NEVADA COAL

60007516	0070
60007517	1420
60007518	0050
60007519	0950
60007520	1070
60007521	3440
60007522	1160
60007523	1700
60007524	1730
60007525	1660
60007526	2200
60007527	5160
60007528	3470
60007529	0050
60007530	3510
60007531	0020
60007532	3560
60007533	5370

NEVADA BUREAU OF MINES AND GEOLOGY
MACKAY SCHOOL OF MINES
UNIVERSITY OF NEVADA • RENO
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1 August 1980

NBMG OPEN-FILE REPORT 80-5

A PRELIMINARY FIRST STAGE STUDY OF NEVADA COAL RESOURCES

This information should be considered preliminary. It has not been edited, or checked for completeness or accuracy.

60007516	0070
60007517	1420
60007518	0050
60007519	0950
60007520	1070
60007521	3440
60007522	1160
60007523	1700
60007524	1730
60007525	1660
60007526	2200
60007527	5160
60007528	3470
60007529	0050
60007530	3510
60007531	0020
60007532	3560
60007533	5370

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(This study --- literature search, reconnaissance examination of occurrences, and sampling --- was done principally by Larry J. Garside and Keith G. Papke)

CONTENTS

Final Scientific Report

U. S. Geological Survey Grant 14-08-0001-G-229

A PRELIMINARY FIRST STAGE STUDY OF NEVADA COAL RESOURCE

by John H. Schilling, Principal Investigator

The purpose of this grant was to make a reconnaissance examination of each occurrence of coal in Nevada, and to take samples for analyse by the U. S. Geological Survey.

As a first step a careful search of the literature was made to locate any mentions of coal in Nevada. The resulting bibliography is enclosed as Appendix A.

Eleven areas were examined (all those that could be identified). Six of these areas were sampled and the samples submitted to the U. S. Geological Survey; 12 samples were taken (see Appendix B). Other data collected are given in Appendix C.

Conclusions: It is obvious from this study that Nevada has only minor coal resources; the total tonnage is very small, its quality is poor, and it is mostly in small, difficult-to-mine seams. Only one deposit, the Lewis Mine, seems to hold any promise, and that only for small-scale mining.

Exposures were very poor, and it was impossible to collect fresh, representative samples, or to describe the occurrence in any detail. If more detailed information is needed (geology, tonnage, "grade", and trace element content) it will require extremely expensive trenching and drilling.

It is recommended that a more-detailed study of the Lewis Mine eventually be made; possibly a two-phased effort: geologic surface mapping, followed by trenching and drilling if the mapping indicates any potential.

The Nevada Bureau of Mines and Geology will continue to study Nevada coals on a small scale, and eventually will publish the results as a NBMG Report.

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Sample No.	Sample Description
Lewis No. 1A	Channel sample across 36 in. coal bed in Coal Valley Formation, Pliocene. 38°30'40"N, 118°54'50"W (C S36,T8N, R27E, MDB&M) Lewis Coal Mine, Lyon County, NV. Collected by L. Garside and K. Papke, 24 Nov 76.
Lewis No. 2A	Channel sample across 15 in. coal bed in Coal Valley Formation, Pliocene. 38°30'40"N, 118°54'50"W (C S36, T8N, R27E, MDB&M) Lewis Coal Mine, Lyon County, NV. Collected by L. Garside and K. Papke, 24 Nov 76.
Coaldale No. 1A	Channel sample across 39 in. coal bed in the Mio-Pliocene Esmeralda Formation ("C-bed") 38°00'10"N, 117°52'40"W (NE/4 S29,T2N,R37E, MDB&M) Coaldale area, Esmeralda Co., NV. Collected by L. Garside and K. Papke, 21 Sept 76.
Coaldale No. 2A	Channel sample across 36 in. coal bed in the Mio-Pliocene Esmeralda Formation ("D-bed") 37°59'50"N, 117°52'40"W (SE/4 S29,T2N,R37E, MDB&M) Coaldale area, Esmeralda County, NV. Collected by L. Garside and K. Papke, 21 Sept 76.
Coaldale No. 3A	Channel samples across 30-36 in. coal bed in the Mio-Pliocene Esmeralda Formation ("C-bed") 38°00'10"N, 117°52'40"W (NE/4 S29, T2N,R37E, MDB&M) Coaldale area, Esmeralda County, NV. Collected by L. Garside and K. Papke, 21 Sept 76.
Gamma No. 1A	Channel sample across 22 in. coal bed in unnamed Pliocene? lacustrine rocks. 39°12'35"N, 117°46'50"W (C S35,T16N,R37E, MDB&M) lacustrine rocks Gamma prospect, Churchill County, NV. Collected by L. Garside and K. Papke, 6 Oct 76.
Eldorado Canyon Mine No. 1A	A select dump sample of coal from the shaft of the Eldorado Canyon Mine in unnamed Miocene? sedimentary rocks. 39°6'10"N, 119°33'30"W (SE/4 SW/4 S6,T14N,R22E, MDB&M) Eldorado Canyon Mine, Carson City, NV. Collected by L. Garside and K. Papke, 14 Sept 76.
Eldorado Canyon Mine No. 2A	A select dump sample of coal from the shaft of the Eldorado Canyon Mine in unnamed Miocene? sedimentary rocks. 39°6'10"N, 119°33'30"W (SE/4 SW/4 S6,T14N,R22E, MDB&M) Eldorado Canyon Mine, Carson City, NV. Collected by L. Garside and K. Papke, 14 Sept 76.

Sample No.	Sample description
Verdi 1A	Channel sample of coal bed 3.0 ft. thick at top of unnamed coal-bearing sequence of late Tertiary age. In SE 1/4 NW 1/4 NE 1/4 Sec. 9, T19N, R18E, MDB&M; 39°31'50"N, 119°57'30"W, Washoe Co., Nevada. Collected by L. Garside and K. Papke, Aug. 8, 1975.

Sample No.	Sample description
Verdi 2A	Channel sample of coal bed 2.0 ft. thick in unnamed coal-bearing sequence of late Tertiary age. In NW 1/4 NW 1/4 NE 1/4 Sec. 9, T19N, R18E, MDB&M; 39°32'00" ; 119°57'40"; Washoe Co., Nevada. Collected by L. Garside and K. Papke, Aug. 8, 1975.

Sample No.	Sample description
Pancake North 1A	Grab sample of best coal on dump. Coal bed in Diamond Peak Formation of Mississippian age. In SW 1/4 NE 1/4 Sec. 28, T18N, R56E, MDB&M; 39°24'5", 115°40'15"; White Pine Co., Nevada. Collected by L. Garside and K. Papke, Nov. 4, 1975.

Sample No.	Sample description
Elko West 1A	Channel sample of coal bed 0.5 ft. thick in oil-shale sequence in Elko Formation of Eocene-Oligocene age. In center NW 1/4 NE 1/4 Sec. 27, T34N, R55E, MDB&M; 40°48'30", 115°45'50"; Elko Co., Nevada. Collected by L. Garside and K. Papke, Nov. 6, 1975.

APPENDIX C - Deposit Descriptions

NAME: Coaldale Area

STATE: Nevada

COUNTY: Esmeralda

QUAD NAME: Coaldale, Nevada QUAD SERIES: 7½ minute

GEOLOGIC BASIN:

COAL FIELD: Coaldale

RANK OF COAL: Sub-bituminous

DATES: (from) 9/21/76 (to)

FIELD NOTE I: (from) (to)

Location: S29, T2N, R37E

Sample Nos.: Coaldale No. 1, 2, 3

Analysis Completed:

FIELD NOTE # Sample Coaldale No. 1 AERIAL PHOTO # _____
(indicates reference to cover notes)

1. SURFACE ALTITUDE: 4,980' 2. DATE: 9 / 21 / 76

*3. TYPE OF DESCRIPTION: _____ *4. QUALITY OF EXPOSURE: good

5. ELEVATION OF BED: _____ *6. TOP OR BASE: _____ *7. PRECISION OF ELEVATION: _____

DESCRIPTION OF COAL BED

8. NAME OF COAL BED: C bed *9. RELIABILITY OF NAME: good

10. NAME OF MINE: _____ 11. NO. OF SAMPLES SUBMITTED FOR USBM ANALYSIS: _____

12. NO. OF SAMPLES SUBMITTED FOR BASS ANALYSIS: _____ *13. KIND OF BASS ANALYSIS REQUESTED: _____ *14. SAMPLE TYPE: channel

15. AVERAGE SLOPE ACROSS BED: 20° 16. AVERAGE SLOPE ABOVE OUTCROP: 20° 17. AVERAGE SLOPE BELOW OUTCROP: 15°

18. THICKNESS OF BED: 39 inches 19. THICKNESS OF PARTINGS: ½-1 inch *20. THICKNESS COMPLETE?: yes

21. COAL THICKNESS FOR RESOURCE CALCULATION: 36 inches *22. QUALITY OF THICKNESS DATA: good

*23. LITHOLOGY OF ROOF ROCK: shale 24. CONTACT WITH COAL BED: gradational

*25. LITHOLOGY OF FLOOR ROCK: carbonaceous shale 26. CONTACT WITH COAL BED: sharp

27. STRIKE OF CLEAT: _____ 28. DIP OF CLEAT: _____ *29. SCALE OF CLEAT: _____

30. STRIKE OF CLEAT: _____ 31. DIP OF CLEAT: _____

DESCRIPTION OF STRUCTURAL FEATURES

32. STRIKE OF BEDDING: N0°E 33. DIP OF BEDDING: 18°E

*34. STRUCTURAL FEATURE: _____ *35. DESCRIPTION OF FEATURE: _____

36. NAME OF FEATURE: _____ 37. POSITION ON FEATURE: _____

38. STRIKE OF FEATURE: _____ 39. DIP OF FEATURE: _____

40. STRIKE OF JOINT: _____ 41. DIP OF JOINT: _____ *42. PROMINENCE OF JOINT: _____

43. STRIKE OF JOINT: _____ 44. DIP OF JOINT: _____ *45. PROMINENCE OF JOINT: _____

FIELD NOTE # Sample Coaldale No. 2 AERIAL PHOTO #
(*indicates reference to cover notes)

1. SURFACE ALTITUDE: 5,100' 2. DATE: 9 / 21 / 76

*3. TYPE OF DESCRIPTION: *4. QUALITY OF EXPOSURE: fair

5. ELEVATION OF BED: *6. TOP OR BASE: *7. PRECISION OF ELEVATION:

DESCRIPTION OF COAL BED

8. NAME OF COAL BED: D bed *9. RELIABILITY OF NAME: very good

10. NAME OF MINE: unknown 11. NO. OF SAMPLES SUBMITTED FOR USBM ANALYSIS:

12. NO. OF SAMPLES SUBMITTED FOR RASS ANALYSIS: *13. KIND OF RASS ANALYSIS REQUESTED: *14. SAMPLE TYPE:

15. AVERAGE SLOPE ACROSS BED: 15° 16. AVERAGE SLOPE ABOVE OUTCROP: 15° 17. AVERAGE SLOPE BELOW OUTCROP: 0°

18. THICKNESS OF BED: 36 inches 19. THICKNESS OF PARTINGS: ½ inch *20. THICKNESS COMPLETE?: yes

21. COAL THICKNESS FOR RESOURCE CALCULATION: 36 inches *22. QUALITY OF THICKNESS DATA: fair

*23. LITHOLOGY OF ROOF ROCK: tuff 24. CONTACT WITH COAL BED: gradational

*25. LITHOLOGY OF FLOOR ROCK: shale 26. CONTACT WITH COAL BED: sharp

27. STRIKE OF CLEAT: 28. DIP OF CLEAT: *29. SCALE OF CLEAT:

30. STRIKE OF CLEAT: 31. DIP OF CLEAT:

DESCRIPTION OF STRUCTURAL FEATURES

32. STRIKE OF BEDDING: N30°E 33. DIP OF BEDDING: 35°SE

*34. STRUCTURAL FEATURE: *35. DESCRIPTION OF FEATURE:

36. NAME OF FEATURE: 37. POSITION ON FEATURE:

38. STRIKE OF FEATURE: 39. DIP OF FEATURE:

40. STRIKE OF JOINT: 41. DIP OF JOINT: *42. PROMINENCE OF JOINT:

43. STRIKE OF JOINT: 44. DIP OF JOINT: *45. PROMINENCE OF JOINT:

FIELD NOTE # Sample Coaldale No. 3 AERIAL PHOTO #
(*indicates reference to cover notes)

1. SURFACE ALTITUDE: 4,990' 2. DATE: 9 / 21 / 1976

*3. TYPE OF DESCRIPTION: *4. QUALITY OF EXPOSURE: fair

5. ELEVATION OF BED: *6. TOP OR BASE: *7. PRECISION OF ELEVATION:

DESCRIPTION OF COAL BED

8. NAME OF COAL BED: C bed *9. RELIABILITY OF NAME: good

10. NAME OF MINE: 11. NO. OF SAMPLES SUBMITTED FOR USBM ANALYSIS:

12. NO. OF SAMPLES SUBMITTED FOR BASS ANALYSIS: *13. KIND OF BASS ANALYSIS REQUESTED: *14. SAMPLE TYPE: channel

15. AVERAGE SLOPE ACROSS BED: 15° 16. AVERAGE SLOPE ABOVE OUTCROP: 15° 17. AVERAGE SLOPE BELOW OUTCROP: 10°

18. THICKNESS OF BED: 30-36 inches 19. THICKNESS OF PARTINGS: ½-1 inch *20. THICKNESS COMPLETE?: yes

21. COAL THICKNESS FOR RESOURCE CALCULATION: 36 inches *22. QUALITY OF THICKNESS DATA: good

*23. LITHOLOGY OF ROOF ROCK: carbonaceous shale 24. CONTACT WITH COAL BED: sharp

*25. LITHOLOGY OF FLOOR ROCK: carbonaceous shale 26. CONTACT WITH COAL BED: sharp

