

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY^{1/}

Half-core samples from Mintech Corporation and Marathon Oil Company's Carl Tomich No. 1 Corehole drilled in 1971 in SW1/4NW1/4 (450 ft E and 1500 ft S of NW corner) of sec 21, T 24 N, R 106 W, Sweetwater County, Wyoming

Collar elevation: 6607 feet
Described interval: 336 to 668 feet

From	To	Description
LANEY MEMBER OF GREEN RIVER FORMATION		
366.0	369.0	Mudstone: Slightly olive and brownish gray, some tan to buff in lower part. Massive to faintly streaked. Irregular thick to thin parting. Irregular 2-inch mass of fine platy porous breccia with drusy calcite at 368.2. (0.8 foot missing)
369.0	369.7	Mudstone: Buff to brownish gray, calcareous. Irregular streaked bedding. Some irregular discontinuous tight to slightly open fractures and breccia masses as above.
369.7	372.0	Mudstone and shale: Brownish to slightly olive gray, calcareous. Faint streaked bedding. Irregular shaly parting. Some slightly open low angle fractures in upper part. Some broken and mixed up core; sample lengths uncertain.
372.0	377.0	Shale: Medium slightly brownish and olive gray, calcareous, slightly silty. Faint very fine regular laminae. Shaly to papery parting. Rare very fine buff earthy laminae and streaks in lower part. Common very fine mica flakes. Rare fine dark brownish-gray dense to granular crystalline layers in lower part.
377.0	381.0	Oil shale: Medium to some dark brownish gray, moderately to slightly calcareous. Faintly laminated; very fine buff streaks and laminae becoming abundant in lower part. Thin shaly to papery parting. Abundant open high and low angle natural (?) fractures in some zones. Very rare small brown coprolites.
381.0	383.4	Oil shale: Medium and some dark brownish gray to brown, calcareous. Faintly laminated; abundant very fine buff laminae in lower part. Very regular shaly to papery parting. Rare coprolites. Very rare ostracods. Sample of brownish-gray to brown oil shale from 381.6 feet: X-ray - quartz, calcite, analcite, illite, dolomite. Sample of papery shale with very fine buff earthy to chalky laminae from 382.5 feet: X-ray - aragonite, analcite, quartz, calcite.
383.4	386.0	Oil shale: Medium and some dark brownish gray, calcareous. Faintly laminated. Thin shaly to papery parting.

^{1/} By L. G. Trudell, completed October 20, 1971

Illustration No. SBR-4330P (Sheet 1 of 22)

Laramie Energy Research Center, Laramie, Wyoming

November 10, 1971

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		Some very fine buff earthy laminae. Rare ostracods. A 3/4-inch medium slightly olive gray fine-grained layer with sparry calcite cement near top.
		Sample of gray calcareous layer from 383.5 feet: X-ray - analcite, calcite, quartz, feldspar, mica.
386.0	391.0	Oil shale: Medium to dark brownish gray, calcareous. Faintly laminated. Thin shaly to papery parting; slightly unctuous. A thin buff marlstone band near top and a 0.1-foot band near bottom.
391.0	392.0	Oil shale; Medium to dark brownish to almost neutral gray. Faintly laminated. Very thin shaly to papery parting. Abundant very fine mica flakes. A fine gray silty lamina at 391.3.
392.0	393.6	Oil shale: As above and below in thick darker and lighter zones. Badly broken and mixed up core in lower part.
393.6	393.8	Missing?
393.8	395.3	Oil shale: Medium to some light and dark brownish gray, slightly calcareous to dolomitic. Faintly laminated. Thin shaly to papery parting. Abundant very fine mica flakes. A 1-inch buff silty marlstone lens at 394.2. Sample of medium brownish-gray oil shale from 394.9 feet: X-ray - dolomite, aragonite, quartz, analcite, calcite, feldspar.
395.3	395.9	Oil shale: Medium to dark brownish gray, calcareous. Faintly laminated to very faintly streaked. Very thin shaly to papery parting. Abundant very fine mica.
395.9	396.2	Missing?
396.2	398.0	Oil shale: Medium to some light and rare dark brownish gray, dolomitic to slightly calcareous. Fairly distinct fine to thin laminae in upper 0.3 foot; faint very fine laminae and streaked bedding in other parts. Thick parting near top; shaly to papery parting in lower part. Abundant very fine mica. A thin dark gray blebby stringer at about 396.6.
398.0	406.0	Oil shale: Medium to very dark brownish gray. Faint very fine laminae. Very thin shaly to papery parting. Abundant very fine mica flakes in upper part. Some badly broken and mixed up core; sample lengths uncertain.

Illustration No. SBR-4330P (Sheet 2 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
406.0	407.0	Oil shale: Medium to dark brownish gray, calcareous. Faint and some fairly distinct very fine laminae. Very regular medium to thin parting. A fine brown granular analcite layer at 406.1. Sample of firm dark to medium brownish-gray oil shale from 406.6 feet: X-ray - calcite, quartz, analcite, feldspar.
407.0	409.4	Oil shale: Very dark brownish gray, slightly calcareous to dolomitic. Faint very fine laminae and streaked bedding. Thin shaly to papery parting. Sample of very dark oil shale from 409.1 feet: X-ray - dolomite, quartz, analcite, feldspar, pyrite, illite.
409.4	410.0	Siltstone and mudstone: Gray to brownish gray, micaceous in upper part. Massive to faintly streaked. Irregular fractured crumbly core pieces; length uncertain. Sample of mudstone from 409.4-410.0 feet: X-ray - quartz, feldspar, illite, pyrite, dolomite.
410.0	410.5	Oil shale: Buff and yellowish tan to medium and some dark brownish gray, dolomitic. Distinct to faint very fine laminae. Thin shaly to papery parting. Buff laminae are commonly earthy and blebby.
410.5	412.7	Oil shale: Medium to very dark brownish gray, dolomitic to calcareous. Faintly laminated. Thin shaly to some papery parting. A thin dark gray silty layer at 412.2. Common very fine light brownish-gray to buff earthy laminae in lower 0.3 foot.
412.7	413.0	Mudstone and oil shale: Dark to medium gray mudstone and dark brownish-gray to black oil shale. One-inch bands of mudstone at top and bottom with faintly streaked oil shale in middle. Uneven sample split.
413.0	413.3	Oil shale and marlstone: Grayish brown to buff. Fairly distinct very fine irregular laminae. Very thin shaly to papery parting.
413.3	413.5	Oil shale: Very dark brownish gray. Faintly laminated to very faintly streaked.
413.5	413.6	Tuff and oil shale: One-half to 3/4-inch light brownish-gray, very fine sandy-textured biotitic tuff stringer at top. Dark to medium brownish-gray oil shale with thin gray-buff silty tuff lenses in lower part. Sample of light brownish-gray biotitic tuff from 413.5 feet: X-ray - quartz, feldspar, analcite, biotite, pyrite, hornblende?

