

U. S. NAVY CORE HOLE 25

Location: T. 5 S., R. 94 W., Section 34

Drilled: September 1977

Surface Elevation: 9095 Feet

Total Depth: 825 Feet

Prepared by:

Ammeralda Resources
John A. Hartley, Geologist

July 1978

U. S. Navy Oil Shale Reserve No. 1

Core-hole No. 25

Lithologic Core Description

Prepared by:

John A. Hartley, Geologist

130.0 TOP OF CORE DESCRIPTION

130.0-162.0 Sandstone and siltstone, interbedded: Sandstone; very fine to fine grained, medium brown gray to light gray on fresh break, massive to irregular bedding, poorly sorted, silty, argillaceous, very slightly calcareous in part, slightly friable, micaceous, salt and pepper; numerous irregular argillaceous and silty stringers; numerous medium grained sandy lenses and beds interbedded throughout unit; Siltstone; medium to dark gray, massive, fairly soft, very argillaceous; abundant black carbonaceous or gilsonite flakes on core breaks; gilsonite stringers and flakes scattered throughout unit; abundant gilsonite on core break at 130.75'; numerous interbedded clay shaly zones with poor competence, pulled apart by hand, fairly soft; pyrite nodule at 132.2'; pyrite blebs common throughout unit; bedding inclined 60° from 132.0-138.0'; bedding inclined 45° from 146.6-147.65'.

162.0-188.7 Marlstone: light brown gray to light gray brown, even bedding, poor competence with numerous shaly planar partings; grades to claystone; abundant blocky breaks; medium to dark olive brown oil shale zone from 170.75-171.95'; trace gilsonite streaks; few dark gray pyrite stringers scattered throughout unit; partially leached vug with pyrite at 178.7'; numerous small vugs on core surface some with pyrite and calcite from 179.5-180.1'; several long vertical fractures with pyrite; irregular pyrite blebs resembling small sole casts on parting at 182.25'; trace solution fracture at 183.0'; irregular buff granular tuff zone from 183.6-183.9'; large granular very calcareous tuff pods with abundant pyrite .20' x .30' diameter at 184.6' and .10' x .15' diameter at 185.0'; trace collapsed vugs from 187.3-187.6'; zone of numerous calcite stringers from 190.3-190.6'.

188.7-195.5 Oil shale: light olive brown, even bedding, fair competence, slightly to moderately calcareous, mud cracks on core break at 192.7'; irregular silty tuff .25' at 195.0'.

195.5-196.65 Oil shale: dark mahogany brown to black, irregular to streaked bedding, fair competence, very low density.

196.65-215.5 Oil shale, marly: medium gray brown, even bedding, fair to good competence; abundant small pyrite blebs; .25' black very low density oil shale at 199.0'; dark gray black metallic blebs on core break at 202.0';

U. S. Navy Oil Shale Reserve No. 1
Core-hole No. 25

bed .15' at 241.4'; vertical fracture with orange brown oxidation stain from 242.5' to 243.5'; orange brown oxidation staining on core surface throughout unit; leached nahcolite vug with nahcolitic structure and orange brown oxidation staining at 245.7.

- 247.3-250.6 Oil shale: medium olive green, even bedding with some offset and looped bedding, poor to fair competence, moderately to very calcareous, numerous fractures; bedding inclined 45° from 248.5-249.65'; faint fractures with angular offset blocks and trace solution breccia from 248.6-249.4'; dark brown black on fresh breaks, fairly low density oil shale.
- 250.6-262.4 Oil shale: light olive brown, even bedding, poor competence, very calcareous; abundant dark gray pyrite streaks and stringers; irregular asphaltic stringer at 251.5' and 251.75' trace gilsonite flakes on core breaks; several planar shaly partings; very poor competence from 256.5-261.6' with numerous fractures with gilsonite, orange oxidation staining and numerous shaly parting; numerous solution fractures and collapsed vugs; some orange brown oxidation staining on core surface; several bands of orange brown oxidation staining throughout core; large irregular collapsed nahcolite vug with numerous short fractures with calcite, gilsonite and orange oxidation staining; zone of numerous 60°-90° fractures with calcite and cream colored coatings from 259.0-261.6'; several white chalky, granular tuff stringers at 261.4', 261.6' and 261.8'; numerous small vugs from 261.8-262.0', and 262.3'; gradational contact with following oil shale.
- 262.4-271.5 Oil shale: medium brown, even bedding, good competence, very calcareous; gilsonite on core break at 265.5'; zone of irregular tuff with yellow orange limonite stain and calcite coated fracture from 267.05-267.3'; trace solution fractures and stringers from 268.2-268.5'; trace nahcolite structure on core break.
- 271.5-302.8' Oil shale: light to medium olive brown with abundant light yellow brown oxidation staining throughout unit, even bedding, very poor competence with numerous partings and calcite sealed fractures; solution breccia and solution fractures throughout unit; highly oxidized zone from 271.5-303.8' with oxidation staining dessiminating into core from fractures; zone of granular tuffaceous material with small vugs and numerous fractures with offset rotated blocks, solution breccia from 279.7-281.0'; rubble from 280.1-280.75', solution fracture zone with abundant small fractures and abundant offset bedding, abundant evidence of collapsed leached nahcolite vugs; nahcolite vug with stalagtitic calcite coating at 282.0'; trace solution fracture zone from 286.6-286.9';

U. S. Navy Oil Shale Reserve No. 1
Core-hole No. 25

moderately to very calcareous on core surface and fresh breaks; zone of abundant very small leached nahcolite vugs and few calcite blebs from 350.5-351.7'; some residual nahcolite remaining in vugs; several partially leached and partially collapsed nahcolite vugs from 351.8-352.4'.