27. STRIKE OF CLEAT: 28. DIP OF CLEAT: *29. SCALE OF CLEAT:

30. STRIKE OF CLEAT: 31. DIP OF CLEAT:

DESCRIPTION OF STRUCTURAL FEATURES

32. STRIKE OF BEDDING: NO°E 33. DIP OF BEDDING: 22°E

*34. STRUCTURAL FEATURE: fold *35. DESCRIPTION OF FEATURE:

36. NAME OF FEATURE: 37. POSITION ON FEATURE:

38. STRIKE OF FEATURE: 39. DIP OF FEATURE:

40. STRIKE OF JOINT: 41. DIP OF JOINT: *42. PROMINENCE OF JOINT:

43. STRIKE OF JOINT: 44. DIP OF JOINT: *45. PROMINENCE OF JOINT:

DESCRIPTION OF ROCK UNIT

46. FORMATION, MEMBER, OR BED NAME: Esmeralda Fm.

*47. POSITION OF UNIT: unknown

*48. LITHOLOGY: sediments volcaniclastic

49. THICKNESS: unknown

50. NO. OF SAMPLES SUBMITTED FOR MASS ANALYSIS:

*51. KIND OF ANALYSIS REQUESTED:

*52. SOURCE OF SAMPLE:

*53. FRESH ROCK COLOR: yellowish-gray

*54. WEATHERED ROCK COLOR:

*55. GRAIN OR XL. SIZE:

*56. GRAIN OR XL. SHAPE:

57. BEDDING CHARACTERISTICS: very thin-bedded

*58. UPPER CONTACT:

59. LOWER CONTACT:

60. WEATHERING CHARACTERISTICS: low rolling hills

*61. FOSSIL TYPES: none

*62. FOSSIL SAMPLE SUBMITTED?:

63. DESCRIPTIVE SEDIMENTOLOGY:

64. COMMENTS OR ADDITIONAL INFORMATION (specify item number if comment relates to one of items above):

Sample Coaldale No. 1 was taken at Area E, northern incline, 120 feet in the incline. Impure coal, slightly iron-stained. Three partings ¼ to 1 inch thick. The incline extends approximately 180 feet further. The coal is probably faulted out. Partings are tuff with some pyrite. Some gypsum noted along coal bed.

Sample Coaldale No. 2 is from Area C, 15 feet down a 35 degree incline. A 3 foot thick coal bed, somewhat distorted by folding and faulting. Coal is high in sulfates here near the surface.

Sample Coaldale No. 3 is from Area E, southern incline, from the north wall at the bottom of the stope. Upper half of sample is dense, dark gray, non-vitreous. Lower half is more vitreous. The bed with the coal rolls to vertical at the base of the stope (where sampled).

NAME: Eldorado Canyon Mine

STATE: Mine

COUNTY: Carson City

QUAD NAME: Dayton, Nevada QUAD SERIES: 15 minute

GEOLOGIC BASIN:

COAL FIELD:

RANK OF COAL: lignite

DATES: (from) 14 Sept., 1976 (to)

FIELD NOTE #: (from) (to)

Location: SE/4 SW/4 S6, T14N, R22E

Sample Nos.: Eldorado Canyon Mine Nos. 1 and 2

Analysis Completed:

FIELD NOTE #: _____ AERIAL PHOTO #: _____
(*indicates reference to cover notes)

1. SURFACE ALTITUDE: 5,850' 2. DATE: 14 / 9 / 76

*3. TYPE OF DESCRIPTION: _____ *4. QUALITY OF EXPOSURE: poor

5. ELEVATION OF BED: unknown *6. TOP OR BASE: _____ *7. PRECISION OF ELEVATION: _____

DESCRIPTION OF COAL BED

8. NAME OF COAL BED: none *9. RELIABILITY OF NAME: _____

10. NAME OF MINE: Eldorado Canyon Mine 11. NO. OF SAMPLES SUBMITTED FOR USBM ANALYSIS: _____

12. NO. OF SAMPLES SUBMITTED FOR RASS ANALYSIS: _____ *13. KIND OF RASS ANALYSIS REQUESTED: _____ *14. SAMPLE TYPE: _____

15. AVERAGE SLOPE ACROSS BED: unknown 16. AVERAGE SLOPE ABOVE OUTCROP: unknown 17. AVERAGE SLOPE BELOW OUTCROP: unknown

18. THICKNESS OF BED: unknown 19. THICKNESS OF PARTINGS: unknown *20. THICKNESS COMPLETE?: unknown

21. COAL THICKNESS FOR RESOURCE CALCULATION: unknown *22. QUALITY OF THE THICKNESS DATA: _____

*23. LITHOLOGY OF ROOF ROCK: claystone 24. CONTACT WITH COAL BED: unknown

*25. LITHOLOGY OF FLOOR ROCK: claystone 26. CONTACT WITH COAL BED: unknown

27. STRIKE OF CLEAT: unknown 28. DIP OF CLEAT: unknown *29. SCALE OF CLEAT: unknown

30. STRIKE OF CLEAT: unknown 31. DIP OF CLEAT: unknown

DESCRIPTION OF STRUCTURAL FEATURES

32. STRIKE OF BEDDING: N-S? 33. DIP OF BEDDING: 20°W?

*34. STRUCTURAL FEATURE: _____ *35. DESCRIPTION OF FEATURE: _____

36. NAME OF FEATURE: _____ 37. POSITION ON FEATURE: _____

38. STRIKE OF FEATURE: _____ 39. DIP OF FEATURE: _____

40. STRIKE OF JOINT: _____ 41. DIP OF JOINT: _____ *42. PROMINENCE OF JOINT: _____

43. STRIKE OF JOINT: _____ 44. DIP OF JOINT: _____ *45. PROMINENCE OF JOINT: _____

DESCRIPTION OF ROCK UNIT

46. FORMATION, MEMBER, OR BED NAME: none

*47. POSITION OF UNIT: unknown

*48. LITHOLOGY: claystones & tuffs

49. THICKNESS: unknown

50. NO. OF SAMPLES SUBMITTED FOR MASS ANALYSIS:

*51. KIND OF ANALYSIS REQUESTED:

*52. SOURCE OF SAMPLE: mine dumps

*53. FRESH ROCK COLOR:

*54. WEATHERED ROCK COLOR:

*55. GRAIN OR XL. SIZE:

*56. GRAIN OR XL. SHAPE:

57. BEDDING CHARACTERISTICS:

*58. UPPER CONTACT:

59. LOWER CONTACT:

60. WEATHERING CHARACTERISTICS:

*61. FOSSIL TYPES:

*62. FOSSIL SAMPLE SUBMITTED?:

63. DESCRIPTIVE SEDIMENTOLOGY:

64. COMMENTS OR ADDITIONAL INFORMATION (specify item number if comment relates to one of items above):

Examined 14 Sept., 1976

The only evidence of coal was a caved shaft and a fairly large dump located in SE/4, SW/4, S6, T14N, R22E about 200 feet west of the creek in Eldorado Canyon. The creek bottom is boundary between Carson City and Lyon County. The best access is by way of Johnson Lane south of Carson City. Depth of shaft is unknown. Dump overgrown with trees and recently was somewhat bulldozed. No outcrops of coal. Sample No. 1 was hand picked from the lower part of the dump and No. 2 was hand picked from the middle part of the dump. Some claystone on the dump. Tuffs and andesites in the vicinity. Recent exploration in the vicinity on placer claims. Relationship of the coal-bearing sediments to Tertiary andesites is unknown. The coal-bearing rocks are probably Miocene or younger. This is probably the deeper shaft reported in the literature.

Soil from dump was washed from coal and samples were dried at 40°C. No. 1A and 2A are for analysis, 1B and 2B are for NBMG.

NAME: Elko Area

STATE: Nevada

COUNTY: Elko

QUAD NAME: Elko West QUAD SERIES: 7½ minute

GEOLOGIC BASIN: Elko

COAL FIELD:

RANK OF COAL:

DATES: (from) 6 Nov., 1975 (to)

FIELD NOTE #: (from) (to)

Location: NW/4 S27, T34N, R55E

Sample Nos.: Elko West No. 1

Analysis Completed: X

FIELD NOTE #: _____ AERIAL PHOTO #: _____
(*indicates reference to cover notes)

1. SURFACE ALTITUDE: 5,270' 2. DATE: 11 / 6 / 75

*3. TYPE OF DESCRIPTION: _____ *4. QUALITY OF EXPOSURE: fair

5. ELEVATION OF BED: 5,270 *6. TOP OR BASE: base *7. PRECISION OF ELEVATION: est.

DESCRIPTION OF COAL BED

8. NAME OF COAL BED: Catlin *9. RELIABILITY OF NAME: _____

10. NAME OF MINE: Catlin 11. NO. OF SAMPLES SUBMITTED FOR USBM ANALYSIS: _____

12. NO. OF SAMPLES SUBMITTED FOR RASS ANALYSIS: _____ *13. KIND OF RASS ANALYSIS REQUESTED: _____ *14. SAMPLE TYPE: _____

15. AVERAGE SLOPE ACROSS BED: 22° 16. AVERAGE SLOPE ABOVE OUTCROP: 24° 17. AVERAGE SLOPE BELOW OUTCROP: 20°

18. THICKNESS OF BED: 0.5' 19. THICKNESS OF PARTINGS: 1/8" shaly *20. THICKNESS COMPLETE?: 0.5'

21. COAL THICKNESS FOR RESOURCE CALCULATION: _____ *22. QUALITY OF THE THICKNESS DATA: _____

*23. LITHOLOGY OF ROOF ROCK: oil shale 24. CONTACT WITH COAL BED: sharp

*25. LITHOLOGY OF FLOOR ROCK: oil shale 26. CONTACT WITH COAL BED: sharp

27. STRIKE OF CLEAT: none 28. DIP OF CLEAT: none *29. SCALE OF CLEAT: _____

30. STRIKE OF CLEAT: _____ 31. DIP OF CLEAT: _____

DESCRIPTION OF STRUCTURAL FEATURES

32. STRIKE OF BEDDING: N10°W 33. DIP OF BEDDING: 30°E

*34. STRUCTURAL FEATURE: NA *35. DESCRIPTION OF FEATURE: _____

36. NAME OF FEATURE: _____ 37. POSITION ON FEATURE: _____

38. STRIKE OF FEATURE: _____ 39. DIP OF FEATURE: _____

40. STRIKE OF JOINT: _____ 41. DIP OF JOINT: _____ *42. PROMINENCE OF JOINT: _____

43. STRIKE OF JOINT: _____ 44. DIP OF JOINT: _____ *45. PROMINENCE OF JOINT: _____

DESCRIPTION OF ROCK UNIT

46. FORMATION, MEMBER, OR BED NAME: Elko Formation

*47. POSITION OF UNIT:

*48. LITHOLOGY: tuffs & oil shales

49. THICKNESS:

50. NO. OF SAMPLES SUBMITTED FOR MASS ANALYSIS:

*51. KIND OF ANALYSIS REQUESTED:

*52. SOURCE OF SAMPLE:

*53. FRESH ROCK COLOR: olive-gray to olive-black

*54. WEATHERED ROCK COLOR: very light-gray

*55. GRAIN OR XL. SIZE:

*56. GRAIN OR XL. SHAPE:

57. BEDDING CHARACTERISTICS: thinly laminated

*58. UPPER CONTACT:

59. LOWER CONTACT:

60. WEATHERING CHARACTERISTICS: shaly

*61. FOSSIL TYPES: reeds

*62. FOSSIL SAMPLE SUBMITTED?:

63. DESCRIPTIVE SEDIMENTOLOGY:

64. COMMENTS OR ADDITIONAL INFORMATION (specify item number if comment relates to one of items above):

Location of sampled area is near old Catlin Oil Shale workings and plant. NW/4 S27, T34N, R55E. Large dumps present; old ruins of a retort just to west of extensive waste dumps. To the east are dumps of burned shale. Beds: N10°W, 30°E. Approximately 10 feet of oil shale, 6-8 feet of tuff and then about 10 feet of oil shale above. A few 6 inch beds of low-grade lignite are in the oil shale sequence. The entire sequence is overlain by a thick tuff.

