.11 | 37 | PF01813.20 | 384 | PF11716.11 | 2  |
| <b>PF00111.30</b> | 2756  | PF06841.15 | 18 | PF03591.17 | 340 | PF01398.24 | 1  |
| <b>PF01799.23</b> | 3731  | PF03334.17 | 13 | PF08840.14 | 100 | PF00356.24 | 4  |
| <b>PF13085.9</b>  | 997   | PF01090.22 | 39 | PF01312.22 | 83  | PF00532.24 | 4  |
| <b>PF13183.9</b>  | 897   | PF14601.9  | 3  | PF01152.24 | 209 | PF13407.9  | 2  |
| <b>PF13237.9</b>  | 2563  | PF09346.13 | 12 | PF13375.9  | 43  | PF06347.16 | 4  |
| <b>PF13534.9</b>  | 699   | PF14567.9  | 9  | PF08000.14 | 260 | PF09858.12 | 1  |
| <b>PF00037.30</b> | 3419  | PF14568.9  | 12 | PF14470.9  | 190 | PF18950.3  | 7  |
| <b>PF12797.10</b> | 586   | PF08770.14 | 17 | PF14526.9  | 16  | PF19965.2  | 1  |
| <b>PF12837.10</b> | 1576  | PF12638.10 | 20 | PF01930.20 | 698 | PF08863.13 | 3  |
| <b>PF12838.10</b> | 2951  | PF01893.19 | 6  | PF12705.10 | 55  | PF14101.9  | 3  |
| <b>PF13187.9</b>  | 2025  | PF03959.16 | 26 | PF01891.19 | 416 | PF16661.8  | 3  |
| <b>PF14697.9</b>  | 1328  | PF08798.14 | 78 | PF08666.15 | 89  | PF01000.29 | 1  |
| <b>PF13247.9</b>  | 835   | PF01976.20 | 7  | PF13144.9  | 21  | PF17920.4  | 4  |
| <b>PF13353.9</b>  | 1473  | PF06803.15 | 49 | PF16976.8  | 14  | PF14579.9  | 5  |
| <b>PF13394.9</b>  | 1796  | PF07314.14 | 9  | PF01408.25 | 286 | PF03692.18 | 7  |
| <b>PF04055.24</b> | 1821  | PF09837.12 | 18 | PF00190.25 | 30  | PF19912.2  | 4  |
| <b>PF13370.9</b>  | 4341  | PF13556.9  | 18 | PF13473.9  | 127 | PF03130.19 | 1  |
| <b>PF13459.9</b>  | 4366  | PF09918.12 | 62 | PF04126.16 | 76  | PF11821.11 | 7  |
| <b>PF06902.14</b> | 1892  | PF09947.12 | 10 | PF18050.4  | 73  | PF14557.9  | 3  |
| <b>PF00210.27</b> | 2320  | PF10844.11 | 19 | PF01928.24 | 218 | PF13371.9  | 6  |
| <b>PF02915.20</b> | 2479  | PF10763.12 | 23 | PF02167.18 | 70  | PF03330.21 | 7  |
| <b>PF01883.22</b> | 814   | PF11984.11 | 4  | PF09719.13 | 80  | PF03291.19 | 3  |
| <b>PF01325.22</b> | 441   | PF13081.9  | 15 | PF07876.15 | 182 | PF00127.23 | 4  |
| <b>PF02742.18</b> | 385   | PF17898.4  | 22 | PF01609.24 | 52  | PF04085.17 | 1  |
| <b>PF00254.31</b> | 288   | PF13487.9  | 12 | PF13586.9  | 41  | PF17645.4  | 3  |
| <b>PF01613.21</b> | 948   | PF09551.13 | 70 | PF02287.18 | 16  | PF20095.2  | 8  |
| <b>PF00258.28</b> | 398   | PF12105.11 | 26 | PF01902.20 | 103 | PF08714.14 | 5  |
| <b>PF02525.20</b> | 3494  | PF01994.19 | 33 | PF17124.8  | 184 | PF14045.9  | 1  |

|                   |            |            |     |            |     |            |   |
|-------------------|------------|------------|-----|------------|-----|------------|---|
| <b>PF03358.18</b> | 4063       | PF04794.15 | 51  | PF13462.9  | 205 | PF13435.9  | 5 |
| <b>PF02441.22</b> | 3350       | PF07694.15 | 61  | PF04077.15 | 127 | PF04952.17 | 2 |
| <b>PF02107.19</b> | 157        | PF17013.8  | 7   | PF18357.4  | 64  | PF11367.11 | 1 |
| <b>PF05130.15</b> | 434        | PF01729.22 | 16  | PF06866.14 | 93  | PF13624.9  | 1 |
| <b>PF00460.23</b> | 5116       | PF08821.14 | 27  | PF06947.15 | 637 | PF14472.9  | 1 |
| <b>PF06429.16</b> | 5885       | PF08876.14 | 4   | PF07853.14 | 92  | PF01599.22 | 2 |
| <b>PF02050.19</b> | 163        | PF09941.12 | 13  | PF13630.9  | 91  | PF19937.2  | 3 |
| <b>PF03748.17</b> | 426        | PF09988.12 | 17  | PF09911.12 | 67  | PF16264.8  | 3 |
| <b>PF02561.17</b> | 390        | PF04017.15 | 22  | PF09969.12 | 27  | PF03847.16 | 4 |
| <b>PF02623.18</b> | 675        | PF14103.9  | 2   | PF11256.11 | 145 | PF10677.12 | 1 |
| <b>PF04964.17</b> | 7          | PF06014.14 | 40  | PF11385.11 | 108 | PF05154.19 | 2 |
| <b>PF04205.17</b> | 281        | PF01541.27 | 20  | PF04241.18 | 363 | PF04010.16 | 2 |
| <b>PF02152.21</b> | 3283       | PF06560.14 | 9   | PF04286.15 | 72  | PF10622.12 | 5 |
| <b>PF00551.22</b> | 3130       | PF01493.22 | 55  | PF04306.16 | 199 | PF01134.25 | 5 |
| <b>PF05683.15</b> | 1086       | PF00126.30 | 9   | PF18955.3  | 106 | PF14606.9  | 3 |
| <b>PF01475.22</b> | 12042      | PF01564.20 | 16  | PF01207.20 | 215 | PF01702.21 | 2 |
| <b>PF02660.18</b> | 3305       | PF13679.9  | 17  | PF08761.14 | 168 | PF04182.15 | 4 |
| <b>PF04309.15</b> | 1153       | PF03448.20 | 28  | PF00889.22 | 750 | PF01861.19 | 5 |
| <b>PF07722.16</b> | 10456      | PF05402.15 | 14  | PF01956.19 | 27  | PF09892.12 | 2 |
| <b>PF01174.22</b> | 7880       | PF01092.22 | 13  | PF00756.23 | 180 | PF18046.4  | 1 |
| <b>PF03575.20</b> | 1460       | PF19489.2  | 3   | PF02472.19 | 522 | PF12673.10 | 3 |
| <b>PF07670.17</b> | 1845       | PF17924.4  | 38  | PF03807.20 | 425 | PF19538.2  | 6 |
| <b>PF01597.22</b> | 7171       | PF17939.4  | 28  | PF01557.21 | 185 | PF06940.14 | 1 |
| <b>PF03009.20</b> | 2358       | PF00154.24 | 43  | PF06490.14 | 39  | PF09888.12 | 6 |
| <b>PF00196.22</b> | 31050<br>2 | PF08423.14 | 36  | PF00813.23 | 328 | PF12669.10 | 1 |
| <b>PF08281.15</b> | 15688<br>2 | PF08747.14 | 12  | PF01728.22 | 468 | PF05573.15 | 2 |
| <b>PF04545.19</b> | 30776      | PF06778.15 | 153 | PF12681.10 | 278 | PF03843.16 | 1 |
| <b>PF13384.9</b>  | 1924       | PF00891.21 | 42  | PF09338.14 | 58  | PF12663.10 | 4 |
| <b>PF13936.9</b>  | 787        | PF00175.24 | 31  | PF12464.11 | 296 | PF12671.10 | 4 |
| <b>PF16968.8</b>  | 193        | PF07099.14 | 1   | PF05015.16 | 79  | PF13958.9  | 1 |
| <b>PF02686.18</b> | 13587      | PF13025.9  | 8   | PF08671.13 | 13  | PF10387.12 | 1 |
| <b>PF01182.23</b> | 1358       | PF14242.9  | 18  | PF13413.9  | 105 | PF03609.17 | 5 |
| <b>PF00462.27</b> | 1025       | PF11611.11 | 10  | PF09021.14 | 253 | PF06160.15 | 2 |
| <b>PF13192.9</b>  | 1080       | PF04324.18 | 21  | PF05116.16 | 51  | PF01163.25 | 2 |
| <b>PF00691.23</b> | 343        | PF17806.4  | 10  | PF08282.15 | 133 | PF06293.17 | 4 |
| <b>PF13441.9</b>  | 67         | PF03143.20 | 18  | PF07885.19 | 7   | PF09501.13 | 1 |
| <b>PF13488.9</b>  | 75         | PF01973.21 | 58  | PF04362.17 | 173 | PF02784.19 | 3 |