Illustration No. SBR-4330P (Sheet 3 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
TOP OF WILKINS PEAK MEMBER?		
413.6	415.0	Oil shale: Olive gray, dolomitic. Faintly laminated to very faintly streaked. Fairly regular to irregular, thick to rare thin parting. Very rare fine pyrite blebs. Sample of olive-gray oil shale from 413.9 feet: X-ray - calcite, dolomite, quartz, feldspar, aragonite, analcite, pyrite.
415.0	416.1	Oil shale: Olive gray near top grading to brown and dark brownish gray in lower part, dolomitic. Faint streaked bedding becoming irregularly banded with dark layers in lower half. Irregular thick to some thin parting. Some fine pyrite blebs in dark layers. Sample of brown oil shale from 415.9 feet: X-ray - calcite, dolomite, quartz, feldspar.
416.1	417.1	Oil shale: Medium and some dark grayish brown to tan and rare buff, dolomitic to slightly calcareous. Faint to distinct very fine irregular laminae. Irregular to regular, thick to very thin parting.
417.1	417.3	Oil shale: Very dark brownish gray. Faint very fine laminae and streaked bedding. Very thin to papery parting. Abundant <u>very</u> fine grayish-brown to buff-white lenses and blebs.
417.3	418.4	Oil shale: Brown and tan to medium and light brownish gray (slightly olive), some buff near base, dolomitic. Moderately distinct to very faint streaked bedding. Irregular thin parting and very hackly fracture in upper 0.3 foot; irregular thick parting in lower part. Abundant fine buff-white dense to silty streaks and blebs near top, and some elsewhere. A fine brown sandy-textured layer at 417.8. Sample of tan oil shale with abundant fine buff-white streaks and blebs from 417.4 feet: X-ray - calcite, dolomite, quartz.
418.4	418.7	Missing?
418.7	419.3	Mudstone: Buff-white to light brownish gray, slightly calcareous, silty and earthy. Faint to some distinct, fine to thin laminae in upper part; very distorted fine streaks and stringers in lower part. Rubble and irregular core pieces in upper part. Some pieces of crumbly porous mudstone breccia. Interfingered with

Illustration No. SBR-4330P (Sheet 4 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		very dark oil shale at bottom.
		Sample of buff-white mudstone from 419.1 feet: X-ray - K feldspar, calcite, illite.
419.3	420.3	Oil shale: Dark brownish gray to black, rare satiny luster, dolomitic. Faint streaked bedding with very abundant distinct thin to fine, buff to brown mudstone streaks, lenses, and distorted stringers; some thick mudstone stringers interfingered with finely shredded oil shale near top. Biotite becoming abundant in mudstone in lower part. Abundant fine brown blebby calcareous streaks in middle part.
		Sample of oil shale with blebby brown streaks from 419.8 feet: X-ray - dolomite, quartz, calcite, feldspar, pyrite.
		Sample of oil shale and brown biotitic streaks and stringers from 420.1 feet: X-ray - K and Na feldspars, dolomite, quartz, pyrite, biotite, hornblende?
420.3	421.3	Oil shale: As above with few mudstone streaks and stringers.
421.3	421.5	Missing?
421.5	422.2	Oil shale: Dark and medium brownish gray in upper part to medium olive gray in lower part. Faint streaked bedding. Abundant irregular streaks and patches of moderately coarse crystalline brown to colorless calcite. Few thin light brownish-gray to buff marlstone stringers at 421.7-421.9.
		Sample of oil shale with calcite patches from 421.6 feet: X-ray - calcite, dolomite, quartz, feldspar.
422.2	423.2	Oil shale: Medium and rare dark olive and brownish gray to some brown and tan. Fairly distinct fine slightly distorted streaks commonly with very finely shredded ends. Irregular thick parting. Some dense silty-textured buff calcite streaks, stringers, and blebs in lower part.
423.2	430.0	Shaly marlstone (oil shale?): Medium slightly olive and brownish gray. Very faint streaked bedding and some faint laminae. Fairly regular to very irregular, thick to very thin parting. Abundant calcite streaks, patches, and fine disseminated crystals--commonly with pyrite.
430.0	430.8	Shaly marlstone: Medium gray (very slight brown tint). Very faint streaked bedding and rare laminae. Irregular

