ANALYSES AND MEASURED SECTIONS OF WASHINGTON COALS

by

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## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Previous work</td>
<td>1</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>2</td>
</tr>
<tr>
<td>Geographic and geologic setting of coal deposits</td>
<td>2</td>
</tr>
<tr>
<td>Coal sampling methods</td>
<td>4</td>
</tr>
<tr>
<td>Method of calculating and reporting analyses</td>
<td>6</td>
</tr>
<tr>
<td>Explanation of analytical data sheets</td>
<td>8</td>
</tr>
<tr>
<td>Explanation of stratigraphic sections</td>
<td>12</td>
</tr>
<tr>
<td>Sample location maps explanation</td>
<td>12</td>
</tr>
<tr>
<td>References cited</td>
<td>30</td>
</tr>
<tr>
<td>Appendix A — Stratigraphic sections</td>
<td></td>
</tr>
<tr>
<td>Legend for stratigraphic sections</td>
<td></td>
</tr>
<tr>
<td>Cowlitz County</td>
<td>A1</td>
</tr>
<tr>
<td>King County</td>
<td>A2</td>
</tr>
<tr>
<td>Kittitas County</td>
<td>A3-4</td>
</tr>
<tr>
<td>Lewis County</td>
<td>A5-6</td>
</tr>
<tr>
<td>Pierce County</td>
<td>A7</td>
</tr>
<tr>
<td>Skagit County</td>
<td>A8</td>
</tr>
<tr>
<td>Thurston County</td>
<td>A9</td>
</tr>
<tr>
<td>Wallowa County, Oregon</td>
<td>A10</td>
</tr>
<tr>
<td>Whatcom County</td>
<td>A11</td>
</tr>
<tr>
<td>Appendix B — Coal analytical data</td>
<td></td>
</tr>
<tr>
<td>Asotin County</td>
<td>B1-4</td>
</tr>
<tr>
<td>Cowlitz County</td>
<td>B5-8</td>
</tr>
<tr>
<td>King County</td>
<td>B9-35</td>
</tr>
<tr>
<td>Kittitas County</td>
<td>B36-81</td>
</tr>
<tr>
<td>Lewis County</td>
<td>B82-101</td>
</tr>
<tr>
<td>Pierce County</td>
<td>B102-104</td>
</tr>
<tr>
<td>Skagit County</td>
<td>B105-118</td>
</tr>
<tr>
<td>Thurston County</td>
<td>B119-121</td>
</tr>
<tr>
<td>Wallowa County, Oregon</td>
<td>B122</td>
</tr>
<tr>
<td>Whatcom County</td>
<td>B123-135</td>
</tr>
</tbody>
</table>
ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Index map of Washington showing major coal-bearing areas and isolated coal</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>occurrences</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Age and suggested correlations of some lower Tertiary rock units in Washington</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>Sample location map for southern Asotin County and northern Wallowa County, Oregon</td>
<td>14</td>
</tr>
<tr>
<td>4.</td>
<td>Sample location map for western Cowlitz County</td>
<td>15</td>
</tr>
<tr>
<td>5.</td>
<td>Sample location map for northwestern King County</td>
<td>16</td>
</tr>
<tr>
<td>6.</td>
<td>Sample location map for southwestern King County</td>
<td>17</td>
</tr>
<tr>
<td>7.</td>
<td>Sample location map for northwestern Kittitas County</td>
<td>18</td>
</tr>
<tr>
<td>8.</td>
<td>Sample location map for southwestern Kittitas County</td>
<td>19</td>
</tr>
<tr>
<td>9.</td>
<td>Sample location map for western Lewis County</td>
<td>20</td>
</tr>
<tr>
<td>10.</td>
<td>Sample location map for central Lewis County</td>
<td>21</td>
</tr>
<tr>
<td>11.</td>
<td>Sample location map for eastern Lewis County</td>
<td>22</td>
</tr>
<tr>
<td>12.</td>
<td>Sample location map for north-central Pierce County</td>
<td>23</td>
</tr>
<tr>
<td>13.</td>
<td>Sample location map for south-central Pierce County</td>
<td>24</td>
</tr>
<tr>
<td>14.</td>
<td>Sample location map for Thurston County</td>
<td>25</td>
</tr>
<tr>
<td>15.</td>
<td>Sample location map for western Skagit County</td>
<td>26</td>
</tr>
<tr>
<td>16.</td>
<td>Sample location map for central Skagit County</td>
<td>27</td>
</tr>
<tr>
<td>17.</td>
<td>Sample location map for western Whatcom County</td>
<td>28</td>
</tr>
<tr>
<td>18.</td>
<td>Sample location map for central Whatcom County</td>
<td>29</td>
</tr>
</tbody>
</table>
INTRODUCTION

In 1975, the Washington Department of Natural Resources undertook to evaluate the occurrences of coal on Department-administered land. In 1978, this effort was expanded to include all coal lands within the State of Washington. Some results of the coal resource evaluation program are given in Vonheeder (1975, 1977a, 1977b, 1977c, 1978a, 1978b, 1979), Walker (1980), and Stoffel (1981). Additional work is under way on coal lands in King and Pierce counties.

An important part of the coal resource evaluation program has been the collection and analysis of coal samples. To date, 135 samples from nine Washington counties and one adjoining county in Oregon have been processed. Stratigraphic sections were measured and recorded at 37 of the 89 sampling localities. This report presents the coal analytical data and associated measured sections.

The coal analyses are presented in Appendix B. Measured sections of many of the sampled coal seams are contained in Appendix A. A detailed discussion of the structure, stratigraphy, previous coal analytical work, and coal resources of the sampled areas is desirable but beyond the scope of this report.

PREVIOUS WORK

Previous analytical results are contained in Daniels and others (1958), Fieldner and others (1931), and Yancey and Geer (1941). Reports detailing the overall coal resources of Washington are Beikman and others (1961), Green (1947), and Smith (1911). The geology of Asotin County is discussed in Russell (1901) and in Stoffel (1981). Culver (1919), Henriksen (1956), Snavely and others (1958), and Roberts (1958) contain data on the general geology of Cowlitz, Thurston, and Lewis Counties. The geology of King County is discussed in Evans (1912), Livingston (1971), Vine (1969), and Warren and others (1945). Saunders (1914) and Walker (1980) detail the geology and coal resources of Kittitas County.
Pierce County geology is treated in Daniels (1914) and Gard (1968). Jenkins (1924) investigated the coalfields of Skagit County. Geological reports pertaining to Whatcom County are Jenkins (1923), Moen (1969), and Woodruff (1914).

ACKNOWLEDGMENTS

Coal samples were collected by Ellis R. Vonheeder, Charles W. Walker, Curtis Cushman, William M. Phillips, Timothy J. Walsh, and Keith L. Stoffel of the Division of Geology and Earth Resources (DGER). Two analyses from samples collected by a private party are also included. The U.S. Geological Survey, U.S. Bureau of Mines, and the U.S. Department of Energy supported this work by performing the bulk of the coal analyses. William M. Phillips (DGER) wrote the computer programs which generated the analytical data sheets and performed the dry, mineral-matter-free (DMMF) and moist, mineral-matter-free (MMMF) calculations.

GEOGRAPHIC AND GEOLOGIC SETTING OF COAL DEPOSITS

Most of the principal coal deposits in Washington occur in a discontinuous belt extending along the western edge of the Cascade Range from the Columbia River northward nearly to the Canadian border. Notable exceptions are the Kittitas County coalfields on the east flank of the Cascades in the central part of the state. In addition, coal occurs in many small, isolated areas throughout the state. The locations of the major coal-bearing areas and of the isolated occurrences of coal are shown in figure 1.

With the exception of several thin beds of semianthracite in rocks of pre-Tertiary age on Orcas Island in San Juan County, all coal in the state is of Tertiary age. The Chuckanut Formation in northwest Washington was formerly thought to contain rocks of Cretaceous age at its base. Recent evidence indicates however, that the Chuckanut may be comprised entirely of Tertiary age rocks (Reiswig, 1982; Frizzell, 1979.)
FIGURE 1. — Index map of Washington showing major coal-bearing areas and isolated coal occurrences.
In the eastern portion of the Puget Lowlands the coal-bearing rocks were principally deposited in Eocene to Oligocene delta systems, prograding into a northerly to northwesterly trending embayment (Buckovic, 1979). The coal-bearing rocks commonly interfinger with, and grade into, marine non-coal-bearing rocks to the west (Beikman and others, 1961). Contemporaneous local volcanism commonly contributed ash to many coal seams in the form of tuffaceous partings. East of the Puget Lowlands, coals of the Kittitas County fields were deposited in Eocene fluvial or lacustrine settings also characterized by local volcanism. Figure 2 shows the age and suggested correlations of the lower Tertiary rocks from which coal was sampled for this report. In addition, there are numerous isolated occurrences of lignite which formed as lacustrine interbeds between flows of the Miocene Columbia River Basalt Group. Samples from one such occurrence, the Grande Ronde field of Asotin County, are presented in this report.

COAL SAMPLING METHODS

The purpose of the coal sampling program has been to characterize coal for which no published analyses are available. Limited exposure conditions sometimes precluded collecting channel samples as recommended by Swanson and Huffman (1976). In those cases, "grab" samples were collected. Because Washington coal has always had to be washed, partings greater than about 3/8 inches thick were excluded in order for the sample more accurately to represent washed coal.

Fresh exposures of coal seams are very limited in Washington; therefore many samples consist of weathered coals. The condition of each sample is noted on the analytical data sheets. The effect of weathering upon analytical results has not been fully documented for Washington coals; therefore, the data contained in this report should be regarded as preliminary. Possible results of weathering include a loss of volatile matter, a degradation of heating value, and an anomalously high apparent rank.
FIGURE 2. — Age and suggested correlations of some lower Tertiary rock units in Washington (asterisks indicate coal-bearing formations; stippled areas represent unconformities).

1/ Each column is modified from the following sources: 1 - Frizzell (1979); 2 - Newman (1981); 3 - Roberts (1958); 4 - Rau (1981); 5 - Snively and others (1988); 6 - Gard (1968); 7 - Vine (1969).

2/ The broad Eocene-Oligocene boundary represents the evolving views of its placement by the various authors whose conventions are followed in this table.
METHOD OF CALCULATING AND REPORTING ANALYSES

All analyses were performed using standard procedures as described in U.S. Bureau of Mines (1967). Three methods of calculating and reporting the analyses are used in this report. The first is "as-received," abbreviated on data sheets as "AR." For most samples, laboratory procedures were carried out on air-dried samples. As-received data are calculated using the following formulas:

Moisture x \( \frac{100 - \text{air-dry loss}}{100} \) + air-dry loss = Moisture (AR)

\[ A \times \frac{100 - \text{air dry loss}}{100} = A \ (\text{AR}) \]

where \( A = \) Volatile matter, fixed carbon, ash, sulfur, carbon, nitrogen, or heating value.

Hydrogen x \( \frac{100 - \text{air-dry loss}}{100} \) + \( \frac{1}{9} \) air-dry loss = Hydrogen (AR)

\[ \text{Oxygen} \times \frac{100 - \text{air-dry loss}}{100} + \frac{8}{9} \times \text{air-dry loss} = \text{Oxygen} \ (\text{AR}) \]

All calculated numbers except heating value are given in percent. The unit of heating value is British Thermal Units per pound (BTU/LB). For samples for which air-dry loss was not recorded, the above as-received quantities were measured directly.

The second and third methods of calculating and reporting analyses are the moist, mineral-matter-free and the dry, mineral-matter-free bases (Parr, 1928). These are abbreviated "M MMMF" and "D MMMF" on the data sheets, respectively. The D MMMF and MMMF data permit convenient and accurate comparisons of relative coal rank (American Society for Testing Materials, 1951). Heating value on a MMMF basis is generally the better rank indicator for coals in the range lignite to high-volatile bituminous. For coals in the range medium-volatile bituminous to anthracite, D MMMF fixed carbon is the better rank indicator.
The MMMF basis is calculated using the following formulas:

\[
\text{Heating value} - \frac{50 \times \text{sulfur}}{100 - (1.08 \times \text{ash} + 0.55 \times \text{sulfur})} \times 100 = \text{Heating value (MMMF)}
\]

\[
\frac{A - 0.15 \times \text{sulfur}}{100 - (1.08 \times \text{ash} + 0.55 \times \text{sulfur})} \times 100 = A \text{ (MMMF)}
\]

where \(A\) = Volatile matter, fixed carbon, moisture, carbon, nitrogen, oxygen, or hydrogen.

The DMMF basis is calculated as follows:

\[
\text{Heating Value} - \frac{50 \times \text{sulfur}}{100 - (\text{Moisture} + (1.08 \times \text{Ash} + 0.55 \times \text{sulfur}))} \times 100 = \text{Heating value (DMMF)}
\]

\[
\frac{A - 0.15 \times \text{Sulfur}}{100 - (\text{Moisture} + (1.08 \times \text{ash} + 0.55 \times \text{sulfur}))} \times 100 = A \text{ (DMMF)}
\]

where \(A\) = Fixed carbon, volatile matter, nitrogen, and carbon.

\[
\frac{(\text{Hydrogen} - (1/9 \times \text{Moisture})) - 0.15 \times \text{sulfur}}{100 - (\text{Moisture} - (1.08 \times \text{ash} + 0.55 \times \text{sulfur}))} \times 100 = \text{Hydrogen (DMMF)}
\]

\[
\frac{(\text{Oxygen} - (8/9 \times \text{Moisture})) - 0.15 \times \text{sulfur}}{100 - (\text{Moisture} + (1.08 \times \text{ash} + 0.55 \times \text{sulfur}))} \times 100 = \text{Oxygen (DMMF)}
\]

All calculated numbers except heating value are given in percent.

It has been traditional in coal literature to report coal on a moisture-free and moisture-and ash-free basis. There is little justification for continuing this convention for Washington State coals. The moisture-free basis is an inferior rank indicator and does not represent a realistic mine product. The DMMF basis is preferred for rank comparisons (American Society for Testing Materials, 1951, p. 75). Because of these factors, this report does not include moisture-free and moisture- and ash-free data.
EXPLANATION OF ANALYTICAL DATA SHEETS

Coal analytical data for 135 samples from nine counties are presented on computer-generated analytical report sheets in Appendix B. The analytical print-outs are organized by county. Within each county group, the report sheets are sorted by sample number in ascending numerical order. Sample location maps for each county are shown in figures 3-18. Measured sections for many of the analyses are contained in Appendix A.

A detailed explanation of the analytical report sheets is given below.

County: Name of county in which sampling site is located.

Sample number: A 7-digit identifying number assigned to each sample by Division of Geology and Earth Resources (DGER) staff.

Coal name: Name of sampled coal seam, as reported in literature or known from unpublished mine maps or reports. If unknown or not named, then the word "unnamed" is printed on the data sheet; queried where correlation is uncertain.

Mine name: Name of mine from which sample was taken, as reported in literature or unpublished mine maps or reports. If sample was not taken from a mine, or if mine name is unknown, then the word "none" is printed.

Coal area: An informal name referring to the geographic region in which the sampling site is located. Coal area designations were assigned by DGER staff. The locations of the coal areas are shown in figure 1.

Sample site elevation: Elevation of sampling site, in feet above mean sea level, taken from U.S. Geological Survey topographic maps. If elevation was not recorded, then an "N" is printed.

Quarter section, section, township, range: Standard Government Land Office coordinates for sampling site location. If quarter section is unknown, then an "N/A" is printed. If the sample was collected from the center of the section, then a "CE" is printed for quarter section.
Quadrangle: Name of the U.S. Geological Survey topographic map containing the sampling site. The scale of the map is indicated by "15" for a 15-minute quadrangle (scale 1:62,500), and by "7.5" for a 7.5-minute quadrangle (scale 1:24,000).

Geologic formation: Name of the formation or group containing sampled coal seam; queried where uncertain.

Age: Geologic Epoch assigned to the formation or group containing the sample.

Strike: Strike of the coal seam or associated rocks at the sampling site.
   If strike was not determined, an "N/A" is printed.

Dip: Dip of the coal seam or associated rocks at the sampling site. If the dip was not determined, an "N/A" is printed.

Major joints in coal: Strike and dip of joints or cleats in sampled coal seam.
   If not determined, then an "N/A" is printed.

Exposure type: Nature of the coal seam exposure. Typical exposure types are roadcut, streamcut, outcrop, prospect, and strip pit.

Sample type: Method of sampling the coal seam. Channel samples are collected by continuously sampling the exposed coal face, excluding noncoal partings greater than 3/8 of an inch thick. Grab samples are noncontinuous samples and therefore do not represent the bulk properties of the coal seam. Grab samples were taken in areas of poor exposure where channel sampling was not feasible. Some grab samples were taken from mine tipples or tailings; a few consist of float found in streams.

Sample conditions: Condition of the sampled coal, as judged by the collector. Fresh samples are from newly exposed seams. Weathered samples were collected at outcrops, streamcuts, or roadcuts several years old or older, and in abandoned mine workings, prospects, or strip pits.

Total section measured: Thickness in feet of the stratigraphic section measured by the collector at the time of sampling. Measured sections include both coal and associated noncoal lithologies. If no section was measured, then an "N" is printed.
Coal thickness: Thickness in feet of the coal seam at sampling location. In general, the reported coal thickness is that observed in the field by the collector. However, in a number of instances, the coal seam thickness was known to exceed that observed in the field. In these cases, the coal thickness reported is that documented in the literature or in unpublished mine maps and reports. If coal thickness is unknown, then an "N" is printed.

Sample thickness: The total thickness in feet of that portion of the seam sampled. If sample thickness is equal to coal thickness, then the entire seam was sampled. If sample thickness is unknown or not relevant, as in the case of some grab samples, then an "N" is printed.

Overburden thickness: Thickness in feet of overburden above the coal exposure (noncoal earth materials). In the case of outcrops and many stream and roadcuts, the overburden thickness is zero or negligible. If overburden thickness was not determined, then an "N" is printed.

Sample collector: Name of sample collector followed by agency abbreviation in parentheses. Note: DGER is the abbreviation for the Division of Geology and Earth Resources.

Date of sampling: Date (month-day-year) the sample was collected.

Date of analysis: Date (month-day-year) the sample was analyzed.

Laboratory: Name or agency abbreviation for the laboratory performing the analysis.

The following abbreviations are used:

USBM  - U.S. Bureau of Mines
USGS  - U.S. Geological Survey, Denver
DOE   - U.S. Dept. of Energy, Pittsburgh, PA
C.T. & E. Co. - Commercial Testing & Evaluation Company

Lab Number: Laboratory number assigned by the analytical laboratory to each sample. If any of the following variables were not determined or were not recorded, then an "N" is printed. N/A: indicates that a variable is not applicable.
Air dry loss: Percent loss in weight of sample after drying at 30-35\(^\circ\)C.

The purpose of air drying is to reduce the moisture in the sample to approximate equilibrium with the air of the laboratory. The total moisture of the sample is equal to air dry loss plus moisture on an as-received basis.

Moisture: Percent moisture in sample following air drying, or for samples that were not air-dried, total percent moisture. Moisture content (as-received) is determined by heating the sample for 1-1.5 hours at 105\(^\circ\)C +5\(^\circ\)C.

Volatile matter: Percent weight loss of sample following heating at 950\(^\circ\)C +20\(^\circ\)C for 7 minutes, minus the percent moisture weight loss. Volatile matter does not represent any definite compound in coal.

Ash: Mineral matter remaining after combustible substances in the coal sample are burned. Determined by gradual heating of the sample to a maximum temperature of 750\(^\circ\)C.

Hydrogen: Percent hydrogen in the sample.

Carbon: Percent carbon in the sample.

Nitrogen: Percent nitrogen in the sample.

Sulfur: Percent sulfur in the sample.

Oxygen: Estimated percent oxygen in the coal sample as estimated by subtracting the sum of Hydrogen, Carbon, Nitrogen, Sulfur, and Ash from 100. Reported percent oxygen contains the summation of all errors incurred in the other determinations.

Heating Value (British Thermal Units (BTU) Per Pound (LB)): A measure of the heating value of the coal sample. One BTU is the amount of heat required to raise the temperature of one pound of water from 63\(^\circ\)F to 64\(^\circ\)F. BTU's are converted to calories by multiplying by 0.556.

Fusibility of coal ash: Ash is prepared from the coal sample and formed into small triangular pyramids or cones. The cones are then heated to high temperatures, and the change in shapes due to melting, and the temperatures at which the shape changes occur are noted.
**Ash-initial deformation:** The temperature (degrees F) at which the apex of the cone has rounded or melted.

**Ash-softening temperature:** The temperature (degrees F) at which the cone has fused down to a spherical lump.

**Ash-fluid temperature:** The temperature (degrees F) at which the cone has spread out into a flat layer.

**Sulfur forms (sulfate, pyritic, organic):** Three forms of sulfur are recognized in coal: sulfur combined with iron as pyrite or marcasite and known as pyritic sulfur; sulfur combined with the coal substance as organic sulfur; and, sulfate compounds such as calcium or iron sulfate. All sulfur forms are reported on an as-received basis as percent sulfur in the sample.

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**EXPLANATION OF STRATIGRAPHIC SECTIONS**

The stratigraphic sections are contained in Appendix A. The sections are grouped by county. Within each county group, sections are sorted by an identifying sample number in approximate ascending order. In some cases, more than one sample number is associated with a stratigraphic section. This occurs when benches are analyzed separately or when a coal seam is too thick to be represented by a single sample.

The sampled stratigraphic intervals are marked with an asterisk on each section. Where multiple samples were collected in a single section, brackets are used to identify individual sample intervals. A legend identifying all lithologic symbols is presented on the first page of Appendix A. The location of each stratigraphic section is indicated on the sample location maps.

**SAMPLE LOCATION MAPS EXPLANATION**

Sample location maps are presented for each county. Sample locations are identified by the 7-digit number assigned to each sample. Two sample symbols are used: a solid circle for analyses without a measured section, and, a triangle
for analyses with an associated stratigraphic column. In some instances, there will be several numbers next to a single location symbol. This indicates that several samples were collected at the same locality. Overlapping symbols indicate sample sites so close together that the scale of the location map does not permit separation of the symbols.
FIGURE 3. — Sample location map for southern Asotin County and northern Wallowa County, Oregon.
FIGURE 4. – Sample location map for western Cowlitz County.
LEGEND

- sample location

△ sample location with measured section

FIGURE 5. — Sample location map for northwestern King County.
FIGURE 6. — Sample location map for southwestern King County.
FIGURE 7. – Sample location map for northwestern Kittitas County.
FIGURE 8. — Sample location map for southwestern Kittitas County.
FIGURE 9. — Sample location map for western Lewis County.
FIGURE 10. — Sample location map for central Lewis County.
FIGURE 11. – Sample location map for eastern Lewis County.
FIGURE 12. — Sample location map for north-central Pierce County.
FIGURE 13. — Sample location map for south-central Pierce County.
FIGURE 14. — Sample location map for Thurston County.
FIGURE 15. — Sample location map for western Skagit County.
FIGURE 16. — Sample location map for central Skagit County.
FIGURE 18. — Sample location map for central Whatcom County.
REFERENCES CITED


Livingston, V. E., Jr., 1971, Geology and mineral resources of King County, Washington: Washington Division of Mines and Geology Bulletin 63, 200 p.


Appendix A

Stratigraphic Sections
Legend for Stratigraphic Sections

- sandstone
- siltstone
- shale
- carbonaceous shale
- impure coal
- coal
- claystone
- covered interval
- igneous rocks
- conglomerate
- phyllite

Jagged lines indicate limit of exposure

* coal/impure coal unit sampled for analysis

* { interval of coal/impure coal units sampled (includes non-coal partings in some instances)

(129) interval of measured stratigraphic section containing sampled coal units combined together into a single coal sample
Appendix B

Coal Analytical Data
**County:** ASOTIN

**Sample Number:** (C08)04-76

**Coal Name:** Grande Ronde

**Mine Name:** Grande Ronde #1

**Coal Area:** Grande Ronde

**Sample Site Elevation (ft):** 2900

**Geologic Formation:** Saddle Mt.

**Age:** Miocene

**Exposure Type:** Mine Dump

**Sample Type:** Grab

**Sample Condition:** Weathered

**Overburden Thickness (ft):** 0

**Sample Collector:** Vonheeder (OGER)

**Laboratory:** USBM

**Lab. Number:** K69673

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<tr>
<td><strong>Heating Value (BTU/LB)</strong></td>
<td>7815</td>
<td>9069</td>
<td>11109</td>
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<tr>
<td>Ash - Initial Deformation</td>
<td>2205</td>
<td></td>
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<tr>
<td>Softening Temp.</td>
<td>2285</td>
<td></td>
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</tr>
<tr>
<td>Fluid Temp.</td>
<td>2365</td>
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</tbody>
</table>

**Miscellaneous Comments:** Mine active 1910-20. Adit inaccessible. No mine map available. Coal occurs in interflow deposits. 2 ft. of mine dump material excavated before taking sample.
COUNTY: ASOTIN

SAMPLE NUMBER: (009)05-76

COAL NAME: UNNAMED

MINE NAME: NONE

QUARTER SECTION: NE

COAL AREA: GRANDE RONDE

SECTION: 30

SAMPLE SITE ELEVATION (FT): 2980

TOWNSHIP: 07N

GEOLGIC FORMATION: SADDLE MTN.

RANGE: 44E

AGE: MIocene

QUADRANGLE: MOUNTAIN VIEW 7.5

EXPOSURE TYPE: STREAMCUT

STRIKE: N/A

SAMPLE TYPE: GRAB

DIP: N/A

SAMPLE CONDITION: WEATHERED

MAJOR JOINTS IN COAL: N/A

OVERBURDEN THICKNESS (FT): 45

DATE OF SAMPLING: 06-27-76

SAMPLE COLLECTOR: VONHEEDER (DGER)

DATE OF ANALYSIS: 01-21-77

LABORATORY: USGS-DENVER

LAB. NUMBER: D18312

<table>
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<tr>
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<th>COAL (API)</th>
<th>COAL (MMMFI)</th>
<th>COAL (DMMF)</th>
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<tbody>
<tr>
<td>PROXIMATE ANALYSIS</td>
<td>15.8</td>
<td>18.3</td>
<td>N/A</td>
</tr>
<tr>
<td>MOISTURE</td>
<td>31.8</td>
<td>36.9</td>
<td>45.2</td>
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<tr>
<td>VOLATILE MATTER</td>
<td>39.6</td>
<td>46.0</td>
<td>56.3</td>
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<tr>
<td>FIXED CARBON</td>
<td>12.8</td>
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<td>N/A</td>
</tr>
<tr>
<td>ASH</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ULTIMATE ANALYSIS

| HYDROGEN         | 4.4       | 3.7          | 3.7          |
| CARBON           | 49.6      | 57.6         | 70.6         |
| NITROGEN         | 0.6       | 0.6          | 0.8          |
| SULFUR           | 0.3       | N/A          | N/A          |
| OXYGEN (IND)     | 32.2      | 37.4         | 25.8         |

HEATING VALUE (BTU/LB) ... 7815 .......... 9069 .......... 11109

ASH - INITIAL DEFORMATION 2205 F

SOFTENING TEMP. 2285 F

FLUID TEMP. 2365 F

SULFUR FORMS

| SULFATE        | 0.01     |
| PYRITIC        | 0.07     |
| ORGANIC        | 0.23     |

MISCELLANEOUS COMMENTS: SAMPLE FROM MEDICINE CREEK. ONLY TOP 2-3 IN. OF COAL SEAM EXPOSED AND SAMPLED. THIS SEAM APPEARS TO CORRELATE WITH SEAM SAMPLED IN (008)05-76.
SAMPLE NUMBER: (324)08-77
COAL NAME: MEDICINE CREEK

MINE NAME: NONE
COAL AREA: GRANDE RONDE
SAMPLE SITE ELEVATION (FT): 2960

GEOLOGIC FORMATION: SADDLE MTN.
AGE: MIocene

EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 75
SAMPLE COLLECTOR: VONHEEGER (ODER)

LABORATORY: USGS-DENVER
LAB. NUMBER: K82079

QUARTER SECTION: NE
SECTION: 30
TOWNSHIP: 07N
RANGE: 44E
QUADRANGLE: MOUNTAIN VIEW 7.5

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): 30.0
SAMPLE THICKNESS (FT): 2.5

DATE OF SAMPLING: 05-06-77
DATE OF ANALYSIS: 05-23-78

AIR DRY LOSS: 30.0

PROXIMATE ANALYSIS

<table>
<thead>
<tr>
<th>Component</th>
<th>(AR)</th>
<th>(MMMF)</th>
<th>(DMMF)</th>
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<tr>
<td>Moisture</td>
<td>36.8</td>
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<tr>
<td>Volatile Matter</td>
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<td>Ash</td>
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ULTIMATE ANALYSIS

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<td>Sulfur</td>
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<td>Oxygen (Ind)</td>
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HEATING VALUE (BTU/LB) 5027 6131 11133

ASH - INITIAL DEFORMATION 2155 F
SOFTENING TEMP. 2255 F
FLUID TEMP. 2355 F

SULFUR FORMS

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<td>Sulfate</td>
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<td>Pyritic</td>
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MISCELLANEOUS COMMENTS: BOTTOM OF SECTION NOT EXPOSED. 2.5 FT. OVERBURDEN AND WEATHERED SEAM EXCAVATED BEFORE SAMPLING.
SAMPLE NUMBER: (025) 09-77  
COAL NAME: MACLOUGHLIN

COUNTY: ASOTIN

MINE NAME: NONE
COAL AREA: GRANDE RONDE
SAMPLE SITE ELEVATION (FT): 2860

GEOLOGIC FORMATION: SADDLE MTN.
AGE: MIocene

EXPOSURE TYPE: OUTCROP
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 15
SAMPLE COLLECTOR: VONHEEDER (DGER)

LABORATORY: USGS-DENVER

AIR DRY LOSS: 24.0

QUARTER SECTION: NE  
SECTION: 29
TOWNSHIP: 07N  
RANGE: 44E
QUADRANGLE: MTN. VIEW 7.5

STRIKE: N20W  
DIP: 18SW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): 5.0
SAMPLE THICKNESS (FT): N