|                   |       |            |     |            |      |            |   |
|-------------------|-------|------------|-----|------------|------|------------|---|
| <b>PF00535.29</b> | 1835  | PF08239.14 | 31  | PF02669.18 | 258  | PF16256.8  | 4 |
| <b>PF10111.12</b> | 239   | PF18348.4  | 8   | PF03548.18 | 77   | PF01627.26 | 3 |
| <b>PF13641.9</b>  | 1172  | PF13597.9  | 7   | PF17131.7  | 14   | PF03279.16 | 5 |
| <b>PF03808.16</b> | 605   | PF14378.9  | 70  | PF03788.17 | 34   | PF06127.14 | 2 |
| <b>PF00903.28</b> | 5429  | PF15781.8  | 15  | PF05148.18 | 20   | PF13650.9  | 1 |
| <b>PF13468.9</b>  | 2213  | PF16242.8  | 11  | PF01106.20 | 733  | PF13975.9  | 1 |
| <b>PF13669.9</b>  | 4053  | PF01191.22 | 21  | PF08780.14 | 69   | PF06984.16 | 1 |
| <b>PF07702.16</b> | 9958  | PF08176.15 | 17  | PF07009.14 | 246  | PF04355.16 | 2 |
| <b>PF12143.11</b> | 626   | PF02824.24 | 5   | PF13505.9  | 87   | PF04032.19 | 1 |
| <b>PF13730.9</b>  | 70    | PF12139.11 | 16  | PF13568.9  | 78   | PF04267.15 | 1 |
| <b>PF14502.9</b>  | 380   | PF00491.24 | 4   | PF03479.18 | 96   | PF07833.14 | 3 |
| <b>PF07355.15</b> | 51    | PF04380.16 | 3   | PF13798.9  | 13   | PF04282.16 | 1 |
| <b>PF01272.22</b> | 8290  | PF09209.14 | 12  | PF07998.14 | 8    | PF07291.14 | 1 |
| <b>PF03449.18</b> | 8277  | PF11007.11 | 16  | PF05135.16 | 30   | PF08899.14 | 3 |
| <b>PF01025.22</b> | 102   | PF06172.14 | 13  | PF13396.9  | 34   | PF09840.12 | 3 |
| <b>PF00255.22</b> | 964   | PF07408.14 | 15  | PF00874.23 | 11   | PF15937.8  | 4 |
| <b>PF00625.24</b> | 2500  | PF08680.13 | 36  | PF00160.24 | 306  | PF06005.15 | 1 |
| <b>PF06888.15</b> | 186   | PF09846.12 | 17  | PF01885.19 | 18   | PF02326.18 | 1 |
| <b>PF12710.10</b> | 8087  | PF09880.12 | 4   | PF02245.19 | 474  | PF13196.9  | 3 |
| <b>PF00702.29</b> | 13287 | PF00013.32 | 13  | PF14489.9  | 478  | PF04344.16 | 1 |
| <b>PF05822.15</b> | 8     | PF05597.14 | 16  | PF03838.17 | 206  | PF09967.12 | 1 |
| <b>PF13419.9</b>  | 14096 | PF04034.16 | 20  | PF04607.20 | 66   | PF09876.12 | 1 |
| <b>PF13242.9</b>  | 9313  | PF01868.19 | 5   | PF01282.22 | 17   | PF07663.14 | 4 |
| <b>PF09419.13</b> | 1014  | PF01887.19 | 10  | PF10099.12 | 7    | PF10803.11 | 3 |
| <b>PF01725.19</b> | 6801  | PF20257.1  | 10  | PF13490.9  | 69   | PF17261.5  | 7 |
| <b>PF01966.25</b> | 1615  | PF03684.16 | 24  | PF10263.12 | 195  | PF02249.20 | 3 |
| <b>PF08668.15</b> | 39    | PF03100.18 | 57  | PF17283.5  | 143  | PF08768.14 | 2 |
| <b>PF13646.9</b>  | 14    | PF04021.15 | 8   | PF01336.28 | 24   | PF07282.14 | 2 |
| <b>PF01814.26</b> | 912   | PF02005.19 | 43  | PF17935.4  | 82   | PF05673.16 | 1 |
| <b>PF01934.20</b> | 460   | PF01180.24 | 26  | PF01974.20 | 19   | PF07700.18 | 3 |
| <b>PF17209.6</b>  | 329   | PF06612.14 | 59  | PF02778.17 | 19   | PF05625.14 | 3 |
| <b>PF00633.26</b> | 1980  | PF09001.14 | 13  | PF05685.15 | 1267 | PF14219.9  | 1 |
| <b>PF10531.12</b> | 510   | PF09930.12 | 7   | PF02699.18 | 172  | PF06426.17 | 3 |
| <b>PF12836.10</b> | 503   | PF12952.10 | 6   | PF04307.17 | 54   | PF06338.14 | 1 |
| <b>PF00730.28</b> | 1927  | PF07505.14 | 27  | PF01863.20 | 208  | PF10634.12 | 1 |
| <b>PF01330.24</b> | 9408  | PF13410.9  | 120 | PF03734.17 | 78   | PF14690.9  | 3 |
| <b>PF07499.16</b> | 8944  | PF04138.17 | 41  | PF09855.12 | 16   | PF02274.20 | 1 |
| <b>PF14520.9</b>  | 9439  | PF13795.9  | 28  | PF00931.25 | 91   | PF01998.20 | 1 |
| <b>PF15919.8</b>  | 241   | PF03721.17 | 75  | PF12730.10 | 267  | PF12672.10 | 2 |