Illustration No. SBR-4330P (Sheet 5 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		thick to very thin parting. Abundant fine calcite blebs and disseminated crystals. Very abundant pyrite (and possibly some pyrrhotite). Sample of gray shale with calcite and pyrite from 430.5 feet: X-ray - dolomite, quartz, calcite, pyrite, feldspar.
430.8	431.0	Missing?
431.0	433.6	Marlstone (oil shale?): Medium olive gray to olive green. Faint streaked bedding. Irregular thick to some thin parting. Abundant fine to moderately coarse calcite blebs and patches. Some pyrite. Crumbly rubble in upper half foot.
433.6	436.7	Oil shale: Medium to rare dark olive gray, dolomitic. Faint streaked bedding. Irregular thick to some thin parting. Abundant calcite patches and blebs with pyrite in upper part; few discontinuous fine stringers in lower part. Some dark gray silty pyritic blebs and streaks at about 435.7-435.8. (434.9-435.3 missing?)
436.7	438.0	Oil shale: Medium to dark olive gray, dolomitic. Faint streaked bedding. Irregular thick parting. Abundant small brown fine-grained calcite patches and fine stringers. Abundant very fine disseminated pyrite.
438.0	441.7	Oil shale: Medium to rare dark olive gray and olive green, dolomitic. Faint to some moderately distinct streaked bedding. Irregular thick parting. Some very fine-grained to dense buff calcareous streaks in upper part becoming sparse in lower part.
441.7	442.8	Oil shale: Medium to some dark olive gray and olive green, dolomitic. Faint distorted streaked bedding. Irregular thick parting. Very abundant moderately coarse irregular calcite stringers, streaks, and blebs.
442.8	444.1	Oil shale: Medium to light olive gray and some brownish gray, dolomitic. Faint laminae and streaked bedding. Irregular thick to some thin parting. Some fine calcite streaks and patches at 443.1.
444.1	445.7	Oil shale: Medium olive gray, dolomitic. Very faint streaked bedding and some laminae. Irregular thick to some thin parting. Rare fine calcite streaks.
445.7	447.0	Marlstone: Medium to light olive gray and some buff, dolomitic. Faint streaked bedding and some laminae. Irregular thick to thin parting. Broken core with

Illustration No. SBR-4330P (Sheet 6 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		some earthy to chalky white tuff fragments in upper part. Abundant fine white to buff calcite specks in lower part.
447.0	447.3	Rubble in plastic bag: As above and below. Abundant fragments of massive very fine-grained calcite.
447.3	450.0	Oil shale: Dark to medium olive gray, dolomitic. Faint streaked bedding. Irregular thick parting. Very abundant small to fine brown calcite blebs and streaks with some pyrite. Abundant fine disseminated pyrite in oil shale. Sample of dark olive-gray oil shale with abundant disseminated pyrite and some fine calcite blebs from 448.6 feet: X-ray - K feldspar, aragonite, dolomite, quartz, calcite, pyrite, illite.
450.0	451.4	Oil shale: Medium olive gray, dolomitic. Faint to some moderately distinct streaked bedding. Irregular thick parting. Some calcite and pyrite near top.
451.4	452.7	Oil shale: Medium to dark olive gray and some brownish gray, dolomitic. Faint streaked bedding and some very fine laminae. Irregular thick parting. Fine calcite streaks becoming fairly abundant in lower part.
452.7	453.7	Oil shale: Medium olive gray, dolomitic. Faint streaked bedding. Irregular thick to very thin parting.
453.7	454.0	Missing.
454.0	455.4	Oil shale: As above. Abundant very fine-grained calcite laminae at 454.4-454.5. Rubble in plastic bag at 454.5-455.0. A 1-1/2-inch tan to brownish-gray, silty to very fine sandy-textured tuff laced with very fine gray fractures at 455.0; top missing; regular lower contact. Sample of tuff from 455.0 feet: X-ray - K feldspar, analcite, illite, montmorillonite, pyrite.
455.4	456.0	Missing.
456.0	458.0	Oil shale: Medium to dark brownish gray and olive gray, dolomitic. Faint streaked bedding. Irregular thick to very thin parting.
458.0	460.3	Oil shale: Medium to some light olive gray and brownish gray, dolomitic. Faintly streaked to very faintly laminated and banded. Irregular thick to thin parting. A 3/4-inch irregular dark gray silty band at 458.1. Bagged rubble at 458.8-459.0 and 459.7-460.3.

Illustration No. SBR-4330P (Sheet 7 of 22)

Laramie Energy Research Center, Laramie, Wyoming

November 10, 1971

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		Sample of dark gray silty band from 458.1 feet: X-ray - pyrite, analcite, feldspar.
460.3	461.3	Marlstone: Medium to light olive gray and brownish gray, dolomitic, very firm, slightly silty. Faint streaked bedding. Irregular to fairly regular thick parting. Abundant tight fine-grained calcite streaks (rarely pyritic).
461.3	462.3	Oil shale: Olive gray streaked with medium and rare dark brownish gray, dolomitic. Faint to fairly distinct distorted streaked bedding. Irregular thin to thick parting. Abundant fine-grained calcite streaks, blebs, and stringers. Some 1/2- to 1-inch irregular to angular dark gray silty masses near base.
462.3	463.3	Oil shale: Medium to some dark olive gray and brownish gray, dolomitic. Faint streaked bedding. Irregular thick to thin parting.
463.3	463.7	Rubble in plastic bag: As above. Some buff earthy claystone.
463.7	465.0	Oil shale: Medium to light olive gray and some brownish gray to tan, dolomitic. Very faint streaked bedding in upper part; fine to thin laminae in lower part. Very fractured to brecciated in some zones. Abundant very fine calcite specks in upper part. Buff-white claystone in upper 1/2 inch. Bagged rubble at 464.5-464.7. Sample of buff-white claystone from 463.7 feet: X-ray - K feldspar, analcite, quartz, dolomite. Sample of crumbly fractured oil shale from 464.4 feet: X-ray - dolomite, calcite, quartz, montmorillonite, feldspar.
465.0	466.1	Marlstone: Light to medium slightly brownish and olive gray, dolomitic, very firm. Very faintly laminated and banded. A 0.2-foot medium to coarse-grained brown stringer in middle. Bagged rubble as above and below at top and bottom. Sample of medium to coarse-grained brown stringer from 465.5 feet: X-ray - calcite, quartz.
466.1	468.0	Oil shale: Medium to very dark grayish brown, dolomitic. Fairly distinct distorted streaks and discontinuous laminae. Irregular to fairly regular thick parting. Abundant small to fine calcite patches, blebs, and streaks in upper half. A 0.2-foot stringer of olive-

