

GUIDE TO WORLD CRUDES

Assays of two Venezuelan crudes differ significantly

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Two important Venezuelan crude oils from Venezuela's Anzoátegui state have been assayed. Heavy Merey has an API gravity of 15° and contains 2.7 wt % sulfur, and Leona has an API gravity of 24° and a sulfur content of 1.5 wt %.

Leona, discovered in 1938, has 29 producing wells. According to the Journal's most recent survey of worldwide crude production, 1995 average production was 3,170 b/d (OGJ, Dec. 30, 1996, p. 37). Merey, discovered in 1937, has 26 production wells, and produced an average of 1,027 b/d in 1995 (total about 26, 702).

Both crudes are produced in eastern Venezuela, then travel by pipeline to loading facilities at Puerto La Cruz (map). Both are produced by Petroleos de Venezuela SA subsidiary Corpoven SA.

Oil & Gas Journal published assays of Leona and Merey in the 1980s (OGJ, Oct. 24, 1983, p. 88). Leona has changed little in the 14 years since the assays were last published. Merey, on the other hand, has become considerably heavier (14.7° API now, compared to 17.4° in 1983). In addition, Merey's sulfur content has increased to 2.74 wt % from 2.2 wt %.

Leona

Puerto La Cruz, Anzoátegui, Venezuela

Whole crude

Gravity, °API: 24
Sp. gr. @ 60/60° F.: 0.91
Kin. visc. @ 100° F., cSt: 31.47

Kin. visc. @ 122° F., cSt: 19.2
Kin. visc. @ 140° F., cSt: 13.07
Mercaptan S, ppm: 18.4
Sulfur, wt %: 1.52
Pour pt. (ASTM max.), °F.: -20
Flash pt., °F.: -23
Rvp, psi: 3.66
Total acid no., mg KOH/g: 0.45
Asphaltenes, wt %: 4.78
Total nitrogen, ppm: 3,205
UOP K factor: 11.7
Concarbon residue, wt %: 7.05
V/Ni, ppm: 139/42
Na/Al, ppm: 5.3/<5

Range, °F.: IBP-68
Yield, wt % (vol %): 0.51 (0.59)

Range, °F.: 68-212
Gravity, °API: 71.3
Yield, wt % (vol %): 4.22 (5.49)
Sp. gr. @ 60/60° F.: 0.6977
ASTM distillation, °F.—
IBP: 104
5 vol % recovered: 127
10 vol % recovered: 131
30 vol % recovered: 147
50 vol % recovered: 162
70 vol % recovered: 178
90 vol % recovered: 196
End point: 201

Mercaptan S, ppm: <1
Sulfur, wt %: 0.002
Rvp, psi: 9.43
RON (clear): 70.3
PNA paraffins, wt %: 65.19
PNA naphthenes, wt %: 27.46
PNA aromatics, wt %: 7.12
Normal paraffins, wt %: 34.58
Carbon-to-hydrogen ratio: 5.58

Range, °F.: 212-302
Gravity, °API: 53.7
Yield, wt % (vol %): 5.56 (6.62)
Sp. gr. @ 60/60° F.: 0.764
ASTM distillation, °F.—
IBP: 223
5 vol % recovered: 235
10 vol % recovered: 241
30 vol % recovered: 248
50 vol % recovered: 255
70 vol % recovered: 264
90 vol % recovered: 279
End point: 284
Mercaptan S, ppm: 3
Sulfur, wt %: 0.004
Rvp, psi: 1.84

RON (clear): 50
PNA paraffins, wt %: 44.37
PNA naphthenes, wt %: 32.87
PNA aromatics, wt %: 22.72
Normal paraffins, wt %: 56.59
Carbon-to-hydrogen ratio: 6.19