|                   |       |            |     |            |     |            |   |
|-------------------|-------|------------|-----|------------|-----|------------|---|
| <b>PF01634.21</b> | 2405  | PF05336.16 | 113 | PF18462.4  | 24  | PF11181.11 | 7 |
| <b>PF00977.24</b> | 12550 | PF01547.28 | 12  | PF19571.2  | 314 | PF19798.2  | 7 |
| <b>PF01884.20</b> | 182   | PF13531.9  | 21  | PF13911.9  | 67  | PF03050.17 | 5 |
| <b>PF00300.25</b> | 6802  | PF08970.13 | 25  | PF01917.19 | 54  | PF13817.9  | 5 |
| <b>PF00403.29</b> | 3939  | PF08177.14 | 19  | PF07441.14 | 96  | PF17647.4  | 4 |
| <b>PF01844.26</b> | 166   | PF08271.15 | 52  | PF02361.19 | 39  | PF13512.9  | 6 |
| <b>PF13395.9</b>  | 80    | PF10899.11 | 1   | PF01903.20 | 168 | PF13525.9  | 6 |
| <b>PF14279.9</b>  | 150   | PF00710.23 | 25  | PF05732.14 | 3   | PF01442.21 | 1 |
| <b>PF10960.11</b> | 9     | PF07088.14 | 9   | PF02633.17 | 90  | PF04989.15 | 2 |
| <b>PF01022.23</b> | 2007  | PF17656.4  | 19  | PF08206.14 | 83  | PF09893.12 | 4 |
| <b>PF13463.9</b>  | 818   | PF02596.18 | 25  | PF04134.15 | 31  | PF10842.11 | 1 |
| <b>PF13601.9</b>  | 186   | PF09879.12 | 7   | PF02288.18 | 28  | PF16316.8  | 7 |
| <b>PF01527.23</b> | 446   | PF09963.12 | 28  | PF09350.13 | 123 | PF06249.15 | 2 |
| <b>PF13518.9</b>  | 204   | PF09365.13 | 35  | PF17782.4  | 6   | PF12692.10 | 2 |
| <b>PF04542.17</b> | 10595 | PF11116.11 | 25  | PF07085.15 | 195 | PF13783.9  | 5 |
| <b>PF01455.21</b> | 164   | PF14330.9  | 53  | PF07796.14 | 20  | PF14229.9  | 3 |
| <b>PF01750.21</b> | 284   | PF08461.13 | 2   | PF07849.14 | 32  | PF17379.5  | 4 |
| <b>PF08645.14</b> | 92    | PF01187.21 | 50  | PF07870.14 | 472 | PF19645.2  | 1 |
| <b>PF01155.22</b> | 2163  | PF01927.19 | 29  | PF08796.13 | 30  | PF05489.15 | 1 |
| <b>PF08858.13</b> | 196   | PF01931.21 | 34  | PF02639.17 | 552 | PF12811.10 | 1 |
| <b>PF08864.13</b> | 208   | PF06769.17 | 31  | PF08968.13 | 63  | PF09990.12 | 1 |
| <b>PF00707.25</b> | 2261  | PF00705.21 | 48  | PF02681.17 | 327 | PF02965.20 | 1 |
| <b>PF05198.19</b> | 2258  | PF02747.18 | 29  | PF10035.12 | 100 | PF19741.2  | 4 |
| <b>PF06135.15</b> | 600   | PF04139.16 | 21  | PF09966.12 | 77  | PF08448.13 | 1 |
| <b>PF00857.23</b> | 2301  | PF04328.16 | 38  | PF10031.12 | 17  | PF04407.15 | 2 |
| <b>PF01128.22</b> | 5699  | PF01026.24 | 6   | PF10740.12 | 49  | PF10049.12 | 1 |
| <b>PF12804.10</b> | 8117  | PF09500.13 | 22  | PF10750.12 | 10  | PF08238.15 | 1 |
| <b>PF01424.25</b> | 2148  | PF14005.9  | 24  | PF11188.11 | 139 | PF17926.4  | 2 |
| <b>PF13083.9</b>  | 7258  | PF14165.9  | 29  | PF01796.20 | 43  | PF11750.11 | 3 |
| <b>PF14804.9</b>  | 2107  | PF20077.2  | 3   | PF12172.11 | 43  | PF13045.9  | 3 |
| <b>PF07689.15</b> | 133   | PF06961.16 | 17  | PF13171.9  | 82  | PF13612.9  | 3 |
| <b>PF00189.23</b> | 5791  | PF13937.9  | 75  | PF13566.9  | 101 | PF14062.9  | 1 |
| <b>PF07650.20</b> | 5867  | PF12728.10 | 17  | PF14079.9  | 31  | PF14514.9  | 4 |
| <b>PF00467.32</b> | 12334 | PF01280.23 | 39  | PF14221.9  | 65  | PF16760.8  | 1 |
| <b>PF17136.7</b>  | 10599 | PF01194.20 | 18  | PF01873.20 | 24  | PF10080.12 | 9 |
| <b>PF02357.22</b> | 8961  | PF00209.21 | 1   | PF00071.25 | 18  | PF01555.21 | 3 |
| <b>PF02502.21</b> | 8449  | PF01988.22 | 13  | PF13484.9  | 181 | PF10727.12 | 2 |
| <b>PF00753.30</b> | 12680 | PF02702.20 | 3   | PF06289.14 | 121 | PF10925.11 | 2 |
| <b>PF12706.10</b> | 8933  | PF14908.9  | 70  | PF04299.15 | 172 | PF11497.11 | 5 |

|                   |      |            |    |            |      |            |   |
|-------------------|------|------------|----|------------|------|------------|---|
| <b>PF19583.2</b>  | 628  | PF18289.4  | 58 | PF01590.29 | 372  | PF12732.10 | 2 |
| <b>PF13483.9</b>  | 3003 | PF06240.16 | 36 | PF13185.9  | 540  | PF07336.14 | 3 |
| <b>PF04011.15</b> | 2546 | PF18750.4  | 7  | PF13807.9  | 328  | PF02656.18 | 1 |
| <b>PF03588.17</b> | 78   | PF08713.14 | 67 | PF00043.28 | 276  | PF06080.15 | 4 |
| <b>PF00717.26</b> | 7275 | PF02600.19 | 76 | PF02798.23 | 306  | PF02882.22 | 2 |
| <b>PF01726.19</b> | 6682 | PF09882.12 | 3  | PF13409.9  | 317  | PF09932.12 | 9 |
| <b>PF00657.25</b> | 463  | PF10732.12 | 20 | PF13417.9  | 362  | PF01655.21 | 6 |
| <b>PF13472.9</b>  | 582  | PF10884.11 | 1  | PF13581.9  | 1333 | PF14334.9  | 4 |
| <b>PF01451.24</b> | 4627 | PF11518.11 | 3  | PF03006.23 | 249  | PF08921.14 | 3 |
| <b>PF04172.19</b> | 123  | PF14066.9  | 26 | PF01978.22 | 182  | PF10112.12 | 3 |
| <b>PF02589.18</b> | 1028 | PF14209.9  | 86 | PF13022.9  | 5    | PF14143.9  | 2 |
| <b>PF00677.20</b> | 5393 | PF04256.15 | 2  | PF01638.20 | 215  | PF12147.11 | 1 |
| <b>PF01810.21</b> | 2871 | PF18481.4  | 2  | PF07486.15 | 508  | PF01986.19 | 1 |
| <b>PF04397.18</b> | 2691 | PF14326.9  | 15 | PF03439.16 | 43   | PF09055.14 | 1 |
| <b>PF01661.24</b> | 1319 | PF19891.2  | 21 | PF01790.21 | 39   | PF06707.14 | 1 |
| <b>PF02545.17</b> | 5656 | PF01346.21 | 28 | PF02664.18 | 152  | PF07589.14 | 1 |
| <b>PF01575.22</b> | 603  | PF07972.14 | 32 | PF06175.14 | 29   | PF09505.13 | 2 |
| <b>PF13452.9</b>  | 337  | PF13513.9  | 4  | PF01909.26 | 226  | PF07653.20 | 1 |
| <b>PF19315.2</b>  | 92   | PF13011.9  | 49 | PF18765.4  | 232  | PF19586.2  | 2 |
| <b>PF01914.20</b> | 645  | PF13565.9  | 49 | PF11071.11 | 41   | PF14819.9  | 1 |
| <b>PF04014.21</b> | 4422 | PF13592.9  | 58 | PF15891.8  | 7    | PF14498.9  | 2 |
| <b>PF15714.8</b>  | 3093 | PF16584.8  | 19 | PF03938.17 | 112  | PF02237.20 | 4 |
| <b>PF03819.20</b> | 505  | PF14582.9  | 33 | PF02604.22 | 96   | PF05258.15 | 1 |
| <b>PF01502.21</b> | 1131 | PF15731.8  | 6  | PF04351.16 | 34   | PF02831.18 | 1 |
| <b>PF01503.20</b> | 1250 | PF13366.9  | 22 | PF08745.14 | 20   | PF05534.15 | 3 |
| <b>PF12643.10</b> | 252  | PF08478.13 | 44 | PF12769.10 | 20   | PF19024.3  | 2 |
| <b>PF05389.15</b> | 630  | PF10584.12 | 7  | PF13367.9  | 82   | PF14597.9  | 2 |
| <b>PF00376.26</b> | 849  | PF00181.26 | 46 | PF03874.19 | 30   | PF20420.1  | 1 |
| <b>PF13411.9</b>  | 860  | PF03947.21 | 46 | PF04246.15 | 124  | PF13921.9  | 1 |
| <b>PF00149.31</b> | 1566 | PF02334.19 | 38 | PF00101.23 | 29   | PF14375.9  | 1 |
| <b>PF12850.10</b> | 3046 | PF01947.19 | 6  | PF03840.17 | 485  | PF03927.16 | 5 |
| <b>PF03141.19</b> | 18   | PF17937.4  | 7  | PF19569.2  | 43   | PF13715.9  | 2 |
| <b>PF01135.22</b> | 3096 | PF09359.13 | 15 | PF14278.9  | 274  | PF07920.14 | 5 |
| <b>PF07021.15</b> | 488  | PF14317.9  | 1  | PF03459.20 | 9    | PF08433.13 | 6 |
| <b>PF03848.17</b> | 319  | PF14071.9  | 24 | PF09976.12 | 173  | PF13685.9  | 3 |
| <b>PF01596.20</b> | 2360 | PF17774.4  | 9  | PF02081.18 | 73   | PF15738.8  | 3 |
| <b>PF13578.9</b>  | 2401 | PF06725.14 | 31 | PF08868.13 | 253  | PF10722.12 | 1 |
| <b>PF04816.15</b> | 927  | PF09662.13 | 39 | PF14183.9  | 26   | PF05901.14 | 2 |
| <b>PF12847.10</b> | 1179 | PF02969.20 | 56 | PF09360.13 | 46   | PF19187.3  | 3 |