NAME: Gamma Prospect

STATE: Nevada

COUNTY: Churchill

QUAD NAME: Buffalo Summit QUAD SERIES: 7½ minute

GEOLOGIC BASIN: Buffalo Canyon

COAL FIELD:

RANK OF COAL: lignite

DATES: (from) 6 Oct., 1976 (to)

FIELD NOTE #: (from) (to)

Location: C, S35, T16N, R37E

Sample Nos.: Gamma No. 1

Analysis Completed:

FIELD NOTE # AERIAL PHOTO #
(*indicates reference to cover-notes)

1. SURFACE ALTITUDE: 6,280 feet 2. DATE: 10 / 7 / 1976

*3. TYPE OF DESCRIPTION: *4. QUALITY OF EXPOSURE: good

5. ELEVATION OF BED: 6,280 feet *6. TOP OR BASE: *7. PRECISION OF ELEVATION: fair

DESCRIPTION OF COAL BED

8. NAME OF COAL BED: none *9. RELIABILITY OF NAME:

10. NAME OF MINE: Gamma Prospect 11. NO. OF SAMPLES SUBMITTED FOR USBM ANALYSIS:

12. NO. OF SAMPLES SUBMITTED FOR RASS ANALYSIS: *13. KIND OF RASS ANALYSIS REQUESTED: *14. SAMPLE TYPE: channel

15. AVERAGE SLOPE ACROSS BED: 25° 16. AVERAGE SLOPE ABOVE OUTCROP: 60° 17. AVERAGE SLOPE BELOW OUTCROP: 20°

18. THICKNESS OF BED: 22 inches 19. THICKNESS OF PARTINGS: 1 inch *20. THICKNESS COMPLETE?: no

21. COAL THICKNESS FOR RESOURCE CALCULATION: 2 feet *22. QUALITY OF THE THICKNESS DATA: good

*23. LITHOLOGY OF ROOF ROCK: claystone 24. CONTACT WITH COAL BED: sharp

*25. LITHOLOGY OF FLOOR ROCK: claystone 26. CONTACT WITH COAL BED: sharp

27. STRIKE OF CLEAT: 28. DIP OF CLEAT: *29. SCALE OF CLEAT:

30. STRIKE OF CLEAT: 31. DIP OF CLEAT:

DESCRIPTION OF STRUCTURAL FEATURES

32. STRIKE OF BEDDING: E-W 33. DIP OF BEDDING: 2° N

*34. STRUCTURAL FEATURE: *35. DESCRIPTION OF FEATURE:

36. NAME OF FEATURE: 37. POSITION ON FEATURE:

38. STRIKE OF FEATURE: 39. DIP OF FEATURE:

40. STRIKE OF JOINT: 41. DIP OF JOINT: *42. PROMINENCE OF JOINT:

43. STRIKE OF JOINT: 44. DIP OF JOINT: *45. PROMINENCE OF JOINT:

DESCRIPTION OF ROCK UNIT

46. FORMATION, MEMBER, OR BED NAME: None

47. POSITION OF UNIT:

48. LITHOLOGY: claystones & sandstones

49. THICKNESS:

50. NO. OF SAMPLES SUBMITTED FOR RASS ANALYSIS:

51. KIND OF ANALYSIS REQUESTED:

52. SOURCE OF SAMPLE:

53. FRESH ROCK COLOR: yellowish-gray

54. WEATHERED ROCK COLOR: yellowish gray

55. GRAIN OR XL. SIZE:

56. GRAIN OR XL. SHAPE:

57. BEDDING CHARACTERISTICS: very thin-bedded

58. UPPER CONTACT:

59. LOWER CONTACT:

60. WEATHERING CHARACTERISTICS:

61. FOSSIL TYPES:

62. FOSSIL SAMPLE SUBMITTED?:

63. DESCRIPTIVE SEDIMENTOLOGY:

64. COMMENTS OR ADDITIONAL INFORMATION (specify item number if comment relates to one of items above):

The sample locality is C, Sec. 35, T16N, R37E. It is 2,600 feet west-northwest of the Gold Trail Mine.

The lignite beds crop out on the lower slopes in a series of claystones and sandstones. The area is one of badlands topography.

The sample was taken at locality D on fig. 2 in TEM Report 226 (surface outcrop). There were several coal beds over a 3 foot interval. We took a 22 inch channel sample in the central part of the best material.

Radioactivity is up to 4 times background. The bed dips 2° N at the sample area. The main workings at locality A (TEM 226) are an inclined adit on beds at approximately-20°.

NAME: Lewis

STATE: Nevada

COUNTY: Lyon

QUAD NAME: Mt. Grant QUAD SERIES: 15 minute

GEOLOGIC BASIN: Coal Valley

COAL FIELD:

RANK OF COAL: Sub-bituminous

DATES: (from) 24 Nov., 1976 (to)

FIELD NOTE #: (from) (to)

Location: S36, T8N, R27E

Sample Nos.: Lewis No. 1 and No. 2

Analysis Completed:

FIELD NOTE #: _____ AERIAL PHOTO #: _____
(*indicates reference to cover-notes)

1. SURFACE ALTITUDE: 5,590' 2. DATE: 11 / 24 / 76

*3. TYPE OF DESCRIPTION: _____ *4. QUALITY OF EXPOSURE: good

5. ELEVATION OF BED: 5,590' *6. TOP OR BASE: _____ *7. PRECISION OF ELEVATION: _____

DESCRIPTION OF COAL BED

8. NAME OF COAL BED: none *9. RELIABILITY OF NAME: _____

10. NAME OF MINE: Lewis Coal Mine 11. NO. OF SAMPLES SUBMITTED FOR USBM ANALYSIS: _____

12. NO. OF SAMPLES SUBMITTED FOR RASS ANALYSIS: _____ *13. KIND OF RASS ANALYSIS REQUESTED: _____ *14. SAMPLE TYPE: channel

15. AVERAGE SLOPE ACROSS BED: 5° 16. AVERAGE SLOPE ABOVE OUTCROP: 10° 17. AVERAGE SLOPE BELOW OUTCROP: 0°

18. THICKNESS OF BED: 6 feet 19. THICKNESS OF PARTINGS: _____ *20. THICKNESS COMPLETE?: _____

21. COAL THICKNESS FOR RESOURCE CALCULATION: 6 feet *22. QUALITY OF THE THICKNESS DATA: good

*23. LITHOLOGY OF ROOF ROCK: light-gray claystone 24. CONTACT WITH COAL BED: sharp

*25. LITHOLOGY OF FLOOR ROCK: brownish-gray siltstone 26. CONTACT WITH COAL BED: sharp

27. STRIKE OF CLEAT: _____ 28. DIP OF CLEAT: _____ *29. SCALE OF CLEAT: _____

30. STRIKE OF CLEAT: _____ 31. DIP OF CLEAT: _____

DESCRIPTION OF STRUCTURAL FEATURES

32. STRIKE OF BEDDING: N15°E 33. DIP OF BEDDING: 20°NW

*34. STRUCTURAL FEATURE: _____ *35. DESCRIPTION OF FEATURE: _____

36. NAME OF FEATURE: _____ 37. POSITION ON FEATURE: _____

38. STRIKE OF FEATURE: _____ 39. DIP OF FEATURE: _____

40. STRIKE OF JOINT: _____ 41. DIP OF JOINT: _____ *42. PROMINENCE OF JOINT: _____

43. STRIKE OF JOINT: _____ 44. DIP OF JOINT: _____ *45. PROMINENCE OF JOINT: _____

DESCRIPTION OF ROCK UNIT

46. FORMATION, MEMBER, OR BED NAME: Coal Valley Formation

47. POSITION OF UNIT:

48. LITHOLOGY: sandstone, diatomaceous shale, adesite tuff

49. THICKNESS: 3,325'

50. NO. OF SAMPLES SUBMITTED FOR MASS ANALYSIS:

51. KIND OF ANALYSIS REQUESTED:

52. SOURCE OF SAMPLE:

53. FRESH ROCK COLOR:

54. WEATHERED ROCK COLOR: inclined shaft

55. GRAIN OR BL. SIZE:

56. GRAIN OR BL. SHAPE:

57. BEDDING CHARACTERISTICS:

58. UPPER CONTACT:

59. LOWER CONTACT:

60. WEATHERING CHARACTERISTICS:

61. FOSSIL TYPES: aquatic plants (Berry, 1927)

62. FOSSIL SAMPLE SUBMITTED:

63. DESCRIPTIVE SEDIMENTOLOGY:

64. REMARKS OR ADDITIONAL INFORMATION (specify item number if comment relates to one of items above):

Examined 24 Nov., 1976

Two coal properties were examined in S36, T8N, R27E. These are shown on the Mt. Grant 15 minute sheet, the south property labeled with the word tunnel and the north having an adit symbol and an abandoned building. Workings at the south property (SW/4, S36) consist of 2 main adits. The lower probably produced most of the coal and has an extensive dump. A coal bin is near this dump. The coal bed attitude is N-S, 22°W. The upper adit on the same bed is approximately 100 feet southeast and 20 feet higher. Both adits are completely caved at the portal. About 4 feet of poorly exposed coal is seen at the surface. Another coal bed is present 300-400 feet west of the adit, but no workings are along it. Several faults are seen in the hills to the southwest.

The north property (C, S36) has an old building and an inclined shaft bearing N70W-12°. The shaft follows down a 6 foot width of coaly material. Samples Lewis No. 1 and 2 were taken on the left wall, 90 feet down, where the incline flattens and the coal disappears into the floor. A nearly horizontal incline continues, but it is impassable. A board in the sheeting of the shed on the property was a sign, possibly for the mine, and says: Mattinson Extension Coal & Oil Co. Two faults were noted in the incline at the north property with offsets of approximately 5 feet, west side down.

Sample Lewis No. 1: channel sample across 36 inch bed, N15E, 20°NW. footwall is brownish-gray siltstone, sharp contact with coal. Above sampled zone is a 2 inch parting of carbonaceous siltstone (not sampled). Some ½ inch shaly layers in the coal. Gypsum and melaterite present.

DESCRIPTION OF ROCK UNIT

46. FORMATION, MEMBER, OR BED NAME: _____

*47. POSITION OF UNIT: _____

*48. LITHOLOGY: _____ 49. THICKNESS: _____

50. NO. OF SAMPLES SUBMITTED FOR MASS ANALYSIS: _____ *51. KIND OF ANALYSIS REQUESTED: _____ *52. SOURCE OF SAMPLE: _____

*53. FRESH ROCK COLOR: _____ *54. WEATHERED ROCK COLOR: _____

*55. GRAIN OR XL. SIZE: _____ *56. GRAIN OR XL. SHAPE: _____

57. BEDDING CHARACTERISTICS: _____

*58. UPPER CONTACT: _____ 59. LOWER CONTACT: _____

60. WEATHERING CHARACTERISTICS: _____

*61. FOSSIL TYPES: _____ *62. FOSSIL SAMPLE SUBMITTED: _____

63. DESCRIPTIVE SEDIMENTOLOGY: _____

64. COMMENTS OR ADDITIONAL INFORMATION (specify item number if comment relates to one of items above):

Lewis cont.

Sample Lewis No. 2: channel sample beginning above the 2 inch parting described in Lewis No. 1. The sampled thickness is 15 inches and the coal is in sharp contact with overlying light-gray claystone. Coal as in Lewis No. 1.

Samples Lewis No. 1A and 2A are for analysis, No. 1B and 2B are for NBMG.

NAME: Pancake Coal Mine

STATE: Nevada

COUNTY: White Pine

QUAD NAME: Pancake Summit QUAD SERIES: 15 minute

GEOLOGIC BASIN:

COAL FIELD:

RANK OF COAL:

DATES: (from) 4 Oct., 1975 (to)

FIELD NOTE #: (from) (to)

Location: S27, 28, T18N, R56E

Sample Nos.: Pancake North No. 1

Analysis Completed: X

FIELD NOTE #: _____ AERIAL PHOTO #: _____
(*indicates reference to cover notes)

1. SURFACE ALTITUDE: 6,720' 2. DATE: 11 / 4 / 75

*3. TYPE OF DESCRIPTION: _____ *4. QUALITY OF EXPOSURE: _____

5. ELEVATION OF BED: _____ *6. TOP OR BASE: _____ *7. PRECISION OF ELEVATION: _____

DESCRIPTION OF COAL BED

8. NAME OF COAL BED: _____ *9. RELIABILITY OF NAME: _____

10. NAME OF MINE: Pancake Coal Mine 11. NO. OF SAMPLES SUBMITTED FOR USBM ANALYSIS: _____

12. NO. OF SAMPLES SUBMITTED FOR BASS ANALYSIS: _____ *13. KIND OF BASS ANALYSIS REQUESTED: _____ *14. SAMPLE TYPE: _____

15. AVERAGE SLOPE ACROSS BED: 18° 16. AVERAGE SLOPE ABOVE OUTCROP: 18° 17. AVERAGE SLOPE BELOW OUTCROP: 18°

18. THICKNESS OF BED: _____ 19. THICKNESS OF PARTINGS: _____ *20. THICKNESS COMPLETE?: _____

21. COAL THICKNESS FOR RESOURCE CALCULATION: _____ *22. QUALITY OF THE THICKNESS DATA: _____

*23. LITHOLOGY OF ROOF ROCK: limestone or shale 24. CONTACT WITH COAL BED: _____

*25. LITHOLOGY OF FLOOR ROCK: limestone or shale 26. CONTACT WITH COAL BED: _____

27. STRIKE OF CLEAT: _____ 28. DIP OF CLEAT: _____ *29. SCALE OF CLEAT: _____

30. STRIKE OF CLEAT: _____ 31. DIP OF CLEAT: _____

DESCRIPTION OF STRUCTURAL FEATURES

32. STRIKE OF BEDDING: _____ 33. DIP OF BEDDING: _____

*34. STRUCTURAL FEATURE: _____ *35. DESCRIPTION OF FEATURE: _____

36. NAME OF FEATURE: _____ 37. POSITION ON FEATURE: _____

38. STRIKE OF FEATURE: _____ 39. DIP OF FEATURE: _____

40. STRIKE OF JOINT: _____ 41. DIP OF JOINT: _____ *42. PROMINENCE OF JOINT: _____

43. STRIKE OF JOINT: _____ 44. DIP OF JOINT: _____ *45. PROMINENCE OF JOINT: _____

DESCRIPTION OF ROCK UNIT

46. FORMATION, MEMBER, OR BED NAME: Diamond Peak Fm 6 (Mississippian)

*47. POSITION OF UNIT: near top

*48. LITHOLOGY: congl., sandstone & shale

49. THICKNESS: unknown

50. NO. OF SAMPLES SUBMITTED FOR MASS ANALYSIS:

*51. KIND OF ANALYSIS REQUESTED:

*52. SOURCE OF SAMPLE:

*53. FRESH ROCK COLOR:

*54. WEATHERED ROCK COLOR:

*55. GRAIN OR XL. SIZE:

*56. GRAIN OR XL. SHAPE:

57. BEDDING CHARACTERISTICS:

*58. UPPER CONTACT:

59. LOWER CONTACT:

60. WEATHERING CHARACTERISTICS:

*61. FOSSIL TYPES: brachiopods & trace fossils

*62. FOSSIL SAMPLE SUBMITTED?:

63. DESCRIPTIVE SEDIMENTOLOGY:

64. COMMENTS OR ADDITIONAL INFORMATION (specify item number if comment relates to one of items above):

Pancake Coal Mine, North Workings

At prospect symbol SW/4 NE/4 S28, T18N, R56E. The only coal observed is on a dump on the lower slope, apparently from a caved adit. The Pancake North No. 1 sample is a character sample of coal from this dump, and was later hand picked. Other workings are about 200 feet west of the caved adit? and about 75 feet higher in elevation. They consist of a caved shaft and dump. The dump consists of fossiliferous limestone, sandy limestone, calcareous sandstone, conglomerate, and siltstone. No coal was noted here. The shaft is inclined slightly to the east. Beds- N10°W, 25°SW. The coal is in limestone, just above a conglomerate. Directly adjoining the coal is a fissile claystone.