Range, °F.: 302-392
Gravity, °API: 46.4
Yield, wt % (vol %): 5.41 (6.18)
Sp. gr. @ 60/60° F.: 0.7964
ASTM distillation, °F.—
IBP: 313
5 vol % recovered: 325
10 vol % recovered: 327
30 vol % recovered: 334
50 vol % recovered: 340
70 vol % recovered: 349
90 vol % recovered: 363
End point: 370
Mercaptan S, ppm: 16.00
Sulfur, wt %: 0.06
Rvp, psi: 1.08
RON (clear): 49.8
PNA paraffins, wt %: 40.27
PNA naphthenes, wt %: 28.16
PNA aromatics, wt %: 31.04
Normal paraffins, wt %: 59.2
Carbon-to-hydrogen ratio: 6.26

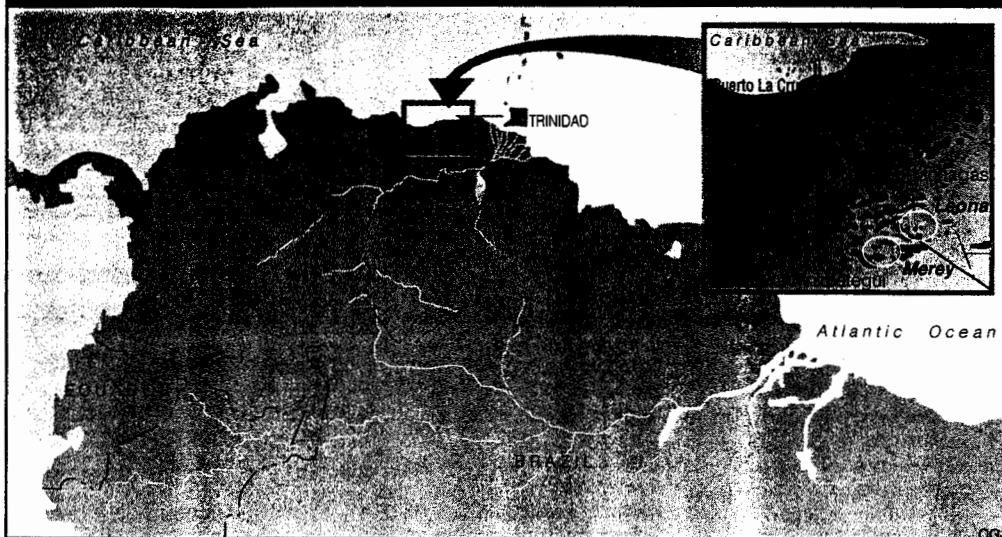
Range, °F.: 392-482
Gravity, °API: 38.8
Yield, wt % (vol %): 7.04 (7.70)
Sp. gr. @ 60/60° F.: 0.8309
ASTM distillation, °F.—
IBP: 412
5 vol % recovered: 421
10 vol % recovered: 423
30 vol % recovered: 428
50 vol % recovered: 433
70 vol % recovered: 442
90 vol % recovered: 455
End point: 460
Kin. visc. @ 100° F., cSt: 1.66
Kin. visc. @ 140° F., cSt: 1.23
Mercaptan S, ppm: 8.3
Sulfur, wt %: 0.2
Total acid no., mg KOH/g:
<0.01
Aromatics, wt %: 25.8
Refractive index (N75): 1.4594
Carbon-to-hydrogen ratio: 6.35
Smoke pt., mm: 22
Freeze pt., °F.: -22
Color stability (48hr @ 100° C.):
7
Aniline pt., °F.: 138

Cetane no.: 39
Calculated cetane index
(ASTM): 41.52

Range, °F.: 482-572
Gravity, °API: 33.1
Yield, wt % (vol %): 7.82 (8.28)
Sp. gr. @ 60/60° F.: 0.8597
ASTM distillation, °F.—
IBP: 457
5 vol % recovered: 498
10 vol % recovered: 504
30 vol % recovered: 509
50 vol % recovered: 515
70 vol % recovered: 523
90 vol % recovered: 534
End point: 540
Kin. visc. @ 100° F., cSt: 3.26
Kin. visc. @ 140° F., cSt: 2.04
Kin. visc. @ 210° F., cSt: 1.12
Mercaptan S, ppm: 16.1
Sulfur, wt %: 0.75
Cloud pt., °F.: -15
Flash pt., °F.: 230
Total acid no., mg KOH/g: 0.
Aromatics, wt %: 34.9
Refractive index (N75): 1.4755
Carbon-to-hydrogen ratio: 6.6
Smoke pt., mm: 14
Freeze pt., °F.: 21
Color stability (48hr @ 100° C):
L1.0
Aniline pt., °F.: 143.5
Cetane no.: 43.2
Calculated cetane index
(ASTM): 44.67