DATE OF SAMPLING: 05-06-77
DATE OF ANALYSIS: 05-23-78

LAB. NUMBER: K82080

PROXIMATE ANALYSIS

<table>
<thead>
<tr>
<th>Component</th>
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<td>VOLATILE MATTER</td>
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<td>N/A</td>
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ULTIMATE ANALYSIS

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<th>MMMF (%)</th>
<th>DMMF (%)</th>
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<tr>
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<td>7.0</td>
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<td>SULFUR</td>
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HEATING VALUE (BTU/LB) ... 6697 7134 11083

ASH - INITIAL DEFORMATION 2155 F
SOFTENING TEMP 2255 F
FLUID TEMP 2355 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: SAMPLE COLLECTED AFTER 1 FT. MATERIAL EXCAVATED FROM WEATHERED COAL FACE. OUTCROP AT ARTESIAN SPRING.
COAL NAME: UNNAMED

QUARTER SECTION: SE
SECTION: 18
TOWNSHIP: 10N
RANGE: 01W
QUADRANGLE: CASTLE ROCK 15

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): 9.9
SAMPLE THICKNESS (FT): 9.9

DATE OF SAMPLING: 08-31-79
DATE OF ANALYSIS: 12-06-79

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K97350

AIR DRY LOSS: 23.0

PROXIMATE ANALYSIS

<table>
<thead>
<tr>
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<th>MMMF</th>
<th>DMMF</th>
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<tbody>
<tr>
<td>MOISTURE</td>
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<td>ASH</td>
<td>19.6</td>
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ULTIMATE ANALYSIS

<table>
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<tr>
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<td>NITROGEN</td>
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<td>OXYGEN(IND)</td>
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HEATING VALUE (BTU/LB) 5293 6706 11077

ASH - INITIAL DEFORMATION >2800 F
SOFTENING TEMPERATURE >2800 F
FLUID TEMPERATURE >2800 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS:
SAMPLE NUMBER: (094)06-80  COAL NAME: UNNAMED

MINE NAME: COAL CREEK  QUARTER SECTION: N/A
COAL AREA: KELSO-Castle ROCK  SECTION: 35
SAMPLE SITE ELEVATION (FT): 355  TOWNSHIP: 09N
GEOLoGIC FORMATION: COWLITZ  RANGE: 03W
AGE: EOCENE  QUADRANGLE: CLATSKANIE 15

EXPOSURE TYPE: PORTAL  STRIKE: N60W
SAMPLE TYPE: CHANNEL  DIP: 17SW
SAMPLE CONDITION: FRESH  MAJOR JOINTS IN COAL: N/A

OVERTURNED THICKNESS (FT): 10  TOTAL SECTION MEASURED (FT): 14.1
SAMPLE COLLECTOR: WALKER (DGER)  COAL THICKNESS (FT): 4.0

LABORATORY: DOE-PITTSBURG  SAMPLE THICKNESS (FT): 2.0
LAB. NUMBER: L00660  DATE OF SAMPLING: 02-28-80

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<td>COAL (AR)</td>
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<tr>
<td>PROXIMATE ANALYSIS</td>
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<td></td>
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<tr>
<td>MOISTURE</td>
<td>12.8</td>
<td>19.4</td>
<td>N/A</td>
</tr>
<tr>
<td>VOLATILE MATTER</td>
<td>28.7</td>
<td>44.1</td>
<td>55.1</td>
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<tr>
<td>ASH</td>
<td>32.0</td>
<td>N/A</td>
<td>N/A</td>
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</tbody>
</table>

| ULTIMATE ANALYSIS |   |   |   |
| HYDROGEN | 4.1 | 4.6 | 4.6 |
| CARBON   | 36.5 | 56.2 | 70.2 |
| NITROGEN | 0.7 | 0.6 | 0.8 |
| SULFUR   | 1.9 | N/A | N/A |
| OXYGEN(IND) | 24.8 | 38.1 | 25.5 |

| HEATING VALUE (BTU/LB) | 6272 | 9592 | 11972 |

| ASH - INITIAL DEFORMATION |   | 2350 | F |
| SOFTENING TEMP. |   | 2490 | F |
| FLUID TEMP. |   | 2620 | F |

| SULFUR FORMS |   |   |
| SULFATE | N |   |
| PYRITIC | N |   |
| ORGANIC | N |   |

MISCELLANEOUS COMMENTS: REWORKED OYSTER FRAGMENTS ASSOCIATED WITH COAL-BEARING ROCKS.
COUNTY: COWLITZ

SAMPLE NUMBER: 095)07-80    COAL NAME: UNNAMED

MINE NAME: NONE    QUARTER SECTION: N/A
COAL AREA: KELSO-CASTLE ROCK    SECTION: 26
SAMPLE SITE ELEVATION (FT): 355    TOWNSHIP: 09N
    GEOLOGIC FORMATION: COWLITZ    RANGE: 03W
    AGE: EOCENE    QUADRANGLE: CLATSCHANIE 15
EXPOSURE TYPE: STREAMCUT    STRIKE: N35W
SAMPLE TYPE: GRAB    DIP: 11SW
SAMPLE CONDITION: WEATHERED    MAJOR JOINTS IN COAL: N/A
OVERBURDEN THICKNESS (FT): 0    TOTAL SECTION MEASURED (FT): 15.2
SAMPLE COLLECTOR: WALKER (DRGR)    COAL THICKNESS (FT): 12.3
LABORATORY: DOE-PITTSBURG    SAMPLE THICKNESS (FT): 2.0
LAB. NUMBER: L00561
    DATE OF SAMPLING: 03-25-80
    DATE OF ANALYSIS: 04-15-80

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<tbody>
<tr>
<td>AIR DRY LOSS:</td>
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PROXIMATE ANALYSIS

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<tr>
<td>MOISTURE</td>
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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) 5040 N/A 9688 11931

ASH - INITIAL DEFORMATION 2730 F
SOFTENING TEMP. 2800 F
FLUID TEMP. 2800 F

SULFUR FORMS

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<tr>
<td>SULFATE</td>
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<tr>
<td>PYRITIC</td>
<td>N</td>
</tr>
<tr>
<td>ORGANIC</td>
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</table>

MISCELLANEOUS COMMENTS: COLLECTED IN SMALL STREAM TRIBUTARY TO COAL CREEK. SEE (096)08-80 FOR ANALYSIS OF COAL 6-7 FT. STRATIGRAPHICALLY BELOW THIS SAMPLE.
COUNTY: COWLITZ

SAMPLE NUMBER: (096)08-80
COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: KELSO-CASTLE ROCK
SAMPLE SITE ELEVATION (FT): 355

GEOLOGIC FORMATION: COWLITZ
AGE: EOCENE
EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED
OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: WALKER (DGER)

QUARTER SECTION: N/A
SECTION: 26
TOWNSHIP: 09N
RANGE: 03W
QUADRANGLE: CLATSKANIE 15

STRIKE: N35W
DIP: 11SW
MAJOR JOINTS IN COAL: N/A
TOTAL SECTION MEASURED (FT): 15.2
COAL THICKNESS (FT): 12.3
SAMPLE THICKNESS (FT): 4.0

DATE OF SAMPLING: 02-28-80
DATE OF ANALYSIS: 04-17-80

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L00662

AIR DRY LOSS: N

PROXIMATE ANALYSIS

<table>
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<th>COAL (DMMF)</th>
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<tr>
<td>MOISTURE</td>
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<tr>
<td>VOLATILE MATTER</td>
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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) 7636 10185 12628

ASH - INITIAL DEFORMATION 1910 F
SOFTENING TEMP. 2000 F
FLUID TEMP. 2100 F

SULFUR FORMS
SULFATE N
PYRITIC N
ORGANIC N

MISCELLANEOUS COMMENTS: SEE SAMPLE (095)07-80 FOR ANALYSIS FROM SAME LOCALITY.
SAMPLE NUMBER: (103)15-80

MINE NAME: SECTION 31 CLAY PIT
COAL AREA: NEWCASTLE
SAMPLE SITE ELEVATION (FT): 1375

GEOLOGIC FORMATION: RENTON
AGE: EOCENE

EXPOSURE TYPE: CLAY PIT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: WALSH (DGER)

LABORATORY: OGE-PITTSBURG

COAL NAME: PRIMROSE

QUARTER SECTION: NW
SECTION: 31
TOWNSHIP: 24N
RANGE: 06E
QUADRANGLE: ISSAQUAH 7.5

STRIKE: N70W
DIP: 47NE
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 173.0
COAL THICKNESS (FT): 5.0
SAMPLE THICKNESS (FT): 5.0

DATE OF SAMPLING: 05-23-80
DATE OF ANALYSIS: 08-27-80

LAB. NUMBER: L03312

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SULFUR FORMS
- SULFATE: N
- PYRITIC: N
- ORGANIC: N

MISCELLANEOUS COMMENTS: COLLECTED DURING RAINSTORM WHICH WASHED MUD INTO SAMPLE.
COUNTY: KING

SAMPLE NUMBER: (104)16-80  COAL NAME: #3

MINE NAME: COAL CREEK  QUARTER SECTION: NE
COAL AREA: NEWCASTLE  SECTION: 36
SAMPLE SITE ELEVATION (FT): 1200  TOWNSHIP: 24N
GEOLIGIC FORMATION: RENTON  RANGE: 05E
AGE: EOCENE  QUADRANGLE: ISSAQUAH 7.5
EXPOSURE TYPE: PORTAL  STRIKE: N90E
SAMPLE TYPE: CHANNEL  DIP: 45N
SAMPLE CONDITION: FRESH  MAJOR JOINTS IN COAL: N/A
OVERBURDEN THICKNESS (FT): 1  TOTAL SECTION MEASURED (FT): 11.0
SAMPLE COLLECTOR: WALSH (DG)  COAL THICKNESS (FT): 11.0
DATE OF SAMPLING: 05-22-80  SAMPLE THICKNESS (FT): 5.5
DATE OF ANALYSIS: 08-27-80

LABORATORY: DOE-PITTSBURG  LAB. NUMBER: L03313

AIR DRY LOSS: 4.0  COAL (AR)  COAL (MMMFF)  COAL (DMMF)

PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) 9626 11390 13428

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

SULFUR FORMS
SULFATE          N
PYRITIC          N
ORGANIC          N

MISCELLANEOUS COMMENTS: LOWER SPLIT OF #3 SEAM.
COUNTY: KING

SAMPLE NUMBER: (105)17-80

COAL NAME: UNNAMED

MINE NAME: NONE

COAL AREA: TIGER MTN.

SAMPLE SITE ELEVATION (FT): 1460

GEOLOGIC FORMATION: TIGER MTN.

AGE: EOCENE

EXPOSURE TYPE: FLOAT

SAMPLE TYPE: GRAB

SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0

SAMPLE COLLECTOR: WALSH (DGER)

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: L03314

QUARTER SECTION: SE

SECTION: 16

TOWNSHIP: 23N

RANGE: 07E

QUADRANGLE: HOBART 7.5

STRIKE: N/A

DIP: N/A

MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N

COAL THICKNESS (FT): N

SAMPLE THICKNESS (FT): N

DATE OF SAMPLING: 05-15-80

DATE OF ANALYSIS: 08-27-80

AIR DRY LOSS: 0.0

COAL (AR)

COAL (MMMF)

COAL (DMMF)

PROXIMATE ANALYSIS

MOISTURE ..................... 1.7 ............... 4.1 ............... N/A

VOLATILE MATTER ............... 25.5 .......... 63.5 .......... 66.3

FIXED CARBON ................. 17.5 .......... 43.5 .......... 45.5

ASH ......................... 55.3 .......... N/A .......... N/A

ULTIMATE ANALYSIS

HYDROGEN ..................... 2.8 ............. 6.7 ............. 6.7

CARBON ....................... 31.9 .......... 79.5 .......... 83.0

NITROGEN ..................... 0.6 ............. 1.3 ............. 1.4

SULFUR ..................... 0.4 .......... N/A .......... N/A

OXYGEN (IND) .................. 8.9 .......... 22.1 .......... 19.1

HEATING VALUE (BTU/LB) .... 5196 .......... 12922 .......... 13495

ASH - INITIAL DEFORMATION .... 2000 F

SOFTENING TEMP. .............. 2080 F

FLUID TEMP. ................. 2170 F

SULFUR FORMS

SULFATE ....................... N

PYRITIC ....................... N

ORGANIC ....................... N

MISCELLANEOUS COMMENTS: SAMPLE REPRESENTATIVE OF COAL TYPES FOUND IN FLOAT, THOUGH NOT NECESSARILY REPRESENTATIVE OF THE COAL SEAM.
SAMPLE NUMBER: (106)18-80          COAL NAME: LOWER ELK

MINE NAME: L. ELK PROSPECT          QUARTER SECTION: SW          SECTION: 34
COAL AREA: GREEN RIVER              TOWNSHIP: 22N              RANGE: 07E
SAMPLE SITE ELEVATION (FT): 1090    QUADRANGLE: CUMBERLAND 7.5

GEOLOGIC FORMATION: PUGET GROUP     STRIKE: N05W              DIP: 15NE
AGE: EOCENE                          MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: PROSPECT             TOTAL SECTION MEASURED (FT): 9.7
SAMPLE TYPE: CHANNEL                COAL THICKNESS (FT): 6.4
SAMPLE CONDITION: WEATHERED         SAMPLE THICKNESS (FT): 6.4

OVERBURDEN THICKNESS (FT): 0         DATE OF SAMPLING: 05-16-80
SAMPLE COLLECTOR: PHILLIPS (DGER)    DATE OF ANALYSIS: 09-29-80

LABORATORY: DOE-PITTSBURG            LAB. NUMBER: L03815

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| ULTIMATE ANALYSIS | 4.9       | 6.8          | 6.8         |
| HYDROGEN          |           |              |             |
| CARBON            | 49.6      | 73.4         | 79.4        |
| NITROGEN          | 0.9       | 1.2          | 1.3         |
| SULFUR            | 0.6       | N/A          | N/A         |
| OXYGEN(IND)       | 14.1      | 20.3         | 15.2        |

| HEATING VALUE (BTU/LB) | 8810      | 13010        | 14674       |

| ASH - INITIAL DEFORMATION | 2800 | F |
| SOFTENING TEMP.           | 2800 | F |
| FLUID TEMP.               | 2800 | F |

SULFUR FORMS
SULFATE          N
PYRITIC          N
ORGANIC          N

MISCELLANEOUS COMMENTS: LOWER ELK COAL BED IS ALSO KNOWN AS ELK NO. 2 COAL BED.
SAMPLE NUMBER: (107)19-80

COAL NAME: UNNAMED

MINE NAME: NONE

COAL AREA: GREEN RIVER

SAMPLE SITE ELEVATION (FT): 1130

GEOLOGIC FORMATION: PUGET GROUP

AGE: EOCENE

EXPOSURE TYPE: OUTCROP

SAMPLE TYPE: CHANNEL

SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 5

SAMPLE COLLECTOR: PHILLIPS (DGER)

QUARTER SECTION: SW

SECTION: 34

TOWNSHIP: 22N

RANGE: 07E

QUADRANGLE: CUMBERLAND 7.5

STRIKE: NOSE

DIP: 15NE

MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 5.6

COAL THICKNESS (FT): 1.0

SAMPLE THICKNESS (FT): 1.0

DATE OF SAMPLING: 05-16-80

DATE OF ANALYSIS: 09-23-80

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: L03817

AIR DRY LOSS: 2.0

COAL (AR) COAL (MMMF) COAL (DMMF)

PROXIMATE ANALYSIS

MOISTURE *********** 6.0 *********** 6.8 *********** N/A

VOLATILE MATTER *********** 35.2 *********** 40.3 *********** 43.3

FIXED CARBON *********** 47.1 *********** 54.0 *********** 58.0

ASH *********** 11.7 *********** N/A *********** N/A

ULTIMATE ANALYSIS

HYDROGEN *********** 5.7 *********** 6.1 *********** 6.1

CARBON *********** 64.4 *********** 73.9 *********** 79.3

NITROGEN *********** 1.3 *********** 1.4 *********** 1.5

SULFUR*********** 0.5 *********** N/A *********** N/A

OXYGEN(KIND) *********** 16.5 *********** 18.9 *********** 13.7

HEATING VALUE (BTU/LB) ... 11488 *********** 13162 *********** 14136

ASH - INITIAL DEFORMATION ... 2800 F

SOFTENING TEMP. ... 2800 F

FLUID TEMP. ... 2800 F

SULFUR FORMS

SULFATE *********** N

PYRITIC *********** N

ORGANIC *********** N

MISCELLANEOUS COMMENTS: PREVIOUSLY UNMAPPED COAL 60 FT. STRATIGRAPHICALLY ABOVE TOP OF LOWER ELK BED (SEE SAMPLE (106)19-80).
COUNTY: KING

SAMPLE NUMBER: (108)20-80  COAL NAME: BIG ELK

MINE NAME: BIG ELK STRIP PIT  QUARTER SECTION: SW  SECTION: 34
COAL AREA: GREEN RIVER  TOWNSHIP: 22N  RANGE: 07E
SAMPLE SITE ELEVATION (FT): 1240  QUADRANGLE: CUMBERLAND 7.5

GEOLoGIC FORMATION: PUGET GROUP  STRIKE: N05W  DIP: 25NE
AGE: EOCENE  MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: STRIP PIT  TOTAL SECTION MEASURED (FT): 47.3
SAMPLE TYPE: CHANNEL  COAL THICKNESS (FT): 10.5
SAMPLE CONDITION: WEATHERED  SAMPLE THICKNESS (FT): 6.2

OVERBURDEN THICKNESS (FT): 0  DATE OF SAMPLING: 05-20-80
SAMPLE COLLECTOR: PHILLIPS (DGER)  DATE OF ANALYSIS: 09-23-80

LABORATORY: DOE-PITTSBURG  LAB. NUMBER: L03818

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ASH - INITIAL DEFORMATION | 2300 F
SOFTENING TEMP. | 2410 F
FLUID TEMP. | 2500 F

SULFUR FORMS
- SULFATE: N
- PYRITIC: N
- ORGANIC: N

MISCELLANEOUS COMMENTS: STRIP PIT ABANDONED.
COUNTY: KING

SAMPLE NUMBER: (109)21-80

MINE NAME: RUFINER
COAL AREA: TIGER MTN.
SAMPLE SITE ELEVATION (FT): 1540

GEOLOGIC FORMATION: TIGER MTN.
AGE: EOCENE

EXPOSURE TYPE: PROSPECT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 4
SAMPLE COLLECTOR: WALSH (OGER)

LABORATORY: DOE-PITTSBURG

COAL NAME: UNNAMED
QUARTER SECTION: SW
SECTION: 16
TOWNSHIP: 23N
RANGE: 07E
QUADRANGLE: HOBART 7.5

STRIKE: N10W
DIP: 55SW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 3.5
COAL THICKNESS (FT): 5.0
SAMPLE THICKNESS (FT): 2.5

DATE OF SAMPLING: 06-05-80
DATE OF ANALYSIS: 09-29-80

LAB. NUMBER: L03824

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PROXIMATE ANALYSIS

| MOISTURE      | 10.3      | 20.9        | N/A         |
| V OLATILE MATTER | 25.4      | 51.8        | 65.7        |
| FIXED CARBON  | 17.2      | 39.1        | 44.4        |
| ASH           | 47.1      | N/A         | N/A         |

ULTIMATE ANALYSIS

| HYDROGEN      | 4.2       | 7.7         | 7.7         |
| CARBON        | 31.8      | 64.9        | 82.3        |
| NITROGEN      | 0.6       | 1.1         | 1.4         |
| SULFUR        | 0.5       | N/A         | N/A         |
| OXYGEN(IND)   | 15.9      | 32.4        | 17.3        |

HEATING VALUE (BTU/LB) ... 5487        11180       14166

ASH - INITIAL DEFORMATION 2510  F
SOFTENING TEMP. 2620  F
FLUID TEMP. 2730  F

SULFUR FORMS

| SULFATE       |          | N           |
| PYRITIC       |          | N           |
| ORGANIC       |          | N           |

MISCELLANEOUS COMMENTS: PROSPECT PIT DUG BY WALSH AND PHILLIPS (OGER) ABOUT 4 FEET FROM RUFINER TUNNEL. OLD STREAM CHANNEL CUT CUT LOWER PART OF SEAM ALTHOUGH FULL THICKNESS IS PRESENT IN TUNNEL. INTERMITTENT RAIN WASHED MUD INTO SAMPLE.
COUNTY: KING

SAMPLE NUMBER: (110)22-80

COAL NAME: CASHMAN

MINE NAME: CASHMAN
COAL AREA: GREEN RIVER
SAMPLE SITE ELEVATION (FT): 980

GEOLeGIC FORMATION: PUGET GROUP
AGE: EOCENE

EXPOSURE TYPE: PROSPECT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: PHILLIPS (DGER)

LABORATORY: DOE-PITTSPURG

LAB. NUMBER: L03819

AIR DRY LOSS: 2.0

PROXIMATE ANALYSIS

COAL (AR) COAL (MMMF) COAL (DMMF)

MOISTURE ................. 6.7 ............... 7.5 ............... N/A
VOLATILE MATTER ........... 40.9 .............. 46.6 .............. 50.5
FIXED CARBON .............. 41.2 .............. 46.9 .............. 50.8
ASH ....................... 11.2 .............. N/A .............. N/A

ULTIMATE ANALYSIS

HYDROGEN .................. 5.7 ............... 6.0 ............... 6.0
CARBON ..................... 65.0 .............. 74.1 .............. 80.3
NITROGEN ................... 1.4 ............... 1.5 ............... 1.6
SULFUR .................... 0.6 ............... N/A .............. N/A
OXYGEN(IND) ................ 16.1 .............. 18.3 .............. 12.4

HEATING VALUE (BTU/LB) ... 11750 .............. 13383 .............. 14492

ASH - INITIAL DEFORMATION .... 2800 F
SOFTENING TEMP. .......... 2800 F
FLUID TEMP. ............... 2800 F

SULFUR FORMS

SULFATE ................. N
PYRITIC .................. N
ORGANIC .................. N

MISCELLANEOUS COMMENTS: UPPER 2.8 FEET OF COAL IN CASHMAN SEAM. SEE SAMPLES (111)23-80 AND (112)24-80 FOR REMAINDER OF SEAM.
COUNTY: KING

SAMPLE NUMBER: (111)23-80

COAL NAME: CASHMAN

MINE NAME: CASHMAN
COAL AREA: GREEN RIVER
SAMPLE SITE ELEVATION (FT): 980

GEOLOGIC FORMATION: PUGET GROUP
AGE: EOCENE

EXPOSURE TYPE: PROSPECT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: PHILLIPS (DOE)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03820

AIR DRY LOSS: 2.0

PROXIMATE ANALYSIS

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<td>SULFUR</td>
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<td>OXYGEN(IND)</td>
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HEATING VALUE (BTU/LB) ... 11303 .......... 13082 .......... 14257

ASH - INITIAL DEFORMATION ...... 2800 F
SOFTENING TEMP. .......... 2800 F
FLUID TEMP. .......... 2800 F

SULFUR FORMS

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<td>SULFATE</td>
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<tr>
<td>ORGANIC</td>
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</table>

MISCELLANEOUS COMMENTS: 1.1 FT. OF COAL FROM MIDDLE PORTION OF CASHMAN SEAM. SEE SAMPLES (110)22-80 AND (112)24-80 FOR REMAINDER OF SEAM.
COUNTY: KING

SAMPLE NUMBER: (112)24-80 COAL NAME: CASHMAN

MINE NAME: CASHMAN QUARTER SECTION: NE
COAL AREA: GREEN RIVER SECTION: 33
SAMPLE SITE ELEVATION (FT): 980 TOWNSHIP: 22N
AGE: EOCENE RANGE: 07E
GEOLoGIC FORMATION: PUGET GROUP QUADRANGLE: CUMBERLAND 7.5
AGE: EOCENE
EXPOSURE TYPE: PROSPECT STRIKE: N60W
SAMPLE TYPE: CHANNEL DIP: 35NE
SAMPLE CONDITION: WEATHERED MAJOR JOINTS IN COAL: N/A
OVERBURDEN THICKNESS (FT): 0 TOTAL SECTION MEASURED (FT): 36.3
SAMPLE COLLECTOR: PHILLIPS (DGER) COAL THICKNESS (FT): 6.7
DATE OF SAMPLING: 06-03-80 SAMPLE THICKNESS (FT): 6.7
DATE OF ANALYSIS: 09-23-80

LABORATORY: DOE-PITTSBURG LAB. NUMBER: L03821

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| HEATING VALUE (BTU/LB) | 10531 | 12080 | 14301 |

| ASH - INITIAL DEFORMATION | 2800 F |
| SOFTENING TEMP.           | 2800 F |
| FLUID TEMP.               | 2800 F |

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<th>SULFUR FORMS</th>
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<td>PYRITIC</td>
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<tr>
<td>ORGANIC</td>
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</table>

MISCELLANEOUS COMMENTS: LOWER 6.7 FEET OF CASHMAN SEAM. SEE SAMPLES (110)22-80 AND (111)23-80 FOR REMAINDER OF SEAM.
COUNTY: KING

SAMPLE NUMBER: (113)25-80
COAL NAME: UNNAMED

MINE NAME: UNNAMED PROSPECT
COAL AREA: GREEN RIVER
SAMPLE SITE ELEVATION (FT): 1050

GEOLOGIC FORMATION: PUGET GROUP
AGE: EOCENE

EXPOSURE TYPE: PROSPECT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

QUARTER SECTION: NE
SECTION: 34
TOWNSHIP: 22N
RANGE: 07E
QUADRANGLE: CUMBERLAND 7.5

STRIKE: N55W
DIP: 06NE
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 32.8
COAL THICKNESS (FT): 9.8
SAMPLE THICKNESS (FT): 6.5

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: PHILLIPS (OGER)

DATE OF SAMPLING: 06-06-80
DATE OF ANALYSIS: 09-23-80

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03822

AIR DRY LOSS: 19.0

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<tr>
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| ULTIMATE ANALYSIS           |          |              |
|-----------------------------|----------|
| HYDROGEN                    | 4.9      |
| CARBON                      | 26.2     |
| NITROGEN                    | 0.6      |
| SULFUR                      | 0.3      |
| OXYGEN(IND)                 | 34.5     |

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| ASH - INITIAL DEFORMATION   | 2500     |
| SOFTENING TEMP.             | 2610     |
| FLUID TEMP.                 | 2700     |

| SULFUR FORMS                |          |
| SULFATE                     | N        |
| PYritic                     | N        |
| ORGANIC                     | N        |

MISCELLANEOUS COMMENTS: BASE OF COAL ZONE NOT EXPOSED. SEE SAMPLE (114)26-80 FOR ANALYSIS OF LOWER 3.3 FT. OF SEAM.
COUNTY: KING

SAMPLE NUMBER: (114)26-80

COAL NAME: UNNAMED

COAL AREA: GREEN RIVER

MINE NAME: UNNAMED PROSPECT

SAMPLE SITE ELEVATION (FT): 1050

TOWNSHIP: 22N

AGE: EOCENE

SECTION: 34

EXPOSURE TYPE: PROSPECT

QUARTER SECTION: NE

SAMPLE TYPE: CHANNEL

SAMPLE CONDITION: WEATHERED

TOWN RANGE: 07E

TOTAL SECTION MEASURED (FT): 32.8

OVERBURDEN THICKNESS (FT): 0

COAL THICKNESS (FT): 9.8

SAMPLE COLLECTOR: PHILLIPS (DGER)

SAMPLE thICKNESS (FT): 3.3

DATE OF SAMPLING: 06-06-80

LAB. NUMBER: LC3823

DATE OF ANALYSIS: 09-23-80

LABORATORY: DOE-PITTSBURG

AIR DRY LOSS: 11.0

COAL

COAL

COAL

(AR) (MMM/F) (DMM/F)

PROXIMATE ANALYSIS

MOISTURE .......... 14.4 .......... 28.8 .......... N/A

VOLATILE MATTER .. 31.5 .......... 63.4 .......... 89.6

FIXED CARBON ....... 7.8 .......... 15.5 .......... 21.8

ASH ................. 46.3 .......... N/A .......... N/A

ULTIMATE ANALYSIS

HYDROGEN .......... 4.0 .......... 6.4 .......... 6.4

CARBON .......... 27.3 .......... 54.9 .......... 77.5

NITROGEN .......... 0.6 .......... 0.9 .......... 1.2

SULFUR .......... 1.1 .......... N/A .......... N/A

OXYGEN(INC) ......... 20.7 .......... 41.5 .......... 22.1

HEATING VALUE (BTU/LB) .... 4701 .......... 9407 .......... 13278

ASH - INITIAL DEFORMATION .... 2010 F

SOFTENING TEMP. .............. 2120 F

FLUID TEMP. .............. 2250 F

SULFUR FORMS

SULFATE .......... N

PYRITIC .......... N

ORGANIC .......... N

MISCELLANEOUS COMMENTS: BASE OF COAL ZONE NOT EXPOSED DURING SAMPLING. SAMPLE (113)25-80 FOR ANALYSIS OF UPPER 7.1 FT. OF THIS COAL SEAM.
COUNTY: KING

SAMPLE NUMBER: (115)27-80

COAL NAME: UNNAMED

MINE NAME: NONE

COAL AREA: GREEN RIVER

SAMPLE SITE ELEVATION (FT): 1100

QUARTER SECTION: NW

SECTION: 34

TOWNSHIP: 22N

RANGE: 07E

QUADRANGLE: CUMBERLAND 7.5

GEOLOGIC FORMATION: PUGET GROUP

STRIKE: N10W

AGE: EOCENE

DIP: 22SW

EXPOSURE TYPE: STREAM

MAJOR JOINTS IN COAL: N/A

SAMPLE TYPE: FLOAT

TOTAL SECTION MEASURED (FT): N

SAMPLE CONDITION: WEATHERED

COAL THICKNESS (FT): N

OVERBURDEN THICKNESS (FT): 0

SAMPLE THICKNESS (FT): N

SAMPLE COLLECTOR: PHILLIPS (OGER)

DATE OF SAMPLING: 06-11-80

LAB. NUMBER: L03315

DATE OF ANALYSIS: 08-27-80

LABORATORY: DOE-PITTSBURG

AIR DRY LOSS: 1.0

PROXIMATE ANALYSIS

COAL (AR)