353.35-355.3 Oil shale: medium brown, dark gray brown on fresh break, even bedding, good to excellent competence, moderately calcareous on core surface and fresh break; .10' orange brown asphaltic tuff stringer at 353.9'; .20' zone of small vugs with nahcolite or calcite; gradational contact with following oil shale.

355.3-388.6 Oil shale: light olive brown to medium olive brown, light to medium gray brown on fresh break, even bedding, fair to good competence, brittle with conchoidal break, moderately calcareous on core surface and fresh break; light gray white granular tuff stringer at 355.7'; few irregular asphalt patches .10' at 363.35'; buff granular tuff bed .10' at 375.7'; dark brown black fairly low density oil shale from 381.0-382.4'; few medium gray pyrite streaks scattered throughout unit; pyrite streak with orange brown oxidation staining at 388.5'.

388.6-396.5 Oil shale: medium to dark olive brown, dark brown black on fresh break, even bedding, very calcareous on core surface, slightly calcareous on fresh tough conchoidal break, excellent competence; few buff granular tuff stringers from 389.7-389.95'; gradational contact with following oil shale.

396.5-427.0 Oil shale: light to medium olive brown, even bedding, moderately to very calcareous on core surface, medium brown and slightly calcareous on fresh break, fair competence; few buff granular tuff stringers from 389.7-389.95'; numerous dark gray pyrite streaks; fairly low density oil shale at 406.0'; few brown asphaltic tuff blebs at 415.21, 416.1' and 421.3'; white to light blue gray tuff streak or lens at 425.8'; few dark gray granular tuff or pyrite stringers scattered throughout unit; gradational contact with following oil shale.

Note: Footage marks are .10' short from 416.0-417.0' therefore .10' core loss.

405.0-406.0 Core loss.

427.0-436.0 Oil shale: medium olive brown, even bedding, excellent competence, moderately to very calcareous on core surface, medium brown and slightly to moderately calcareous on fresh break, tough; gradational contact with following oil shale.

U. S. Navy Oil Shale Reserve No. 1
Core-hole No. 25

- 479.0-486.2 Oil shale: light to medium olive brown, even bedding, excellent competence, moderately calcareous on core surface, medium to dark brown and slightly calcareous on tough conchoidal fresh breaks.
- 486.2-487.6 Oil shale: medium to dark olive brown, even bedding, excellent competence, dark brown black and very slightly calcareous on fresh conchoidal breaks, slightly calcareous on core surface, fairly low density oil shale; gradational contact with following oil shale.
- 487.6-494.2 Oil shale: light to medium olive brown, even bedding, excellent competence, medium brown and very slightly calcareous on fresh tough conchoidal breaks, very slightly to slightly calcareous on core surface; gradational contact with following oil shale.
- 494.2-496.1 Oil shale: medium to dark olive brown, even bedding, excellent competence, tough, very calcareous on core surface, fairly low density, dark brown black noncalcareous on fresh conchoidal break; .10' brown granular asphaltic tuff stringers at 494.2' and 495.9'; gradational contact with following oil shale.
- 496.1-503.3 Oil shale: medium gray brown, even bedding, excellent competence, very calcareous on core surface, light brown to medium gray brown and moderately to very calcareous on fresh breaks, slightly brittle with conchoidal break; gray granular tuff stringer at 496.55; gradational contact with following oil shale.
- 503.3-511.0 Oil shale: medium olive brown to medium brown, even bedding, excellent competence, medium gray brown to dark brown and slightly calcareous on fresh break, tough with conchoidal break; brown asphaltic tuff streaks at 503.4', 504.5' and 506.3'; gray granular tuffs with orange brown oxidation staining at 505.9', 507.19', 507.5', 507.7' and 508.0'.
- 511.0-512.8 Oil shale: dark brown black, even bedding, excellent competence, very slightly calcareous on core surface, dark brown black on fresh break, tough, conchoidal break, fairly low density; numerous dark brown granular asphaltic tuff stringers.
- 512.8-515.8 Oil shale: light olive brown, even bedding, excellent competence, light gray brown and slightly calcareous on fresh conchoidal break slightly brittle, very calcareous on core surface from 512.55-512.75'.
- 515.8-517.8 Marlstone: buff, even bedding, excellent competence, dark brown black oil shale .20' at 517.2'.