Range, °F.: 572-650
Gravity, °API: 29
Yield, wt % (vol %): 7.60 (7.8-
Sp. gr. @ 60/60° F.: 0.8816
ASTM distillation, °F.—
IBP: 556
5 vol % recovered: 577
10 vol % recovered: 581
30 vol % recovered: 590
50 vol % recovered: 594
70 vol % recovered: 599
90 vol % recovered: 608
End point: 612
Kin. visc. @ 100° F., cSt: 6.7
Kin. visc. @ 140° F., cSt: 3.85
Kin. visc. @ 210° F., cSt: 1.83
Mercaptan S, ppm: 12.4
Sulfur, wt %: 1.15
Pour pt. (ASTM max.), °F.: 15
Cloud pt., °F.: 16

LEONA, MEREY FIELDS



Flash pt., °F.: 290
 Total acid no., mg KOH/g: 0.06
 Aromatics, wt %: 38.8
 Refractive index (N75): 1.4883
 Carbon-to-hydrogen ratio: 6.73
 Total nitrogen, ppm: 321
 Color stability (48hr @ 100° C.):
 L1.0
 Aniline pt., °F.: 152.5
 Cetane no.: 45.8
 Calculated cetane index
 (ASTM): 44.78

Range, °F.: 650-756
 Gravity, °API: 24.4
 Yield, wt % (vol %): 10.28 (10.26)
 Sp. gr. @ 60/60° F.: 0.9071
 ASTM distillation, °F.—
 IBP: 673
 5 vol % recovered: 685
 10 vol % recovered: 692
 30 vol % recovered: 714
 50 vol % recovered: 721
 70 vol % recovered: 739
 90 vol % recovered: 797
 End point: 824

Kin. visc. @ 140° F., cSt: 10.6
 Kin. visc. @ 210° F., cSt: 4.04
 Sulfur, wt %: 1.54
 Pour pt. (ASTM max.), °F.: 60
 Flash pt., °F.: 400
 Total acid no., mg KOH/g: 0.408
 Aromatics, wt %: 45.8
 Refractive index (N75): 1.4879
 Carbon-to-hydrogen ratio: 7.08
 Total nitrogen, ppm: 1,108
 Color stability (48hr @ 100° C.):
 L2.0
 Aniline pt., °F.: 161
 Calculated cetane index
 (ASTM): 39.51
 V/Ni, ppm: 8.2/<10

Range, °F.: 756-862
 Gravity, °API: 21
 Yield, wt % (vol %): 9.08 (8.87)
 Sp. gr. @ 60/60° F.: 0.9273
 ASTM distillation, °F.—
 IBP: 711
 5 vol % recovered: 736
 10 vol % recovered: 754
 30 vol % recovered: 788
 50 vol % recovered: 806
 70 vol % recovered: 833
 90 vol % recovered: 885
 End point: 914
 Kin. visc. @ 140° F., cSt: 25.5
 Kin. visc. @ 210° F., cSt: 7.32
 Sulfur, wt %: 1.6
 Pour pt. (ASTM max.), °F.: 90
 Flash pt., °F.: 425
 Total acid no., mg KOH/g: 0.559
 Aromatics, wt %: 50.2
 Refractive index (N75): 1.4972
 Carbon-to-hydrogen ratio: 7.15
 Total nitrogen, ppm: 1,634
 Color stability (48hr @ 100° C.):
 L3.5
 Aniline pt., °F.: 171
 Concarbon residue, wt %: <0.05
 V/Ni, ppm: 8.1/<5

Range, °F.: 862-968
 Gravity, °API: 18.6
 Yield, wt % (vol %): 8.15 (7.72)
 Sp. gr. @ 60/60° F.: 0.9549

