

LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY<sup>1/</sup>

Core samples from Carter Oil Company's Opportunity No. 2 corehole drilled in SW1/4NW1/4NE1/4 (approximately 850' FNL, 2150' FEL) of sec. 28, T 1 N, R 96 W, Rio Blanco County, Colorado

Approximate surface elevation: 7,080 feet

Described interval: 106.5-1963.0 feet

From	To	Description
106.5	107.1	Siltstone: Buff, calcareous. Faint streaked bedding. Irregular thick parting; irregular fracture. High-angle natural fracture with fine black spots through most of interval.
107.1	109.9	Siltstone and mudstone: Medium and some light slightly brownish gray, calcareous. Moderately distinct to faint very fine irregular nonparallel laminae and streaks. Irregular thick parting; irregular to fairly regular fracture. Few fine to 1/4-inch high-angle calcite-filled fractures with some drusy cavities. Rare limonite-stained diagonal fracture surfaces.
109.9	111.8	Mudstone and siltstone: Medium to some dark and light brownish gray, rare buff, calcareous. Distinct to faint distorted and discontinuous laminae, stringers, and streaks. Slightly irregular to irregular thick parting; irregular fracture. Some fine calcite-filled medium- to high-angle fractures and glossy shear surfaces with slickensides in upper part.
111.8	114.4	Siltstone and mudstone: Buff to brownish gray, very calcareous. Faint to distinct streaked bedding; very fine laminae with loop structures at 112.2. Irregular to slightly irregular thick parting; slightly conchoidal to irregular fracture. Rare fine calcite-filled fractures. (112.4-114.0 missing.)
114.4	116.3	Mudstone: Medium to light brownish gray, calcareous. Faint streaked bedding to distorted laminae. Irregular thick parting; slightly conchoidal to irregular fracture. Rare carbonaceous streaks. Buff siltstone streaks becoming abundant near bottom.
116.3	123.4	Siltstone and mudstone: Buff, calcareous. Faintly streaked to massive and variegated. Irregular to rare regular thick parting; irregular to slightly irregular fracture; permeable in part. Few fine irregular high-angle fractures with brown iron-stained fillings.
123.4	124.8	Mudstone and siltstone: Medium to light and rare dark slightly olive and brownish gray, moderately to slightly calcareous. Moderately distinct to faint displaced, disrupted, and distorted streaks and laminae. Irregular thick parting; irregular to slightly conchoidal fracture; tight.
124.8	127.8	Mudstone and siltstone: Light to medium slightly brownish gray, calcareous. Moderately distinct disrupted and displaced laminae and streaks. Irregular thick parting; irregular fracture. Rare carbonaceous plant debris.
127.8	133.2	Siltstone and mudstone: Light to medium slightly brownish gray, rare buff, moderately to slightly calcareous. Moderately distinct to faint distorted and disrupted to fairly regular streaks and laminae. Irregular thick parting; irregular to slightly irregular and conchoidal fracture. Rare tight irregular diagonal fractures.

<sup>1/</sup> By L. G. Trudell, completed July 19, 1977.

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Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
133.2	137.0	Siltstone: Light slightly brownish gray, calcareous. Very faint distorted streaked bedding to massive. Irregular thick parting; slightly irregular and conchoidal fracture. Sample of massive siltstone from 135.1 feet: X-ray--quartz, analcime, feldspar, calcite, dolomite, Mg-siderite.
137.0	140.3	Siltstone and mudstone: Like 124.8-133.2. Some contorted bedding.
140.3	144.0	Siltstone and rare sandstone: Buff to yellowish tan, some light to medium gray in lower part, calcareous. Faint to moderately distinct very distorted to fairly regular streaked bedding. Irregular thick parting; irregular to slightly irregular fracture; rarely friable. Few zones with abundant fine carbonaceous flecks.
144.0	146.0	Mudstone and siltstone: Medium to light slightly olive and brownish gray, calcareous. Moderately distinct to faint distorted and disrupted to contorted streaks and laminae. Irregular thick parting; irregular to slightly irregular fracture. Some fine carbonaceous flecks in lower part.
146.0	152.4	Siltstone and very fine sandstone: Light slightly olive and brownish gray, calcareous. Massive; some faint disrupted bedding. Irregular thick parting; irregular fracture; rarely permeable. Some carbonaceous flecks.
152.4	153.4	Shale, mudstone, and siltstone: Medium to some light brownish gray, dolomitic to calcareous. Faint laminae to distorted and disrupted streaked bedding; irregular shredded contact with siltstone above. Irregular thick parting; slightly conchoidal to irregular fracture; Sample of brownish-gray laminated shale from 152.5 feet: X-ray--quartz, dolomite, calcite, feldspar, analcime.
153.4	156.4	Siltstone: Light brownish gray to buff and gray buff, calcareous. Faint disrupted bedding in upper part to massive in lower part. Irregular thick parting; irregular fracture.
156.4	164.7	Siltstone: Light brownish gray, calcareous. Faint disrupted bedding; some massive zones. Irregular thick parting; slightly conchoidal to irregular fracture. Some irregular high-angle fractures with brown tarry patches and very fine pyrite in lower part. Yellowish-buff sandy siltstone in lower 3 inches.
164.7	167.8	Mudstone (including some oil shale): Light to medium and very rare dark brownish gray, calcareous. Faint intricately contorted and displaced laminae in upper 0.6 foot; faint to distinct very fine to thin laminae with abundant fine displacements and loop structures in other parts. Irregular to some fairly regular thick parting; irregular to slightly conchoidal fracture. A 1/8-inch calcite-filled high-angle fracture from about 165.3 to 165.8. Gray siltstone stringers with angular broken and shredded contacts at 164.8-164.9 and 167.0-167.4.
167.8	169.0	Mudstone and siltstone: Mudstone as above with abundant stringers of gray calcareous siltstone. Interfingered and shredded contacts.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		Some irregular high-angle fracture surfaces with brown varnish-like coatings in middle part.
169.0	169.9	Mudstone: Light to medium olive gray, calcareous. Faint very fine to thin irregular laminae. Irregular to slightly irregular thick to rare thin parting; irregular to fairly regular fracture. Some orangish-yellow weathering alteration in lower 0.3 foot.
169.9	173.0	Siltstone and some very fine to medium-grained sandstone: Tan and buff. Faint slightly irregular laminae, bands, and streaks in upper foot; very indistinct steeply inclined bedding in lower part with a large overturned fold centered around 172.0. Irregular thick parting; slightly irregular fracture; slightly permeable.
173.0	178.0	Sandstone and some siltstone: Yellowish orangish tan and buff, medium to very fine grained. Very indistinct inclined and disrupted bedding becoming faintly variegated to massive. Irregular parting and fracture; some broken core; permeable. Rare irregular fractures with brownish-gray carbonaceous coatings.
		Sample of orangish tan-buff sandstone from 177.3 feet: X-ray--quartz, Na-feldspar, analcime, K-feldspar, dolomite.
178.0	187.0	Sandstone and siltstone: Yellowish orangish tan and buff, some gray buff. Massive to variegated and mottled; some indistinct irregular to broken stringers and inclusions. Irregular parting and fracture; permeable. Some brownish-gray carbonaceous patches and fine disseminated specks and streaks.
187.0	195.0	Siltstone and very fine to medium-grained sandstone: Medium to light gray. Massive to faint distorted, inclined, and disrupted bedding. Irregular parting and fracture; slightly to moderately permeable. Occasional streaks and zones of abundant carbonaceous plant debris.
		Sample of light gray sandstone from 192.7 feet: X-ray--quartz, Na-feldspar, dolomite, analcime, K-feldspar, pyrite.
195.0	200.0	Sandstone: Light yellowish buff; fine to fairly coarse-grained. Massive; becoming faintly variegated near bottom. Irregular thick parting; slightly irregular to irregular fracture; very permeable. A thick steeply inclined stringer of gray sandstone with abundant black carbonaceous plant debris in lower 0.3 foot.
		Sample of yellowish-buff sandstone from 197.5 feet: X-ray--quartz, Na-feldspar, analcime, K-feldspar, dolomite.
200.0	203.4	Sandstone and siltstone: Light to rare medium gray and gray buff. Faint to fairly distinct irregular and inclined to disrupted stringers, bands, and laminae. Irregular parting and fracture; mostly permeable. Some very carbonaceous stringers and streaks. Irregular high-angle fracture with patchy fine-grained pyrite at 200.9-201.1.
203.4	205.3	Siltstone and mudstone: Light to some medium gray and some light to medium brownish gray; slightly to moderately calcareous.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		Faint to moderately distinct disrupted and shredded to slightly distorted laminae, stringers, and streaks. Irregular thick parting; irregular fracture. Some carbonaceous plant debris.
205.3	206.0	Oil shale: Medium to light brownish gray, some buff, calcareous, silty. Moderately distinct very fine irregular slightly non-parallel laminae inclined about 35°. Irregular thick parting; irregular fracture.
206.0	206.1	Missing
206.1	207.1	Mudstone: Light brownish gray, calcareous. Faint very fine fairly regular laminae; slightly inclined in upper part. Irregular thick parting; slightly conchoidal to irregular fracture. A 1-inch lenticular gray sparry biotitic tuff at 206.4; a very fine brownish-black oil-shale layer at base of tuff.
207.1	210.6	Mudstone (lean oil shale?): Light to medium olive gray and brownish gray, calcareous. Moderately distinct to very faint very fine laminae. Irregular thick parting; conchoidal to irregular fracture. Some vertical fractures with very fine drusy crusts and patchy bitumen stains.
210.6	216.3	Siltstone and mudstone: Light and rare medium brownish gray to very light gray buff, calcareous. Fairly distinct to faint thick bands and fine nonparallel laminae and streaks. Irregular thick parting; irregular to some fairly regular fracture. Some fine irregular discontinuous calcite-filled fractures.
216.3	220.2	Siltstone and mudstone: As above. Irregular vertical fractures with glossy dark brownish-gray slickensides in upper half.
220.2	221.8	Mudstone: Buff to some medium brownish gray, calcareous. Moderately distinct to faint nonparallel streaks and laminae; faintly streaked dark brownish-gray to black oil shale at 220.3-220.7. Irregular thick parting; irregular fracture. Irregular natural vertical fracture with very fine patchy vitreous black crusts in lower part.
221.8	223.6	Siltstone: Buff, calcareous. Very faintly bedded with distinct black to brownish-gray oil-shale stringers and streaks becoming abundant at 222.4-222.8. Irregular thick parting; conchoidal to irregular fracture. Some high-angle fractures with varnish-like to tarry patches and slickensides.
223.6	224.0	Missing
224.0	226.1	Mudstone: Buff to light and some medium slightly brownish gray, calcareous. Fairly distinct very fine laminae; abundant buff bands in upper part; abundant small displacements in upper part; abundant very fine loop structures in lower part. Irregular thick parting; slightly conchoidal fracture. Some very fine to thin brownish-gray to black oil-shale shreds in upper 0.3 foot. { Sample of finely laminated mudstone from 225.6 feet: X-ray--quartz, dolomite, calcite, feldspar, analcime.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

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From	To	Description
226.1	231.9	Siltstone: Gray buff, calcareous. Massive with rare faint streaks and stringers; a 3/4-inch layer of mudstone as above at 226.5. Irregular thick parting; slightly irregular fracture. Some fine high-angle calcite-filled fractures. Sample of siltstone from 229.9 feet: X-ray--quartz, dolomite, calcite, feldspar, analcime.
231.9	232.2	Siltstone: Buff to light and rare medium brownish gray, calcareous. Faint irregular streaks and discontinuous laminae; angular unconformity at bottom.
232.2	233.5	Mudstone (oil shale): Medium to rare light and dark brownish gray, calcareous. Faint crinkly and displaced vertical laminae in upper 0.4 foot; faint irregular discontinuous moderately inclined to fairly flat laminae in lower part. Irregular thick parting; irregular and conchoidal fracture.
233.5	234.0	Missing
234.0	234.5	Oil shale: Dark and rare medium brownish gray to black, rare satiny luster, dolomitic. Faint laminae to very faint streaked bedding; some small displacements and fine loop structures; unconformities at 234.2 and 234.4. Irregular thick parting; irregular fracture.
234.5	235.8	Mudstone (oil shale?): Medium to some dark and rare light brownish gray, calcareous. Faint to moderately distinct very fine laminae with abundant fine displacements in upper half; faint displaced contorted flow structure with large laminated inclusions in lower half. Irregular thick parting; slightly conchoidal to irregular fracture.
235.8	236.5	Missing
236.5	239.0	Mudstone: Medium slightly brownish gray, calcareous, very silty in upper part. Very faint contorted streaks and stringers to faint very fine laminae with abundant fine loop structures and displacements. Irregular thick parting; irregular to slightly conchoidal fracture. A thin light gray silty tuff at bottom.
239.0	245.0	Mudstone (oil shale?): Medium to some dark and rare light brownish gray, slightly to moderately calcareous. Moderately distinct to faint displaced to nonparallel laminae and streaked bedding. Irregular thick parting; irregular and conchoidal fracture. Some very fine carbonaceous specks and streaks.
245.0	249.6	Siltstone and mudstone: Medium to some light slightly brownish gray, slightly to moderately calcareous. Faint regular to very distorted discontinuous laminae and streaked bedding. Irregular thick parting; irregular to slightly irregular fracture. Some carbonaceous specks and streaks.
249.6	251.7	Oil shale: Medium to some dark and light brownish gray, slightly calcareous to dolomitic. Faint to moderately distinct laminae; abundant fine loop structures and displacements. Irregular thick parting; irregular to slightly conchoidal fracture. Irregular

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		pieces of buff earthy friable mudstone at 250.0-250.2. A very thin brownish-gray silty tuff lamina at 251.4; few small lenses at bottom.
251.7	254.0	Mudstone (oil shale in part?): Medium to some light and rare dark brownish gray, calcareous. Faint to moderately distinct nonparallel streaked bedding and discontinuous laminae. Irregular thick parting; irregular to slightly conchoidal fracture. Rare fine to thin brownish-gray silty tuff streaks; a thin irregular layer at 253.2. Short tight high-angle fractures with tarry coatings and some pyrite at 252.5-252.7.
254.0	255.4	Oil shale: Medium to dark brownish to slightly olive gray, slightly to moderately calcareous. Faint streaked bedding and very fine discontinuous laminae marked by abundant buff silty lenses and streaks. Irregular thick parting; irregular to slightly irregular fracture. A very irregular grayish-brown silty tuff layer at 254.5-254.7.
		Sample of grayish-brown silty tuff from 254.6 feet: X-ray--analcime, quartz, Na-feldspar, biotite.
255.4	256.9	Oil shale and siltstone: Dark to medium slightly brownish and olive-gray oil shale braided with fine to 1-inch stringers and streaks of light brownish-gray to tan-buff muddy siltstone. Very fine distorted to contorted streaked bedding and discontinuous laminae in oil shale. Irregular thick parting; slightly irregular to irregular fracture.
256.9	258.0	Siltstone and some oil shale: Buff to light brownish-gray siltstone with some braided to shredded stringers of medium to dark brownish-gray oil shale. Irregular thick parting; irregular and some conchoidal fracture.
		Sample of light brownish-gray massive siltstone from 257.6 feet: X-ray--quartz, dolomite, calcite, analcime, feldspar.
258.0	259.3	Oil shale and some siltstone: Medium to dark brownish-gray oil shale with very fine regular to wavy streaked bedding and discontinuous laminae; some thin to thick streaks, nodules, and stringers of very light buff siltstone. Irregular to slightly irregular thick parting; slightly conchoidal to irregular fracture. High-angle glossy shear surfaces with slickensides in upper 0.4 foot. Some very fine vertical calcite-filled fractures in siltstone stringer in lower part.
259.3	260.5	Oil shale: Dark brownish gray to some black, dolomitic. Faint laminae and streaked bedding. Irregular thick parting; irregular fracture. Some very fine pyrite streaks. Rare biotite flakes.
260.5	263.4	Oil shale: Medium to dark brownish gray, dolomitic to slightly calcareous. Faint laminae and streaked bedding. Irregular thick parting; slightly conchoidal to irregular fracture. A thin gray-buff tuff lamina at 260.55; very silty biotitic light brownish-

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		gray to buff tuffs at 260.7-260.9 (with abundant fine to thin oil-shale stringers and shreds), at 261.1-261.2, and at 262.1-262.3; few fine streaks and layers elsewhere. Some high-angle fractures with calcite and pyrite in lower 1.2 foot.
263.4	264.5	Missing
264.5	266.0	Oil shale: As above. Discontinuous core pieces; some pieces of mudstone as below; few pieces of buff earthy friable rubble.
266.0	270.6	Mudstone, siltstone, and oil shale: Light brownish-gray to buff mudstone and siltstone streaked and interbedded with medium to dark brownish-gray silty oil shale, calcareous. Bedding mostly irregular, discontinuous, and slightly nonparallel; rarely contorted. Irregular thick parting; irregular fracture.
270.6	274.4	Siltstone and mudstone: As above, with sparse oil shale.
274.4	275.2	Missing
275.2	277.0	Mudstone, siltstone, and oil shale: Like 266.0-270.6 in upper part; oil shale with very abundant fine buff silty streaks and lenses in lower 0.6 foot.
277.0	279.6	Oil shale: Medium to some dark olive gray and brownish gray, calcareous. Faint very fine discontinuous and displaced laminae; some loop structures; abundant very fine distinct gray-buff silty streaks in upper part. Irregular thick parting; slightly conchoidal to irregular fracture. Few thin buff siltstone laminae and streaks.
279.6	280.7	Oil shale: Very dark to rare medium grayish brown, dolomitic. Faint <u>very</u> fine laminae and streaked bedding. Irregular to slightly irregular thick parting; conchoidal fracture. Sample of very dark grayish-brown oil shale from 279.9 feet: X-ray--dolomite, quartz, calcite, analcime, feldspar.
280.7	282.1	Oil shale: Dark to some medium grayish brown and brownish gray, dolomitic to calcareous. Faint streaked bedding and very fine laminae. Irregular to slightly irregular thick parting; irregular and conchoidal fracture. A fine tan silty lamina at 281.85.
282.1	284.4	Oil shale: Dark and medium brownish gray, calcareous to dolomitic. Faint very fine laminae and streaked bedding. Irregular to fairly regular thick parting; conchoidal and irregular fracture; broken core with regular artificial (?) vertical fractures in upper 0.8 foot. Thin light to medium grayish-brown biotitic tuffs at 282.15, 283.1 and 283.2.
284.4	286.6	Oil shale: Dark and some medium brownish gray and grayish brown, calcareous to dolomitic. Faint very fine laminae and streaked bedding. Irregular thick parting; irregular to slightly conchoidal fracture. A 1-inch pinch-and-swell light slightly brownish gray silty stringer at 284.9.
286.6	287.8	Siltstone: Light brownish gray to buff, calcareous. Interfingered with dark to medium grayish-brown oil shale in upper 0.3 foot;

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Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		some fine to thin oil-shale streaks and shreds in other parts; regular conformable contact with oil shale below. Irregular parting and fracture.
287.8	290.0	Oil shale: Dark and medium brownish gray, slightly to moderately calcareous. Faint and rare distinct very fine laminae and streaked bedding. Regular to rare irregular thick to some thin parting; slightly irregular and conchoidal fracture. A thin tan silty tuff lens at 288.4. A fine brownish-gray sandy-textured analcime lamina at bottom. Few very fine discontinuous tight diagonal calcite-filled fractures in lower part.
290.0	292.0	Oil shale: Dark brownish gray and olive gray, slightly calcareous to dolomitic. Faint very fine laminae and streaked bedding. Irregular thick to rare medium parting; slightly conchoidal to irregular fracture; some broken core in lower part.
292.0	295.1	Oil shale: Medium to dark olive gray and brownish gray, slightly to moderately calcareous. Faint very fine laminae and streaked bedding. Irregular to slightly irregular thick to some medium parting; slightly conchoidal to irregular fracture; broken core in lower part. Rare very fine tight high-angle calcite-filled fractures. Interfingered olive-buff biotitic tuff and oil shale at 292.6-292.8.
295.1	296.2	Oil shale: Medium to some dark olive gray, moderately to slightly calcareous. Faint very fine laminae and streaked bedding. Irregular thick parting; slightly conchoidal to irregular fracture. Rare fine irregular calcite-filled fractures. Olive-buff tuff with dark gray sparry streaks and very fine oil-shale streaks in upper inch; a 1/2-inch olive-buff biotitic tuff at 295.6. Vitreous black woody-textured fossil on parting surfaces at 295.5.
296.2	301.0	Oil shale: Medium to dark olive gray and brownish gray, moderately to slightly calcareous. Faint very fine laminae and streaked bedding. Irregular to some fairly regular thick parting; irregular to slightly conchoidal fracture; artificial (?) smooth vertical fractures through most of interval.
301.0	304.0	Oil shale: As above. Mostly broken core and rubble.
304.0	305.7	Oil shale: Medium and rare light olive gray to medium and dark brownish gray, calcareous to dolomitic. Faint to some fairly distinct very fine discontinuous laminae and streaked bedding. Irregular to some slightly irregular thick to rare thin parting; conchoidal to irregular fracture. Very irregular fracture surface with glossy slickensides near top. Thin gray-buff silty tuff lamina at 304.3; fine streaks at 304.5 and 305.05.
305.7	306.8	Oil shale: Very dark to some medium brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Fairly regular to irregular thick parting; irregular and conchoidal fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

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From	To	Description
306.8	308.2	Oil shale: Dark and some medium brownish gray, dolomitic to slightly calcareous. Faint laminae and streaked bedding. Fairly regular to irregular thick to rare medium and thin parting; irregular fracture. A 3/4-inch silty tuff band at 306.9 - buff in upper part and medium gray in lower part. Rare fine dense dark brownish-gray pyritic chalcedony(?) streaks in upper part.
308.2	312.3	Oil shale: Dark to medium brownish gray and olive gray, slightly calcareous to dolomitic. Faint very fine laminae and streaked bedding. Irregular shaly to papery parting and hackly fracture with some zones of thick parting and slightly conchoidal fracture. Sample of papery oil shale from 309.2 feet: X-ray--dolomite, quartz, calcite, analcime, feldspar.
312.3	313.7	Oil shale: Medium to light and rare dark brownish gray and olive gray, some buff, calcareous, silty. Faint to fairly distinct very fine discontinuous to regular laminae. Irregular thick parting; slightly irregular and conchoidal fracture; irregular shaly parting and hackly fracture near top. A 1 1/2-inch greenish-gray to white mottled silty tuff at 312.6.
313.7	315.2	Mudstone: Buff to light brownish gray and olive gray, calcareous. Faint to moderately distinct very fine laminae and streaked bedding. Irregular to fairly regular thick parting; conchoidal fracture. Some very fine high-angle calcite-filled fractures in upper part. Sample of mudstone from 314.8 feet: X-ray--dolomite, quartz, calcite, feldspar.
315.2	316.8	Mudstone: Buff to medium and rare dark brownish gray, calcareous. Fairly distinct to faint very fine laminae. Fairly regular to irregular thick parting; slightly irregular and conchoidal fracture. Very fine high-angle calcite-filled fractures with small displacements in lower part. Few thin buff siltstone bands.
316.8	317.8	Oil shale: Light to medium and rare dark olive gray and brownish gray, calcareous, silty. Fairly distinct to faint very fine laminae. Regular to irregular thick to rare thin parting; regular to slightly irregular and conchoidal fracture. A thin light brownish-gray silty to very fine sandy-textured tuff band at 317.1. Gray-buff mudstone band at 317.6-317.7.
317.8	318.8	Oil shale: Medium and some light to rare dark olive gray, calcareous. Moderately distinct to faint very fine laminae and streaked bedding. Regular to irregular thick to medium parting; slightly conchoidal to irregular fracture.
318.8	321.2	Oil shale: Medium to dark olive gray and brownish gray, dolomitic to slightly calcareous. Faint streaked bedding and very fine laminae. Irregular thick parting; conchoidal to irregular fracture. Irregular high-angle fracture with tarry patches in lower part.

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From	To	Description
321.2	323.7	Oil shale: As above. One or more irregular fractures with tarry patches through most of interval. Uneven sample split.
323.7	325.9	Oil shale: Brownish gray, slightly calcareous. Faint very fine laminae; abundant very fine light gray silty laminae and streaks in upper part. Regular to irregular thick to thin parting; irregular and some coarse hackly fracture. Irregular high-angle fractures with light brownish-gray silty coatings and vitreous brittle black organic patches through most of interval.
325.9	328.3	Oil shale: Medium and some dark brownish gray, moderately to slightly calcareous. Faint very fine laminae and streaked bedding. Regular to some irregular thick to some thin parting; irregular to slightly conchoidal fracture. Some discontinuous high-angle tar-coated fractures in lower part.
		Sample of medium to dark brownish-gray oil shale from 326.5 feet: X-ray--calcite, dolomite, quartz, analcime, feldspar, illite.
328.3	329.3	Oil shale: Medium to very dark brownish gray, dolomitic. Faint to some moderately distinct laminae. Regular to irregular thick to some thin parting; slightly irregular and conchoidal fracture. A 1/4-inch slightly brownish gray fine-grained analcime lamina at 328.6.
329.3	330.1	Tuff: Medium to light gray and buff, fine sandy to silty textured. Mottled and variegated; small amount of interbedded oil shale at bottom. Broken core; length uncertain.
		Sample of gray mottled tuff from 329.6 feet: X-ray--dolomite, calcite, quartz, feldspar.
330.1	331.4	Oil shale: Medium to some dark and light brownish gray and olive gray, slightly calcareous. Faint to some fairly distinct laminae. Regular to irregular thick to medium parting; conchoidal fracture; some broken core pieces. A fine gray-white tuff with very fine dark flecks and some pyrite at 330.4.
331.4	332.4	Oil shale: Medium to some light and rare dark brownish gray, calcareous. Faint very fine laminae and streaked bedding marked by some distinct buff streaks. Fairly regular to irregular thick parting; conchoidal to fairly regular fracture.
332.4	333.4	Oil shale: Medium to some light and dark brownish gray, calcareous. Moderately distinct very fine laminae with abundant very fine buff streaks and lenses. Regular to some irregular thick parting; slightly irregular fracture. A thin buff siltstone band at top.
		Sample of oil shale with very fine buff streaks and lenses from 333.3 feet: X-ray--analcime, quartz, feldspar, pyrite, calcite, illite.
333.4	334.6	Oil shale: Medium to some dark brownish gray, dolomitic to calcareous. Moderately distinct to faint laminae marked by fairly abundant fine buff streaks and lenses. Slightly irregular to irregular thick parting; irregular and conchoidal fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
334.6	335.8	Oil shale: As above but with rare fine buff streaks and lenses. A very thin light gray biotitic tuff lens with some pyrite at top; few fine gray pyritic silty streaks and lenses elsewhere.
335.8	336.9	Oil shale: Medium to very dark brownish gray and some black, rare satiny to resinous luster, dolomitic. Moderately distinct to faint laminae. Regular to some irregular thick parting; slightly conchoidal fracture. Rare fine medium to dark brownish-gray and gray silty pyritic streaks. Sample of very dark oil shale from 336.2 feet: X-ray--dolomite, quartz, calcite, analcime, feldspar.
336.9	339.0	Oil shale: Medium to some light and rare dark brownish gray, moderately to slightly calcareous. Faint to some moderately distinct laminae. Irregular to slightly irregular thick parting; conchoidal to regular fracture. A very fine irregular tight vertical fracture with bitumen, calcite, and pyrite fillings extends from top to 338.8. A thin buff to gray calcareous mudstone lamina at 338.3.
339.0	340.0	Oil shale: Medium to rare dark brownish gray, slightly calcareous to dolomitic. Faint very fine laminae and streaked bedding; rare fine displacements and loop structures. Slightly irregular to irregular thick parting; slightly irregular to conchoidal fracture.
340.0	344.4	Oil shale: Medium to light and rare dark brownish gray, calcareous. Distinct to faint very fine laminae; abundant very fine buff streaks in some parts; some very fine displacements and loop structures. Irregular to some regular thick parting; fairly regular to conchoidal fracture. Fine gray silty tuff streaks at 344.3.
344.4	344.9	Oil shale: Dark and rare medium brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Regular thick parting; conchoidal to regular fracture. Very fine brittle vitreous black organic streak at 344.8.
344.9	347.5	Oil shale: Medium to some dark and rare light brownish gray, dolomitic to slightly calcareous. Fairly distinct to some faint laminae; some very fine loop structures; some very fine buff streaks. Regular to irregular thick parting; slightly conchoidal to irregular fracture. A small buff-white silty lens with gray patches at 346.8.
347.5	348.5	Oil shale: Medium to some dark and rare light brownish gray and olive gray, dolomitic to calcareous. Moderately distinct to faint laminae. Irregular to slightly irregular thick parting; irregular to conchoidal fracture; some broken core.
348.5	350.6	Oil shale: Medium to some light and rare dark olive gray and brownish gray, very slightly calcareous. Faint to fairly distinct laminae; abundant fine loop structures and displacements. Irregular thick parting; conchoidal fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
350.6	353.9	Oil shale: Medium to some dark and rare light brownish gray, slightly to strongly calcareous. Faint to distinct very fine laminae; some fine displacements and loop structures. Irregular to some regular thick parting; conchoidal to some irregular fracture. Some very fine buff streaks in lower part. A 1/2-inch buff marlstone zone at 352.5.
353.9	355.9	Oil shale: Medium brownish gray, calcareous. Faint very fine laminae; rare very fine loop structures; contorted bedding in lower 0.2 foot. Regular to irregular thick parting; conchoidal fracture.
355.9	356.9	Oil shale: Medium to some dark brownish gray, calcareous to dolomitic. Faint to moderately distinct very fine laminae; rare fine loop structures; some very fine distinct buff streaks and lenses in lower part. Regular to irregular thick parting; slightly irregular and conchoidal fracture. A fine lenticular gray-buff silty layer at 356.45 and a very thin lamina at 356.65.
356.9	357.9	Oil shale: Dark to rare medium brownish gray and rare buff, dolomitic. Faint regular to discontinuous laminae. Irregular to slightly irregular thick parting; irregular to slightly irregular and conchoidal fracture.
357.9	358.9	Oil shale: Dark to medium and some light brownish gray, calcareous and some dolomitic. Distinct to faint very fine discontinuous to regular laminae; some very fine displacements and loop structures. Fairly regular to irregular thick parting; slightly conchoidal and irregular fracture. Some fine buff mudstone laminae in lower 2 inches.
358.9	360.9	Oil shale: Dark to medium brownish gray, calcareous to dolomitic. Fairly distinct to faint very fine laminae; abundant fine loop structures; some very fine distinct buff streaks. Regular to some irregular thick to some medium parting; slightly conchoidal and irregular fracture.
360.9	364.4	Oil shale: Medium to some light and dark brownish gray, moderately to slightly calcareous. Fairly distinct very fine laminae; some very fine loop structures; some very fine buff streaks and laminae. A fine pinched out buff tuff lamina at 361.2.
364.4	365.8	Oil shale: Dark and rare medium brownish gray to black, dolomitic. Faint to rare moderately distinct very fine laminae. Regular thick to medium and rare thin parting; conchoidal to irregular fracture.
365.8	366.8	Oil shale: Dark to medium brownish gray, dolomitic to calcareous. Faint to distinct very fine laminae; rare fine loop structures and displacements. Irregular thick parting; conchoidal to fairly regular fracture.
366.8	368.2	Oil shale: Medium to some dark and rare light brownish gray, calcareous. Faint to distinct very fine laminae and streaked