COAL (MMMF)

COAL (DMMF)

MOISTURE ............... 5.7 ......... 10.6 ......... N/A

VOLATILE MATTER ....... 22.2 ....... 41.7 ....... 46.7

FIXED CARBON .......... 29.1 ....... 54.7 ....... 61.3

ASH ...................... 43.2 ....... N/A ....... N/A

ULTIMATE ANALYSIS

HYDROGEN ............... 4.1 ......... 7.1 ......... 7.1

CARBON .................. 40.9 ....... 75.3 ....... 84.4

NITROGEN ............... 1.0 ......... 1.7 ......... 1.9

SULFUR .................. 0.6 ......... N/A ......... N/A

OXYGEN(IND) ............. 11.2 ....... 21.9 ....... 12.8

HEATING VALUE (BTU/LB) ... 7680 .......... 13298 ....... 14900

ASH - INITIAL DEFORMATION .... 2800 F

SOFTENING TEMP. ........... 2800 F

FLUID TEMP. .............. 2800 F

SULFUR FORMS

SULFATE ................ N

PYRITIC ................ N

ORGANIC ................ N

MISCELLANEOUS COMMENTS: COAL FLOAT FOUND IN STREAM WITHIN 100 FT. OF UNNAMED CAVED-IN PROSPECT. VINE (1969) SHOWS APPROX. N10W 22SW STRIKE AND DIP AT LOCATION.
COAL NAME: UNNAMED

QUARTER SECTION: NW
SECTION: 34
TOWNSHIP: 22N
RANGE: 07E
QUADRANGLE: CUMBERLAND 7.5

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): N
SAMPLE THICKNESS (FT): N

DATE OF SAMPLING: 06-11-80
DATE OF ANALYSIS: 08-27-80

LAB. NUMBER: L03316

AIR DRY LOSS: 0.0

PROXIMATE ANALYSIS

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<td>OXYGEN(IND)</td>
<td>12.6</td>
<td>19.3</td>
<td>13.9</td>
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HEATING VALUE (BTU/LB) 8766 13484 14539

ASH - INITIAL DEFORMATION 2790 F
SOFTENING TEMP. 2800 F
FLUID TEMP. 2800 F

SULFUR FORMS

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<td>ORGANIC</td>
<td>N</td>
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</table>

MISCELLANEOUS COMMENTS: COAL SAMPLE FROM ABUNDANT FLOAT FOUND IN UNNAMED STREAM. THERE IS NO EVIDENCE OF OLD TIPTLE, MINE DUMP OR RAILROAD IN AREA. LOCATION IS CLOSE TO PROJECTED OUTCROP LINE OF UPPER UNNAMED COAL BED SHOWN ON VINE'S (1969) MAP.
COUNTY: KING

SAMPLE NUMBER: (117)29-80
COAL NAME: BIG ELK

MINE NAME: ELK CLAY PIT
COAL AREA: GREEN RIVER
SAMPLE SITE ELEVATION (FT): 1020
GEOLIGIC FORMATION: PUGET GROUP
AGE: EOCENE
EXPOSURE TYPE: STRIP PIT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED
OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: PHILLIPS (DFER)
LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03317

QUARTER SECTION: SE
SECTION: 34
TOWNSHIP: 22N
RANGE: 07E
QUADRANGLE: CUMBERLAND 7.5
STRIKE: N45E
DIP: 35NW
MAJOR JOINTS IN COAL: N/A
TOTAL SECTION MEASURED (FT): 21.4
COAL THICKNESS (FT): 2.6
SAMPLE THICKNESS (FT): 1.9
DATE OF SAMPLING: 06-13-30
DATE OF ANALYSIS: 08-27-80

| AIR DRY LOSS | 4.0 | COAL (AR) | 7.9 | 16.5 | N/A |
| VOLATILE MATTER | 16.6 | 34.7 | 41.7 |
| FIXED CARBON | 27.2 | 57.0 | 68.4 |
| ASH | 48.3 | N/A | N/A |

PROXIMATE ANALYSIS

| HYDROGEN | 3.7 | 6.9 | 6.9 |
| CARBON | 34.1 | 71.5 | 85.8 |
| NITROGEN | 0.8 | 1.5 | 1.8 |
| SULFUR | 0.5 | N/A | N/A |
| OXYGEN (IND) | 12.6 | 26.3 | 13.9 |

ULTIMATE ANALYSIS

HEATING VALUE (BTU/LB) ... 5708 .............. 11949 .............. 14329

ASH - INITIAL DEFORMATION ........ 2740 F
SOFTENING TEMP. ................. 2800 F
FLUID TEMP. ............ 2800 F

SULFUR FORMS
SULFATE ................. N
PYRITIC ................. N
ORGANIC ................. N

MISCELLANEOUS COMMENTS: SAMPLE IS REPRESENTATIVE OF UPPERMOST PORTION OF BIG ELK COAL SEAM ONLY. THE BULK OF BIG ELK COAL BED WAS NOT EXPOSED AT THIS LOCALITY.
COUNTY: KING

SAMPLE NUMBER: (118) 30-80
COAL NAME: DURHAM NO. 1

MINE NAME: DURHAM NO. 1
COAL AREA: GREEN RIVER
SAMPLE SITE ELEVATION (FT): 1100

GEOLOGIC FORMATION: PUGET GROUP
AGE: EOCENE

EXPOSURE TYPE: STRIP PIT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: PHILLIPS (DOE)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03318

QUARTER SECTION: NW
SECTION: 2
TOWNSHIP: 21N
RANGE: 07E
QUADRANGLE: CUMBERLAND 7.5

STRIKE: N30W
DIP: 31NE
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 49.0
COAL THICKNESS (FT): 8.5
SAMPLE THICKNESS (FT): 8.5

DATE OF SAMPLING: 06-13-80
DATE OF ANALYSIS: 08-27-80

AIR DRY LOSS: 8.0

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<th>COAL (DMMFM)</th>
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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) ...

ASH - INITIAL DEFORMATION...
SOFTENING TEMP...
FLUID TEMP...

SULFUR FORMS

SULFATE N
PYRITIC N
ORGANIC N

MISCELLANEOUS COMMENTS: STRIP PIT ABANDONED.
LOWER 13.4 FT. OF 49.0 FT. MEASURED SECTION. SEE SAMPLE (119) 31-80 FOR REMAINDER OF ANALYSED SECTION.
COUNTY: KING

SAMPLE NUMBER: (119)31-80

COAL NAME: DURHAM NO. 1

MINE NAME: DURHAM NO. 1

COAL AREA: GREEN RIVER

SAMPLE SITE ELEVATION (FT): 1100

QUARTER SECTION: NW

SECTION: 2

TOWNSHIP: 21N

RANGE: 07E

QUADRANGLE: CUMBERLAND 7.5

GEologic FORMATION: PUGET GROUP

STRIKE: N30W

AGE: EOCENE

DIP: 31YE

MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: STRIP PIT

TOTAL SECTION MEASURED (FT): 49.0

SAMPLE TYPE: CHANNEL

COAL THICKNESS (FT): 16.5

SAMPLE CONDITION: WEATHERED

SAMPLE THICKNESS (FT): 16.4

OVERBURDEN THICKNESS (FT): 0

DATE OF SAMPLING: 06-13-80

SAMPLE COLLECTOR: PHILLIPS (DGER)

DATE OF ANALYSIS: 08-27-80

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: L03319

AIR DRY LOSS: 6.0

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PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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ASH - INITIAL DEFORMATION | 2800 | F

SOFTENING TEMP. | 2800 | F

FLUID TEMP. | 2800 | F

SULFUR FORMS

<p>| | | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>SULFATE</td>
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<tr>
<td>PYritic</td>
<td>N</td>
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<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: STRIP PIT ABANDONED.

INTERVAL 13.4 OF 49.0 FT. MEASURED SECTION.

SEE SAMPLE (118)30-80 FOR LOWER PORTION OF ANALYSED SECTION.
COUNTY: KING

SAMPLE NUMBER: (126)38-80

COAL NAME: CURHAM NO. 1

MINE NAME: DURHAM NO. 1
COAL AREA: GREEN RIVER
SAMPLE SITE ELEVATION (FT): 1260

GEOLOGIC FORMATION: PUGET GROUP
AGE: EOCENE

EXPOSURE TYPE: STRIP PIT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: PHILLIPS (DGER)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03320

QUARTER SECTION: SW
SECTION: 2
TOWNSHIP: 21N
RANGE: 07E
QUADRANGLE: CUMBERLAND 7.5

STRIKE: N10E
DIP: 20SE
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 102.7
COAL THICKNESS (FT): 7.1
SAMPLE THICKNESS (FT): 4.9

DATE OF SAMPLING: 06-18-80
DATE OF ANALYSIS: 08-27-80

AIR DRY LOSS: 0.0

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<thead>
<tr>
<th>PROXIMATE ANALYSIS</th>
<th>COAL (AR)</th>
<th>COAL (MMMFM)</th>
<th>COAL (DMMFM)</th>
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<td>FIXED CARBON</td>
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ULTIMATE ANALYSIS

| HYDROGEN             | 4.7       | 5.8          | 5.8          |
| CARBON               | 61.6      | 80.4         | 83.9         |
| NITROGEN             | 1.1       | 1.3          | 1.4          |
| SULFUR               | 0.5       | N/A          | N/A          |
| OXYGEN(IND)          | 10.4      | 13.5         | 10.2         |

HEATING VALUE (BTU/LB) 10893 14206 14826

ASH - INITIAL DEFORMATION 2800 F
SOFTENING TEMP. 2800 F
FLUID TEMP. 2800 F

SULFUR FORMS

| SULFATE               | N         |
| PYritic               | N         |
| ORGANIC               | N         |

MISCELLANEOUS COMMENTS: STRIP PIT ABANDONED.
INTERVAL 21.4 TO 31.5 OF 102.7 FT. MEASURED SECTION.
STRATIGRAPHICALLY ABOVE SAMPLE (130)42-80.
COUNTY: KING

SAMPLE NUMBER: (127)39-80

COAL NAME: DURHAM NO. 1

MINE NAME: DURHAM NO. 1
COAL AREA: GREEN RIVER
SAMPLE SITE ELEVATION (FT): 1260

GEOLOGIC FORMATION: PUGET GROUP
AGE: EOCENE

EXPOSURE TYPE: STRIP PIT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: PHILLIPS (OGER)

QUARTER SECTION: SW
SECTION: 2
TOWNSHIP: 21N
RANGE: 07E
QUADRANGLE: CUMBERLAND 7.5

STRIKE: NICE
DIP: 20SE
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 102.7
COAL THICKNESS (FT): 6.6
SAMPLE THICKNESS (FT): 5.5

DATE OF SAMPLING: 06-18-80
DATE OF ANALYSIS: 08-27-80

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03321

AIR DRY LOSS: 0.0

PROXIMATE ANALYSIS

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<th>MMMF</th>
<th>DMMF</th>
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ULTIMATE ANALYSIS

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<th>MMMF</th>
<th>DMMF</th>
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HEATING VALUE (BTU/LB) ... 11149 ... 14406 ... 15049

ASH - INITIAL DEFORMATION 2650 F
SOFTENING TEMP. 2760 F
FLUID TEMP. 2800 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: STRIP PIT ABANDONED.
INTERVAL 31.5 TO 38.8 OF 102.7 FT. MEASURED SECTION.
STRATIGRAPHICALLY ABOVE SAMPLE (126)38-80.
**COUNTY:** KING

**SAMPLE NUMBER:** (128) 40-80

**COAL NAME:** DURHAM NO. 1

**MINE NAME:** DURHAM NO. 1
**COAL AREA:** GREEN RIVER
**SAMPLE SITE ELEVATION (FT):** 1260

**GEologic FORMATION:** PUGET GROUP
**AGE:** EOCENE

**EXPOSURE TYPE:** STRIP PIT
**SAMPLE TYPE:** CHANNEL
**SAMPLE CONDITION:** WEATHERED

**OVERTURE THICKNESS (FT):** 0
**SAMPLE COLLECTOR:** PHILLIPS (OGER)

**QUARTER SECTION:** SW
**SECTION:** 2
**TOWNSHIP:** 21N
**RANGE:** 07E
**QUADRANGLE:** CUMBERLAND 7.5

**STRIKE:** N10E
**DIP:** 20SE
**MAJOR JOINTS IN COAL:** N/A

**TOTAL SECTION MEASURED (FT):** 102.7
**COAL THICKNESS (FT):** 8.1
**SAMPLE THICKNESS (FT):** 8.1

**DATE OF SAMPLING:** 06-18-80
**DATE OF ANALYSIS:** 08-27-80

**LABORATORY:** DOE-PITTSBURG
**LAB. NUMBER:** L03322

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**ULTIMATE ANALYSIS**

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<th>NITROGEN</th>
<th>SULFUR</th>
<th>OXYGEN (IND)</th>
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**HEATING VALUE (BTU/LB):** 11210
**14304**
**14955**

**ASH - INITIAL DEFORMATION:** 2660 F
**SOFTENING TEMP.:** 2780 F
**FLUID TEMP.:** 2780 F

**SULFUR FORMS**

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<th>SULFATE</th>
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**MISCELLANEOUS COMMENTS:** STRIP PIT ABANDONED.
**COAL FROM INTERVAL 38.8 TO 47.2 OF 102.7 FT.**
**MEASURED SECTION.** STRATIGRAPHICALLY ABOVE SAMPLE (127) 39-80.
COUNTY: KING

SAMPLE NUMBER: (129)41-80

COAL NAME: DURHAM NO. 1

MINE NAME: DURHAM NO. 1

COAL AREA: GREEN RIVER

SAMPLE SITE ELEVATION (FT): 1260

QUARTER SECTION: SW

SECTION: 2

TOWNSHIP: 21N

RANGE: 07E

QUADRANGLE: CUMBERLAND 7.5

GEOLOGIC FORMATION: PUGET GROUP

AGE: EOCENE

EXPOSURE TYPE: STRIP PIT

SAMPLE TYPE: CHANNEL

SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0

SAMPLE COLLECTOR: PHILLIPS (DGER)

STRIKE: N10E

DIP: 20S

MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 102.7

COAL THICKNESS (FT): 9.9

SAMPLE THICKNESS (FT): 9.9

DATE OF SAMPLING: 06-18-80

DATE OF ANALYSIS: 08-27-80

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: L03323

AIR DRY LOSS: 1.0

COAL (AR)

COAL (MMMFM)

COAL (DMMMF)

PROXIMATE ANALYSIS

MOISTURE ************** 3.5 ************** 5.1 ************** N/A

VOLATILE MATTER ********** 25.1 ********** 38.0 ********** 40.1

FIXED CARBON ********** 40.1 ********** 50.8 ********** 64.2

ASH ************** 31.3 ************** N/A ************** N/A

ULTIMATE ANALYSIS

HYDROGEN ************** 4.7 ************** 6.7 ************** 6.7

CARBON ************** 52.6 ************** 79.8 ************** 84.3

NITROGEN ************** 1.1 ************** 1.5 ************** 1.5

SULFUR ************** 0.8 ************** N/A ************** N/A

OXYGEN(IND) ************** 9.5 ************** 14.3 ************** 10.1

HEATING VALUE (BTU/LB) ... 9317 ************** 14108 ************** 14901

ASH - INITIAL DEFORMATION .... 2800 F

SOFTENING TEMP. ............ 2800 F

FLUID TEMP. ............ 2800 F

SULFUR FORMS

SULFATE ................. N

PYRITIC ................. N

ORGANIC ................. N

MISCELLANEOUS COMMENTS: STRIP PIT ABANDONED.

COAL FROM INTERVAL 47.2 TO 102.7 OF 102.7 FT.

MEASURED SECTION: STRATIGRAPHICALLY ABOVE SAMPLE (128)40-80.
SAMPLE NUMBER: (130) 42-80
COAL NAME: DURHAM NO. 1

MINE NAME: DURHAM NO. 1
QUARTER SECTION: SW
COAL AREA: GREEN RIVER
SECTION: 2
TOWNSHIP: 21N
SAMPLE ELEVATION (FT): 1240
RANGE: 07E
QUADRANGLE: CUMBERLAND 7.5
GEOLOGIC FORMATION: PUGET GROUP
STRIKE: N05W
AGE: EOCENE
DIP: 2CNE
MAJOR JOINTS IN COAL: N/A
EXPOSURE TYPE: STRIP PIT
TOTAL SECTION MEASURED (FT): 102.7
SAMPLE TYPE: CHANNEL
COAL THICKNESS (FT): 3.4
SAMPLE CONDITION: WEATHERED
SAMPLE THICKNESS (FT): 2.2
OVERBURDEN THICKNESS (FT): 0
DATE OF SAMPLING: 06-19-90
SAMPLE COLLECTOR: PHILLIPS (DGEE)
DATE OF ANALYSIS: 08-27-80
LABORATORY: DOE-PITTSBURGH
LAB. NUMBER: L03324

AIR DRY LOSS: 0.0

PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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<td>OXYGEN(IND)</td>
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<td>9.6</td>
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HEATING VALUE (BTU/LB) 10382 14566 15185

ASH - INITIAL DEFORMATION 2800 F
SOFTENING TEMP. 2800 F
FLUID TEMP. 2800 F

SULFUR FORMS

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<tbody>
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</table>

MISCELLANEOUS COMMENTS: STRIP PIT ABANDONED.
COAL FROM INTERVAL 0.0 TO 8.0 OF 102.7 FT.
MEASURED SECTION. BASE OF DURHAM NO. 1 COAL ZONE NOT EXPOSED.
INTERVAL 8.0 TO 21.4 FT. OF SECTION COVERED.

-B 30-
COUNTY: KING

SAMPLE NUMBER: (134) 46-80

COAL NAME: UNNAMED

MINE NAME: PETERS
COAL AREA: TIGER MTN.
SAMPLE SITE ELEVATION (FT): 640

GEOLOGIC FORMATION: TIGER MTN.
AGE: EOCENE

EXPOSURE TYPE: MINE DUMP
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: WALSH (DGER)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03934

AIR DRY LOSS: 3.0

COAL

PROXIMATE ANALYSIS

MOISTURE ................. 8.5 ................. 21.7 ................. N/A
VOLATILE MATTER ........... 11.2 ................. 28.7 ................. 36.8
FIXED CARBON .............. 23.9 ................. 51.6 ................. 79.1
ASH ......................... 56.4 ................. N/A ................. N/A

ULTIMATE ANALYSIS

HYDROGEN ................. 2.0 ................. 3.0 ................. 3.0
CARBON .................. 28.4 ................. 73.3 ................. 94.0
NITROGEN ................. 0.5 ................. 0.9 ................. 1.2
SULFUR .................... 1.0 ................. N/A ................. N/A
OXYGEN (IND) ............. 11.7 ................. 30.0 ................. 13.3

HEATING VALUE (BTU/LB) ... 4091 ................. 10486 ................. 13453

ASH - INITIAL DEFORMATION 2220 F
SOFTENING TEMP. ............ 2340 F
FLUID TEMP. ................. 2460 F

SULFUR FORMS

SULFATE ................... N
PYRITIC ................... N
ORGANIC ................... N

MISCELLANEOUS COMMENTS: MINE DUMP CONTAINS BONY COAL MIXED WITH PORPHYRITIC ANDESITE. ANDESITE HAS SURFACE COATING OF SULPHIDES.
SAMPLE NUMBER: (135)47-80
COAL NAME: PRIMROSE

MINE NAME: SECTION 31 CLAY PIT
COAL AREA: NEWCASTLE
SAMPLE SITE ELEVATION (FT): 1375

GEOLIGIC FORMATION: RENTON
AGE: EOCENE

EXPOSURE TYPE: CLAY PIT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: WALSH (DGER)

LABORATORY: DOE-PITTSBURG

QUARTER SECTION: NW
SECTION: 31
TOWNSHIP: 24N
RANGE: 06E
QUADRANGLE: ISSAQAH 7.5

STRIKE: N70W
DIP: 47NE
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 173.0
COAL THICKNESS (FT): 5.0
SAMPLE THICKNESS (FT): 4.0

DATE OF SAMPLING: 07-08-80
DATE OF ANALYSIS: 09-23-80

LAB. NUMBER: L03835

AIR DRY LOSS: 5.0

PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) 9739 11204 13462

ASH - INITIAL DEFORMATION 2600 F
SOFTENING TEMP. 2690 F
FLUID TEMP. 2780 F

SULFUR FORMS

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<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: COLLECTED FROM A SITE 10 FT. WEST OF SAMPLE (103)15-80. DOES NOT INCLUDE LOWERMOST 1 FT. OF INTERBEDDED CARBONACEOUS SHALE AND COAL.
COUNTY: KING

SAMPLE NUMBER: (136)48-80  COAL NAME: UNNAMED

MINE NAME: NONE  QUARTER SECTION: NW
COAL AREA: GREEN RIVER  SECTION: 2  TOWNSHIP: 21N
SAMPLE SITE ELEVATION (FT): 1550  RANGE: 07E
GEOLGIC FORMATION: PUGET GROUP  QUADRANGLE: CUMBERLAND 7.5
AGE:

EXPOSURE TYPE: ROADCUT  STRIKE: N10W
SAMPLE TYPE: CHANNEL  DIP: 60ONE
SAMPLE CONDITION: WEATHERED  MAJOR JOINTS IN COAL: N/A

OVERBURDEN THICKNESS (FT): 0  TOTAL SECTION MEASURED (FT): 35.3
SAMPLE COLLECTOR: PHILLIPS (DGER)  COAL THICKNESS (FT): 11.3
DATE OF SAMPLING: 07-09-80  SAMPLE THICKNESS (FT): 9.1
DATE OF ANALYSIS: 09-23-80

LABORATORY: DOE-PITTSBURG  LAB. NUMBER: L03836

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HEATING VALUE (BTU/LB) ... 6618 ............ 9563 ............ 11836

ASH - INITIAL DEFORMATION .... 2800  F
SOFTENING TEMP. .............. 2800  F
FLUID TEMP. ............... 2800  F

SULFUR FORMS
SULFATE ................. N
PYRITIC ................. N
ORGANIC ................. N

MISCELLANEOUS COMMENTS: PREVIOUSLY UNMAPPED COAL SEAM. SEE COMMENTS SAMPLE (137)49-80.
COUNTY: KING

SAMPLE NUMBER: (137)49-80
COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: GREEN RIVER
SAMPLE SITE ELEVATION (FT): 1550

GEOLOGIC FORMATION: PUGET GROUP
AGE: EOCENE

EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: PHILLIPS (DGER)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03837

QUARTER SECTION: NW
SECTION: 2
TOWNSHIP: 21N
RANGE: 07E
QUADRANGLE: CUMBERLAND 7.5

STRIKE: N10W
DIP: 60\(^\circ\)
MAJOR Joints IN COAL: N/A

TOTAL SECTION MEASURED (FT): 35.3
COAL THICKNESS (FT): 6.4
SAMPLE THICKNESS (FT): 6.4

DATE OF SAMPLING: 07-07-80
DATE OF ANALYSIS: 09-23-80

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| ULTIMATE ANALYSIS | | | |
| HYDROGEN | 3.6 | 6.1 | 6.1 |
| CARBON | 30.0 | 60.0 | 75.0 |
| NITROGEN | 0.5 | 0.9 | 1.1 |
| SULFUR | 0.3 | N/A | N/A |
| OXYGEN (IND) | 19.3 | 38.6 | 26.0 |

| HEATING VALUE (BTU/LB) | 4767 | 9516 | 11898 |

ASH - INITIAL DEFORMATION | 2500 | F |
| SOFTENING TEMP. | 2630 | F |
| FLUID TEMP. | 2720 | F |

SULFUR FORMS
| SULFATE | N |
| PYRITIC | N |
| ORGANIC | N |

MISCELLANEOUS COMMENTS: IMPURE COAL (CLAY-INJECTED) STRATIGRAPHICALLY ABOVE SAMPLE (136)48-80. PREVIOUSLY UNMAPPED COAL SEAM.
COUNTY: KING

SAMPLE NUMBER: (172)23-81

MINE NAME: NONE
COAL AREA: RAGING RIVER
SAMPLE SITE ELEVATION (FT): 2210

GEOLOGIC FORMATION: TIGER MTN.
AGE: EOCENE

EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 2
SAMPLE COLLECTOR: WALSH (DGER)

LABORATORY: C.T. & E. CO.

LAB. NUMBER: 72-111

COAL NAME: UNNAMED

QUARTER SECTION: NW
SECTION: 16
TOWNSHIP: 23N
RANGE: 07E
QUADRANGLE: HOBART 7.5

STRIKE: N28W
DIP: 44SW
MAJOR JOINTS IN COAL: N70E 60N

TOTAL SECTION MEASURED (FT): 30.0
COAL THICKNESS (FT): 1.9
SAMPLE THICKNESS (FT): 1.4

DATE OF SAMPLING: 08-04-81
DATE OF ANALYSIS: 08-19-81

AIR DRY LOSS: N

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| HEATING VALUE (BTU/LB)              | 12321     | 14672        | 15104       |

| ASH - INITIAL DEFORMATION           | 2130 F    |
| SOFTENING TEMP.                    | 2160 F    |
| FLUID TEMP.                        | 2430 F    |

| SULFUR FORMS                       |           |
| SULFATE                            | N         |
| PYRITIC                            | N         |
| ORGANIC                            | N         |

MISCELLANEOUS COMMENTS:
**COUNTY:** KITITAS

**SAMPLE NUMBER:** (026)01-78  
**COAL NAME:** NO. 8 SEAM

**MINE NAME:** NONE  
**QUARTER SECTION:** N/A  
**COAL AREA:** ROSLYN-CLE ELUM  
**SECTION:** 36  
**SAMPLE SITE ELEVATION (FT):** 3000  
**TOWNSHIP:** 21N  
**GEOLOGIC FORMATION:** ROSLYN  
**RANGE:** 14E  
**AGE:** EOCENE

**EXPOSURE TYPE:** ROADCUT  
**STRIKE:** N90E  
**SAMPLE TYPE:** GRAB  
**DIP:** 15S  
**SAMPLE CONDITION:** WEATHERED  
**MAJOR JOINTS IN COAL:** N/A

**OVERBURDEN THICKNESS (FT):** 2  
**TOTAL SECTION MEASURED (FT):** N  
**SAMPLE COLLECTOR:** WALKER (DGER)  
**COAL THICKNESS (FT):** 2.5

**DATE OF SAMPLING:** 07-19-78  
**DATE OF ANALYSIS:** 01-16-79

**LABORATORY:** DOE-PITTSBURG  
**LAB. NUMBER:** K88392

**AIR DRY LOSS:** 10.0

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| HEATING VALUE (BTU/LB) | | |
|------------------------| | |
|                        | 7584 | 10346 | 12948 |

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<tr>
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<td>ORGANIC</td>
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**MISCELLANEOUS COMMENTS:** BULLDOZER CUT ALONG DINGBATT CREEK. COMPOSITE OF 4 SAMPLES COLLECTED ALONG COAL SEAM.
SAMPLE NUMBER: (027)02-78  
COAL NAME: #5 SEAM

MINE NAME: NONE  
COAL AREA: ROSLYN-CLE ELUM  
SAMPLE SITE ELEVATION (FT): 2245

GEOLOGIC FORMATION: ROSLYN  
AGE: EOCENE

EXPOSURE TYPE: STRIP PIT  
SAMPLE TYPE: CHANNEL  
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 0  
SAMPLE COLLECTOR: WALKER (DGER)

LABORATORY: DOE-PITTSBURG  
LAB. NUMBER: K88393

QUARTER SECTION: NW  
SECTION: 12  
TOWNSHIP: 20N  
RANGE: 14E  
QUADRANGLE: KACHESS LAKE 15

STRIKE: N44E  
DIP: 18SE  
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N  
COAL THICKNESS (FT): N  
SAMPLE THICKNESS (FT): 1.5

DATE OF SAMPLING: 08-09-78  
DATE OF ANALYSIS: 01-15-79

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| HEATING VALUE (BTU/LB)    | 5510 | 6809 | 10940 |

ASH - INITIAL DEFORMATION  | 2210 F |
SOFTENING TEMP.            | 2320 F |
FLUID TEMP.                | 2410 F |

SULFUR FORMS
SULFATE  | 0.01 |
PYRITIC  | 0.14 |
ORGANIC  | 0.04 |

MISCELLANEOUS COMMENTS: TOTAL COAL THICKNESS UNDETERMINED. WESTERN LIMIT OF #5 (ROSLYN) SEAM.
SAMPLE NUMBER: (028)03-78
COAL NAME: #5 SEAM

MINE NAME: ROSLYN-CASCADE #4
QUARTER SECTION: NW
COAL AREA: ROSLYN-CLE ELUM
SECTION: 7
TOWNSHIP: 20N
SAMPLE SITE ELEVATION (FT): 2880
RANGE: 15E
QUADRANGLE: KACHESS LAKE 15
GEOLOGIC FORMATION: ROSLYN
STRIKE: N45W
AGE: EOCENE
DIP: 10SW
MAJOR JOINTS IN COAL: N/A
EXPOSURE TYPE: STRIP PIT
TOTAL SECTION MEASURED (FT): 3.9
SAMPLE TYPE: CHANNEL
COAL THICKNESS (FT): 3.9
SAMPLE CONDITION: FRESH
SAMPLE THICKNESS (FT): 3.9
OVERBURDEN THICKNESS (FT): 26
DATE OF SAMPLING: 08-09-78
SAMPLE COLLECTOR: WALKER (DGER)
DATE OF ANALYSIS: 01-16-79
LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K88394

AIR DRY LOSS: 0.0

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HEATING VALUE (BTU/LB) ... 12118 ... 14703 ... 15163

ASH - INITIAL DEFORMATION ..., 2450 F
SOFTENING TEMP., 2550 F
FLUID TEMP., 2640 F

SULFUR FORMS
SULFATE ..., 0.01
PYRITIC ..., 0.16
ORGANIC ..., 0.20

MISCELLANEOUS COMMENTS: BEST EXPOSURE OF #5 (ROSLYN) SEAM.
COUNTY: KITTITAS

SAMPLE NUMBER: (029)04-78
COAL NAME: #5 SEAM

MINE NAME: NONE
COAL AREA: ROSLYN-CLE ELUM
SAMPLE SITE ELEVATION (FT): 2880

GEOLoGIC FORMATION: ROSLYN
AGE: EOCENE

EXPOSURE TYPE: STRIP PIT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: WALKER (DGER)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K88387