ASTM distillation, °F.—
 IBP: 795
 5 vol % recovered: 831
 10 vol % recovered: 844
 30 vol % recovered: 874
 50 vol % recovered: 901
 70 vol % recovered: 927
 90 vol % recovered: 957
 End point: 979
 Kin. visc. @ 140° F., cSt: 81.5
 Kin. visc. @ 210° F., cSt: 76.5
 Sulfur, wt %: 1.76
 Pour pt. (ASTM max.), °F.: 105
 Flash pt., °F.: 485
 Total acid no., mg KOH/g: 0.654
 Aromatics, wt %: 58.2
 Refractive index (N75): 1.5077
 Carbon-to-hydrogen ratio: 7.36
 Total nitrogen, ppm: 2,391
 Color stability (48hr @ 100° C.):
 L6.0
 Aniline pt., °F.: 177
 Concarbon residue, wt %: 0.12
 V/Ni, ppm: 9.4/<5

Range, °F.: 650+
 Gravity, °API: 12.3
 Yield, wt % (vol %): 61.84 (57.00)
 Sp. gr. @ 60/60° F.: 0.984
 ASTM distillation, °F.—
 IBP: 689
 5 vol % recovered: 709
 10 vol % recovered: 730
 30 vol % recovered: 840
 50 vol % recovered: 977
 70 vol % recovered: 1,031
 Kin. visc. @ 210° F., cSt: 93
 Sulfur, wt %: 2.32
 Pour pt. (ASTM max.), °F.: 75
 Flash pt., °F.: 485
 Total acid no., mg KOH/g: 0.475
 Asphaltenes, wt %: 8.08
 Total nitrogen, ppm: 4,959
 Concarbon residue, wt %: 11.59
 V/Ni, ppm: 223/63
 Na/Al, ppm: 6.3/<10

Range, °F.: 756+
 Gravity, °API: 10.2

Yield, wt % (vol %): 51.56 (46.74)
 Sp. gr. @ 60/60° F.: 0.9986
 ASTM distillation, °F.—
 IBP: 741
 5 vol % recovered: 793
 10 vol % recovered: 822
 30 vol % recovered: 923
 50 vol % recovered: 1,031
 Kin. visc. @ 210° F., cSt: 318
 Sulfur, wt %: 2.49
 Pour pt. (ASTM max.), °F.: 95
 Flash pt., °F.: 555
 Total acid no., mg KOH/g: 0.595
 Asphaltenes, wt %: 9.52
 Total nitrogen, ppm: 5,245
 Concarbon residue, wt %: 13.74
 V/Ni, ppm: 267/76

Range, °F.: 862+
 Gravity, °API: 8.5
 Yield, wt % (vol %): 42.48 (37.87)
 Sp. gr. @ 60/60° F.: 1.0107
 ASTM distillation, °F.—
 IBP: 808
 5 vol % recovered: 874
 10 vol % recovered: 900
 30 vol % recovered: 1,006
 50 vol % recovered: 1,029
 Kin. visc. @ 210° F., cSt: 1,276
 Sulfur, wt %: 2.65
 Pour pt. (ASTM max.), °F.: 110
 Flash pt., °F.: 615
 Total acid no., mg KOH/g: 0.621
 Asphaltenes, wt %: 11.42
 Total nitrogen, ppm: 7,298
 Concarbon residue, wt %: 16.3
 V/Ni, ppm: 319/87

Range, °F.: 968+
 Gravity, °API: 5.7
 Yield, wt % (vol %): 34.33 (30.15)
 Sp. gr. @ 60/60° F.: 1.0313
 Kin. visc. @ 210° F., cSt: 8,786
 Sulfur, wt %: 2.7
 Pour pt. (ASTM max.), °F.: 140
 Flash pt., °F.: 705
 Total acid no., mg KOH/g: 0.653
 Asphaltenes, wt %: 14.81
 Total nitrogen, ppm: 8,104