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		bedding; fairly abundant very fine distinct buff streaks and lenses. Regular to irregular thick parting; conchoidal to regular fracture.
368.2	369.2	Oil shale: Buff to medium and rare dark brownish gray, calcareous, silty. Distinct very fine discontinuous laminae; very abundant fine loop structures. Irregular to fairly regular thick parting; irregular to slightly conchoidal fracture. A 1-inch slightly wavy gray-buff siltstone band at 368.6.
369.2	370.7	Mudstone: Buff and gray buff to some medium and rare dark brownish gray, calcareous. Moderately distinct intricately displaced to distorted and nonparallel laminae. Irregular thick parting; slightly conchoidal to irregular fracture; some broken core.
370.7	378.3	Siltstone: Medium-light slightly brownish gray, calcareous. Very irregular to contorted bedding marked by fine to thin streaks, shreds, stringers, and few thick contorted zones of light to medium and rare dark brownish-gray oil shale. Irregular parting and fracture. Rare vitreous black carbonaceous streaks.
378.3	382.2	Marlstone, oil shale, and siltstone: Buff to brownish-gray marlstone and oil shale with disrupted to very distorted and displaced very fine laminae; cut by some very irregular stringers of siltstone as above and below. Irregular thick parting; slightly irregular fracture.
382.2	389.1	Siltstone: Light and some medium slightly brownish gray to gray-buff, calcareous. Faint very irregular stringers, streaks, and layers. Irregular thick parting; irregular to slightly irregular fracture. Rare lean oil-shale and marlstone streaks and stringers.
389.1	391.2	Marlstone and oil shale: Buff to medium and some dark brownish gray, calcareous, silty in upper part. Distinct very fine laminae with intricate loop structures and fine displacements. Irregular to fairly regular thick parting; slightly irregular and conchoidal fracture. Some thinly interbedded gray-buff to light gray siltstone near top.
391.2	392.2	Oil shale: Very dark to some medium brownish gray, dolomitic. Moderately distinct to faint laminae. Irregular to regular thick to some thin parting; slightly conchoidal to some hackly fracture. A thin brown silty tuff stringer at 391.9.
392.2	393.2	Oil shale: Medium to dark brownish gray, dolomitic. Moderately distinct laminae. Slightly irregular to irregular thick parting; irregular to slightly conchoidal fracture.
393.2	412.9	Siltstone and some mudstone: Gray buff to light and rare medium slightly brownish gray, calcareous. Faint irregular to disrupted streaks, stringers, and layers; few stringers and contorted zones of buff to brownish-gray marlstone and oil shale. Irregular thick parting; slightly irregular to irregular fracture; some broken core.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
412.9	416.9	Mudstone, marlstone, and oil shale: Gray-buff to buff calcareous mudstone and marlstone finely interlaminated with light to dark brownish-gray oil shale. Distinct discontinuous and slightly nonparallel laminae to crinkly and wavy parallel laminae; some intricately disrupted and displaced laminae; inclination gradually increasing to about 75° at 415.5-416.0, becoming disrupted below; low-angle oil-shale stringers interfingering with siltstone near bottom. Irregular thick parting; slightly irregular and conchoidal to some irregular fracture.
416.9	422.2	Siltstone: Light slightly brownish gray, very slightly calcareous. Massive with rare very faint disrupted streaked bedding. Irregular thick parting; irregular to slightly conchoidal fracture. Some fine high-angle calcite-filled fractures in upper part. Sparse very fine carbonaceous specks. Sharp regular slightly inclined contact with oil shale below.
422.2	423.4	Oil shale: Buff to medium and some dark brownish gray, slightly calcareous to dolomitic. Distinct to faint laminae, inclined about 20° in upper part; some fine loop structures and displacements. Irregular to rare regular thick parting; irregular to slightly conchoidal fracture. Some very fine discontinuous high-angle fractures with calcite and pyrite fillings in upper part.
423.4	430.0	Oil shale: Buff to medium grayish brown, slightly to moderately calcareous. Fairly distinct to some faint slightly inclined laminae; some very fine loop structures and displacements. Irregular to rare regular thick to some medium parting; fairly regular to slightly conchoidal fracture.
430.0	431.0	Oil shale: Buff to medium and some dark grayish brown, calcareous to dolomitic. Fairly distinct to faint laminae inclined 10-20°. Irregular to fairly regular thick parting; fairly regular to irregular and conchoidal fracture. A very fine vertical calcite-filled fracture in upper part.
431.0	435.0	Marlstone and oil shale: Buff to medium and rare dark grayish brown, moderately to slightly calcareous, slightly silty in some lighter parts. Fairly distinct to faint slightly inclined laminae; tight coarse to muddy slightly deformed breccia with calcite fracture fillings at 434.1-434.5. Irregular to some regular thick parting; slightly irregular to conchoidal fracture. Rare very fine vertical calcite-filled fractures.
		Sample of buff to grayish-brown oil shale from 431.5 feet: X-ray--dolomite, quartz, analcime, calcite, feldspar, illite.
435.0	443.6	Marlstone: Gray buff to light and some medium slightly brownish gray, slightly calcareous. Moderately distinct to faint very fine laminae; rare fine loop structures and displacements. Irregular to regular thick parting; slightly conchoidal fracture. Rare fine high-angle calcite-filled fractures. Few 1/2- to 1-inch bands of light gray siltstone; thick band at 438.8-439.1.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		Sample of gray-buff to light slightly brownish-gray marlstone from 441.3 feet: X-ray--dolomite, quartz, K-feldspar.
TOP OF MAHOGANY ZONE		
443.6	444.6	Oil shale: Light to some dark brownish gray, dolomitic. Moderately distinct to faint very fine laminae; rare very fine loop structures. Regular thick to medium parting; slightly conchoidal fracture.
444.6	445.6	Oil shale: Medium to some dark and rare light grayish brown, dolomitic. Faint to moderately distinct very fine laminae; rare very fine loop structures. Irregular to fairly regular thick parting; slightly irregular and conchoidal fracture.
445.6	447.6	Oil shale: Medium and rare dark grayish brown to some tan, dolomitic. Moderately distinct to faint very fine laminae. Irregular to regular thick to some medium parting; slightly conchoidal fracture.
		Sample of grayish-brown oil shale from 446.3 feet: X-ray--dolomite, quartz, analcime, feldspar.
447.6	449.6	Oil shale: Medium to dark brownish gray, some black in lower part, dolomitic. Faint to some moderately distinct laminae; some blebby laminae in upper part. Regular to some irregular thin to thick parting; slightly irregular to irregular and some hackly fracture. Two fine dense dark gray analcime laminae at 447.7-447.8. Some <u>very</u> fine pyrite streaks in upper part.
449.6	452.6	Oil shale: Buff to dark brownish gray, dolomitic. Distinctly laminated; abundant fine loop structures and displacements. Irregular to fairly regular thick parting; irregular to slightly conchoidal fracture. A 2-inch lenticular white, buff, and gray streaked tuff at 450.7. Rare thin dense medium to dark gray lenses, streaks, and laminae in lower part.
452.6	453.6	Oil shale: Medium to some light and rare dark brownish gray (some very slightly olive tinge), dolomitic. Faint to some moderately distinct laminae. Regular thin to some thick parting; slightly conchoidal and coarse hackly fracture.
453.6	454.2	Missing
454.2	455.4	Oil shale: Medium to some dark and light brownish gray, dolomitic. Moderately distinct to faint laminae. Irregular to rare regular medium to thick parting; irregular and some coarse hackly to slightly conchoidal fracture. Abundant thin to fine gray-buff to slightly brownish-gray tight silty tuff lenses and streaks. A 3/4-inch grayish-brown very fine sandy-textured tuff band at 455.0.
		Sample of tight silty-textured lenticular tuff with some lean dolomitic oil shale from 454.2 feet: X-ray--dolomite, analcime, feldspar, fluorite.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
455.4	457.8	<p>Sample of grayish-brown sandy-textured tuff band from 455.0 feet: X-ray--analcime, quartz, feldspar.</p> <p>Oil shale: Very dark to some medium brownish gray and grayish brown, dolomitic. Faint to moderately distinct laminae. Regular to irregular medium to thick and some thin parting; coarse hackly to slightly irregular and conchoidal fracture. Some thin to 2-inch irregular to lenticular gray and brownish-gray to buff medium-grained to silty tuffs.</p>
457.8	459.1	<p>Sample of dark brownish-gray oil shale from 456.3 feet: X-ray--dolomite, quartz, analcime, feldspar, pyrite, illite.</p> <p>Oil shale: Medium to some dark grayish brown and rare tan, dolomitic. Moderately distinct to faint laminae; some fine to thin loop structures and displacements. Irregular to fairly regular thick parting; slightly irregular and conchoidal fracture. Few fine to thin light to dark gray and brownish-gray tuff streaks and lenses.</p>
459.1	460.4	Oil shale: Medium to dark grayish brown, dolomitic. Moderately distinct laminae. Fairly regular thick parting; slightly conchoidal fracture. Rare fine tuff streaks and laminae in upper part.
460.4	462.4	Oil shale: Very dark to some medium grayish brown, dolomitic. Faint to some moderately distinct regular to some distorted and displaced laminae. Fairly regular to irregular thick parting; slightly irregular to irregular fracture. Some zones with abundant very fine lacy mineral-filled fractures. Few fine to 1-inch very fine to coarse-grained analcime layers and streaks in lower part.
462.4	462.9	<p>Sample of brown coarse-grained analcime (?) band from 461.8 feet: X-ray--analcime, calcite, pyrite, quartz, dolomite.</p> <p>Tuff: Gray to grayish brown; silty textured, with coarse-grained patches in lower part. Finely streaked with dark to medium grayish-brown oil shale in upper part. Irregular parting and fracture.</p>
462.9	465.4	Oil shale: Medium to dark grayish brown, dolomitic. Fairly distinct to some faint laminae. Fairly regular to irregular thick parting; irregular to slightly irregular and conchoidal fracture. Several thin to 1-inch brown coarse-grained analcime (?) streaks and lenses in upper half (like 461.8); a 3 1/2-inch nodule at 464.8-465.2 looks like filling in a nahcolite vug.
465.4	466.8	Oil shale: Dark to medium grayish brown and brownish gray, dolomitic. Faint to moderately distinct laminae; some fine to thin loop structures and displacements. Irregular thick parting; irregular fracture.
466.8	469.5	Oil shale: Medium to some dark brownish gray and grayish brown, dolomitic. Faint regular to discontinuous laminae. Fairly

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		regular to irregular thick parting; irregular to slightly conchoidal fracture.
		Sample of oil shale from 468.7 feet: X-ray--dolomite, quartz; analcime, calcite, feldspar, illite.
469.5	470.6	Oil shale: Dark and rare medium brownish gray to some black, dolomitic. Faint to some moderately distinct very fine laminae; some very fine and rare thin loop structures. Regular to irregular thick to medium parting; slightly conchoidal to irregular fracture.
470.6	471.8	Oil shale: Dark to medium brownish gray and grayish brown, dolomitic. Faint very fine regular to discontinuous laminae. Irregular to some regular thick parting; irregular to slightly conchoidal fracture.
471.8	475.0	Oil shale: Medium to dark and rare light brownish gray, dolomitic. Faint to moderately distinct very fine laminae and some streaked bedding. Irregular to slightly irregular thick parting; slightly conchoidal to irregular fracture. Rare discontinuous vertical fractures with calcite and sparse pyrite.
475.0	478.0	Oil shale: Medium to light and rare dark brownish gray, dolomitic. Distinct to faint very fine laminae; some fine loop structures. Irregular to fairly regular thick to medium parting; slightly conchoidal to irregular fracture. Occasional very fine short vertical calcite-filled fractures. Irregular vertical fracture with very fine-grained drusy patches and some very fine slickensides from 476.2 to 477.2. Irregular medium to light brownish-gray sandy porous tuff at 476.8-477.1; some small drusy cavities in lower part. A tight gray mudstone band at 477.6-477.7.
478.0	481.0	Oil shale: Medium to some dark brownish gray, dolomitic. Moderately distinct to faint very fine laminae; abundant fine loop structures and displacements. Regular to irregular thick to some thin parting; slightly conchoidal to irregular fracture; some mixed up vertically fractured core with drusy calcite, muddy coatings, and rare slickensides in middle part.
481.0	482.5	Oil shale: Medium to dark and rare light brownish gray, dolomitic. Faint to rare distinct laminae. Regular to irregular thick to some thin parting; slightly conchoidal fracture. Rare very fine short calcite-filled high-angle fractures. Few fine dark gray silty pyritic streaks in lower part.
482.5	483.5	Oil shale: Medium to some light and dark brownish gray, dolomitic to slightly calcareous. Distinct to faint laminae; some fine loop structures and small displacements. Irregular to slightly irregular thick parting; conchoidal fracture. Few fine discontinuous vertical calcite-filled fractures through most of interval.
483.5	484.3	Oil shale: Medium grayish brown and some tan to very dark brownish gray, dolomitic. Distinct to faint laminae; some fine to small

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		displacements in upper part. Fairly regular thick to medium parting; slightly irregular and conchoidal fracture. Some very fine discontinuous high-angle calcite-filled fractures in upper part. A thin brownish-gray fine to medium-grained crystalline stringer at 484.0.
		{ Sample of thin crystalline stringer from 484.0 feet: X-ray--analcime, quartz, feldspar.
484.3	485.3	Oil shale: Dark grayish brown to black, some satiny luster, dolomitic. Faint very fine blebby to regular laminae. Regular thick to medium parting; slightly irregular and rare hackly fracture.
485.3	486.6	Oil shale: Dark to medium brownish gray, dolomitic. Faint to moderately distinct laminae; some fine loop structures and displacements. Regular to irregular thick parting; irregular fracture. Rare fine gray tuff streaks in lower part.
486.6	487.8	Oil shale: Medium and dark to some light brownish gray, dolomitic. Faint to fairly distinct laminae. Irregular thick parting; irregular fracture.
487.8	489.8	Oil shale: Tan and buff to medium and rare dark grayish brown, calcareous. Distinct to faint laminae; abundant fine displacements and loop structures. Regular to some irregular thick parting; irregular to fairly regular fracture. Abundant short tight high-angle fractures with brown to black resinous coatings at 488.9-489.0.
		{ Sample of very finely laminated buff to grayish-brown oil shale from 489.0 feet: X-ray--dolomite, quartz, calcite, analcime, feldspar.
489.8	491.1	Oil shale: Tan to very dark grayish brown, calcareous to dolomitic. Distinct to faint laminae; some fine loop structures and displacements. Regular to irregular thick parting; irregular to slightly conchoidal fracture. A fine lenticular buff to gray earthy to very fine crystalline tuff at 490.3. A 1 1/2-inch buff silty tuff with abundant very fine disseminated pyrite specks at bottom; cut by fine vertical fractures with dark brown fillings.
		{ Sample of buff silty tuff from 491.0 feet: X-ray--quartz, Na-feldspar, analcime, pyrite, dolomite.
491.1	492.5	Oil shale: Dark grayish brown to brownish black, dolomitic. Faint very fine laminae. Regular to slightly irregular thick to medium parting; irregular to slightly conchoidal fracture. Rare fine brown tuff streaks and lenses.
		{ Sample of very dark oil shale from 492.2 feet: X-ray--dolomite, quartz, analcime, pyrite, feldspar, illite.
492.5	494.0	Oil shale: Dark to medium grayish brown, dolomitic. Faint very fine laminae; rare fine loop structures. Irregular to regular

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		thick to medium parting; irregular to slightly conchoidal fracture. A thin gray silty tuff lamina at 492.7. A dense slightly brownish-gray dolomite (?) band at bottom.
494.0	494.2	Missing
494.2	495.7	Oil shale: Medium to rare dark and light grayish brown, dolomitic. Distinctly laminated in upper 3 inches; faint distorted to intricately contorted streaked bedding and discontinuous laminae in lower part. Fractured and broken core in upper half; irregular thick parting and irregular to slightly conchoidal fracture in lower half. Some resinous to tarry coatings and very fine glossy slickensides on high-angle fractures in upper part. Two thick tight gray to slightly brownish-gray silty bands at 494.5-494.9 and a thick stringer with broken and shredded contacts at 495.4-495.6. Sharp very wavy contact with dark oil shale below. Sample of tight gray silty band from 494.7 feet: X-ray--quartz, dolomite, feldspar, pyrite.
495.7	497.7	Oil shale: Dark brownish gray, dolomitic. Faint very fine laminae and streaked bedding (slightly inclined). Irregular to fairly regular thick parting; slightly irregular to irregular fracture. Irregular vertical fracture with glossy slickensides in lower 0.3 foot.
497.7	499.0	MAHOGANY BED? Oil shale: Black, with some distinct brownish-gray to buff laminae in lower part; some satiny to resinous luster in lower part. Very faint and rare distinct laminae; some fine to thin irregular loop structures and displacements. Regular to some irregular thick to thin parting; irregular and some slight to coarse hackly fracture; broken core with some glossy shear surfaces near top.
499.0	502.3	Oil shale: Dark to medium brownish gray, some black in lower part, some satiny to resinous luster in upper part, dolomitic. Faint laminae and streaked bedding. Irregular to regular thick to rare medium and thin parting; irregular fracture. Few thin to 1 1/2-inch stringers and layers of dark to medium brownish-gray mudstone in upper part (color and texture only very slightly different from surrounding oil shale). Sample of dense dark brownish-gray mudstone band from 499.6 feet: X-ray--quartz, analcime, dolomite, feldspar, pyrite, illite.
502.3	503.7	Oil shale: Medium to dark grayish brown, dolomitic. Fairly distinct to faint laminae; some fine to thin loop structures and displacements. Regular thick to some medium parting; conchoidal to irregular fracture. Thin brownish-gray mudstone streaks with slightly shredded contacts at 502.5-502.6
503.7	505.0	Oil shale: Very dark brownish gray to black, dolomitic. Faint very fine regular laminae. Regular to some irregular thick parting; moderately to slightly conchoidal fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
505.0	507.2	Oil shale: Medium and some dark grayish brown to some tan and buff, dolomitic. Moderately distinct to very distinct laminae. Irregular to fairly regular thick parting; slightly conchoidal to some irregular fracture; natural fractures in upper 3 inches. A 1-inch light gray silty band at top. A 0.1-foot buff silty to very fine sandy-textured band at 505.2. Rare fine dense light brownish-gray crystalline streaks.
507.2	508.4	Oil shale: Dark brownish gray to black, medium grayish-brown zone at 507.4-507.6, dolomitic. Moderately distinct to faint laminae and some streaked bedding. Irregular to some regular thick and rare thin parting; slightly irregular and conchoidal fracture.
508.4	510.7	Oil shale: Buff and tan to dark brownish gray, dolomitic to calcareous. Distinct discontinuous to regular laminae; faintly streaked very dark zone at 510.0-510.15. Irregular to rare regular thick parting; slightly to moderately conchoidal fracture; broken core at 509.5-506.0. Sample of distinctly laminated oil shale from 510.3 feet: X-ray--dolomite, calcite, quartz, analcime, feldspar.
510.7	511.4	Missing?
511.4	512.4	Oil shale: Black to dark brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Regular thick parting; slightly irregular and conchoidal fracture; broken core with muddy vertical fractures in upper half.
512.4	514.6	Oil shale: Dark and some medium grayish brown, dolomitic. Moderately distinct to faint laminae. Regular to some irregular thick to medium parting; slightly irregular and conchoidal fracture; a vertical muddy fracture at 513.1-513.6 with bordering shale slightly bleached. A thin gray silty tuff layer at 513.8. A thin tight slightly brownish-gray layer at 514.5. Abundant <u>very</u> fine disseminated crystals and crystalline streaks from about 513.2 to 514.1 Sample of dark oil shale with <u>very</u> fine crystals from 513.9 feet: X-ray--dolomite, quartz, analcime, illite, feldspar, pyrite.
514.6	515.6	Oil shale: Very dark grayish brown to black, dolomitic. Faint very fine laminae. Regular thick parting; fairly regular fracture.
515.6	518.6	Oil shale: Dark to medium brownish gray, dolomitic. Faintly laminated. Regular to some irregular thick to rare thin parting; slightly to moderately conchoidal fracture. Tight slightly brownish-gray mudstone with some fine oil-shale streaks at 515.7-516.0, 516.2-516.3, and 517.2-517.4. A 3/4-inch gray-buff to buff silty tuff band at 518.4.
518.6	520.0	Oil shale: Dark grayish brown to some tan and rare buff, dolomitic. Distinct to some faint laminae, becoming discontinuous

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		in lower part. Irregular thick parting; regular to conchoidal fracture. Tan silty tuff band with some very fine black oil-shale laminae in upper 0.1 foot.
520.0	521.4	Oil shale: Medium to some light and dark grayish brown, dolomitic. Moderately distinct laminae; some fine loop structures and displacements; faint distorted streaked bedding in upper 3 inches. Irregular to regular thick parting; slightly conchoidal fracture. A vertical fracture with very fine drusy calcite crusts and tarry patches in lower 0.3 foot.
521.4	521.8	Oil shale: Dark brownish gray to black, dolomitic. Faint discontinuous laminae and streaked bedding. Irregular to slightly irregular thick parting; slightly irregular fracture. Abrupt change to leaner oil shale at top and bottom.
521.8	522.8	Oil shale: Medium to light and rare dark brownish gray, dolomitic. Faint to fairly distinct laminae. Irregular thick parting; conchoidal fracture. A very fine irregular vertical calcite-filled fracture in upper part.
522.8	523.8	Oil shale: Medium to some dark grayish brown, dolomitic. Faint to moderately distinct laminae. Slightly irregular thick parting; slightly conchoidal fracture.
523.8	524.5	Missing?
524.5	525.5	Oil shale: Medium to dark grayish brown; dark brownish gray to black at 524.70-524.85. Faint to distinct laminae. Regular to irregular thick to medium parting; slightly conchoidal fracture; crumbly light brownish-gray mudstone and siltstone rubble at top.
525.5	527.2	Oil shale: Medium to some dark and rare light grayish brown; dolomitic to slightly calcareous. Distinct to some faint laminae; abundant fine displacements and loop structures in lower part. Fairly regular to irregular thick parting; slightly conchoidal to some irregular fracture.
527.2	531.4	Oil shale: Medium to some light and dark grayish brown, dolomitic. Fairly distinct to faint laminae and some streaked bedding; rare fine loop structures and displacements. Irregular thick parting; conchoidal to irregular fracture. Rare short tight natural vertical fractures. Faintly streaked dark brownish-gray to black oil shale at 528.95-529.10.
531.4	535.0	Oil shale: Dark brownish gray, some black in lower part, dolomitic. Faint streaked bedding and some very fine discontinuous laminae. Irregular to some slightly irregular thick parting; slightly conchoidal to irregular fracture. Some fine to small dense silty grayish-brown lenses, streaks, and blebs.
535.0	537.9	Oil shale: Dark to medium grayish brown, dolomitic. Faint to fairly distinct laminae. Irregular thick parting; slightly irregular and conchoidal fracture.
537.9	539.2	Oil shale: Dark brownish gray to black, dolomitic. Very faint streaked bedding. Irregular to slightly irregular thick parting;

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		slightly irregular and conchoidal fracture.
539.2	541.5	Oil shale: Very dark to medium grayish brown, dolomitic. Faint to moderately distinct discontinuous to regular laminae. Irregular to rare regular thick parting; slightly irregular and conchoidal fracture. Dense slightly brownish-gray mudstone interfingered with oil shale at 539.5-539.8.
541.5	543.5	Oil shale: Medium and dark to some light grayish brown; dolomitic to calcareous. Faint to moderately distinct laminae; abundant fine loop structures and displacements. Irregular to rare regular thick parting; conchoidal fracture.
543.5	543.8	Missing?
543.8	545.3	Oil shale: Buff and tan to medium and some dark grayish brown; slightly calcareous to dolomitic. Faint to distinct laminae; abundant fine displacements and loop structures. Irregular thick parting; conchoidal to slightly irregular fracture. Rare fine buff cherty laminae and streaks. A very thin pinch-and-swell buff silty tuff at 544.9.
545.3	548.8	Oil shale: Medium to some dark grayish brown and some buff; dolomitic to slightly calcareous. Faint to distinct laminae; rare fine loop structures and displacements; discontinuous laminae and streaked bedding near top. Irregular to slightly irregular thick parting; slightly conchoidal to some irregular fracture. Some very fine vertical calcite- and bitumen-filled fractures in middle part.
548.8	553.7	Oil shale and marlstone: Buff to medium and rare dark grayish brown, dolomitic. Faint to some distinct laminae. Irregular to some regular thick to medium parting; irregular to slightly conchoidal fracture; some high-angle fractures with brown to black bitumen coatings; some broken core. ( Sample of buff marlstone from 552.7 feet: X-ray--dolomite, quartz, analcime, feldspar, illite.
553.7	554.0	Missing
554.0	555.3	Oil shale: Medium to some dark grayish brown, dolomitic. Faint very fine laminae and streaked bedding. Irregular thick to medium parting; irregular to slightly conchoidal fracture; some broken core with irregular vertical fractures. A 3/4-inch tan to brown silty tuff band at 554.9.
555.3	555.5	Missing?
555.5	556.4	Oil shale: Medium to dark grayish brown, dolomitic. Faint to some moderately distinct laminae. Fairly regular to irregular thick parting; slightly conchoidal fracture.
556.4	557.9	Oil shale: Medium and rare dark brownish to slightly olive gray, slightly silty, dolomitic. Faint laminae and streaked bedding. Fairly regular to irregular thick parting; irregular to conchoidal fracture; a vertical fracture with bitumen coatings in

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		upper 0.3 foot. A very thin pinched out gray silty tuff lamina at 556.95; few fine buff silty tuff streaks in lower part.
557.90	558.25	Tuff: Buff to gray buff; silty to fine sandy textured. Very faint irregular broken banding. Sharp fairly regular contacts at top and bottom. <p>[ Sample of gray-buff sandy tuff from 558.1 feet: X-ray--analcime, K-feldspar, dolomite, quartz, smectite, pyrite, Mg-siderite.</p>
558.2	559.3	Oil shale: Medium slightly olive gray to medium and some dark brownish gray, dolomitic. Faint laminae and some very faint streaked bedding. Irregular to fairly regular thick parting; irregular to slightly conchoidal fracture; vertical fracture with calcite and bitumen coating from top to 559.1. <p>[ Sample of medium to dark brownish-gray oil shale from 559.2 feet: X-ray--dolomite, analcime, quartz, feldspar, pyrite.</p>
559.3	560.7	Oil shale: Medium to some dark brownish gray, dolomitic. Faint to moderately distinct laminae; abundant fine loop structures and displacements. Fairly regular to some irregular thick to some medium parting; slightly conchoidal to irregular fracture.
560.7	562.0	Oil shale: Medium to very dark grayish brown and some black, dolomitic. Faint to some distinct laminae; blebby laminae from 561.2 to 561.6. Regular to rare irregular thick to some medium and rare thin parting; slightly irregular to regular and rare hackly fracture. A very thin gray-buff silty tuff streak at 561.2. Abundant very fine pyrite on parting surfaces at 561.8. <p>[ Sample of grayish-brown and black blebby oil shale from 561.4 feet: X-ray--dolomite, quartz, feldspar, analcime, illite.</p> <p>[ Sample of brownish-black oil shale from 561.7 feet: X-ray--dolomite, quartz, illite, analcime, feldspar, pyrite.</p>
562.0	564.0	Oil shale: Medium to very dark brownish gray in upper part with light brownish-gray to buff laminae gradually becoming abundant in lower part, dolomitic. Moderately distinct to very distinct laminae; some fine loop structures and displacements. Fairly regular to irregular thick parting; fairly regular to some conchoidal and irregular fracture; some zones with abundant very fine short bitumen-filled high-angle fractures. A very thin buff tuff lamina at 562.9. Rare fine gray pyritic streaks in lower part. <p>[ Sample of distinctly laminated oil shale from 563.3 feet: X-ray--dolomite, K-feldspar, pyrite, quartz.</p>
564.0	566.0	Oil shale: Buff to medium and some dark grayish brown, dolomitic. Distinctly laminated; abundant fine displacements. Fairly regular thick parting; slightly irregular and conchoidal fracture; one or more high-angle fracture with patchy bitumen and rare

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		calcite coatings throughout interval. A 1/2-inch buff-white silty biotitic tuff band at 565.85.
566.0	567.2	Oil shale: Medium to dark and some light brownish gray, dolomitic. Distinct laminae; some fine to thin loop structures and displacements. Fairly regular to rare irregular thick parting; slightly conchoidal and irregular fracture; some short tight vertical fractures with chalky coatings.
567.2	568.2	Oil shale: Dark brownish gray to some black, dolomitic. Faint very fine laminae and streaked bedding; blebby below 567.9. Irregular to some regular thick to rare thin parting; irregular to slightly irregular fracture; short vertical fracture with slight mineral coatings and bitumen stains at 567.5-567.6. A thin gray-white fairly coarse blebby-textured tuff band at 567.8.
568.2	570.3	Oil shale: Medium and dark grayish brown to some tan and rare buff, dolomitic. Distinct to some faint laminae; rare fine displacements and loop structures. Regular to irregular thick parting; slightly irregular and conchoidal fracture. Some very fine discontinuous calcite-filled fractures. A fine buff tuff streak at 568.8.
570.3	573.0	Marlstone and mudstone: Buff and tan to some medium and rare dark grayish brown, dolomitic to slightly calcareous. Faint to some fairly distinct laminae. Irregular to regular thick to some medium parting; conchoidal to irregular fracture. Some vertical fractures with patchy bitumen coatings and very fine drusy crusts. A thin light gray silty to blebby tuff lamina at 571.7. Sample of buff mudstone from 570.7 feet: X-ray--dolomite, quartz, analcime, feldspar, illite.
573.0	574.3	Oil shale: Buff and tan to medium and some very dark grayish brown, dolomitic. Distinct to some faint laminae; some fine loop structures in lower part. Regular to irregular thick parting; irregular and conchoidal to fairly regular fracture; some natural fractures in upper part.
574.3	575.3	Oil shale: Medium to very dark grayish brown, dolomitic. Fairly distinct to faint laminae; some fine loop structures and displacements. Irregular to regular thick parting; slightly irregular and conchoidal fracture; few very short tight natural vertical fractures. Sharp wavy contact with tuff below.
575.3	576.4	Tuff: White to buff-white; silty to fine blebby textured; earthy to chalky, massive. Fractured and broken core pieces. Sharp slightly wavy contact with oil shale below. Sample of white tuff from 576.3 feet: X-ray--quartz, analcime, Na-feldspar, pyrite, dolomite.
576.4	578.0	Oil shale: Dark and some medium grayish brown to black, dolomitic. Faint very fine laminae. Regular thick to medium parting; fairly regular fracture. Some very fine dense brown dolomite laminae in middle part.