Illustration No. SBR-4330P (Sheet 8 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		gray marlstone interfingering with fine shredded oil-shale stringers at 466.6. Some parting surfaces and natural (?) fractures with dark resinous organic stains. A 1-inch irregular dense bright tan lens at 467.8; some very small dense grayish-brown lenses in other parts.
		Sample of very dark to medium grayish-brown oil shale from 466.3 feet: X-ray - dolomite, calcite, quartz, feldspar.
		Sample of dark oil shale with calcite blebs and streaks from 467.0 feet: X-ray - dolomite, calcite, quartz, feldspar, illite.
468.0	469.3	Oil shale: Olive green to olive gray, dolomitic to slightly calcareous. Faint streaked bedding. Abundant fine calcite blebs and streaks. Few thin dense olive-gray to tan lenses in lower part.
469.3	471.0	Marlstone: Buff to light and some medium olive gray and brownish gray, dolomitic. Massive to faintly streaked and laminated; very distorted in lower part. Some fine to coarse breccia zones and discontinuous open high angle fractures. Very abundant fine-grained calcite in lower 2 inches.
471.0	472.8	Oil shale: Medium to light olive green and olive gray, dolomitic. Faint distorted streaked bedding with abundant thin to fine irregular distinct light streaks, lenses, and stringers. Abundant tan calcite blebs, streaks, and small patches.
472.8	475.1	Marlstone: Light to some medium olive gray and rare brownish gray, dolomitic. Very faintly bedded to faintly laminated and banded. Some small buff lenses at 473.1. Some high angle fractures with slight brown stains in upper part. Very irregular wavy contact with oil shale below.
475.1	475.9	Oil shale: Very dark brownish gray to some medium brown. Faint streaked bedding to moderately distinct very fine distorted and truncated laminae. A thin brown dolomite (?) stringer near top; abundant thin lenses and layers in lower 0.2 foot. Rare small dense gray lenses and broken layers. Rare calcite streaks.
475.9	476.6	Oil shale: Very dark brownish gray. Faint streaked bedding. Rare fine brown to tan streaks.

Illustration No. SBR-4330P (Sheet 9 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
476.6	478.0	Oil shale: Medium and rare dark brownish and olive gray in upper part to olive green in lower part, dolomitic. Faint streaked bedding. Abundant very irregular calcite streaks and patches.
478.0	479.2	Marlstone: Olive gray to light gray. Very faintly bedded. Small buff lenses at 478.7. Broken core in lower 0.4 foot.
479.2	480.5	Oil shale: Olive gray becoming streaked with medium to dark brownish gray in lower half. Faint to fairly distinct streaked bedding and some laminae; very distorted with abundant irregular broken dense light brownish-gray marlstone lenses, streaks, and stringers in lower 0.4 foot.
480.5	482.0	Oil shale: Medium to some dark olive gray and brownish gray. Moderately distinct streaked bedding. Rare small dense marlstone nodules and streaks. A 1-inch oil-shale inclusion with diagonal laminae at 480.6.
482.0	482.6	Oil shale: Medium olive gray and brownish gray to black. Faint to some distinct distorted to regular streaks and some laminae. A thin light brownish-gray to tan, silty to blebby tuff stringer at 482.4.
482.6	483.8	Oil shale and marlstone: Medium and some dark olive gray to light gray. Faintly laminated in upper part to very faintly streaked in lower part. Rare fine buff streaks.
483.8	484.0	Missing.
484.0	486.5	Marlstone and mudstone: Light slightly olive and brownish gray. Very faintly streaked with some faint to moderately distinct laminae and bands. Abundant very small gray calcite patches and streaks in upper 0.3 foot.
486.5	487.8	Marlstone: Light slightly brownish gray to buff and tan, rare medium brownish gray in lower part. Very faintly streaked in upper part to faintly laminated in lower part. Thin tight fractured to brecciated zone at 487.5. Sample of buff marlstone from 487.4 feet: X-ray - dolomite, calcite, quartz.
487.8	489.2	Oil shale: Medium to some dark brownish gray; rare fine resinous to waxy black streaks. Faint to fairly distinct very fine laminae and streaked bedding; some fine to thin brown streaks, lenses, and laminae. Slightly irregular thick to some thin parting. A fine dense gray lamina at 488.6.

Illustration No. SBR-4330P (Sheet 10 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
489.2	490.2	Oil shale: Medium and rare dark brownish to olive gray, slightly calcareous. Faint to moderately distinct laminae and streaked bedding. Fairly regular to irregular, thick to thin parting. Abundant ostracods (?) on parting surfaces in upper part.
490.2	492.4	Mudstone and marlstone?: Light slightly brownish to neutral gray, dolomitic to slightly calcareous. Very faint laminae and streaked bedding. Irregular thin to thick parting. Sharp irregular contact with oil shale below. Sample of light gray marlstone (?) from 491.7 feet: X-ray - quartz, dolomite, calcite, feldspar, pyrite.
492.4	494.3	Oil shale: Medium to very dark brownish gray. Moderately distinct to faint streaked bedding. Abundant fine brown calcite streaks down to 493.7. Some small irregular dense buff to tan marlstone lenses in upper half foot; a 1- x 3-inch grayish-brown marlstone lens at 493.3. Sharp irregular contact with marlstone below. Sample of dark brownish-gray oil shale from 493.9 feet: X-ray - dolomite, calcite, quartz, feldspar.
494.3	495.5	Marlstone: Tan and light slightly olive gray to buff, some medium brownish gray in lower part. Faint streaked bedding with some fairly distinct laminae and bands. Irregular thin to thick parting.
495.5	496.7	Shaly marlstone and some oil shale: Medium to light slightly olive gray and some medium to rare dark brownish gray. Faint laminae and streaked bedding. Some thin to 1-inch buff silty-textured limestone layers and stringers. Fine tight marlstone masaic breccia at 496.4-496.6. Fairly regular medium to thin parting in upper part to very irregular parting and fracture in lower part.
496.7	498.0	Marlstone: Light brownish gray to yellowish buff, some olive gray to gray buff in lower part. Faintly laminated and banded. Regular to irregular, thick to thin parting; some rubble in lower part.
498.0	499.8	Marlstone and mudstone: Light to medium slightly olive to neutral gray, dolomitic to slightly calcareous. Faintly laminated and banded. Regular to irregular thick parting. Rubble with some buff to light brownish-gray, earthy and very silty mudstone below 499.1.