Concarbon residue, wt %: 20.31
 V/Ni, ppm: 367/102

Meray

Puerto La Cruz, Anzoátegui, Venezuela

Whole crude
 Gravity, °API: 14.7
 Sp. gr. @ 60/60° F.: 0.9679
 Kin. visc. @ 100° F., cSt: 992.1
 Kin. visc. @ 210° F., cSt: 38.8
 Mercaptan S, ppm: 52.5
 Sulfur, wt %: 2.74
 Pour pt. (ASTM max.), °F.: 10
 Flash pt., °F.: 98
 Rvp, psi: 2.00
 Total acid no., mg KOH/g: 0.957
 Asphaltenes, wt %: 8.68
 Total nitrogen, ppm: 5,068
 UOP K factor: 11.5
 Concarbon residue, wt %: 11.21
 Ash, wt %: 0.058
 V/Ni, ppm: 303/84
 Na/Al, ppm: 25/<5

Range, °F.: IBP-212
 Gravity, °API: 65.6
 Yield, wt % (vol %): 1.00 (1.36)
 Sp. gr. @ 60/60° F.: 0.7179
 ASTM distillation, °F.—
 IBP: 135
 5 vol % recovered: 160
 10 vol % recovered: 163
 30 vol % recovered: 174
 50 vol % recovered: 189
 70 vol % recovered: 194
 90 vol % recovered: 207
 End point: 259
 Mercaptan S, ppm: 4.72
 Sulfur, wt %: 0.011
 Rvp, psi: 6.82
 Total acid no., mg KOH/g: 0.20
 PNA paraffins, wt %: 51.86
 PNA naphthenes, wt %: 37.39
 PNA aromatics, wt %: 10.71
 Refractive index (N75): 1.3985

Carbon-to-hydrogen ratio: 5.90

Range, °F.: 212-302

Gravity, °API: 52.7
Yield, wt % (vol %): 1.87 (2.36)
Sp. gr. @ 60/60° F.: 0.7682
ASTM distillation, °F.—
IBP: 217
5 vol % recovered: 237
10 vol % recovered: 243
30 vol % recovered: 256
50 vol % recovered: 265
70 vol % recovered: 268
90 vol % recovered: 277
End point: 318
Mercaptan S, ppm: 3.29
Sulfur, wt %: 0.014
Rvp, psi: 1.99
RON (clear): 64.6
PNA paraffins, wt %: 42.97
PNA naphthenes, wt %: 36.31
PNA aromatics, wt %: 20.80
Refractive index (N75): 1.4287
Carbon-to-hydrogen ratio: 6.48

Range, °F.: 302-392

Gravity, °API: 44.2
Yield, wt % (vol %): 2.49 (2.99)
Sp. gr. @ 60/60° F.: 0.8054
ASTM distillation, °F.—
IBP: 291
5 vol % recovered: 320
10 vol % recovered: 320
30 vol % recovered: 333
50 vol % recovered: 342
70 vol % recovered: 352
90 vol % recovered: 370
End point: 394
Mercaptan S, ppm: 10.2
Sulfur, wt %: 0.017
Rvp, psi: 1.77
RON (clear): 55.0
PNA paraffins, wt %: 33.37
PNA naphthenes, wt %: 32.95
PNA aromatics, wt %: 30.85
Refractive index (N75): 1.445
Carbon-to-hydrogen ratio: 6.13

Range, °F.: 392-482

Gravity, °API: 36.1
Yield, wt % (vol %): 4.72 (5.41)
Sp. gr. @ 60/60° F.: 0.8443
ASTM distillation, °F.—
IBP: 388
5 vol % recovered: 414
10 vol % recovered: 417
30 vol % recovered: 424
50 vol % recovered: 433
70 vol % recovered: 442
90 vol % recovered: 457
End point: 473
Kin. visc. @ 100° F., cSt: 1.79
Kin. visc. @ 140° F., cSt: 1.27
Mercaptan S, ppm: 4.7
Sulfur, wt %: 0.39
Cloud pt., °F.: -74
Flash pt., °F.: 166
Total acid no., mg KOH/g: 0.20
Aromatics, wt %: 20.6
Refractive index (N75): 1.4639
Carbon-to-hydrogen ratio: 6.43
Smoke pt., mm: 20
Freeze pt., °F.: <-76
Color stability (Bef./Aft. 48hr @ 100° C.): 0.5/1.0
Cetane no.: 35.5