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LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
578.0	580.0	Oil shale: Medium to dark grayish brown and brownish gray, rare tan to buff in lower part. Distinct to faint laminae; some fine to thin loop structures and displacements. Irregular thick parting; irregular to slightly conchoidal fracture. Rare fine tan dolomite lenses.
580.0	586.0	Oil shale: Dark grayish brown to tan and buff; dolomitic to slightly calcareous. Distinct to some faint laminae; some fine loop structures and displacements. Slightly irregular to irregular thick parting; slightly to moderately conchoidal and irregular fracture; common high-angle fractures with bitumen and calcite coatings; uneven sample split. Faintly mottled and streaked white to buff silty tuff band at 579.1-579.2.
586.0	588.0	Oil shale: Medium to dark and some light grayish brown, dolomitic. Distinct to some faint laminae; some small displacements. Irregular thick parting; irregular and conchoidal fracture. Mostly irregular core pieces with vertical fractures with patchy bitumen coatings; uneven sample split.
588.0	590.0	Oil shale: Medium-dark brownish gray, dolomitic. Faint to moderately distinct laminae; abundant fine loop structures and displacements; 2-inch contorted zone at top. Irregular thick parting; conchoidal to irregular fracture.
		{ Sample of brownish-gray oil shale from 589.0 feet: X-ray--dolomite, feldspar, analcime, quartz.
590.0	592.0	Oil shale: Medium and rare dark brownish gray to light brownish gray and rare buff, dolomitic. Fairly distinct to some faint laminae; abundant fine displacements and loop structures. Irregular thick parting; conchoidal to irregular fracture; some broken core with natural high-angle fractures.
592.0	598.0	Oil shale and marlstone: Buff and tan to some medium and rare dark grayish brown, dolomitic. Distinct to faint laminae; abundant very fine loop structures and displacements. Irregular thick parting; conchoidal to irregular fracture; common high-angle natural fractures; some broken core. A light gray to white silty tuff band at 593.3-593.4. A very thin irregular gray pyritic lamina at 594.9.
		{ Sample of white tuff from 593.4 feet: X-ray--Na-feldspar, pyrite, analcime.
		{ Sample of buff marlstone from 597.2 feet: X-ray--dolomite, feldspar, quartz, analcime.
598.0	604.0	Marlstone and oil shale: Buff and gray buff to some medium and rare dark brownish gray and grayish brown, commonly silty, dolomitic. Faint to some distinct laminae. Irregular to some regular thick parting; irregular to conchoidal fracture. Some fractured, very broken and mixed up core; uneven sample split.
		{ Sample of gray-buff silty marlstone from 602.6 feet: X-ray--dolomite, K-feldspar, quartz, Na-feldspar, Mg-siderite, pyrite.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
604.0	608.0	Mudstone and siltstone: Gray buff to light slightly olive and brownish gray; dolomitic to slightly calcareous. Very faint laminae and rare bands. Irregular to some regular thick to some thin parting; slightly conchoidal to irregular fracture. Some fractured core and rubble in lower part (includes few small pieces of porous breccia). Some fine to moderately coarse pyrite crystals on high-angle fractures. Some marlstone and oil shale as above in lower part.
608.0	610.3	Mudstone and silty marlstone: Gray buff to some buff and rare light to medium slightly brownish gray, slightly calcareous to dolomitic. Faintly laminated. Regular to very irregular thick to medium parting; irregular to slightly conchoidal fracture. Rare very small irregular cavities with pyrite. A 1-inch light gray tuff band at 609.9.
610.3	616.0	Mudstone: Gray buff to light and rare medium brownish gray, dolomitic. Faint slightly crinkly and disrupted to fairly regular very fine laminae. Irregular to fairly regular thick to some medium parting; irregular fracture. Some fairly tight irregular discontinuous natural high-angle fractures in lower part. Some fine-grained pyritic streaks.
616.0	617.8	Mudstone: As above. Abundant fine buff earthy blebs in some zones.
617.8	619.3	Oil shale (mudstone): Light to medium and rare dark brownish gray, dolomitic. Faint to moderately distinct very fine regular laminae. Regular to some irregular thick parting; conchoidal fracture. Abundant very fine buff-white pyritic blebs and streaks. <div style="margin-left: 2em;">Sample of oil shale with abundant fine buff-white blebs and streaks from 618.4 feet: X-ray--dolomite, feldspar, quartz, pyrite.</div>
619.3	620.8	Marlstone: Light to some medium brownish gray, dolomitic. Faint to moderately distinct very fine regular laminae. Regular to irregular thick to medium parting; slightly irregular and conchoidal fracture. Abundant very fine pyrite (and pyrrhotite?) flecks. Small boxwork cavities with drusy calcite and some pyrite near top.
620.8	622.3	Marlstone: Light brownish gray to light gray and gray buff, slightly silty, dolomitic. Faint to moderately distinct very fine regular laminae. Irregular to regular thick parting; slightly conchoidal to irregular fracture. Rare very fine short high-angle fractures with spotty pyrite fillings. Rare fine to very small pyrite-lined cavities. Abundant very fine pyrrhotite (?) flecks in some zones.
622.3	625.0	Marlstone: Like 619.3-622.3. Irregular fractured core pieces. Some fine irregular high-angle calcite-filled to open fractures. Some contorted and displaced bedding. Uneven sample split.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
625.0	627.4	Marlstone: Light to medium brownish gray and some grayish brown, dolomitic. Moderately distinct to faint laminae. Irregular to regular thick parting; irregular fracture; uneven sample split. Abundant fine high-angle calcite-filled fractures. A 3-inch breccia mass of coarse marlstone fragments in brown earthy porous matrix at about 626.1-626.4. A small drusy cavity at bottom. Rare thin zones with abundant very fine dark brownish-gray crystalline specks.
627.4	629.6	Marlstone: Light to some medium slightly brownish gray, silty in parts, dolomitic. Faint very fine laminae and streaked bedding. Irregular to slightly irregular thick parting; irregular and conchoidal fracture. Some fine high-angle calcite-filled fractures. Rare fine cavities.
629.6	630.3	Missing
630.3	631.8	Oil shale: Light to medium and rare dark brownish gray and grayish brown, dolomitic. Faint to moderately distinct laminae; a small angular z-shaped fold at 630.6-630.7 lying on flat laminae below and quickly leveling out above. Some very fine high-angle calcite-filled fractures in upper part.
631.8	632.8	Oil shale: Medium and rare light to some dark grayish brown, dolomitic. Faint to moderately distinct laminae; rare fine displacements and loop structures. Fairly regular to irregular thick parting; slightly conchoidal to irregular fracture. Some very short tight high-angle fractures with white coatings. A thin slightly pinch-and-swell light brownish-gray silty tuff lamina at 632.65.
632.8	633.8	Oil shale: Brownish black to some brown and rare tan, some satiny luster, dolomitic. Faint to some fairly distinct very fine laminae; some brown and tan laminae are slightly blebby to lenticular. Regular to slightly irregular thick parting; slightly irregular and conchoidal fracture. Rare fine brownish-gray to tan tuff laminae.
633.8	638.4	<p>Sample of brownish-black to grayish-brown laminated oil shale from 633.3 feet: X-ray--dolomite, quartz, analcime, illite, feldspar, Mg-siderite.</p> <p>Oil shale: Dark grayish brown and brownish gray to buff, dolomitic. Very distinct to some faint laminae. Irregular to regular thick parting; slightly conchoidal to some irregular fracture. Fine tan tuff lenses at 633.9. Rare fine pyritic streaks in upper part.</p>
638.4	640.5	Oil shale: Very dark to medium grayish brown, dolomitic. Faint to moderately distinct laminae. Irregular to regular thick parting; slightly conchoidal to some irregular fracture. A thin gray-buff silty tuff band at 638.55; rare fine brown to tan silty streaks elsewhere.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
640.5	641.7	Oil shale: Medium and dark to some light grayish brown; dolomitic to slightly calcareous. Fairly distinct to some faint laminae. Irregular thick parting; slightly conchoidal fracture. A 2-inch slightly pinched buff silty to very fine sandy-textured tuff band at 641.2 (broken core). Sample of buff tuff from 641.2 feet: X-ray--analcime, quartz, calcite, feldspar, smectite.
641.7	642.9	Oil shale: Medium and rare dark grayish brown to tan and buff, dolomitic. Distinct to rare faint laminae. Irregular to regular thick parting; slightly conchoidal fracture. A 0.1-foot buff silty tuff band at 642.0; a 1/2- x 2-inch brown sandy tuff lens in contact with lower surface of band with oil-shale laminae smoothly distorted around bottom of lens.
642.9	644.6	Oil shale: Dark brownish gray to buff; dolomitic to slightly calcareous. Distinctly laminated. Irregular to some regular thick parting; slightly conchoidal fracture. Rare fine gray streaks and specks. Sample of distinctly laminated oil shale from 644.1 feet: X-ray--dolomite, calcite, feldspar, quartz, aragonite.
644.6	645.0	Tuff: Buff to grayish brown; silty to very fine sandy textured. Indistinct swirly bedding. Sharp regular contacts at top and bottom. Irregular parting and fracture; uneven sample split. Some very fine disseminated pyrite.
645.0	647.2	Oil shale: Dark to light brownish gray and some buff, dolomitic. Distinctly laminated. Regular to rare irregular thick parting; regular to slightly irregular and conchoidal fracture. Thin gray silty pyritic tuff lens at 645.2; thin buff silty stringer at 645.5. Fairly abundant <u>very</u> fine gray pyritic streaks and specks in lower part.
647.2	649.0	Oil shale: Buff to some medium and rare dark grayish brown; dolomitic to moderately calcareous. Distinct to faint laminae. Regular to irregular thick parting; slightly conchoidal to irregular fracture. Some irregular high-angle fractures with patchy black bitumen and chalky white coatings. Uneven sample split.
649.0	651.2	Mudstone: Buff and gray buff, rare grayish-brown oil shale; slightly calcareous to dolomitic. Very faintly bedded to faint and rare distinct laminae. Irregular parting and fracture. Irregular vertical fractures throughout with patchy bitumen and some calcite coatings; uneven sample split.
651.2	653.0	Oil shale and some mudstone: Tan and some buff to medium grayish brown; slightly calcareous to dolomitic. Fairly distinct to faint laminae. Irregular thick parting; slightly conchoidal to irregular fracture. Some natural vertical fractures with dark gray to white mottled coatings through most of interval.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		A 1- x 2-inch boxwork vug filled with vitreous black bitumen at 651.4; few small <u>empty boxwork vugs</u> around 651.7; fine to coarse breccia with bitumen filling in lower half foot.
653.0	654.2	Oil shale: Tan and buff to grayish brown; slightly calcareous to dolomitic. Fairly distinct to faint laminae. Irregular to regular thick parting; regular to conchoidal fracture. Rare very fine short tight high-angle calcite-filled fractures.
654.2	656.5	Oil shale: Medium and rare dark grayish brown to tan and some buff, dolomitic. Distinct to some faint laminae. Regular to some irregular thick parting; conchoidal to regular fracture.
656.5	659.9	Oil shale and marlstone: Buff and tan to medium and rare dark grayish brown, dolomitic. Distinct to some faint laminae. Regular to irregular thick parting; slightly to moderately conchoidal fracture. One or two high-angle fractures with brown to brownish-black patchy coatings through most of interval. <span style="border-left: 1px solid black; padding-left: 10px;">Sample of buff marlstone from 659.6 feet: X-ray--dolomite, quartz, K-feldspar, analcime.</span>
659.9	661.0	Oil shale: Tan to dark grayish brown and some buff, dolomitic. Distinctly laminated. Regular to irregular thick parting; slightly conchoidal fracture. Few short vertical fractures with brown coatings in upper part.
661.0	662.0	Oil shale: Medium to dark and some light brownish gray, dolomitic. Moderately distinct to faint laminae. Irregular to regular thick parting; irregular to slightly conchoidal fracture. A thin brown dolomite lamina at 661.8 with a very thin lenticular buff silty tuff immediately below; a thin lenticular yellow-brown tuff at 661.9.
662.0	663.4	Oil shale: Tan and buff to medium and some dark grayish brown, dolomitic. Distinctly laminated. Regular to irregular thick to medium parting; conchoidal to irregular fracture. Mostly broken core with irregular high-angle fractures coated with brown to black bitumen; uneven sample split. Some very fine pyritic streaks. Some thin buff silty tuffaceous layers near top.
663.4	664.8	Oil shale: Tan and light gray to medium and rare dark brownish gray, slightly silty, dolomitic. Fairly distinct to faint laminae. Irregular to regular thick parting; fairly regular to conchoidal fracture. A regular high-angle fracture with brown coatings and very fine patchy gray pyritic crusts down to about 664.3.
664.8	665.9	Oil shale: Medium-dark to rare light slightly brownish gray to grayish brown, dolomitic. Faint to moderately distinct laminae. Regular to irregular thick to medium parting; conchoidal to regular fracture. <span style="border-left: 1px solid black; padding-left: 10px;">Sample of medium-dark slightly brownish-gray oil shale from 665.4 feet: X-ray--dolomite, quartz, analcime, feldspar, pyrite, illite.</span>

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
665.9	666.9	Oil shale: Tan and buff to medium and some dark grayish brown, dolomitic. Moderately to very distinct laminae. Regular to irregular thick parting; slightly conchoidal to some irregular fracture.
666.9	668.2	Oil shale: Buff and gray buff to medium and some dark grayish brown and brownish gray, dolomitic. Very distinct laminae. Irregular thick parting; conchoidal fracture. Some very short tight natural vertical fractures in lower part.
668.2	669.2	Oil shale: Tan and buff to some medium and rare dark grayish brown, dolomitic. Faint to rare distinct laminae. Regular to irregular thick parting; conchoidal fracture.
669.2	670.2	Oil shale: Tan to medium and rare dark grayish brown, dolomitic. Faint to fairly distinct laminae. Regular to irregular thick parting; irregular to slightly conchoidal fracture.
670.2	671.3	Oil shale: Medium to some dark brownish gray and grayish brown to some tan and buff, dolomitic. Faint to moderately distinct laminae and some streaked bedding. Irregular thick parting; slightly irregular and conchoidal fracture. Vertical fracture with brown coating from 670.6 to 670.9.
671.3	672.4	Oil shale: Medium to some dark grayish brown and some tan, dolomitic. Fairly distinct laminae. Regular thick parting; slightly irregular and conchoidal fracture. A thin dense gray band at 671.45.
672.4	673.3	Oil shale: Medium to dark and some light slightly brownish gray, dolomitic. Moderately distinct laminae. Irregular to regular thick parting; conchoidal to irregular fracture. A tight natural vertical fracture with slight buff earthy coating in upper part.
673.3	673.6	Tuff: Medium slightly brownish gray; very fine sandy textured. Massive; sharp regular contacts at top and bottom. Some irregular high-angle fractures with brownish-black varnish-like coatings. { Sample of gray tuff from 673.5 feet: X-ray--analcime, dolomite, Na-feldspar, quartz, pyrite.
673.6	674.4	Oil shale: Dark to medium grayish brown and rare black, dolomitic. Moderately distinct laminae. Regular to irregular thick parting; slightly irregular fracture.
674.4	679.0	Oil shale: Light brownish gray and some gray buff, commonly laminated with medium to dark brownish gray in most parts, dolomitic. Distinct to some faint laminae; contorted zone at 676.9-677.0. Regular to irregular thick parting; conchoidal to fairly regular fracture. Occasional short tight high-angle fractures with brown coatings. A 1/4-inch dark gray silty lamina at 677.4.
679.0	680.0	Oil shale: Medium and rare dark grayish brown to buff, dolomitic. Distinct very fine laminae; some fine loop structures and displacements. Irregular to regular thick parting; slightly conchoidal fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
680.0	681.6	Oil shale: Very dark to some medium and light brownish gray; rare satiny luster in middle part; dolomitic. Faint to distinct laminae and some streaked bedding; rare fine to thin loop structures and displacements. Fairly regular to irregular thick parting; slightly conchoidal to some irregular fracture. Rare thin to fine gray to brown blebby tuff lenses, streaks, and stringers; a 1/4- to 1 1/4-inch buff sandy tuff at 680.6. { Sample of buff sandy tuff from 680.6 feet: X-ray--analcime, quartz, feldspar. { Sample of very dark brownish-gray oil shale from 681.0 feet: X-ray--dolomite, calcite, quartz, analcime, feldspar, illite, smectite.
681.6	682.8	Oil shale: Dark grayish brown to buff, dolomitic. Distinct to rare faint laminae; some fine displacements and loop structures. Irregular to regular thick parting; slightly conchoidal and irregular fracture. A 1/4-inch dark gray dense silty lenticular layer with buff rind at 682.45. { Sample of very thin dark gray layer from 682.45 feet: X-ray--pyrite, ralstonite, feldspar, analcime, quartz.
682.8	684.9	Oil shale: Buff to dark brownish gray, dolomitic. Distinctly laminated; some fine loop structures and displacements. Regular to irregular thick parting; slightly conchoidal to some irregular fracture.
684.9	685.9	Oil shale: Very dark to some medium grayish brown, dolomitic. Faint very fine laminae and some streaked bedding. Irregular to regular thick to medium parting; slightly conchoidal to some irregular fracture. Rare fine dark dense lenses.
685.9	686.9	Oil shale: Dark to medium grayish brown, dolomitic. Faint very fine laminae. Regular to irregular thick parting; slightly irregular and conchoidal fracture. Rare fine to 3/4-inch grayish-brown tuff lenses in lower part; a thin irregular dark brownish-gray silty to very fine sandy-textured tuff stringer at 686.5.
686.9	694.9	Oil shale: Tan-buff to rare medium and dark grayish brown, dolomitic. Faint to rare distinct laminae. Regular to irregular thick parting; regular to conchoidal fracture. Vertical fractures with brown to black varnish-like coatings in upper 0.4 foot; irregular broken core pieces at 693.5-694.0. Rare fine gray pyritic streaks. (693.2-693.5 missing?)
694.9	695.3	Oil shale: Black to some medium brownish gray, dolomitic. Faint very fine regular to discontinuous laminae. Regular thick parting; slightly irregular fracture.
695.3	696.0	Oil shale: Tan to medium and some dark grayish brown, dolomitic. Distinctly laminated. Regular to irregular thick parting; conchoidal to regular fracture. A thin irregular lenticular gray dense to blebby tuff at 695.65.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
696.0	697.2	Oil shale: Dark grayish brown and rare black with fine blebby tan to buff laminae becoming abundant in lower part. Faint to distinct laminae. Regular thick to thin parting; fairly regular to irregular and some slightly hackly fracture.
697.2	697.4	Marlstone and oil shale: Tan blebby marlstone very finely laced and laminated with black oil shale.. Sample of marlstone and oil shale from 697.3 feet: X-ray--dolomite, quartz, feldspar.
697.4	697.7	Oil shale: Buff to medium and rare dark brownish gray, dolomitic. Faint to moderately distinct laminae; small low-angle displacement at 697.5. Regular thick to medium parting; slightly conchoidal fracture. A fine gray dense and slightly silty lamina at 697.6.
697.7	700.6	Oil shale: Medium to some dark brownish gray and grayish brown, dolomitic. Faintly laminated. Regular to irregular thick parting; irregular to slightly conchoidal fracture. Very rare fine gray silty pyritic streaks and laminae.
700.6	702.6	Oil shale: Medium to very dark grayish brown, dolomitic. Faintly laminated; rare fine to thin loop structures. Irregular to regular thick to rare thin parting; irregular to fairly regular fracture.
702.6	704.3	Oil shale: Medium to rare dark and light brownish gray, dolomitic. Faint to some moderately distinct laminae; rare small displacements and thin very distorted zones. Irregular to rare regular thick parting; irregular to slightly conchoidal fracture; rubble with irregular medium to thin parting at 703.4-703.7.
704.3	706.2	Oil shale: Buff to light and some medium brownish gray, dolomitic. Faint to moderately distinct laminae. Irregular to regular thick parting; irregular and conchoidal to fairly regular fracture. Vertical fracture with very fine patchy mineral crusts at 705.3-705.6.
706.2	707.5	Oil shale: Light to medium and rare dark brownish gray, dolomitic. Faint to moderately distinct laminae. Fairly regular to irregular thick parting; slightly conchoidal and irregular fracture.
707.5	708.9	Oil shale: Light to some dark grayish brown and rare black, dolomitic. Faint to moderately distinct laminae; some discontinuous laminae and streaked bedding in dark zones. Regular to irregular thick to rare medium and thin parting; slightly conchoidal fracture. A thin brown silty tuff lens at 708.3; a very thin pinched out gray silty tuff layer at 708.8.
708.9	710.3	Oil shale: Very dark to medium brownish gray, dolomitic. Faint to moderately distinct very fine laminae (commonly slightly blebby). Regular thin to thick parting; fairly regular fracture.
710.3	711.0	Oil shale: Medium and rare dark to some light grayish brown, dolomitic. Faint to some moderately distinct laminae. Regular to irregular thick parting; irregular fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
723.0	723.4	Oil shale: Medium to some dark and light brownish gray, dolomitic. Moderately distinct to faint laminae; some very fine loop structures. Irregular to regular medium to thick parting; irregular fracture. Thin zone of fine brown dolomite (?) streaks and lenses at bottom.
723.4	724.5	Oil shale: Dark and rare medium brownish gray to black; rare satiny luster. Faint very fine laminae and streaked bedding; blebby in lower part. Irregular to regular thick to thin parting; irregular to regular and rare hackly fracture. Sharp slightly wavy and very finely interfingered contact with mudstone below.
724.5	724.7	Mudstone: Gray, dense, siliceous, massive. Sharp regular contact at bottom. Conchoidal fracture.
724.7	727.5	Oil shale: Light to dark brownish gray, dolomitic. Faint to distinct laminae; some fine loop structures and displacements. Regular to irregular thick to medium parting; slightly conchoidal to irregular fracture; broken core at 724.9-725.7.
727.5	735.3	Oil shale and marlstone: Buff to medium and rare dark brownish gray in upper part becoming mostly buff and light brownish gray in middle and lower parts, dolomitic. Distinct to faint very fine laminae; abundant very fine displacements and loop structures. Irregular to fairly regular thick parting; irregular to slightly conchoidal fracture. (733.3-733.8 missing)
735.3	736.3	Oil shale: Light to medium and rare dark grayish brown and brownish gray, dolomitic. Distinct to faint very fine laminae; abundant very fine loop structures and displacements. Irregular to regular thick parting; conchoidal to irregular fracture.
736.3	737.8	Marlstone: Light gray (slight brown to olive tint), slightly silty, dolomitic. Faint very fine laminae; abundant very fine displacements. Irregular to regular thick parting; irregular to conchoidal fracture. <div style="margin-left: 2em;">Sample of light gray slightly silty marlstone from 737.1 feet: X-ray--dolomite, quartz, analcime, feldspar, Mg-siderite, illite.</div>
737.8	738.9	Oil shale: Light to medium slightly brownish gray; some dark brownish gray to black in upper part, dolomitic. Faintly laminated; some distinct dark streaks and bands in upper part. Irregular thick parting; irregular to slightly conchoidal fracture.
738.9	741.2	Oil shale: Medium to dark brownish to slightly olive gray; rare black in lower part, dolomitic. Faint to some fairly distinct slightly nonparallel streaked bedding and discontinuous laminae. Irregular to regular thick to rare medium and thin parting; irregular to slightly conchoidal fracture. A thin dolomite lens with truncated internal bedding at 739.2; a thin blebby dolomite streak at 740.15.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
711.0	712.0	Marlstone: Light to some medium and very rare dark brownish to almost neutral gray, dolomitic. Faintly laminated; indistinct contorted and disrupted bedding in lower 0.3 foot. Fairly regular to some irregular thick parting; regular to irregular fracture.
712.0	713.5	Oil shale: Medium to some dark and light brownish gray, dolomitic. Faintly streaked to laminated. Irregular thick to medium parting; slightly conchoidal to irregular fracture; fractured and broken core in lower half foot.
713.5	714.0	Missing
714.0	715.4	Marlstone: Light and some medium brownish gray to buff and gray buff, dolomitic. Faint laminae and some streaked bedding. Regular to irregular thick to some thin parting; conchoidal to irregular fracture. A vertical fracture with muddy coatings and some very fine pyrite crystals throughout interval; uneven sample split.
715.4	716.5	Oil shale: Medium to some light and dark brownish gray and olive gray, dolomitic. Faintly laminated; some discontinuous laminae. Irregular thick parting; slightly conchoidal fracture.
716.5	717.6	Oil shale: Medium to light and rare dark brownish gray, dolomitic. Moderately distinct to faint laminae; an intricately displaced horizontal fold at 717.0-717.3. Irregular thick parting; irregular fracture. A 0.1-foot dense siliceous gray-buff layer with very wavy contacts at 716.8. Some broken core; uneven sample split. A fine vitreous black organic streak at 716.7. <span style="margin-left: 2em;">{ Sample of gray-buff siliceous layer from 716.8 feet: X-ray-- Mg-siderite, analcime, quartz, feldspar.</span>
717.6	719.6	Oil shale: Black to dark and rare medium brownish gray; some satiny luster in upper part, dolomitic. Faint very fine laminae. Irregular to regular thick to some medium and thin parting; slightly irregular and conchoidal and rare coarse hackly fracture. A very thin buff silty tuff lamina at 717.9.
719.6	720.3	Oil shale: Medium brownish gray, dolomitic. Faint very fine discontinuous laminae. Irregular to regular thick to medium parting; irregular fracture.
720.3	720.5	Missing
720.5	723.5	Oil shale: Medium to light brownish gray and some buff; rare dark brownish gray in upper part, dolomitic. Faint to moderately distinct laminae and rare streaked bedding; abundant fine to thin loop structures in some parts. Irregular to regular thick parting; irregular to fairly regular fracture. Some high-angle fractures with very fine drusy calcite and pyrite crusts in upper part.
Footage adjustment: 723.5 = 723.0.		