Another adit is found approximately 1,400 feet south of the sample locality. A fairly large dump is present, but no coal is exposed; no coal on dump. No coal outcrops between north workings and here.

Panckae Coal Mine, South Worings

NW/4 SE/4 S33,T18N, R56E. Inclined shaft (approx. 40° west) and dump. Only a very small amount of coaly material in a large amount of carbonaceous shale on the dump. Some selenite seen. Beds: due N, 25W.

The "coal" bed seems to be within the conglomerate unit, but nearly at its top. A 3 foot thick conglomerate bed

DESCRIPTION OF ROCK UNIT

46. FORMATION, MEMBER, OR FIELD NAME: _____

*47. POSITION OF UNIT: _____

*48. LITHOLOGY: _____ 49. THICKNESS: _____

50. NO. OF SAMPLES SUBMITTED FOR MASS ANALYSIS: _____ *51. KIND OF ANALYSIS REQUESTED: _____ *52. SOURCE OF SAMPLE: _____

*53. FRESH ROCK COLOR: _____ *54. WEATHERED ROCK COLOR: _____

*55. GRAIN OR XL. SIZE: _____ *56. GRAIN OR XL. SHAPE: _____

57. BEDDING CHARACTERISTICS: _____

*58. UPPER CONTACT: _____ 59. LOWER CONTACT: _____

60. WEATHERING CHARACTERISTICS: _____

*61. FOSSIL TYPES: _____ *62. FOSSIL SAMPLE SUBMITTED?: _____

63. DESCRIPTIVE SEDIMENTOLOGY: _____

64. COMMENTS OR ADDITIONAL INFORMATION (specify item number if comment relates to one of items above):

Pancake Coal Mine, South Workings cont.

overlies the shale horizon which apparently contains the "coal". Then, above this is fossiliferous limestone. These workings are at nearly the same stratigraphic level as the north workings.

NAME: Verdi

STATE: Nevada

COUNTY: Washoe

QUAD NAME: Verdi QUAD SERIES: 7½ minute

GEOLOGIC BASIN:

COAL FIELD:

RANK OF COAL:

DATES: (from) 25 Aug., 1975 (to)

FIELD NOTE #: (from) (to)

Location: NE/4 S9,T19N, R18E

Sample Nos.: Verdi: No. 1 and No. 2

Analysis Completed: X

FIELD NOTE # Verdi Sample No. 1A AERIAL PHOTO # _____
(*indicates reference to cover notes)

1. SURFACE ALTITUDE: 4,995' 2. DATE: 8 / 25 / 75

*3. TYPE OF DESCRIPTION: surface exposure *4. QUALITY OF EXPOSURE: weathered

5. ELEVATION OF BED: 4,995' *6. TOP OR BASE: base *7. PRECISION OF ELEVATION: T

DESCRIPTION OF COAL BED

8. NAME OF COAL BED: _____ *9. RELIABILITY OF NAME: _____

10. NAME OF MINE: _____ 11. NO. OF SAMPLES SUBMITTED FOR USBM ANALYSIS: 1

12. NO. OF SAMPLES SUBMITTED FOR BASS ANALYSIS: _____ *13. KIND OF BASS ANALYSIS REQUESTED: _____ *14. SAMPLE TYPE: _____

15. AVERAGE SLOPE ACROSS BED: 15° 16. AVERAGE SLOPE ABOVE OUTCROP: 15° 17. AVERAGE SLOPE BELOW OUTCROP: 15°

18. THICKNESS OF BED: 3.0' 19. THICKNESS OF PARTINGS: 1" *20. THICKNESS COMPLETE?: yes

21. COAL THICKNESS FOR RESOURCE CALCULATION: 3.0' *22. QUALITY OF THICKNESS DATA: precise

*23. LITHOLOGY OF ROOF ROCK: weakly consolidated feldspathic ss 24. CONTACT WITH COAL BED: sharp & smooth; regular

*25. LITHOLOGY OF FLOOR ROCK: same as roof 26. CONTACT WITH COAL BED: sharp & regular

27. STRIKE OF CLEAT: none 28. DIP OF CLEAT: _____ *29. SCALE OF CLEAT: _____

30. STRIKE OF CLEAT: _____ 31. DIP OF CLEAT: _____

DESCRIPTION OF STRUCTURAL FEATURES

32. STRIKE OF BEDDING: N65°E 33. DIP OF BEDDING: 25°NW

*34. STRUCTURAL FEATURE: none observed *35. DESCRIPTION OF FEATURE: _____

36. NAME OF FEATURE: _____ 37. POSITION ON FEATURE: _____

38. STRIKE OF FEATURE: _____ 39. DIP OF FEATURE: _____

40. STRIKE OF JOINT: _____ 41. DIP OF JOINT: _____ *42. PROMINENCE OF JOINT: _____

43. STRIKE OF JOINT: _____ 44. DIP OF JOINT: _____ *45. PROMINENCE OF JOINT: _____

FIELD NOTE # Verdi Sample No. 2A AERIAL PHOTO #
(*indicates reference to cover notes)

1. SURFACE ALTITUDE: 5,020' 2. DATE: 8 / 25 / 75

*3. TYPE OF DESCRIPTION: surface exposure *4. QUALITY OF EXPOSURE: weathered

5. ELEVATION OF BED: 5,020' *6. TOP OR BASE: base *7. PRECISION OF ELEVATION: T

DESCRIPTION OF COAL BED

8. NAME OF COAL BED: *9. RELIABILITY OF NAME:

10. NAME OF MINE: 11. NO. OF SAMPLES SUBMITTED FOR USBM ANALYSIS: 1

12. NO. OF SAMPLES SUBMITTED FOR BASS ANALYSIS: *13. KIND OF BASS ANALYSIS REQUESTED: *14. SAMPLE TYPE: channel

15. AVERAGE SLOPE ACROSS BED: 20° 16. AVERAGE SLOPE ABOVE OUTCROP: 20° 17. AVERAGE SLOPE BELOW OUTCROP: 0°

18. THICKNESS OF BED: 2.0' 19. THICKNESS OF PARTINGS: none *20. THICKNESS COMPLETE?: yes

21. COAL THICKNESS FOR RESOURCE CALCULATION: 2.0' *22. QUALITY OF THE THICKNESS DATA: precise

*23. LITHOLOGY OF ROOF ROCK: claystone 24. CONTACT WITH COAL BED: sharp

*25. LITHOLOGY OF FLOOR ROCK: claystone 26. CONTACT WITH COAL BED: gradational

27. STRIKE OF CLEAT: none 28. DIP OF CLEAT: *29. SCALE OF CLEAT:

30. STRIKE OF CLEAT: 31. DIP OF CLEAT:

DESCRIPTION OF STRUCTURAL FEATURES

32. STRIKE OF BEDDING: N40°W 33. DIP OF BEDDING: 25°SW

*34. STRUCTURAL FEATURE: none observed *35. DESCRIPTION OF FEATURE:

36. NAME OF FEATURE: 37. POSITION ON FEATURE:

38. STRIKE OF FEATURE: 39. DIP OF FEATURE:

40. STRIKE OF JOINT: 41. DIP OF JOINT: *42. PROMINENCE OF JOINT:

43. STRIKE OF JOINT: 44. DIP OF JOINT: *45. PROMINENCE OF JOINT:

DESCRIPTION OF ROCK UNIT

46. FORMATION, MEMBER, OR BED NAME: Sandstone of Hunter Creek(?)

*47. POSITION OF UNIT: unknown

*48. LITHOLOGY: sandstone, diatomaceous shale, diatomite

49. THICKNESS: unknown

50. NO. OF SAMPLES SUBMITTED FOR MASS ANALYSIS:

*51. KIND OF ANALYSIS REQUESTED:

*52. SOURCE OF SAMPLE: channel

*53. FRESH ROCK COLOR: medium gray

*54. WEATHERED ROCK COLOR: yellowish-gray

*55. GRAIN OR XL. SIZE: variable

*56. GRAIN OR XL. SHAPE: variable

57. BEDDING CHARACTERISTICS: Thinly bedded with coal seams

*58. UPPER CONTACT:

59. LOWER CONTACT:

60. WEATHERING CHARACTERISTICS:

*61. FOSSIL TYPES:

*62. FOSSIL SAMPLE SUBMITTED?:

63. DESCRIPTIVE SEDIMENTOLOGY:

64. COMMENTS OR ADDITIONAL INFORMATION (specify item number if comment relates to one of items above):

Verdi Sample No. 1

Point 5-location of Verdi Sample No. 1, along a stream channel, most of country above covered by alluvium, sparse outcrops of country rock including friable sandstone, diatomaceous shale, possibly of sandstone of Hunter Creek. Sample No. 1 came from upper 3 feet and included 2 or 3 one inch interlayers of sandy material. The entire coal coal sequence seems to be 20-25 feet thick with mostly thin-bedded coal seams in friable feldspathic sandstone. Strike and dip: N65°E, 25°NW, but is variable. Except for the upper 3 feet, the coal makes up only a small percentage of the rock. No evidence of former workings. Sample locality is about 200 feet north of the northern-most pipeline. The formation also has some pebble beds of andesite fragments. Formerly Truckee or Coal Valley Fm. Possibly correlative with sandstone of Hunter Creek.

Point 13 (in vicinity of). A few thin organic-rich beds, none of them as good as sample No. 1. Striking N60°W, 25°SW. Organic-rich beds are very impure clay plus organic material.

Verdi Sample No. 2

Half way between map points 28 and 29. Only exposures are in canyon-reasonably continuous between 28 and 29. S. of 29 of E. side of canyon is old shaft, caved at 6', no rock exposures. Coal bed sample is 2 feet thick, lower contact somewhat gradational, upper contact somewhat sharper. Most of country rock is claystone. 6 or 8 beds of 1 foot or less of very impure coal. To the west, across the road a short distance, there is a probable fault which terminates the coal-bearing unit.

Sample 2A is for analysis, 2B is for NBMG.

Lewis #1A

COAL ANALYSIS REPORT

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

LAB NO. K73617

ORGANIZATION: USGS, DENVER

SAMPLE ID: USGS,D, D187046, FACE CHANNEL -
CAN NO: -

OPERATOR: -

MINE: LEWIS
STATE: NV COUNTY: LYON
TOWN: -
BED: UNNAMED

Lewis #1A

DATE OF SAMPLING: 5-17-77 DATE RECEIVED: 5-31-77 DATE OF REPORT: 6-16-77
COLLECTOR: V. SWANSON

AIR DRY LOSS 8.0	COAL [AS RECD.]	COAL [MOIST FREE]	COAL [MOIST,ASH FREE]
PROXIMATE ANALYSIS			
MOISTURE	24.0	N/A	N/A
VOLATILE MATTER	34.6	45.5	68.8
FIXED CARBON	15.6	20.6	31.2
ASH	25.8	33.9	N/A
ULTIMATE ANALYSIS			
HYDROGEN	4.9	3.0	4.5
CARBON	25.1	33.0	50.0
NITROGEN	.6	.8	1.2
SULFUR	5.4	7.0	10.7
OXYGEN [IND]	38.2	22.2	33.6
HEATING VALUE[BTU/LB]	4132	5439	8232
ASH - INITIAL DEFORMATION	2005 F		
SOFTENING TEMP	2105 F		
FLUID TEMP	2210 F		
SULFUR FORMS BY ATOMIC ABSORPTION			
SULFATE	3.62	4.77	7.22
PYRITIC	.22	.29	.44
ORGANIC	1.51	1.99	3.01
FREE SWELLING INDEX	.0		

Lewis #2A

COAL ANALYSIS REPORT

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

LAB NO. K73618

ORGANIZATION: USGS, DENVER

SAMPLE ID: USGS,D, D187047, FACE CHANNEL -
CAN NO: -

OPERATOR: -

MINE: LEWIS

STATE: NV COUNTY: LYON
TOWN: -

BED: UNNAMED

Lewis #2

DATE OF SAMPLING: 5-17-77 DATE RECEIVED: 5-31-77 DATE OF REPORT: 6-16-77
COLLECTOR: V. SWANSON

AIR DRY LOSS 8.5	COAL [AS RECD.]	COAL [MOIST FREE]	COAL [MOIST,ASH FREE]
PROXIMATE ANALYSIS			
MOISTURE	22.6	N/A	N/A
VOLATILE MATTER	34.5	44.6	56.9
FIXED CARBON	26.1	33.7	43.1
ASH	16.8	21.7	N/A
ULTIMATE ANALYSIS			
HYDROGEN	5.5	3.8	4.9
CARBON	36.0	46.5	59.3
NITROGEN	.7	.9	1.2
SULFUR	4.1	5.3	6.7
OXYGEN [IND]	37.0	21.8	27.9
HEATING VALUE[BTU/LB]	5996	7744	9890
ASH - INITIAL DEFORMATION	2110 F		
SOFTENING TEMP	2210 F		
FLUID TEMP	2300 F		
SULFUR FORMS BY ATOMIC ABSORPTION			
SULFATE	2.02	2.61	3.33
PYRITIC	.13	.17	.21
ORGANIC	1.94	2.50	3.20
FREE SWELLING INDEX	.0		