U. S. Navy Oil Shale Reserve No. 1
Core-hole No. 25

and moderately calcareous on fresh breaks; gradational contact with following oil shale.

588.5-608.6 Oil shale: medium olive brown to medium gray brown, even bedding, excellent competence, very calcareous on core surface; light gray brown and medium brown, moderately calcareous on fresh conchoidal break; fairly tough oil shale; dark olive brown from 607.7-608.6'; few dark brown asphaltic tuff stringers from 595.4-595.7'; gilsonite plant fossil on core break at 596.0'; few brown granular asphaltic tuff stringers from 607.5-608.6'; gradational contact with following oil shale.

608.6-626.7 Oil shale: medium to light olive brown, even bedding, excellent competence, medium brown and moderately to very calcareous on fresh breaks, very calcareous on core surface; grades to tan marly oil shale from 611.0-611.7' and 613.0-614.75'; tough conchoidal breaks except marly zones where brittle and blocky on breaks; light gray brown granular tuff stringer .10' at 612.4 and 612.5'.

626.7-640.5 A-GROOVE

626.7-633.85 Marlstone: tan with few light olive brown zones, even bedding, very poor to poor competence, slightly to moderately calcareous, brittle and blocky breaks; few dark gray pyrite stringers; several irregular calcareous nodules at 631.25', 631.4' and 631.6'; undulating bedding from 631.8-632.2' associated with calcareous nodules above; white granular tuffaceous material on core break at 632.2' and other breaks from 632.7-632.9'.

633.85-640.5 Marlstone: light brown gray, faint even bedding, poor competence, very argillaceous, numerous shaly partings; slightly rubblized from 636.5-638.0'; gradational contact with following oil shale.

640.5 TOP OF MAHOGANY ZONE

640.5-642.0 Oil shale, marly: light gray brown to medium olive brown, even bedding, good to excellent competence, conchoidal breaks, light gray and medium brown alternating laminae on core breaks; gradational contact with following oil shale.

642.0-643.2 Oil shale: light olive brown, even bedding, excellent competence.

643.2-644.8 Oil shale: medium to dark olive brown, even bedding, excellent competence.

U. S. Navy Oil Shale Reserve No. 1
Core-hole No. 25

- 682.5-689.4 Oil shale: medium olive brown, even with looped bedding, excellent competence, moderately to very calcareous on core surface; medium gray brown and medium brown, slightly to moderately calcareous on fresh conchoidal core breaks; gray brown marly bands .10' at 686.9' and 687.2'; several irregular marly stringers and lenses from 686.5-687.3'; shiny micaceous flakes on parting at 687.25'.
- 689.4-692.5 Oil shale: medium olive brown with light olive brown streaks, streaked bedding, excellent competence, medium to dark brown and slightly calcareous on fresh conchoidal break; few dark gray brown marly bands.
- 692.5-698.85 Oil shale, marly: light olive brown, even bedding, excellent competence; light brown gray slightly brittle to slightly conchoidal on fresh break.
- 698.85-699.15 Marlstone: light olive brown to tan, even bedding, poor to fair competence, very calcareous on core surface, buff to light gray brown and slightly calcareous on fresh break, brittle; numerous dark brown black and dark gray stringers and laminae; several weak planar shaly parting planes; slightly blocky on some breaks; few dark brown oil shale stringers and bands; chatter marks and rough marly texture throughout unit; gradational contact with following oil shale.
- Note: Footage correction to core; two consecutive footages marked 699'.
- 699.15-701.0 Oil shale: light olive brown, even bedding, excellent competence, slightly to moderately calcareous on core surface; medium gray brown to medium brown and very slightly calcareous on fresh conchoidal break, fairly tough; gradational contact with following oil shale.
- 701.0-705.15 Oil shale: dark brownish black, streaked bedding, excellent competence, very slightly calcareous on core surface; even bedding with light olive brown bands and moderately calcareous from 703.2-704.1'.
- 705.15 TOP OF B-GROOVE
- 705.15-713.5 Marlstone: light olive brown to tan, even bedding, very poor to poor competence, moderately to very calcareous on core surface; light gray brown, brittle and moderately calcareous on fresh core break; numerous planar shaly partings; plant fossil on core break at 706.1'; few dark gray pyritic laminae scattered throughout unit; gray granular tuff stringer at 709.0'; .10' gray granular tuff with short vertical fractures at 710.15'.

U.S. Navy Oil Shale Reserve No. 1
Core-hole No. 25

- 774.8-777.7 Marlstone and sandstone, interbedded: marlstone as above; sandstone, very fine grained, buff, massive, micaceous, fairly dense, fairly well consolidated, very calcareous, brittle to slightly friable.
- 777.7-790.0 Marlstone: light brownish gray to medium gray, even bedding, very poor to poor competence, moderately calcareous, numerous shaly partings throughout unit; fairly soft; rubble from 789.35-790.0'.
- 790.0 Bottom of core interval.