QUARTER SECTION: NE
SECTION: 16
TOWNSHIP: 20N
RANGE: 15E
QUADRANGLE: CLE ELUM 15

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 40.0
COAL THICKNESS (FT): 4.5
SAMPLE THICKNESS (FT): 3.0

DATE OF SAMPLING: 08-10-78
DATE OF ANALYSIS: 01-15-79

AIR DRY LOSS: 22.0

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MISCELLANEOUS COMMENTS: BASE OF COAL NOT EXPOSED.
COUNTY: KITITAS

SAMPLE NUMBER: (030)05-78
COAL NAME: #5 SEAM

MINE NAME: NONE
COAL AREA: ROSLYN-CLE ELUM
SAMPLE SITE ELEVATION (FT): 3300

GEOLIGIC FORMATION: ROSLYN
AGE: EOCINE

EXPOSURE TYPE: STRIP PIT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: WALKER (DGER)

LABORATORY: DOE-PITTSBURGH
LAB. NUMBER: K88388

QUARTER SECTION: NW
SECTION: 15
TOWNSHIP: 20N
RANGE: 15E
QUADRANGLE: CLE ELUM 15

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): 2.7
SAMPLE THICKNESS (FT): 2.7

DATE OF SAMPLING: 08-10-78
DATE OF ANALYSIS: 01-05-79

AIR DRY LOSS: 3.0

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ULTIMATE ANALYSIS

<table>
<thead>
<tr>
<th>HYDROGEN</th>
<th>4.9</th>
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<td>OXYGEN(IND)</td>
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HEATING VALUE (BTU/LB) ... 9950 ... 12580 ... 13671

ASH - INITIAL DEFORMATION ...... >2610 F
SOFTENING TEMP. ............... >2715 F
FLUID TEMP. .................. >2910 F

SULFUR FORMS

| SULFATE     | 0.01 |
| PYRITIC     | 0.25 |
| ORGANIC     | 0.15 |

MISCELLANEOUS COMMENTS: SAMPLE FROM ONLY STRIP PIT ON NE SIDE OF CLE ELUM RIDGE.
COUNTY: KITITAS

SAMPLE NUMBER: (031)05-78
MINE NAME: #1 STRIP PIT
COAL AREA: ROSLYN-CLE ELUM
SAMPLE SITE ELEVATION (FT): 2960

GEOLeGIC FORMATION: ROSLYN
AGE: EOCENE
EXPOSURE TYPE: STRIP PIT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH
OVERBURDEN THICKNESS (FT): 8
SAMPLE COLLECTOR: WALKER (DGGER)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K88390

AIR DRY LOSS: 1.0

COAL
COAL
COAL
(AR) (MMMF) (DMMF)

PROXIMATE ANALYSIS
MOISTURE 3.8 5.7 N/A
VOLATILE MATTER 25.8 39.3 41.8
FIXED CARBON 38.6 58.9 62.5
ASH 31.8 N/A N/A

ULTIMATE ANALYSIS
HYDROGEN 4.3 6.2 6.2
CARBON 50.7 77.4 82.2
NITROGEN 1.2 1.7 1.8
SULFUR 0.4 N/A N/A
OXYGEN(IND) 11.7 17.8 13.4

HEATING VALUE (BTU/LB) 8974 13684 14527

ASH - INITIAL DEFORMATION >2910 F
SOFTENING TEMP. >2910 F
FLUID TEMP. >2910 F

SULFUR FORMS
SULFATE 0.01
PYritic 0.18
ORGANIC 0.19

MISCELLANEOUS COMMENTS: LOWER BENCH OF #1 SEAM. SEE (033)07-78 FOR ANALYSIS OF UPPER BENCH OF #1 SEAM, SAME LOCALITY. NORTHERN-MOST KNOWN OUTCROP OF #1 SEAM.
COUNTY: KITTITAS

SAMPLE NUMBER: (032)06-78
COAL NAME: #5 SEAM

MINE NAME: NONE
COAL AREA: ROSLYN-CLE ELUM
SAMPLE SITE ELEVATION (FT): 2240

GEOLOGIC FORMATION: ROSLYN
AGE: EOCENE

EXPOSURE TYPE: STRIP PIT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: WALKER (OGER)

LABORATORY: DOE-PITTSBURG

AIR DRY LOSS: 8.0

PROXIMATE ANALYSIS

<table>
<thead>
<tr>
<th></th>
<th>COAL (AR)</th>
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<th>COAL (DMM)</th>
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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) ... 8857 ......... 10726 ......... 12626

ASH - INITIAL DEFORMATION .......... >2910 F
SOFTENING TEMP. .......... >2910 F
FLUID TEMP. .......... >2910 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: LOWER BENCH OF #5 SEAM. STRIKE AND DIP ARE ANOMALOUS FOR LOCALITY. TOTAL COAL THICKNESS UNKNOWN DUE TO EROSION.

-8 42-
COUNTY: KITTITAS

SAMPLE NUMBER: (033)07-78

COAL NAME: #1 (BIG SEAM)

MINE NAME: #1 STRIP PIT

QUARTER SECTION: NE

COAL AREA: ROSLYN-CLE ELUM

SECTION: 7

SAMPLE SITE ELEVATION (FT): 2960

TOWNSHIP: 20N

GEOL OLOGIC FORMATION: ROSLYN

RANGE: 15E

AGE: EOCENE

QUADRANGLE: KACHESS LAKE 15

EXPOSURE TYPE: STRIP PIT

STRIKE: N80W

SAMPLE TYPE: CHANNEL

DIP: 14SW

SAMPLE CONDITION: FRESH

MAJOR JOINTS IN COAL: N-S 90

OVERBURDEN THICKNESS (FT): 0

TOTAL SECTION MEASURED (FT): 12.4

SAMPLE COLLECTOR: WALKER (DGER)

COAL THICKNESS (FT): 6.6

DATE OF SAMPLING: 08-09-78

LABORATORY: DOE-PITTSBURG

DATE OF ANALYSIS: 01-16-79

LAB. NUMBER: K88391

AIR DRY LOSS: 7.0

COAL

(CAR) COAL

(MMMF) COAL

(DMMF)

PROXIMATE ANALYSIS

MOISTURE ......................... 10.1 .................... 17.3 ................. N/A

VOLATILE MATTER ................ 23.1 .................... 39.7 ................. 48.1

FIXED CARBON .................... 28.1 .................... 48.3 ................. 58.5

ASH .............................. 38.7 .................... N/A ................. N/A

ULTIMATE ANALYSIS

HYDROGEN ........................ 3.8 .................... 5.5 ................. 5.5

CARBON .......................... 34.1 .................... 58.7 ................. 71.0

NITROGEN ........................ 0.8 .................... 1.3 ................. 1.6

SULFUR .......................... 0.3 .................... N/A ................. N/A

OXYGEN (IND) ..................... 22.3 .................... 38.3 ................. 27.7

HEATING VALUE (BTU/LB) ....... 5884 .................... 10112 ............. 12243

ASH - INITIAL DEFORMATION ........ >2910 F

SOFTENING TEMP. ................. >2910 F

FLUID TEMP. ..................... >2910 F

SULFUR FORMS

SULFATE ........................ 0.01

PYRITIC ........................ 0.15

ORGANIC ........................ 0.12

MISCELLANEOUS COMMENTS: ANALYSIS OF UPPER BENCH OF #1 SEAM. SEE

(031)05-78 FOR ANALYSIS OF LOWER BENCH, SAME LOCALITY.
SAMPLE NUMBER: (034) 08-78  COAL NAME: #5 SEAM

MINE NAME: NONE  QUARTER SECTION: SE  SECTION: 15
COAL AREA: ROSLYN-CLE ELUM  TOWNSHIP: 20N  RANGE: 15E
SAMPLE SITE ELEVATION (FT): 2960  QUADRANGLE: CLE ELUM 15

GEOLeGIC FORMATION: ROSLYN  STRIKE: N70W  DIP: 14SW
AGE: EOCENE  MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: STRIP PIT  TOTAL SECTION MEASURED (FT): N
SAMPLE TYPE: CHANNEL  COAL THICKNESS (FT): 4.3
SAMPLE CONDITION: FRESH  SAMPLE THICKNESS (FT): 4.3

OVERRIDE THICKNESS (FT): 0  DATE OF SAMPLING: 08-10-78
SAMPLE COLLECTOR: WALKER (DGERT)  DATE OF ANALYSIS: 01-16-79

LABORATORY: DOE-PITTSBURG  LAB. NUMBER: K88395

AIR DRY LOSS: 8.0  COAL (AR)  COAL (MMMF)  COAL (DMMF)

PROXIMATE ANALYSIS

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<th>DMMF</th>
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ULTIMATE ANALYSIS

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<td>OXYGEN(IND)</td>
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<td>16.9</td>
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HEATING VALUE (BTU/LB) ... 8726  11322  13414

ASH - INITIAL DEFORMATION  >2910  F
SOFTENING TEMP  >2910  F
FLUID TEMP  >2910  F

SULFUR FORMS

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<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS:
COUNTY: KITTITAS

SAMPLE NUMBER: (035)09-78  COAL NAME: #1 (BIG SEAM)

MINE NAME: #1 STRIF PIT  QUARTER SECTION: SW  SECTION: 8
COAL AREA: ROSLYN-CLE ELUM  TOWNSHIP: 20N  RANGE: 15E
SAMPLE SITE ELEVATION (FT): 2880  QUADRANGLE: KACHESS LAKE 15

GEOLOGIC FORMATION: ROSLYN  STRIKE: N80W  DIP: 14SW
AGE: EOCENE  MAJOR JOINTS IN COAL: N-S 90

EXPOSURE TYPE: STRIP PIT  TOTAL SECTION MEASURED (FT): 19.3
SAMPLE TYPE: CHANNEL  COAL THICKNESS (FT): 6.7
SAMPLE CONDITION: FRESH  SAMPLE THICKNESS (FT): 5.4

OVERBURDEN THICKNESS (FT): 13  DATE OF SAMPLING: 08-09-78
SAMPLE COLLECTOR: WALKER (DGER)  DATE OF ANALYSIS: 01-15-79

LABORATORY: DOE-PITTSBURG  LAB. NUMBER: K88396

<table>
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PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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<td>OXYGEN(IND)</td>
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<td>14.7</td>
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HEATING VALUE (BTU/LB) | 8819      | 13377       | 14151       |

ASH - INITIAL DEFORMATION | 2440 F
SOFTENING TEMP | 2560 F
FLUID TEMP | 2670 F

SULFUR FORMS

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<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: ANALYSIS OF LOWER BENCH, #1 SEAM.
COUNTY: KITITAS

SAMPLE NUMBER: (036)10-78
COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: ROSLYN-CLE ELUM
SAMPLE SITE ELEVATION (FT): 2240

GEOLOGIC FORMATION: ROSLYN
AGE: EOCENE

EXPOSURE TYPE: OUTCROP
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: WALKER (DGER)

QUARTER SECTION: SE
SECTION: 4
TOWNSHIP: 20N
RANGE: 15E
QUADRANGLE: KACHESS LAKE 15

STRIKE: N08W
DIP: 85SW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): 2.0
SAMPLE THICKNESS (FT): 1.0

DATE OF SAMPLING: 09-28-78
DATE OF ANALYSIS: 05-17-79

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K92616

AIR DRY LOSS: 2.0

PROXIMATE ANALYSIS

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<th>(DMMF)</th>
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ULTIMATE ANALYSIS

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<td>OXYGEN(IND)</td>
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HEATING VALUE (BTU/LB) 11678 13571 14555

ASH - INITIAL DEFORMATION 2100 F
SOFTENING TEMP. 2220 F
FLUID TEMP. 2310 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: OUTCROP ALONG SW SIDE OF CLE ELUM LAKE. DURING HIGH WATER, OUTCROP IS FLOODED.
COUNTY: KITTITAS

SAMPLE NUMBER: (046)20-78  
COAL NAME: #1 (BIG SEAM)

MINE NAME: NONE  
COAL AREA: ROSLYN-CLE ELUM
SAMPLE SITE ELEVATION (FT): 2400

GEOLOGIC FORMATION: ROSLYN
AGE: EOCENE

EXPOSURE TYPE: DOZER CUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 8
SAMPLE COLLECTOR: WALKER (ODER)

LABORATORY: DOE-PITTSBURG  
LAB. NUMBER: K92617

AIRDY LOSS: 1.0

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<th>Proximate Analysis</th>
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<th>Coal (MMMF)</th>
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<tr>
<td>Fixed Carbon</td>
<td>37.6</td>
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<td>Ash</td>
<td>27.4</td>
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<td>12.4</td>
</tr>
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</table>

| Heating Value (BTU/LB) | 9658          | 13735        | 14500        |

| Ash - Initial Deformation | >2910 F |
| Softening Temp. | >2910 F |
| Fluid Temp.     | >2910 F   |

<table>
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<tr>
<th>Sulfur Forms</th>
<th>Coal (AR)</th>
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<th>Coal (DMMMF)</th>
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Miscellaneous Comments: Locality deformed by series of small, overturned, recumbent folds restricted to a 7 ft. thick zone. Folded zone bounded by 6 in. bone layer below and carb. shale above.
**COUNTY: KITITAS**

**SAMPLE NUMBER:** (047)01-79

**COAL NAME:** PATRICK SEAM

**MINE NAME:** NONE
**COAL AREA:** ROSLYN-CLE ELUM
**SAMPLE SITE ELEVATION (FT):** 2900

**GEOLOGIC FORMATION:** ROSLYN
**AGE:** EOCENE

**EXPOSURE TYPE:** PORTAL
**SAMPLE TYPE:** CHANNEL
**SAMPLE CONDITION:** WEATHERED

**OVERBURDEN THICKNESS (FT):** 2
**SAMPLE COLLECTOR:** WALKER (DGER)

**LABORATORY:** DOE-PITTSBURG
**LAB. NUMBER:** K94306

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<th>(AR)</th>
<th>COAL (MMMF)</th>
<th>COAL (DMMF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.0</td>
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</table>

**PROXIMATE ANALYSIS**

| MOISTURE | 30.9 | 40.2 | N/A |
| VOLATILE MATTER | 25.5 | 33.1 | 55.4 |
| FIXED CARBON | 22.3 | 29.0 | 48.5 |
| ASH | 21.3 | N/A | N/A |

**ULTIMATE ANALYSIS**

| HYDROGEN | 5.2 | 3.7 | 3.7 |
| CARBON | 30.8 | 40.0 | 67.0 |
| NITROGEN | 0.8 | 1.0 | 1.6 |
| SULFUR | 0.3 | N/A | N/A |
| OXYGEN(IND) | 41.7 | 54.2 | 30.9 |

**HEATING VALUE (BTU/LB)**

| 4626 | 6001 | 10039 |

**ASH - INITIAL DEFORMATION**

| 2560 | F |
| SOFTENING TEMP. | 2650 | F |
| FLUID TEMP. | 2740 | F |

**SULFUR FORMS**

| SULFATE | 0.01 |
| PYRITIC | 0.03 |
| ORGANIC | 0.29 |

**MISCELLANEOUS COMMENTS:** COAL EXPOSED BY SHOVELING AT PORTAL OF ABANDONED MINE.
COUNTY: KITTITAS

SAMPLE NUMBER: (048)02-79

COAL NAME: LANTIGAN SEAM

MINE NAME: NONE

QUARTER SECTION: SW

COAL AREA: ROSLYN-CLE ELUM

SECTION: 19

SAMPLE SITE ELEVATION (FT): 2500

TOWNSHIP: 20N

GEOLGIC FORMATION: ROSLYN

RANGE: 16E

AGE: EOCENE

QUADRANGLE: CLE ELUM 15

EXPOSURE TYPE: OUTCROP

STRIKE: N60W

SAMPLE TYPE: CHANNEL

DIP: 20SW

SAMPLE CONDITION: WEATHERED

MAJOR JOINTS IN COAL: N/A

OVERBURDEN THICKNESS (FT): 4

TOTAL SECTION MEASURED (FT): 9.9

SAMPLE COLLECTOR: WALKER (ODER)

COAL THICKNESS (FT): 5.6

DATE OF SAMPLING: 05-03-79

SAMPLE THICKNESS (FT): 2.1

DATE OF ANALYSIS: 07-17-79

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K94307

AIR DRY LOSS: 20.0

COAL

AR

COAL

(MMMF)

COAL

(DMMF)

PROXIMATE ANALYSIS

MOISTURE ************* 32.4 ************* 40.1 ************* N/A

VOLATILE MATTER ************* 26.0 ************* 32.2 ************* 53.8

FIXED CARBON ************* 23.8 ************* 29.5 ************* 49.3

ASH ************* 17.8 ************* N/A ************* N/A

ULTIMATE ANALYSIS

HYDROGEN ************* 5.8 ************* 4.5 ************* 4.5

CARBON ************* 32.3 ************* 40.0 ************* 66.9

NITROGEN ************* 0.8 ************* 0.9 ************* 1.6

SULFUR ************* 0.3 ************* N/A ************* N/A

OXYGEN(IND) ************* 43.0 ************* 53.3 ************* 29.4

HEATING VALUE (BTU/LB) ... 4970 ************* 6147 ************* 10278

ASH - INITIAL DEFORMATION ........ 2540 F

SOFTENING TEMP. ........ 2620 F

FLUID TEMP. ........ 2710 F

SULFUR FORMS

SULFATE ........ 0.01

PYRITIC ........ 0.03

ORGANIC ........ 0.23

MISCELLANEOUS COMMENTS: COAL DEFORMED AND BRECCIATED. SEE (049)03-79 FOR ANALYSIS FORM SAME LOCALITY.
<table>
<thead>
<tr>
<th><strong>COUNTY:</strong> KITTITAS</th>
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<tbody>
<tr>
<td><strong>SAMPLE NUMBER:</strong> (049)03-79</td>
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<tr>
<td><strong>COAL NAME:</strong> LANIGAN SEAM</td>
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<tr>
<td><strong>MINE NAME:</strong> NONE</td>
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<td><strong>SECTION:</strong> 19</td>
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<td><strong>SAMPLE SITE ELEVATION (FT):</strong> 2500</td>
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<td><strong>TOWNSHIP:</strong> 20N</td>
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<td><strong>GEOLOGIC FORMATION:</strong> ROSLYN</td>
</tr>
<tr>
<td><strong>RANGE:</strong> 16E</td>
</tr>
<tr>
<td><strong>AGE:</strong> EOCENE</td>
</tr>
<tr>
<td><strong>QUADRANGLE:</strong> CLE ELUM 15</td>
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<tr>
<td><strong>EXPOSURE TYPE:</strong> OUTCROP</td>
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<td><strong>STRIKE:</strong> N60W</td>
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<td><strong>DIP:</strong> 20SW</td>
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<tr>
<td><strong>SAMPLE CONDITION:</strong> WEATHERED</td>
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<td><strong>MAJOR JOINTS IN COAL:</strong> N/A</td>
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<td><strong>OVERBURDEN THICKNESS (FT):</strong> 6</td>
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<td><strong>TOTAL SECTION MEASURED (FT):</strong> 9.9</td>
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<td><strong>SAMPLE COLLECTOR:</strong> WALKER (OGER)</td>
</tr>
<tr>
<td><strong>COAL THICKNESS (FT):</strong> 5.6</td>
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<td><strong>DATE OF SAMPLING:</strong> 05-03-79</td>
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<td><strong>SAMPLE THICKNESS (FT):</strong> 2.5</td>
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<td><strong>DATE OF ANALYSIS:</strong> 07-17-79</td>
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<tr>
<td><strong>LABORATORY:</strong> DOE-PITTSBURG</td>
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<tr>
<td><strong>LAB. NUMBER:</strong> K94308</td>
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</table>

| **AIR DRY LOSS:** 14.0 |
| **PROXIMATE ANALYSIS** |

<table>
<thead>
<tr>
<th><strong>AR</strong></th>
<th><strong>MMMF</strong></th>
<th><strong>DMMF</strong></th>
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</thead>
<tbody>
<tr>
<td>28.1</td>
<td>36.8</td>
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<tr>
<td>25.9</td>
<td>33.9</td>
<td>53.8</td>
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<td>24.1</td>
<td>31.6</td>
<td>50.0</td>
</tr>
<tr>
<td>21.9</td>
<td>N/A</td>
<td>N/A</td>
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</tbody>
</table>

| **ULTIMATE ANALYSIS** |

<table>
<thead>
<tr>
<th><strong>COAL</strong></th>
<th><strong>HYDROGEN</strong></th>
<th><strong>CARBON</strong></th>
<th><strong>NITROGEN</strong></th>
<th><strong>SULFUR</strong></th>
<th><strong>OXYGEN(IND)</strong></th>
<th><strong>HEATING VALUE (BTU/LB)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.0</td>
<td>32.7</td>
<td>0.8</td>
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<td>39.3</td>
<td>5049</td>
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<td></td>
<td></td>
<td></td>
<td>10469</td>
</tr>
</tbody>
</table>

| **ASH - INITIAL DEFORMATION** | 2800 F |
| **SOFTENING TEMP.** | 2800 F |
| **FLUID TEMP.** | 2800 F |

| **SULFUR FORMS** |

| **SULFATE** | 0.01 |
| **PYRITIC** | 0.04 |
| **ORGANIC** | 0.22 |

|MISCELLANEOUS COMMENTS: SEE (048)02-79 FOR ANALYSIS FROM SAME LOCALITY. |

-R 50-
COUNTY: KITITAS

SAMPLE NUMBER: (050)04-79

COAL NAME: LANIGAN SEAM

MINE NAME: NONE

QUARTER SECTION: SW

COAL AREA: ROSLYN-CLE ELUM

SECTION: 19

SAMPLE SITE ELEVATION (FT): 2500

TOWNSHIP: 20N

AGE: EOCENE

RANGE: 16E

EXPOSED FORMATION: ROSLYN

QUADRANGLE: CLE ELUM 15

AGE: EOCENE

STRIKE: N50W

EXPOSURE TYPE: OUTCROP

DIP: 20SW

SAMPLE TYPE: CHANNEL

MAJOR JOINTS IN COAL: N/A

SAMPLE CONDITION: WEATHERED

TOTAL SECTION MEASURED (FT): 12.0

OVERBURDEN THICKNESS (FT): 6

COAL THICKNESS (FT): 15.4

SAMPLE COLLECTOR: WALKER (DGCR)

DATE OF SAMPLING: 05-08-79

DATE OF ANALYSIS: 07-17-79

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K94309

AIR DRY LOSS: 20.0

PROXIMATE ANALYSIS

<table>
<thead>
<tr>
<th></th>
<th>COAL</th>
<th>COAL</th>
<th>COAL</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(AR)</td>
<td>(MMMF)</td>
<td>(DMMF)</td>
</tr>
<tr>
<td>MOISTURE</td>
<td>33.5</td>
<td>43.2</td>
<td>N/A</td>
</tr>
<tr>
<td>VOLATILE MATTER</td>
<td>26.7</td>
<td>34.4</td>
<td>60.7</td>
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<tr>
<td>FIXED CARBON</td>
<td>19.0</td>
<td>24.5</td>
<td>43.2</td>
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<td>ASH</td>
<td>20.8</td>
<td>N/A</td>
<td>N/A</td>
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ULTIMATE ANALYSIS

<p>| | | | |</p>
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<thead>
<tr>
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<td>NITROGEN</td>
<td>6.8</td>
<td>1.0</td>
<td>1.8</td>
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<tr>
<td>SULFUR</td>
<td>0.2</td>
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<td>N/A</td>
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<tr>
<td>OXYGEN(INC)</td>
<td>43.6</td>
<td>56.3</td>
<td>31.4</td>
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HEATING VALUE (BTU/LB) ... 4462 ... 5750 ... 10135

ASH - INITIAL DEFORMATION ... 2800 ... F

SOFTENING TEMP. ... 2800 ... F

FLUID TEMP. ... 2800 ... F

SULFUR FORMS

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<tr>
<td>PYRITIC</td>
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</tr>
<tr>
<td>ORGANIC</td>
<td>0.21</td>
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MISCELLANEOUS COMMENTS: COAL DEFORMED AND BRECCIATED. SEE (051)05-79 AND (052)06-79 FOR ANALYSIS FROM SAME LOCALITY.
SAMPLE NUMBER: (051)05-79  COAL NAME: LANIGAN SEAM

MINE NAME: NONE  QUARTER SECTION: SW
COAL AREA: ROSLYN-CLE ELUM  SECTION: 19
SAMPLE SITE ELEVATION (FT): 2500  TOWNSHIP: 20N
GEOLOGIC FORMATION: ROSLYN  RANGE: 16E
AGE: EOCENE  QUADRANGLE: CLE ELUM 15
EXPOSURE TYPE: OUTCROP  STRIKE: N60W
SAMPLE TYPE: CHANNEL  DIP: 20SW
SAMPLE CONDITION: WEATHERED  MAJOR JOINTS IN COAL: N/A
OVERBURDEN THICKNESS (FT): 8  TOTAL SECTION MEASURED (FT): 23.0
SAMPLE COLLECTOR: WALKER (DGER)  COAL THICKNESS (FT): 15.4
LABORATORY: DOE-PITTSBURG  SAMPLE THICKNESS (FT): 0.5
LAB. NUMBER: K94309  DATE OF SAMPLING: 05-08-79

<table>
<thead>
<tr>
<th>PROXIMATE ANALYSIS</th>
<th>COAL (AR)</th>
<th>COAL (MMMF)</th>
<th>COAL (DMMF)</th>
</tr>
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<tbody>
<tr>
<td>MOISTURE</td>
<td>20.0</td>
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<td>N/A</td>
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<tr>
<td>VOLATILE MATTER</td>
<td>27.3</td>
<td>33.1</td>
<td>43.8</td>
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<tr>
<td>FIXED CARBON</td>
<td>36.4</td>
<td>44.2</td>
<td>58.4</td>
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<tr>
<td>ASH</td>
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<td>N/A</td>
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<table>
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<td>HYDROGEN</td>
<td>5.8</td>
<td>5.7</td>
<td>5.7</td>
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<tr>
<td>CARBON</td>
<td>49.3</td>
<td>59.9</td>
<td>79.2</td>
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<tr>
<td>NITROGEN</td>
<td>1.0</td>
<td>1.1</td>
<td>1.5</td>
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<tr>
<td>SULFUR</td>
<td>0.4</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>OXYGEN(IND)</td>
<td>27.2</td>
<td>33.0</td>
<td>15.1</td>
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</table>

| HEATING VALUE (BTU/LB) | 8675 | 10532 | 13920 |

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

SULFUR FORMS
SULFATE 0.01
PYRITIC 0.03
ORGANIC 0.37

MISCELLANEOUS COMMENTS: SEE (056)04-79 AND (052)06-79 FOR ANALYSIS FROM SAME LOCALITY.
COUNTY: KITTITAS

SAMPLE NUMBER: (052)06-79
COAL NAME: LANIGAN SEAM

MINE NAME: NONE
QUARTER SECTION: SW
COAL AREA: ROSLYN-CLE ELUM
SECTION: 19
TOWNSHIP: 20N
SAMPLE SITE ELEVATION (FT): 2500
RANGE: 16E
QUADRANGLE: CLE ELUM 15
AGE: EOCENE

EXPOSURE TYPE: OUTCROP
STRIKE: N50W
SAMPLE TYPE: CHANNEL
DIP: 20SW
SAMPLE CONDITION: WEATHERED
SAMPLE THICKNESS (FT): 7.5

OVERBURDEN THICKNESS (FT): 8
TOTAL SECTION MEASURED (FT): 23.0
SAMPLE COLLECTOR: WALKER (DGER)
DATE OF SAMPLING: 05-08-79

LABORATORY: DOE-PITTSBURG
DATE OF ANALYSIS: 07-20-79
LAB. NUMBER: K94311

AIR DRY LOSS: 21.0

PROXIMATE ANALYSIS

COAL         COAL         COAL
(AP)         (MMMF)      (DMMF)

<table>
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<th>Property</th>
<th>AP</th>
<th>MMMF</th>
<th>DMMF</th>
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<tbody>
<tr>
<td>Moisture</td>
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<tr>
<td>Volatile Matter</td>
<td>23.2</td>
<td>32.5</td>
<td>55.5</td>
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<tr>
<td>Fixed Carbon</td>
<td>20.8</td>
<td>29.1</td>
<td>49.8</td>
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<tr>
<td>Ash</td>
<td>26.5</td>
<td>N/A</td>
<td>N/A</td>
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ULTIMATE ANALYSIS

<table>
<thead>
<tr>
<th>Property</th>
<th>AP</th>
<th>MMMF</th>
<th>DMMF</th>
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<tr>
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<td>5.0</td>
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<tr>
<td>Carbon</td>
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<td>68.3</td>
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<tr>
<td>Nitrogen</td>
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<tr>
<td>Sulfur</td>
<td>0.3</td>
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<td>N/A</td>
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<tr>
<td>Oxygen(IND)</td>
<td>38.7</td>
<td>54.3</td>
<td>29.8</td>
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HEATING VALUE (BTU/LB) ... 4437 ... 6209 ... 10601

ASH - INITIAL DEFORMATION ... >2800 F
SOFTENING TEMP. ... >2800 F
FLUID TEMP. ... >2800 F

SULFUR FORMS

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<th>Property</th>
<th>AP</th>
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<tbody>
<tr>
<td>Sulfate</td>
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<tr>
<td>Pyritic</td>
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<tr>
<td>Organic</td>
<td>0.21</td>
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MISCELLANEOUS COMMENTS: COMPOSITE SAMPLE (051)05-79 AND (050)04-79.
Uniformed State:

Sample Number: (053) 07-79

Coal Name: Unnamed

Mine Name: None

Coal Area: Roslyn-Cle Elum

Sample Site Elevation (ft): 2300

Geologic Formation: Roslyn

Age: Eocene

Exposure Type: Streamcut

Sample Type: Grab

Sample Condition: Weathered

Overburden Thickness (ft): 17

Sample Collector: Walker (Oger)