COAL ANALYSIS REPORT

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Coaldale #1A + #3A

LAB NO. K73619

ORGANIZATION: USGS, DENVER

SAMPLE ID: USGS,D, D187048-049, COMPOSITE -
CAN NO: -

OPERATOR: -

MINE: -

STATE: NV COUNTY: ESMERALDA
TOWN: -

BED: "C"

Coaldale #1A & #3A

DATE OF SAMPLING: 5-17-77 DATE RECEIVED: 5-31-77 DATE OF REPORT: 6-16-77
COLLECTOR: V. SWANSON

	COAL [AS RECD.]	COAL [MOIST FREE]	COAL [MOIST,ASH FREE]
AIR DRY LOSS .0			
PROXIMATE ANALYSIS			
MOISTURE	5.2	N/A	N/A
VOLATILE MATTER	20.8	22.0	52.0
FIXED CARBON	19.3	20.3	48.0
ASH	54.7	57.7	N/A
ULTIMATE ANALYSIS			
HYDROGEN	2.8	2.4	5.6
CARBON	27.8	29.4	69.5
NITROGEN	.8	.8	1.9
SULFUR	1.9	2.0	4.6
OXYGEN [IND]	12.0	7.8	18.3
HEATING VALUE[BTU/LB]	4701	4960	11723

ASH - INITIAL DEFORMATION 2715 F
SOFTENING TEMP 2800+F
FLUID TEMP 2800+F

SULFUR FORMS BY ATOMIC ABSORPTION			
SULFATE	.89	.94	2.22
PYRITIC	.55	.58	1.37
ORGANIC	.42	.44	1.05

40

Coaldale #2A

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

COAL ANALYSIS REPORT

LAB NO. K73620

ORGANIZATION: USGS, DENVER

SAMPLE ID: USGS,D, D187050, OUTCROP FACE -
CAN NO: -

OPERATOR: -
STATE: NV COUNTY: ESMERALDA
TOWN: -

MINE: -
BED: "D"

Coaldale #2

DATE OF SAMPLING: 5-17-77 DATE RECEIVED: 5-31-77 DATE OF REPORT: 6-16-77
COLLECTOR: V. SWANSON

	COAL [AS RECD.]	COAL [MOIST FREE]	COAL [MOIST,ASH FREE]
AIR DRY LOSS .0			
PROXIMATE ANALYSIS			
MOISTURE	5.2	N/A	N/A
VOLATILE MATTER	24.2	25.6	51.6
FIXED CARBON	22.8	24.0	48.4
ASH	47.8	50.4	N/A
ULTIMATE ANALYSIS			
HYDROGEN	3.0	2.5	5.1
CARBON	30.2	31.9	64.3
NITROGEN	.6	.6	1.2
SULFUR	4.3	4.6	9.2
OXYGEN [IND]	14.1	10.0	20.1
HEATING VALUE[BTU/LB]	5064	5344	10777
ASH - INITIAL DEFORMATION	2505 F		
SOFTENING TEMP	2605 F		
FLUID TEMP	2720 F		
SULFUR FORMS BY ATOMIC ABSORPTION			
SULFATE	1.93	2.04	4.11
PYRITIC	.21	.22	.45
ORGANIC	2.19	2.31	4.66

4

Gamma #1A

COAL ANALYSIS REPORT

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

LAB NO. K73621

ORGANIZATION: USGS, DENVER

SAMPLE ID: USGS,D, D187051, OUTCROP FACE

CAN NO: -

OPERATOR: -

MINE: -

STATE: NV COUNTY: CHURCHILL

BED: UNNAMED

TOWN: -

Gamma #1A

DATE OF SAMPLING: 5-17-77 DATE RECEIVED: 5-31-77 DATE OF REPORT: 6-16-77

COLLECTOR: V. SWANSON

AIR DRY LOSS .2	COAL [AS RECD.]	COAL [MOIST FREE]	COAL [MOIST,ASH FREE]
PROXIMATE ANALYSIS			
MOISTURE	13.3	N/A	N/A
VOLATILE MATTER	33.4	38.6	84.9
FIXED CARBON	6.0	6.8	15.1
ASH	47.3	54.6	N/A
ULTIMATE ANALYSIS			
HYDROGEN	3.3	2.1	4.6
CARBON	13.3	15.3	33.7
NITROGEN	.5	.6	1.4
SULFUR	5.6	6.4	14.2
OXYGEN [IND]	30.0	21.0	46.1
HEATING VALUE[BTU/LB]	1749	2018	4442

ASH - INITIAL DEFORMATION 2355 F
SOFTENING TEMP 2455 F
FLUID TEMP 2555 F

SULFUR FORMS BY ATOMIC ABSORPTION			
SULFATE	4.96	5.72	12.60
PYRITIC	.14	.16	.35
ORGANIC	.48	.55	1.22

Eldorado Canyon #1A+#2A

COAL ANALYSIS REPORT

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

LAB NO. K73622

ORGANIZATION: USGS, DENVER

SAMPLE ID: USGS,D, D187052-053, COMPOSITE -
CAN NO: -

OPERATOR: -

MINE: ELDORADO CANYON
BED: UNNAMED

Eldorado Can
#1A +

STATE: NV COUNTY: ORMSBY
TOWN: -

DATE OF SAMPLING: 5-17-77 DATE RECEIVED: 5-31-77 DATE OF REPORT: 6- 9-77
COLLECTOR: V. SWANSON

AIR DRY LOSS 5.9	COAL [AS RECD.]	COAL [MOIST FREE]	COAL [MOIST,ASH FREE]
PROXIMATE ANALYSIS			
MOISTURE	18.6	N/A	N/A
VOLATILE MATTER	28.6	35.2	60.2
FIXED CARBON	19.0	23.3	39.8
ASH	33.8	41.5	N/A
ULTIMATE ANALYSIS			
HYDROGEN	4.7	3.3	5.6
CARBON	32.1	39.5	67.5
NITROGEN	.6	.8	1.4
SULFUR	.8	.9	1.6
OXYGEN [IND]	27.9	14.0	23.9
HEATING VALUE[BTU/LB]	5428	6670	11402

ASH - INITIAL DEFORMATION 2245 F
SOFTENING TEMP 2355 F
FLUID TEMP 2445 F

SULFUR FORMS BY ATOMIC ABSORPTION			
SULFATE	.08	.09	.16
PYRITIC	.11	.14	.24
ORGANIC	.57	.71	1.21

Verdi #1A

COAL ANALYSIS REPORT

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

LAB NO. K67736

ORGANIZATION: USGS, DENVER

SAMPLE ID: USGS,D,D179400,COAL,FACE CHAN CAN

OPERATOR: -

MINE: -

STATE: NV COUNTY: WASHOE

BED: UNNAMED

TOWN: -

DATE OF SAMPLING: 12/15/75 DATE RECEIVED: 10-13-76 DATE OF REPORT: 11- 5-76

COLLECTOR: SWANSON

	COAL [AS RECD.]	COAL [MOIST FREE]	COAL [MOIST,ASH FREE]
AIR DRY LOSS 24.9			
PROXIMATE ANALYSIS			
MOISTURE	31.2	N/A	N/A
VOLATILE MATTER	17.3	25.2	71.0
FIXED CARBON	7.1	10.3	29.0
ASH	44.4	64.5	N/A
ULTIMATE ANALYSIS			
HYDROGEN	4.9	2.0	5.7
CARBON	14.4	20.9	59.0
NITROGEN	.5	.7	1.9
SULFUR	.3	.5	1.4
OXYGEN [IND]	35.5	11.3	31.9
ASH	44.4	64.5	N/A
HEATING VALUE[BTU/LB]	2278	3309	9335

ASH - INITIAL DEFORMATION 2160 F
SOFTENING TEMP 2270 F
FLUID TEMP 2385 F

SULFUR FORMS BY ATOMIC ABSORPTION			
SULPHATE	.1	.2	.5
PYRITIC	.0	.0	.1
ORGANIC	.2	.3	.8

4

Verdi #2A

COAL ANALYSIS REPORT

DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

LAB NO. K67737

ORGANIZATION: USGS, DENVER

SAMPLE ID: USGS,D,D179401,COAL,FACE CHAN CAN NO:

OPERATOR: -
STATE: NV COUNTY: WASHOE
TOWN: -

MINE: -
BED: UNNAMED

DATE OF SAMPLING: 12/15/75 DATE RECEIVED: 10-13-76 DATE OF REPORT: 11- 5-76
COLLECTOR: SWANSON

AIR DRY LOSS 38.3	COAL [AS RECD.]	COAL [MOIST FREE]	COAL [MOIST,ASH FREE]
PROXIMATE ANALYSIS			
MOISTURE	44.4	N/A	N/A
VOLATILE MATTER	15.7	28.2	66.1
FIXED CARBON	8.0	14.5	33.9
ASH	31.9	57.3	N/A
ULTIMATE ANALYSIS			
HYDROGEN	6.3	2.5	5.9
CARBON	14.8	26.5	62.2
NITROGEN	.4	.8	1.8
SULFUR	.3	.5	1.2
OXYGEN [IND]	46.3	12.3	28.9
ASH	31.9	57.3	N/A
HEATING VALUE[BTU/LB]	2458	4420	10356

ASH - INITIAL DEFORMATION 2210 F
SOFTENING TEMP 2310 F
FLUID TEMP 2420 F

SULFUR FORMS BY ATOMIC ABSORPTION			
SULPHATE	.0	.0	.0
PYRITIC	.0	.1	.2
ORGANIC	.2	.4	1.0

4

Pancake North 1A

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

COAL ANALYSIS REPORT

LAB NO. K67738

ORGANIZATION: USGS, DENVER SAMPLE ID: USGS,D,D179403,COAL,GRAB CAN NO: -

OPERATOR: -
STATE: NV COUNTY: WHITE PINE
TOWN: -

MINE: -
BED: -

DATE OF SAMPLING: 12/15/75 DATE RECEIVED: 10-13-76 DATE OF REPORT: 11-11-76
COLLECTOR: SWANSON

	COAL [AS RECD.]	COAL [MOIST FREE]	COAL [MOIST,ASH FREE]
AIR DRY LOSS 2.9			
PROXIMATE ANALYSIS			
MOISTURE	7.9	N/A	N/A
VOLATILE MATTER	31.4	34.1	39.4
FIXED CARBON	48.4	52.6	60.6
ASH	12.3	13.3	N/A
ULTIMATE ANALYSIS			
HYDROGEN	4.4	3.8	4.4
CARBON	60.0	65.2	75.2
NITROGEN	.9	1.0	1.1
SULFUR	2.2	2.4	2.8
OXYGEN [IND]	20.3	14.3	16.5
ASH	12.3	13.3	N/A
HEATING VALUE[BTU/LB]	10213	11095	12798

ASH - INITIAL DEFORMATION 2170 F
SOFTENING TEMP 2280 F
FLUID TEMP 2405 F

SULFUR FORMS BY ATOMIC ABSORPTION			
SULPHATE	.3	.4	.4
PYRITIC	.1	.1	.2
ORGANIC	1.7	1.9	2.2

4

PT 47

FORM 9-1212 B. (REV 9-1967)

Project No. 9420-20106

ANALYTICAL LABORATORIES, GEOLOGICAL SURVEY, U.S.D.I.

Page 1 A

(8) SEMIQUANTITATIVE 6-STEP SPECTROGRAPHIC ANALYSIS OF THE ASH

Report No. 77LHSS0131 For 4-5-77 Vern Swanson Spec. Lab. No Date 5-31-77

Lot No. 26-019* Analyst Plate No. Job No. PT 47

Si, Al, Fe, Mg, Ca, Na, K, Ti, and P are reported in %; all others in ppm. Results are to be identified with geometric brackets whose boundaries are 1.2, 0.83, 0.56, 0.38, 0.26, 0.18, 0.12, etc., but are reported arbitrarily as mid-points of these brackets, 1., 0.7, 0.5, 0.3, 0.2, 0.15, 0.1, etc. The precision of a reported value is approximately plus or minus one bracket at 68%, or two brackets at 95% confidence.