|                   |             |            |    |            |      |            |   |
|-------------------|-------------|------------|----|------------|------|------------|---|
| <b>PF02384.19</b> | 78          | PF08006.14 | 49 | PF01643.20 | 115  | PF08807.13 | 1 |
| <b>PF02390.20</b> | 1574        | PF10864.11 | 8  | PF13346.9  | 195  | PF13790.9  | 3 |
| <b>PF04452.17</b> | 3683        | PF11419.11 | 1  | PF06541.14 | 17   | PF10816.11 | 1 |
| <b>PF20260.1</b>  | 3478        | PF11755.11 | 11 | PF05368.16 | 819  | PF12919.10 | 2 |
| <b>PF02142.25</b> | 959         | PF04367.16 | 37 | PF09527.13 | 59   | PF01789.19 | 2 |
| <b>PF02308.19</b> | 966         | PF05610.14 | 35 | PF11599.11 | 5    | PF09382.13 | 1 |
| <b>PF03775.19</b> | 812         | PF04670.15 | 4  | PF01027.23 | 85   | PF14808.9  | 1 |
| <b>PF05209.16</b> | 378         | PF12902.10 | 3  | PF07362.15 | 2    | PF04255.17 | 2 |
| <b>PF03776.17</b> | 308         | PF01070.21 | 5  | PF02962.18 | 34   | PF05545.14 | 1 |
| <b>PF00230.23</b> | 2175        | PF05690.17 | 26 | PF02464.20 | 89   | PF03969.19 | 2 |
| <b>PF02659.18</b> | 2076        | PF07786.15 | 26 | PF02627.23 | 246  | PF06821.16 | 2 |
| <b>PF05067.15</b> | 980         | PF00665.29 | 32 | PF10672.12 | 69   | PF10230.12 | 2 |
| <b>PF01967.24</b> | 5050        | PF13276.9  | 9  | PF02870.18 | 232  | PF12389.11 | 2 |
| <b>PF03205.17</b> | 213         | PF02613.18 | 21 | PF10411.12 | 20   | PF02006.19 | 4 |
| <b>PF00994.27</b> | 2044        | PF01199.21 | 14 | PF06335.15 | 104  | PF13273.9  | 6 |
| <b>PF04879.19</b> | 161         | PF01667.20 | 10 | PF06570.14 | 23   | PF17182.7  | 2 |
| <b>PF03473.20</b> | 529         | PF08960.13 | 6  | PF07301.14 | 22   | PF10368.12 | 4 |
| <b>PF03476.19</b> | 104         | PF02230.19 | 18 | PF07659.14 | 2    | PF12655.10 | 2 |
| <b>PF01618.19</b> | 688         | PF13431.9  | 5  | PF09878.12 | 9    | PF00679.27 | 6 |
| <b>PF02381.21</b> | 7181        | PF03264.17 | 9  | PF10370.12 | 89   | PF17299.5  | 5 |
| <b>PF01741.21</b> | 921         | PF09875.12 | 4  | PF10941.11 | 48   | PF04955.15 | 1 |
| <b>PF00893.22</b> | 2896        | PF18690.4  | 19 | PF14004.9  | 53   | PF02426.19 | 2 |
| <b>PF02080.24</b> | 10630       | PF05751.14 | 35 | PF16265.8  | 4    | PF04314.16 | 3 |
| <b>PF02254.21</b> | 10621       | PF06445.18 | 21 | PF04703.15 | 23   | PF09559.13 | 3 |
| <b>PF03446.18</b> | 1378        | PF05168.17 | 16 | PF03961.16 | 96   | PF15780.8  | 2 |
| <b>PF04131.17</b> | 561         | PF06305.14 | 7  | PF00009.30 | 58   | PF07303.16 | 1 |
| <b>PF03892.17</b> | 18          | PF13036.9  | 8  | PF04347.16 | 11   | PF08963.13 | 3 |
| <b>PF00334.22</b> | 7429        | PF17135.7  | 20 | PF02663.17 | 153  | PF07755.14 | 2 |
| <b>PF01957.21</b> | 252         | PF09138.14 | 3  | PF01227.25 | 2912 | PF00155.24 | 1 |
| <b>PF01592.19</b> | 1920        | PF00303.22 | 14 | PF03031.21 | 33   | PF01041.20 | 1 |
| <b>PF00881.27</b> | 4798        | PF09680.13 | 18 | PF12917.10 | 188  | PF08915.14 | 1 |
| <b>PF02579.20</b> | 684         | PF00115.23 | 29 | PF13023.9  | 189  | PF00553.22 | 1 |
| <b>PF06941.15</b> | 106         | PF05899.15 | 57 | PF04405.17 | 225  | PF06276.15 | 2 |
| <b>PF00483.26</b> | 1132        | PF07563.14 | 32 | PF03746.19 | 126  | PF19644.2  | 1 |
| <b>PF00293.31</b> | 3549        | PF08850.14 | 15 | PF04525.15 | 103  | PF04659.16 | 3 |
| <b>PF01029.21</b> | 1632        | PF10066.12 | 7  | PF01423.25 | 29   | PF10970.11 | 4 |
| <b>PF05991.14</b> | 1540        | PF03799.18 | 20 | PF13244.9  | 23   | PF04098.18 | 1 |
| <b>PF00486.31</b> | 14432<br>09 | PF13248.9  | 36 | PF20501.1  | 4    | PF18665.4  | 2 |