Illustration No. SBR-4330P (Sheet 11 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
499.8	500.4	Oil shale: Medium to some dark brownish gray and olive gray, dolomitic. Faint streaked bedding. Irregular thick to medium parting; hard and dense in upper part. Abundant fine brown calcite streaks. Sample of hard dense oil shale with fine calcite streaks from 499.9 feet: X-ray - dolomite, quartz, calcite, feldspar, pyrite.
500.4	502.0	Oil shale: Medium to dark brownish gray, some satiny to resinous black streaks, dolomitic. Faint to distinct distorted streaked bedding. Abundant fine calcite streaks and blebs. Some fine to thin tan marlstone lenses, streaks, and laminae. Few 1/2- to 1-inch dense brownish-gray lenses with tan to buff rims at 501.0. Sample of dark oil shale with rare fine calcite streaks and blebs from 501.1 feet: X-ray - dolomite, quartz, calcite, feldspar.
502.0	502.6	Oil shale: Medium olive gray. Faint streaked bedding. Rare fine calcite streaks.
502.6	504.0	Marlstone: Light olive gray and some neutral gray to buff and light brownish gray. Faintly banded and laminated. Irregular thick to thin parting. A thin fractured and displaced buff silty calcareous mudstone layer at 503.6.
504.0	505.5	Marlstone grading to lean oil shale: Light to medium olive gray, dolomitic. Faint streaked bedding and some fine to thin laminae. Abundant fine brown to buff calcite blebs and streaks below 504.5.
505.5	508.0	Oil shale: Medium olive gray to olive green and rare medium to dark brownish gray, dolomitic. Faint to moderately distinct streaked bedding and some laminae.
508.0	510.0	Marlstone: Light olive gray to buff, dolomitic. Very faintly streaked to thinly laminated. Fairly regular thick to thin parting in upper part; some open fractures, broken core, and fine to coarse breccia in lower part. Very faintly streaked gray-buff marly mudstone at 508.8-509.0. Some fine to thin calcite specks and streaks in lower part. Irregularly laminated to conglomeratic, silty to blebby yellowish-tan algal (?) marlstone in lower 3 inches; very irregular 3/4-inch light brownish-gray silty to blebby limestone layer with some small rounded marlstone inclusions at 509.9.
510.0	512.4	Oil shale: Brown to dark brownish gray, some olive gray at top and bottom and occasional streaks in middle, rare satiny to resinous black streaks in lower part.

Illustration No. SBR-4330P (Sheet 12 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		Broken and displaced to regular laminae with abundant fine distinct buff to yellowish-tan layers and streaks in upper 0.3 foot; faint to some distinct, fairly regular to very distorted streaks and fine stringers in other parts. Abundant fine specks to small patches and irregular streaks of fine to fairly coarsely crystalline, pale to dark brown calcite. Some thin brown to tan slightly blebby lenses and stringers from 511.0 to 512.0.
		Sample of oil shale with abundant calcite from 511.6 feet: X-ray - dolomite, calcite, quartz, feldspar.
512.4	513.4	Marlstone: Medium to light olive gray. Faint streaked bedding and some irregular banding. Some short open fractures and tight (but easily broken) coarse breccia in upper half. Abundant irregular calcite streaks and fine blebs. Rare very small buff marlstone inclusions in lower part.
		Sample of light olive-gray marlstone from 513.1 feet: X-ray - dolomite, quartz, feldspar.
513.4	514.4	Oil shale: Medium olive gray and rare medium to dark brownish gray. Faint streaked bedding; distorted and truncated with abundant calcite blebs and fine to thin yellowish-buff marlstone streaks in upper half. Few small irregular black silty pyritic masses in lower part.
514.4	516.0	Marlstone: Medium to light olive gray, dolomitic. Faint streaked bedding and some slightly irregular banding. Some calcite patches and streaks.
516.0	516.4	Calcite, marlstone, and some oil shale: Irregular thin to 3/4-inch layers of light brownish-gray to tan, silty to coarse granular calcite and light olive-gray to buff marlstone with some fine braided layers of dark brownish-gray oil shale. Layers displaced 1/2 inch with some drag folding and fragmentation along an irregular diagonal fracture.
516.4	517.3	Oil shale: Medium and some light olive and grayish brown, grading to buff marlstone in lower 0.2 foot, dolomitic. Moderately distinct to faint distorted streaked bedding. Some fine to thin buff marlstone streaks, lenses, and short vermiform stringers.
517.3	518.1	Main Tuff: Orange tan to buff white, silty to very fine blebby textured, abundant biotite in some zones. Discontinuous irregular platy core pieces. Some buff marlstone layers in lower part.