Laboratory: Doe-Pittsburg

Lab. Number: K94312

Air Dry Loss: 5.0

Proximate Analysis

<table>
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<tr>
<th>Component</th>
<th>AR</th>
<th>MMMMF</th>
<th>DMMF</th>
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<tbody>
<tr>
<td>Moisture</td>
<td>12.7</td>
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<tr>
<td>Volatile Matter</td>
<td>17.3</td>
<td>55.3</td>
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<td>Fixed Carbon</td>
<td>6.4</td>
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<td>34.4</td>
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<tr>
<td>Ash</td>
<td>63.6</td>
<td>N/A</td>
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Ultimate Analysis

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<th>DMMF</th>
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<tr>
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<td>Nitrogen</td>
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<td>Sulfur</td>
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<td>N/A</td>
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<tr>
<td>Oxygen (IND)</td>
<td>19.8</td>
<td>63.4</td>
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Heating Value (Btu/Lb) 1798

Ash - Initial Deformation 2800 F

Softening Temp. 2800 F

Fluid Temp. 2800 F

Sulfur Forms

<table>
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<tr>
<th>Form</th>
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<tbody>
<tr>
<td>Sulfate</td>
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<tr>
<td>Pyritic</td>
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<td>Organic</td>
<td>0.04</td>
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Miscellaneous Comments: Coal is irregular in thickness and quality. Lower, Middle Roslyn Formation.
COUNTY: KITITAS

SAMPLE NUMBER: (054)08-79

COAL NAME: UNKNOWN

MINE NAME: NONE

QUARTER SECTION: NE
SECTION: 15
TOWNSHIP: 20N
RANGE: 16E
QUADRANGLE: CLE ELUM 15

COAL AREA: ROSLYN-CLE ELUM

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

SAMPLE SITE ELEVATION (FT): 2320

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): N
SAMPLE THICKNESS (FT): N

EXPOSURE TYPE: ROADCUT

DATE OF SAMPLING: 06-06-79

SAMPLE TYPE: GRAB

DATE OF ANALYSIS: 07-17-79

SAMPLE CONDITION: WEATHERED

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K94313

OVERBURDEN THICKNESS (FT): 10

AIR DRY LOSS: 2.0

SAMPLE COLLECTOR: WALKER (DGER)

PROXIMATE ANALYSIS

COAL (AR)

COAL (MMMF)

COAL (DMMF)

MOISTURE .............................. 7.7 .............................. 10.1 .............................. N/A
VOLATILE MATTER ....................... 31.6 .............................. 41.0 .............................. 45.6
FIXED CARBON ............................ 38.8 .............................. 51.3 .............................. 57.1
ASH ...................................... 22.5 .............................. N/A .............................. N/A

ULTIMATE ANALYSIS

HYDROGEN .............................. 4.9 .............................. 5.9 .............................. 5.9
CARBON ................................. 53.9 .............................. 71.3 .............................. 79.4
NITROGEN ................................ 1.3 .............................. 1.7 .............................. 1.9
SULFUR .................................. 0.3 .............................. N/A .............................. N/A
OXYGEN (IND) ......................... 17.1 .............................. 22.6 .............................. 15.1

HEATING VALUE (BTU/LB) ... 9442 .............................. 12480 .............................. 13897

ASH - INITIAL DEFORMATION ............. 2410 F
SOFTENING TEMP. ......................... 2520 F
FLUID TEMP. ............................. 2610 F

SULFUR FORMS

SULFATE .................................. 0.01
PYRRITIC ................................ 0.07
ORGANIC .................................. 0.27

MISCELLANEOUS COMMENTS: SAMPLE FROM 1 FT. ZONE UNDER AND OVERLAIN BY GRAVELS. CONTAINS 50% COAL, 30% CLINKER, 5% BURNED WOOD, 15% CLAY SAND AND GRAVEL. COAL PROBABLY FROM CIRCA 1900 ROADGRADE. SAMPLED TO DETERMINE IF COAL MINED LOCALLY.
COUNTY: KITTITAS

SAMPLE NUMBER: (055)09-79

MINE NAME: NONE
COAL AREA: ROSLYN-CLE ELUM
SAMPLE SITE ELEVATION (FT): 2350

GEOLeGIC FORMATION: ROSLYN
AGE: EOCENE

EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 2
SAMPLE COLLECTOR: WALKER (DGER)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K94314

COAL NAME: NO. 7 SEAM (?)
QUARTER SECTION: SE
SECTION: 24
TOWNSHIP: 20N
RANGE: 15E
QUADRANGLE: CLE ELUM 15

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): 1.0
SAMPLE THICKNESS (FT): 1.0

DATE OF SAMPLING: 06-07-79
DATE OF ANALYSIS: 07-20-79

AIR DRY LOSS: 5.0

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<th>AR</th>
<th>MMMF</th>
<th>DMMF</th>
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<td>HEATING VALUE (BTU/LB)</td>
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ASH - INITIAL DEFORMATION >2800 F
SOFTENING TEMP. >2800 F
FLUID TEMP. >2800 F

SULFUR FORMS
SULFATE 0.01
PYRITIC 0.07
ORGANIC 0.10

MISCELLANEOUS COMMENTS: COAL IMPURE AND IRREGULARLY BEDDED.
COUNTY: KITITTAS

SAMPLE NUMBER: (057)11-79

COAL NAME: UNNAMED

MINE NAME: NONE

COAL AREA: ROSLYN-CLE ELUM

SAMPLE SITE ELEVATION (FT): 2000

QUARTER SECTION: SE

SECTION: 24

TOWNSHIP: 20N

RANGE: 16E

QUADRANGLE: CLE ELUM 15

GEOLoGIC FORMATION: ROSLYN

AGE: EOCENE

STRIKE: N55W

DIP: 16SW

MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: RIVERCUT

SAMPLE TYPE: CHANNEL

TOTAL SECTION MEASURED (FT): 128.8

SAMPLE CONDITION: WEATHERED

COAL THICKNESS (FT): 4.0

OVERBURDEN THICKNESS (FT): 125

SAMPLE THICKNESS (FT): 3.0

SAMPLE COLLECTOR: WALKER (DGER)

DATE OF SAMPLING: 06-07-79

DATE OF ANALYSIS: 07-17-79

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K94316

AIR DRY LOSS: 3.0

COAL (AR)

COAL (MMMFC)

COAL (DMMF)

PROXIMATE ANALYSIS

MOISTURE ................. 8.4 ............... 15.4 ............... N/A

VOLATILE MATTER ............. 49.6 ............... 58.7

FIXED CARBON ................. 41.3 ............... 48.9

ASH ....................... N/A ............... N/A

ULTIMATE ANALYSIS

HYDROGEN ..................... 4.3 ............... 7.2 ............... 7.2

CARBON ..................... 75.4 ............... 65.1 ............... 77.0

NITROGEN ................. 0.8 ............... 1.4 ............... 1.6

SULFUR ..................... N/A ............... N/A

OXYGEN (IND) ............... 16.9 ............... 31.0 ............... 20.4

HEATING VALUE (BTU/LB) .... 6332 ............... 11622 ............... 13748

ASH - INITIAL DEFORMATION .... 2800 F

SOFTENING TEMP ............... 2800 F

FLUID TEMP .................. 2800 F

SULFUR FORMS

SULFATE ..................... 0.31

PYRITIC ..................... 0.06

ORGANIC ..................... 0.32

MISCELLANEOUS COMMENTS: COAL IS IN LOWER, MIDDLE ROSLYN, EXPOSED ALONG THE TEANAWAY RIVER.
COUNTY: KITITAS

SAMPLE NUMBER: (058)12-79

COAL NAME: UNNAMED

MINE NAME: NONE

QUARTER SECTION: SW

COAL AREA: ROSLYN-CLE ELUM

SECTION: 27

SAMPLE ELEVATION (FT): 2750

TOWNSHIP: 20N

RANGE: 16E

GEOLOGIC FORMATION: ROSLYN

QUADRANGLE: CLE ELUM 15

AGE: EOCENE

STRIKE: N75W

EXPOSURE TYPE: ROADCUT

DIP: 25SW

SAMPLE TYPE: CHANNEL

MAJOR JOINTS IN COAL: N/A

SAMPLE CONDITION: WEATHERED

TOTAL SECTION MEASURED (FT): N

OVERBURDEN THICKNESS (FT): 82

COAL THICKNESS (FT): 1.5

SAMPLE COLLECTOR: WALKER (DGER)

SAMPLE THICKNESS (FT): 1.5

DATE OF SAMPLING: 06-13-79

LABORATORY: DOE-PITTSBURG

DATE OF ANALYSIS: 08-06-79

LAB. NUMBER: K94317

AIR DRY LOSS: 3.0

COAL

COAL

COAL

(AR) (MMMF) (DMMF)

PROXIMATE ANALYSIS

8.8

28.9

N/A

MOISTURE

VOLATILE MATTER

13.6

44.7

63.0

FIXED CARBON

13.2

43.4

61.1

ASH

64.4

N/A

N/A

ULTIMATE ANALYSIS

2.8

8.3

2.8

HYDROGEN

CARBON

18.4

60.6

85.3

NITROGEN

0.4

1.2

1.7

SULFUR

0.2

N/A

N/A

OXYGEN

13.8

45.4

27.5

IND

HEATING VALUE (BTU/LB)

3014

9902

13947

ASH - INITIAL DEFORMATION

SOFTENING TEMP.

FLUID TEMP.

2180 F

2270 F

2390 F

SULFUR FORMS

SULFATE

PYRITIC

ORGANIC

0.01

0.09

0.07

MISCELLANEOUS COMMENTS: COAL IS IN THE LOWER PART OF THE LOWER ROSLYN FORMATION - PROBABLY WITHIN 1000 FT. OF TEANAWAY-ROSLYN CONTACT.
COUNTY: KITTITAS

SAMPLE NUMBER: (059)13-79
COAL NAME: LANIGAN SEAM

MINE NAME: NONE
QUARTER SECTION: SW
COAL AREA: ROSLYN-CLE ELUM
SECTION: 19
SAMPLE SITE ELEVATION (FT): 2500
TOWNSHIP: 20N
GEOLoGIC FORMATION: ROSLYN
RANGE: 16E
AGE: EOCENE
QUADRANGLE: KACHESS LAKE 15

EXPOSURE TYPE: BACKHOE PIT
STRIKE: N/A
SAMPLE TYPE: CHANNEL
DIP: N/A
SAMPLE CONDITION: WEATHERED
MAJOR JOINTS IN COAL: N/A

OVERBURDEN THICKNESS (FT): 4
TOTAL SECTION MEASURED (FT): 20.0
SAMPLE COLLECTOR: WALKER (DGER)
COAL THICKNESS (FT): 15.4

LABORATORY: DOE-PITTSBURG
DATE OF SAMPLING: 06-27-79
LAB. NUMBER: K94601
DATE OF ANALYSIS: 08-06-79

AIR DRY LOSS: 6.0

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<tr>
<th>PROXIMATE ANALYSIS</th>
<th>COAL (AR)</th>
<th>COAL (MMMF)</th>
<th>COAL (DMMF)</th>
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<td>N/A</td>
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| ULTIMATE ANALYSIS   |           |             |             |
| HYDROGEN            | 5.6       | 6.1         | 6.1         |
| CARBON              | 52.8      | 65.8        | 78.4        |
| NITROGEN            | 1.1       | 1.3         | 1.5         |
| SULFUR              | 0.5       | N/A         | N/A         |
| OXYGEN(IND)         | 21.8      | 27.1        | 15.4        |

| HEATING VALUE (BTU/LB) | 9389 | 11695 | 13920 |

| ASH - INITIAL DEFORMATION | >2800 | F |
| SOFTENING TEMP. | >2800 | F |
| FLUID TEMP. | >2800 | F |

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<tr>
<td>PYRITIC</td>
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<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: PIT A DUG BY BACKHOE.
COUNTY: KITITAS

SAMPLE NUMBER: (060)14-79

COAL NAME: LANIGAN SEAM

MINE NAME: NONE

QUARTER SECTION: SW

COAL AREA: ROSLYN-CLE ELUM

SECTION: 19

SAMPLE SITE ELEVATION (FT): 2500

TOWNSHIP: 20N

QUADRANGLE: CLE ELUM 15

AGE: EOCENE

STRIKE: N/A

EXPOSURE TYPE: TEST PIT

DIP: N/A

SAMPLE TYPE: CHANNEL

MAJOR JOINTS IN COAL: N/A

SAMPLE CONDITION: WEATHERED

TOTAL SECTION MEASURED (FT): 24.0

OVERBURDEN THICKNESS (FT): 12

SAMPLE THICKNESS (FT): 10.0

SAMPLE COLLECTOR: WALKER (DGER)

DATE OF SAMPLING: 06-27-79

LAB. NUMBER: K94602

DATE OF ANALYSIS: 08-13-79

LABORATORY: DOE-PITTSBURG

AIR DRY LOSS: 8.0

TOTAL SECTION MEASURED (FT): 24.0

PROXIMATE ANALYSIS

COAL

COAL

COAL

(AR) (MMMFM) (DMMF)

MOISTURE ............... 17.4 .......... 23.0 .......... N/A

VOLATILE MATTER ........... 28.0 .......... 37.6 .......... 48.1

FIXED CARBON ............. 32.1 .......... 42.4 .......... 55.2

ASH .................. 22.5 .......... N/A .......... N/A

ULTIMATE ANALYSIS

HYDROGEN ............... 5.6 .......... 6.2 .......... 6.2

CARBON ................ 43.6 .......... 57.7 .......... 75.0

NITROGEN ............... 1.0 .......... 1.2 .......... 1.6

SULFUR ................ 0.4 .......... N/A .......... N/A

OXYGEN(IND) ........... 26.8 .......... 35.4 .......... 19.4

HEATING VALUE (BTU/LB) ... 7451 .......... 9845 .......... 12794

ASH - INITIAL DEFORMATION .......... >2800 F

SOFTENING TEMP. .......... >2800 F

FLUID TEMP. ............ >2800 F

SULFUR FORMS

SULFATE ............... 0.02

PYRITIC ............... 0.06

ORGANIC ............... 0.30

MISCELLANEOUS COMMENTS: PIT B CUG BY BACKHOE. BOTTOM OF PIT STILL IN COAL DEFORMED BY CLAY INJECTION.
COUNTY: KITTITAS

SAMPLE NUMBER: (361)15-79

COAL NAME: LANIGAN SEAM

MINE NAME: NONE

QUARTER SECTION: SW

COAL AREA: ROSLYN-CLE ELUM

SECTION: 19

SAMPLE SITE ELEVATION (FT): 2500

TOWNSHIP: 20N

AGE: EOCENE

RANGE: 16E

GEOLeGIC FORMATION: ROSLYN

QUADRANGLE: CLE ELUM 15

AGE: EOCENE

STRIKE: N/A

EXPOSURE TYPE: TEST PIT

DIP: N/A

SAMPLE TYPE: CHANNEL

MAJOR JOINTS IN COAL: N/A

SAMPLE CONDITION: WEATHERED

TOTAL SECTION MEASURED (FT): 19.0

OVERBURDEN THICKNESS (FT): 4

COAL THICKNESS (FT): 13.0

SAMPLE COLLECTOR: WALKER (DGER)

SAMPLE THICKNESS (FT): 13.0

DATE OF SAMPLING: 06-27-79

LABORATORY: DOE-PITTSBURG

DATE OF ANALYSIS: 08-06-79

LAB. NUMBER: K94603

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<th>Coal (AR)</th>
<th>Coal (MMMF)</th>
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</table>

PROXIMATE ANALYSIS

| Moisture      | 23.4      | 32.6        | N/A         |
| Volatile Matter| 26.4      | 36.8        | 54.6        |
| Fixed Carbon  | 24.1      | 33.6        | 49.9        |
| Ash           | 26.1      | N/A         | N/A         |

ULTIMATE ANALYSIS

| Hydrogen      | 5.0       | 4.9         | 4.9         |
| Carbon        | 33.6      | 46.8        | 69.5        |
| Nitrogen      | 0.9       | 1.2         | 1.8         |
| Sulfur        | 0.3       | N/A         | N/A         |
| Oxygen (ind)  | 34.2      | 47.7        | 27.7        |

Heating Value (Btu/Lb) 5360 7460 11078

ASH - INITIAL DEFORMATION >2800 F

SOFTENING TEMP. >2800 F

FLUID TEMP. >2800 F

SULFUR FORMS

| Sulfate      | 0.02      |
| Pyritic      | 0.07      |
| Organic      | 0.19      |

MISCELLANEOUS COMMENTS: PIT C DUG BY BACKHOE. COAL DEFORMED AND BRECCIATED.
SAMPLE NUMBER: (263)17-79                  COAL NAME: UNNAMED
MINE NAME: NONE                             QUARTER SECTION: N/A
COAL AREA: CABIN CREEK                      SECTION: 21
SAMPLE SITE ELEVATION (FT): 2560             TOWNSHIP: 20N
GEOLOGIC FORMATION: NACHES                   RANGE: 13E
AGE: EOCENE                                  QUADRANGLE: EASTON 15
EXPOSURE TYPE: ROADCUT                       STRIKE: N15W
SAMPLE TYPE: CHANNEL                        DIP: 55SW
SAMPLE CONDITION: WEATHERED                 MAJOR JOINTS IN COAL: N/A
OVERBURDEN THICKNESS (FT): 15                TOTAL SECTION MEASURED (FT): 130.0
SAMPLE COLLECTOR: WALKER (ODER)              COAL THICKNESS (FT): 1.4
LABORATORY: DOE-PITTSBURG                    SAMPLE THICKNESS (FT): 1.4
LAB. NUMBER: K94605                          DATE OF SAMPLING: 06-27-79
                                              DATE OF ANALYSIS: 08-06-79

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<th>COAL (MMMMP)</th>
<th>COAL (DMMMF)</th>
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PROXIMATE ANALYSIS

| MOISTURE | 9.5 | 23.5 | N/A |
| VOLATILE MATTER | 8.7 | 21.5 | 28.2 |
| FIXED CARBON | 26.6 | 66.0 | 86.4 |
| ASH | 55.2 | N/A | N/A |

ULTIMATE ANALYSIS

| HYDROGEN | 3.0 | 6.2 | 6.2 |
| CARBON | 28.4 | 70.5 | 92.3 |
| NITROGEN | 0.8 | 1.9 | 2.5 |
| SULFUR | 0.3 | N/A | N/A |
| OXYGEN(IND) | 12.2 | 30.2 | 12.1 |

HEATING VALUE (BTU/LB) 4697 11641 15241
ASH - INITIAL DEFORMATION 2510 F
SOFTENING TEMP. 2620 F
FLUID TEMP. 2710 F
SULFUR FORMS

| SULFATE | 0.02 |
| PYRITIC | 0.16 |
| ORGANIC | 0.16 |

MISCELLANEOUS COMMENTS:
SAMPLE NUMBER: (064)18-79
COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: CABIN CREEK
SAMPLE SITE ELEVATION (FT): 2560

GEOLOGIC FORMATION: NACHES
AGE: EOCENE

EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 15
SAMPLE COLLECTOR: WALKER (OGER)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K94606

COAL (AR) | COAL (MMMFM) | COAL (DMMFM)
--- | --- | ---
AIR DRY LOSS: 5.0 | | |

PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) | 2453 | 10286 | 15034 |

ASH - INITIAL DEFORMATION | 2460 | F
SOFTENING TEMP. | 2550 | F
FLUID TEMP. | 2640 | F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: COMPOSITE OF TWO SMALL SEAMS FROM ROAD CUT. SEAM NO. 1 IS 0.5 FT. THICK. SEAM NO. 2 IS 1.4 FT. THICK.
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MISCELLANEOUS COMMENTS:
SAMPLE NUMBER: (066)20-79
MINE NAME: NONE
COAL AREA: CABIN CREEK
SAMPLE SITE ELEVATION (FT): 2560
GEOLOGIC FORMATION: NACHES
AGE: EOCENE
EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED
OVERBURDEN THICKNESS (FT): 15
SAMPLE COLLECTOR: WALKER (DGER)
LABORATORY: DOE-PITTSBURG

COAL NAME: UNNAMED
QUARTER SECTION: N/A SECTION: 21
TOWNSHIP: 20N RANGE: 13E
QUADRANGLE: EASTON 15
STRIKE: N15W DIP: 55SW
MAJOR JOINTS IN COAL: N/A
TOTAL SECTION MEASURED (FT): 130.0
COAL THICKNESS (FT): 2.3
SAMPLE THICKNESS (FT): 2.3
DATE OF SAMPLING: 06-27-79
DATE OF ANALYSIS: 08-06-79
LAB. NUMBER: K94608

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MISCELLANEOUS COMMENTS:
COUNTY: KITITAS

SAMPLE NUMBER: (367)21-79

COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: CABIN CREEK
SAMPLE SITE ELEVATION (FT): 2500
GEOLeGIC FORMATION: NACHES
AGE: EOCENE
EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED
OVERBURDEN THICKNESS (FT): 20
SAMPLE COLLECTOR: WALKER (OGER)

QUARTER SECTION: N/A
SECTION: 21
TOWNSHIP: 20N
RANGE: 13E
QUADRANGLE: EASTON 15
STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A
TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): 1.1
SAMPLE THICKNESS (FT): 1.1
DATE OF SAMPLING: 06-27-79
DATE OF ANALYSIS: 08-06-79

LABORATORY: DDE-PITTSBURG

LAB. NUMBER: K94609

AIR DRY LOSS: 7.0

PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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<td>Oxygen (Ind.)</td>
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HEATING VALUE (BTU/LB) | 9443 | 10388 | 12630 |

ASH - INITIAL DEFORMATION | 2020 | F |
SOFTENING TEMP. | 2140 | F |
FLUID TEMP. | 2230 | F |

SULFUR FORMS

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MISCELLANEOUS COMMENTS:
COUNTY: KITTITAS

SAMPLE NUMBER: (068)22-79

COAL NAME: UNNAMED

MINE NAME: NONE

COAL AREA: TEANAWAY

SAMPLE SITE ELEVATION (FT): 2720

GEOLOGIC FORMATION: ROSLYN

AGE: EOCENE

EXPOSURE TYPE: ROADCUT

SAMPLE TYPE: CHANNEL WEATHERED

SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 50

SAMPLE COLLECTOR: WALKER (DGER)

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K94610

QUARTER SECTION: SE

SECTION: 5

TOWNSHIP: 21N

RANGE: 16E

QUADRANGLE: EASTON 15

STRIKE: N15E

DIP: 08NW

MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N

COAL THICKNESS (FT): 2.5

SAMPLE THICKNESS (FT): 2.5

DATE OF SAMPLING: 06-28-79

DATE OF ANALYSIS: 08-06-79

AIR DRY LOSS: 2.0

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ULTIMATE ANALYSIS

HYDROGEN | 3.2 | 9.3 | 9.3
CARBON   | 20.2| 61.1| 74.9
NITROGEN | 0.5 | 1.4 | 1.7
SULFUR   | 0.2 | N/A | N/A
OXYGEN(IND) | 14.1 | 42.6 | 32.1

HEATING VALUE (BTU/LB) ... 3281 | 9901 | 12143

ASH - INITIAL DEFORMATION | >2800 | F
SOFTENING TEMP. | >2800 | F
FLUID TEMP. | >2800 | F

SULFUR FORMS

SULFATE | 0.01
PYRITIC | 0.09
ORGANIC | 0.10

MISCELLANEOUS COMMENTS: OUTCROP IS LOCATED NEAR THE JUNCTION OF JUNGLE CREEK AND NORTH FORK TEANAWAY RIVER.
COUNTY: KITTITAS

SAMPLE NUMBER: (C85)39-79

COAL NAME: PATRICK SEAM

MINE NAME: GALLAGER (?)

QUARTER SECTION: NW

COAL AREA: ROSLYN-CLE ELUM

SECTION: 28

SAMPLE SITE ELEVATION (FT): 2152

TOWNSHIP: 2ON

AGE: EOCENE

RANGE: 16E

GEOLOGIC FORMATION: ROSLYN

QUADRANGLE: CLE ELUM 15

AGE: EOCENE

EXPOSURE TYPE: FLOAT

STRIKE: N65E

SAMPLE TYPE: GRAB

DIP: 153E

SAMPLE CONDITION: WEATHERED

MAJOR JOINTS IN COAL: N/A

OVERBURDEN THICKNESS (FT): N

TOTAL SECTION MEASURED (FT): N

SAMPLE COLLECTOR: WALKER (DGCR)

COAL THICKNESS (FT): N

DATE OF SAMPLING: 10-11-79

SAMPLE THICKNESS (FT): N

DATE OF ANALYSIS: 12-06-79

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K97358

AIR DRY LOSS: 3.0

COAL (AR)

COAL (M MMMF)

COAL (D MMMF)

PROXIMATE ANALYSIS

MOISTURE ................. 8.3 ......... 11.7 ......... N/A

VOLATILE MATTER ............. 29.3 ........ 41.7 ........ 47.3

FIXED CARBON ............ 35.0 ........ 49.8 ........ 56.5

ASH ................. 27.4 .......... N/A .......... N/A

ULTIMATE ANALYSIS

HYDROGEN ................. 4.7 .......... 6.0 .......... 6.0

CARBON ................. 47.9 .......... 68.2 .......... 77.3

NITROGEN .............. 0.9 ........ 1.2 ........ 1.3

SULFUR .............. 0.5 .......... N/A .......... N/A

OXYGEN (IND) ........... 18.5 .......... 26.3 .......... 17.9

HEATING VALUE (BTU/LB) ... 8447 .......... 12009 .......... 13621

ASH - INITIAL DEFORMATION .......... >2800 F

SOFTENING TEMP .......... >2800 F

FLUID TEMP .......... >2800 F

SULFUR FORMS

SULFATE ................. 0.01

PYRITIC ................. 0.05

ORGANIC ................. 0.48

MISCELLANEOUS COMMENTS: SAMPLE FROM OUTSIDE OF OLD PORTAL. PRESUMED TO HAVE ORIGINATED FROM WITHIN THE OLD MINE.
COUNTY: KITITAS

SAMPLE NUMBER: (687) 41-79

COAL NAME: #1 (BIG SEAM)

MINE NAME: #1 STRIP PIT

QUARTER SECTION: NE

COAL AREA: ROSLYN-CLE ELUM

SECTION: 7

SAMPLE SITE ELEVATION (FT): 2960

TOWNSHIP: 20N

AGE: EOCENE

RANGE: 15E

GEOLGIC FORMATION: ROSLYN

QUADRANGLE: KACHESS LAKE 15

AGE: EOCENE

EXPOSURE TYPE: STRIP PIT

STRIKE: N80W

SAMPLE TYPE: GRAB

DIP: 14SW

SAMPLE CONDITION: FRESH

MAJOR JOINTS IN COAL: N-S 90

OVERBURDEN THICKNESS (FT): 8

TOTAL SECTION MEASURED (FT): N

SAMPLE COLLECTOR: WALKER (OSER)

COAL THICKNESS (FT): N

DATE OF SAMPLING: 10-15-79

SAMPLE THICKNESS (FT): N

DATE OF ANALYSIS: 01-11-80

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K98492

AIR DRY LOSS: 1.0

COAL (AP)

COAL (MMMFM)

COAL (DMMFM)

PROXIMATE ANALYSIS

MOISTURE .................. 2.5 .................. 3.7 .................. N/A

VOLATILE MATTER .......... 39.9 .................. 59.7 .................. 62.0

FIXED CARBON ............. 27.0 .................. 40.4 .................. 41.9

ASH ........................ 30.6 .................. N/A .................. N/A

ULTIMATE ANALYSIS

HYDROGEN ................. 2.8 .................. 3.9 .................. 3.9

CARBON ..................... 44.7 .................. 66.9 .................. 69.5

NITROGEN .................. 0.9 .................. 1.3 .................. 1.3

SULFUR ..................... 2.3 .................. N/A .................. N/A

OXYGEN(INO) .............. 20.7 .................. 30.9 .................. 28.7

HEATING VALUE (BTU/LB) .. 6740 .................. 10069 .................. 10461

ASH - INITIAL DEFORMATION .... 2550 F

SOFTENING TEMP. ............ 2610 F

FLUID TEMP. ................ 2680 F

SULFUR FORMS

SULFATE ..................... N

PYRITIC ..................... N

ORGANIC ..................... N

MISCELLANEOUS COMMENTS:

-8 69-
COUNTY: KITTITAS

SAMPLE NUMBER: (100)12-80

COAL NAME: UNNAMED

MINE NAME: NONE

COAL AREA: CABIN CREEK

SAMPLE SITE ELEVATION (FT): 2780

QUARTER SECTION: NW

SECTION: 21

TOWNSHIP: 20N

RANGE: 13E

QUADRANGLE: EASTON 15

GEOLeGIC FORMATION: NACHES

AGE: EOCENE

STRIKE: N60W

DIP: 32NE

MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: ROADCUT

SAMPLE TYPE: CHANNEL

SAMPLE CONDITION: WEATHERED

TOTAL SECTION MEASURED (FT): 82.5

COAL THICKNESS (FT): 3.5

SAMPLE THICKNESS (FT): 3.5

OVERBURDEN THICKNESS (FT): 2

DATE OF SAMPLING: 05-15-80

SAMPLE COLLECTOR: WALKER (ODER)

DATE OF ANALYSIS: 08-27-80

LABORATORY: JOE-PITTSBURG

LAB. NUMBER: L03309

AIR DRY LOSS: 1.0

PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) 2655 9007 12496

ASH - INITIAL DEFORMATION 2400 F

SOFTENING TEMP. 2530 F

FLUID TEMP. 2620 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: STRATIGRAPHICALLY ABOVE SAMPLE (101)13-80.
COUNTY: KITTITAS

SAMPLE NUMBER: (101)13-80

COAL NAME: UNNAMED

MINE NAME: NONE

QUARTER SECTION: NW

COAL AREA: CABIN CREEK

SECTION: 21

SAMPLE ELEVATION (FT): 2780

TOWNSHIP: 20N

AGE: EOCENE

RANGE: 13E

GEOLOGIC FORMATION: NACHES

QUADRANGLE: EASTON 15

AGE: EOCENE

EXPOSURE TYPE: ROADCUT

STRIKE: N60W

SAMPLE TYPE: CHANNEL

DIP: 32NW

SAMPLE CONDITION: WEATHERED

MAJOR JOINTS IN COAL: N/A

OVERBURDEN THICKNESS (FT): 6

TOTAL SECTION MEASURED (FT): 82.5

SAMPLE COLLECTOR: WALKER (OGER)