Symbols used are:

G = Greater than 10%, or greater than value shown
• = Usual limits of determinations do not apply due to use of dilution techniques
- = Not looked for
H = Interference
N = Not detected, at limit of detection or at value shown
L = Detected, but below limit of determination or below value shown

Field No.	Lewis #1A	Lewis #2A	Coaldale #1A	Coaldale #3A	Coaldale #2A	Gamma #1A	Eldorado Canyon #1A	Eldorado Canyon #2A
Lab No.	D187046	D187047	D187048	D187049	D187050	D187051	D187052	D187053
Fe %	G	G	3.	5.	7.	7.	5.	5.
Mg %	1.5	1.5	.3	.2	.15	.7	1.	.7
Ca %	3.	2.	.7	1.5	1.5	1.5	7.	3.
Ti %	.15	.15	.15	.3	.15	.15	.3	.3
Mn (ppm)	1500	1500	20	300	30	200	700	700
Ag	N	N	N	N	N	N	N	N
As	7000	7000	N	N	N	N	N	N
Au	N	N	N	N	N	N	N	N
B	100	150	150	150	300	70	70	70
Ba	700	500	500	700	700	200	700	700
Be	N	3	N	N	N	3	3	3
Bi	|	N	|	|	|	N	N	N
Cd	|	N	|	|	|	N	N	N
Co	30	30	N5	20	N5	30	10	15
Cr	30	30	10	15	15	7	50	30
Cu	100	70	30	30	50	30	150	100
La	N	N	N	N	N	N	N	N
Mo	100 ✓	70	30	20	N	300 ✓	30	30
Nb	20	15	20	20	15	20	N	N
Ni	70	50	5	15	N5	20	70	50
Pb	N	N	15	N	15	N	50	30
Pd	N	N	N	N	N	N	N	N
Pt	|	|	|	|	|	|	|	|
Sb	|	|	|	|	|	|	|	|
Sc	10	10	10	10	7	10	15	15
Sn	N	N	N	N	N	N	N	N
Sr	500	500	500	300	300	150	700	300
Te	N	N	N	N	N	N	N	N
U	N	N	N	N	N	N	N	N
V	300	150	150	150	70	150	300	200
W	300	700	N	N	N	2000	N	N
Y	50	70	50	30	20	70	70	70
Zn	N	N	N	N	N	N	N	N
Zr	100	70	300	150	100	70	150	100

Approved Ray J. Haven
Project Leader

Approved R. E. VanLoenen
Branch of Analytical Laboratories

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9-1242 B (CONT. SHEET)
(REV. 28-1557)

Page 1 B

SEMIQUANTITATIVE 6-STEP SPECTROGRAPHIC ANALYSIS (CONTINUED)

Report No. _____ Job. No. PT 47

Field No.	Lewis #1A	Lewis #2A	Coaldale #1A	Coaldale #3A	Coaldale #2A	Gamma #1A	Eldorado Canyon #1A	Eldorado Canyon #2A
Lab. No	D187046	D187047	D187048	D187049	D187050	D187051	D187052	D187053
Si %	—	—	—	—	—	—	—	—
Al %	10.	10.	7.	10.	7.	7.	5	5
Na %	—	—	—	—	—	—	—	—
K %	N	N	3.	1.5	7.	N	1.5	N
P %	N	N	N	N	N	N	N	N
Ce (ppm)	N	N	N	N	N	N	N	N
Ga	20	15	15	15	15	15	20	30
Ge	30	N	70	N	N	70	N	N
Hf	N	|	N	|	|	N	|	|
In	N	|	N	|	|	N	|	|
Li	N	N	N	N	N	N	N	N
Re	N	N	N	N	N	N	N	N
Ta	|	|	|	|	|	|	|	|
Th	|	|	|	|	|	|	|	|
Tl	|	|	|	|	|	|	|	|
Yb	7	7	7	5	3	7	7	7
Looked for only when La or Ce found								
Pr								
Nd								
Sm								
Eu	N	N	N	N	N	N	N	N
Looked for only when Y is found above 50 ppm								
Gd	N	N	N	N	N	N	N	N
Tb	|	|	|	|	|	|	|	|
Dy	|	|	|	|	|	|	|	|
Ho	|	|	|	|	|	|	|	|
Er	|	|	|	|	|	|	|	|
Tm	|	|	|	|	|	|	|	|
Lu	|	|	|	|	|	|	|	|
Looked for only when Pd or Pt found								
Ir								
Os								
Rh								
Ru								
Looked for only when requested								
Cs								
Rb								
F								
Hg								

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U. S. GOVERNMENT PRINTING OFFICE : 1958 O - 292-274
846 - 540

PN 54

FORM 9-742 B (REV. 12-1967)

Project No. 9420-20106

Page 1 49 A

ANALYTICAL LABORATORIES, GEOLOGICAL SURVEY U.S.D.I.

SEMIQUANTITATIVE 6-STEP SPECTROGRAPHIC ANALYSIS

OF THE ASH

(4)

Report No. 77LASS0012 7/16/76 | For Vern Swanson | Spec. Lab. No | Date 6-24-76

Lot No. 26-031* | Analyst Harriet G. Neiman | Plate No. II 7120 | Job No. PN 54

Si, Al, Fe, Mg, Ca, Na, K, Ti, and P are reported in %; all others in ppm. Results are to be identified with geometric brackets whose boundaries are 1.2, 0.83, 0.56, 0.38, 0.26, 0.18, 0.12, etc., but are reported arbitrarily as mid-points of these brackets, 1., 0.7, 0.5, 0.3, 0.2, 0.15, 0.1, etc. The precision of a reported value is approximately plus or minus one bracket at 68%, or two brackets at 95% confidence.

Symbols used are:

- G = Greater than 10%, or greater than value shown
- * = Usual limits of determinations do not apply due to use of dilution techniques
- – = Not looked for
- H = Interference
- N = Not detected, at limit of detection or at value shown
- L = Detected, but below limit of determination or below value shown

Field No.	Verdi 1A	Verdi 2A	Elko West 1A	Pancake North 1A				
Lab No.	D179400 *	D179401 *	D179402 *	D179403 *				
Fe %	3.	5.	2.	5.				
Mg %	1.	1.	.07	.7				
Ca %	7.	5.	.1	3.				
Ti %	.2	.3	.03	.3				
Mn (ppm)	500	150	20	50				
Ag	N	N	N	N				
As	N	N	N	N				
Au	N	N	N	N				
B	N	N	N	500				
Ba	700	500	700	500				
Be	N	3	N	20				
Bi	N	N	N	N				
Cd	N	N	N	N				
Co	15	20	7	N				
Cr	30	50	15	150				
Cu	70	100	30	30				
La	N	N	N	N				
Mo	10	15	20	100				
Nb	N	20	20	20				
Ni	30	30	10	30				
Pb	N	20	N	50				
Pd	N	N	N	N				
Pt	N	N	N	N				
Sb	N	N	N	N				
Sc	10	20	N	15				
Sn	N	N	N	N				
Sr	700	500	100	300				
Te	N	N	N	N				
U	N	N	N	N				
V	300	700	150	1000				
W	N	N	N	N				
Y	20	30	50	100				
Zn	N	N	N	N				
Zr	70	150	70	150				

Approved Ray Harvez Project Leader

Approved R. E. McGregor Branch of Analytical Laboratories

GPO : 1968 O - 292-273

SEMIQUANTITATIVE 6-STEP SPECTROGRAPHIC ANALYSIS (CONTINUED)

Report No. _____

Job. No. PN 54

Field No.	Verdi 1A	Verdi 2A	Elko West 1A	Pancake North 1A				
Lab. No	D179400*	D179401*	D179402*	D179403*				
Si %	—	—	—	—				
Al %	10.	G	2.	G				
Na %	—	—	—	—				
K %	N	N	N	1.5				
P %	N	N	N	N				
Ce (ppm)	N	N	N	N				
Ga	20	30	N	50				
Ge	N	N	|	150				
Hf	|	|	|	N				
In	|	|	|	|				
Li	|	|	100	|				
Re	|	|	N	|				
Ta	|	|	|	|				
Th	|	|	|	|				
Tl	|	|	|	|				
Yb	2	3	7	15				
Looked for only when La or Ce found								
Pr								
Nd								
Sm								
Eu	N	N	N	N				
Looked for only when Y is found above 50 ppm								
Gd				N				
Tb				|				
Dy				|				
Ho				|				
Er				|				
Tm				|				
Lu				|				
Looked for only when Pd or Pt found								
Ir								
Os								
Rh								
Ru								
Looked for only when requested								
Cs								
Rb								
F								
Hg								

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846-540

JOB NO.- PT47

DATE- 12/22/76 4-19-77

REQUESTED BY- V.E.SWANSON

REPORT NO. T.LAXR0120

LAB NO.	FIELD NO.	AL203 %		SO3 %		CL %	CAO %	SIO2 %		P205 %	TIO2 %		MNO2 %
D187 46	Lewis #1A	10.		19.	<	.20	4.8	38.	<	1.0	.47		.15
D187 47	Lewis #2A	11.		14.	<	.20	4.0	45.	<	1.0	.49		.24
D187 48	Coaldale #1A	8.7		1.5	<	.20	1.4	78.	<	1.0	.35	<	.050
D187 49	Coaldale #3A	12.		3.0	<	.20	3.0	70.	<	1.0	.51	<	.050
D187 50	Coaldale #JA	7.8		4.9	<	.20	2.6	66.	<	1.0	.27	<	.050
D187 51	Gamma #1A	7.9		13.	<	.20	2.2	59.	<	1.0	.31	<	.050
D187 52	Eldorado Canyon #1A	18.		5.6	<	.20	11.	54.	<	1.0	.82		.11
D187 53	Eldorado Canyon #2A	18.		3.3	<	.20	6.5	57.	<	1.0	.80		.11

ANALYST- JSW,JWB METHOD- LI2B407(TE)

ONLY TWO FIGURES ARE SIGNIFICANT

APPROVED: J.S. WAHLBERG
(PROJECT LEADER)

APPROVED: R.E. VAN LOENEN
(SAMPLE CONTROL)

TOTAL FE AS FE203, TOTAL S AS SO3 OR S.
ALL ANALYSES ARE OF ASH EXCEPT SE.

JOB NO.- PT47

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XRF ANALYSIS

JOB NO.- PT47

DATE- 12/22/76

REQUESTED BY- V.E.SWANSON

REPORT NO.....

LAB NO.	FIELD NO.	FE203 %	K20 %
D187 46	Lewis No.1A	21.	.82
D187 47	Lewis	15.	.91
D187 48	Coaldale #1A	3.1	1.9
D187 49	Coaldale #3A	5.0	1.6
D187 50	Coaldale #2A	6.9	3.0
D187 51	Gamma #1A	7.8	.42
D187 52	Eldorado Canyon #1A	5.4	1.3
D187 53	Eldorado Canyon #2A	5.8	1.1

ANALYST- JSW,JWB METHOD- LI2B407(TE)

APPROVED: J.S. WAHLBERG
(PROJECT LEADER)

TOTAL FE AS FE203, TOTAL S AS SO3 OR S.
ALL ANALYSES ARE OF ASH EXCEPT SE.

ONLY TWO FIGURES ARE SIGNIFICANT

APPROVED: R.E. VAN LOENEN
(SAMPLE CONTROL)

JOB NO.- PT47

XRF ANALYSIS

JOB NO.- PN54

DATE- 1/21/76

REQUESTED BY- V. E. SWANSON

REPORT NO 76LAXR0244. 6/21/76

	LAB NO.	FIELD NO.	SE PPM
Verdi 1A	D179400		1.0
Verdi 2A	D179401		7.3 ✓
Elko West 1A	D179402		1.8
Pancake North 1A	D179403		2.3

ANALYST- JSW,RJY,JWB METHOD- NOREL(SE)

ONLY TWO FIGURES ARE SIGNIFICANT

APPROVED: J.S. WAHLBERG
(PROJECT LEADER)

APPROVED: R.E. VAN LOENEN
(SAMPLE CONTROL)

TOTAL FE AS FE203, TOTAL S AS SO3 OR S.

JOB NO.- PN54

XRF ANALYSIS

Should now be 77LAXR0120 9-27-77

JOB NO.- PT47

DATE- 12/22/76

REPORT NO. 77LAXR0166, 9/26/77

REQUESTED BY- V. E. SWANSON

LAB NO.	FIELD NO.	SE PPM
D187 46	Lewis #1A	1.5
D187 47	Lewis #1A	.7
D187 48	Coaldale #3A	INSUFFICIENT SAMPLE FOR ANALYSIS
D187 49	Coaldale #3A	.1

ANALYST- JSW, JWB GW METHOD- NOREL(SE)

APPROVED: J.S. WAHLBERG
(PROJECT LEADER)

TOTAL FE AS FE2O3, TOTAL S AS SO3 OR S.

ONLY TWO FIGURES ARE SIGNIFICANT

APPROVED: R.E. VAN LOENEN RVL
(SAMPLE CONTROL)

JOB NO.- PT47

PT47

45

9-011
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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
LABORATORY REPORT

REPORT NO.	77LAPC0162	FOR	Vern Swanson	DATE	Sept. 20, 1977
JOB NO.	PT 47	PROJECT OR ORGANIZATION	OER-Coal 9420-20106		G&G of Coal
LOT NO.	26-019*	REFER TO OTHER REPORTS	77LANA0085, 77IASS0131, 77LAXR0120		

Three (3) samples from group of Eight (8) Additional Work. from Nevada.

Serial No.	Field No.	COAL AS RECEIVED As ppm	Sb ppm
D187046	Lewis #1A	1650 ✓	21.9 ✓
D187047	Lewis #2A	890	12.9
D187049	Coaldale #3A	140	1.47

As determined by graphite furnace - atomic absorption method by J. G. Crock & G. Riddle JGC
Sb determined by Rhodamine-B method by George Burrow. PTB

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BY Chemical Analysis
Wayne Mountjoy
for Project Leader: Claude Huffman, Jr.

APPROVED
R. E. Van Loenen
Sample Control
Branch of Analytical Laboratories

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
LABORATORY REPORT

REPORT NO. 77LAPC0162 FOR Vern Swanson DATE 3/21/77

JOB NO. PT 47 PROJECT OR ORGANIZATION OER-Coal 9420-20106 Geol. & Geochem. of Coal

LOT NO. 26-019* REFER TO OTHER REPORTS 77LANA0085, Semi-Quant and X-ray pending.

COAL AS RECEIVED

Serial No.	Field No.	% Ash	F ppm	Hg ppm
D187046	Lewis #1A	36.2	135	.15
D187047	Lewis #2A	23.4	280	.12
D187048	Coaldale #1A	49.6	45	.15
D187049	Coaldale #3A	63.9	115	.20
D187050	Coaldale #2A	52.5	85	.26
D187051	Gamma #1A	56.1	200	.05
D187052	Eldorado Canyon #1A	36.7	85	.04
D187053	Eldorado Canyon #2A	39.8	95	.05

% Ash determined gravimetrically ashed at 525°C by G. D. Shipley. NPS.
F determined by specific ion electrode method by Harriet Neiman and Pat Guest.
Hg determined by wet oxidation + atomic absorption method by J. A. Thomas. JAT

BY APPROVED

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
LABORATORY REPORT

REPORT NO. 77LAPC0162 FOR Vern Swanson DATE 3/21/77

JOB NO. PT 47 PROJECT OR ORGANIZATION OER-COAL 9420-20106

LOT NO. 26-019* REFER TO OTHER REPORTS Semi-quant and X-ray Pending

				ON THE ASH					
Serial No.	Field No.	MgO %	Na_2O %	Cd	Cu	Li	Mn	Pb	Zn
D187046	Lewis #1A	2.20	1.79	<1	69	36	1150	<25	118
D187047	Lewis #2A	2.70	2.04	<1	56	52	1990	<25	108
D137048	Coaldale #1A	.38	.64	<1	23	65	20	<25	24
D187049	Coaldale #3A	.34	1.46	<1	26	57	180	<25	134
D187050	Coaldale #2A	.27	.64	<1	66	25	50	<25	21
D187051	Gamma #1A	1.11	1.11	<1	26	<10	230	<25	155
D187052	Eldorado Canyon #1A	1.60	1.70	2.0	123	22	520	35	119
D187053	Eldorado Canyon #2A	1.03	1.74	3.0	106	17	635	30	168

MgO, Na_2O, and Mn determined by atomic absorption by Violet Merritt. VMM
Cd, Cu, Li, Pb and Zn determined by atomic absorption by G. D. Shipley. GDS

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BY Chemical Analysis
Project Leader: Claude Huffman, Jr.