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		Sample of buff-white biotitic tuff from 517.8 feet: X-ray - K and Na feldspars, quartz, biotite, pyrite.
518.1	519.1	Marlstone: Buff to light olive and brownish gray, dolomitic to slightly calcareous. Faintly laminated to massive. Regular to irregular, thin to thick parting.
519.1	520.1	Marlstone and oil shale: As above and below. Rubble and irregular broken core pieces.
520.1	522.5	Oil shale: Medium olive gray to almost neutral gray, some light in upper part, dolomitic to slightly calcareous. Faint laminae and some bands to very faint streaked bedding. Regular medium to very thin shaly parting from 520.9 to 521.4. Some thin vermiform fine-grained calcite stringers in upper half foot (also in broken core above). Rare fine buff marlstone streaks in lower part.
522.5	523.5	Marlstone: Medium to some light olive gray to almost neutral gray. Faint streaked bedding. Irregular discontinuous core pieces. Abundant very fine white calcite blebs concentrated in irregular streaks and patches. Sample of medium to light gray marlstone with very fine calcite blebs from 523.0? feet: X-ray - dolomite, calcite, quartz, feldspar, pyrite.
523.5	524.7	Missing?
524.7	525.0	Oil shale: Like 520.1-522.5.
525.0	526.1	Marlstone and oil shale: Light to medium olive gray and some brownish gray, dolomitic. Faintly streaked in thick slightly lighter and darker zones. Very abundant fine white to buff calcite blebs, streaks and rare short vermiform stringers--mostly in browner zones. Sample of light olive-gray marlstone (without visible calcite) from 525.7 feet: X-ray - dolomite, calcite, quartz, feldspar.
526.1	527.5	Oil shale: Like 520.1-522.5. About half is small to fine rubble.
527.5	528.0	Missing?
528.0	529.1	Oil shale: Medium and rare light olive gray, slightly calcareous. Faint streaked bedding and thin to fine laminae. Abundant fine calcite blebs and streaks in

Illustration No. SBR-4330P (Sheet 14 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		upper 0.4 foot. Slightly irregular medium to thin parting in lower part.
529.1	529.8	Marlstone grading to oil shale: Light olive gray (looks yellowish by contrast to greener shale above) to medium olive gray and brownish gray, calcareous to dolomitic. Faintly streaked marlstone with abundant faint irregular very fine-grained calcite streaks and stringers (nearly same color as marlstone) in upper part grading to faintly streaked oil shale with some very distinct bright tan marlstone streaks and lenses in lower part; bedding is slightly to moderately distorted.
529.8	530.8	Oil shale: Medium and rare dark olive gray to brown, slightly calcareous to dolomitic. Faint streaked bedding and some laminae. A 1/2-inch vermiform tan fine-grained calcite stringer at 530.3-530.6 and some small nodules and thin stringers near base. Sample of olive gray to brown oil shale from 530.7 feet: X-ray - dolomite, calcite, feldspar, quartz.
530.8	532.0	Oil shale: Medium to dark olive gray and some dark brownish gray. Faintly laminated and streaked. Some thin to fine, irregular to vermiform, silty to marly tan calcareous stringers and streaks.
532.0	533.0	Oil shale: Medium olive gray and olive green, slightly calcareous. Faint streaked bedding and some very fine laminae. Some very fine calcite blebs.
533.0	534.0	Missing.
534.0	535.0	Oil shale: As above. Rare very fine calcite blebs.
535.0	535.7	Missing.
535.7	537.2	Oil shale: Medium to some light olive gray, slightly calcareous. Faintly streaked and irregularly layered; some moderately distinct laminae in lower part. Some very fine calcite blebs and streaks in lower part.
537.2	543.0	Oil shale: Medium olive gray and some olive green, slightly calcareous. Faint streaked bedding and some very fine laminae. Light olive-gray marlstone with irregular silty-textured calcite stringers at 537.4-537.7. Some broken core and rubble.
543.0	549.0	Oil shale and marlstone: Medium to light olive gray and rare buff. Faint to some moderately distinct laminae and streaked bedding. Regular to very irregular, thick to very thin parting. A fine dark

Illustration No. SBR-4330P (Sheet 15 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's Carl Tomich No. 1 corehole (Con.)

From	To	Description
		gray silty to very fine sandy-textured layer with some orange-brown to yellowish-tan stains at about 545.7. Some rubble in lower part.
549.0	550.0	Marlstone: Medium to light slightly olive gray, slightly to moderately calcareous. Faintly laminated and streaked to banded. Some very fine calcite blebs and streaks.
550.0	552.0	Oil shale: Medium to light olive gray and some buff, slightly to moderately calcareous. Faint to distinct laminae and some irregularly streaked zones. Some fairly regular medium to thin parting. Abundant thinly zoned very fine calcite blebs.
552.0	553.1	Marlstone: Light to some medium slightly olive gray and some buff. Mostly large to small rubble. Buff-white silty and earthy biotitic tuff in lower inch vermiform stringers extending one inch into oil shale below; upper contact missing so thickness unknown. Sample of buff-white biotitic tuff from 553.0 feet: X-ray - K feldspar, biotite.
553.1	554.1	Oil shale: Medium to light olive gray and some greenish gray, slightly calcareous to dolomitic. Faint to fairly distinct laminae. A 1-inch, pinch-and-swell, gray-buff, biotitic tuff layer at 553.7.
554.1	556.2	Oil shale: Medium olive and some brownish gray to rare brown, some light brownish gray to buff in upper part, dolomitic. Faint and some moderately distinct laminae and streaked bedding; rare fine loop structures and displacements. Irregular thick to thin parting. A thin brownish-black satiny oil-shale lamina at 554.1. A thin pinch-and-swell light brownish-gray tuff stringer at 556.0. Sample of olive to brown oil shale from 554.9 feet: X-ray - aragonite, calcite, dolomite, quartz.
556.2	557.2	Oil shale: Medium to light olive gray and olive green, calcareous. Faintly laminated and banded. A fine light brownish-gray silty-crystalline lamina at 556.4.
557.2	558.4	Marlstone: Light to medium olive gray and some buff, slightly calcareous. Faint streaked bedding and rare laminae. Some rubble.
558.4	560.0	Marlstone and oil shale: Light to medium olive gray and some buff becoming slightly brownish gray to