Calculated cetane index (ASTM): 36.76

Range, °F.: 482-572

Gravity, °API: 30.7
Yield, wt % (vol %): 6.47 (7.16)
Sp. gr. @ 60/60° F.: 0.8745
ASTM distillation, °F.—
IBP: 417
5 vol % recovered: 491
10 vol % recovered: 504
30 vol % recovered: 507
50 vol % recovered: 514
70 vol % recovered: 522
90 vol % recovered: 538
End point: 550
Kin. visc. @ 100° F., cSt: 3.68
Kin. visc. @ 140° F., cSt: 2.25
Mercaptan S, ppm: 16.7
Sulfur, wt %: 1.03
Cloud pt., °F.: -44
Flash pt., °F.: 230
Total acid no., mg KOH/g: 0.52
Aromatics, wt %: 32.9
Refractive index (N75): 1.4814
Carbon-to-hydrogen ratio: 6.85
Smoke pt., mm: 15
Freeze pt., °F.: 10.4
Color stability (Bef./Aft. 48hr @ 100° C.): 0.5/1.5
Aniline pt., °F.: 134
Cetane no.: 38.5
Calculated cetane index (ASTM): 40.28

Range, °F.: 572-650

Gravity, °API: 25.9
Yield, wt % (vol %): 6.14 (6.60)
Sp. gr. @ 60/60° F.: 0.8990
ASTM distillation, °F.—
IBP: 466
5 vol % recovered: 574
10 vol % recovered: 576
30 vol % recovered: 588
50 vol % recovered: 594
70 vol % recovered: 601
90 vol % recovered: 613
End point: 626
Kin. visc. @ 100° F., cSt: 7.99
Kin. visc. @ 140° F., cSt: 4.17
Mercaptan S, ppm: 20.6
Sulfur, wt %: 1.69
Pour pt. (ASTM max.), °F.: -10
Cloud pt., °F.: -5
Flash pt., °F.: 262
Total acid no., mg KOH/g: 0.80
Aromatics, wt %: 57.2
Refractive index (N75): 1.4958
Carbon-to-hydrogen ratio: 7.12
Total nitrogen, ppm: 187
Aniline pt., °F.: 136
Cetane no.: 39.2
Calculated cetane index (ASTM): 40.43
Concarbon residue, wt %: <0.05

Range, °F.: 650-756

Gravity, °API: 20.6
Yield, wt % (vol %): 12.46 (13.0)
Sp. gr. @ 60/60° F.: 0.9303
ASTM distillation, °F.—
IBP: 605
5 vol % recovered: 640
10 vol % recovered: 667
30 vol % recovered: 700
50 vol % recovered: 702

70 vol % recovered: 723
90 vol % recovered: 763
End point: 792*
Kin. visc. @ 140° F., cSt: 14.99
Kin. visc. @ 210° F., cSt: 4.76
Sulfur, wt %: 2.29
Pour pt. (ASTM max.), °F.: 50
Flash pt., °F.: 405
Total acid no., mg KOH/g: 1.10
Aromatics, wt %: 49.7
Refractive index (N75): 1.499
Carbon-to-hydrogen ratio: 7.40
Total nitrogen, ppm: 997
Aniline pt., °F.: 145
Calculated cetane index (ASTM): 35.25
V/Ni, ppm: 8.9/<2

Range, °F.: 765-862

Gravity, °API: 17.1
Yield, wt % (vol %): 9.86 (10.06)
Sp. gr. @ 60/60° F.: 0.9522
ASTM distillation, °F.—
IBP: 676
5 vol % recovered: 718
10 vol % recovered: 750
30 vol % recovered: 797
50 vol % recovered: 801
70 vol % recovered: 829
90 vol % recovered: 860
End point: 894*
Kin. visc. @ 140° F., cSt: 57.7
Kin. visc. @ 210° F., cSt: 11.9
Sulfur, wt %: 2.41
Pour pt. (ASTM max.), °F.: 80
Flash pt., °F.: 450
Total acid no., mg KOH/g: 1.37
Aromatics, wt %: 54.8
Refractive index (N75): 1.5105
Carbon-to-hydrogen ratio: 7.51
Total nitrogen, ppm: 1,833
Aniline pt., °F.: 154
Concarbon residue, wt %: <0.05
V/Ni, ppm: 9/<2