COAL THICKNESS (FT): 2.5

DATE OF SAMPLING: 05-15-80

DATE OF ANALYSIS: 08-27-80

LAB. NUMBER: L03310

LABORATORY: DOE-PITTSBURG

AIR DRY LOSS: 2.0

PROXIMATE ANALYSIS

COAL (AR)

COAL (MMMFS)

COAL (DMMF)

MOISTURE .............. 9.9 .............. 15.1 .............. N/A

VOLATILE MATTER .............. 19.8 .............. 30.3 .............. 35.7

FIXED CARBON .............. 38.2 .............. 58.5 .............. 69.0

ASH .............. 32.1 .............. N/A .............. N/A

ULTIMATE ANALYSIS

HYDROGEN .............. 3.8 .............. 4.8 .............. 4.8

CARBON .............. 45.2 .............. 69.3 .............. 81.7

NITROGEN .............. 1.0 .............. 1.5 .............. 1.7

SULFUR .............. 0.3 .............. N/A .............. N/A

OXYGEN (IND) .............. 17.5 .............. 26.8 .............. 15.7

HEATING VALUE (BTU/LB) ... 7275 .............. 11141 .............. 13136

ASH - INITIAL DEFORMATION .............. 2020 F

SOFTENING TEMP. .............. 2100 F

FLUID TEMP. .............. 2190 F

SULFUR FORMS

SULFATE .............. N

PYRITIC .............. N

ORGANIC .............. N

MISCELLANEOUS COMMENTS: STRATIGRAPHICALLY BELOW SAMPLE (100)12-80.
COAL NAME: UNNAMED

SAMPLE NUMBER: (102)14-80
MINE NAME: NONE
COAL AREA: CABIN CREEK
SAMPLE SITE ELEVATION (FT): 2800
GEOLOGIC FORMATION: NACHES
AGE: EOCENE
EXPOSURE TYPE: OUTCROP
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED
OVERBURDEN THICKNESS (FT): N
SAMPLE COLLECTOR: WALKER (DGER)
QUARTER SECTION: NE
SECTION: 20
TOWNSHIP: 20N
RANGE: 13E
QUADRANGLE: EASTON 15
STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A
TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): N
SAMPLE THICKNESS (FT): 3.0
DATE OF SAMPLING: 05-15-80
DATE OF ANALYSIS: 08-27-80
LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03311

AIR DRY LOSS: 2.0

PROXIMATE ANALYSIS

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<tr>
<td>OXYGEN(IND)</td>
<td>20.0</td>
<td>23.9</td>
<td>13.9</td>
</tr>
</tbody>
</table>

HEATING VALUE (BTU/LB) 9368

ASH INITIAL DEFORMATION 2070 F
SOFTENING TEMP 2160 F
FLUID TEMP 2240 F

SULFUR FORMS
<p>| |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>SULFATE</td>
</tr>
<tr>
<td>PYRITIC</td>
</tr>
<tr>
<td>ORGANIC</td>
</tr>
</tbody>
</table>

MISCELLANEOUS COMMENTS: COAL FOUND AT HEAD OF LARGE LANDSLIDE INTO CABIN CREEK.
COUNTY: KITTITAS

SAMPLE NUMBER: (120)32-80
COAL NAME: WILSON SEAM

MINE NAME: WILSON
COAL AREA: TANEUM
SAMPLE SITE ELEVATION (FT): 2350
QUARTER SECTION: N/A
SECTION: 33
TOWNSHIP: 19N
RANGE: 16E
QUADRANGLE: CLE ELUM 15

GEOLIGIC FORMATION: ROSLYN
AGE: EOCENE
STRIKE: N55E
DIP: 20SE
MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: PORTAL
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED
TOTAL SECTION MEASURED (FT): 7.7
COAL THICKNESS (FT): 3.4
SAMPLE THICKNESS (FT): 3.4

OVERRIDE THICKNESS (FT): 2
DATE OF SAMPLING: 06-03-80
SAMPLE COLLECTOR: WALKER (DGER)
DATE OF ANALYSIS: 09-23-80
LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03825

<table>
<thead>
<tr>
<th>Air Dry Loss</th>
<th>Coal (AR)</th>
<th>Coal (MMMF)</th>
<th>Coal (DMMMF)</th>
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</thead>
<tbody>
<tr>
<td>16.0</td>
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PROXIMATE ANALYSIS

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Moisture</td>
<td>26.0</td>
<td>41.1</td>
<td>N/A</td>
</tr>
<tr>
<td>Volatile Matter</td>
<td>24.9</td>
<td>39.3</td>
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<tr>
<td>Fixed Carbon</td>
<td>15.2</td>
<td>24.0</td>
<td>40.7</td>
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<tr>
<td>Ash</td>
<td>33.9</td>
<td>N/A</td>
<td>N/A</td>
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ULTIMATE ANALYSIS

<p>| | | | |</p>
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<thead>
<tr>
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<tbody>
<tr>
<td>Hydrogen</td>
<td>4.9</td>
<td>5.3</td>
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<tr>
<td>Carbon</td>
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<td>Nitrogen</td>
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<td>Sulfur</td>
<td>0.3</td>
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<td>N/A</td>
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<tr>
<td>Oxygen (Ind)</td>
<td>34.6</td>
<td>54.7</td>
<td>30.7</td>
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</table>

HEATING VALUE (BTU/LB) 3996 6297 10695

ASH - INITIAL DEFORMATION 2260 F
SOFTENING TEMP. 2360 F
FLUID TEMP. 2470 F

SULFUR FORMS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Sulfate</td>
<td>N</td>
</tr>
<tr>
<td>Pyritic</td>
<td>N</td>
</tr>
<tr>
<td>Organic</td>
<td>N</td>
</tr>
</tbody>
</table>

MISCELLANEOUS COMMENTS: COAL SEAM HAD 1.3 FT. OF SHALE PARTING. COAL SAMPLED FROM 2.8 FT. ABOVE AND 0.6 FT. BELOW THIS PARTING. SAMPLES WERE MIXED TOGETHER FOR ANALYSIS.
**COUNTY:** KITTITAS

**SAMPLE NUMBER:** (121)33-80  
**COAL NAME:** UNNAMED

**MINE NAME:** NONE  
**QUARTER SECTION:** N/A  
**COAL AREA:** MANASTASH  
**SECTION:** 10  
**SAMPLE SITE ELEVATION (FT):** 4560  
**TOWNSHIP:** 18N  
**AGE:** EOCENE  
**RANGE:** 15E  
**GEOLOGIC FORMATION:** MANASTASH  
**QUADRANGLE:** CLE ELUM 15  
**EXPOSURE TYPE:** TAILINGS  
**STRIKE:** N/A  
**SAMPLE TYPE:** GRAB  
**DIP:** N/A  
**SAMPLE CONDITION:** WEATHERED  
**MAJOR JOINTS IN COAL:** N/A

**OVERBURDEN THICKNESS (FT):** N  
**TOTAL SECTION MEASURED (FT):** N  
**SAMPLE COLLECTOR:** WALKER (OGER)  
**COAL THICKNESS (FT):** N  
**DATE OF SAMPLING:** 06-17-80  
**SAMPLE THICKNESS (FT):** N  
**DATE OF ANALYSIS:** 09-23-80  
**LABORATORY:** DOE-PITTSBURG  
**LAB. NUMBER:** L03826

<table>
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<tr>
<th>AIR DRY LOSS:</th>
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<tr>
<td><strong>PROXIMATE ANALYSIS</strong></td>
<td></td>
</tr>
<tr>
<td>MOISTURE</td>
<td>4.2</td>
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<tr>
<td>VOLATILE MATTER</td>
<td>37.6</td>
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<tr>
<td>FIXED CARBON</td>
<td>32.4</td>
</tr>
<tr>
<td>ASH</td>
<td>25.8</td>
</tr>
<tr>
<td><strong>ULTIMATE ANALYSIS</strong></td>
<td></td>
</tr>
<tr>
<td>HYDROGEN</td>
<td>4.0</td>
</tr>
<tr>
<td>CARBON</td>
<td>60.4</td>
</tr>
<tr>
<td>NITROGEN</td>
<td>1.5</td>
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<tr>
<td>SULFUR(IND)</td>
<td>0.8</td>
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<tr>
<td>OXYGEN(IND)</td>
<td>7.6</td>
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<td><strong>HEATING VALUE (BTU/LB)</strong></td>
<td>10267</td>
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<tr>
<td>ASH - INITIAL DEFORMATION</td>
<td>2490</td>
</tr>
<tr>
<td>SOFTENING TEMP.</td>
<td>2600</td>
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<tr>
<td>FLUID TEMP.</td>
<td>2710</td>
</tr>
</tbody>
</table>

| **SULFUR FORMS** |   |
| SULFATE | N |
| PYRITIC  | N |
| ORGANIC  | N |

**MISCELLANEOUS COMMENTS:** TAILINGS FROM UNNAMED ABANDONED MINE. HIGH GRADED FOR THIS SAMPLE. SAMPLE (122)34-80 IS RANDOM SAMPLE.
SAMPLE NUMBER: (122)34-80
COAL NAME: UNNAMED

MINE NAME: UNKNOWN
COAL AREA: MANASTASH
SAMPLE SITE ELEVATION (FT): 4560

GEOLOGIC FORMATION: MANASTASH
AGE: EOCENE

EXPOSURE TYPE: TAILINGS
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: WALKER (DGER)

QUARTER SECTION: N/A
SECTION: 10
TOWNSHIP: 18N
RANGE: 1SE
QUADRANGLE: CLE ELUM 15

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): N
SAMPLE THICKNESS (FT): N

DATE OF SAMPLING: 06-04-80
DATE OF ANALYSIS: 09-23-80

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03827

AIR DRY LOSS: 3.0

PROXIMATE ANALYSIS

<table>
<thead>
<tr>
<th>Component</th>
<th>AR (%)</th>
<th>MMMF (%)</th>
<th>DMMF (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOISTURE</td>
<td>6.6</td>
<td>29.7</td>
<td>N/A</td>
</tr>
<tr>
<td>VOLATILE MATTER</td>
<td>33.6</td>
<td>152</td>
<td>216</td>
</tr>
<tr>
<td>FIXED CARBON</td>
<td>0.0</td>
<td>-0.1</td>
<td>-0.2</td>
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<tr>
<td>ASH</td>
<td>72.0</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

ULTIMATE ANALYSIS

<table>
<thead>
<tr>
<th>Component</th>
<th>AR (%)</th>
<th>MMMF (%)</th>
<th>DMMF (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROGEN</td>
<td>2.3</td>
<td>9.9</td>
<td>9.9</td>
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<tr>
<td>CARBON</td>
<td>15.1</td>
<td>68.1</td>
<td>97.0</td>
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<tr>
<td>NITROGEN</td>
<td>0.5</td>
<td>2.1</td>
<td>3.0</td>
</tr>
<tr>
<td>SULFUR</td>
<td>0.2</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>OXYGEN(IND)</td>
<td>9.8</td>
<td>44.1</td>
<td>25.1</td>
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</tbody>
</table>

HEATING VALUE (BTU/LB) 2229

ASH - INITIAL DEFORMATION 2440 F
SOFTENING TEMP. 2520 F
FLUID TEMP. 2640 F

SULFUR FORMS

<table>
<thead>
<tr>
<th>Type</th>
<th>AR (%)</th>
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<tbody>
<tr>
<td>SULFATE</td>
<td>N</td>
</tr>
<tr>
<td>PYRITIC</td>
<td>N</td>
</tr>
<tr>
<td>ORGANIC</td>
<td>N</td>
</tr>
</tbody>
</table>

MISCELLANEOUS COMMENTS: RANDOM SAMPLE OF TAILINGS FROM ABANDONED MINE.
COUNTY: KITTITAS

SAMPLE NUMBER: (123)35-80

COAL NAME: UNNAMED

MINE NAME: NONE

COAL AREA: MANASTASH

SAMPLE SITE ELEVATION (FT): 4600

QUARTER SECTION: N/A

SECTION: 10

TOWNSHIP: 18N

RANGE: 15E

QUADRANGLE: CLE ELUM 15

GEOLOGIC FORMATION: MANASTASH

AGE: EOCENE

STRIKE: N90E

DIP: 40S

MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: ROADCUT

SAMPLE TYPE: CHANNEL

SAMPLE CONDITION: FRESH

TOTAL SECTION MEASURED (FT): 4.4

COAL THICKNESS (FT): 3.9

SAMPLE THICKNESS (FT): 3.9

OVERBURDEN THICKNESS (FT): 6

DATE OF SAMPLING: 06-17-80

DATE OF ANALYSIS: 09-23-80

SAMPLE COLLECTOR: WALKER (DGER)

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: L03828

AIR DRY LOSS: 6.0

COAL

COAL

COAL

AR (AR) (MMMF) (DMMF)

PROXIMATE ANALYSIS

MOISTURE .................. 12.8 40.8 N/A

VOLATILE MATTER .......... 14.0 44.6 75.5

FIXED CARBON .............. 9.7 30.9 52.2

ASH ......................... 63.5 N/A N/A

ULTIMATE ANALYSIS

HYDROGEN ................ 2.5 5.7 5.7

CARBON ................... 15.7 59.0 84.7

NITROGEN ................. 0.4 1.2 2.0

SULFUR ................... 0.2 N/A N/A

OXYGEN(INO) ............. 17.7 56.4 34.0

HEATING VALUE (BTU/LB) ... 2210 7027 11885

ASH - INITIAL DEFORMATION .... 2040 F

SOFTENING TEMP. .......... 2170 F

FLUID TEMP. .............. 2290 F

SULFUR FORMS

SULFATE ................. N

PYritic .................. N

ORGANIC .................. N

MISCELLANEOUS COMMENTS: COAL FROM AREA OF POSSIBLE TECTONIC ACTIVITY

DIP-STRIKE UNLIKE GOOD MEASURED SECTION NEARBY. BOTTOM OF COAL ZONE

NOT REACHED.
COUNTY: KITTITAS

SAMPLE NUMBER: (124)36-80

COAL NAME: UNNAMED

MINE NAME: UNKNOWN

COAL AREA: MANASTASH

SAMPLE SITE ELEVATION (FT): 4480

GEOLOGIC FORMATION: MANASTASH

AGE: EOCENE

EXPOSURE TYPE: PORTAL

SAMPLE TYPE: CHANNEL

SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): N

SAMPLE COLLECTOR: WALKER (DGCR)

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: L03929

AIR DRY LOSS: N

PROXIMATE ANALYSIS

MOISTURE ................ 20.3 .......... 29.6 .......... N/A

VOLATILE MATTER ............ 24.0 .......... 35.0 .......... 49.8

FIXED CARBON ............... 26.6 .......... 38.8 .......... 55.2

ASH ......................... 29.1 .......... N/A .......... N/A

ULTIMATE ANALYSIS

HYDROGEN .................... 4.6 .......... 4.8 .......... 4.8

CARBON ....................... 35.7 .......... 52.1 .......... 74.1

NITROGEN .................... 0.9 .......... 1.2 .......... 1.8

SULFUR ...................... 0.3 .......... N/A .......... N/A

OXYGEN (IND) ............... 29.4 .......... 42.9 .......... 23.5

HEATING VALUE (BTU/LB) ... 5789 .......... 8441 .......... 12002

ASH - INITIAL DEFORMATION .... 2230 F

SOFTENING TEMP. ............ 2320 F

FLUID TEMP. ................. 2390 F

SULFUR FORMS

SULFATE ...................... N

PYRITIC ..................... N

ORGANIC .................... N

MISCELLANEOUS COMMENTS: SAMPLE FROM NORTHERNMOST OF THREE DRIFTS IN UNNAMED, ABANDONED COAL FIELD. SAMPLE (125)37-80 FROM IMPURE COAL IMMEDIATELY ABOVE THIS SAMPLE.
COUNTY: KITTITAS

SAMPLE NUMBER: (125)37-80
COAL NAME: UNNAMED

MINE NAME: UNKNOWN
COAL AREA: MANASTASH
SAMPLE SITE ELEVATION (FT): 4480
QUARTER SECTION: N/A
SECTION: 14
TOWNSHIP: 18N
RANGE: 15E
QUADRANGLE: CLE ELUM 15

GEOLOGIC FORMATION: MANASTASH
AGE: EOCENE
STRIKE: N70W
DIP: 46SW
MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: PORTAL
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED
TOTAL SECTION MEASURED (FT): 20.7
COAL THICKNESS (FT): 1.8
SAMPLE THICKNESS (FT): 1.8

OVERBURDEN THICKNESS (FT): N
DATE OF SAMPLING: 06-18-80
SAMPLE COLLECTOR: WALKER (DGER)
DATE OF ANALYSIS: 09-24-80

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03830

AIR DRY LOSS: 5.0

COAL (AR)
COAL (MMMF)
COAL (DMMF)

PROXIMATE ANALYSIS

MOISTURE
VOLATILE MATTER
FIXED CARBON
ASH

8.9
11.8
0.0
79.6

63.6
34.3
-0.1
-0.3

N/A
N/A
N/A
N/A

ULTIMATE ANALYSIS

HYDROGEN
CARBON
NITROGEN
SULFUR
OXYGEN(IND)

2.0
5.2
9.3
0.1
12.8

19.6
37.1
2.0
N/A
91.5

19.6
102
5.6
N/A
N/A

HEATING VALUE (BTU/LB) ...

693
4922
13551

ASH - INITIAL DEFORMATION 2430 F
SOFTEMENING TEMP. 2520 F
FLUID TEMP. 2620 F

SULFUR FORMS

SULFATE
PYRITIC
ORGANIC

N
N
N

MISCELLANEOUS COMMENTS: IMPURE COAL EXPOSED IN NORTHERNMOST OF THREE DRIFTS IN UNNAMED ABANDONED COAL FIELD. SAMPLE IMMEDIATELY ABOVE SAMPLE (124)36-80.
COUNTY: KITITAS

SAMPLE NUMBER: (131)43-80

COAL NAME: UNNAMED

MINE NAME: NONE

COAL AREA: MANASTASH

SAMPLE SITE ELEVATION (FT): N

QUARTER SECTION: N/A

SECTION: 17

TOWNSHIP: 18N

RANGE: 15E

QUADRANGLE: CLE ELUM 15

GEOLOGIC FORMATION: MANASTASH

STRIKE: HORZ

DIP: 0

AGE: EOCENE

MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: ROADCUT

TOTAL SECTION MEASURED (FT): N

SAMPLE TYPE: GRAB

COAL THICKNESS (FT): N

SAMPLE CONDITION: WEATHERED

SAMPLE THICKNESS (FT): N

OVERBURDEN THICKNESS (FT): 0

DATE OF SAMPLING: 07-18-80

SAMPLE COLLECTOR: CUSHMAN (ODER)

DATE OF ANALYSIS: 09-23-80

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: L03831

AIR DRY LOSS: 14.0

<table>
<thead>
<tr>
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<th>COAL (AR)</th>
<th>COAL (MMMF)</th>
<th>COAL (DMMF)</th>
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<tbody>
<tr>
<td>MOISTURE</td>
<td>26.7</td>
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<td>VOLATILE MATTER</td>
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<tr>
<td>ASH</td>
<td>24.3</td>
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PROXIMATE ANALYSIS

ULTIMATE ANALYSIS

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<table>
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<tr>
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<tr>
<td>SULFUR</td>
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<tr>
<td>OXYGEN(IND)</td>
<td>35.9</td>
<td>48.7</td>
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OXYGEN

HEATING VALUE (BTU/LB) ... 5416             7339             11518

ASH - INITIAL DEFORMATION ... 2190  F

SOFTENING TEMP. ............... 2270  F

FLUID TEMP. .................. 2360  F

SULFUR FORMS

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<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS:
COUNTY: KITITAS

SAMPLE NUMBER: (132)44-80

COAL NAME: UNNAMED

MINE NAME: UNNAMED
COAL AREA: MANASTASH
SAMPLE SITE ELEVATION (FT): N

GEOLeGIC FORMATION: MANASTASH
AGE: EOCENE

EXPOSURE TYPE: PROSPECT
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: CUSHMAN (DGER)

QUARTER SECTION: NW
SECTION: 21
TOWNSHIP: 18N
RANGE: 15E
QUADRANGLE: CLE ELUM 15

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 8.5
COAL THICKNESS (FT): 3.5
SAMPLE THICKNESS (FT): 3.5

DATE OF SAMPLING: 07-18-80
DATE OF ANALYSIS: 09-23-80

LABORATORY: JOE-PITTSBURG
LAB. NUMBER: L03832

<table>
<thead>
<tr>
<th>AIR DRY LOSS</th>
<th>COAL (AR)</th>
<th>COAL (MMMF)</th>
<th>COAL (DMMF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.0</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

PROXIMATE ANALYSIS

| MOISTURE     | 12.7      | 78.1        | N/A         |
| V OLATILE MATTER | 9.6      | 59.0        | 270         |
| FIXED CARBON | 0.2       | 1.1         | 5.2         |
| ASH          | 77.5      | N/A         | N/A         |

ULTIMATE ANALYSIS

| HYDROGEN     | 2.4       | 27.5        | 27.5        |
| CARBON       | 4.3       | 26.4        | 121         |
| NITROGEN     | 0.1       | 0.5         | 2.4         |
| SULFUR       | 0.1       | N/A         | N/A         |
| OXYGEN(IN)   | 15.7      | 96.6        | 124         |

HEATING VALUE (BTU/LB) ... | 479 | 2918 | 13371 |

ASH - INITIAL DEFORMATION | 2680 F |
SOFTENING TEMP. | 2760 F |
FLUID TEMP. | 2800 F |

SULFUR FORMS

| SULFATE | N |
| PYRITIC  | N |
| ORGANIC  | N |

MISCELLANEOUS COMMENTS: BECAUSE STRIKE AND DIP OF COAL NOT KNOWN, SAMPLE WAS OF "BEST" COAL VISIBLE IN SEAM. COMPLETE COAL SECTION NOT EXPOSED AT PROSPECT.
COUNTY: KITTITAS

SAMPLE NUMBER: (133)45-80
COAL NAME: UNNAMED

MINE NAME: UNNAMED
QUARTER SECTION: NW
COAL AREA: MANASTASH
SECTION: 21
TOWNSHIP: 18N
SAMPLE SITE ELEVATION (FT): N
RANGE: 15E
QUADRANGLE: CLE ELUM 15

AGE: EOCENE
STRIKE: N/A
EXPOSURE TYPE: TIPPLE
DIP: N/A
SAMPLE TYPE: GRAB
MAJOR JOINTS IN COAL: N/A
SAMPLE CONDITION: WEATHERED
TOTAL SECTION MEASURED (FT): N
OVERBURDEN THICKNESS (FT): 0
COAL THICKNESS (FT): N
SAMPLE COLLECTOR: CUSHMAN (ODGER)
DATE OF SAMPLING: 07-18-80

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L03833
DATE OF ANALYSIS: 09-23-80

AIR DRY LOSS: 9.0

COAL COAL COAL
(AR) (MMMFM) (DMMF)

PROXIMATE ANALYSIS
MOISTURE .......... 14.9 .......... 40.8 .......... N/A
VOLATILE MATTER .......... 13.1 .......... 35.9 .......... 60.7
FIXED CARBON .......... 13.2 .......... 36.2 .......... 61.2
ASH .......... 58.8 .......... N/A .......... N/A

ULTIMATE ANALYSIS
HYDROGEN .......... 3.1 .......... 6.6 .......... 6.6
CARBON .......... 18.3 .......... 50.2 .......... 84.9
NITROGEN .......... 0.3 .......... 0.8 .......... 1.3
SULFUR .......... 0.1 .......... N/A .......... N/A
OXYGEN(IND) .......... 19.4 .......... 53.2 .......... 28.5

HEATING VALUE (BTU/LB) ... 2755 .......... 7546 .......... 12766

ASH - INITIAL DEFORMATION .......... 2800 F
SOFTENING TEMP. .......... 2800 F
FLUID TEMP. .......... 2800 F

SULFUR FORMS
SULFATE .......... N
PYRITE .......... N
ORGANIC .......... N

MISCELLANEOUS COMMENTS:

-8 81-
**COUNTY:** LEWIS

**SAMPLE NUMBER:** (007)03-76  
**COAL NAME:** CEDAR CREEK #1

**MINE NAME:** WINDOM  
**QUARTER SECTION:** SW  
**COAL AREA:** KELSO-Castle Rock  
**SECTION:** 15  
**SAMPLE SITE ELEVATION (FT):** 400  
**TOWNSHIP:** 12N  
**EXPOSURE TYPE:** STRIP PIT  
**RANGE:** 01E  
**SAMPLE TYPE:** CHANNEL  
**SAMPLE CONDITION:** FRESH  
**SAMPLE THICKNESS (FT):** 46  
**OVERBURDEN THICKNESS (FT):** 46  
**SAMPLE COLLECTOR:** VONHEEDER (DGHER)  
**DATE OF SAMPLING:** 08-19-76  
**DATE OF ANALYSIS:** 01-21-77

**LABORATORY:** USBM  
**LAB. NUMBER:** UNKNOWN

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<th>COAL (MMMFM)</th>
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**HEATING VALUE (BTU/LB):** 5174  
**7415**  
**12170**

**ASH - INITIAL DEFORMATION:** 2345 F  
**SOFTENING TEMP:** 2450 F  
**FLUID TEMP:** 2530 F

**SULFUR FORMS**  
**SULFATE:** 0.13  
**PYRITIC:** 0.15  
**ORGANIC:** 0.67

**MISCELLANEOUS COMMENTS:**
COUNTY: LEWIS

SAMPLE NUMBER: (069)23-79

MINE NAME: WEIKEL
COAL AREA: SUMMIT CREEK
SAMPLE SITE ELEVATION (FT): 3120

GEOLOGIC FORMATION: PUGET GROUP (?)
AGE: EOCENE

EXPOSURE TYPE: MINE DUMP
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): N
SAMPLE COLLECTOR: MILNE (OGER)

LABORATORY: DOE-PITTSBURG

COAL NAME: NO. 6 SEAM (?)
QUARTER SECTION: NE
SECTION: 13
TOWNSHIP: 14N
RANGE: 10E
QUADRANGLE: WHITE PASS 15

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): N
SAMPLE THICKNESS (FT): N

DATE OF SAMPLING: 07-02-79
DATE OF ANALYSIS: 10-02-79
LAB. NUMBER: K95700

AIR DRY LOSS: 1.0

PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) 7237

ASH - INITIAL DEFORMATION 2330 F
SOFTENING TEMP. 2420 F
FLUID TEMP. 2500 F

SULFUR FORMS

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<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: COAL ASSOCIATED WITH CARBONACEOUS SANDSTONE AND ANDESITIC FLOWS AND LAHARS. MINE AREA HAS BEEN BULLDOOZED OVER. OUTCROPS OF SEDIMENTARY UNITS NOT OBSERVED IN IMMEDIATE AREA.
<table>
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<th>SAMPLE NUMBER: (071)25-79</th>
<th>COAL NAME: TONO NO. 7</th>
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<tr>
<td>MINE NAME: COLUMBIA COLLIERIES</td>
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<td>COAL AREA: CENTRALIA</td>
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<td>SAMPLE SITE ELEVATION (FT): 400</td>
<td>TOWNSHIP: 15N</td>
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<tr>
<td>GEOLOGIC FORMATION: SKOOKUMCHUCK</td>
<td>RANGE: 03W</td>
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<tr>
<td>AGE: EOCENE</td>
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<td>EXPOSURE TYPE: PORTAL</td>
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<td>SAMPLE TYPE: CHANNEL</td>
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<td>SAMPLE CONDITION: FRESH</td>
<td>MAJOR JOINTS IN COAL: N/A</td>
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<td>OVERBURDEN THICKNESS (FT): N</td>
<td>TOTAL SECTION MEASURED (FT): N</td>
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<td>SAMPLE COLLECTOR: VONHEEDER (DGDR)</td>
<td>COAL THICKNESS (FT): 7.8</td>
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<td>SAMPLE THICKNESS (FT): 1.0</td>
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<td>LABORATORY: DOE-PITTSBURG</td>
<td>DATE OF SAMPLING: 08-10-79</td>
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<td>DATE OF ANALYSIS: 10-02-79</td>
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<td>AIR DRY LOSS: 16.0</td>
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**PROXIMATE ANALYSIS**

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<th>MOISTURE</th>
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**ULTIMATE ANALYSIS**

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<tr>
<td>OXYGEN (IND)</td>
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**HEATING VALUE (BTU/LB)**

7989

| ASH - INITIAL DEFORMATION | 2170 | F |
| SOFTENING TEMP. | 2250 | F |
| FLUID TEMP. | 2340 | F |

**SULFUR FORMS**

| SULFATE | 0.01 |
| PYRITIC | 0.19 |
| ORGANIC | 0.46 |

**MISCELLANEOUS COMMENTS:**
**COUNTY:** LEWIS

**SAMPLE NUMBER:** (073)27-79

**COAL NAME:** UNNAMED

**QUARTER SECTION:** NE

**SECTION:** 8

**TOWNSHIP:** 14N

**RANGE:** 03W

**QUADRANGLE:** ADNA 15

**STRIKE:** N12E

**DIP:** 07SE

**MAJOR Joints IN COAL:** N/A

**TOTAL SECTION MEASURED (FT):** 8.8

**COAL THICKNESS (FT):** 2.3

**SAMPLE THICKNESS (FT):** 2.3

**DATE OF SAMPLING:** 08-15-79

**DATE OF ANALYSIS:** 10-02-79

**LABORATORY:** JOE-PITTSBURG

**LAB. NUMBER:** K95704

**AIR DRY LOSS:** 12.0

<table>
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<th>COAL (AR)</th>
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</table>