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
741.2	742.2	Oil shale: Dark to rare medium brownish gray and some black, dolomitic. Faint very fine regular laminae and streaked bedding, slightly blebby). Regular thick to some thin parting; fairly regular and rare hackly fracture. Sample of dark brownish-gray oil shale from 741.4 feet: X-ray--dolomite, quartz, analcime, feldspar, illite.
742.2	743.2	Oil shale: Dark to some medium brownish gray and rare black, dolomitic. Faint to some moderately distinct very fine laminae; rare fine to thin loop structures. Regular to some irregular thick to medium parting; fairly regular to irregular fracture. A thin dense gray dolomite (?) lamina at 742.3; some fine streaks at 742.6.
743.2	744.7	Oil shale: Dark to medium and rare light brownish gray, dolomitic. Faint to distinct slightly irregular laminae; small horizontal fold at 743.9-744.0. Fairly regular to irregular thick to medium parting; irregular fracture. Natural (?) vertical fracture below 744.0; uneven sample split.
744.7	747.0	Mudstone (including some lean oil shale): Medium to light slightly brownish gray; rare medium grayish brown, dolomitic. Faint to some moderately distinct slightly irregular very fine to rare thin laminae. Irregular to regular thick to rare medium and thin parting; irregular to slightly conchoidal fracture. Gradational contact with oil shale above; sharp fairly regular contact with oil shale below.
747.0	749.1	Oil shale: Dark to some medium brownish gray, dolomitic. Faint streaked bedding and some discontinuous disrupted laminae. Irregular to slightly irregular thick parting; irregular to slightly irregular fracture.
749.1	750.1	Oil shale: Dark brownish gray to black, dolomitic. Faint <u>very</u> fine regular laminae and streaked bedding. Regular thick to medium parting; regular fracture.
750.1	750.35	Tuff: Medium-light brownish gray; silty to very fine sandy textured. Faintly variegated and mottled. Cut by irregular tar-coated vertical fractures. Regular upper contact; wavy lower contact. Sample of tuff from 750.2 feet: X-ray--quartz, Na-feldspar, analcime, Mg-siderite.
750.35	751.2	Oil shale: Like 749.1-750.1. Broken core with artificial (?) vertical fractures throughout; uneven sample split.
751.2	752.2	Oil shale: Dark to medium brownish gray. Faintly laminated. Broken core with artificial (?) vertical fractures throughout most of interval; uneven sample split. Diagonal fracture covered with very fine pyrite crystals at 751.9-752.0. Abrupt conformable change to marlstone below.
752.2	754.0	Marlstone: Medium-light brownish gray to buff, dolomitic, slightly silty. Moderately distinct to faint laminae; some

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		fine to small diagonal displacements. Irregular thick parting; slightly conchoidal to irregular fracture. A 3/16- x 5/8-inch oval leaf and other plant trash at 753.4. A 3/4-inch dense white siliceous stringer at 752.5; very thin streaks at 752.35.
754.0	755.0	Oil shale: Medium to light grayish brown to almost neutral gray, dolomitic. Faint very fine laminae and rare bands. Irregular to regular thin to thick parting; irregular and some coarse hackly fracture.
755.0	757.0	Marlstone: Medium to light slightly brownish gray, dolomitic. Very faint streaked bedding and very fine laminae; some nearly massive zones in upper part. Irregular to fairly regular thick parting and slightly conchoidal fracture in upper half; fairly regular thick to thin parting and slightly conchoidal to some hackly fracture in lower half. Sample of nearly massive dense gray marlstone from 755.6 feet: X-ray--quartz, dolomite, analcime, feldspar, pyrite, Mg-siderite, illite.
757.0	758.7	Oil shale and marlstone: Like 754.0-757.0. Some unconformable, displaced, and disrupted bedding at 757.4-757.7. Abrupt conformable change to dark oil shale at bottom.
758.7	759.7	Oil shale: Very dark grayish brown, dolomitic. Faint slightly irregular streaked bedding and some discontinuous laminae; very fine regular laminae near top. Irregular to slightly irregular thick parting; irregular to slightly irregular fracture. Some fine to 3/4-inch medium to dark grayish-brown dense blebby dolomite (?) streaks, lenses, and nodules.
759.7	760.4	Oil shale: Medium-dark grayish brown, dolomitic. Faint streaked bedding; some very dark oil-shale streaks near top and bottom. Irregular thick parting; irregular and conchoidal fracture; hard and dense. Sample of hard dense grayish-brown oil shale from 760.0 feet: X-ray--dolomite, quartz, analcime, feldspar, Mg-siderite, illite.
760.4	761.4	Oil shale: Black to dark grayish brown, dolomitic. Faint slightly irregular to disrupted streaked bedding. Irregular to slightly irregular thick parting; slightly irregular fracture. Few hard dense lenses and streaks as above. Sample of very dark streaked oil shale from 760.8 feet: X-ray--dolomite, quartz, analcime, Mg-siderite, feldspar, illite.
761.4	761.9	Oil shale: Medium grayish brown with fairly abundant very dark streaks, dolomitic. Distinct to faint disrupted and displaced to wavy streaked bedding. Irregular thick parting; slightly conchoidal fracture; hard and dense. Disrupted contacts at top and bottom.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
761.9	763.3	Oil shale: Very dark to rare medium grayish brown, dolomitic. Faint slightly irregular to some disrupted and displaced streaked bedding and discontinuous laminae. Irregular thick parting; slightly irregular to irregular fracture. Rare small dark to light gray dense fine-grained crystalline lenses and streaks.
763.3	763.5	Missing?
763.5	765.0	Oil shale: Black to very dark brownish gray, dolomitic. Faint streaked bedding to very fine regular laminae. Irregular to some regular thick to medium parting; slightly conchoidal to irregular fracture. <div style="margin-left: 2em;">Sample of very dark laminated oil shale from 764.8 feet: X-ray--analcime, quartz, dolomite, Mg-siderite, feldspar, illite.</div>
765.0	766.3	Oil shale: Medium and some dark to light brownish gray and rare buff, dolomitic. Distinct to faint regular to discontinuous laminae. Irregular thick parting; irregular to slightly conchoidal fracture. Rare fine dark gray pyritic streaks and short vermiform stringers.
766.3	767.5	Mudstone and marlstone: Buff and gray buff to some light brownish gray, dolomitic. Very faint streaked bedding and some faint very fine regular laminae. Slightly irregular thick to rare medium and thin parting; irregular to fairly regular fracture. Few very fine discontinuous calcite-filled vertical fractures.
767.5	769.3	Oil shale: Buff to medium and rare dark grayish brown, dolomitic. Fairly distinct regular laminae; rare fine displacements and loop structures. Regular to some irregular thick to medium and some thin parting; slightly conchoidal and rare coarse hackly fracture.
769.3	770.3	Mudstone: Gray buff and rare light brownish gray, dolomitic. Very faint very fine laminae and streaked bedding. Regular to irregular thick parting; slightly irregular and conchoidal fracture. A thin broken and displaced gray-white silty tuff lamina at 769.7.
770.3	771.6	Oil shale: Tan and buff to medium grayish brown, dolomitic. Moderately distinct to faint laminae; rare fine displacements. Regular thick to medium and rare thin parting; slightly conchoidal fracture. Faintly streaked light slightly brownish-gray mudstone at 771.3-771.55. <div style="margin-left: 2em;">Sample of tan to grayish-brown oil shale from 770.8 feet: X-ray--dolomite, quartz, analcime, feldspar, illite.</div>
771.6	772.9	Oil shale: Medium to dark grayish brown and some brownish gray; some tan in upper 0.3 foot, dolomitic. Faint streaked bedding and very fine laminae; fairly distinct laminae in upper 0.3 foot. Regular to irregular thick to rare medium and thin parting; slightly conchoidal to irregular fracture. A very thin dark

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		gray silty-crystalline pyritic streak at 772.5; a fine dark gray pyritic lamina at 772.75.
772.9	773.9	Oil shale: Very dark brownish to almost neutral gray, dolomitic. Very faint <u>very</u> fine laminae. Regular thick to thin parting; slightly conchoidal fracture; slightly unctuous parting surfaces. Sample of dark slightly brownish-gray shale from 773.5 feet: X-ray--analcime, quartz, dolomite, Mg-siderite, feldspar, pyrite, illite.
773.9	775.0	Oil shale: Dark to some medium slightly brownish gray, dolomitic. Faint very fine laminae; rare fine displacements. Regular thick to rare thin parting; conchoidal fracture; slightly unctuous parting surfaces.
775.0	776.0	Oil shale: Medium and dark brownish gray, dolomitic. Faintly laminated; rare fine displacements and loop structures. Fairly regular thick parting; irregular to slightly conchoidal fracture.
776.0	779.5	Oil shale: Dark to light brownish gray, dolomitic. Moderately distinct to some faint laminae; abundant fine and rare small displacements. Regular to some irregular thick to rare thin parting; slightly irregular and conchoidal fracture. A very fine vitreous black organic seam at 779.3.
779.5	780.0	Missing
780.0	785.0	Mudstone and siltstone: Gray buff and light gray; some interbedded buff to light and rare medium brownish-gray marlstone: dolomitic to very slightly calcareous. Thin to thick bands interbedded with laminated zones. Regular to irregular thick parting; regular to slightly irregular and conchoidal fracture. Sample of gray-buff siltstone from 781.2 feet: X-ray--quartz, dolomite, analcime, feldspar, illite.
785.0	787.0	Mudstone: Light gray and light to some medium brownish gray, dolomitic. Very faint to some moderately distinct very fine laminae. Irregular to regular thick parting; slightly conchoidal to irregular fracture.
787.0	793.6	Oil shale: Light to medium and rare dark brownish gray, dolomitic. Fairly distinct to some faint laminae. Fairly regular to irregular thick parting; slightly conchoidal and some irregular fracture. Occasional fine to small dark gray pyritic blebs and lenses. Occasional thin to 3-inch gray-buff to light gray mudstone bands, commonly with fine gray pyritic streaks.
793.6	796.9	Oil shale: Buff to medium and rare dark brownish gray, dolomitic. Distinctly laminated; some fine loop structures and displacements. Slightly irregular to irregular thick parting; irregular to slightly conchoidal fracture. Few 1- to 3-inch gray-buff mudstone and siltstone bands.
796.9	797.9	Oil shale: Yellowish tan to medium and some dark brownish gray, dolomitic. Distinct to some faint laminae; some fine displacements

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		and loop structures. Irregular thick parting; slightly irregular and conchoidal fracture.
797.9	799.1	Siltstone and oil shale: Gray-buff siltstone with abundant fine dark oil-shale shreds at 797.9-798.1 and 798.5-799.1; faintly laminated dark to medium brownish-gray oil shale between. Irregular thick to medium parting; slightly irregular to irregular fracture.
799.1	799.7	Oil shale: Medium to very dark brownish (slightly olive?) gray, dolomitic. Faint very fine laminae and streaked bedding. Irregular thick parting; conchoidal fracture.
799.7	805.0	Mudstone: Buff and gray buff to rare light and medium brownish gray; dolomitic to very slightly calcareous. Faint very fine laminae and some very faint streaked bedding. Irregular thick parting; slightly to moderately conchoidal and some irregular fracture. Rare fine streaks composed of fine irregular platy bitumen blebs. Regular nearly vertical fracture with sparse pyrite at 803.0-803.9.
805.0	806.8	Oil shale: Medium to very dark brownish gray; light brownish-gray to buff zone at 805.2-805.3, dolomitic. Faint to distinct irregular and commonly discontinuous laminae and streaked bedding. Slightly irregular to irregular thick parting; slight irregular fracture. Some fine dark dense pyritic mineral blebs near top.
806.8	811.8	Oil shale: Medium brownish gray; some dark in upper and lower parts; some light brownish gray to buff at 810.0-810.4, dolomitic. Faint to some fairly distinct laminae; some fine displacements and rare loop structures. Irregular to regular thick parting; irregular to slightly conchoidal fracture. Abundant fine lacy dark gray pyritic mineral stringers at 808.4-808.5.
		Sample of oil shale with dark pyritic stringers from 808.5 feet: X-ray--analcime, pyrite, feldspar, quartz, dolomite.
811.8	816.5	Oil shale: Buff to medium and some dark brownish gray; dolomitic to very slightly calcareous; occasionally silty in lighter parts. Faint to distinct laminae; abundant fine loop structures and displacements in darker zones. Regular to irregular thick to rare thin parting; slightly conchoidal to irregular fracture.
816.5	817.5	Oil shale: Medium to some light and dark grayish brown, dolomitic. Moderately distinct very fine laminae; abundant very fine loop structures. Fairly regular thick to rare thin parting; irregular fracture.
817.5	820.0	Oil shale: Like 811.8-816.5. Fractured and broken core below 818.7.
820.0	822.5	Oil shale: As above and below. Irregular, fractured and broken core.
822.5	828.5	Oil shale: Buff to medium and some dark brownish gray; dolomitic to slightly calcareous. Distinct to some faint laminae; abundant

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		fine loop structures and displacements; contorted bedding at 827.4-827.5. Irregular thick parting; conchoidal to irregular fracture. (826.7-827.0 missing?)
828.5	833.1	Oil shale: Medium to dark brownish gray; occasional thin to 2-inch light brownish-gray to buff zones. Faint to some distinct discontinuous to regular laminae; some fine to thin loop structures. Irregular to some regular thick to rare thin parting; irregular to slightly irregular and conchoidal fracture. Few very small tan lenses at 830.5. A 1-inch buff-white silty and slightly earthy band at 831.3.
833.1	834.1	Oil shale: Black to dark and some medium grayish brown, dolomitic. Faint streaked bedding to faint and some moderately distinct laminae. Irregular to regular thick to rare thin parting; irregular to slightly conchoidal fracture. A very thin dark gray silty lamina at 834.0.
834.1	835.1	Oil shale: Dark brownish gray to rare black, dolomitic. Faint very fine laminae. Regular to irregular thick to medium parting; slightly irregular to irregular fracture.
835.1	840.2	Oil shale: Dark to medium brownish gray, dolomitic. Faint to some moderately distinct laminae; rare very fine loop structures. Regular to irregular thick to rare thin parting; irregular to slightly conchoidal and rare coarse hackly fracture. A very fine dense gray mineral lamina at 838.8.
		Sample of dark to medium brownish-gray oil shale from 839.5 feet: X-ray--analcime, quartz, dolomite, Mg-siderite, feldspar, illite, smectite.
840.2	841.3	Oil shale: Dark and some medium brownish gray to rare black, dolomitic. Faint regular to slightly wavy and discontinuous laminae; some thin loop structures. Regular to irregular thick to medium parting; coarse hackly to slightly conchoidal fracture. A 3/4-inch brownish-gray silty to blebby analcime (?) band at 840.8.
841.3	842.0	Missing?
842.0	845.0	Oil shale: Dark grayish brown to some black, dolomitic. Faint very fine laminae and some very faint streaked bedding. Regular to irregular thick to rare thin parting; slightly irregular and conchoidal fracture; broken core and some muddy crumbly rubble in upper half foot. A very thin dark brownish-gray lenticular mineral stringer at 843.3. A small dark grayish-brown oil-stained silty lens in broken core near top.
845.0	847.0	Oil shale: Black to dark and rare medium brownish gray, dolomitic. Faint streaked bedding and very fine laminae. Regular to irregular thick to some medium parting; irregular to slightly conchoidal fracture.
		Sample of black oil shale from 845.3 feet: X-ray--analcime, quartz, illite, Mg-siderite, dolomite, feldspar.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
847.0	850.5	Siltstone and marlstone: Gray buff; rare light to dark grayish-brown oil shale; very slightly calcareous to dolomitic. Faint slightly irregular to regular laminae and thin to very thick bands; rare fairly distinctly laminated oil-shale zones. Irregular to slightly irregular thick parting; slightly to moderately conchoidal and some irregular fracture. Rare fine dark gray silty and occasionally pyritic streaks and laminae.
850.5	852.6	Oil shale and mudstone: Medium and rare dark grayish brown to buff and gray buff; very slightly calcareous to dolomitic. Distinct to faint very fine discontinuous to regular laminae; abundant very fine loop structures and displacements. Irregular thick parting; irregular to conchoidal fracture. Some natural (??) high-angle fractures. Rare gray laminae and streaks.
852.6	853.6	Oil shale: Medium to light and rare dark brownish gray, dolomitic. Faint to rare moderately distinct laminae; rare fine displacements. Regular to irregular thick parting; slightly irregular and conchoidal fracture; a very fine tight dolomite-filled vertical fracture at 852.7-853.0. Fine dark gray pyritic streaks at 853.05.
853.6	857.0	Oil shale: Medium to dark brownish gray, dolomitic. Faint very fine laminae. Irregular to some regular thick to medium and rare thin parting; irregular to slightly conchoidal fracture. A 1/2-inch dense gray dolomitic mudstone band at 854.7. A fine dark gray silty-crystalline pyritic lamina at 856.2.
857.0	858.0	Oil shale: Light to medium brownish to almost neutral gray; becoming silty in lower part, dolomitic. Faint very fine to thin laminae. Regular to irregular thick to medium parting; irregular to slightly conchoidal fracture; some fractured and broken core with brown-stained very fine drusy quartz.
858.0	859.8	Oil shale, marlstone, and mudstone: Light to some medium brownish gray and buff to gray buff, dolomitic. Faint laminae and some thin bands. Irregular to regular thick to medium parting; irregular to slightly conchoidal fracture; mostly irregular fractured core pieces with very fine drusy crusts and sparse pyrite.
859.8	861.2	Oil shale: Medium and some dark grayish brown to tan and rare buff, dolomitic. Distinct to faint laminae. Very regular and rare irregular thick to some thin parting; slightly conchoidal to some irregular fracture.
861.2	862.2	Oil shale: Buff and tan to medium and rare dark grayish brown, dolomitic. Distinct to some faint laminae; rare fine displacements. Regular to irregular thick parting; slightly conchoidal to irregular fracture.
862.2	864.2	Oil shale: Medium to rare dark brownish gray, dolomitic; becoming slightly silty in lower part. Faint to some moderately distinct

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		laminae. Irregular to fairly regular thick to medium parting; irregular fracture.
		{ Sample of brownish-gray slightly silty oil shale from 863.8 feet: X-ray--quartz, dolomite, analcime, feldspar, illite, pyrite.
864.2	865.2	Oil shale: Medium to dark brownish gray, dolomitic. Faint laminae to very faint streaked bedding. Irregular to fairly regular thick parting; slightly conchoidal to irregular fracture. A thin dense grayish-brown dolomite stringer at 864.6. Abruptly grades to mudstone at bottom.
865.2	866.2	Mudstone and silty marlstone: Gray buff and buff to rare medium and dark brownish gray and gray, dolomitic. Faint to some distinct very fine laminae; very faintly bedded band at 865.7-865.8. Irregular to very regular thick parting; slightly conchoidal fracture.
		{ Sample of gray-buff and gray laminated mudstone from 866.0 feet: X-ray--quartz, dolomite, feldspar, analcime, pyrite, Mg-siderite.
866.2	867.2	Oil shale: Buff to medium and rare dark brownish gray, dolomitic. Distinct to some faint laminae; rare fine displacements. Irregular thick parting; slightly to moderately conchoidal fracture. Very thin dark gray silty pyritic laminae at 866.5 and 866.95; thin streak at 866.6; very thin diagonal crevice filling at 866.8-866.9.
		{ Sample of thin dark gray silty lamina from 866.5 feet: X-ray--pyrite, marcasite, feldspar, analcime, quartz.
867.2	871.6	Oil shale: Medium to some dark and rare light brownish gray, dolomitic. Moderately distinct to faint very fine laminae; rare fine loop structures and displacements. Irregular to regular thick to medium parting; slightly irregular to irregular and conchoidal fracture. A tight silty medium gray band at 871.3-871.4.
		{ Sample of gray silty band from 871.3 feet: X-ray--analcime, dolomite, quartz, feldspar.
871.6	875.1	Mudstone and silty marlstone: Like 865.2-866.2. Some buff to grayish-brown oil shale. Natural vertical fracture in upper part.
875.1	875.3	Missing?
875.3	876.6	Mudstone and marlstone: Gray buff to light and rare medium grayish brown; very slightly calcareous to dolomitic. Faint streaked bedding to faint and some moderately distinct laminae. Irregular thick parting; conchoidal to irregular fracture. Some very fine dark gray streaks. Some natural vertical fracture surfaces.
876.6	877.6	Marlstone (very lean oil shale): Buff to light and some medium grayish brown, dolomitic. Faint to some distinct very fine

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		very regular laminae. Irregular to regular thick parting; conchoidal to regular fracture. A fine medium gray silty lamina at 877.0.
877.6	878.7	Oil shale: Buff to medium and some dark grayish brown, dolomitic. Fairly distinct laminae; faintly laminated medium to dark zones at 878.1-878.4 and 878.5-878.6. Regular to irregular thick to some medium parting; slightly conchoidal to irregular fracture. A fine white silty lamina at 877.95. A fine lenticular brownish-gray silty stringer at 878.2.
878.7	880.6	Marlstone and oil shale: Buff and gray buff to some medium and very rare dark brownish gray, slightly silty, dolomitic. Faint to fairly distinct laminae. Irregular thick parting; conchoidal fracture; vertical fracture with patchy brown crusts, sparse very fine pyrite, and rare vertical slickensides through upper foot. Fine light gray silty lamina at 879.0.
880.6	882.1	Mudstone: Buff and gray buff to light and rare medium brownish gray and gray; dolomitic to slightly calcareous. Very faintly bedded in upper 0.4 foot; very faint to some distinct laminae in lower part. Irregular thick parting; irregular to conchoidal fracture. A 1-inch very light gray silty band at 880.9-881.0. Medium to dark grayish-brown oil shale in lower 0.1 foot.
882.1	882.3	Missing?
882.3	883.1	Oil shale: Medium to dark and rare light brownish gray, dolomitic. Moderately distinct to faint laminae. Irregular to regular thick to medium parting; slightly conchoidal fracture.
883.1	884.0	Mudstone: Buff to gray buff and rare light gray and brownish gray, dolomitic. Faint laminae to very faint streaked bedding. Irregular to regular thick parting; slightly irregular and conchoidal fracture.
884.0	885.3	Oil shale: Medium brownish and olive gray to almost neutral gray, dolomitic. Moderately distinct to faint laminae. Regular to some irregular thick parting; slightly to moderately conchoidal fracture.
885.3	886.3	Marlstone and mudstone: Light and rare medium grayish brown to buff and gray buff, dolomitic. Distinct to faint laminae. Irregular to rare regular thick parting; conchoidal to regular fracture. Rare fine dark gray silty pyritic laminae and streaks.
886.3	888.0	Mudstone: Buff to gray buff; becoming interbedded with light to medium gray siltstone and sandstone near bottom; dolomitic to very slightly calcareous. Very faintly laminated to massive and banded. Irregular to regular thick parting; regular and slightly conchoidal to some irregular fracture.
888.0	893.0	Sandstone: Light slightly brownish gray, medium to fine grained, subrounded to subangular, commonly salt-and-pepper, massive. Fairly regular thick parting; regular fracture; permeable. Very

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		rare pink grains. Some buff earthy grains. Gray siltstone in lower inch.
		[ Sample of sandstone from 889.5 feet: X-ray--quartz, feldspar, dolomite.
893.0	893.1	Marlstone: Tan-buff, silty. Faintly laminated.
893.1	893.9	Missing
893.9	896.9	Marlstone: Buff and gray buff to light brownish gray; some medium gray and brownish gray in lower part, dolomitic, silty in upper part. Fairly distinct to faint laminae. Irregular to regular thick parting; conchoidal fracture.
896.9	897.9	Oil shale: Dark brownish gray, dolomitic. Faint very fine laminae and rare streaked bedding. Irregular thick parting; irregular to slightly conchoidal fracture.
897.9	899.2	Oil shale: Dark to medium and rare light brownish gray, dolomitic. Faint to moderately distinct laminae. Irregular thick parting; irregular and conchoidal fracture. A 1-inch light gray mudstone band with fine white spots at 898.8.
899.2	900.4	Oil shale: Medium to light brownish gray, dolomitic. Moderately distinct laminae. Irregular thick parting; conchoidal to fairly regular fracture. A thin gray siltstone band at 900.2.
900.4	901.5	Oil shale: Medium to some dark brownish gray, dolomitic. Faintly laminated. Irregular thick parting; conchoidal fracture. Medium-light slightly brownish-gray tight sandy siltstone at 901.3-901.4.
901.5	902.6	Oil shale: Dark to medium brownish gray, dolomitic. Faintly laminated. Irregular to very regular thick to medium parting; slightly conchoidal fracture.
902.6	903.6	Oil shale: Medium to dark and light brownish gray, dolomitic. Faint to moderately distinct laminae. Fairly regular thick to medium parting; slightly irregular fracture. A gray silty to sandy band at 903.3-903.5.
		[ Sample of gray silty to sandy band from 903.4 feet: X-ray--analcime, dolomite, Na-feldspar.
903.6	907.7	Mudstone and marlstone: Gray buff and some buff to rare medium brownish gray; dolomitic to very slightly calcareous. Moderately distinct to faint laminae and thin to thick bands. Regular to irregular thick to some medium parting; slightly to moderately conchoidal fracture. Some fine dark gray streaks.
907.7	909.1	Oil shale: Gray to some medium and dark grayish brown, dolomitic, silty in lighter parts. Distinct to some faint laminae. Irregular to fairly regular thick parting; slightly to moderately conchoidal fracture. Vertical fracture with some very fine disseminated pyrite and spotty brown coatings at 907.9-908.6.
909.1	912.0	Mudstone: Light to rare medium and dark brownish gray, dolomitic. Moderately distinct to faint laminae. Regular to irregular thick parting; moderately to slightly conchoidal fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
912.0	913.4	Oil shale: Medium to some light and dark brownish gray, dolomitic. Faintly laminated. Irregular to regular thick to medium parting; slightly conchoidal to irregular fracture. Few 1/2- to 3/4-inch medium-light brownish-gray to gray silty bands in lower part.
913.4	914.0	Oil shale: Medium to dark brownish gray, dolomitic. Faint to moderately distinct laminae. Regular to irregular thick to medium parting; regular to slightly conchoidal fracture.
914.0	914.9	Oil shale and mudstone: Light and rare medium brownish gray to buff and gray buff, dolomitic. Fairly distinct to faint laminae. Irregular to regular thick to medium parting; slightly conchoidal to irregular fracture. Some high- to medium-angle fractures with sparse pyrite at 914.3-914.7. Sharp conformable contact with sandstone below.
914.9	915.9	Sandstone: Gray and buff, medium to fine grained, angular to subrounded. Massive, speckled. Irregular thick parting; slightly irregular fracture; moderately permeable. Abundant buff marly to earthy grains. Few streaks composed of fine vitreous to resinous black bitumen globs. Sharp conformable contact with siltstone below. Sample of sandstone from 915.3 feet: X-ray--quartz, K-feldspar, dolomite, Na-feldspar.
915.9	921.0	Siltstone and mudstone: Light gray and gray buff to some light and rare medium brownish gray, dolomitic. Faint to rare moderately distinct laminae and bands. Regular to irregular thick to medium parting; slightly irregular and conchoidal fracture; some broken core with natural high-angle fractures.
921.0	922.0	Marlstone: Buff and gray buff to light and rare medium brownish gray; slightly calcareous to dolomitic, slightly silty. Faint to moderately distinct laminae. Regular to irregular thick parting; conchoidal fracture.
922.0	923.0	Oil shale: Buff and tan to grayish brown; few brownish-black laminae near bottom, dolomitic. Moderately distinct to faint laminae. Fairly regular to irregular thick parting; slightly to moderately conchoidal fracture.
923.0	924.0	Oil shale: Medium to some light and rare dark grayish brown, dolomitic. Moderately distinct to faint laminae. Irregular to rare regular thick parting; slightly irregular and conchoidal fracture. A 1 1/2-inch gray siltstone band at top and a 1-inch gray-buff siltstone band at 923.4.
924.0	925.0	Oil shale: Medium to light and very rare dark brownish gray, dolomitic. Moderately distinct to faint laminae. Irregular to regular thick parting; slightly irregular and conchoidal fracture. a 3/4-inch light slightly brownish-gray mudstone band at 924.7.
925.0	927.5	Marlstone: Light to some medium and rare dark brownish gray and grayish brown, dolomitic, slightly silty. Faint to moderately

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		distinct laminae. Irregular to regular thick to rare medium parting; slightly to moderately conchoidal fracture. A 2-inch light gray siltstone band at 927.2.
		Sample of light gray siltstone from 927.2 feet: X-ray--dolomite, quartz, analcime, feldspar.
927.5	928.8	Oil shale: Light to medium and rare dark grayish brown and brownish gray, dolomitic. Fairly distinct laminae. Irregular to regular thick parting; moderately to slightly conchoidal fracture.
		Sample of light to dark brownish-gray laminated oil shale from 928.5 feet: X-ray--dolomite, quartz, analcime, K-feldspar, Mg-siderite, Na-feldspar, illite.
928.8	936.0	Marlstone, mudstone, and rare siltstone: Buff and gray buff to medium gray and some medium to very rare dark grayish brown; dolomitic to very slightly calcareous. Faint to some distinct laminae and few faintly streaked to massive bands. Irregular to rare regular thick parting; slightly to moderately conchoidal and some irregular fracture. Occasional natural high-angle fractures with sparse very fine pyrite. Rare thin zones of abundant very fine bitumen globs.
936.0	941.0	Mudstone: Light to medium slightly brownish gray, dolomitic. Faint laminae; occasional faintly streaked to massive zones. Irregular to some regular thick parting; irregular to slightly conchoidal fracture; some natural vertical fractures.
941.0	944.1	Oil shale: Medium to some dark brownish to almost neutral gray, dolomitic. Faintly laminated; rare fine to small displacements; slightly cross-laminated mudstone at 941.5-941.8. Irregular to rare regular thick parting; irregular and conchoidal fracture. Few very fine tan dolomite laminae and streaks near bottom.
		Sample of medium-dark brownish-gray oil shale from 942.2 feet: X-ray--quartz, analcime, dolomite, feldspar, illite, Mg-siderite, pyrite.
944.1	945.5	Mudstone: Medium-light gray, very slightly calcareous. Faintly laminated; few very faintly bedded to massive zones. Irregular thick parting; conchoidal fracture. A 1-inch medium-grained sandstone band at 944.2-944.3. A 1-inch dark brownish-gray oil-shale band at 945.2-945.3.
945.5	946.5	Mudstone grading to oil shale: Medium and some light almost neutral to brownish gray, dolomitic. Faint to some moderately distinct laminae. Regular thick to some medium parting; slightly conchoidal fracture.
946.5	947.5	Oil shale: Medium brownish gray in upper part to medium and dark grayish brown in lower part, dolomitic. Faintly laminated. Regular to rare irregular thick to some thin parting; slightly conchoidal to rare coarse hackly fracture. Fine gray silty lamina at 947.3.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
947.5	949.3	Oil shale: Medium-dark slightly brownish to neutral gray, dolomitic. Faint very fine laminae. Regular to some irregular thin to rare thick parting; coarse hackly to slightly conchoidal fracture. Sample of medium-dark gray shale from 948.3 feet: X-ray--quartz, analcime, feldspar, dolomite, pyrite, illite.
949.3	950.8	Oil shale grading to mudstone: Light and some medium brownish gray to gray buff, dolomitic. Moderately distinct to faint laminae; rare fine displacements. Regular to irregular medium to thick parting; moderately to slightly conchoidal fracture. Few fine dark pyritic blebs and streaks at 950.2-950.3.
950.8	953.4	Mudstone: Gray buff to rare light gray and light brownish gray, very slightly calcareous. Faintly laminated; abundant fine to small displacements. Regular to irregular thick parting; conchoidal and irregular fracture; some broken core. A very thin gray pyritic lamina at 951.2.
953.4	956.7	Mudstone and marlstone: Gray buff to light and rare medium brownish gray, very slightly calcareous. Faint to moderately distinct laminae. Regular to irregular thick parting; irregular to slightly conchoidal fracture.
956.7	957.6	Oil shale: Medium and rare dark brownish gray to some buff, dolomitic. Faint to moderately distinct laminae. Irregular to some regular thick to medium parting; slightly conchoidal fracture.
957.6	958.8	Marlstone and mudstone: Buff to light and rare medium brownish gray; some gray buff to gray in upper part, slightly calcareous. Faintly laminated. Regular to irregular thick to medium parting; slightly irregular and conchoidal fracture.
958.8	962.8	Mudstone: Gray buff and buff to light slightly brownish gray; very slightly calcareous to dolomitic. Faintly laminated to massive. Irregular to regular thick parting; slightly to moderately conchoidal and some irregular fracture. Vertical fracture with some bright iridescent pyrite patches at 959.9-960.5.
962.8	966.0	Oil shale (?): Medium to medium-light brownish gray, slightly silty, dolomitic. Faint very fine laminae. Irregular to some regular thick parting; irregular and conchoidal fracture.
966.0	967.0	Mudstone: Medium-light gray, dolomitic. Faintly laminated. Irregular thick parting; slightly conchoidal to irregular fracture.
967.0	971.0	Mudstone (lean oil shale in part): Medium to light gray and brownish gray, dolomitic. Faint to some moderately distinct laminae; rare fine displacements. Irregular thick parting; slightly conchoidal to some irregular fracture.
971.0	973.0	Oil shale: Medium to some light and rare dark brownish gray; some neutral gray mudstone in middle part, dolomitic. Moderately