Range, °F.: 862-968

Gravity, °API: 14.5
Yield, wt % (vol %): 9.19 (9.21)
Sp. gr. @ 60/60° F.: 0.9692
ASTM distillation, °F.—
IBP: 781
5 vol % recovered: 831
10 vol % recovered: 865
30 vol % recovered: 905
50 vol % recovered: 905
70 vol % recovered: 923
90 vol % recovered: 954
End point: 977*
Kin. visc. @ 140° F., cSt: 263.9
Kin. visc. @ 210° F., cSt: 33.2
Sulfur, wt %: 2.60
Pour pt. (ASTM max.), °F.: 90
Flash pt., °F.: 530
Total acid no., mg KOH/g: 1.67
Aromatics, wt %: 65.6
Refractive index (N75): 1.5227
Carbon-to-hydrogen ratio: 7.62
Total nitrogen, ppm: 2,869
Aniline pt., °F.: 160
Concarbon residue, wt %: 0.56
Ash, wt %: 0.001
V/Ni, ppm: 9.9/<2

Range, °F.: 650+

Gravity, °API: 8.0
Yield, wt % (vol %): 77.31 (74.12)

Sp. gr. @ 60/60° F.: 1.0143
ASTM distillation, °F.—
IBP: 651
5 vol % recovered: 696
10 vol % recovered: 730
30 vol % recovered: 849
50 vol % recovered: 1,000
Kin. visc. @ 210° F., cSt: 588.4
Sulfur, wt %: 3.34
Pour pt. (ASTM max.), °F.: 95
Flash pt., °F.: 505
Total acid no., mg KOH/g: 1.09
Asphaltenes, wt %: 10.98
Total nitrogen, ppm: 6,380
Concarbon residue, wt %: 14.93
Ash, wt %: 0.080
V/Ni, ppm: 391/104
Na/Al, ppm: 30/<0.1

Range, °F.: 756+

Gravity, °API: 6.2
Yield, wt % (vol %): 64.85 (61.12)
Sp. gr. @ 60/60° F.: 1.0275
ASTM distillation, °F.—
IBP: 747
5 vol % recovered: 793
10 vol % recovered: 831
30 vol % recovered: 858
Kin. visc. @ 210° F., cSt: 4,160.5
Sulfur, wt %: 3.4
Pour pt. (ASTM max.), °F.: 135
Flash pt., °F.: 580
Total acid no., mg KOH/g: 1.03
Asphaltenes, wt %: 13.91
Total nitrogen, ppm: 7,509
Concarbon residue, wt %: 18.3
Ash, wt %: 0.096
V/Ni, ppm: 448/123

Range, °F.: 862+

Gravity, °API: 4.4
Yield, wt % (vol %): 54.99 (51.06)
Sp. gr. @ 60/60° F.: 1.0412
ASTM distillation, °F.—
IBP: 828
5 vol % recovered: 873
10 vol % recovered: 910
Kin. visc. @ 210° F., cSt: 22,208
Sulfur, wt %: 3.44
Pour pt. (ASTM max.), °F.: 165
Flash pt., °F.: 675
Total acid no., mg KOH/g: 0.78
Asphaltenes, wt %: 15.33
Total nitrogen, ppm: 8,384
Concarbon residue, wt %: 21.48
Ash, wt %: 0.112
V/Ni, ppm: 522/141

Range, °F.: 968+

Gravity, °API: 2.6
Yield, wt % (vol %): 45.80 (41.85)
Sp. gr. @ 60/60° F.: 1.0552
Sulfur, wt %: 3.51
Pour pt. (ASTM max.), °F.: 205
Flash pt., °F.: 760
Total acid no., mg KOH/g: 0.65
Asphaltenes, wt %: 19.38
Total nitrogen, ppm: 9,466
Concarbon residue, wt %: 25.63
Ash, wt %: 0.132
V/Ni, ppm: 600/176

* 95 vol % recovered