**ULTIMATE ANALYSIS**

| HYDROGEN                   | 5.4       | 4.9         | 4.9         |
| CARBON                     | 37.3      | 49.9        | 70.4        |
| NITROGEN                   | 0.9       | 0.6         | 0.9         |
| SULFUR                     | 3.0       | N/A         | N/A         |
| OXYGEN(IND)                | 30.7      | 41.0        | 21.3        |

**HEATING VALUE (BTU/LB):** 6577

**ASH - INITIAL DEFORMATION:** 1960 F

**SOFTENING TEMP:** 2050 F

**FLUID TEMP:** 2190 F

**SULFUR FORMS**

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**MISCELLANEOUS COMMENTS:** COAL SEAM NOT RECORDED IN LITERATURE.
COUNTY: LEWIS

SAMPLE NUMBER: (089)01-80

COAL NAME: TH0/BLDIRT/SMI

MINE NAME: WIDCO, OLD KING COAL

QUARTER SECTION: N/A

COAL AREA: CENTRALIA

SECTION: N

SAMPLE SITE ELEVATION (FT): N

TOWNSHIP: 15N

QUADRANGLE: BUCODA 7.5

AGE: EOCENE

RANGE: 01W

EXPOSURE TYPE: STOCK PILE

STRIKE: N/A

SAMPLE TYPE: GRAB

DIP: N/A

SAMPLE CONDITION: FRESH

MAJOR JOINTS IN COAL: N/A

EXPERIMENT THICKNESS (FT): N

TOTAL SECTION MEASURED (FT): N

SAMPLE COLLECTOR: WALKER (DGER)

COAL THICKNESS (FT): N

DATE OF SAMPLING: 01-25-30

SAMPLE THICKNESS (FT): N

DATE OF ANALYSIS: 04-15-80

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: L00655

AIR DRY LOSS: 12.0

COAL

COAL

COAL

AR

(MME)

(DMMF)

PROXIMATE ANALYSIS

MOISTURE ............... 19.8 ............... 23.8 ............... N/A

VOLATILE MATTER ........... 31.6 ............... 38.1 ............... 50.1

FIXED CARBON .......... 32.9 ............... 39.7 ............... 52.2

ASH ............... 15.7 ............... N/A ............... N/A

ULTIMATE ANALYSIS

HYDROGEN ............... 6.0 ............... 5.9 ............... 5.9

CARBON ............... 47.3 ............... 57.1 ............... 75.1

NITROGEN ............... 0.9 ............... 0.9 ............... 1.2

SULFUR ............... 0.8 ............... N/A ............... N/A

OXYGEN(IND) .......... 29.3 ............... 35.3 ............... 18.4

HEATING VALUE (BTU/LB) .... 8337 ............... 10044 ............... 13211

ASH - INITIAL DEFORMATION ........ 2050 F

SOFTENING TEMP. ........... 2150 F

FLUID TEMP. ............... 2280 F

SULFUR FORMS

SULFATE ............... N

PYRITIC ............... N

ORGANIC ............... N

MISCELLANEOUS COMMENTS: WASHINGTON IRRIGATION DEVELOPMENT COMPANY
(WIDCO) WASHING PLANT REJECT SOLD TO OLD KING COAL COMPANY.
MIXTURE OF THOMPSON(TH0), BIG AND LITTLE DIRTY(BLDIRTT),
AND SMITH(SMI) SEAMS.
COUNTY: LEWIS

SAMPLE NUMBER: (090)02-80

COAL NAME: THO/BLDIRT/SMI

QUARTER SECTION: N/A  SECTION: N
TOWNSHIP: 15N  RANGE: 01W
QUADRANGLE: BUCODA 7.5

STRIKE: N/A  DIP: N/A
MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: STOCK PILE
SAMPLE TYPE: GRAB
SAMPLE CONDITION: FRESH

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): N
SAMPLE THICKNESS (FT): N

OVERBURDEN THICKNESS (FT): N
SAMPLE COLLECTOR: WALKER (DGER)

DATE OF SAMPLING: 01-25-80
DATE OF ANALYSIS: 04-15-80

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: L00656

AIR DRY LOSS: 7.0

PROXIMATE ANALYSIS

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<td>OXYGEN(IND)</td>
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HEATING VALUE (BTU/LB) 8559  10355  13277

ASH - INITIAL DEFORMATION 2130 F
SOFTENING TEMP. 2250 F
FLUID TEMP. 2340 F

SULFUR FORMS

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<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: WASHINGTON IRRIGATION DEVELOPMENT COMPANY (WIDCO) WASHING PLANT REJECT SOLD TO OLD KING COAL COMPANY. MIXTURE OF THOMPSON(THO), BIG AND LITTLE DIRTY(BLDIRT), AND SMITH(SMI) SEAMS.
COUNTY: LEWIS

SAMPLE NUMBER: (091)03-80

COAL NAME: THO/BLDIRT/SMI

MINE NAME: WIDCO, OLD KING COAL

QUARTER SECTION: N/A

COAL AREA: CENTRALIA
SECTION: N

SAMPLE SITE ELEVATION (FT): N
TOWNSHIP: 15N
QUADRANGLE: BUCODA 7.5

AGE: EOCENE

STRIKE: N/A

EXPOSURE TYPE: STOCK PILE
DIP: N/A

SAMPLE TYPE: GRAB
MAJOR JOINTS IN COAL: N/A

SAMPLE CONDITION: FRESH
TOTAL SECTION MEASURED (FT): N

OVERBURDEN THICKNESS (FT): N
COAL THICKNESS (FT): N

SAMPLE COLLECTOR: WALKER (DGER)
SAMPLE THICKNESS (FT): N

DATE OF SAMPLING: 01-25-80

LABORATORY: DOE-PITTSBURG

DATE OF ANALYSIS: 04-14-80

LAB. NUMBER: L00657

AIR DRY LOSS: 6.0

COAL

AR

COAL

MMMF

COAL

DMMF

PROXIMATE ANALYSIS

MOISTURE ............... 17.5 ............... 19.7 ............... N/A
VOLATILE MATTER ........ 34.7 ............... 39.2 ............... 48.8
FIXED CARBON ............ 37.3 ............... 42.1 ............... 52.5
ASH ...................... 10.5 ............... N/A ............... N/A

ULTIMATE ANALYSIS

HYDROGEN ............... 6.0 ............... 5.6 ............... 5.6
CARBON .................. 53.1 ............... 60.0 ............... 74.8
NITROGEN ............... 0.9 ............... 0.9 ............... 1.2
SULFUR ................. 0.4 ............... N/A ............... N/A
OXYGEN(IND) .............. 29.1 ............... 32.8 ............... 19.0

HEATING VALUE (BTU/LB) .... 9272 ............... 10461 ............... 13042

ASH - INITIAL DEFORMATION ........ 2030 F
SOFTENING TEMP ........... 2140 F
FLUID TEMP ................ 2220 F

SULFUR FORMS

SULFATE .................. N
PYRITIC ................... N
ORGANIC .................. N

MISCELLANEOUS COMMENTS: WASHINGTON IRRIGATION DEVELOPMENT COMPANY (WIDCO) WASHING PLANT REJECT SOLO TO OLD KING COAL COMPANY. MIXTURE OF THOMPSON(THO), BIG AND LITTLE DIRTY(BLDIRT), AND SMITH(SMI) SEAMS.
COUNTY: LEWIS

SAMPLE NUMBER: (092) 04-80

COAL NAME: UNNAMED

MINE NAME: WIDCO, OLD KING

QUARTER SECTION: N/A

COAL AREA: KELSO-CASTLE ROCK

SECTION: 30

SAMPLE SITE ELEVATION (FT): 182

TOWNSHIP: 11N

QUADRANGLE: TOUTLE 15

AGE: EOCENE/OLIGOCENE

STRIKE: N22E

EXPOSURE TYPE: STREAMCUT

DIP: 05NW

SAMPLE TYPE: GRAB

MAJOR JOINTS IN COAL: N50E

SAMPLE CONDITION: WEATHERED

TOTAL SECTION MEASURED (FT): N

OVERBURDEN THICKNESS (FT): 0

COAL THICKNESS (FT): 3.0

SAMPLE COLLECTOR: WALKER (DGER)

DATE OF SAMPLING: 02-27-80

LAB. NUMBER: L00658

DATE OF ANALYSIS: 04-15-80

LABORATORY: DOE-PITTSBURG

AIR DRY LOSS: N

COAL (AR)

COAL (MMMF)

COAL (DMMF)

PROXIMATE ANALYSIS

MOISTURE ............... 22.1

VOLATILE MATTER ....... 27.8

FIXED CARBON .......... 27.2

ASH ..................... 22.9

29.6

37.3

36.5

N/A

53.8

52.6

N/A

ULTIMATE ANALYSIS

HYDROGEN ............... 4.3

CARBON ................ 34.1

NITROGEN ............... 0.8

SULFUR ................ 5.6

OXYGEN(IND) ............ 32.2

2.9

46.1

-0.1

N/A

43.4

2.0

66.4

-0.1

N/A

23.4

HEATING VALUE (BTU/LB) .. 6059

8005

11538

ASH - INITIAL DEFORMATION .... 1840 F

SOFTENING TEMP .......... 2010 F

FLUID TEMP ............. 2140 F

SULFUR FORMS

SULFATE ............... N

PYRITIC ................ N

ORGANIC ............... N

MISCELLANEOUS COMMENTS: COAL SEAM PROBABLY AT THE CONTACT OF THE TOUTLE AND WILKES FORMATIONS. SAMPLE FROM CEDAR CREEK STREAM CUT.
COUNTY: LEWIS

SAMPLE NUMBER: (093)05-80  COAL NAME: UNNAMED

MINE NAME: NONE  QUARTER SECTION: N/A
COAL AREA: KELSO-CASTLE ROCK  SECTION: 30
SAMPLE SITE ELEVATION (FT): 180  TOWNSHIP: 11N
GEOLOGIC FORMATION: WILKES (?)  RANGE: 01E
AGE: MIOCENE  QUADRANGLE: TOUTLE 15
EXPOSURE TYPE: STREAMCUT  STRIKE: N30W
SAMPLE TYPE: GRAB  DIP: 06NE
SAMPLE CONDITION: WEATHERED  MAJOR JOINTS IN COAL: N/A
OVERBURDEN THICKNESS (FT): 0  TOTAL SECTION MEASURED (FT): N
SAMPLE COLLECTOR: WALKER (OGER)  COAL THICKNESS (FT): 3.0
LABORATORY: DOE-PITTSBURG  SAMPLE THICKNESS (FT): 3.0
LAB. NUMBER: L00659  DATE OF SAMPLING: 02-27-80

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MISCELLANEOUS COMMENTS: COAL OUTCROPS IN CEDAR CREEK STREAM CUT.
COUNTY: LEWIS

SAMPLE NUMBER: (138)50-80  
COAL NAME: U THOMP/B DIRT

MINE NAME: NONE  
QUARTER SECTION: NE  
COAL AREA: CENTRALIA  
SECTION: 36  
SAMPLE SITE ELEVATION (FT): N  
TOWNSHIP: 15N  
GEOLIC FORMATION: SKOCKUMCHUCK  
RANGE: 01W  
AGE: EOCENE  
QUADRANGLE: CENTRALIA 15

EXPOSURE TYPE: STREAMCUT  
STRIKE: N35W  
SAMPLE TYPE: CHANNEL  
DIP: 15NE  
SAMPLE CONDITION: WEATHERED  
TOTAL SECTION MEASURED (FT): 22.1

OVERBURDEN THICKNESS (FT): 100  
COAL THICKNESS (FT): 13.0

SAMPLE COLLECTOR: VONHEEDEER (DGER)  
SAMPLE THICKNESS (FT): 13.0

DATE OF SAMPLING: 07-29-80  
DATE OF ANALYSIS: 10-08-80

LABORATORY: C.T. & E. CO.  
LAB. NUMBER: 72-978

AIR DRY LOSS: N

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| HEATING VALUE (BTU/LB)       | 8408      | 9438        | 12711        |

ASH - INITIAL DEFORMATION: 2260 F  
SOFTENING TEMP: 2230 F  
FLUID TEMP: 2400 F

SULFUR FORMS
| SULFATE          | N  |
| PYRITIC          | N  |
| ORGANIC          | N  |

MISCELLANEOUS COMMENTS: OUTCROP ON STATE-ADMINISTERED LANDS. AN 8.0 FT. PORTION OF THE SECTION COVERED AND THEREFORE NOT SAMPLED.

-B 91-
SAMPLE NUMBER: (140)52-80

MINE NAME: NONE
COAL AREA: CENTRALIA
SAMPLE SITE ELEVATION (FT): 400

GEOLOGIC FORMATION: SKOOKUMCHUCK
AGE: EOCENE

EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 5
SAMPLE COLLECTOR: VONHEEDER (DGER)

LABORATORY: C.T. & E. CO.
LAB. NUMBER: 72-978

COAL NAME: UNNAMED
QUARTER SECTION: NE
SECTION: 36
TOWNSHIP: 15N
RANGE: 01W
QUADRANGLE: CENTRALIA 15

STRIKE: N05W
DIP: 15NE
MAJOR JOINTS IN COAL: N10W 61S

TOTAL SECTION MEASURED (FT): 3.1
COAL THICKNESS (FT): 0.8
SAMPLE THICKNESS (FT): 0.8

DATE OF SAMPLING: 08-13-80
DATE OF ANALYSIS: 10-13-80

AIR DRY LOSS: N

PROXIMATE ANALYSIS

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HEATING VALUE (BTU/LB) ... 5450 8307 11951

ASH - INITIAL DEFORMATION .......... >2400 F
SOFTENING TEMP. .......... >2440 F
FLUID TEMP. .......... >2700 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS:
COUNTY: LEWIS

SAMPLE NUMBER: (141)53-80

MINE NAME: NONE
COAL AREA: CENTRALIA
SAMPLE SITE ELEVATION (FT): N

GEOLOGIC FORMATION: SKOOKUMCHUCK
AGE: EOCENE

EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 15
SAMPLE COLLECTOR: VONHEEDER (DGER)

LABORATORY: C.T. & E. CO.

COAL NAME: BIG DIRTY(?)

QUARTER SECTION: NW
SECTION: 36
TOWNSHIP: 15N
RANGE: 01W
QUADRANGLE: CENTRALIA 15

STRIKE: N70W
DIP: 32NE
MAJOR JOINTS IN COAL: N47W 77S

TOTAL SECTION MEASURED (FT): 17.1
COAL THICKNESS (FT): 4.9
SAMPLE THICKNESS (FT): 1.7

DATE OF SAMPLING: 08-13-80
DATE OF ANALYSIS: 10-13-80

LAB. NUMBER: 729788

AIR DRY LOSS: N

PROXIMATE ANALYSIS

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HEATING VALUE (BTU/LB) ..... 8812 ............... 9960 ............... 12183

ASH - INITIAL DEFORMATION ....... >2700 F
SOFTENING TEMP. ............... >2700 F
FLUID TEMP. ...................... >2700 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: SAMPLE FROM STATE-ADMINISTERED LAND. "HIGH-GRADED" SAMPLE OF UPPER-SECTION, SAME LOCALITY AS SAMPLE (142)54-80.
COUNTY: LEWIS

SAMPLE NUMBER: (142)54-80
COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: CENTRALIA
SAMPLE SITE ELEVATION (FT): 400

GEOLIGIC FORMATION: SKOOKUMCHUCK
AGE: EOCENE

EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 75
SAMPLE COLLECTOR: VONHEEDER (DGER)

QUARTER SECTION: NE
SECTION: 36
TOWNSHIP: 15N
RANGE: 01W
QUADRANGLE: CENTRALIA 15

STRIKE: N70W
DIP: 324E

MAJOR JOINTS IN COAL: N47W 77S

TOTAL SECTION MEASURED (FT): 17.1
COAL THICKNESS (FT): 4.9
SAMPLE THICKNESS (FT): 2.8

DATE OF SAMPLING: 08-13-80
DATE OF ANALYSIS: 10-15-80

LABORATORY: C.T. & E. CO.
LAB. NUMBER: 72-978

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PROXIMATE ANALYSIS

| MOISTURE     | 17.2      | 24.8        | N/A          |
| VOLATILE MATTER | 36.6      | 44.4        | 59.3         |
| FIXED CARBON  | 23.8      | 34.4        | 46.0         |
| ASH           | 28.4      | N/A         | N/A          |

ULTIMATE ANALYSIS

| HYDROGEN     | 4.5       | 4.6         | 4.6          |
| CARBON       | 37.2      | 54.0        | 72.2         |
| NITROGEN     | 0.5       | 0.4         | 0.5          |
| SULFUR (IND) | 1.7       | N/A         | N/A          |
| OXYGEN (IND) | 27.7      | 40.1        | 23.7         |

HEATING VALUE (BTU/LB) ... 6004 .......... 8654 .......... 11562

ASH - INITIAL DEFORMATION .......... 2460 F
SOFTENING TEMP. .......... 2510 F
FLUID TEMP. .......... 2640 F

SULFUR FORMS

| SULFATE | N |
| PYRITIC | N |
| ORGANIC | N |

MISCELLANEOUS COMMENTS:
COUNTY: LEWIS

SAMPLE NUMBER: (143) 55-80

MINE NAME: NONE
COAL AREA: CENTRALIA
SAMPLE SITE ELEVATION (FT): 400

GEOLGIC FORMATION: SKOOKUMCHUCK
AGE: EOCENE

EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 5
SAMPLE COLLECTOR: VONHEEDER (DGCR)

LABORATORY: C.T. & E. CO.

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MISCELLANEOUS COMMENTS:

LAB. NUMBER: 72-978

QUARTER SECTION: NE
SECTION: 36
TOWNSHIP: 15N
RANGE: 01W
QUADRANGLE: CENTRALIA 15

STRIKE: N70W
DIP: 20NE
MAJOR JOINTS IN COAL: N27W 79N

TOTAL SECTION MEASURED (FT): 3.7
COAL THICKNESS (FT): 1.2
SAMPLE THICKNESS (FT): 1.2

DATE OF SAMPLING: 08-13-80
DATE OF ANALYSIS: 10-08-80
COUNTY: LEWIS

SAMPLE NUMBER: (144)56-80

MINE NAME: NONE

COAL AREA: CENTRALIA

SAMPLE SITE ELEVATION (FT): 400

GEOLOGIC FORMATION: SKOOKUMCHUCK

AGE: EOCENE

EXPOSURE TYPE: STREAMCUT

SAMPLE TYPE: CHANNEL

SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 50

SAMPLE COLLECTOR: VONHEEDE (DOER)

LABORATORY: C.T. & E. CO.

LAB. NUMBER: 72-978

COAL NAME: UNNAMED

QUARTER SECTION: NE
SECTION: 36
TOWNSHIP: 15N
RANGE: 01W
QUADRANGLE: CENTRALIA 15

STRIKE: N35W
DIP: 22NE
MAJOR JOINTS IN COAL: N78W 76S

TOTAL SECTION MEASURED (FT): 6.7
COAL THICKNESS (FT): 4.3
SAMPLE THICKNESS (FT): 4.3

DATE OF SAMPLING: 08-19-80
DATE OF ANALYSIS: 10-08-80

AIR DRY LOSS: N

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<td>19.1</td>
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<tr>
<td>ASH</td>
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ULTIMATE ANALYSIS

| HYDROGEN                            | 3.3       | 5.2         | 5.2         |
| CARBON                              | 22.3      | 52.4        | 73.9        |
| NITROGEN                            | 0.6       | 0.5         | 0.7         |
| SULFUR                              | 2.7       | N/A         | N/A         |
| OXYGEN(IND)                         | 18.7      | 43.8        | 25.2        |

HEATING VALUE (BTU/LB) ... 3695 -------- 8514 --------- 12021

ASH - INITIAL DEFORMATION ........... >2420 F
SOFTENING TEMP. ..................... >2475 F
FLUID TEMP. ........................ >2700 F

SULFUR FORMS

| SULFATE                            | N         |
| PYRITIC                            | N         |
| ORGANIC                            | N         |

MISCELLANEOUS COMMENTS:
COUNTY: LEWIS

SAMPLE NUMBER: (154) 05-81

MINE NAME: NONE
COAL AREA: CENTRALIA
SAMPLE SITE ELEVATION (FT): 400

GEOLeGIC FORMATION: SKookUMCHuck
AGE: Eocene

EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 100
SAMPLE COLLECTOR: VONHEEDEr (DGER)

LABORATORY: C.T. & E. CO.

COAL NAME: UPPER THOMPSON

QUARTER SECTION: NE
SECTION: 36
TOWNSHIP: 15N
RANGE: 01W
QUADRANGLE: CENTRALIA 15

STRIKE: N85W
DIP: 15NE
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): 22.1
SAMPLE THICKNESS (FT): 7.5

DATE OF SAMPLING: 05-22-81
DATE OF ANALYSIS: 07-02-81

LAB. NUMBER: 72-107

AIR DRY LOSS: N

PROXIMATE ANALYSIS

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<th>COAL (DMMF)</th>
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HEATING VALUE (BTU/LB) ... 6769 ... 8166 ... 11733

ASH - INITIAL DEFORMATION ... 2520 F
SOFTENING TEMP. ... 2570 F
FLUID TEMP. ... 2670 F

SULFUR FORMS

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<tr>
<td>PYRITIC</td>
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<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: sample from dept. natural resources administered lands. correlation of coal with upper thompson seam is uncertain.
COUNTY: LEWIS

SAMPLE NUMBER: (155)06-81

COAL NAME: SMITH

MINE NAME: NONE

COAL AREA: CENTRALIA

SAMPLE SITE ELEVATION (FT): N

QUARTER SECTION: NE

SECTION: 36

TOWNSHIP: 15N

RANGE: 01W

QUADRANGLE: CENTRALIA 15

GEOLOGIC FORMATION: SKOOKUMCHUCK

STRIKE: N/A

AGE: EOCENE

DIP: N/A

MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: STREAMCUT

TOTAL SECTION MEASURED (FT): N

SAMPLE TYPE: CHANNEL

COAL THICKNESS (FT): N

SAMPLE CONDITION: WEATHERED

SAMPLE THICKNESS (FT): N

OVERBURDEN THICKNESS (FT): N

DATE OF SAMPLING: UNKNOWN

SAMPLE COLLECTOR: PARKIN (PRIVATE)

DATE OF ANALYSIS: 03-27-79

LABORATORY: BENNETT

LAB. NUMBER: NONE

AIR DRY LOSS: N

COAL

PROXIMATE ANALYSIS

COAL (AR)

COAL (MMMFF)

COAL (DMMF)

MOISTURE 20.9

N

N/A

VOLATILE MATTER 36.1

N

N

FIXED CARBON 38.5

N

N

ASH 4.5

N/A

N/A

ULTIMATE ANALYSIS

HYDROGEN N

N

N

CARBON N

N

N

NITROGEN N

N

SULFUR N

N/A

N/A

SULFUR IND. N

N

OXYGEN N

N

HEATING VALUE (BTU/LB) 9599

N

ASH - INITIAL DEFORMATION N F

SOFTENING TEMP. N F

FLUID TEMP. N F

SULFUR FORMS

SULFATE N

PYRITIC N

ORGANIC N

MISCELLANEOUS COMMENTS: SAMPLED BY NON-DGER PERSONNEL.
COUNTY: LEWIS

SAMPLE NUMBER: (156) 07-81

COAL NAME: BIG THOMPSON

QUARTER SECTION: NE
SECTION: 36
TOWNSHIP: 15N
RANGE: 01W
QUADRANGLE: CENTRALIA 15

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): N
SAMPLE THICKNESS (FT): N

DATE OF SAMPLING: UNKNOWN
DATE OF ANALYSIS: 03-27-79

LAB. NUMBER: NONE

LABORATORY: BENNETT

AIR DRY LOSS: N

COAL

PROXIMATE ANALYSIS

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<th>COAL (DMMF)</th>
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HEATING VALUE (BTU/LB) ... 10268

ASH - INITIAL DEFORMATION ......... N F
SOFTENING TEMP. ................. N F
FLUID TEMP. ................. N F

SULFUR FORMS

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<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: SAMPLED BY NON-OGER PERSONNEL.

- B 99 -
COUNTY: LEWIS

SAMPLE NUMBER: (158) 09-81

COAL NAME: UNNAMED

MINE NAME: NONE

QUARTER SECTION: SW

COAL AREA: WADE-WINLOCK

SECTION: 9

SAMPLE SITE ELEVATION (FT): 330

TOWNSHIP: 12N

QUADRANGLE: ADNA 15

AGE: EOCENE

STRIKE: N87E

EXPOSURE TYPE: DRILL-HOLE

DIP: 11NW

SAMPLE TYPE: CUTTINGS

SAMPLE CONDITION: FRESH

SAMPLE THICKNESS (FT): N

OVERBURDEN THICKNESS (FT): 125

TOTAL SECTION MEASURED (FT): N

SAMPLE COLLECTOR: VONHEEDER (OGER)

DATE OF SAMPLING: 04-07-81

DATE OF ANALYSIS: 07-02-81

LABORATORY: C.T. & E. CO.

LAB. NUMBER: 72-107

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<td>N/A</td>
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ULTIMATE ANALYSIS

| HYDROGEN      | 5.6 | 5.4 | 5.4 |
| CARBON        | 54.3 | 62.0 | 71.5 |
| NITROGEN      | 1.0 | 0.9 | 1.1 |
| SULFUR        | 1.3 | N/A | N/A |
| OXYGEN(IND)   | 26.8 | 30.5 | 21.5 |

HEATING VALUE (BTU/LB)   9361        10649        12281

ASH - INITIAL DEFORMATION   2120   F
SOFTENING TEMP.          2160   F
FLUID TEMP.             2200   F

SULFUR FORMS

| SULFATE | N |
| PYRITIC | N |
| ORGANIC | N |

MISCELLANEOUS COMMENTS: SAMPLE FROM DRILL-HOLE.
COUNTY: LEWIS

SAMPLE NUMBER: (159)10-81

COAL NAME: SUMMIT CREEK

MINE NAME: WEIKEL
COAL AREA: SUMMIT CREEK
SAMPLE SITE ELEVATION (FT): 3120

QUARTER SECTION: NE
SECTION: 13
TOWNSHIP: 14N
RANGE: 10E
QUADRANGLE: WHITE PASS 15

GEOLOGIC FORMATION: PUGET GROUP
AGE: EOCENE

STRIKE: N-S
DIP: 90

EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED

MAJOR JOINTS IN COAL: N/A

OVERBURDEN THICKNESS (FT): N
SAMPLE CONDITION: PHILLIPS (DGER)

DATE OF SAMPLING: 06-05-81
DATE OF ANALYSIS: 08-31-81

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: L08722

AIR DRY LOSS: 2.0

COAL
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<td>ASH</td>
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ULTIMATE ANALYSIS

| HYDROGEN          | 3.3  | 4.4   | 4.4   |
| CARBON            | 57.6 | 86.0  | 92.0  |
| NITROGEN          | 1.1  | 1.5   | 1.6   |
| SULFUR (IND)      | 0.6  | N/A   | N/A   |
| OXYGEN(IND)       | 7.1  | 10.5  | 5.1   |

HEATING VALUE (BTU/LB) ... 9657 14403 15394

ASH - INITIAL DEFORMATION N F
SOFTENING TEMP. N F
FLUID TEMP. N F

SULFUR FORMS

| SULFATE | N |
| PYRITIC | N |
| ORGANIC | N |

MISCELLANEOUS COMMENTS: SAMPLE FROM PORTAL AREA OF ABANDONED WATER LEVEL DRIFT. BRIGHT ORANGE IRON (?) STAINING PRESENT NEAR PORTAL. DUE TO SHEARING ALONG BEDDING PLANES, COAL EASILY CONFUSED WITH SHEARED CARB. SHALES.