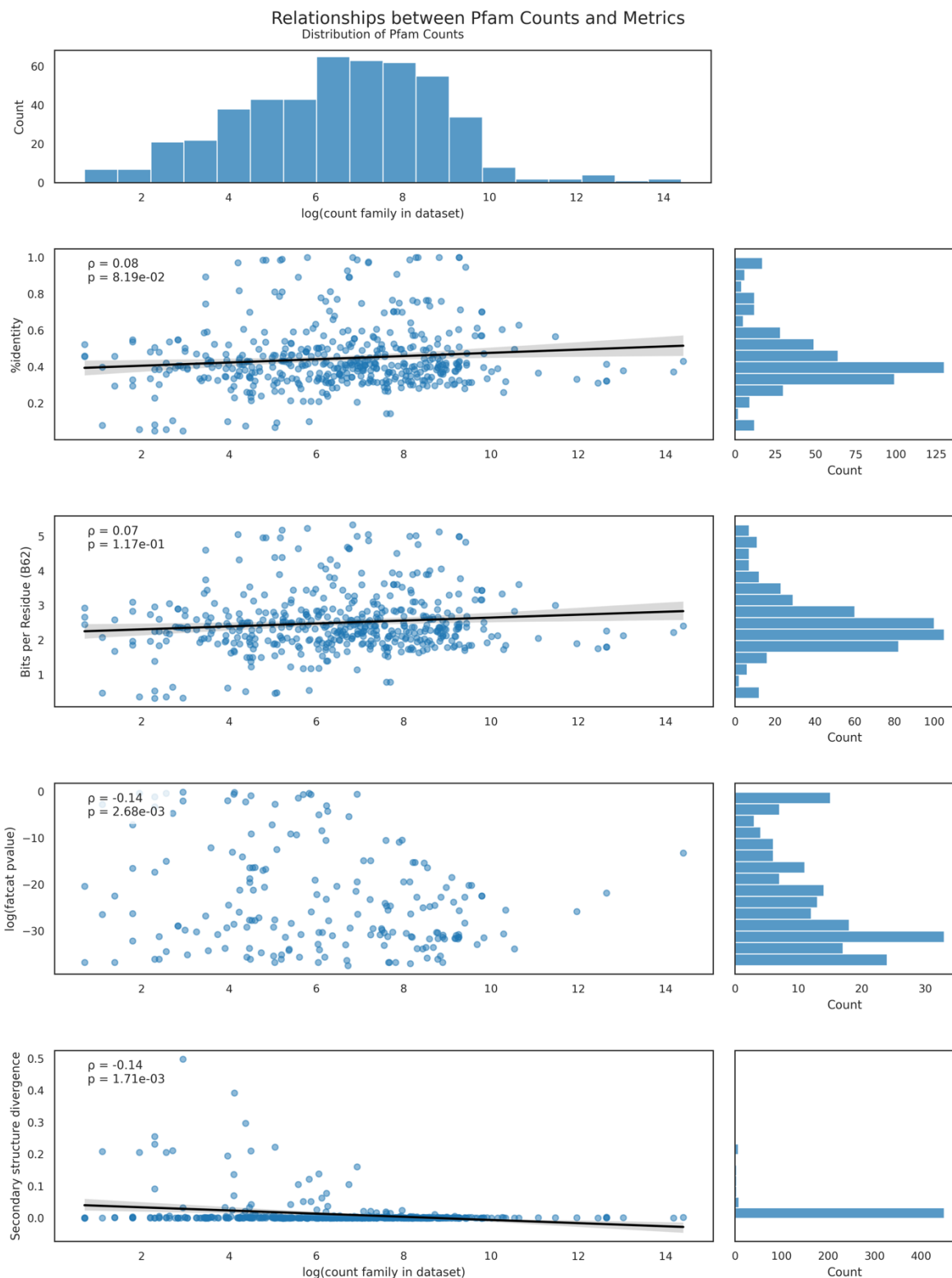
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|-------------------|-------|------------|----|------------|-----|------------|---|
| <b>PF03709.18</b> | 158   | PF01322.23 | 24 | PF01189.20 | 39  | PF08955.13 | 3 |
| <b>PF00215.27</b> | 1778  | PF08958.13 | 13 | PF05494.15 | 84  | PF05405.17 | 3 |
| <b>PF00213.21</b> | 3898  | PF09928.12 | 26 | PF13677.9  | 239 | PF09884.12 | 2 |
| <b>PF02566.22</b> | 813   | PF18446.4  | 12 | PF01402.24 | 305 | PF10698.12 | 2 |
| <b>PF00174.22</b> | 110   | PF01287.23 | 22 | PF08753.14 | 202 | PF00970.27 | 1 |
| <b>PF00420.27</b> | 4130  | PF06155.15 | 2  | PF14803.9  | 12  | PF00248.24 | 1 |
| <b>PF00499.23</b> | 586   | PF13542.9  | 39 | PF14815.9  | 138 | PF12718.10 | 1 |
| <b>PF00507.22</b> | 4099  | PF03550.17 | 19 | PF01936.21 | 13  | PF20457.1  | 3 |
| <b>PF00543.25</b> | 20950 | PF03169.18 | 2  | PF10400.12 | 72  | PF03682.16 | 1 |
| <b>PF01507.22</b> | 481   | PF06810.14 | 15 | PF05016.18 | 361 | PF09472.13 | 1 |
| <b>PF01161.23</b> | 184   | PF01157.21 | 27 | PF07352.15 | 7   | PF01954.19 | 1 |
| <b>PF00398.23</b> | 311   | PF01198.22 | 30 | PF05137.16 | 60  | PF18556.4  | 2 |
| <b>PF02452.20</b> | 4356  | PF05857.14 | 32 | PF00484.22 | 333 | PF18946.3  | 1 |
| <b>PF03965.19</b> | 240   | PF00089.29 | 2  | PF04024.15 | 163 | PF05275.14 | 1 |
| <b>PF01252.21</b> | 840   | PF13365.9  | 2  | PF00239.24 | 230 | PF19174.3  | 3 |
| <b>PF01470.20</b> | 888   | PF08889.14 | 46 | PF01694.25 | 295 | PF07295.14 | 1 |
| <b>PF00557.27</b> | 5137  | PF14007.9  | 19 | PF00352.24 | 64  | PF14537.9  | 2 |
| <b>PF04327.15</b> | 2065  | PF07524.16 | 15 | PF03070.19 | 106 | PF12910.10 | 1 |
| <b>PF10502.12</b> | 2984  | PF16036.8  | 16 | PF02909.20 | 114 | PF10069.12 | 1 |
| <b>PF01195.22</b> | 11630 | PF01972.19 | 13 | PF03966.19 | 214 | PF03612.17 | 1 |
| <b>PF01327.24</b> | 2934  | PF10414.12 | 14 | PF03350.19 | 106 | PF11554.11 | 1 |
| <b>PF04020.16</b> | 756   | PF14285.9  | 5  | PF14003.9  | 35  | PF01946.20 | 1 |
| <b>PF00589.25</b> | 196   | PF02662.19 | 39 | PF06908.14 | 94  | PF14137.9  | 1 |
| <b>PF08890.14</b> | 73    | PF01551.25 | 19 | PF14038.9  | 33  | PF08222.14 | 2 |
| <b>PF01895.22</b> | 10756 | PF00832.23 | 34 | PF06983.16 | 147 | PF13751.9  | 1 |
| <b>PF01865.19</b> | 2696  | PF00872.21 | 13 | PF01118.27 | 24  | PF14715.9  | 1 |
| <b>PF02811.22</b> | 954   | PF12637.10 | 35 | PF00004.32 | 37  | PF13197.9  | 1 |
| <b>PF02585.20</b> | 528   | PF07015.14 | 11 | PF00308.21 | 299 | PF07452.15 | 1 |
| <b>PF07238.17</b> | 558   | PF03029.20 | 14 | PF18277.4  | 98  | PF03691.17 | 1 |
| <b>PF12945.10</b> | 495   | PF08477.16 | 7  | PF04548.19 | 87  | PF15980.8  | 1 |
| <b>PF01625.24</b> | 275   | PF01148.23 | 18 | PF03773.16 | 174 | PF01734.25 | 1 |
| <b>PF01243.23</b> | 418   | PF01864.20 | 32 | PF04266.17 | 6   | PF04636.16 | 1 |
| <b>PF10590.12</b> | 219   | PF02578.18 | 25 | PF17805.4  | 151 | PF20617.1  | 2 |
| <b>PF12766.10</b> | 41    | PF07905.14 | 7  | PF13549.9  | 1   | PF02136.23 | 1 |
| <b>PF01048.23</b> | 4485  | PF07843.14 | 20 | PF01869.23 | 13  | PF12680.10 | 2 |
| <b>PF03364.23</b> | 370   | PF03266.18 | 24 | PF00188.29 | 75  | PF06999.15 | 1 |
| <b>PF10604.12</b> | 462   | PF10649.12 | 6  | PF01693.19 | 15  | PF12666.10 | 2 |
| <b>PF01522.24</b> | 243   | PF10830.11 | 13 | PF15630.9  | 45  | PF01845.20 | 1 |
| <b>PF01558.21</b> | 4735  | PF14063.9  | 10 | PF04218.16 | 18  | PF13590.9  | 2 |