Illustration No. SBR-4330P (Sheet 16 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		almost neutral in lower part. Faint to some distinct laminae and streaked bedding. About half is rubble and irregular crumbly core pieces. Abundant thinly zoned very fine calcite blebs.
560.0	563.0	Oil shale: Almost neutral gray to medium and rare dark olive gray and brownish gray. Faintly streaked and laminated. A 2-inch zone of light brownish-gray to buff marlstone with very fine slightly wavy oil-shale laminae and very fine gray granules at 561.2. Mixed up platy core pieces and rubble at top and bottom.
563.0	565.0	Mudstone and marlstone: Light to some medium gray and rare buff, slightly calcareous. Faint streaked bedding to faint and some distinct laminae and bands. Very fine calcite blebs becoming abundant in thin to thick zones in lower part. Regular to irregular, thick to some thin parting. Sample of light gray mudstone from 563.5 feet: X-ray - dolomite, quartz, calcite, feldspar, pyrite, illite.
565.0	566.6	Mudstone and marlstone: Buff to gray, slightly to moderately calcareous. Faint to some distinct laminae and some bands. Regular to irregular, thick to thin parting.
566.6	567.0	Oil shale: Medium to dark brownish gray and some buff, rare brownish-black satiny streaks. Interbedded very light buff silty marlstone and brownish-gray oil shale in upper 0.1 foot; oil shale with moderately distinct to faint laminae and streaks in other parts.
567.0	568.7	Marlstone: Light to some medium olive gray and olive green, a 1-inch tan to buff band at top, dolomitic to very slightly calcareous. Faintly laminated and banded. Very abrupt change to oil shale at base.
568.7	571.4	Oil shale: Medium olive gray and olive green with dark streaks becoming very abundant in lower part, dolomitic. Faint streaked bedding; rare fine distinct tan marlstone lenses and streaks. Abundant tan to brown fine-grained calcite blebs and streaks in upper part.
571.4	572.8	Oil shale: Medium to light olive gray. Faint streaks, laminae, and bands. A 1-inch tan to buff marlstone band at top. A 1-inch gray-buff silty and earthy mudstone stringer at 572.6.
572.8	573.8	Marlstone and mudstone: Light olive gray to gray buff, slightly calcareous. Faint very fine laminae and streaked bedding. Irregular to regular, medium to thin parting in lower part.

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
573.8	574.0	Missing?
574.0	576.0	Marlstone and oil shale: As above and below. Mostly mixed up core pieces and rubble; length uncertain.
576.0	577.0	Oil shale: Medium to rare dark and light brownish gray and olive gray. Faint to some moderately distinct streaked bedding. Abundant very fine calcite blebs and streaks in lower part. Sample of light to dark oil shale with very fine calcite blebs and streaks from 576.7 feet: X-ray - dolomite, calcite, quartz, feldspar.
577.0	579.0	Oil shale grading to marlstone: Medium olive gray to medium and light almost neutral gray, dolomitic to moderately calcareous. Very faintly streaked to faintly laminated and banded. Irregular thin parting in upper part.
579.0	580.4	Marlstone: Light gray to buff, calcareous. Faintly laminated and streaked. Mostly rubble in lower half; length uncertain.
580.4	581.0	Oil shale: Medium and very rare dark brownish gray, dolomitic. Faint streaked bedding and some very fine laminae. Abundant fine tan to buff earthy streaks and lenses in some zones.
581.0	582.0	Marlstone: Buff to light and some medium olive gray, calcareous. Very faintly streaked. Rubble in upper part.
582.0	584.1	Claystone and mudstone: Olive green, slightly calcareous. Very faint streaked bedding; indistinctly mottled and laced with gray in middle part. Rubble in upper part; length uncertain. Sample of olive-green claystone with gray mottling from 583.3 feet: X-ray - montmorillonite, illite, dolomite, calcite, feldspar, analcite.
584.1	584.4	Missing?
584.4	585.8	Marlstone: Buff to light and some medium olive gray, moderately to slightly calcareous. Faint streaked bedding and rare laminae.
585.8	587.9	Claystone: Medium to light slightly olive gray. Faint streaked bedding. Abundant very fine dark gray streaks in upper part. Few thin zones of crumbly to tight claystone breccia in lower part. Rubble at base.
587.9	589.0	Oil shale and marlstone: Medium and some dark grayish brown in upper part to light slightly brownish and olive gray in lower part. Moderately distinct very

Illustration No. SBR-4330P (Sheet 18 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		fine distorted streaked bedding to very faint regular streaks and some laminae. Abundant very fine brown to tan blebs and streaks in upper part.
589.0	591.0	Claystone: Medium to light olive green. Very faint streaked bedding. Some very fine dark gray streaks and lacy stringers. Very shattered by desiccation cracks.
591.0	592.5	Claystone: Olive gray. Very coarse to fine breccia in upper part (apparently deformed and fragmented in tight confinement in core barrel). Some buff marlstone with very fine dark oil-shale laminae in middle. Broken core in lower part.
592.5	596.0	Oil shale (?) and marlstone: Medium to light olive gray and gray green, dolomitic to slightly calcareous. Faint streaked bedding. Some buff silty zones in lower part.
596.0	597.0	Marlstone: Buff to tan and light to some medium olive gray, slightly calcareous. Faint to some fairly distinct streaks and rare laminae. Some fine olive-gray to dark gray vermiform stringers.
597.0	598.0	Marlstone: Light to some medium olive gray, calcareous. Faintly streaked and laminated. Silty in lighter parts.
598.0	599.9	Claystone: Olive green. Very shattered by desiccation cracks.
599.9	601.0	Marlstone: Buff to light brownish gray and olive gray, slightly calcareous. Faint streaked bedding and some fine to thin laminae.
601.0	602.5	Claystone and mudstone: Olive green. Shattered. A 1/2-inch buff oolitic limestone band at top.
602.5	604.0	Marlstone: Buff to light and rare medium brownish gray. Massive buff marlstone with irregular claystone-- and marlstone--filled fractures in upper 0.3 foot; faintly streaked to very finely laminated marlstone in other parts. Very abundant fine calcite blebs.
604.0	606.0	Oil shale and marlstone: Medium to light olive gray and olive green, some brownish gray to buff mostly in lower part, dolomitic to moderately calcareous. Faint streaked bedding and some laminae and bands. Some thin vermiform stringers of abundant very fine calcite blebs.
606.0	610.0	Marlstone and oil shale: Buff to medium olive gray and olive green. Faint streaked bedding and some laminae and bands.