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LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		distinct to faint laminae. Irregular to some regular thick parting; slightly irregular and conchoidal fracture.
973.0	975.0	Oil shale: Medium to rare light and dark brownish gray, dolomitic. Moderately distinct to very faint laminae. Regular thick to some thin parting; regular to rare irregular fracture. Sample of brownish-gray oil shale from 973.4 feet: X-ray-- dolomite, quartz, analcime, feldspar, illite, Mg-siderite, pyrite.
975.0	976.0	Oil shale (?): Medium slightly brownish gray, dolomitic, slightly silty. Very faintly laminated; abundant fine to small displacements. Irregular to fairly regular thick to medium parting; irregular to slightly conchoidal fracture.
976.0	976.9	Oil shale: Medium-light slightly brownish gray and some medium to rare dark grayish brown, dolomitic. Faintly laminated. Very regular thin to rare thick parting; slightly conchoidal and rare coarse hackly fracture. A 3/4-inch gray siltstone band at 976.8.
976.9	977.9	Oil shale: Medium to dark brownish gray, dolomitic. Faint very fine laminae and some streaked bedding. Irregular to regular thick to medium parting; slightly irregular and conchoidal fracture. Rare fine brown dolomite lenses and streaks.
977.9	979.0	Oil shale: Brownish black to dark brownish gray, dolomitic. Faint streaked bedding and some very fine laminae; some fairly distinct fine brown dolomite streaks and rare small nodules in upper half foot. Irregular to slightly irregular thick to rare thin parting; slightly irregular and conchoidal and rare coarse hackly fracture. Rare fine gray silty blebs in upper part. A fine dark brownish-gray lenticular silty stringer at 978.8.
979.0	981.3	Oil shale: Dark brownish gray, dolomitic to noncalcareous. Faint very fine laminae and streaked bedding. Irregular to slightly irregular thick to medium parting; irregular and some slight to coarse hackly fracture.
981.3	982.6	Oil shale: Dark to medium brownish gray, dolomitic. Faint very fine laminae. Irregular to regular thick parting; irregular to slightly conchoidal fracture. A 1/2-inch yellowish-buff silty to fine sandy-textured band at top; abundant very fine irregular tight vertical fractures with dark fillings through band.
982.6	983.8	Mudstone and siltstone: Medium to light slightly brownish and olive gray to light neutral gray, slightly calcareous. Faint fine to thin slightly irregular laminae. Irregular to fairly regular thick parting; irregular to slightly irregular fracture.
983.8	986.1	Siltstone and mudstone: Light and rare medium gray (very slight brown tint); slightly calcareous to noncalcareous. Faintly laminated and banded to massive. Irregular thick parting; slightly to moderately conchoidal and some irregular fracture. Sample of light gray siltstone from 985.8 feet: X-ray-- quartz, dolomite, K-feldspar, pyrite.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
986.1	990.3	Siltstone, mudstone, and some oil shale: Siltstone and mudstone as above with some 1- to 5-inch bands of light to rare dark brownish-gray and grayish-brown laminated oil shale. Some fine to 0.1-foot porous zones of abundant fine dull to vitreous black blebs in lower part. Sample of siltstone with abundant fine black blebs from 988.6 feet: X-ray--quartz, dolomite, K-feldspar, analcime, Mg-siderite, pyrite.
990.3	991.3	Oil shale: Grayish brown; some tan to buff in upper part; some dark brownish gray in lower part, dolomitic. Distinct to faint laminae; distorted and displaced to brecciated near top with some black stringers and fracture fillings. Irregular thick parting; irregular and conchoidal fracture. Sample of fractured to brecciated buff marlstone with black fillings from 990.4 feet: X-ray--dolomite, analcime, quartz, feldspar, pyrite, Mg-siderite.
991.3	992.4	Oil shale: Dark grayish brown to brownish black, dolomitic. Faint streaked bedding and very fine laminae. Irregular thick parting; irregular and conchoidal fracture. A thin brown dolomite lamina with fine lacy black pyritic stringers at 991.6.
992.4	994.1	Mudstone, oil shale, and some siltstone: Light to medium brownish gray and olive gray to almost neutral gray; dolomitic to slightly calcareous. Faint laminae and bands. Irregular to some regular thick parting; irregular to slightly conchoidal fracture; some vertical fractures with chalky white coatings.
994.1	995.3	Sandstone: Light slightly brownish gray, fine to some medium grained. Finely streaked and rarely banded with mudstone. Irregular parting and fracture; slightly permeable. A vertical fracture with tarry black patches and chalky white coatings in upper 0.4 foot.
995.3	1001.3	Siltstone and mudstone: Light to medium gray; grading to some brownish-gray oil-shale zones at 997.3-999.3 and near bottom. Faint to rare distinct laminae and bands. Irregular to rare regular thick parting; slightly to moderately conchoidal and irregular fracture.
1001.3	1001.9	Oil shale: Medium to some light and dark grayish brown, dolomitic. Moderately distinct to faint laminae. Regular to irregular thick parting; conchoidal to regular fracture. A thin white very fine sandy-textured lamina at 1001.8.
1001.9	1004.1	Oil shale: Dark and some medium grayish brown to very dark brownish gray, dolomitic. Faint streaked bedding to very fine laminae; occasional thin laminated oil-shale inclusions in upper part. Irregular thick parting; slightly conchoidal to some irregular fracture. Occasional fine dense to silty-crystalline lenses, streaks, and shredded stringers.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		Sample of dark brownish-gray oil shale from 1003.3 feet: X-ray--quartz, dolomite, analcime, feldspar, illite, pyrite, Mg-siderite.
1004.1	1005.6	Oil shale: Medium and rare dark slightly brownish and olive gray, dolomitic. Faint laminae and streaked bedding. Irregular thick parting; irregular to slightly conchoidal fracture; broken core in lower half foot.
1005.6	1006.9	Sandstone: Medium to light gray, medium grained to silty. Irregularly laminated and streaked with medium brownish-gray mudstone. Irregular to slightly irregular thick parting; irregular to fairly regular fracture; slightly permeable. Abundant fine buff grains in upper part; some platy mudstone and marlstone inclusions in lower part.
1006.9	1008.0	Mudstone: Medium slightly brownish gray. Distinctly streaked with light gray siltstone. Irregular to fairly regular thick parting; slightly irregular and conchoidal fracture.
1008.0	1008.7	Oil shale: Dark brownish gray, dolomitic, slightly silty. Faint streaked bedding. Irregular to regular thick parting; conchoidal fracture.
1008.7	1009.5	Oil shale: Very dark brownish gray, dolomitic. Faint streaked bedding. Irregular thick parting; irregular fracture.
1009.5	1011.0	Oil shale: Medium-dark brownish gray, dolomitic, slightly silty. Faint streaked bedding. Irregular to some regular thick parting; irregular and conchoidal fracture.
		Sample of medium-dark silty oil shale from 1010.2 feet: X-ray--quartz, dolomite, analcime, feldspar, illite, pyrite, Mg-siderite.
1011.0	1013.0	Oil shale: Very dark brownish gray, noncalcareous. Faint very fine laminae and streaked bedding. Irregular thick to rare thin parting; irregular coarse hackly fracture. A 1-inch dark grayish-brown to black dolomite band at 1011.4. A 1-inch medium to light brownish-gray silty band at 1012.8-1012.9.
1013.0	1017.5	Oil shale: Dark brownish gray, noncalcareous to dolomitic. Faint very fine laminae and streaked bedding. Regular to irregular thick to rare thin parting; slightly conchoidal to rare coarse hackly fracture. A 0.1-foot grayish-brown dolomite band at 1013.9.
1017.5	1018.6	Claystone: Medium slightly olive gray and some medium to rare dark grayish brown. Faint streaked bedding and some very fine discontinuous and displaced laminae. Irregular thick parting; slightly irregular to some irregular coarse hackly fracture.
1018.6	1023.4	Oil shale: Dark brownish gray, noncalcareous to dolomitic. Faint very fine laminae and streaked bedding. Irregular to very regular thick to some thin parting; irregular and hackly fracture. (1020.8-1021.0 missing?)

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		Sample of dark brownish-gray shale from 1021.2 feet: X-ray--quartz, dolomite, analcime, illite, feldspar, pyrite, Mg-siderite.
1023.4	1024.6	Oil shale: Dark to rare medium grayish brown, dolomitic. Faint streaked bedding. Irregular to slightly irregular thick parting; irregular fracture.
1024.6	1024.9	Missing
1024.9	1026.7	Oil shale: Medium and some dark brownish gray, dolomitic. Faint streaked bedding and discontinuous laminae. Irregular thick parting; irregular fracture. A thin gray fine-grained analcime laminae at top with a vermiform stringer extending to 1025.1. A 1 1/4-inch gray silty tuff stringer at 1025.3-1025.4. A 1- x 2-inch dense grayish-brown dolomite nodule at 1025.8.
1026.7	1029.2	Oil shale: Dark and medium grayish brown, slightly dolomitic. Faint streaked bedding; some discontinuous to regular laminae in lower part. Irregular thick parting; irregular fracture. Rare very small to fine grayish-brown dolomite nodules. A thin buff-white silty tuff at 1029.1 with blebby stringers extending to bottom.
1029.2	1033.9	Oil shale: Very dark brownish gray, slightly dolomitic. Faint streaked bedding in upper part to very fine regular laminae in lower part. Irregular to regular thick to medium parting; irregular and some coarse hackly fracture in upper part to slightly irregular and conchoidal fracture in lower part. Rare fine buff to dark gray dense to fine crystalline streaks and discontinuous laminae.
1033.9	1035.9	Oil shale: Very dark brownish gray, dolomitic. Faint streaked bedding and very fine discontinuous laminae. Irregular to regular medium to thick parting; irregular and rare coarse hackly fracture. A 1-inch faintly bedded brown dolomite band with gradational contacts at 1034.6.
1035.9	1036.9	Oil shale: Very dark brownish gray to rare medium grayish brown, dolomitic. Faint streaked bedding and very fine laminae. Regular to irregular thick parting; irregular and rare coarse hackly fracture.
1036.9	1037.9	Oil shale: Medium to rare light and dark brownish to slightly olive gray; dolomitic to very slightly calcareous. Faint discontinuous laminae and streaked bedding. Irregular thick to medium parting; irregular fracture. Rare thin dense silty gray to light brownish-gray mineral streaks.
1037.9	1039.1	Oil shale: Medium to dark brownish gray and grayish brown, becoming very dark at bottom, dolomitic. Faint very fine laminae and streaked bedding; some very fine displacements. Irregular to slightly irregular thick to some medium parting; irregular to slightly conchoidal and rare coarse hackly fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1039.1	1040.4	Oil shale: Medium to some light and rare dark brownish to slightly olive gray, dolomitic. Moderately distinct to faint streaked bedding and discontinuous laminae. Irregular thick parting; irregular fracture. Tan-buff dolomite interlaminated with light gray siltstone in upper 2 inches; sharp regular contact with oil shale above; silty streaks in oil shale immediately below. A 2-inch gray silty stringer with small to fine angular oil-shale inclusions at 1040.2-1040.4.
1040.4	1041.2	Oil shale: Dark grayish brown, becoming black near bottom, dolomitic. Faint discontinuous laminae and streaked bedding. Irregular thick parting; slightly irregular and some coarse hackly fracture.
1041.2	1041.5	Dolomite: Medium-light grayish brown, slightly silty. Faint fairly regular to nonparallel and discontinuous laminae. Irregular fracture. A natural vertical fracture with very fine drusy crusts and dark grayish-brown coatings through layer. Sharp regular upper contact; slightly irregular lower contact with very fine interfingering.
1041.5	1042.5	Oil shale: Dark to some medium and light grayish brown, dolomitic. Faint to some distinct streaked bedding and discontinuous laminae. Irregular thick parting; slight to rare coarse hackly fracture. Abundant thin to fine brownish-gray silty-crystalline streaks in middle part.
		Sample of dark oil shale with silty streaks from 1042.2 feet: X-ray--dolomite, quartz, analcime, illite, feldspar.
1042.5	1043.6	Oil shale: Dark and some medium grayish brown to black, dolomitic. Faint streaked bedding and discontinuous laminae. Slightly irregular to irregular thick parting; irregular and some coarse hackly fracture.
1043.6	1044.0	Missing
1044.0	1047.4	Oil shale: Dark brownish gray; some black near top, dolomitic. Faint streaked bedding near top; very faint very fine regular laminae in other parts. Irregular to some regular thick to some medium parting; irregular and rare coarse hackly fracture. Few dark brownish-gray dolomitic bands near top. Slightly silty in parts. A very small black chert nodule at 1047.2.
1047.4	1048.7	Oil shale: As above and below with some grayish-brown dolomite laminae and bands.
1048.7	1051.3	Oil shale: Very dark brownish gray, dolomitic. Faint very fine discontinuous to regular laminae. Irregular thick parting; irregular fracture. Rare fine black chert streaks.
1051.3	1053.1	Oil shale: Very dark to rare medium brownish gray, dolomitic. Faint streaked bedding and some very fine laminae. Irregular to some regular thick to rare thin parting; irregular fracture. A 1 1/2-inch dense brown dolomite band at 1051.4; a 1/2-inch

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		band at 1051.5; a 1-inch band at 1052.1. A 2-inch buff to dirty brown silty stringer with columnar fractures at 1052.8-1053.0; few small black drusy patches near bottom of stringer.
		Sample of dense brown dolomite from 1051.4 feet: X-ray--dolomite, quartz, feldspar.
		Sample of silty stringer from 1052.9 feet: X-ray--quartz, analcime, feldspar, Mg-siderite.
		Sample of small drusy patches in silty stringer from 1053.0 feet: X-ray--analcime, quartz, feldspar, extra peak at 21.8° 2θ.
1053.1	1054.1	Oil shale: Medium and very rare dark brownish and slightly olive gray; dolomitic to very slightly calcareous. Irregular thick parting; irregular to slightly conchoidal fracture. A 1-inch buff dolomite band at top; a 3-inch medium brownish-gray band near bottom.
1054.1	1056.3	Oil shale: Medium to some dark brownish gray. Faint to some fairly distinct irregular laminae and streaks. Irregular thick parting; irregular fracture. Abundant dense dolomite zones.
1056.3	1059.8	Oil shale: Dark brownish gray to brownish black, dolomitic. Faint streaked bedding and very fine laminae. Regular to irregular thick to medium parting; irregular and some coarse hackly fracture.
1059.8	1060.3	Dolomite: Grayish brown to tan, dense, faintly laminated. Few fine to thin dark oil-shale laminae.
1060.3	1064.0	Oil shale: Dark brownish gray, dolomitic. Faint streaked bedding and very fine laminae. Irregular to regular thick to rare thin parting; irregular and some coarse hackly fracture. Some grayish-brown dolomite bands in upper part; rare in lower part. Rare fine black chert streaks.
1064.0	1065.0	Oil shale: Medium and some dark to rare light olive gray and grayish brown, dolomitic. Faint discontinuous laminae. Irregular thick parting; irregular fracture.
1065.0	1066.3	Oil shale: Medium to some light and rare dark olive gray and brownish gray, dolomitic. Faint discontinuous laminae. Irregular to regular thick to medium parting; irregular to conchoidal fracture. Gray medium to fine-grained salt-and-pepper sandstone at 1065.2-1065.4.
1066.3	1069.1	Oil shale: Medium to some dark brownish gray and grayish brown, dolomitic. Faint very fine laminae. Irregular to regular thick to some thin parting; slightly irregular to some coarse hackly fracture.
1069.1	1072.3	Oil shale: Dark brownish gray and some grayish brown, becoming brown to tan near bottom, dolomitic. Faint very fine laminae and some streaked bedding. Irregular to regular thick to rare thin parting; irregular to coarse hackly fracture. A 2-inch

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		brownish-gray to dark gray dense silty band at 1069.7-1069.9; laced with very fine dark gray fracture fillings.
1072.3	1074.4	Mudstone: Medium olive gray, rare grayish brown to buff; dolomitic to very slightly calcareous. Faint laminae and bands; some fine displacements in upper part. Irregular to slightly irregular thick parting; irregular and conchoidal fracture.
1074.4	1075.1	Oil shale: Dark brownish gray to some black in upper 0.2 foot; medium to rare dark olive gray and grayish brown in lower part, dolomitic. Moderately distinct to faint discontinuous and displaced to fairly regular laminae. Slightly irregular to irregular thick parting; irregular and some slightly hackly fracture.
1075.1	1075.7	Oil shale: Very dark brownish gray, dolomitic. Faint very fine streaked bedding. Slightly irregular thick to medium parting; irregular slightly hackly fracture. A 1-inch faintly laminated brown dolomite band at 1075.2-1075.3; rare small dolomite lenses.
1075.7	1077.1	Oil shale: Medium to very dark olive gray, dolomitic. Faint to moderately distinct regular laminae to disrupted streaked bedding. Slightly irregular to irregular thick parting; slightly irregular to irregular fracture. A very fine low-angle vitreous black organic seam at 1076.5.
1077.1	1080.7	Oil shale: Very dark brownish gray, dolomitic. Faint very fine discontinuous and some distorted laminae and streaked bedding. Regular to irregular thick to medium parting; irregular and slightly hackly fracture. Occasional fine to 1-inch grayish-brown silty to dense tuff and dolomite lenses and streaks in upper part.
1080.7	1082.7	Oil shale: Medium and some dark olive gray, becoming almost neutral gray in lower part; dolomitic to very slightly calcareous. Faint discontinuous and displaced laminae and rare bands. Irregular thick parting; irregular to conchoidal fracture. Dense buff dolomite bands at 1081.4-1081.6 and 1082.6-1082.7. Fine gray silty streaks becoming abundant in lower part.
1082.7	1084.0	Sandstone and mudstone: Light gray medium-fine sandstone in upper part becoming streaked and braided with increasing amounts of buff to light olive-gray mudstone in lower part. Irregular parting and fracture.
1084.0	1087.0	Oil shale: Medium olive gray and rare medium to dark brownish gray. Faint very fine regular to discontinuous laminae; some thick massive bands of olive-gray mudstone. Irregular thick parting; irregular fracture.
1087.0	1089.0	Oil shale: Medium to dark grayish brown, dolomitic. Faint very fine regular to discontinuous laminae. Irregular to regular thick to rare thin parting; slightly irregular and some coarse hackly fracture. Gray silty band at 1087.1-1087.2; some fine vermiform stringers immediately below.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		Sample of gray silty band from 1087.1-1087.2 feet: X-ray--pyrite, marcasite, feldspar, analcime, quartz, dolomite, Mg-siderite.
1089.0	1091.0	Oil shale: Dark brownish gray, dolomitic. Faint very fine discontinuous to regular laminae. Irregular to rare regular thick parting; irregular fracture. A 1/4-inch dense gray lamina at 1090.35.
		Sample of dark brownish-gray oil shale from 1089.8 feet: X-ray--quartz, dolomite, K-feldspar, illite, pyrite, Mg-siderite.
1091.0	1092.0	Oil shale: Dark to rare medium brownish gray, dolomitic. Faint very fine laminae. Irregular to fairly regular thick to some thin parting; coarse to slight hackly fracture. A 1/4-inch brown dolomite lamina at 1091.2; 1/4-inch buff silty dolomite lenses at 1091.6.
1092.0	1094.2	Oil shale: Medium and rare dark to light olive gray and some buff to grayish brown; some light olive-gray to buff mudstone in lower part, slightly calcareous. Faint to moderately distinct discontinuous and displaced to fairly regular laminae. Irregular to rare regular thick parting; slightly conchoidal to irregular fracture. Some fine gray silty streaks.
1094.2	1095.3	Mudstone and sandstone: Buff to medium olive-gray and brownish-gray slightly calcareous mudstone irregularly streaked and banded with gray-buff to light gray fine to medium-grained sandstone. Irregular thick parting; irregular fracture.
1095.3	1096.3	Oil shale: Medium to rare light and dark olive gray and brownish gray; slightly calcareous to dolomitic, slightly silty. Faint discontinuous laminae to streaked bedding. Irregular thick parting; irregular fracture. A very fine vitreous black organic streak at 1095.7. Some fine silty streaks in upper part.
1096.3	1099.1	Oil shale: Dark and rare medium brownish gray to some brownish black, dolomitic. Faint streaked bedding and rare discontinuous laminae. Fairly regular to irregular thick to rare thin parting; irregular and some slight to coarse hackly fracture. A thin dense gray lamina at top. A fine vitreous black organic streak at 1097.0.
1099.1	1100.2	Oil shale: Dark to light brownish gray and some buff, dolomitic. Faint to some moderately distinct laminae; some fine to small displacements. Fairly regular to irregular thick to medium parting; irregular to slightly irregular fracture.
1100.2	1104.0	Oil shale: Medium to light and rare dark brownish to slightly olive gray; dolomitic to very slightly calcareous; slightly silty in parts. Faint regular to some discontinuous and displaced laminae. Irregular to some regular thick to medium parting; irregular and some slight to coarse hackly fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		A thick buff dolomite stringer with hackly contacts at 1101.3-1101.6.
1104.0	1105.0	Missing
1105.0	1106.0	Oil shale: Medium olive gray to rare medium and dark brownish gray, dolomitic. Faint very fine laminae. Fairly regular to irregular thick parting; slightly conchoidal fracture. Rare gar scales.
1106.0	1107.0	Oil shale: Dark brownish gray, dolomitic. Very faint streaked bedding and very fine laminae. Irregular to fairly regular thick to medium parting; slightly irregular to some coarse hackly fracture. Rare gar scales. A 1 1/2-inch brown oil-stained silty to sandy tuff band at 1106.7.
1107.0	1108.2	Oil shale: Very dark brownish gray, dolomitic. Very faint very fine streaked bedding and laminae. Regular to some irregular thick to thin parting; slightly irregular to some hackly fracture. Rare medium- to low-angle glossy shear surfaces. A fine gray silty pyritic lamina at 1107.4.
1108.2	1109.3	Oil shale: Dark grayish brown, dolomitic. Faint very fine laminae and streaked bedding. Regular to irregular thick to rare medium and thin parting; irregular and some coarse hackly fracture. Very rare gar scales.
1109.3	1110.3	Oil shale: Dark to medium brownish gray, dolomitic. Very faint streaked bedding to faint and rare distinct displaced laminae. Irregular thick parting; irregular and conchoidal fracture.
1110.3	1111.3	Oil shale: Medium to light slightly brownish and olive gray; some buff and rare dark grayish brown in lower part; silty in part, slightly calcareous. Faint to rare distinct laminae and some very faintly streaked zones. Irregular thick parting; irregular and conchoidal fracture.
1111.3	1112.5	Oil shale: Dark brownish gray to black; medium-light brownish-gray mudstone at 1111.6-1111.8; medium grayish-brown in lower 0.1 foot, dolomitic. Faint streaked bedding and some disrupted laminae; abundant fine brownish-gray silty streaks and stringers at 1111.8-1112.2. Slightly irregular to irregular thick parting; irregular fracture.
1112.5	1118.7	Oil shale: Very dark brownish gray to black, dolomitic. Faint streaked bedding to very faint very fine discontinuous laminae. Irregular to some regular thick to rare thin parting; slight to rare coarse hackly fracture. Sample of very dark oil shale from 1116.4 feet: X-ray-- quartz, dolomite, analcime, feldspar, illite, pyrite, Mg-siderite.
1118.7	1119.7	Oil shale: As above with some medium grayish brown in upper part. Tan to buff irregularly laminated dolomite band at 1118.9-1119.0. Sharp slightly unconformable contact with leaner oil shale below.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1119.7	1120.3	Oil shale: Medium olive gray with some medium to dark brownish gray, dolomitic. Faint discontinuous and displaced laminae. Regular to irregular thick to medium parting; slightly irregular fracture. A thin very light buff marlstone band at 1120.1; sharp irregular upper contact and gradational lower contact.
1120.3	1125.0	Oil shale: Dark brownish gray to black, dolomitic. Faint very fine streaked bedding and discontinuous laminae. Regular to irregular thick to some thin parting; irregular and hackly to fairly regular fracture; fractured and broken core from 1121.5 to 1123.3. Some medium to dark grayish-brown dolomite bands in upper part. (1123.3-1123.7 missing?)
1125.0	1126.0	Oil shale: Dark brownish gray, dolomitic. Faint laminae and streaked bedding. Regular to irregular thick to thin parting; irregular and some hackly fracture.
1126.0	1132.8	Oil shale: Dark to medium-dark brownish gray, dolomitic. Faint very fine regular to discontinuous laminae and some streaked bedding. Irregular to some fairly regular thick to some thin parting; slightly irregular to irregular and some coarse hackly fracture. Rare diagonal glossy shear surfaces. Rare fine dense tan to gray mineral laminae and streaks.
Footage adjustment: 1132.8 = 1132.2		
1132.2	1133.9	Oil shale: Dark to some medium brownish to almost neutral gray, dolomitic. Faint very fine laminae and streaked bedding. Regular to some irregular thick to rare thin parting; slightly irregular to some coarse hackly fracture. Occasional fine to thin grayish-brown dolomite laminae.
1133.9	1135.6	Oil shale: Medium to dark slightly brownish gray, slightly dolomitic. Faint very fine laminae and streaked bedding. Irregular to fairly regular thick parting; irregular to slightly conchoidal fracture. Some thin to 2-inch dense massive gray bands. Sample of gray band from 1134.5 feet: X-ray--quartz, K-feldspar, illite, dawsonite, Mg-siderite, pyrite, dolomite.
1135.6	1136.6	Oil shale: Medium to very dark brownish gray, dolomitic. Faintly laminated to very faintly streaked. Irregular to regular thick to rare thin parting; slightly conchoidal to irregular fracture.
1136.6	1137.8	Oil shale: Medium to dark grayish brown, dolomitic. Moderately distinct to faint laminae in upper part; faint disrupted streaked bedding below 1137.1. Irregular thick to medium parting; slightly conchoidal to irregular fracture. Abundant fine to thin gray-buff to light gray silty streaks and stringers below 1137.1. A very thin buff to grayish-brown pinch-and-swell algal dolomite layer at contact with darker oil shale above.
1137.8	1139.0	Siltstone and mudstone: Light to medium olive gray and some neutral gray; dolomitic to very slightly calcareous. Moderately distinct to faint blebby streaked bedding. Irregular thick

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LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		parting; irregular fracture. A 2-inch dense tan-buff dolomite band near top.
1139.0	1140.0	Oil shale: Medium olive gray and medium to very dark brownish gray; dolomitic to very slightly calcareous. Distinct distorted streaked bedding in upper 0.4 foot; faint discontinuous to regular thin to very fine laminae in lower part. Irregular to slightly irregular thick to some medium parting; irregular fracture. Few small to 2-inch brown to buff dolomite lenses. { Sample of mudstone streaked with siltstone from 1138.6 feet: X-ray--quartz, dolomite, illite, analcime, feldspar.
1140.0	1143.4	Oil shale: Very dark to rare medium brownish gray; medium slightly olive-gray zone at 1140.7-1140.9, dolomitic. Faint to some moderately distinct very fine to thin streaked bedding; some discontinuous laminae in lower part. Regular to irregular thick to some medium parting; irregular and some coarse hackly fracture. A very thin to 5/8-inch brown dolomite stringer at 1140.1; a 2-inch grayish-brown (center) to buff (rims) dolomite band at bottom.
1143.4	1144.1	Missing?
1144.1	1144.9	Oil shale: Medium to rare light and dark brownish gray, dolomitic. Faint to rare distinct very fine discontinuous to regular laminae and streaked bedding. Irregular to fairly regular thick to medium parting; irregular to fairly regular fracture.
1144.9	1145.5	Oil shale: Very dark to some medium grayish brown, dolomitic. Faint streaked bedding and some laminae; some small loop structures near bottom. Slightly irregular thick to medium parting; irregular and some coarse hackly fracture.
1145.5	1146.5	Claystone and mudstone (oil shale?): Medium olive gray to brownish gray and rare neutral gray, dolomitic. Very faint thin to fine laminae. Irregular thick parting; slightly conchoidal to irregular fracture. Thin vermiform gray siltstone stringers at 1145.9-1146.2. Coarse sand grains tightly packed in dense dolomitic matrix at 1146.2-1146.45.
1146.5	1147.6	Oil shale: Medium slightly olive gray to dark brownish gray, dolomitic. Faint discontinuous laminae and streaked bedding; some nearly massive zones. Regular to irregular thick parting; conchoidal fracture.
1147.6	1150.7	Oil shale: Medium-dark brownish gray in upper part to black in lower part, dolomitic. Faint streaked bedding and very fine discontinuous to regular laminae. Irregular to fairly regular thick to some medium parting; irregular and some coarse hackly fracture. Irregular white and gray silty band at 1148.5-1148.6. Thin dense gray stringers at 1150.15 and 1150.25. A thin streak of brownish-black platy gar scales (?) at 1148.45. { Sample of white to gray silty band from 1148.5-1148.6 feet: X-ray--quartz, K-feldspar, pyrite, dolomite.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1150.7	1151.3	<p>Sample of black oil shale from 1150.6 feet: X-ray--quartz, dolomite, illite, feldspar, Mg-siderite, pyrite.</p> <p>Mudstone: Light to some medium and rare dark brownish gray, dolomitic. Faint to fairly distinct laminae and bands. Irregular thick parting; irregular to slightly conchoidal fracture. Some fine light gray silty streaks and stringers.</p>
1151.3	1159.0	<p>Sandstone (tar sand): Light to medium brown, medium to fine-grained. Abundant white to buff wavy siltstone and mudstone laminae and bands. Irregular thick parting; slightly irregular to irregular fracture.</p> <p>Sample of sandstone from 1153.5 feet: X-ray--quartz, dolomite, feldspar.</p>
1159.0	1161.7	<p>Sandstone (tar sand): Medium to some dark brown, medium to fine-grained; some buff to white very fine-grained streaks and stringers. Irregular thick parting; irregular to fairly regular fracture.</p>
1161.7	1162.0	Missing
1162.0	1163.1	<p>Sandstone (tar sand): Dark to medium-light brown, medium-grained. Strongly tar impregnated. Irregular thick parting; slightly irregular fracture.</p> <p>Sample of tar sand from 1162.5 feet: X-ray--quartz, dolomite, feldspar.</p>
1163.1	1167.5	<p>Oil shale: Dark and some medium brownish gray, dolomitic. Faint streaked bedding and very fine discontinuous to regular laminae. Irregular to slightly irregular thick parting; irregular to slightly conchoidal fracture. A 2-inch band of light brownish-gray marly mudstone at 1163.4-1163.6. Gray-buff to medium brownish-gray silty tuff band laced with fine dark gray fracture fillings at 1166.0-1166.1.</p>
1167.5	1168.7	<p>Mudstone and claystone: Medium-light olive gray, slightly dolomitic. Faintly laminated zones alternating with massive zones. Irregular thick parting; conchoidal to irregular fracture.</p>
1168.7	1170.0	<p>Claystone and oil shale: Medium olive gray to medium and dark brownish gray, dolomitic. Faint thin to fine discontinuous to regular laminae. Irregular to slightly irregular thick to rare thin parting; irregular to slightly conchoidal fracture.</p>
1170.0	1171.0	<p>Oil shale: Medium to some dark brownish gray, dolomitic. Faint very fine laminae; rare small displacements. Regular to irregular thick parting; irregular to fairly regular fracture.</p>
1171.0	1172.0	<p>Oil shale: Medium olive gray and medium to rare dark brownish gray, dolomitic. Faint to some moderately distinct laminae; some fine to small displacements. Irregular thick parting; irregular and rare coarse hackly fracture.</p>
1172.0	1174.0	<p>Oil shale: Dark to some medium brownish to slightly olive gray, dolomitic. Faint very fine laminae. Regular to some irregular thick to rare thin parting; irregular to slightly irregular fracture. A thin dense gray mudstone lamina at 1172.7.</p>