|                   |       |            |    |            |      |            |   |
|-------------------|-------|------------|----|------------|------|------------|---|
| <b>PF00550.28</b> | 3678  | PF06161.14 | 23 | PF10628.12 | 97   | PF19027.3  | 2 |
| <b>PF14573.9</b>  | 265   | PF10639.12 | 15 | PF04977.18 | 123  | PF15619.9  | 2 |
| <b>PF00481.24</b> | 3464  | PF12019.11 | 29 | PF07261.14 | 148  | PF16431.8  | 2 |
| <b>PF07228.15</b> | 2178  | PF13298.9  | 9  | PF02481.18 | 4    | PF00083.27 | 1 |
| <b>PF13672.9</b>  | 4129  | PF10125.12 | 11 | PF07681.15 | 79   | PF07690.19 | 1 |
| <b>PF00697.25</b> | 3505  | PF05951.16 | 7  | PF02001.19 | 108  | PF12832.10 | 1 |
| <b>PF01782.21</b> | 8914  | PF08291.14 | 7  | PF07293.14 | 138  | PF13347.9  | 1 |
| <b>PF05239.19</b> | 8999  | PF00866.21 | 6  | PF07556.14 | 98   | PF09845.12 | 1 |
| <b>PF01255.22</b> | 1163  | PF01193.27 | 4  | PF09889.12 | 4    | PF16745.8  | 1 |
| <b>PF14681.9</b>  | 15446 | PF13656.9  | 11 | PF10702.12 | 5    | PF01246.23 | 3 |
| <b>PF14464.9</b>  | 974   | PF17922.4  | 79 | PF11023.11 | 34   | PF10771.12 | 1 |
| <b>PF00227.29</b> | 6283  | PF04366.15 | 4  | PF03860.19 | 10   | PF00261.23 | 1 |
| <b>PF11563.11</b> | 15    | PF18174.4  | 6  | PF12225.11 | 84   | PF05266.17 | 1 |
| <b>PF01416.23</b> | 3736  | PF01610.20 | 5  | PF19601.2  | 62   | PF05911.14 | 1 |
| <b>PF00849.25</b> | 20121 | PF13852.9  | 4  | PF19810.2  | 2    | PF06008.17 | 1 |
| <b>PF01479.28</b> | 41620 | PF14344.9  | 5  | PF06149.15 | 211  | PF06818.18 | 1 |
| <b>PF04012.15</b> | 675   | PF19618.2  | 5  | PF05653.17 | 22   | PF16729.8  | 2 |
| <b>PF06130.15</b> | 374   | PF02240.19 | 2  | PF01996.19 | 12   | PF00291.28 | 1 |
| <b>PF01242.22</b> | 1042  | PF00069.28 | 4  | PF04060.16 | 74   | PF13444.9  | 3 |
| <b>PF00381.22</b> | 6443  | PF12900.10 | 38 | PF00498.29 | 221  | PF04193.17 | 2 |
| <b>PF03829.16</b> | 179   | PF01020.20 | 12 | PF12401.11 | 40   | PF04365.16 | 1 |
| <b>PF03830.18</b> | 1406  | PF16295.8  | 23 | PF16697.8  | 221  | PF07866.14 | 1 |
| <b>PF00358.23</b> | 741   | PF03073.18 | 19 | PF12641.10 | 146  | PF18573.4  | 2 |
| <b>PF00359.25</b> | 4592  | PF03683.16 | 10 | PF04961.15 | 622  | PF14147.9  | 1 |
| <b>PF00367.23</b> | 71    | PF14864.9  | 3  | PF13653.9  | 151  | PF14478.9  | 2 |
| <b>PF02255.19</b> | 607   | PF11724.11 | 18 | PF01184.22 | 5    | PF20126.2  | 1 |
| <b>PF02302.20</b> | 4323  | PF10237.12 | 7  | PF02518.29 | 1497 | PF20458.1  | 2 |
| <b>PF02700.17</b> | 2278  | PF03232.16 | 14 | PF07927.15 | 98   | PF14501.9  | 1 |
| <b>PF00719.22</b> | 477   | PF14709.10 | 22 | PF04883.15 | 41   | PF02089.18 | 2 |
| <b>PF02568.17</b> | 84    | PF11009.11 | 55 | PF07456.14 | 141  | PF03496.17 | 1 |
| <b>PF06508.16</b> | 1625  | PF13031.9  | 20 | PF03641.17 | 113  | PF13893.9  | 3 |
| <b>PF02677.17</b> | 132   | PF13711.9  | 53 | PF13591.9  | 10   | PF01636.26 | 1 |
| <b>PF06177.14</b> | 433   | PF14332.9  | 23 | PF09936.12 | 43   | PF19974.2  | 2 |
| <b>PF04002.18</b> | 4221  | PF20122.2  | 9  | PF03060.18 | 228  | PF18478.4  | 2 |
| <b>PF20582.1</b>  | 4054  | PF04313.17 | 2  | PF01784.21 | 12   | PF16917.8  | 1 |
| <b>PF02033.21</b> | 1471  | PF13588.9  | 24 | PF02501.20 | 14   | PF10551.12 | 1 |
| <b>PF05025.16</b> | 1635  | PF18546.4  | 7  | PF16552.8  | 51   | PF19480.2  | 1 |
| <b>PF02132.18</b> | 17427 | PF01015.21 | 9  | PF06114.16 | 45   | PF19502.2  | 1 |
| <b>PF13662.9</b>  | 17871 | PF14069.9  | 39 | PF10076.12 | 27   | PF04410.17 | 2 |