Illustration No. SBR-4330P (Sheet 19 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
610.0	614.2	Marlstone: Buff to light olive green and some light brownish gray. Faint streaked bedding; some distorted and fractured zones. Some gray streaks, patches, and peculiar outline patterns in upper foot. Irregular 2-inch medium to light gray silty biotitic tuff nodule in fractured zone at 611.9.
614.2	616.6	Marlstone and mudstone: Light olive gray to gray buff, dolomitic to calcareous. Faintly streaked and finely mottled to massive. Some rubble in upper part.
616.6	619.9	Claystone: Greenish gray to some buff. Shattered by desiccation cracks. Some olive-gray to gray massive siltstone in lower part.
619.9	626.9	Marlstone and lean oil shale: Light to some medium brownish gray and olive gray, dolomitic to calcareous. Faint streaked bedding and rare laminae. Abundant very irregular fine to rare thin buff silty calcareous streaks, stringers, and blebs in some parts. Sample of light olive-gray marlstone from 624.0 feet: X-ray - dolomite, calcite, quartz, montmorillonite, illite, feldspar.
626.9	627.6	Oil shale: Medium to some dark and light brownish gray and olive gray, dolomitic. Fairly distinct streaked bedding to faint very fine laminae. Abundant very fine calcite blebs and streaks. Fine buff to white silty tuff (?) streaks at 627.3 and a thin light brownish-gray stringer at 627.4. Sample of medium to dark oil shale from 627.5 feet: X-ray - dolomite, calcite, quartz, feldspar, pyrite.
627.6	629.4	Oil shale grading to marlstone: Medium to light olive and olive gray, rare brownish gray in upper part. Faintly streaked to nearly massive.
629.4	630.0	Mudstone: Olive green, slightly calcareous. Very faintly streaked. Grades to yellow-buff marlstone at base.
630.0	631.8	Marlstone: Light olive gray to some buff, slightly to moderately calcareous. Faint streaked bedding and some laminae. Some thin zones of abundant very fine calcite specks in middle.
631.8	634.5	Marlstone: Medium olive gray to greenish gray, slightly calcareous. Faint streaked bedding to nearly massive. Some faint gray specks, streaks, and vertical stringers.

Illustration No. SBR-4330P (Sheet 20 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
634.5	637.7	Mudstone: Olive gray to gray green, sandy in parts, moderately to slightly calcareous. Faintly streaked to massive. Lower part shattered by desiccation cracks.
637.7	638.8	Claystone: Medium to light olive gray, slightly silty, very slightly calcareous, massive.
638.8	640.0	Oil shale: Medium and some dark to light brownish gray and olive gray, dolomitic. Faint to some moderately distinct streaks and laminae. Irregular thick tapering hackly claystone stringer from top to 639.2. Sample of medium to dark brownish-gray oil shale from 639.3 feet: X-ray - calcite, quartz, dolomite, feldspar, analcite.
640.0	641.0	Marlstone: Light and some medium olive gray to tan and rare brown, dolomitic. Moderately distinct streaked bedding to very faint thin laminae and bands. Some thin zones and fine streaks of abundant calcite specks--mostly in upper part.
641.0	644.0	Marlstone: Tan and light olive gray to buff, very slightly calcareous. Very faint irregular and displaced to regular laminae and thick bands. Some fine calcite blebs in irregular zones, streaks, and stringers in upper part. Some irregular gray stains in lower part. Indistinctly interbedded slightly silty biotitic tuff and marlstone in upper 3/4 inch. Tight coarsely fractured to brecciated marlstone at 641.4-641.8. Sample of interbedded buff biotitic tuff and marlstone from 641.0 feet: X-ray - K and Na feldspars, biotite, dolomite, calcite, montmorillonite.
644.0	645.3	Marlstone: Light to some medium olive gray and brownish gray, dolomitic. Faint to some moderately distinct streaks and some thin laminae and bands. Some fine buff silty calcareous streaks.
645.3	646.6	Marlstone and mudstone: Light olive gray to medium greenish gray, some sandy zones in lower part. Faint streaked bedding. Some broken core.
646.6	648.0	Mudstone and marlstone: Olive gray. Faint streaked bedding. Some fine irregular dark gray pyritic blebs and vertical streaks in lower part.
648.0	651.0	Missing.
651.0	668.0	Mudstone and some siltstone: Medium to some light and rare dark olive gray. Faint regular to some very contorted

Illustration No. SBR-4330P (Sheet 21 of 22)

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Half-core samples from Mintech Corporation and Marathon Oil Company's
Carl Tomich No. 1 corehole (Con.)

From	To	Description
		streaks, laminae, and bands. Uneven sample split.
		Sample of olive-gray mudstone from 666.0 feet:
		X-ray - quartz, analcite, calcite, montmorillonite, illite, feldspar, dolomite.

Bottom of core.

Illustration No. SBR-4330P (Sheet 22 of 22)