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1174.0	1175.0	Oil shale: Dark to medium brownish to slightly olive gray, dolomitic. Faint very fine to rare thin laminae. Regular to irregular thick to medium parting; slightly irregular to conchoidal fracture.
1175.0	1177.0	Oil shale and claystone: Medium olive gray and some brownish gray, slightly dolomitic. Faintly laminated to massive; some light gray sandy to silty streaks in upper part. Irregular thick parting; irregular to conchoidal fracture.
1177.0	1178.2	Claystone (oil shale?): Medium slightly olive and brownish gray, dolomitic. Faint very fine laminae with abundant fine displacements to nearly massive with fine shredded streaks. Irregular thick parting; irregular fracture.
1178.2	1179.7	Oil shale: Medium to dark brownish gray, dolomitic. Faint streaked bedding. Irregular thick parting; irregular and conchoidal fracture. A 3-inch white to light gray silty tuff band at 1179.3-1179.6.
1179.7	1179.9	Oil shale: Very dark brownish gray. Faint very fine laminae and streaked bedding.
1179.9	1181.7	Oil shale: Medium-dark slightly olive and brownish gray, dolomitic. Faint very fine laminae. Regular to very irregular thick to some medium parting; slightly irregular to irregular fracture. Rare irregular shear surfaces with very fine slickensides. A fine vitreous black organic streak at 1180.3.
1181.7	1183.7	Oil shale: Dark and medium to medium and rare light olive gray and brownish gray; dolomitic to very slightly calcareous. Faint very fine laminae; some fine to small displacements. Irregular to slightly irregular thick to medium parting; irregular fracture.
1183.7	1185.5	Oil shale: Medium to light and rare dark brownish gray, dolomitic. Faint laminae; some fine displacements. Regular to irregular thick parting; irregular fracture. A massive light brownish-gray dolomitic marlstone band at 1184.0-1184.2.
1185.5	1187.0	Mudstone: Medium slightly olive gray, dolomitic. Faintly laminated to massive. Irregular thick parting; conchoidal to irregular fracture.
1187.0	1188.4	Oil shale: Brownish gray, dolomitic. Faint very fine laminae; some faintly streaked mudstone as above in middle part. Regular to irregular thick to rare thin parting; irregular fracture. A thin dark gray silty pyritic lamina at about 1187.7.
1188.4	1190.4	Oil shale: Dark to medium brownish to slightly olive gray, dolomitic. Faint very fine regular to discontinuous and displaced laminae. Regular to irregular thick to rare thin parting; irregular fracture.
1190.4	1191.6	Oil shale: Medium to rare light and dark brownish gray, dolomitic. Faint laminae; some fine displacements. Regular to some irregular thick parting; irregular to slightly conchoidal fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1191.6	1192.8	Mudstone: Medium-light slightly brownish gray; dolomitic to slightly calcareous. Faintly laminated and streaked to massive. Irregular thick parting; irregular and conchoidal fracture.
1192.8	1193.8	Mudstone and oil shale: Like 1190.4-1192.8.
1193.8	1196.9	Oil shale: Medium and some dark brownish gray, dolomitic. Faint very fine laminae; some fine to small displacements in lower part. Irregular to regular thick to medium parting; fairly regular to irregular fracture.
		Sample of medium-dark brownish-gray oil shale from 1195.2 feet: X-ray--dolomite, quartz, illite, analcime, feldspar.
1196.9	1197.9	Oil shale: Medium to dark grayish brown and some tan to buff, dolomitic. Faint to distinct regular to irregular laminae, bands, and fine to thin streaks; some intricately displaced bedding in middle part. Irregular parting and fracture; uneven sample split.
1197.9	1202.8	Oil shale: Dark to medium brownish gray, some black near bottom, dolomitic. Faintly laminated; some fine displacements. Irregular to rare regular thick to some medium parting; irregular to some fairly regular fracture. Occasional fine vertical to diagonal pyrite streaks in upper part.
1202.8	1204.4	Oil shale and marlstone: Dark to medium and rare light grayish-brown faintly streaked and rarely laminated oil shale; light to medium brownish-gray faintly laminated to banded slightly silty marlstone at 1203.1-1203.6. Irregular thick parting; irregular to slightly conchoidal fracture.
1204.4	1205.4	Oil shale: Medium to light grayish brown, dolomitic. Faint to moderately distinct very fine laminae; abundant fine displacements. Irregular to fairly regular thick parting; irregular to slightly conchoidal fracture.
1205.4	1206.4	Oil shale: Medium grayish brown to medium and dark brownish gray, dolomitic. Faintly laminated; rare fine displacements. Irregular to fairly regular thick parting; irregular to slightly conchoidal fracture. Rare fine irregular pyrite streaks.
1206.4	1209.7	Oil shale: Dark to medium brownish gray (common slight olive tint), dolomitic. Faint to rare moderately distinct laminae; rare fine displacements. Irregular to some regular thick to rare thin parting; irregular to slightly conchoidal fracture.
1209.7	1211.0	Oil shale: Medium to some dark and light brownish gray, dolomitic. Faint to some moderately distinct laminae. Regular to irregular thick to medium parting; slightly conchoidal to irregular fracture. A 1-inch tan to brown blebby to dense dolomite lens at 1210.9.
1211.0	1213.0	Oil shale: Dark to medium grayish brown, dolomitic. Faint streaked bedding with some thin brown dolomite streaks in upper 0.7 foot; faint laminae with rare fine displacements in lower

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		part. Irregular to regular thick to medium parting; slight to coarse hackly fracture in upper part; slightly irregular and conchoidal fracture in lower part. A 1-inch zone of abundant fine slightly brownish-gray silty streaks near top.
1213.0	1215.0	Oil shale: Dark grayish brown, dolomitic. Faint very fine regular to displaced and discontinuous laminae. Irregular to some regular thick to medium parting; irregular fracture. Few irregular diagonal glossy shear surfaces in lower part. Rare fine irregular pyrite streaks in lower part.
1215.0	1216.4	Oil shale: Dark grayish brown to black in upper and lower parts; medium brownish gray at 1215.4-1215.9, dolomitic. Faint very fine laminae to very faint streaked bedding. Irregular to slightly irregular thick to medium parting; irregular to slightly conchoidal fracture. Abundant fine pyrite streaks at 1216.1.
1216.4	1217.5	Oil shale: Medium and rare dark grayish brown to slightly olive gray, dolomitic. Faint and rare moderately distinct laminae, some fine displacements. Irregular to regular thick to medium parting; irregular fracture.
1217.5	1219.9	Oil shale: Medium and rare light brownish to slightly olive gray, dolomitic. Faintly laminated; abundant fine displacements. Irregular thick parting; conchoidal to irregular fracture. Very sharp regular slightly unconformable contact with dark oil shale below.
1219.9	1220.7	Oil shale: Dark brownish gray; dolomitic. Faint streaked bedding; rare small lenticular cross-laminated oil-shale inclusions. Irregular thick parting; slightly irregular to irregular fracture.
1220.7	1221.8	Oil shale: Medium to some light olive gray; dolomitic to slightly calcareous. Faint very fine laminae; interfingered with dark grayish-brown oil shale in lower 3 inches. Irregular thick parting; irregular to conchoidal fracture.
1221.8	1224.0	Oil shale: Medium to rare light and dark brownish gray; slightly calcareous to dolomitic. Faint to some moderately distinct laminae. Irregular to regular thick parting; slightly conchoidal fracture. Fine displaced blue-gray silty lamina at 1223.85.
1224.0	1224.4	Missing
1224.4	1227.3	Oil shale: Dark to medium olive gray becoming mostly dark grayish brown in lower part; rare resinous black streaks and laminae in upper part, dolomitic. Faint laminae and streaked bedding. Irregular to some regular thick to rare thin parting; slightly irregular to irregular fracture. Fine gray silty lamina at 1225.2
1227.3	1229.3	Oil shale: Dark grayish brown to black, dolomitic. Faint very fine laminae to <u>very</u> faint streaked bedding. Irregular to fairly regular thick to medium parting; irregular fracture. A 1 1/2-inch dense grayish-brown dolomite band at 1228.3-1228.5.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1229.3	1230.7	Oil shale: Very dark brownish gray and some black, dolomitic. Faint very fine laminae and rare discontinuous laminae. Irregular to regular thick to medium parting; irregular slight to coarse hackly fracture. A thin medium-light brownish-gray slightly silty band at 1229.7. { Sample of black oil shale from 1230.3 feet: X-ray--quartz, calcite, illite, feldspar, Mg-siderite, dolomite, extra peak at 30° 2θ.
1230.7	1232.0	Oil shale: Dark to some medium brownish gray, slightly dolomitic. Faint to some moderately distinct laminae; rare fine loop structures and displacements. Fairly regular to irregular thick to medium parting; slightly irregular to irregular fracture.
1232.0	1232.2	Limestone: Buff and tan-buff, dolomitic. Very faint displaced bands and laminae. Fairly regular contacts. { Sample of tan-buff limestone from 1232.1 feet: X-ray--dolomite, some quartz.
1232.2	1233.3	Oil shale: Medium brown and some tan to buff in upper part becoming dark brownish gray in lower part, very dolomitic. Distinct streaked bedding and disrupted laminae in upper part to very faint regular laminae and streaked bedding in lower part. Irregular to regular thick to rare thin parting; irregular to slightly conchoidal fracture. A 1/2-inch limestone lens (as above) at 1232.4.
1233.3	1236.6	Oil shale: Very dark to some medium brownish gray; dolomitic to very slightly calcareous. Faint regular to discontinuous laminae and streaked bedding; occasional distinct buff to tan marlstone bands and laminae. Irregular to some regular thick to some medium parting; slightly irregular to irregular and some hackly fracture.
1236.6	1239.0	Oil shale: Dark to light grayish brown and brownish gray. Very fine commonly displaced laminae and streaked bedding in gradational to sharply defined darker and lighter zones. Fairly regular to irregular thick to rare thin parting; slightly irregular to irregular fracture. A very small black chalcedony lens at 1238.25. { Sample of dark to medium brownish-gray oil shale from 1237.7 feet: X-ray--quartz, dolomite, analcime, feldspar, illite, calcite.
1239.0	1240.0	Oil shale: Medium grayish brown and some tan to very dark brownish gray and some black, dolomitic. Distinct to very faint laminae and streaked bedding. Regular to irregular thick to very thin parting; irregular to hackly fracture.
1240.0	1243.6	Oil shale: Dark brownish gray and rare black, dolomitic. Faint very fine laminae to very faint streaked bedding; some distinct tan marlstone laminae in upper part. Regular to irregular medium

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		to thick and rare thin parting; irregular and some slight to coarse hackly fracture; occasional medium to low-angle glossy shear surfaces. Very rare ostracods.
1243.6	1244.0	Missing
1244.0	1249.0	Oil shale: Black to dark brownish gray, dolomitic. Faint streaked bedding and some laminae; distinct tan dolomitic limestone bands at 1244.9-1245.05, 1245.25-1245.45, 1246.7-1246.8, 1247.6-1247.75, and 1247.9-1248.0. Irregular to regular thick to rare thin parting; irregular to slightly conchoidal fracture. A fine black chalcedony lens at 1248.3.
1249.0	1254.4	Oil shale: Dark and rare medium brownish gray; some black near bottom; dolomitic and some slightly calcareous. Very faint very fine laminae and streaked bedding. Regular to some irregular papery to thick parting; hackly to some slightly irregular fracture. <p style="margin-left: 40px;">Sample of dark papery shale from 1252.8 feet: X-ray-- quartz, illite, calcite, analcime, feldspar, pyrite, Mg-siderite.</p>
1254.4	1255.5	Oil shale: Black to dark and rare medium grayish brown; distinctly streaked and laminated with tan marlstone. Fairly regular thick to some thin parting; irregular and some hackly fracture. A 0.1-foot band of tan-buff marlstone at top.
1255.5	1257.7	Oil shale: Very dark grayish brown, dolomitic. Very faint very fine streaked bedding and discontinuous laminae. Regular to some irregular thick to some thin parting; slightly irregular and conchoidal fracture. Rare ostracods.
1257.7	1260.3	Oil shale: Dark brownish gray, rare medium and black in lower part, dolomitic. Very faint very fine streaked bedding and some laminae. Irregular to regular thick to thin parting; irregular and some hackly fracture; some incomplete fractured core pieces.
1260.3	1260.7	Oil shale: Buff to medium-dark olive gray; very dolomitic or slightly calcareous. Faint very fine streaked bedding and discontinuous laminae. Irregular parting and fracture.
1260.7	1261.2	Missing
1261.2	1262.2	Oil shale: Dark to some medium brownish gray; buff to medium-light zone at 1261.5-1261.8. Moderately distinct to faint streaked bedding. Irregular thick to some medium parting; slightly irregular and hackly fracture.
1262.2	1263.0	Oil shale: Medium to dark grayish brown, dolomitic. Faint distorted streaked bedding with abundant small to 1-inch tan marlstone lenses and nodules (rarely with truncated internal bedding); a very irregular marlstone layer in lower 2 inches. Irregular parting and fracture. <p style="margin-left: 40px;">Sample of tan marlstone layer from 1262.9 feet: X-ray-- dolomite, some quartz.</p>

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1263.0	1263.7	Oil shale: Dark grayish brown and some black to medium brown, dolomitic. Faint to moderately distinct streaked bedding and some discontinuous laminae. Irregular parting and fracture.
1263.7	1266.0	Oil shale: Dark brownish gray; some black in upper part, dolomitic. Moderately distinct to very faint regular to some discontinuous laminae. Regular to irregular medium to thick and some thin parting; slightly irregular to irregular fracture; few very irregular glossy shear surfaces in lower part.
1266.0	1269.2	Oil shale: Dark brownish to slightly olive gray, dolomitic. Faint very fine regular laminae. Irregular to some regular thick parting; irregular to slightly conchoidal fracture; irregular shaly parting and hackly fracture from 1267.6 to 1268.5.
1269.2	1270.8	Oil shale: Medium to dark brownish to slightly olive gray, slightly dolomitic. Faint to some moderately distinct regular to discontinuous and displaced laminae. Regular to irregular thick to rare thin parting; slightly conchoidal to irregular and rare hackly fracture.
1270.8	1271.8	Oil shale: Medium to some dark olive gray and brownish gray, dolomitic. Faint streaked bedding and very fine discontinuous laminae. Irregular thick parting; slightly conchoidal to irregular fracture. A 1 1/2-inch tan dolomitic limestone band at 1271.0-1271.2.
1271.8	1274.4	Oil shale: Dark to some medium olive gray and brownish gray, dolomitic. Faint laminae and some streaked bedding. Regular to irregular thick to some medium parting; slightly irregular to irregular fracture.
1274.4	1276.6	Oil shale: Medium to some light olive gray, becoming interbedded with dark brownish gray in lower part, dolomitic. Faint to some moderately distinct streaked bedding and rare discontinuous laminae. Irregular to slightly irregular thick parting; slightly to moderately conchoidal and irregular fracture. A 1-inch light gray dense and slightly silty band at 1274.5. A 1 1/4-inch irregularly bedded grayish-brown dolomite band at 1275.2; some small dolomite lenses in dark zones in lower part.
1276.6	1278.6	Oil shale: Dark and rare medium brownish gray to some black, slightly dolomitic. Faint streaked bedding and some discontinuous laminae. Regular to irregular thick to thin parting; slight irregular to irregular and some hackly fracture.
1278.6	1281.0	Oil shale: Dark brownish to almost neutral gray; few medium grayish-brown bands; slightly dolomitic to noncalcareous. Very faint very fine discontinuous laminae. Regular to rare irregular thick to some thin parting; irregular to slightly conchoidal fracture.

Sample of dark slightly brownish-gray oil shale from 1279.9 feet: X-ray--quartz, illite, feldspar, pyrite, dolomite.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1281.0	1282.2	Oil shale: Dark to rare medium brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Regular to irregular thick to some thin parting; irregular and rare hackly fracture. (Sample of dark brownish-gray oil shale from 1281.9 feet: X-ray--quartz, dolomite, illite, feldspar.
1282.2	1282.9	Oil shale: Dark to medium brownish to slightly olive gray; dolomitic to very slightly calcareous. Faint discontinuous and displaced laminae to distorted streaked bedding; a 2-inch tan marlstone band at top. Irregular thick to thin parting; irregular fracture.
1282.9	1286.0	Oil shale: Dark to some medium brownish gray and rare olive gray, dolomitic. Faint to moderately distinct streaked bedding and rare laminae. Irregular to regular thick to medium parting; irregular to slightly conchoidal fracture.
1286.0	1289.0	Oil shale: Dark slightly olive gray and brownish gray, dolomitic. Very faint streaked bedding and <u>very</u> fine laminae. Irregular to fairly regular thick to thin parting; irregular to hackly fracture. Some finely laminated tan marlstone at 1287.8-1288.0.
1289.0	1296.6	Oil shale: Dark and rare medium brownish gray, dolomitic. Faint very fine laminae and streaked bedding; some tan dolomitic marlstone bands in upper part becoming rare in lower part. Regular to irregular thick to thin parting; irregular and hackly to slightly irregular and conchoidal fracture; rare high- to low-angle glossy shear surfaces.
1296.6	1298.6	Oil shale: Medium and some dark grayish brown to tan, becoming interbedded with black oil shale in lower part, dolomitic. Moderately distinct to very faint streaked bedding and discontinuous laminae. Irregular to regular thick to rare thin parting; slightly conchoidal to irregular fracture.
1298.6	1300.0	Oil shale: Dark brownish gray and some black, dolomitic. Very faint streaked bedding and some laminae. Irregular to regular thick to thin parting; irregular and hackly fracture. (Sample of black oil shale from 1299.9 feet: X-ray--quartz, illite, dolomite, feldspar, Mg-siderite, pyrite.
1300.0	1305.9	Oil shale: Dark to rare medium brownish gray; rare medium grayish-brown to tan bands, dolomitic. Very faint very fine laminae and streaked bedding. Regular to irregular thick to very thin parting; slightly irregular to hackly fracture.
1305.9	1306.9	Oil shale: Dark to medium brownish gray, dolomitic. Faint to moderately distinct discontinuous and displaced laminae to streaked bedding. Slightly irregular to irregular thick parting; irregular and some coarse hackly fracture. Tan to buff marlstone in lower 0.1 foot.
1306.9	1310.0	Oil shale: Dark brownish gray, slightly dolomitic. Faint <u>very</u> fine laminae. Regular to irregular thick to some papery parting; hackly fracture. Rare dense grayish-brown dolomite bands.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1310.0	1312.0	Oil shale: Dark slightly brownish gray, slightly dolomitic. Faint <u>very</u> fine laminae. Irregular to some regular thick to thin parting; hackly to slightly conchoidal fracture.
1312.0	1315.9	Oil shale: Medium-dark slightly brownish gray, dolomitic. Faint <u>very</u> fine laminae. Irregular to some regular thick to rare thin parting; irregular and slightly conchoidal to rare hackly fracture. Brown dolomite bands at 1312.9-1313.0 and 1315.75-1315.9. Sample of medium-dark slightly brownish-gray oil shale from 1313.5 feet: X-ray--quartz, illite, Mg-siderite, feldspar, dolomite, pyrite.
1315.9	1316.0	Missing?
1316.0	1317.9	Oil shale: Dark brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Irregular to very regular medium to thick and rare thin parting; irregular and slightly conchoidal to rare coarse hackly fracture. A 1-inch brown dolomite band at 1316.4.
1317.9	1319.4	Oil shale: Dark to some medium and rare light brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Irregular to regular thick to rare thin parting; irregular to slightly irregular fracture. A 1-inch brown dolomite band at top. Sample of brown band from 1318.0 feet: X-ray--dolomite, trace quartz.
1319.4	1320.5	Oil shale: Dark and rare medium grayish brown and brownish gray, dolomitic. Faint and rare moderately distinct very fine laminae. Irregular to regular thick to some thin parting; irregular to slightly conchoidal fracture.
1320.5	1323.8	Oil shale: Dark slightly brownish gray. Faint streaked bedding and very fine laminae. Irregular thick to some thin parting; irregular and some hackly fracture. A 1-inch brown dolomite band at 1322.3.
1323.8	1324.0	Missing?
1324.0	1325.0	Oil shale: Dark to rare medium brownish gray, slightly dolomitic. Faintly laminated. Irregular thick to some thin parting; irregular and some coarse hackly fracture. A 1-inch brown dolomite band at 1324.7.
1325.0	1327.2	Oil shale: Dark to medium brownish to slightly olive gray; dolomitic to very slightly calcareous. Faint to some moderately distinct very fine to thin laminae and rare bands. Regular to irregular thick to rare thin parting; irregular to slightly conchoidal fracture.
1327.2	1328.4	Mudstone: Light to medium slightly olive gray; slightly calcareous to dolomitic. Faint discontinuous and some wavy laminae, streaks, and bands. Irregular to fairly regular thick parting; slightly conchoidal to irregular fracture. Irregular displaced 3/4-inch brown dolomite band at 1327.6. Rare fine light gray silty streaks.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		Sample of medium-light slightly olive-gray mudstone from 1327.9 feet: X-ray--quartz, dolomite, illite, feldspar, analcime.
1328.4	1332.1	Oil shale: Medium to some dark and rare light olive gray; some brownish gray in lower part; dolomitic to slightly calcareous. Faint to rare distinct regular to some discontinuous and displaced laminae. Irregular to rare regular thick to rare thin parting; slightly conchoidal to irregular and some hackly fracture. Rare thin dolomite bands.
1332.1	1333.4	Oil shale: Buff to medium and rare dark brownish gray, slightly calcareous, slightly silty in part. Moderately distinct to faint regular to displaced and discontinuous fine to thin laminae. Irregular thick parting; irregular to slightly conchoidal fracture.
1333.4	1334.0	Oil shale: Medium to dark and some light brownish gray and grayish brown, dolomitic. Distinct regular to discontinuous laminae; common fine displacements and irregular loop structures. Irregular thick parting; irregular to slightly conchoidal fracture. Faintly layered dense grayish-brown dolomite in lower 0.1 foot.
1334.0	1334.7	Oil shale: Light to rare dark olive gray and grayish brown, calcareous. Moderately distinct to faint discontinuous and displaced laminae. Irregular thick parting; irregular and conchoidal fracture.
1334.7	1336.3	Oil shale: Alternating zones as above and below.
1336.3	1338.4	Oil shale: Medium to dark brownish gray; some light brownish-gray and olive-gray streaks in upper part, dolomitic. Moderately distinct to faint streaked bedding. Irregular thick parting; irregular fracture. Rare small tan-buff dolomite lenses.
1338.4	1340.0	Oil shale: Dark to some medium brownish gray and olive gray, dolomitic. Faint streaked bedding and very fine laminae. Irregular thick to medium parting; irregular fracture. Grayish-brown to tan dolomite bands at 1338.65-1338.8 and 1339.45-1339.55.
1340.0	1343.3	Oil shale: Medium and rare dark olive gray and brownish gray, slightly calcareous. Faint to moderately distinct very fine discontinuous and displaced to regular laminae. Irregular thick parting; irregular fracture. Abundant fine light gray silty streaks and blebs.
1343.3	1344.3	Oil shale: As above, but without silty streaks and blebs.
1344.3	1345.3	Oil shale: Medium to dark grayish brown, dolomitic. Faint streaked bedding and very fine discontinuous to regular laminae. Irregular medium to thick parting; slightly conchoidal to irregular fracture.
1345.3	1346.6	Oil shale: Dark grayish brown and brownish gray, dolomitic. Very faint very fine laminae and streaked bedding. Irregular to regular thick to rare thin parting; irregular to slightly conchoidal fracture.
1346.6	1348.0	Oil shale: Dark brownish gray, dolomitic. Very faint very fine laminae and streaked bedding. Regular to irregular thick to

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		some thin parting; slightly conchoidal to irregular and hackly fracture; rare low to high-angle glossy shear surfaces.
1348.0	1349.0	Oil shale: Dark grayish brown to rare black, dolomitic. Faint very fine laminae and streaked bedding. Irregular to regular thick to medium parting; irregular fracture.
1349.0	1350.5	Oil shale: Medium to rare dark olive gray and brownish gray, dolomitic. Faint to moderately distinct streaked bedding and discontinuous and displaced to regular laminae. Irregular thick parting; irregular to conchoidal fracture. Small grayish-brown dolomite lenses at 1349.9.
1350.5	1352.0	Oil shale: Medium to dark brownish gray and rare black. Faint to moderately distinct streaked bedding and discontinuous and displaced to regular laminae. Irregular thick to medium parting; irregular fracture; some double-cut and broken partial core; uneven sample split.
1352.0	1354.0	Missing
1354.0	1355.0	Oil shale: Medium to rare light olive gray and brownish gray, dolomitic to very slightly calcareous. Moderately distinct to faint very fine discontinuous and displaced to regular laminae. Irregular thick parting; irregular to conchoidal fracture. A thin irregular grayish-brown dolomite layer at 1354.2.
1355.0	1355.9	Oil shale: Medium olive gray and medium to some dark grayish brown, very dolomitic. Faint to some distinct very fine laminae; common very fine displacements. Irregular to fairly regular thick parting; irregular to slightly conchoidal fracture.
		Sample of medium to dark oil shale from 1355.5 feet: X-ray--dolomite, quartz, illite, feldspar, analcime.
1355.9	1358.0	Oil shale: Dark grayish brown to brownish black, dolomitic. Very faint streaked bedding and some displaced to regular laminae. Regular to irregular thick to rare thin parting; slightly irregular to irregular and some coarse hackly fracture. A thin tan dolomite laminae at 1357.15 and a thick grayish-brown band at 1357.2-1357.3.
1358.0	1359.0	Oil shale: Dark to rare medium brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Regular to irregular thick to some thin parting; irregular and some hackly to conchoidal fracture.
		Sample of dark brownish-gray oil shale from 1358.7 feet: X-ray--quartz, illite, dolomite, calcite, feldspar.
1359.0	1363.0	Oil shale: Dark to rare medium brownish gray, dolomitic. Faint to rare moderately distinct laminae. Irregular to some regular medium to some thick and thin parting; irregular and hackly to slightly conchoidal fracture. Few medium grayish-brown to tan laminated to massive dolomite bands.
1363.0	1364.0	Oil shale: As above and below. Some broken core and rubble.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1364.0	1366.1	Oil shale: Medium and some dark slightly olive gray, dolomitic. Faint very fine laminae; common fine displacements. Regular to irregular thick to medium parting; slightly irregular fracture.
1366.1	1368.8	Mudstone and claystone: Medium slightly olive gray, slightly dolomitic. Very faint streaked bedding and some displaced laminae. Irregular to fairly regular thick parting; irregular to slightly conchoidal fracture. A 0.1-foot light brownish-gray massive dolomite band at top; bands with faint irregular to wavy laminae at 1368.1-1368.3 and 1368.6-1368.8.
1368.8	1369.9	Oil shale: Medium to dark brownish gray, dolomitic. Faint discontinuous and displaced to regular laminae. Irregular to some regular medium to thick parting; irregular to slightly conchoidal fracture.
1369.9	1370.9	Oil shale: Black to dark brownish gray, dolomitic. Very faintly bedded; some distinct fine to 3/4-inch grayish-brown dolomite laminae and bands. Regular to some irregular medium to thin and rare thick parting; hackly fracture.
1370.9	1373.9	Oil shale: Dark brownish gray; rare medium to light grayish-brown zones, dolomitic. Faint streaked bedding and very fine laminae. Irregular to regular thick to some thin parting; irregular to slightly conchoidal fracture.
1373.9	1374.1	Missing?
1374.1	1376.7	Oil shale: Dark brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Regular to irregular thick to papery parting; hackly fracture. Some irregular medium- to high-angle glossy shear surfaces.
1376.7	1381.0	Oil shale: Dark to some medium brownish gray, slightly dolomitic. Faint very fine discontinuous and displaced to regular laminae and streaked bedding. Mostly irregular broken core pieces and rubble; partly grab sampled. Few dolomite bands. Very irregular and wavy brownish-gray silty tuff (?) stringer at 1378.0-1378.2.
1381.0	1381.3	Missing?
1381.3	1383.3	Oil shale: Dark to some medium brownish gray, slightly dolomitic. Faint very fine laminae, becoming discontinuous and displaced in lower part. Irregular to fairly regular medium to thin and some thick parting; hackly fracture.
1383.3	1386.3	Marlstone: Medium slightly olive gray and rare grayish brown, very dolomitic. Faint streaked bedding and discontinuous to regular thin to fine laminae. Irregular thick parting; irregular to conchoidal fracture. A 2-inch grayish-brown dolomite band at 1383.5-1383.7; a 1-inch band at 1384.4-1384.5; 1/2- and 1/4-inch bands at 1385.5-1385.6.
		Sample of olive-gray marlstone from 1384.8 feet: X-ray-- quartz, dolomite, illite, analcime, feldspar.
1386.3	1386.7	Oil shale: Medium grayish brown to dark brownish gray, dolomitic. Faint to moderately distinct discontinuous laminae to distorted