|                   |       |            |    |            |     |            |   |
|-------------------|-------|------------|----|------------|-----|------------|---|
| <b>PF02631.19</b> | 263   | PF01253.25 | 26 | PF13470.9  | 110 | PF16921.8  | 2 |
| <b>PF01042.24</b> | 10651 | PF10025.12 | 11 | PF02563.19 | 53  | PF04705.15 | 1 |
| <b>PF14588.9</b>  | 2022  | PF11576.11 | 6  | PF01200.21 | 18  | PF12570.11 | 3 |
| <b>PF00687.24</b> | 16570 | PF00290.23 | 4  | PF01201.25 | 51  | PF00454.30 | 2 |
| <b>PF00466.23</b> | 7810  | PF07022.16 | 2  | PF04308.15 | 297 | PF18846.4  | 1 |
| <b>PF00298.22</b> | 19859 | PF06296.15 | 2  | PF03259.20 | 107 | PF07497.15 | 1 |
| <b>PF03946.17</b> | 19847 | PF14006.9  | 21 | PF14361.9  | 11  | PF03144.28 | 6 |
| <b>PF00542.22</b> | 17799 | PF09860.12 | 30 | PF05866.14 | 17  | PF10826.11 | 1 |
| <b>PF16320.8</b>  | 17798 | PF10949.11 | 11 | PF02630.17 | 179 | PF02550.18 | 1 |
| <b>PF00572.21</b> | 14304 | PF11010.11 | 11 | PF02810.18 | 87  | PF19300.2  | 1 |
| <b>PF00238.22</b> | 20294 | PF04019.15 | 14 | PF03695.16 | 50  | PF18854.4  | 1 |
| <b>PF00252.21</b> | 16046 | PF16789.8  | 16 | PF01641.21 | 303 | PF13335.9  | 1 |
| <b>PF00861.25</b> | 6548  | PF09684.13 | 2  | PF04079.19 | 198 | PF13343.9  | 1 |
| <b>PF01245.23</b> | 10025 | PF01411.22 | 16 | PF04203.16 | 80  | PF14172.9  | 1 |
| <b>PF00453.21</b> | 13373 | PF07973.17 | 15 | PF03567.17 | 19  | PF13103.9  | 1 |
| <b>PF00829.24</b> | 14244 | PF10087.12 | 21 | PF04612.15 | 31  | PF09877.12 | 2 |
| <b>PF00237.22</b> | 7442  | PF11325.11 | 12 | PF02416.19 | 99  | PF11483.11 | 1 |
| <b>PF01386.22</b> | 1674  | PF13464.9  | 31 | PF05099.16 | 24  | PF20208.1  | 1 |
| <b>PF14693.9</b>  | 1674  | PF04250.16 | 34 | PF17754.4  | 57  | PF05233.16 | 1 |
| <b>PF01016.22</b> | 4820  | PF17253.5  | 24 | PF01096.21 | 50  | PF07879.14 | 1 |
| <b>PF00828.22</b> | 15067 | PF03065.18 | 10 | PF14451.9  | 223 | PF12276.11 | 1 |
| <b>PF00830.22</b> | 10606 | PF12826.10 | 37 | PF02371.19 | 10  | PF07298.14 | 1 |
| <b>PF00831.26</b> | 1986  | PF05891.15 | 12 | PF02588.18 | 31  | PF17294.5  | 1 |
| <b>PF00297.25</b> | 16473 | PF13190.9  | 11 | PF14036.9  | 18  | PF16575.8  | 1 |
| <b>PF00327.23</b> | 5675  | PF04717.15 | 3  | PF13717.9  | 7   | PF04237.16 | 1 |
| <b>PF01197.21</b> | 4644  | PF01855.22 | 5  | PF02826.22 | 164 | PF11141.11 | 1 |
| <b>PF01783.26</b> | 6035  | PF02776.21 | 17 | PF06745.16 | 220 | PF16732.8  | 1 |
| <b>PF00471.23</b> | 8935  | PF14141.9  | 38 | PF13481.9  | 109 | PF07606.14 | 1 |
| <b>PF00468.20</b> | 6757  | PF14174.9  | 10 | PF03992.19 | 126 | PF05719.14 | 1 |
| <b>PF01632.22</b> | 13983 | PF03767.17 | 19 | PF13336.9  | 115 | PF09509.13 | 1 |
| <b>PF00573.25</b> | 9424  | PF09881.12 | 3  | PF14542.9  | 87  | PF00950.20 | 1 |
| <b>PF00935.22</b> | 48    | PF13047.9  | 49 | PF06857.14 | 39  | PF01032.21 | 1 |
| <b>PF00281.22</b> | 16507 | PF04854.17 | 21 | PF00107.29 | 39  | PF05523.14 | 1 |
| <b>PF00673.24</b> | 16507 | PF02433.18 | 5  | PF06094.15 | 71  | PF06082.14 | 3 |
| <b>PF00347.26</b> | 19582 | PF03597.18 | 6  | PF13772.9  | 34  | PF01548.20 | 3 |
| <b>PF01248.29</b> | 1371  | PF00078.30 | 1  | PF01871.20 | 84  | PF09537.13 | 1 |
| <b>PF01281.22</b> | 16675 | PF08388.14 | 1  | PF08280.14 | 37  | PF07666.14 | 1 |
| <b>PF03948.17</b> | 16675 | PF08797.14 | 2  | PF07100.14 | 92  | PF02867.18 | 1 |
| <b>PF00338.25</b> | 15679 | PF13100.9  | 1  | PF06180.14 | 40  | PF14064.9  | 1 |

|                   |       |            |    |            |     |            |   |
|-------------------|-------|------------|----|------------|-----|------------|---|
| <b>PF00411.22</b> | 8274  | PF04066.16 | 35 | PF01339.20 | 30  | PF09929.12 | 1 |
| <b>PF00416.25</b> | 17611 | PF04210.16 | 3  | PF20229.1  | 29  | PF03083.19 | 1 |
| <b>PF00253.24</b> | 14668 | PF10126.12 | 8  | PF00795.25 | 36  | PF12441.11 | 1 |
| <b>PF00312.25</b> | 14792 | PF02150.19 | 35 | PF14522.9  | 27  | PF06252.15 | 1 |
| <b>PF00886.22</b> | 2685  | PF04259.17 | 3  | PF00034.24 | 299 | PF03351.20 | 1 |
| <b>PF00366.23</b> | 3683  | PF07812.15 | 3  | PF00926.22 | 15  | PF09459.13 | 1 |
| <b>PF01084.23</b> | 1377  | PF07374.14 | 8  | PF07719.20 | 43  | PF07704.14 | 2 |
| <b>PF00203.24</b> | 11713 | PF12007.11 | 31 | PF06569.14 | 210 | PF00395.23 | 2 |
| <b>PF01165.23</b> | 2975  | PF01183.23 | 8  | PF08897.14 | 43  | PF06291.14 | 2 |
| <b>PF02482.22</b> | 7313  | PF12323.11 | 9  | PF09954.12 | 47  | PF04945.16 | 1 |
| <b>PF16321.8</b>  | 7271  | PF13344.9  | 14 | PF09986.12 | 231 | PF18681.4  | 1 |
| <b>PF00163.22</b> | 20930 | PF06835.16 | 8  | PF10652.12 | 38  | PF09388.13 | 1 |
| <b>PF00333.23</b> | 3967  | PF04630.15 | 7  | PF10942.11 | 77  | PF10142.12 | 1 |
| <b>PF03719.18</b> | 3967  | PF01775.20 | 10 | PF11117.11 | 185 | PF13618.9  | 1 |
| <b>PF01250.20</b> | 9591  | PF08175.15 | 26 | PF11127.11 | 126 | PF02411.18 | 1 |
| <b>PF00177.24</b> | 19361 | PF04536.17 | 2  | PF11667.11 | 4   | PF03190.18 | 1 |
| <b>PF00410.22</b> | 20255 | PF08325.13 | 40 | PF04027.16 | 15  | PF00685.30 | 1 |
| <b>PF00380.22</b> | 7413  | PF14151.9  | 28 | PF04260.15 | 458 | PF10447.12 | 1 |
| <b>PF00164.28</b> | 13048 | PF01738.21 | 35 | PF14584.9  | 130 | PF13377.9  | 1 |
| <b>PF00834.22</b> | 12004 | PF11859.11 | 20 | PF04379.17 | 258 | PF13577.9  | 1 |
| <b>PF00355.29</b> | 873   | PF14272.9  | 4  | PF19799.2  | 4   | PF07991.15 | 2 |
| <b>PF13806.9</b>  | 354   | PF02925.19 | 4  | PF01940.19 | 13  | PF17925.4  | 1 |
| <b>PF10399.12</b> | 332   | PF03054.19 | 15 | PF06107.14 | 227 | PF20498.1  | 1 |
| <b>PF00075.27</b> | 852   | PF02922.21 | 2  | PF02661.21 | 114 | PF06170.15 | 1 |
| <b>PF13456.9</b>  | 116   | PF01817.24 | 2  | PF12611.11 | 95  | PF19668.2  | 1 |
| <b>PF01351.21</b> | 250   | PF11582.11 | 18 | PF08704.13 | 94  | PF19851.2  | 1 |
| <b>PF01138.24</b> | 2298  | PF20398.1  | 10 | PF13589.9  | 279 | PF17648.4  | 1 |
| <b>PF03725.18</b> | 2252  | PF01912.21 | 39 | PF07432.16 | 19  | PF05636.14 | 1 |
| <b>PF00929.27</b> | 493   | PF01794.22 | 6  | PF06787.14 | 4   | PF14148.9  | 1 |
| <b>PF16473.8</b>  | 104   | PF03444.18 | 11 | PF02602.18 | 5   | PF13640.9  | 1 |
| <b>PF02508.17</b> | 1639  | PF09123.14 | 27 | PF17836.4  | 509 | PF13661.9  | 1 |
| <b>PF00639.24</b> | 41    | PF10710.12 | 7  | PF01418.20 | 58  | PF07498.15 | 1 |
| <b>PF13145.9</b>  | 41    | PF13450.9  | 14 | PF02002.20 | 11  | PF00700.24 | 1 |
| <b>PF13616.9</b>  | 41    | PF05049.16 | 8  | PF01899.19 | 86  | PF01116.23 | 1 |
| <b>PF07288.14</b> | 166   | PF13328.9  | 28 | PF02391.20 | 122 | PF07578.14 | 1 |
| <b>PF03737.18</b> | 304   | PF05958.14 | 81 | PF08378.14 | 140 | PF00136.24 | 2 |
| <b>PF01765.22</b> | 17362 | PF15898.8  | 13 | PF06042.14 | 17  | PF10061.12 | 1 |
| <b>PF02082.23</b> | 5093  | PF11139.11 | 8  | PF11612.11 | 54  | PF13280.9  | 1 |
| <b>PF06962.15</b> | 1010  | PF04173.16 | 11 | PF04277.16 | 11  | PF14139.9  | 1 |