APPROVED
R. E. Van Loenen
Sample Control
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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
LABORATORY REPORT

REPORT NO.	7TLAPC0054	FOR Vern Swanson	DATE August 12, 1976
JOB NO.	PN 54	PROJECT OR ORGANIZATION	OER-Coal 9420-20106 Geol. & Geochem. of coal
LOT NO.	26-031*	REFER TO OTHER REPORTS	76LAXR0244, 76LAXR0244 7TLASS0012, U & Th pending

Four (4) samples from various locations in Nevada.

Serial No.	Field No.	COAL AS RECEIVED				
		% Ash	As ppm	F ppm	Hg ppm	Sb ppm
D179400	Verdi 1A	53.5	11	100	0.08	0.9
D179401	Verdi 2A	51.2	7.0 ✓	155	0.11	1.4
D179402	Elko West 1A	83.3	220 ✓	100	0.52	1.1
D179403	Pancake North 1A	13.2	1.0	145	0.08	0.2

% ash determined gravimetrically ashed at 525°C by G. D. Shipley. GDS,
As determined by graphite furnace - atomic absorption method by G. O. Riddle and J. G. Crock. JGC
F determined by specific ion electrode method by Johnnie Gardner. J.G.
Hg determined by wet oxidation + atomic absorption method by J. A. Thomas and G. O. Riddle. JAT.
Sb determined by Rhodamine-B method by G. T. Burrow. GTB

BY

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UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
LABORATORY REPORT

REPORT NO. 7TLAPC0054 FOR Vern Swanson DATE August 12, 1976

JOB NO. PN 54 PROJECT OR ORGANIZATION

LOT NO. 26-031* REFER TO OTHER REPORTS

Serial No.	Field No.	ON THE ASH MgO %	Na_2O %	Cd ppm	Cu ppm	Li ppm	Mn ppm	Pb ppm	Zn ppm
D179400	Verdi 1A	1.33	1.15	<1	67	17	650	<25	53
D179401	Verdi 2A	1.48	0.58	<1	92	19	160	<25	68
D179402	Elko West 1A	0.08	0.15	<1	40	87	50	<25	23
D179403	Pancake North 1A	1.10	0.26	<1	37	43	70	60	292

MgO, Na_2O, and Mn determined by atomic absorption by Violet Merritt.
Cd, Cu, Li, Pb, and Zn determined by atomic absorption by G. D. Shipley.

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BY Chemical Analysis
Project Leader: Claude Huffman, Jr.

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R. E. Van Loenen
Sample Control
Branch of Analytical Laboratories

LABORATORY REPORT

INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS

REPORT NO. FOR DATE 12/23/7

JOB NO. pt47 PROJECT OR ORGANIZATION

		Lewis #1A	Lewis #2A	Coaldale #1A
LAB NO.	=	d187046	d187047	d187048
FIELD NO.	=			

ELEMENT	PPM	CV(%)	PPM	CV(%)	PPM	CV(%)
as =	~~0.33~~	~~0.~~ high Ash (Na)	~~5.00~~	~~0.~~ High Ash (Na)	11.50	0.
se =	0.00	0.	0.90	7.	0.00	0.
sb =	19.40	1.	9.02	0.	0.41	4.
cr =	11.00	2.	7.90	8.	0.00	0.
co =	12.50	1.	7.25	0.	2.07	2.
th =	3.36	1.	1.74	1.	4.25	1.

ANALYST: RJ Knight

NOTES: 1) CV= coeff. of variation one standard deviation, based on counting statistics as percentage of concentration
2) Concentrations with CV greater than 30% should not be considered reliable
3) A 0.00 value for ppm represents none detected, >>0.1 ppm, unles otherwise noted.

LABORATORY REPORT

INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS

REPORT NO. FOR DATE 12/23/77

JOB NO. pt47 PROJECT OR ORGANIZATION

	Coaldale #3A	Coaldale #2A	Gamma #1A
LAB NO. =	d187049	d187050	d187051
FIELD NO. =			

ELEMENT	PPM	CV(%)	PPM	CV(%)	PPM	CV(%)
as =	~~0.00~~	~~0.~~ High Ash(ve)	200.00	2.	105.00	2.
se =	0.00	0.	0.00	0.	0.00	0.
sb =	1.06	4.	13.70	1.	14.50	1.
cr =	8.24	3.	6.82	16.	4.36	7.
co =	14.20	0.	1.81	0.	25.20	1.
th =	3.17	1.	4.98	1.	2.23	1.

ANALYST: R J Knight

NOTES: 1) CV= coeff. of variation one standard deviation, based on counting statistics as percentage of concentration
2) Concentrations with CV greater than 30% snould not be considered reliable
3) A 0.00 value for ppm represents none detected, >>0.1 ppm, unles otherwise noted.

LABORATORY REPORT

INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS

REPORT NO. . . FOR DATE 12/13/77

JOB NO. pt47 PROJECT OR ORGANIZATION

	Eldorado Canyon #1A	Eldorado Canyon #2A		
LAB NO. =	d137052	d137053		
FIELD NO. =				
ELEMENT	PPM CV(%)	PPM CV(%)	PPM	CV(%)
as =	45.70 0.	51.00 2.	0.00	0.
se =	2.03 3.	1.76 22.	0.00	0.
sb =	2.10 1.	1.94 0.	0.00	0.
cr =	15.80 2.	16.00 5.	0.00	0.
co =	4.28 0.	9.89 1.	0.00	0.
th =	3.25 1.	3.15 1.	0.00	0.

ANALYST: RJ Knight

NOTES: 1) CV= coeff. of variation one standard deviation, based on counting statistics as percentage of concentration
2) Concentrations with CV greater than 30% should not be considered reliable
3) A 0.00 value for ppm represents none detected, >>0.1 ppm, unles otherwise noted.

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TT4 NA@183 8/31/76

DELAYED NEUTRON DETERMINATIONS OF U AND TH

REPORT NO.: FOR: V. SWANSON DATE: ~~8/30/76~~ 8/27/76

JOB NO.: PN54 PROJECT OR ORGANIZATION: 6-9420-20106

IRRADIATION NO.: TH-P9-47

DT BLKS	LAB NO.	WT(GMS)	PCT O,CV	PPM TH,CV	PPM U,CV	TH/U
115,376	D179400 (Verdi 1A)	4.5068	(58.20)32.	~~(2.84)66.~~	5.75 3.	0.49
116,377	D179401 (Verdi 2A)	4.8925	(69.77)41.	~~(0.00)58.~~	27.50 ✓ 1.	0.00
117,378	D179402 (Elko Mnt 1A)	6.3436	69.38 19.	~~(1.29)97.~~	3.24 4.	0.40
118,379	D179403 (Pancake Mnt 1A)	5.0402	(26.91)67.	~~(0.43)99.~~	11.98 2.	0.04

All Th values should read 3.0L

ANALYSTS: H.T.MILLARD, R.J.KNIGHT, A.J.BARTEL, J.P.HEMMING, R.J.WHITE, R.J.VINNOLA, E.BRANDT

NOTES: 1) CV=COEFF. OF VARIATION = ONE STANDARD DEVIATION, BASED ON COUNTING STATISTICS, EXPRESSED AS PERCENTAGE OF CONCENTRATION.
2) CONCENTRATIONS WITH CV >30% ARE ENCLOSED IN PARENTHESES AND SHOULD NOT BE CONSIDERED RELIABLE.

LABORATORY REPORT

DELAYED NEUTRON DETERMINATIONS OF U AND TH

REPORT NO.: 77LANR0085 2/18/77 FOR: V.SVANSON DATE: 2/14/77

JOB NO.: FT47 PROJECT OR ORGANIZATION: 9420-20106

IRRADIATION NO.: TH-FS-67

DT BLKS	LAB NO.		WT(GMS)	PCT U,CV		PPM TH,CV		PPM U,CV		TH/U
206,497	D187046	Lewis #1A	5.6600	54.86	24.	5.47	23.	2.49	5.	2.19
207,498	D187047	Lewis #2A	5.1000	49.41	19.(	0.00)	50.	2.12	6.	0.00
208,499	D187048	Coaldale #1A	5.7600	(38.47)	32.(	3.18)	38.	2.63	5.	1.21
209,500	D187049	Coaldale #3A	5.7900	(41.25)	33.(	0.00)	50.	7.56	3.	0.00
210,501	D187050	Coaldale #2A	5.7400	49.55	25.	5.02	24.	2.22	6.	2.26
211,502	D187051	Gamma #1A	3.9200	(0.00)	50.(	0.00)	50.	√129.53	1.	0.00
212,503	D187052	Eldorado Canyon #1A	5.7800	72.92	17.(	2.27)	50.	1.89	6.	1.20
213,504	D187053	Eldorado Canyon #2A	5.7600	51.05	29.(	4.30)	33.	3.74	4.	1.15

ANALYSTS: H.T.MILLARD,JR.,A.J.BARTEL,E.J.KNIGHT, C.L.SHIELDS, C.M.ELLIS,F.L.NELMS,C.A.RAMSEY

NOTES: 1) CV=COEFF. OF VARIATION = ONE STANDARD DEVIATION, BASED ON COUNTING STATISTICS, EXPRESSED AS PERCENTAGE OF CONCENTRATION.
2) CONCENTRATIONS WITH CV >30% ARE ENCLOSED IN PARENTHESES AND SHOULD NOT BE CONSIDERED RELIABLE.

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Office of Energy Resources
Branch of Oil and Gas Resources
Mail Stop 940
May 16, 1979

Dr. James Firby
Department of Geology
University of Nevada - Reno
Reno, Nevada 89507

Dear Jim:

I am sending to you a copy of the report of results of Platt Bradbury's analysis of pollen and diatoms in samples from Neogene samples in Nevada. The samples were given to me by Larry Garside of the NBM and they represent a suite of samples from coal bearing rocks in Nevada.

I think they will be of interest to you in light of your work with the Coal Valley, Verdi and Esmeralda Formations. I am sure you will be able to judge the real value of many of the speculative conclusions offered by Platt. Both Platt and I would like to receive a copy of your recent SEPM paper on these rocks.

Jim, my current plans are to visit China in June and hopefully visit Nevada sometime after the 4th of July. Platt Bradbury, Bob Ekry, and Barry Solomon have all expressed interest in visiting some sites of mutual interest and I hope that my schedule problems have not precluded you from joining us. I plan to bring my family for a week or two and I will contact you in late June about mutually beneficial dates if you are interested.

Best wishes with your work and I look forward to seeing you this summer.

Sincerely,

Thomas D. Fouch, Geologist

Enclosure

Copy to:
Larry Garside
J. Platt Bradbury

LINE UP TYPE X

REPORT ON REFERRED FOSSILS

1

STRATIGRAPHIC RANGE	Miocene-Pliocene	SHIPMENT NUMBER	O&G-77-5Da
GENERAL LOCALITY (STATE, COUNTRY, OCEAN, ETC.)	Nevada: Washoe, Nye, Esmeralda, Churchill, Lyon	REGION (COUNTY, PROVINCE, STATE, ETC.)	Carson City
QUADRANGLE OR AREA	Reno 2 degree	DATE RECEIVED (MO DAY YR)	2/23/77
KINDS OF FOSSILS	Pollen and diatoms	STATUS OF WORK	Complete
REFERRED BY	T. D. Fouch	DATE REPORTED (MO DAY YR)	5/10/79
REPORT PREPARED BY	J. Platt Bradbury		

Six samples from various localities in Nevada were examined for pollen and diatoms. Sample Verdi No. 1 B is a coal from the sandstone at Hunter Creek (Truckee Fm.?). Its locality is SE 1/4, NW 1/4 NE 1/4 Sec 9, T19N, R18E, latitude 39 degrees 31 minutes, 15 seconds north, longitude 119 degrees 57 minutes, 30 seconds west. The sample was assigned pollen locality number D5718, and diatom locality number 23II7-1.

This sample has abundant, well-preserved pollen. The following types were recognized.

Cupressaceae
FAGUS?
QUERCUS
ABIES
PINUS (common)
GRAMINEAE
ARTEMISIA (common)
SALIX
Chenopodiaceae
Compositae
EPHEDRA
JUGLANS?
FRAXINUS
Cyperaceae

The siliceous microfossils are represented by diatoms, sponge spicules and chrysomonad cysts. The latter dominate and the diatoms are poorly preserved. The following types were seen.