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		and shredded streaked bedding. Slightly irregular thick parting; slightly irregular and conchoidal fracture.
1386.7	1387.5	Oil shale: Medium and rare dark slightly olive and brownish gray, very dolomitic. Faint to moderately distinct very fine laminae; zone of distorted streaked bedding with unconformable contacts at 1387.1-1387.4. Regular thick to rare thin parting; irregular to slightly conchoidal fracture.
1387.5	1388.0	Oil shale: Medium to dark brownish gray, dolomitic. Faint very fine laminae. Regular medium to thin parting; irregular slightly hackly fracture. A thin mottled grayish-brown to tan silty tuff lamina at bottom.
1388.0	1391.0	Oil shale: Medium to dark gray (slightly brownish and olive), dolomitic. Faint very fine laminae and streaked bedding. Regular to irregular thick to thin parting; slightly conchoidal to hackly fracture.
1391.0	1391.2	Missing?
1391.2	1392.6	Oil shale: Dark and some medium brownish gray; rare black in lower part, dolomitic. Faint streaked bedding and some very fine discontinuous to regular laminae. Irregular to regular thick to medium parting; irregular fracture. Broken core in upper part; uneven sample split.
1392.6	1394.6	Oil shale: Medium to dark brownish gray, grayish brown, and olive gray; dolomitic. Faint to moderately distinct very fine to thin laminae; common fine displacements. Regular to irregular thick parting; irregular to slightly conchoidal fracture.
1394.6	1396.8	Oil shale: Medium to some dark and light olive gray, brownish gray, and grayish brown; dolomitic to slightly calcareous. Moderately distinct to faint very fine to rare thin laminae; common fine displacements. Irregular thick parting; slightly conchoidal to irregular fracture.
1396.8	1397.6	Oil shale: Dark and rare medium brownish gray to black, dolomitic. Faint <u>very</u> fine laminae. Regular papery to rare thick parting; hackly to slightly irregular and conchoidal fracture.
		{ Sample of dark papery oil shale from 1397.0 feet: X-ray-- quartz, illite, dolomite, calcite, feldspar, pyrite.
1397.6	1398.9	Oil shale: Dark to medium-dark brownish gray, dolomitic. Faint very fine discontinuous laminae and streaked bedding. Irregular to fairly regular thick parting; irregular fracture. A vertical fracture with very patchy noncalcareous mineral crusts in upper part; broken core in lower part.
1398.9	1400.0	Oil shale: Dark to some medium brownish gray, dolomitic. Faint streaked bedding and very fine laminae. Broken core and rubble; grab sampled.
1400.0	1403.0	Oil shale: Medium brownish gray and olive gray; some dark brownish gray near top and bottom; dolomitic to slightly calcareous. Faint

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		to moderately distinct laminae and rare streaked bedding; common fine displacements. Irregular thick parting; irregular to slightly conchoidal fracture. A 2-inch irregular layer or large lens of buff dolomite at 1401.8.
1403.0	1404.0	Oil shale: Dark and some medium grayish brown to black, dolomitic. Faint streaked bedding and discontinuous and displaced to regular laminae. Regular thick to thin parting; slightly irregular to hackly fracture.
1404.0	1407.0	Oil shale: Dark to medium-dark brownish to slightly olive gray, dolomitic. Faint very fine regular to discontinuous laminae. Regular to irregular thick to some thin parting; irregular to hackly fracture. Three 1-inch grayish-brown dolomite bands separated by thin oil-shale layers in upper 0.3 foot; few fine chalcedony streaks in lower oil-shale layer.
1407.0	1409.0	Oil shale: As above. Mostly broken core and rubble with artificial (?) vertical fractures. A 1-inch tan-buff dolomite band at about 1407.8.
1409.0	1411.0	Oil shale: Medium to dark grayish brown and some black, dolomitic. Faint to fairly distinct very fine regular to discontinuous and displaced laminae. Regular to some irregular thick to thin parting; slightly conchoidal to coarse hackly fracture. Few dolomite bands in lower part.
1411.0	1414.0	Oil shale: Dark brownish to almost neutral gray, dolomitic. Faint very fine regular to discontinuous laminae. Irregular to regular medium to very thin parting; hackly fracture. A 3/4-inch dense medium-dark grayish-brown dolomite band at 1413.1
1414.0	1417.0	Oil shale: Very dark brownish gray, slightly dolomitic. Faint very fine laminae. Regular to some irregular thick to some thin parting; hackly to slightly conchoidal fracture. Grayish-brown dolomite band at 1414.3-1414.5.
1417.0	1419.0	Oil shale: Medium almost neutral gray to brownish gray; dolomitic to slightly calcareous. Faint very fine laminae; very abundant fine displacements. Irregular thick to thin parting; coarse hackly to irregular fracture. A 1-inch tan silty dolomite band at 1418.6.
		{ Sample of slightly brownish-gray oil shale from 1418.0 feet: X-ray--quartz, illite, dolomite, feldspar.
1419.0	1422.4	Oil shale: Dark to medium slightly brownish gray, dolomitic. Faint regular to discontinuous and rarely disrupted laminae and streaked bedding. Irregular to regular medium to papery parting; hackly fracture. A 1-inch tan-buff laminated dolomite band at top.
1422.4	1422.9	Oil shale: Dark to some medium brownish gray and rare black, dolomitic. Faint regular to irregular and displaced laminae. Regular thin to medium parting; hackly fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1422.9	1423.4	Oil shale: Medium to some light and rare dark brownish gray; very dolomitic or slightly calcareous. Faint to moderately distinct laminae. Slightly irregular to irregular thick to medium parting; slightly irregular to irregular fracture. Some very fine silty calcareous streaks. A 1-inch light brownish-gray to buff marly dolomite band in middle.
1423.4	1424.0	Missing
1424.0	1425.3	Oil shale: Distinctly laminated tan to dark brownish-gray zones alternating with faintly laminated dark brownish-gray to black zones, dolomitic. Distinct to faint laminae; some fine to small irregular displacements in lighter zones. Regular to irregular thick to thin parting; slightly conchoidal to irregular and some coarse hackly fracture. A thin zone of small to fine buff marlstone lenses in distorted laminae at 1424.5.
1425.3	1426.3	Oil shale: Dark brownish gray, dolomitic. Faint very fine laminae. Regular to irregular thick to thin parting; slightly conchoidal to hackly fracture.
1426.3	1427.3	Oil shale: Medium to dark brownish gray; some grayish brown to tan in upper part; slightly calcareous to dolomitic. Moderately distinct to very faint laminae; some fine to small displacements in upper part. Regular to rare irregular thick to some thin parting; slightly conchoidal fracture. A very thin pale yellow soft earthy layer at 1426.4; few fine crystalline patches in oil shale immediately below layer. Sample of pale yellow earthy layer from 1426.4 feet: X-ray--mixed layer clay, kaolin, illite, feldspar, analcime. Sample of oil shale with few fine mineral patches from 1426.45 feet: X-ray--dolomite, analcime, quartz, feldspar.
1427.3	1429.5	Oil shale: Dark and rare medium brownish gray, dolomitic. Very faint very fine laminae and streaked bedding. Irregular to regular thick to thin parting; hackly to slightly conchoidal fracture. A 0.1-foot grayish-brown to buff dolomite band near top; abundant light brownish-gray displaced laminae at 1428.1-1428.3.
1429.5	1430.5	Oil shale: Dark brownish gray, dolomitic. Very faint very fine laminae and streaked bedding. Regular to irregular medium to thin parting; coarse hackly fracture.
1430.5	1431.5	Oil shale: Dark brownish gray to black, dolomitic. Very faint very fine laminae and streaked bedding. Regular thin to medium parting; fairly regular to hackly fracture.
1431.5	1432.6	Oil shale: Dark and rare medium brownish gray to some black, dolomitic. Faint very fine laminae. Regular medium to thin parting; slightly irregular and some hackly fracture.
1432.6	1434.0	Oil shale: Dark to medium brownish gray and some tan to buff, dolomitic. Faint and rare distinct very fine to thin laminae;

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		rare fine to small displacements. Irregular to regular thick to some thin parting; irregular to slightly conchoidal fracture.
1434.0	1434.1	Missing?
1434.1	1438.1	Oil shale: Dark and rare medium brownish gray, dolomitic. Faint very fine laminae. Irregular to regular thick to thin parting; slightly conchoidal to hackly fracture.
1438.1	1440.1	Oil shale: Dark brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Regular to some irregular very thin to rare thick parting; hackly fracture.
1440.1	1442.0	Oil shale: Medium to some dark brownish gray and some tan to buff, dolomitic. Faint to some distinct discontinuous and displaced laminae and streaked bedding. Fairly regular to irregular thick parting; slightly irregular and conchoidal fracture.
1442.0	1444.0	Oil shale: Dark brownish gray to black, dolomitic. Faint very fine discontinuous and displaced to regular laminae. Regular medium to thin and some thick parting; hackly to slightly irregular and conchoidal fracture. Faintly laminated and streaked dolomite bands at 1442.7-1442.9 and 1443.8-1443.9.
1444.0	1450.0	Oil shale: Dark slightly brownish gray, becoming medium-dark in lower part; slightly to moderately dolomitic. Faint very fine laminae. Regular to irregular medium to thick parting; slightly conchoidal to some irregular and hackly fracture. Medium to light brownish-gray dolomite bands at 1444.6-1444.8, 1445.9-1446.0, 1447.85-1448.0, and 1448.95-1449.05.
1450.0	1451.2	Oil shale: Dark and rare medium to light brownish gray, dolomitic. Faint very fine laminae; abundant distinct medium to light brownish-gray dolomite laminae in some zones. Regular to some irregular thick to papery parting; slightly conchoidal to hackly fracture.
1451.2	1451.3	Missing?
1451.3	1457.0	Oil shale: Dark slightly brownish to almost neutral gray; moderately to slightly dolomitic. Faint very fine laminae. Regular to irregular thick to thin parting; slightly conchoidal to hackly fracture. Rare fine to thin brownish-gray and gray dolomite and limestone bands. ( Sample of dark gray shale from 1452.0 feet: X-ray--quartz, illite, dolomite, feldspar, pyrite.
1457.0	1458.0	Oil shale: Dark to medium slightly brownish gray, dolomitic. Faint very fine laminae. Irregular to regular thick to rare thin parting; coarse hackly to slightly conchoidal fracture. Some thin medium to light brownish-gray dolomite laminae in upper part.
1458.0	1459.0	Oil shale: As above and below, abundantly laminated with buff to brownish-gray dolomite.
1459.0	1460.0	Oil shale: Dark brownish gray, dolomitic. Faintly laminated. Regular to irregular thick to rare thin parting; irregular to slightly conchoidal fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1460.0	1463.0	Oil shale: Dark to medium slightly brownish gray, dolomitic. Faint very fine laminae; some fine displacements. Regular to irregular medium to thick and some thin parting; irregular and hackly to slightly conchoidal fracture; some broken core in upper part. A 1-inch dolomite band at 1460.4 and a 1 1/2-inch band at 1461.9-1462.0.
1463.0	1464.0	Dolomite and oil shale: Buff to light brownish-gray dolomite with faint irregular and displaced laminae, thickly interbedded with oil shale as above and below. ( Sample of light brownish-gray dolomite from 1463.8 feet: X-ray--dolomite; some quartz, feldspar.
1464.0	1465.0	Oil shale: Dark and rare medium brownish gray, dolomitic. Faint very fine laminae; some fine displacements. Regular to some irregular medium to thick parting; slightly irregular and conchoidal fracture. Rare diagonal glossy shear surfaces.
1465.0	1466.0	Oil shale: Dark to medium slightly brownish to almost neutral gray, dolomitic. Faint very fine laminae; some fine displacements. Irregular to regular medium to thick parting; slightly to moderately conchoidal fracture.
1466.0	1468.0	Oil shale: Dark to some medium-light almost neutral gray to grayish brown, dolomitic. Faint to moderately distinct very fine laminae; some fine displacements. Irregular to regular thick to rare thin parting; slightly conchoidal fracture. Distinctly laminated buff marlstone with abundant irregular fine to small displacements at 1466.6-1466.8.
1468.0	1469.0	Oil shale: Dark to some medium brownish gray and rare black, dolomitic. Faint very fine laminae and streaked bedding. Irregular to regular thick to thin parting; irregular to fairly regular fracture. Some irregular grayish-brown to buff dolomite laminae and bands.
1469.0	1470.0	Oil shale: Dark brownish gray, dolomitic. Faint very fine laminae. Regular to irregular medium to thin and some thick parting; slightly conchoidal to hackly fracture. A thin grayish-brown dolomite lamina near bottom.
1470.0	1472.7	Oil shale: Dark slightly brownish gray to medium grayish brown, dolomitic. Faint to some moderately distinct very fine laminae. Regular to irregular thick to thin parting; slightly irregular to irregular and hackly fracture. A 1-inch dolomite band at 1470.7 and a 1 1/2-inch band at 1472.4-1472.5.
1472.7	1473.7	Dolomite and oil shale: Buff to light brownish-gray dolomite and dark to some medium brownish-gray oil shale. Faintly banded to thinly laminated dolomite with some interbedded oil-shale bands and laminae. Irregular thick parting and regular to slightly conchoidal fracture in dolomite; medium to thin shaly parting and hackly fracture in oil shale.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1473.7	1474.0	Missing
1474.0	1477.9	Oil shale: Dark brownish gray to rare black, dolomitic. Faint very fine laminae. Regular to irregular medium to thin and rare thick parting; hackly to slightly irregular and conchoidal fracture.
1477.9	1479.3	Oil shale: Medium to dark brownish gray, very dolomitic. Faint and rare moderately distinct regular to displaced and disrupted laminae. Irregular to regular thick to thin parting; irregular to slightly conchoidal fracture. A 1-inch buff dolomite band at top, a thin band at 1478.2, and a thick band at 1478.4-1478.6.
1479.3	1485.9	Oil shale: Dark and rare medium brownish gray, becoming very dark in lower part; slightly to moderately dolomitic. Faint to rare moderately distinct very fine laminae. Regular to irregular thick to thin parting; irregular and hackly to slightly conchoidal fracture; some broken core. A thin brownish-gray dolomite layer near top. A 1-inch light brownish-gray silty band at 1485.3.
1485.9	1491.2	Oil shale: Medium to some dark brownish to slightly olive gray; some light brownish gray to buff near bottom; dolomitic to calcareous. Moderately distinct to faint displaced to regular laminae. Regular to irregular thick to rare thin parting; irregular and rare hackly to slightly conchoidal fracture. Rare low-angle glossy shear surfaces with slickensides. A 1-inch light gray slightly silty siliceous band at top and a thin brownish-gray dolomite band at 1486.05.
1491.2	1494.9	Oil shale: Medium to dark brownish gray; slightly calcareous to dolomitic. Moderately distinct to faint very fine regular to some displaced laminae. Regular to irregular thick to rare thin parting; slightly irregular and conchoidal fracture. Thin brownish-gray to tan dolomite bands at 1492.4 and 1492.6.
1494.9	1496.8	Oil shale: Dark to some medium brownish gray; slightly to moderately calcareous. Faintly laminated. Regular to rare irregular thick to rare thin parting; slightly irregular and conchoidal fracture.
		Sample of dark to medium brownish-gray oil shale from 1495.2 feet: X-ray--dolomite, quartz, illite, calcite, feldspar, analcime, pyrite.
1496.8	1498.1	Oil shale: Medium to very dark brownish gray; some light brownish gray to buff in upper part; rare black in lower part; slightly calcareous to dolomitic. Distinct to faint laminae; abundant fine to small displacements. Irregular to regular thick to thin parting; slightly irregular and conchoidal to some hackly fracture. A 1 1/4- to 1 3/4-inch tapered faintly bedded grayish-brown dolomite band at 1497.7-1497.8.

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LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1498.1	1499.8	Oil shale: Medium-dark brownish gray, slightly dolomitic. Very faint streaked bedding and very fine laminae. Irregular to regular thick to thin parting; irregular to hackly fracture. A 1/2- to 1-inch brown dolomite band at top. A 2-inch irregular dark gray silty band at 1499.0. { Sample of dark gray silty band from 1499.0 feet: X-ray-- analcime, quartz, pyrite, Mg-siderite, feldspar.
1499.8	1500.9	Oil shale: Dark brownish gray, slightly dolomitic. Very faint very fine laminae. Regular to some irregular medium to very thin parting; hackly to slightly conchoidal fracture. A 3-inch tan slightly silty dolomite band at top; some thin vermiform stringers and blebs in oil shale below.
1500.9	1502.0	Oil shale and dolomite: As above and below with some thin to 1-inch tan to buff dolomite layers.
1502.0	1503.0	Oil shale: Medium-dark almost neutral gray to dark brownish gray, dolomitic. Very faint very fine laminae and streaked bedding. Regular to irregular thick to rare thin parting; slightly conchoidal to irregular and hackly fracture. Three fine pinch-and-swell buff marlstone layers at 1502.6-1502.7.
1503.0	1507.0	Oil shale: Dark brownish gray; some brownish black in lower part, dolomitic. Very faint to rare moderately distinct laminae. Regular to irregular thick to some thin parting; slightly conchoidal to irregular and hackly fracture. Some thin wavy to regular tan dolomite laminae at 1505.4-1506.0.
1507.0	1508.0	Oil shale: As above with two 2-inch buff dolomite bands.
1508.0	1511.8	Oil shale: Dark brownish gray to medium-dark slightly olive gray, dolomitic. Faint laminae and some streaked bedding. Regular to irregular thick to rare medium and thin parting; slightly irregular and conchoidal to irregular and rare hackly fracture. A 1 1/2-inch buff dolomite band at 1508.4; a 1-inch band at 1510.4; a 1 3/4-inch band at 1511.5. { Sample of buff dolomite from 1508.4 feet: X-ray--dolomite; trace quartz, feldspar.
1511.8	1512.0	Missing?
1512.0	1514.0	Oil shale: Dark slightly brownish gray, dolomitic. Very faint laminae and streaked bedding. Regular to some irregular thick to medium parting; slightly irregular fracture. Abundant ostracods.
1514.0	1516.0	Oil shale: Dark brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Regular to some irregular medium to very thin and rare thick parting; hackly to slightly irregular fracture. Some ostracods. { Sample of dark brownish-gray oil shale from 1515.3 feet: X-ray--quartz, analcime, illite, pyrite, dolomite.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1516.0	1519.1	Oil shale: Dark to medium brownish gray; slightly to moderately dolomitic. Faint laminae and streaked bedding; some distorted and displaced zones. Regular to irregular thick to some thin parting; slightly irregular to irregular and hackly fracture; some broken core in lower part. Some distinctly laminated bands of light brownish-gray to buff dolomite.
1519.1	1520.5	Oil shale: Medium to some light and rare dark brownish gray, dolomitic. Faint to distinct discontinuous and displaced to regular laminae. Regular to irregular thick parting; conchoidal to regular fracture. A 1-inch tan dolomite band at top.
1520.5	1520.8	Oil shale: Dark brownish gray to tan. Distinct distorted and discontinuous laminae and streaks. Some irregular to lenticular buff marlstone inclusions.
1520.8	1522.6	Oil shale: Dark brownish gray to black, dolomitic. Faint very fine regular to discontinuous laminae. Regular to irregular medium to papery parting; hackly fracture. Rare ostracods and fine bone fragments.
1522.6	1523.6	Oil shale: Medium to dark and rare light brownish gray; dolomitic to calcareous. Faint to some moderately distinct laminae. Regular thick to rare thin parting; slightly conchoidal to some irregular fracture. One-inch tan dolomite bands near top and bottom.
1523.6	1525.6	Oil shale: Dark brownish gray, dolomitic. Very faint very fine laminae and streaked bedding. Regular to irregular medium to thin and some thick parting; coarse hackly to slightly conchoidal fracture. A 2-inch grayish-brown dolomite band at 1524.4; a 2 1/2-inch medium to dark brown band with gradational contacts at bottom. Rare fish bone fragments.
1525.6	1526.9	Oil shale: Dark brownish gray to black, dolomitic. Very faint very fine streaked bedding and discontinuous to regular laminae; some distinct medium grayish-brown laminae in lower part. Regular to irregular thick to thin parting; hackly fracture.
1526.9	1527.6	Oil shale: As above with some grayish-brown dolomite laminae and bands.
1527.6	1528.8	Oil shale: Dark to medium brownish gray and some grayish brown, dolomitic. Faint very fine discontinuous and displaced laminae in thin to 2-inch darker and lighter zones. Regular thick to medium parting; irregular fracture. A 1-inch grayish-brown dolomite band with very fine irregular black oil-shale laminae at 1527.9; a 2-inch very faintly bedded tan dolomite band at bottom.
1528.8	1529.8	Oil shale: Dark brownish gray, some medium in upper part, dolomitic. Faint discontinuous and displaced laminae and streaked bedding. Regular to some irregular medium to thin parting; hackly fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1529.8	1531.0	Oil shale: As above and below. Rubble in a plastic bag at 1530.4-1530.7. A 2 1/2-inch tan dolomite band at top.
1531.0	1532.2	Oil shale: Dark brownish to almost neutral gray, dolomitic. Very faint very fine laminae and streaked bedding. Regular to irregular thin to thick parting; hackly to slightly irregular fracture. Grayish-brown to buff dolomitic zones with gradational contacts in lower part.
1532.2	1533.2	Oil shale: Medium-dark brownish gray, dolomitic. Faint very fine laminae. Irregular to regular thick to medium parting; irregular to slightly conchoidal fracture.
1533.2	1534.2	Oil shale: Dark and rare medium brownish gray to some black, dolomitic. Faint and rare moderately distinct very fine laminae and streaked bedding. Regular to some irregular thick to rare thin parting; irregular and some coarse hackly fracture.
1534.2	1536.0	Oil shale: Dark almost neutral to brownish gray, slightly dolomitic. Very faintly laminated and streaked. Irregular thick to thin parting; irregular hackly fracture. Thinly banded brownish-gray dolomite with few fine oil-shale laminae in upper 3 inches.
1536.0	1536.2	Missing?
1536.2	1538.4	Oil shale: Medium-dark almost neutral to slightly brownish gray, slightly dolomitic. Faint very fine regular to discontinuous laminae. Irregular to regular thick to rare thin parting; slightly irregular to irregular and coarse hackly fracture. A 2-inch brownish-gray dolomite band near top. Sample of medium-dark gray shale from 1537.1 feet: X-ray--quartz, illite, feldspar, pyrite, Mg-siderite, dolomite.
1538.4	1542.0	Oil shale: Dark to medium-dark slightly brownish gray, dolomitic. Faint very fine regular to discontinuous and displaced laminae. Regular to some irregular medium to thick parting; slightly irregular to irregular fracture.
1542.0	1546.0	Oil shale: As above. Rubble in a plastic bag in upper half foot.
1546.0	1547.5	Oil shale: Medium to dark brownish gray, dolomitic. Faint laminae; rare fine to small displacements. Irregular to regular thick to medium parting; irregular to slightly conchoidal fracture. A 2 1/2-inch brownish-gray dolomite band at top.
1547.5	1562.0	Oil shale: Dark to very dark brownish gray; rare black in lower part; moderately to slightly dolomitic. Faint regular to discontinuous and displaced laminae. Regular to irregular thick to some papery parting; hackly and irregular to some regular fracture. Tan dolomite bands at 1553.0-1553.3, 1553.5-1553.6, and 1554.3-1554.5. (1551.8-1552.0 missing?; 1552.0-1552.3 rubble)
1562.0	1562.3	Missing
1562.3	1564.6	Oil shale: Medium-dark almost neutral gray; slightly to moderately dolomitic. Faint regular laminae. Irregular to regular thin to

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		thick parting; hackly to fairly regular fracture; some broken core and rubble in upper part.
1564.6	1569.4	Oil shale: Medium-dark to dark slightly brownish gray, slightly dolomitic. Faint very fine discontinuous to regular laminae. Regular to irregular thick to some thin parting; regular to irregular and some hackly fracture..
1569.4	1572.0	Oil shale: Medium and some dark brownish to almost neutral gray; slightly to moderately dolomitic, slightly silty. Faint to moderately distinct very fine to thin regular to discontinuous and displaced laminae. Irregular to regular thick parting; irregular to fairly regular fracture. Faintly streaked and laminated buff to light brownish-gray dolomitic marlstone bands at 1569.9-1570.2, 1570.8-1571.1, and 1571.7-1572.0; a thin broken tan-buff band near top.
1572.0	1574.5	Oil shale: Medium-dark to dark almost neutral to brownish gray, dolomitic, slightly silty. Faint to moderately distinct regular to discontinuous, displaced, and rarely distorted laminae. Regular to rare irregular thick to some thin parting; regular to irregular fracture. (1573.2-1573.4 missing?) Sample of dark gray silty shale from 1572.3 feet: X-ray--quartz, illite, dolomite, calcite, feldspar, analcime, pyrite.
1574.5	1576.7	Oil shale: Medium-dark to very dark brownish gray, dolomitic. Moderately distinct to faint very fine laminae. Regular to irregular thick to thin parting; slightly conchoidal to some irregular and hackly fracture.
1576.7	1582.0	Oil shale: Dark to medium brownish to almost neutral gray, slightly dolomitic. Faint to rare distinct regular to distorted and displaced laminae. Irregular to some regular thick to thin parting; irregular to coarse hackly fracture. Occasional medium to light brownish-gray dolomite bands.
1582.0	1589.0	Oil shale: Medium-dark to dark almost neutral to slightly brownish gray, dolomitic. Faint very fine regular laminae. Regular to some irregular thick to thin parting; regular to hackly fracture. A 2-inch slightly brownish-gray dolomite band at 1582.5-1582.7.
1589.0	1592.0	Oil shale: As above and below but with regular thick to medium parting.
1592.0	1602.0	Oil shale: Medium-dark to dark gray and slightly brownish gray, slightly dolomitic. Faint very fine to rare thin laminae. Regular to some irregular thick to thin parting; regular to rare irregular and hackly fracture. Gray shaly rubble in lower foot. Brownish-gray dolomite bands at 1592.5-1592.7, 1593.7-1593.8, and 1599.9-1600.1