|                   |     |            |    |            |     |            |   |
|-------------------|-----|------------|----|------------|-----|------------|---|
| <b>PF02410.18</b> | 908 | PF08901.14 | 31 | PF02678.19 | 184 | PF05656.17 | 1 |
|-------------------|-----|------------|----|------------|-----|------------|---|



**Figure S3:** Test set metrics on a per family basis for the examples in the test set with Pfam labels (479) against the number of times the family is found in the dataset.<sup>2</sup> We observe a tendency for decreased performance as the family becomes more “rare” to the model. In some cases, the

BEAM search collapses and the model does not create a protein that matches the same predicted fold as the thermophilic homolog (log FATCAT >-3).<sup>3</sup>

## Alignment of NOMELT EnHD Variant to Wild Type

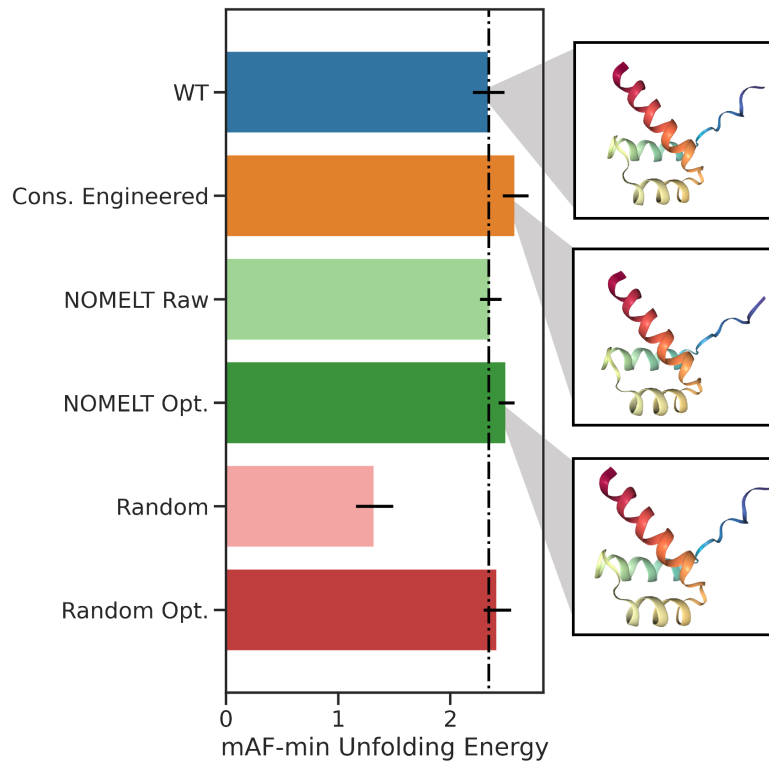
```
DKRPRTAFSSEQLARLKREFNENRYLTERRRQQLSSELGLNEAQIKIWFQNKRAKIKK-----  
· |||||· · ||· ||· ||· · ||||· ||· · ||||· ||||| ||||| |||||  
EKRPRTAFTAEQLQRLKAEFQASRYLTEQRRQELARELGLNESQIKIWFQNKRAKIKKASGNK
```

Figure S4: Alignment of wild type EnHD (top) to NOMELT generated variant (bottom).

## Creating a second “optimized” EnHD variant

In addition to taking the raw 14 mutation output of NOMELT, we viewed it as a generator of variation, given that the model may be introducing variation picked up from nature that does not directly impact thermal stability. This yields a library size of 16,384 considering 14 binary mutations to search over.

We conducted 10 rounds of NSGA-ii evolutionary optimization each with a population size of 10 using the mAF-min method as an objective function. These rounds explore only 0.6% of the library, but are able to improve the estimated stability score of EnHD from 2.37 to to 2.51 using NOMELT suggestions. We then repeated this process considering 14 random mutations as opposed to the 14 suggested by NOMELT, and were unable to significantly improve score. See Figure S1. The optimized variant did non however exhibit an increase in stability as measured by MD or experimentally.



**Figure S5** Comparison of stability of various designs according to the mAF-min method's unfolding free energy change. Error bars indicate 95% CI over the ensemble of AlphaFold structures.<sup>4</sup> Vertical black line is the wild type's score. The previously engineered variant, by consensus over many homologs (orange) is more stable according to the estimator (P-value  $1.7e^{-19}$ ). The raw output of the NOMELT model given a single input wild type sequence (light green), which includes 14 mutations involving some insertions, is not stabilizing or destabilizing. After only 100 examples from the search space of  $14^2$  mutation permutations have been explored using NSGA-ii (dark green), we achieve a statistically more stable variant than WT (P-value  $9.5e^{-14}$ ). Introducing the same number of mutations randomly is extremely destabilizing (light red), and running the same number of exploration steps over the random search space cannot improve the protein over wild type.

1. Komp, E. *et al.* Homologous Pairs of Low and High Temperature Originating Proteins Spanning the Known Prokaryotic Universe. *Sci. Data* **10**, 682 (2023).
2. Mistry, J. *et al.* Pfam: The protein families database in 2021. *Nucleic Acids Res.* **49**, D412–D419 (2021).
3. Li, Z., Jaroszewski, L., Iyer, M., Sedova, M. & Godzik, A. FATCAT 2.0: towards a better understanding of the structural diversity of proteins. *Nucleic Acids Res.* **48**, W60–W64 (2020).
4. Peccati, F., Alunno-Rufini, S. & Jiménez-Osés, G. Accurate Prediction of Enzyme Thermostabilization with Rosetta Using AlphaFold Ensembles. *J. Chem. Inf. Model.* **63**, 898–909 (2023).