DESMOGONIUM sp. cf. D. RABENHORSTIANUM
NAVICULA SEMEN
EUNOTIA PECTINALIS
PINNULARIA
HANTZSCHIA AMPHIOXYS v. VIVAX
EUNOTIA PECTINALIS v. MINOR
EUNOTIA PECTINALIS v. UNDULATA
STAURONEIS PHOENICENTRON

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LINE UP TYPE
X

REPORT ON REFERRED FOSSILS

[2]

LINE UP TYPE 67

STRATIGRAPHIC RANGE		SHIPMENT NUMBER	O&G-77-5Da
GENERAL LOCALITY	(STATE, COUNTRY, OCEAN, ETC.)	REGION	(COUNTY, PROVINCE, SEA, ETC.)
QUADRANGLE OR AREA		DATE RECEIVED	MO DAY YR
KINDS OF FOSSILS		STATUS OF WORK	
REFERRED BY		DATE REPORTED	MO DAY YR
REPORT PREPARED BY			

EUNOTIA PRAERUPTA
PINNULARIA aff. P. CYMBELLOIDES
CYMBELLA MEXICANA

The pollen from this sample suggests an upper Tertiary age for the deposit. The comparative abundance of conifer species, particularly PINUS, and large amounts of ARTEMISIA pollen indicates that a generally dry environment prevailed. A few mesophytic species, such as JUGLANS and FRAXINUS are still present, however. Based on the general and perhaps simplistic model of climatic change through time in western Nevada, this flora should postdate sample Lewis No. 1 B of the Coal Valley Formation which contains larger numbers of temperate mesophytic plant pollen types. My guess is that it could be early Pliocene in the old sense of the term (which was used to establish the model just mentioned). Wolfe (1964) shows the Verdi flora of this area to be of Hemphillian age which sounds reasonable. The only problem is that it is not clear if the sample analyzed came from the Coal Valley Formation, the Truckee Formation (as suggested in the submittal form), or from the Verdi plant locality. Axelrod (1958) reports lignites in the Coal Valley Formation, but does not document their stratigraphic distribution. The good preservation of pollen and the abundance of diatomites in these sections makes them interesting for further study.

Because there are so few studied diatomites of known age, it is not possible to interpret the occurrence of PINNULARIA sp. aff. P. CYMBELLOIDES in a biostratigraphic sense. This taxon is known from the Pliocene of southeastern USSR, but the closely related P. CYMBELLOIDES is also reported from the Miocene of the same region.

The diatoms in general indicate shallow, swampy water of low pH.

Sample Tonopah SF-2 was found to be barren of pollen. It was not examined for diatoms. This sample came from 38 degrees, 11 minutes, 45 seconds north latitude and 117 degrees, 15 minutes, 20 seconds west longitude. Its location is in Nye County, Nevada, T4N, R42E, Section 15 (unsurveyed). It was from near the Barstovian locality of Henshaw (1942) and collected from the Siebert Tuff of Miocene-Pliocene age. @

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LINE UP TYPE . X .

REPORT ON REFERRED FOSSILS

LINE UP T... 3

STRATIGRAPHIC RANGE		SHIPMENT NUMBER	O&G-77-5Da
GENERAL LOCALITY	(STATE, COUNTRY, OCEAN, ETC.)	REGION	(COUNTY, PROVINCE, SEA, ETC.)
QUADRANGLE OR AREA		DATE RECEIVED	MO DAY YR
KINDS OF FOSSILS		STATUS OF WORK	
REFERRED BY		DATE REPORTED	MO DAY YR
REPORT PREPARED BY			

Sample Tonopah SF-2 (continued)

The sample locality is located on the Tonopah 2 degree quadrangle.

Sample El Dorado Canyon Mine No. 1 B was examined for pollen and diatoms. It was assigned pollen locality number D5719, and diatom locality number 23II77-2. The sample came from a coal dump of the El Dorado Canyon Coal Mine from presumed Miocene sedimentary rocks. The locality is on the Reno 2 degree quadrangle in T14N, R22E; Latitude 36 degrees 6 minutes, and 10 seconds north, longitude 119 degrees, 33 minutes, and 30 seconds west. The pollen in this sample is poorly preserved, but the following types could be recognized.

PINUS (dominant)
PICEA
ABIES?
QUERCUS (common)
ALNUS
Cupressaceae type
Compositae

The sample has bery poorly preserved diatoms. Some rather corroded, ghost-like specimens of NAVICULA SEMEN have apparently been preserved by an organic coating which they acquired sometime after deposition. Today this species is found in aquatic moss vegetation, and in swamps or swampy meadows which would appear to be appropriate environments for the formation of coal.

The pollen does not refute a Miocene age for the sample, but the lack of temperate deciduous tree species implies a somewhat younger age for this sample than Lewis No. 1 B. It is possible that the floristic differences could be explained by paleo elevation. @

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LINE UP TYPE X

REPORT ON REFERRED FOSSILS

LINE UP TYPE 4

STRATIGRAPHIC RANGE		SHIPMENT NUMBER	O&G-77-5Da
GENERAL LOCALITY (STATE, COUNTRY, OCEAN, ETC.)		REGION (COUNTY, PROVINCE, SEA, ETC.)	
QUADRANGLE OR AREA		DATE RECEIVED (MO DAY YR)	
KINDS OF FOSSILS		STATUS OF WORK	
REFERRED BY		DATE REPORTED (MO DAY YR)	
REPORT PREPARED BY			

Sample Coaldale No. 1 B came from the NE 1/4 of Section 29, T2N, R37E. Its longitude is 117 degrees, 52 minutes, 40 seconds west; and its latitude is 30 degrees, 00 minutes, and 10 seconds north. It is located on the Tonopah 2 degree quadrangle in Esmeralda County, Nevada. The sample is a coal from the outcrop of the Esmeralda Formation of Miocene or Pliocene age.

The sample was barren of diatoms. The sample contained poorly preserved (degraded) pollen. The following types were noted.

PINUS
PICEA
QUERCUS
ALNUS
MYRICA type

Other pollen types may be present, but the preservation is too poor to permit reliable identification.

The Esmeralda formation is considered to be Clarendonian in age (Wolfe, 1964). The pollen evidence does not refute this possiblility, but the apparent lack of temperate deciduous tree types suggests a slightly drier climate than is characteristic of the Coal Valley Formation. This may be due to local geographic or climatic differences, or the Esmeralda Formation may be somewhat younger than the Coal Valley Formation. Unfortunately, the poor pollen preservation makes such comments quite tentative.

Sample Gamma No. 1 B came from T16N, R37E, center of section 36 in Churchill County, Nevada. It is from longitude 117 degrees, 46 minutes, 50 seconds west, and latitude 39 degrees 12 minutes, 35 seconds north. The locality is on the Millett 2 degree quadrangle. The sample was collected from an outcrop of presumed Pliocene sedimentary rocks; the lithology is coal. It has been assigned pollen locality number D5721 and diatom locality number 23II77-3. a

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GRM 9-1861 (OCT 1972)

LINE UP TYPE
X

REPORT ON REFERRED FOSSILS

5

LINE UP TYPE

STRATIGRAPHIC RANGE		SHIPMENT NUMBER	O&G-77-5Da
GENERAL LOCALITY	(STATE, COUNTRY, OCEAN, ETC.)	REGION	(COUNTY, PROVINCE, SEA, ETC.)
QUADRANGLE OR AREA		DATE RECEIVED	MO DAY YR
KINDS OF FOSSILS		STATUS OF WORK	
REFERRED BY		DATE REPORTED	MO DAY YR
REPORT PREPARED BY			

Sample Gamma No. 1 B (continued)

This sample contains well preserved, abundant pollen. The following types were recognized.

PINUS (common)
PICEA
ABIES (common)
PTEROCARYA
MYRICA type
QUERCUS (common)
GRAMINEAE (very common)
SALIX?
SPARGANIUM-TYPHA
BETULA
CARYA
ALNUS
ULMUS-ZELKOVA

The pollen assemblage suggest a mid Miocene age for the sample. It is similar in many respects to the assemblage from Lewis No. 1 B, and may be time correlative to it. Because it is seldom possible to exactly relate a pollen assemblage to a megafossil floral assemblage, it may be somewhat misleading to suggest age assignments from pollen data alone. It would be worthwhile to look for plant megafossils in this area.

Diatoms are abundant and well preserved. The following species were recognized.

PINNULARIA VIRIDIS (compare with P. ANGULOCOSTATA)
PINNULARIA sp. aff. P. CYMBELLOIDES
STAURONEIS ANCEPS
STAURONEIS PHOENICENTRON f. GRACILIS
STAURONEIS LAURENBURGIANA
PINNULARIA NODOSA
EUNOTIA CURVATA
FRAGILARIA VIRESCENS
NAVICULA SEMINULUM

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LINE UP TYPE X

REPORT ON REFERRED FOSSILS

LINE UP TYPE 6

STRATIGRAPHIC RANGE		SHIPMENT NUMBER	O&G-77-5Da
GENERAL LOCALITY	(STATE, COUNTRY, OCEAN, ETC.)	REGION	(COUNTY, PROVINCE, SEA, ETC.)
QUADRANGLE OR AREA		DATE RECEIVED	MO DAY YR
KINDS OF FOSSILS		STATUS OF WORK	
REFERRED BY		DATE REPORTED	MO DAY YR
REPORT PREPARED BY			

NAVICULA sp. cf. N. FRAGILARIOIDES
NAVICULA ELGINENSIS?
ACHNANTHES EXIGUA
MELOSIRA ITALICA ssp. subarctica
MELOSIRA sp. cf. M. INTERRUPTA
GOMPHONEMA PARVULUM v. MICROPUS
GOMPHONEMA DICHOTOMUM
NITZSCHIA VITREA

The MELOSIRA species dominate the sample, and FRAGILARIA VIRESCENS is quite abundant. These species suggest the presence of slightly deeper water nearby than can be inferred for some of the other coaly samples. The several species of PINNULARIA and specimens of EUNOTIA indicate somewhat acidic water. Some species appear to be related to Mio-Pliocene forms from the USSR, but at present they provide little information about the age of the sample.

Sample Lewis No. 1B was examined for pollen and diatoms. It was assigned pollen locality number D5722 and diatom locality number 23I77-4. The sample was collected from a coal deposit in the Lewis Coal Mine, located at 38 deg. 30 min. 40 sec. north latitude, 118 deg. 54 min. 50 sec. west longitude. It is on the Walker lake 2 degree quadrangle in T8N, R27E, section 36 near the center of the section, Lyon County, Nevada. The sample is from the Coal Valley Formation. The sample contains comparatively well-preserved pollen; the following types were noted.

SPARGANIUM or TYPHA very common
QUERCUS very common
ULMUS-ZELKOVA common
Gramineae very common
PTEROCARYA
JUGLANS
Myricaceae
ALNUS
Cyperaceae
ABIES

CONTINUED IN O&G-77-5Db

a

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REPORT ON REFERRED FOSSILS

LINE OR TYPE: X | 1 | LINE OR TYPE: 72

STRATIGRAPHIC RANGE	Miocene-Pliocene	SHIPMENT NUMBER	O&G-77-5Db
GENERAL LOCALITY (STATE, COUNTRY, OCEAN, ETC.)	Nevada: Washoe, Nye, Esmeralda, Churchill, Lyon	REGION (COUNTY, PROVINCE, SEA, ETC.)	Carson City
QUADRANGLE OR AREA	Reno 2 degree	DATE RECEIVED (MO. DAY YR.)	2/23/77
KINDS OF FOSSILS	Pollen and diatoms	STATUS OF WORK	Complete
REFERRED BY	T. D. Fouch	DATE REPORTED (MO. DAY YR.)	5/10/79
REPORT PREPARED BY	J. Platt Bradbury		

CONTINUED FROM O&G-775Da

PICEA common
PINUS
EPHEDRA
CARYA
FRAXINUS

This pollen assemblage shows similarities to several Miocene microfossil floras of this region in Nevada--see Wolfe, 1964. The closest relationships seem to be with the Fingerrock and Stewart Spring floras which are considered to be Hemingfordian and Barstovian in age respectively. Wolfe (1964) indicates that the Coal Valley Formation is Clarendonian in age. Probably these deposits will float around a bit until radiometric ages are available for them. The pollen data suggests that this sample, which came from the Coal Valley Formation is likely to be of pre-Clarendonian age.

The diatom flora is moderately well preserved. The following types were recognized.

PINNULARIA sp. aff. P. CYMBELLOIDES
PINNULARIA VIRIDIS
NAVICULA ELGINENSIS v ROSTRATA
NAVICULA AMPHIBOLA
CYMBELLA EHRENBERGII
PINNULARIA MESOLEPTA v. ANGUSTA
MELOSIRA ITALICA
MELOSIRA sp. cf. M. INTERRUPTA
EUNOTIA sp.
FRAGILARIA VIRESCENS

These diatoms are generally characteristic of shallow, circumneutral water, although MELOSIRA ITALICA can be planktonic and could therefore indicate somewhat deeper water. I have found MELOSIRA sp. cf. M. INTERRUPTA in Holocene peats of central Mexico.

With the exception of PINNULARIA sp. aff. P. CYMBELLOIDES, the other species are common modern forms. A closely related form, P. a

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LINE OF TYPE X

REPORT ON REFERRED FOSSILS

2

LINE OF TYPE 73

STRATIGRAPHIC RANGE		SHIPMENT NUMBER	O&G-77-5Db
GENERAL LOCALITY	(STATE, COUNTRY, OCEAN, ETC.)	REGION	(COUNTY, PROVINCE, SEA, ETC.)
QUADRANGLE OR AREA		DATE RECEIVED	MO DAY YR
KINDS OF FOSSILS		STATUS OF WORK	
REFERRED BY		DATE REPORTED	MO DAY YR
REPORT PREPARED BY			

Sample Lewis No. 1B (continued)

CYMBELLOIDES, was described from Miocene deposits surrounding Lake Khanka in southeastern Russia (near Vladivostok). Unfortunately these deposits are not dated so the species is not yet much help in age assignment.

Reference

Wolfe, J. A., 1964, Miocene floras from Fingerrock Wash. southwestern Nevada: USGS Prof. Paper 454-M, 36 p.

J. Platt Bradbury

J. Platt Bradbury

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