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1602.0	1605.0	Oil shale: Medium-dark to dark almost neutral to brownish gray, slightly dolomitic. Faint very fine regular to discontinuous laminae. Regular to irregular thick to very thin parting; fairly regular to hackly fracture. Irregularly laminated brownish-gray dolomite at 1603.4-1603.6.
1605.0	1611.0	Oil shale: Dark to very rare medium.brownish gray, dolomitic. Faint to rare moderately distinct very fine discontinuous laminae. Regular to irregular thick to thin parting; slightly irregular to irregular and hackly fracture. Grayish-brown dolomite at 1605.2-1605.3. Light slightly olive-gray to buff soft clayey band at 1608.4-1608.6. Very rare fish (?) fragments. { Sample of dark brownish-gray oil shale from 1608.2 feet: X-ray--quartz, illite, dolomite, feldspar, Mg-siderite. Sample of light gray to buff clayey band from 1608.4-1608.6 feet: X-ray--smectite, analcime, feldspar, quartz, pyrite.
1611.0	1612.8	Oil shale: Medium slightly olive gray to medium and rare dark brownish gray; slightly to moderately dolomitic. Faint streaked bedding and very fine discontinuous to regular laminae. Regular to irregular thick to rare thin parting; irregular to slightly conchoidal fracture. A 1-inch laminated dolomite band at 1612.1. Very sharp conformable contact with dark oil shale below.
1612.8	1615.8	Oil shale: Mostly black in upper part to dark and rare medium brownish gray in lower part; slightly to moderately dolomitic. Faint <u>very</u> fine discontinuous to regular laminae. Regular to rare irregular very thin to some thick parting; hackly fracture. Rare thin to 1-inch irregularly laminated grayish-brown dolomite layers.
1615.8	1618.4	Oil shale: Medium to dark brownish gray, dolomitic. Faint very fine discontinuous to regular laminae. Irregular to regular thin to some thick parting; hackly and irregular to slightly conchoidal fracture. One-inch grayish-brown dolomite bands at 1616.5 and 1616.7.
1618.4	1621.0	Claystone: Medium to medium-dark slightly olive and brownish gray. Very faint streaked bedding and very fine laminae. Irregular medium to thin and rare thick parting; very irregular coarse hackly fracture; badly broken up and somewhat mixed up from splitting. A 4-inch band of irregularly streaked and laminated medium to light brownish-gray dolomite at top. { Sample of gray claystone from 1619.6 feet: X-ray--quartz, illite, dolomite, analcime, feldspar, pyrite.
1621.0	1624.7	Oil shale: Medium-dark to some medium slightly brownish gray, dolomitic. Very faint very fine discontinuous to regular laminae. Irregular to regular medium to thick and rare thin parting; slightly conchoidal to irregular and rare hackly fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		A 1-inch gray slightly silty band at 1622.0. A 2-inch medium-light dolomite band at 1624.4.
1624.7	1624.9	Missing?
1624.9	1634.0	Shale (lean oil shale?): Medium and some dark slightly brownish to almost neutral gray. Faint to rare moderately distinct regular to irregular and discontinuous laminae. Regular to some irregular medium to thick and rare thin parting; slightly conchoidal to some irregular and rare hackly fracture.
1634.0	1635.0	Oil shale: Medium to dark brownish gray, dolomitic. Faint discontinuous and displaced laminae. Irregular thick to rare thin parting; irregular fracture.
1635.0	1636.0	Oil shale: Dark brownish gray to rare black, dolomitic. Very faint very fine laminae and streaked bedding. Regular medium to thick and rare thin parting; slightly conchoidal fracture.
1636.0	1637.6	Shale (oil shale?): Dark slightly brownish gray, dolomitic. <u>Very faint</u> very fine laminae. Regular to some irregular medium to some thick and rare thin parting; slightly conchoidal fracture.
1637.6	1639.2	Oil shale: Dark brownish gray, slightly dolomitic. Faint very fine discontinuous laminae. Regular medium to rare thick and thin parting; slightly irregular fracture.
1639.2	1641.0	Oil shale: Dark brownish gray, slightly dolomitic. Faint very fine laminae and streaked bedding. Regular thick to rare thin parting; slightly irregular to conchoidal fracture. A 2 1/4-inch grayish-brown tuff band at top. A 0.1-foot medium to dark gray thinly laminated slightly silty dolomitic band at 1640.3. Sample of gray band from 1640.3 feet: X-ray--dolomite, feldspar, Mg-calcite, pyrite, marcasite, dawsonite, quartz.
1641.0	1642.5	Oil shale (?): Medium-dark slightly brownish gray, slightly dolomitic. Very faint laminae. Regular to slightly irregular thick to some thin parting; slightly conchoidal fracture.
1642.5	1643.1	Oil shale: As above. Dense massive medium-light slightly brownish-gray silty dolomite band at 1642.55-1642.7. Grading to irregularly bedded gray limy mudstone near bottom.
1643.1	1643.6	Dolomite: Medium-light gray to brownish gray, silty. Faintly banded to irregularly layered. Slightly irregular to irregular medium to thick parting; irregular fracture. A thin oil-shale layer at 1643.5.
1643.6	1649.0	Oil shale: Dark to medium-dark slightly brownish gray, slightly dolomitic. Faint very fine discontinuous to regular laminae. Regular to some irregular thick to rare thin parting; slightly irregular and conchoidal fracture. Massive slightly brownish-gray dolomite bands at 1645.7-1645.9 and 1646.8-1647.0.
1649.0	1651.0	Oil shale (?): Medium-dark brownish gray, dolomitic. Very faint streaked bedding. Irregular to regular thick to some medium and thin parting; irregular to slightly conchoidal fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1651.0	1654.4	Oil shale: Medium-dark to dark brownish gray, dolomitic. Faint very fine streaked bedding and discontinuous to regular laminae. Regular to irregular thick to some thin parting; irregular to coarse hackly fracture.
1654.4	1655.5	Oil shale: Very dark brownish gray, slightly dolomitic. Very faint very fine laminae. Regular to irregular medium to some thick and thin parting; irregular coarse hackly fracture.
1655.5	1658.8	Oil shale: Dark to some medium brownish to almost neutral gray, slightly dolomitic. Very faint regular to discontinuous laminae. Regular to irregular thick to some thin parting; irregular hackly fracture. Dolomite band at 1657.5-1657.7. Rare fish fragments. Sample of dark gray shale from 1657.3 feet: X-ray--quartz, illite, feldspar, analcime, pyrite, Mg-siderite, dolomite.
1658.8	1660.0	Oil shale: Medium-dark slightly brownish gray. Faint very fine regular to discontinuous laminae. Irregular medium to very thin parting; hackly fracture; unctuous.
1660.0	1664.0	Oil shale: Like 1655.5-1658.8. Brownish-gray dolomite band at 1661.0-1661.3.
1664.0	1665.0	Oil shale: Like 1660.0-1664.0. <i>this must be a mistake</i>
1665.0	1668.0	Oil shale: Dark to medium almost neutral gray. Faint very fine laminae. Regular to some irregular thick to medium parting; slightly conchoidal fracture.
1668.0	1672.0	Claystone: Medium almost neutral to slightly brownish gray, slightly silty. Faintly laminated. Irregular to regular thick to rare thin parting; irregular to conchoidal fracture. A 2 3/4-inch gray-buff mudstone band at 1670.2.
1672.0	1676.8	Claystone: Medium-dark slightly brownish gray. Faintly laminated. Regular to some irregular thick to medium parting; slightly conchoidal and rare hackly fracture. A 2 1/2-inch slightly brownish-gray oolitic dolomite band at bottom. (1673.5-1676.2 missing)
1676.8	1677.8	Oil shale: Dark slightly brownish gray, slightly dolomitic. Very faint very fine laminae. Regular to irregular thick to rare thin parting; conchoidal to rare hackly fracture.
1677.8	1680.6	Oil shale: Dark and rare medium brownish gray, dolomitic. Faint very fine laminae and some streaked bedding. Regular to some irregular thick to thin parting; slightly irregular to hackly fracture. Thin grayish-brown dolomite lamina at 1679.6. Rare fish fragments.
1680.6	1680.8	Siltstone: Light gray to buff-white with some dark gray streaks and stringers. Sharp regular contacts.
1680.8	1682.2	Oil shale: Dark and some medium grayish brown in upper part to medium slightly brownish gray in lower part, dolomitic. Faintly laminated. Regular papery to rare thick parting; hackly to slightly conchoidal fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1682.2	1683.7	Oil shale: Medium to dark brownish gray. Faintly laminated. Shaly rubble; grab sampled.
1683.7	1684.9	Oil shale: Very dark to medium brownish gray, dolomitic. Faintly laminated. Regular to irregular thin to thick parting; hackly to slightly conchoidal fracture.
1684.9	1686.9	Oil shale: Dark to medium brownish to almost neutral gray, slightly dolomitic. Faintly laminated. Regular to irregular thin to thick parting; irregular coarse hackly fracture.
1686.9	1691.4	Sandstone: Gray-buff to light gray, fine grained, some salt-and-pepper. Massive to faintly streaked. Irregular thick parting; slightly irregular fracture; permeable.
1691.4	1692.6	Mudstone and claystone: Medium and rare dark slightly brownish gray. Massive with some faint laminae. Irregular broken core pieces and some rubble. Some gray-buff siltstone in upper part.
1692.6	1693.9	Oil shale: Medium to dark brownish gray, dolomitic. Very faint streaked bedding and discontinuous laminae. Irregular thick to rare thin parting; irregular fracture; some broken core. A very irregular brownish-gray sandy oolitic dolomite layer at about 1693.4-1693.6.
1693.9	1696.0	Oil shale: Dark to some medium brownish gray. Faint regular to discontinuous laminae. Regular to irregular thick to rare thin parting; coarse hackly to slightly irregular fracture. Dark grayish-brown dolomite band at 1694.8-1694.9.
1696.0	1699.3	Oil shale: Medium to rare dark brownish gray, dolomitic. Faint to some moderately distinct very fine laminae. Irregular to regular thick to some thin parting; irregular to coarse hackly fracture. A 1-inch dolomite band at 1697.9-1698.0; a thin band at 1698.6.
1699.3	1702.0	Oil shale: Very dark to some medium brownish gray, slightly dolomitic. Faintly laminated. Regular to irregular thick to thin parting; coarse hackly to slightly conchoidal fracture. Few 1/2- to 1 1/2-inch dolomite bands. Thin irregular buff silty lamina with fine drusy blebs at 1700.7.
1702.0	1703.1	Oil shale: Dark to rare medium brownish gray, dolomitic. Faint and rare moderately distinct laminae. Regular medium to thin and rare papery parting; coarse hackly fracture. Irregularly layered buff to light brownish-gray slightly earthy oolitic band at 1702.3-1702.5.
		Sample of buff to light brownish gray oolitic band from 1702.3 feet: X-ray--dolomite, quartz, illite, analcime, feldspar.
		Sample of dark brownish-gray oil shale from 1702.7 feet: X-ray--quartz, illite, feldspar, analcime, Mg-siderite.
1703.1	1704.0	Missing

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
✓ 1704.0	1706.2	Siltstone: Buff to light gray, slightly calcareous. Faint streaked bedding and irregular discontinuous laminae. Irregular to some fairly regular thick parting; irregular fracture. Dark brownish-gray shale in upper inch. Some medium-light slightly brownish-gray mudstone with sandy blebs and stringers in upper half foot.
✓ 1706.2	1708.0	Siltstone and very fine sandstone. Gray-buff and light gray. Faint irregular discontinuous laminae and streaks. Regular to irregular thin to some thick parting; hackly fracture.
1708.0	1709.2	Mudstone: Medium to light slightly brownish to neutral gray, shaly to silty. Faint to fairly distinct irregular to regular laminae. Irregular to fairly regular thin to medium parting; hackly fracture.
1709.2	1712.0	Mudstone: Medium-light slightly brownish gray, slightly dolomitic. Faintly streaked to massive; some laminae near top. Irregular to regular thick to medium parting; irregular to fairly regular fracture.
1712.0	1714.4	Siltstone and some mudstone: Light gray to medium very slightly brownish gray. Faint to moderately distinct irregular laminae and streaks. Irregular thick to rare thin parting; irregular and some hackly fracture. A 1-inch sandy algal dolomite layer at top.
✓ 1714.4	1739.4	Sandstone: Light gray, some medium gray in upper part, fine-grained. Faintly bedded to massive; rare irregular mudstone and siltstone layers. Irregular thick parting; regular to some irregular fracture; permeable. <div style="margin-left: 2em;">Sample of light gray sandstone from 1720.8 feet: X-ray--quartz, feldspar, dolomite.</div>
1739.4	1741.7	Siltstone, mudstone, and claystone: Medium to light gray. Very faint disrupted bedding. Irregular thick to thin parting; hackly to irregular fracture.
1741.7	1744.0	Siltstone: Very light to some medium gray and slightly brownish gray, slightly calcareous. Very faint irregular bedding and some moderately distinct irregular laminae and bands. Irregular thick to some thin parting; irregular and some hackly fracture. Rare slightly brownish-gray shale.
1744.0	1744.7	Mudstone: Gray to slightly brownish gray, very slightly calcareous. Faintly streaked to massive. Irregular thin to thick parting; irregular hackly fracture. <div style="margin-left: 2em;">Sample of gray mudstone from 1744.3 feet: X-ray--quartz, illite, analcime, Mg-siderite, feldspar, dolomite.</div>
✓ 1744.7	1746.2	Siltstone: Buff to light brownish gray, calcareous. Faint to moderately distinct discontinuous to disrupted and very irregular streaks, laminae, and stringers. Irregular thick parting; irregular and rare hackly fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1746.2	1749.8	Mudstone and siltstone: Like 1744.0-1746.2.
1749.8	1753.3	Siltstone and some very fine sandstone: Light to medium gray, slightly calcareous. Faint irregular streaks and layers; contorted zone at 1751.6-1752.3. Irregular thick and rare thin parting; irregular to slightly irregular fracture.
1753.3	1754.0	Missing
1754.0	1755.6	Mudstone: Medium-dark gray. Faint streaked bedding; abundant fine to thin light gray siltstone streaks in lower part. Irregular to regular thick to thin parting; slightly irregular to hackly fracture.
1755.6	1756.6	Siltstone: Medium-light gray to gray-buff, slightly to moderately calcareous. Faintly bedded; rare small-scale cross bedding. Irregular thick to thin parting; irregular to some hackly fracture. Some interbedded gray shaly mudstone as above.
1756.6	1757.4	Sandstone: Gray, medium grained, calcareous, very oolitic. Massive; rare irregular laminae. Irregular thick parting; fairly regular fracture.
1757.4	1759.3	Sandstone: Medium to light gray and brownish gray, medium to very fine grained, calcareous, oolitic. Very faintly streaked to massive and variegated. Irregular thick parting; slightly irregular to irregular fracture.
1759.3	1775.0	Sandstone: Light gray, fine grained to silty, calcareous, some ooliths in upper part. Faint irregular to very regular streaked bedding; rare gray shaly mudstone layers. Irregular to slightly irregular thick parting; slightly irregular to some irregular and hackly fracture; slightly permeable in parts.
1775.0	1777.0	Sandstone: Gray-buff, very fine grained, calcareous. Very faint regular to irregular bedding; some distinct gray shaly laminae. Regular to irregular thick to some thin parting; slightly irregular to irregular and some hackly fracture; slightly permeable.
1777.0	1778.9	Siltstone, mudstone, and sandstone: Medium to light gray and slightly brownish-gray laminated siltstone and mudstone banded with gray-buff sandstone as above. Irregular to regular thick to thin parting; slightly irregular to irregular and hackly fracture.
1778.9	1780.0	Sandstone: Medium to light gray, medium to fine grained, slightly calcareous, oolitic. Faintly streaked to massive. Irregular thick parting; slightly irregular to regular fracture; permeable.
1780.0	1784.0	Sandstone: Gray-buff, fine grained. Very faintly bedded. Irregular thick parting; fairly regular fracture; permeable.
1784.0	1788.4	Sandstone: Gray-buff and buff, fine grained, slightly calcareous. Faint to some moderately distinct irregular streaked bedding and some discontinuous laminae; occasional slightly brownish-gray shaly laminae and bands. Irregular thick to some thin parting; slightly irregular to irregular and hackly fracture; slightly permeable.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1788.4	1790.2	Mudstone, siltstone, and some shale: Medium-dark gray to gray-buff and some medium to dark brownish gray. Faint to some distinct bands and laminae. Regular to irregular thick to rare thin parting; slightly irregular and conchoidal to rare hackly fracture.
		Sample of gray mudstone from 1788.6 feet: X-ray--quartz, illite, analcime, Mg-siderite, feldspar.
1790.2	1792.6	Oolite: Tan-buff to light brownish gray; dark brownish-gray shaly zone at 1790.4-1790.6; calcareous. Massive; some faint streaked bedding. Irregular thick parting; irregular to fairly regular fracture.
		Sample of tan-buff oolite from 1791.2 feet: X-ray--dolomite, trace quartz.
1792.6	1793.0	Sandstone: Light slightly brownish to neutral gray, very fine grained, very calcareous, massive. Irregular thick parting; slightly irregular fracture.
1793.0	1795.0	Sandstone: Medium-light slightly brownish to neutral gray, fine grained. Faintly variegated to massive. Irregular parting and fracture; permeable.
1795.0	1798.0	Sandstone: Gray-buff and light gray; very fine grained to silty and muddy. Faintly variegated. Irregular parting and fracture; slightly permeable.
1798.0	1803.1	Sandstone: Gray-buff, becoming slightly olive near bottom, fine grained to silty. Massive to very faintly variegated. Irregular thick parting; slightly irregular to irregular fracture; slightly permeable.
1803.1	1805.3	Sandstone: Gray-buff and olive-gray-buff to some light slightly brownish gray; very fine grained to silty and muddy; very slightly calcareous. Very faintly streaked and irregularly layered. Irregular thick parting; irregular to slightly irregular fracture; slightly permeable.
1805.3	1807.6	Sandstone: Medium-light slightly olive to neutral gray, fine grained to silty. Faint distorted to disrupted streaked bedding. Irregular parting and fracture; slightly permeable. Sparse fine carbonaceous streaks.
1807.6	1814.7	Sandstone: Light gray, fine to medium grained. Very faint regular streaked bedding. Irregular to slightly irregular thick parting; fairly regular fracture; permeable. Rare pink grains. A thin dark gray shale layer at 1811.8 and a 1-inch band at 1814.5. A 1- x 2-inch shredded coal lens at 1813.1.
1814.7	1816.9	Siltstone, mudstone, and some very fine sandstone: Light to some medium gray to slightly olive gray; slightly calcareous in parts. Faint to rare moderately distinct streaks and disrupted laminae. Irregular thick to some thin parting; irregular to hackly fracture.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1816.9	1818.0	Siltstone and very fine sandstone: Gray-buff to light gray. Fairly abundant very fine light to dark brownish-gray streaks and discontinuous and disrupted shaly laminae. Irregular thick to medium parting; irregular and some hackly fracture; slightly permeable. Rare fine to small very fine-grained pyrite blebs.
1818.0	1824.0	Sandstone: Very light gray and gray-buff. Very faintly bedded and variegated with some faint very fine brownish streaks and irregular laminae. Irregular to slightly irregular thick parting; irregular to fairly regular fracture; permeable.
1824.0	1826.5	Very fine sandstone and siltstone: Very light gray and gray-buff; slightly calcareous in parts. Abundant fine irregular and discontinuous medium gray to slightly brownish-gray muddy to shaly laminae and rare irregular bands. Irregular thick to rare thin parting; hackly to irregular fracture.
1826.5	1827.7	Oil shale: Medium to dark brownish gray, dolomitic. Faint very fine streaked bedding and discontinuous laminae. Irregular to fairly regular thick to rare thin parting; irregular to slightly conchoidal fracture. Abundant fine buff-white silty streaks in upper part; some fine light gray silty streaks and blebs near bottom. Sample of brownish-gray oil shale with some very fine light silty streaks from 1826.7 feet: X-ray--quartz, illite, analcime, Mg-siderite, feldspar, dolomite.
1827.7	1829.3	Siltstone and very fine sandstone: Light slightly brownish gray to buff. Very faintly streaked to massive. Irregular thick parting; irregular to fairly regular fracture; very slightly permeable.
1829.3	1831.5	Sandstone: Light gray, fine to medium grained. Very faintly bedded to massive. Irregular thick parting; fairly regular fracture; permeable. Rare muddy streaks and laminae in lower part.
1831.5	1831.9	Oil shale: Dark to medium brownish gray. Very faint streaked bedding. Sparse fine light silty streaks and blebs.
1831.9	1832.1	Siltstone and mudstone: Light slightly olive gray. Faint streaky and blebby bedding.
1832.1	1832.3	Oil shale: Like 1831.5-1831.9 with abundant silty streaks and blebs.
1832.3	1832.5	Siltstone and mudstone: Like 1831.9-1832.1.
1832.5	1833.0	Siltstone: Light slightly olive gray, sandy, massive.
1833.0	1833.9	Siltstone and mudstone: Light to medium slightly brownish gray. Very faintly streaked and mottled; olive-gray siltstone and mudstone with streaky and blebby bedding at 1833.5-1833.7. Irregular thick parting; irregular and some hackly fracture.
1833.9	1834.0	Missing

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1834.0	1835.2	Oil shale: Very dark to some medium brownish gray, dolomitic. Faint very fine discontinuous laminae and streaked bedding. Regular to some irregular thick to medium parting; irregular and slightly conchoidal fracture. Resinous black streak with some pyrite at 1834.8 (fossil?). Sample of dark brownish-gray oil shale from 1835.0 feet: X-ray--quartz, illite, dolomite, analcime, Mg-siderite, feldspar, pyrite.
1835.2	1836.5	Oil shale: Dark to medium brownish gray, dolomitic. Faint very fine streaked bedding and discontinuous laminae; abundant gray-buff to light gray silty streaks and blebs in lower half. Regular to irregular thick to rare thin parting; slightly conchoidal to irregular hackly fracture.
1836.5	1839.7	Sandstone: Light gray to slightly olive gray; fine grained to silty. Faint distorted streaked bedding. Irregular parting and fracture; slightly permeable.
1839.7	1842.4	Oil shale: Dark to some medium brownish gray, dolomitic. Very faint to rare moderately distinct laminae. Regular to some irregular thick to rare thin parting; coarse hackly to slightly conchoidal fracture. A 2-inch dense brownish-gray dolomite band at 1840.7-1840.9; some fine drusy tar-stained cavities near bottom. A 3/4-inch very wavy dolomite band at 1841.5. Wavy shredded contact with siltstone below.
1842.4	1842.9	Siltstone and some mudstone: Gray-buff to light gray and some light brownish gray. Faint irregular discontinuous laminae, streaks, and bands. Irregular thick parting; irregular and some hackly fracture.
1842.9	1844.0	Claystone and mudstone: Light and rare medium slightly brownish gray to some gray-buff. Very faint streaked bedding. Regular to irregular thick to rare thin parting; regular to irregular and some hackly fracture. Rare carbonaceous plant fragments.
1844.0	1847.3	Sandstone: Very light gray, fine grained. Very faintly streaked to massive. Irregular thick parting; fairly regular to irregular fracture; permeable.
1847.3	1847.55	Oil shale: Dark brownish gray. Very faint wavy bedding. A 1 1/4- x 3-inch dense dark grayish-brown dolomite lens in lower half.
1847.55	1847.9	Mudstone: Medium gray. Very faintly bedded. Few fine gray-buff silty stringers and streaks.
1847.9	1851.5	Sandstone and some siltstone: Very light gray, fine grained. Faintly streaked to very faintly variegated and massive; contorted zone at 1848.6-1848.8. Irregular thick parting; slightly irregular fracture; permeable.
1851.5	1852.9	Mudstone: Medium slightly brownish gray. Faint irregular streaks, laminae, and bands; abundant thin to fine slightly greenish-gray

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
		silty streaks, blebs, and (layers?) in lower half foot. Irregular to fairly regular thick to rare thin parting; slightly conchoidal to irregular and rare hackly fracture. A 0.1-foot dark brownish-gray silty dolomitic band with some fine pyrite blebs at top; a 1-inch medium grayish-brown oolitic dolomite band at bottom.
1852.9	1853.5	Oil shale: Medium to dark brownish gray, dolomitic. Faint streaked bedding and very fine laminae. Regular thick to medium parting; slightly irregular fracture. Some fine to thin light brownish-gray oolitic laminae and streaks.
1853.5	1854.0	Oil shale: Very dark brownish gray, dolomitic. Faint very fine laminae and streaked bedding. Regular to some irregular thick to rare thin parting; slightly irregular and conchoidal fracture.
1854.0	1859.0	Sandstone: Very light gray-buff, fine grained to silty. Massive to faintly streaked. Irregular to slightly irregular thick to some medium parting; fairly regular fracture; permeable. Some fine medium to dark slightly brownish-gray shaly laminae at 1855.0-1855.6; irregular gray claystone band at 1855.9-1856.0.
1859.0	1860.1	Siltstone and some oil shale: Gray-buff to light gray siltstone with some irregular layers of dark brownish-gray oil shale. Irregular to regular thick to rare thin parting; irregular and coarse hackly fracture.
1860.1	1862.0	Oil shale: Dark to some medium brownish gray, dolomitic. Very faint regular to discontinuous laminae. Regular to irregular thick to rare thin parting; slightly conchoidal to irregular coarse hackly fracture. Some slightly olive-gray fine to thin vermiform mudstone stringers. A 1-inch dense dark brownish-gray wavy dolomite band at 1860.9.
1862.0	1864.2	Sandstone: Light gray to gray-buff; fine grained to silty. Massive to faintly streaked. Irregular thick parting; fairly regular to irregular fracture.
1864.2	1864.7	Oil shale: Dark to medium grayish brown, dolomitic. Faint streaked bedding. Irregular to fairly regular thick to rare thin parting; slightly irregular and conchoidal fracture. Fine vermiform buff-white silty stringers in upper 0.1 foot.
		Sample of grayish-brown oil shale from 1864.4 feet: X-ray--dolomite, quartz, illite, analcime, feldspar.
1864.7	1866.8	Oil shale: Dark to some medium brownish to almost neutral gray, dolomitic. Very faint streaked bedding and discontinuous laminae. Regular to irregular thick to some thin parting; irregular to slightly conchoidal fracture. Rare fine to thin buff to gray silty streaks and stringers. A 1 1/2-inch light brownish to neutral gray fine-grained sandstone band at 1866.6; a fine irregular tan-buff dolomite layer at top of band.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1866.8	1869.4	Oil shale: Dark to medium brownish to almost neutral gray, dolomitic; becoming silty in lower part. Very faint streaked bedding and discontinuous laminae. Irregular to some regular thick to medium parting; irregular to slightly irregular and conchoidal fracture. Abundant fine to thin medium-light brownish-gray to gray silty streaks.
1869.4	1870.6	Siltstone and mudstone: Light to medium and rare dark gray and brownish gray, dolomitic. Faint to moderately distinct streaked bedding and discontinuous slightly crinkly laminae. Irregular to slightly irregular thick parting; irregular fracture.
1870.6	1872.0	Mudstone and siltstone: As above, becoming mostly medium-light slightly brownish-gray mudstone in lower part.
1872.0	1872.3	Missing?
1872.3	1872.9	Oolite and oil shale: Buff to tan calcareous oolite banded with very dark brownish-gray to rare tan and buff oil shale. Irregular thick to thin parting; irregular fracture.
1872.9	1873.1	Siltstone: Light gray to slightly brownish gray, dolomitic. Faintly streaked to variegated. Wavy and slightly interfingered upper contact; regular lower contact.
1873.1	1873.45	Oil shale: Dark brownish gray, dolomitic. Very faintly bedded. A 1-inch medium grayish-brown dolomite band near bottom.
1873.45	1873.6	Siltstone: Medium to light gray. Faintly laminated. Slightly interfingered upper contact; regular lower contact.
1873.6	1874.0	Oil shale: Dark brownish gray, dolomitic. Very faintly bedded. Regular thick to medium parting; slightly irregular and conchoidal fracture. Rare fine fish fragments.
1874.0	1874.6	Oil shale grading to mudstone: Dark to medium slightly brownish gray, becoming very silty in lower part. Faint streaked bedding. Slightly irregular to irregular thick to thin parting; irregular and some coarse hackly fracture. A thin to fine white silty stringer at 1874.2.
1874.6	1875.3	Mudstone: Medium-light slightly brownish gray, very dolomitic. Massive; rare very faint swirly streaks. Irregular thick parting; irregular to conchoidal fracture. Wavy contacts.
1875.3	1875.7	Oil shale: Medium-dark slightly brownish gray. Faint streaked bedding. Irregular to regular thick to medium parting; irregular to slightly conchoidal fracture.
1875.7	1877.5	Oil shale: Dark brownish gray, dolomitic. Faint discontinuous to regular laminae. Regular thick to some medium parting; irregular to slightly conchoidal fracture. Slightly irregular and interfingered contact with oolite below.
1877.5	1880.7	Oolite: Buff and some tan-buff; gray and slightly tar-stained at 1878.9-1879.6, dolomitic. Massive and variegated to very faintly bedded. Irregular parting and fracture; slightly to moderately permeable. A 1-inch band of dark brownish-gray oil shale at 1877.7-1877.8. (0.5 foot missing)

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
✓ 1880.7	1885.4	Sandstone: Light slightly brownish to neutral gray, fine grained, slightly calcareous. Massive with some faint irregular streaks and laminae. Irregular thick parting; slightly irregular to irregular fracture; permeable.
✓ 1885.4	1887.0	Sandstone: Gray-buff, very fine to silty, calcareous. Faint very fine irregular to braided streaks and laminae. Irregular thick parting; slightly irregular fracture; permeable.
✓ 1887.0	1890.2	Sandstone: Like 1880.7-1887.0. Oolitic at 1888.8-1889.4.
1890.2	1893.2	Siltstone and shaly mudstone: Gray-buff to medium-dark gray, slightly calcareous. Distinct to faint braided to discontinuous and displaced laminae. Slightly irregular to irregular thick to some thin parting; irregular hackly fracture. <p style="margin-left: 40px;">Sample of finely interbedded mudstone and siltstone from 1892.5 feet: X-ray--quartz, illite, feldspar, analcime, calcite, dolomite.</p>
1893.2	1894.0	Missing
1894.0	1895.7	Mudstone and shale: Medium to dark slightly brownish gray, slightly calcareous. Faint discontinuous laminae and streaked bedding; some moderately distinct light silty laminae and streaks in upper part. Fairly regular to irregular thick to thin parting; irregular to slightly conchoidal fracture. A 0.2-foot irregular broken dense grayish-brown dolomite band with very fine calcite-filled fractures at 1895.1-1895.3.
1895.7	1896.0	Oolite: Tan to light slightly brownish gray, slightly calcareous. Massive; grading to oolitic sandstone in lower part.
✓ 1896.0	1899.4	Sandstone: Light slightly brownish gray to medium neutral gray, fine to medium grained, oolitic, slightly calcareous. Massive to faintly streaked. Irregular thick parting; slightly irregular fracture; slightly to moderately permeable.
✓ 1899.4	1901.5	Sandstone: Gray, fine grained, calcareous. Finely laminated and streaked with medium to dark gray mudstone. Irregular to fairly regular thick to some medium parting; slightly irregular to irregular fracture; slightly permeable.
1901.5	1903.9	Siltstone and mudstone: Light gray siltstone with dark gray mudstone laminae, calcareous. Distinct fine discontinuous to intricately displaced and braided laminae. Irregular thick to rare thin parting; irregular and some coarse hackly fracture. Irregular light brownish-gray oolite bands at 1903.0-1903.1 and 1903.7-1903.9.
1903.9	1905.0	Mudstone and siltstone: Dark to medium-light gray, calcareous. Distinct to faint discontinuous to irregular, distorted, and displaced laminae and some bands. Slightly irregular to irregular thick to some thin parting; slightly irregular to irregular and rare hackly fracture. A 3-inch light brownish-gray oolitic band in middle.

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1905.0	1906.4	Mudstone and shale: Dark to medium gray, slightly calcareous. Very faint streaked bedding and some laminae. Regular to irregular medium to thin parting; coarse hackly to slightly conchoidal fracture. Some medium-light gray siltstone in lower part.
1906.4	1907.1	Mudstone: Medium-light to rare dark brownish gray, oolitic, slightly calcareous. Faintly variegated. Irregular thick parting; irregular fracture.
1907.1	1913.6	Siltstone and some very fine sandstone: Light to medium gray; slightly to moderately calcareous. Faintly bedded with some irregular discontinuous muddy to shaly laminae and bands. Irregular thick to some thin parting; irregular to hackly fracture. Oolitic muddy zone at 1910.8-1911.3.
1913.6	1913.9	Missing
1913.9	1916.0	Mudstone: Medium gray; some light gray siltstone in lower part; slightly calcareous. Massive to faintly streaked. Slightly irregular to irregular thick to medium parting; slightly irregular to irregular fracture.
1916.0	1918.3	Mudstone and siltstone: Medium-dark to light slightly brownish gray; some dark gray shale near bottom; slightly calcareous. Faint to moderately distinct distorted streaked bedding and some irregular discontinuous laminae. Irregular thick to some thin parting; irregular to hackly fracture.
1918.3	1921.2	Siltstone and very fine sandstone: Light gray to gray-buff. Massive to faintly streaked; few medium gray mudstone layers. Irregular thick parting; irregular to slightly irregular fracture.
1921.2	1923.2	Mudstone and siltstone: Medium to light gray and gray buff; slightly to moderately calcareous. Faint to moderately distinct irregular laminae and bands. Slightly irregular to irregular thick to rare thin parting; fairly regular fracture. Dark gray papery unctuous shale in lower 0.2 foot.
1923.2	1923.9	Mudstone: Light brownish gray, oolitic, slightly calcareous. Faintly layered to massive and variegated; abundant distinct dark gray ooliths. Slightly irregular to irregular thick to medium parting; irregular to slightly irregular fracture.
1923.9	1926.9	Sandstone: Light to some medium gray, fine grained, slightly calcareous. Massive; some interbedded medium gray muddy to shaly zones. Irregular thick to some thin parting; regular to some irregular and hackly fracture; permeable.
1926.9	1948.6	Sandstone: Gray-buff to some light gray and white; fine to rare medium grained. Faintly streaked to massive; very rare gray muddy to shaly layers. Irregular thick to rare medium and thin parting; fairly regular to some irregular and rare hackly fracture; permeable.
1948.6	1951.0	Siltstone, very fine sandstone, and mudstone: Gray-buff to light and rare medium gray; moderately to slightly calcareous. Faint

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## LITHOLOGIC DESCRIPTION OF SAMPLES SUBMITTED FOR ASSAY

Core samples from Carter Oil Company's Opportunity No. 2 corehole

From	To	Description
1951.0	1952.7	streaks and irregular discontinuous laminae and bands. Irregular thick to rare thin parting; irregular to coarse hackly fracture. Siltstone and mudstone: Light to medium gray, calcareous. Faint to some moderately distinct irregular discontinuous streaks, laminae, and bands. Irregular to slightly irregular thick to thin parting; irregular coarse hackly fracture.
1952.7	1954.5	Siltstone, very fine sandstone, and mudstone: Light to rare medium gray, calcareous. Faint irregular to discontinuous and displaced laminae and bands. Irregular to slightly irregular thick to medium parting; irregular fracture.
1954.5	1963.0	Siltstone, mudstone, and some very fine sandstone: Like 1948.6-1954.5. Rare medium to dark slightly brownish-gray mudstone and shale in lower part.

Bottom of core.