-B101-
COUNTY: PIERCE

SAMPLE NUMBER: 01006-76

COAL NAME: WILKESON #6

MINE NAME: NONE

COAL AREA: WILKESON

SAMPLE SITE ELEVATION (FT): 1370

QUARTER SECTION: SW

SECTION: 2

TOWNSHIP: 18N

RANGE: 06E

QUADRANGLE: WILKESON 7.5

GEOLOGIC FORMATION: CARBONADO

STRIKE: N82W

AGE: EOCENE

DIP: 48NE

EXPOSURE TYPE: ROAD CUT

MAJOR JOINTS IN COAL: N/A

SAMPLE TYPE: CHANNEL

TOTAL SECTION MEASURED (FT): 14.7

SAMPLE CONDITION: FRESH

COAL THICKNESS (FT): 9.4

OVERBURDEN THICKNESS (FT): 175

SAMPLE THICKNESS (FT): 9.4

SAMPLE COLLECTOR: VONHEEDER (DGCR)

DATE OF SAMPLING: 08-03-76

DATE OF ANALYSIS: 01-13-77

LABORATORY: USBM

LAB. NUMBER: K69674

AIR DRY LOSS: 6.0

COAL (AR)

COAL (MMMF)

COAL (DMMF)

PROXIMATE ANALYSIS

MOISTURE ................. 11.8 ................. 16.3 ................. N/A

VOLATILE MATTER ........... 12.4 ................. 25.5 ................. 30.5

FIXED CARBON ............... 43.9 ................. 61.1 ................. 73.1

ASH ....................... 25.9 ................. N/A ................. N/A

ULTIMATE ANALYSIS

HYDROGEN ................. 3.8 ................. 4.0 ................. 4.0

CARBON .................. 47.8 ................. 66.5 ................. 79.7

NITROGEN ................. 1.8 ................. 2.4 ................. 2.9

SULFUR ................... 0.6 ................. N/A ................. N/A

OXYGEN(IND) ............... 20.1 ................. 27.9 ................. 15.9

HEATING VALUE (BTU/LB) ... 7839 ................. 10892 ................. 13037

ASH - INITIAL DEFORMATION ....... >2800 F

SOFTENING TEMP. .......... >2800 F

FLUID TEMP. ............... >2800 F

SULFUR FORMS

SULFATE .................... 0.01

PYRITIC .................... 0.15

ORGANIC ................... 0.41

MISCELLANEOUS COMMENTS:

-B102-
COUNTY: PIERCE

SAMPLE NUMBER: (011)07-76

MINE NAME: NONE
COAL AREA: WILKESON
SAMPLE SITE ELEVATION (FT): 1400

GEOLOGIC FORMATION: CARBONADO
AGE: EOCENE

EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 40
SAMPLE COLLECTOR: VONHEEDER (DGER)

LABORATORY: USBM

COAL NAME: WILKESON NO. 7

QUARTER SECTION: SW
SECTION: 2
TOWNSHIP: 18N
RANGE: 06E
QUADRANGLE: WILKESON 7.5

STRIKE: N82W
DIP: 48NE
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 9.4
COAL THICKNESS (FT): 6.2
SAMPLE THICKNESS (FT): 6.2

DATE OF SAMPLING: 08-03-76
DATE OF ANALYSIS: 01-13-77

LAB. NUMBER: K69675

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ASH - INITIAL DEFORMATION: >2800 F
SOFTENING TEMP.: >2800 F
FLUID TEMP.: >2800 F

SULFUR FORMS
SULFATE: 0.01
PYRITIC: 0.26
ORGANIC: 0.43

MISCELLANEOUS COMMENTS: APPROXIMATELY 2 FT. WEATHERED COAL EXCAVATED BEFORE SAMPLING.
COUNTY: PIERCE

SAMPLE NUMBER: (012)08-76
COAL NAME: NISQUALLY #8

MINE NAME: MASHELL #1
QUARTER SECTION: NW
COAL AREA: ASHFORD
SECTION: 27
SAMPLE SITE ELEVATION (FT): 1720
TOWNSHIP: 15N
QUADRANGLE: KAPOWSIN 15
AGE: EOCENE
STRIKE: N/A
EXPOSURE TYPE: MINE DUMP
DIP: N/A
SAMPLE TYPE: GRAB
MAJOR JOINTS IN COAL: N/A
SAMPLE CONDITION: WEATHERED
TOTAL SECTION MEASURED (FT): N
OVERBURDEN THICKNESS (FT): N
COAL THICKNESS (FT): N
SAMPLE COLLECTOR: VONHEEDER (OGER)
DATE OF SAMPLING: 08-19-76
LAB. NUMBER: K69490
DATE OF ANALYSIS: 01-10-77

LABORATORY: USBM

AIR DRY LOSS: 0.0

PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) ... 10669 ......... 14575 ......... 15071

ASH - INITIAL DEFORMATION ....... >2800 F
SOFTENING TEMP. ................. >2800 F
FLUID TEMP. ................. >2800 F

SULFUR FORMS

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<tr>
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<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: MINE CLOSED SINCE 1925. 3-4 FT. DUMP MATERIAL EXCAVATED BEFORE SAMPLING.
COUNTY: SKAGIT

SAMPLE NUMBER: (017)01-77
COAL NAME: CUMBERLAND #2

MINE NAME: #2 TUNNEL
COAL AREA: HAMILTON
SAMPLE SITE ELEVATION (FT): 450

GEOLOGIC FORMATION: CHUCKANUT
AGE: CRETACEOUS-TERTIARY

EXPOSURE TYPE: TUNNEL
SAMPLE TYPE: GRAB
SAMPLE CONDITION: FRESH
OVERBURDEN THICKNESS (FT): 200
SAMPLE COLLECTOR: VONHEEDER (OGER)

LABORATORY: USBM
LAB. NUMBER: K74812

QUARTER SECTION: SE
SECTION: 22
TOWNSHIP: 35N
RANGE: 06E
QUADRANGLE: HAMILTON 15

STRIKE: N25W
DIP: 47SW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): N
SAMPLE THICKNESS (FT): N

DATE OF SAMPLING: 03-10-77
DATE OF ANALYSIS: 07-20-77

<table>
<thead>
<tr>
<th>PROXIMATE ANALYSIS</th>
<th>COAL (AR)</th>
<th>COAL (MMMFM)</th>
<th>COAL (DMMFM)</th>
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<tbody>
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<th>15937</th>
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ASH - INITIAL DEFORMATION: 2100 F
SOFTENING TEMP: 2195 F
FLUID TEMP: 2395 F

SULFUR FORMS
SULFATE: 0.01
PYRITIC: 0.43
ORGANIC: 0.37

MISCELLANEOUS COMMENTS: FROM BASAL PORTION OF CHUCKANUT FM. #2 TUNNEL OPEN FOR 225 FT. SAMPLE FROM CAVED AREA AT END OF TUNNEL. SEAM THICKNESS NOT DETERMINED DUE TO SLUMPING AT SAMPLE POINT.
COUNTY: SKAGIT

SAMPLE NUMBER: (018)02-77
COAL NAME: CUMBERLAND #1

MINE NAME: #2 TUNNEL
COAL AREA: HAMILTON
SAMPLE SITE ELEVATION (FT): 450
QUARTER SECTION: SE
SECTION: 22
TOWNSHIP: 35N
RANGE: 06E
QUADRANGLE: HAMILTON 15

GEOLIGIC FORMATION: CHUCKANUT
AGE: CRETAEOUS-TERTIARY
STRIKE: N25W
DIP: 47SW
MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: TUNNEL
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH
TOTAL SECTION MEASURED (FT): 1.6
COAL THICKNESS (FT): 1.6
SAMPLE THICKNESS (FT): 1.6

OVERBURDEN THICKNESS (FT): 200
DATE OF SAMPLING: 03-10-77
SAMPLE COLLECTOR: VONHEEDEER (DGER)
DATE OF ANALYSIS: 07-20-77
LAB. NUMBER: K74813

LABORATORY: USBM

AIR DRY LOSS: 6.9

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<th>COAL (DMM)</th>
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<tr>
<td>MOISTURE</td>
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ULTIMATE ANALYSIS

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<td>OXYGEN (IND)</td>
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HEATING VALUE (BTU/LB) 7366 13146 15220

ASH - INITIAL DEFORMATION 2200 F
SOFTENING TEMP. 2290 F
FLUID TEMP. 2410 F

SULFUR FORMS

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<td>PYRITIC</td>
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<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: SAMPLE FROM END OF #2 TUNNEL, 10 FT. DOWN-
SECTION FROM (017)01-77. MEASURED SECTION CORRELATED WITH
SECTION OF (019)03-77.
COUNTY: SKAGIT

SAMPLE NUMBER: (019)03-77
COAL NAME: CUMBERLAND #1

MINE NAME: NONE
COAL AREA: HAMILTON
SAMPLE SITE ELEVATION (FT): 500

GEOLeGIC FORMATION: CHUCKANUT
AGE: CRETAceOUS-TERTIARY

EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: VONHEEDER (OGER)

LABORATORY: USBM
LAB. NUMBER: K74814

QUARTER SECTION: SE
SECTION: 22
TOWNSHIP: 35N
RANGE: 06E
QUADRANGLE: HAMILTON 15

STRIKE: N40W DIP: 45SW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 3.0
COAL THICKNESS (FT): 2.4
SAMPLE THICKNESS (FT): 2.4

DATE OF SAMPLING: 03-10-77
DATE OF ANALYSIS: 07-20-77

AIR DRY LOSS: 4.0

PROXIMATE ANALYSIS

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<tr>
<th>Moisture</th>
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<tr>
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<td>Fixed Carbon</td>
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<td>Ash</td>
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<td>N/A</td>
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ULTIMATE ANALYSIS

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<td>Nitrogen</td>
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<td>Sulfur</td>
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<td>Oxygen (Ind.)</td>
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HEATING VALUE (BTU/LB) ... 7156 ................ 14108 ........... 15798

ASH - INITIAL DEFORMATION .... 2440 F
SOFTENING TEMP. ............... 2555 F
FLUID TEMP. .................. 2670 F

SULFUR FORMS

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<tr>
<td>Organic</td>
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MISCELLANEOUS COMMENTS: 2 FT. WEATHERED MATERIAL EXCAVATED BEFORE SAMPLING. ROADCUT LOCATED AT CUMBERLAND CREEK BRIDGE. MEASURED SECTION CORRELATED WITH #2 TUNNEL SECTION (SAMPLE (018)02-77).

-R107-
COUNTY: SKAGIT

SAMPLE NUMBER: (037)11-78

COAL NAME: CUMBERLAND #3

MINE NAME: TUNNEL #3 (?)

QUARTER SECTION: SE

COAL AREA: HAMILTON

SECTION: 23

SAMPLE SITE ELEVATION (FT): 1500

TOWNSHIP: 35N

AGE: CRETACEOUS-TERTIARY

RANGE: 06E

GEOLIGIC FORMATION: CHUCKANUT

QUADRANGLE: HAMILTON 15

AGE: CRETACEOUS-TERTIARY

EXPOSURE TYPE: TUNNEL

STRIKE: N15W

SAMPLE TYPE: CHANNEL

DIP: 12SW

SAMPLE CONDITION: FRESH

MAJOR JOINTS IN COAL: N/A

OVERBURDEN THICKNESS (FT): 45

TOTAL SECTION MEASURED (FT): N

SAMPLE COLLECTOR: VONHEEDEER (ODER)

COAL THICKNESS (FT): 2.0

DATE OF SAMPLING: 10-10-78

SAMPLE THICKNESS (FT): 2.0

DATE OF ANALYSIS: 05-18-78

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K92618

AIR DRY LOSS: 3.0

COAL (AR)

COAL (MMMF)

COAL (DMMF)

PROXIMATE ANALYSIS

| MOISTURE | 4.3 | 12.6 | N/A |
| VOLATILE MATTER | 10.0 | 29.5 | 33.8 |
| FIXED CARBON | 24.5 | 72.6 | 83.3 |
| ASH | 61.2 | N/A | N/A |

ULTIMATE ANALYSIS

| HYDROGEN | 2.6 | 7.0 | 7.9 |
| CARBON | 27.8 | 82.4 | 94.5 |
| NITROGEN | 0.6 | 1.6 | 1.8 |
| SULFUR | 0.5 | N/A | N/A |
| OXYGEN(IND) | 7.3 | 21.5 | 11.6 |

HEATING VALUE (BTU/LB) ... 4080 12058 13826

ASH - INITIAL DEFORMATION ... 2460 F
SOFTENING TEMP. ... 2560 F
FLUID TEMP. ... 2650 F

SULFUR FORMS

| SULFATE | 0.31 |
| PYRITIC | 0.21 |
| ORGANIC | 0.26 |

MISCELLANEOUS COMMENTS: TUNNEL FLOODED FOR 79 YEARS. RIGHT-ENTRY SAMPLE. SEE (040)14-78 AND (041)15-78 FOR ANALYSES FROM SAME LOCATION.
COUNTY: SKAGIT

SAMPLE NUMBER: (C38)12-78

MINE NAME: NONE
COAL AREA: HAMILTON
SAMPLE SITE ELEVATION (FT):  500

GEOLOGIC FORMATION: CHUCKANUT
AGE: CRETAUCEOUS-TERTIARY

EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: VONHEEDE (DGER)

COAL NAME: CUMBERLAND #1

QUARTER SECTION: SE
SECTION: 23
TOWNSHIP: 35N
RANGE: 06E
QUADRANGLE: HAMILTON 15

STRIKE: N40W
DIP: 45SW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 3.0
COAL THICKNESS (FT): 2.3
SAMPLE THICKNESS (FT): 2.3

DATE OF SAMPLING: 10-10-78
DATE OF ANALYSIS: 05-17-78

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K92621

AIR DRY LOSS: 0.0

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<th>COAL (DMMF)</th>
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<tr>
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<td>31.9</td>
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<td>N/A</td>
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<td>ASH</td>
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ULTIMATE ANALYSIS

|                |            | 2.8          | 5.2          | 5.2          |
| HYDROGEN       |            | 44.5         | 88.5         | 91.4         |
| CARBON         |            | 0.8          | 1.4          | 1.5          |
| NITROGEN       |            | 0.6          | N/A          | N/A          |
| SULFUR         |            | 5.5          | 10.8         | 8.2          |
| OXYGEN(IND)    |            |              |              |              |

HEATING VALUE (BTU/LB) ... 7418 .............. 14715 .............. 15200

ASH - INITIAL DEFORMATION ........ 2120 F
SOFTENING TEMP. ................. 2210 F
FLUID TEMP. .................... 2320 F

SULFUR FORMS

|                |            |            |
| SULFATE        |            | 0.00       |
| PYRRHITIC      |            | 0.20       |
| ORGANIC        |            | 0.40       |

MISCELLANEOUS COMMENTS: SAME LOCALITY AND COAL AS (019)03-77.

-B109-
COUNTY: SKAGIT

SAMPLE NUMBER: (039)13-78
COAL NAME: CUMBERLAND #1

MINE NAME: TUNNEL #2
QUARTER SECTION: SE
COAL AREA: HAMILTON
SECTION: 23
SAMPLE SITE ELEVATION (FT): 450
TOWNSHIP: 35N
QUADRANGLE: HAMILTON 15
RANGE: 06E

GEOLOGIC FORMATION: CHUCKANUT
STRIKE: N20W
AGE: CRETAEROUS-TERTIARY
DIP: 65SW
MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: TUNNEL
TOTAL SECTION MEASURED (FT): 2.7
SAMPLE TYPE: CHANNEL
COAL THICKNESS (FT): 2.7
SAMPLE CONDITION: FRESH
SAMPLE THICKNESS (FT): 2.7
OVERBURDEN THICKNESS (FT): 200
DATE OF SAMPLING: 10-25-78
SAMPLE COLLECTOR: VONHEEDE (DGRE)
DATE OF ANALYSIS: 05-17-78

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K92622

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<td>MOISTURE</td>
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<td>FIXED CARBON</td>
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<td>84.1</td>
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<tr>
<td>ASH</td>
<td>41.2</td>
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<td>N/A</td>
</tr>
</tbody>
</table>

| ULTIMATE ANALYSIS |           |             |             |
| HYDROGEN         | 3.4       | 5.3         | 5.3         |
| CARBON           | 45.0      | 81.5        | 92.2        |
| NITROGEN         | 0.9       | 1.4         | 1.6         |
| SULFUR           | 0.7       | N/A         | N/A         |
| OXYGEN(IND)      | 8.7       | 15.6        | 6.0         |

HEATING VALUE (BTU/LB) ... 7776 ............... 14044 ............... 15889

ASH - INITIAL DEFORMATION .......... >2620 F
SOFTENING TEMP. ................. >2710 F
FLUID TEMP. ................. >2800 F

SULFUR FORMS
SULFATE ...................... N
PYRITIC  ...................... N
ORGANIC  ...................... N

MISCELLANEOUS COMMENTS: SAMPLED 180 FT. FROM PORTAL INSIDE TUNNEL.
### Coal Sample Information

**Sample Number:** (040)14-78  
**Coal Name:** Cumberland #3

**Mine Name:** Tunnel #3  
**Coal Area:** Hamilton

**Sample Site Elevation (ft):** 1500

**Geologic Formation:** Chuckanut  
**Age:** Cretaceous-Tertiary

**Exposure Type:** Tunnel  
**Sample Type:** Channel  
**Sample Condition:** Fresh

**Overburden Thickness (ft):** 45  
**Sample Collector:** VonHeeder (DGER)

**Laboratory:** DOE-Pittsburg  
**Lab. Number:** K92619

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<td>Oxygen(Ind)</td>
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**Sulfur Forms**

- Sulfate: 0.01
- Pyritic: 0.19
- Organic: 0.45

**Miscellaneous Comments:** See (037)11-78 and (41)15-78 for analyses from same location.
COUNTY: SKAGIT

SAMPLE NUMBER: (041)15-78

COAL NAME: CUMBERLAND #3

MINE NAME: TUNNEL #3

COAL AREA: HAMILTON

SAMPLE SITE ELEVATION (FT): 1500

QUARTER SECTION: SE

SECTION: 23

TOWNSHIP: 35N

RANGE: 6E

QUADRANGLE: HAMILTON 15

GEOLOGIC FORMATION: CHUCKANUT

AGE: CRETAUCEOUS-TERTIARY

STRIKE: N15W

DIP: 12SW

MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: TUNNEL

SAMPLE TYPE: CHANNEL

SAMPLE CONDITION: FRESH

TOTAL SECTION MEASURED (FT): 1.8

COAL THICKNESS (FT): 1.8

SAMPLE THICKNESS (FT): 1.8

OVERBURDEN THICKNESS (FT): 45

DATE OF SAMPLING: 10-25-78

SAMPLE COLLECTOR: VONHEEGER (DGER)

DATE OF ANALYSIS: 05-17-78

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K92620

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<td>FLUID TEMP.</td>
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SULFUR FORMS

| SULFATE | 0.01 |
| PYRITIC | 0.17 |
| ORGANIC | 0.35 |

MISCELLANEOUS COMMENTS: SEE (037)11-78 AND (040)14-78 FOR ANALYSES FROM SAME LOCATION.
COUNTY: SKAGIT

SAMPLE NUMBER: (042)16-78

COAL NAME: UNNAMED

MINE NAME: NONE

COAL AREA: HAMILTON

SAMPLE SITE ELEVATION (FT): 3560

GEOLOGIC FORMATION: CHUCKANUT

AGE: CRETACEOUS-TERTIARY

EXPOSURE TYPE: ROADCUT

SAMPLE TYPE: CHANNEL

SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 2

SAMPLE COLLECTOR: VONHEEDER (DGER)

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K92623

QUARTER SECTION: NW

SECTION: 18

TOWNSHIP: 34N

RANGE: 07E

QUADRANGLE: OSO 15

STRIKE: N15W

DIP: 53SW

MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 7.5

COAL THICKNESS (FT): 1.5

SAMPLE THICKNESS (FT): 1.5

DATE OF SAMPLING: 10-25-78

DATE OF ANALYSIS: 05-18-79

AIR DRY LOSS: 12.0

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ULTIMATE ANALYSIS

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<th>COAL (DMMF)</th>
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<td>81.9</td>
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<td>1.4</td>
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HEATING VALUE (BTU/LB) ........ 7129 .......... 10130 .......... 13684

ASH - INITIAL DEFORMATION .......... >2800 F

SOFTENING TEMP. .......... >2800 F

FLUID TEMP. .......... >2800 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: ONLY BOTTOM 1.5 FT. OF A BONEY AND IMPURE SEAM SAMPLED.
COUNTY: SKAGIT

SAMPLE NUMBER: (043)17-78
COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: DEFOREST CREEK
SAMPLE SITE ELEVATION (FT): 2100

GEOLOGIC FORMATION: CHUCKANUT
AGE: CRETAKEOUS-TERTIARY

EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 35
SAMPLE COLLECTOR: VONHEEDER (ODER)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K92624

QUARTER SECTION: NW
SECTION: 36
TOWNSHIP: 34N
RANGE: 07E
QUADRANGLE: 050 15

STRIKE: NO2E
DIP: 47NW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 2.7
COAL THICKNESS (FT): 2.7
SAMPLE THICKNESS (FT): 2.7

DATE OF SAMPLING: 10-26-78
DATE OF ANALYSIS: 05-18-79

AIR DRY LOSS: 10.0

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<th>COAL (AR)</th>
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<th>COAL (DMMF)</th>
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HEATING VALUE (BTU/LB)  6480  12099  15433

ASH - INITIAL DEFORMATION  >2800  F
SOFTENING TEMP.  >2800  F
FLUID TEMP.  >2800  F

SULFUR FORMS
| SULFATE | 0.02 |
| PYRITIC | 0.42 |
| ORGANIC | 0.31 |

MISCELLANEOUS COMMENTS:
COUNTY: SKAGIT

SAMPLE NUMBER: (944)18-78
COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: COKEDALE
SAMPLE SITE ELEVATION (FT): 100

GEOLIGIC FORMATION: CHUCKANUT
AGE: CRETAUCEOUS-TERTIARY

EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 70
SAMPLE COLLECTOR: VONHEEDER (DG)ER

QUARTER SECTION: NW
SECTION: 13
TOWNSHIP: 35N
RANGE: 05E
QUADRANGLE: WICKERSHAM 15

STRIKE: N05E
DIP: 42NW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 9.3
COAL THICKNESS (FT): 5.2
SAMPLE THICKNESS (FT): 5.2

DATE OF SAMPLING: 10-26-78
DATE OF ANALYSIS: 05-18-79

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K92625

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|            |             |            |               |             |
| ULTIMATE ANALYSIS | |            |               |             |
| HYDROGEN   | 3.7          | 6.5        | 6.5           |
| CARBON     | 42.7         | 80.8       | 87.4          |
| NITROGEN   | 8.9          | 1.6        | 1.7           |
| SULFUR     | 0.5          | N/A        | N/A           |
| OXYGEN(IND) | 8.7          | 16.4       | 10.4          |

| HEATING VALUE (BTU/LB) | 7475             | 14125        | 15284        |

| ASH - INITIAL DEFORMATION | 2560             | F            |
| SOFTENING TEMP.           | 2650             | F            |
| FLUID TEMP.               | 2750             | F            |

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<tr>
<th>SULFUR FORMS</th>
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<th>ORGANIC</th>
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MISCELLANEOUS COMMENTS:

-8115-
COUNTY: SKAGIT

SAMPLE NUMBER: (045)19-78

COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: COKEDALE
SAMPLE SITE ELEVATION (FT): 410

GEOLGIC FORMATION: CHUCKANUT
AGE: CRATACEOUS-TERTIARY

EXPOSURE TYPE: TRENCH
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 10
SAMPLE COLLECTOR: VONHEEDER (DGER)

QUARTER SECTION: NW
SECTION: 13
TOWNSHIP: 35N
RANGE: 05E
QUADRANGLE: OSO 15

STRIKE: N56W
DIP: 62SW
MAJOR JOINTS IN COAL: N73E 41N

TOTAL SECTION MEASURED (FT): 11.3
COAL THICKNESS (FT): 2.3
SAMPLE THICKNESS (FT): 2.3

DATE OF SAMPLING: 10-26-78
DATE OF ANALYSIS: 05-18-79

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K92626

AIR DRY LOSS: 2.0

PROXIMATE ANALYSIS

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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) ... 9025 ......... 14755 ......... 15709

ASH - INITIAL DEFORMATION 2560 F
SOFTENING TEMP. 2610 F
FLUID TEMP. 2700 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: TRENCH 25 FT. X 250 FT. EXPOSED DURING FOUNDATION WORK FOR SKAGIT NUCLEAR REACTOR PROJECT.
COUNTY: SKAGIT

SAMPLE NUMBER: (079)33-79

COAL NAME: GLACIER ANTHR

QUARTER SECTION: NE
SECTION: 23
TOWNSHIP: 34N
RANGE: 07E
QUADRANGLE: OS0 15

STRIKE: N41E
DIP: N/A
MAJOR JOINTS IN COAL: N/A

GEOLOGIC FORMATION: CHUCKANUT
AGE: CRETACEOUS-TERTIARY

OVERBURDEN THICKNESS (FT): 110
SAMPLE COLLECTOR: VONHEEDER (DGER)

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K97352

AIR DRY LOSS: 6.0

PROXIMATE ANALYSIS

<table>
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<th>Component</th>
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<th>MMMF (wt%)</th>
<th>DMMF (wt%)</th>
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ULTIMATE ANALYSIS

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<th>DMMF (wt%)</th>
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HEATING VALUE (BTU/LB) 10269

ASH - INITIAL DEFORMATION 2500 F
SOFTENING TEMP. 2590 F
FLUID TEMP. 2680 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: COLLECTED IN STRUCTURALLY DISTURBED AREA.
COUNTY: SKAGIT

SAMPLE NUMBER: (082)36-79
COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: DEFOREST CREEK
SAMPLE SITE ELEVATION (FT): 3600

GEOLeGIC FORMATION: CHUCKANUT
AGE: CRETACEOUS-TERTIARY

EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 175
SAMPLE COLLECTOR: VONHEEDER (DGER)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K97355

QUARTER SECTION: SW
SECTION: 25
TOWNSHIP: 34N
RANGE: 07E
QUADRANGLE: OSO 15

STRIKE: N50E
DIP: 39NW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 12.7
COAL THICKNESS (FT): 1.7
SAMPLE THICKNESS (FT): 1.7

DATE OF SAMPLING: 09-12-79
DATE OF ANALYSIS: 12-06-79

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| ULTIMATE ANALYSIS | HYDROGEN | 4.3 | 4.7 | 4.7 |
| CARBON | 57.8 | 75.1 | 84.9 |
| NITROGEN | 1.5 | 1.8 | 2.1 |
| SULFUR | 0.7 | N/A | N/A |
| OXYGEN (IND) | 14.6 | 18.9 | 9.7 |

HEATING VALUE (BTU/LB) ... 9940 ... 12893 ... 14582

ASH - INITIAL DEFORMATION ... 2290 F
SOFTENING TEMP. ... 2440 F
FLUID TEMP. ... 2550 F

SULFUR FORMS
SULFATE ... 0.01
PYRITIC ... 0.21
ORGANIC ... 0.48

MISCELLANEOUS COMMENTS: MAY BE A CONTINUATION OF THE DEFOREST CREEK #1 SEAM. AREA SOMEWHAT DEFORMED AND JUMBLED.
COUNTY: THURSTON

SAMPLE NUMBER: (004)04-75
COAL NAME: SMITH

MINE NAME: WIDCO STRIP MINE
COAL AREA: CENTRALIA
SAMPLE SITE ELEVATION (FT): N

GEOLOGIC FORMATION: SKOOKUMCHUCK
AGE: EOCENE

EXPOSURE TYPE: STRIP MINE
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): N
SAMPLE COLLECTOR: VONHEEDER (ODER)

QUARTER SECTION: NE
SECTION: 23
TOWNSHIP: 15N
RANGE: 01W
QUADRANGLE: BUCODA 7.5

STRIKE: N30W
DIP: 06NE
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 8.1
COAL THICKNESS (FT): 6.3
SAMPLE THICKNESS (FT): 6.3

DATE OF SAMPLING: 09-10-75
DATE OF ANALYSIS: 11-05-76

LABORATORY: USBM
LAB. NUMBER: K67735

AIR DRY LOSS: 8.0

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<th>COAL (AR)</th>
<th>COAL (MMMFM)</th>
<th>COAL (DMMF)</th>
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<tr>
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ASH - INITIAL DEFORMATION 2280 F
SOFTENING TEMP. 2394 F
FLUID TEMP. 2460 F

SULFUR FORMS
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MISCELLANEOUS COMMENTS: SAMPLE FROM NORTH PIT; WASHINGTON IRRIGATION DEVELOPMENT COMPANY'S CENTRALIA STRIP PIT.
COUNTY: THURSTON

SAMPLE NUMBER: (070)24-79
COAL NAME: TONO NO. 2

MINE NAME: NONE
COAL AREA: CENTRALIA
SAMPLE SITE ELEVATION (FT): 380

GEOLeGIC FORMATION: SKOOKUMCHUCK
AGE: EOCENE

EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: VONHEEDER (DGCR)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K95701

QUARTER SECTION: NE
SECTION: 20
TOWNSHIP: 15N
RANGE: 01W
QUADRANGLE: TENINO 15

STRIKE: N36W
DIP: 07NE
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 3.0
COAL THICKNESS (FT): 2.1
SAMPLE THICKNESS (FT): 2.1

DATE OF SAMPLING: 07-23-79
DATE OF ANALYSIS: 10-02-79

AIR DRY LOSS: 9.0

PROXIMATE ANALYSIS

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<tr>
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<th>COAL (AR)</th>
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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) 4756 7849 11398

ASH - INITIAL DEFORMATION 2170 F
SOFTENING TEMP. 2250 F
FLUID TEMP. 2350 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: NEW ROADCUT THROUGH POSSIBLE LANDSLIDE. TOP OF SEAM NOT EXPOSED.
COUNTY: THURSTON

SAMPLE NUMBER: (076)30-79
COAL NAME: TONO NO. 1

MINE NAME: HANAFORD #1
QUARTER SECTION: SW
COAL AREA: CENTRALIA
SECTION: 21
SAMPLE SITE ELEVATION (FT): 340
TOWNSHIP: 15N
QUADRANGLE: TENINO 15
AGE: EOCENE
STRIKE: N/A
MAJOR JOINTS IN COAL: N/A
EXPOSURE TYPE: STRIP PIT
DIP: N/A
SAMPLE TYPE: CHANNEL
TOTAL SECTION MEASURED (FT): 8.7
SAMPLE CONDITION: FRESH
COAL THICKNESS (FT): 8.5
OVERBURDEN THICKNESS (FT): 0
DATE OF SAMPLING: 08-16-79
SAMPLE COLLECTOR: VONHEEDER (DGER)
DATE OF ANALYSIS: 10-02-79
LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K95707

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<td>SULFUR .................</td>
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<td>OXYGEN(IND) .............</td>
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<td>SOFTENING TEMP: &gt;2800 F</td>
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<td>SULFUR FORMS</td>
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<td>MISCELLANEOUS COMMENTS:</td>
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-B121-
COUNTY: WALLOWA

SAMPLE NUMBER: (699)11-80

COAL NAME: UNNAMED

MINE NAME: NONE

COAL AREA: GRANDE RONDE

SAMPLE SITE ELEVATION (FT): 3580

QUARTER SECTION: NE

SECTION: 35 TOWNSHIP: 06 N

RANGE: 44 E QUADRANGLE: FLORA 7.5

GEOLoGIC FORMATION: SADDLE MTN.

STRIKE: N/A

AGE: MIocene

DIP: N/A

EXPOSURE TYPE: ROAD CUT

MAJOR JOINTS IN COAL: N/A

SAMPLE TYPE: CHANNEL

TOTAL SECTION MEASURED (FT): 7.0

SAMPLE CONDITION: FRESH

COAL THICKNESS (FT): 2.0

OVERBURDEN THICKNESS (FT): 5

SAMPLE THICKNESS (FT): 2.0

SAMPLE COLLECTOR: STOFFEL (DGCR)

DATE OF SAMPLING: 04-17-80

LABORATORY: JOE-PITTSBURG

DATE OF ANALYSIS: 09-23-80

LAB. NUMBER: L03815

AIR DRY LOSS: 2.0

COAL

COAL

COAL

(AR) (MMMFM) (DMMFM)

PROXIMATE ANALYSIS

MOISTURE 12.5 15.0 N/A

VOLATILE MATTER 43.9 52.7 62.1

FIXED CARBON 28.2 33.8 39.8

ASH 15.4 N/A N/A

ULTIMATE ANALYSIS

HYDROGEN 5.4 5.6 5.6

CARBON 46.6 56.0 65.9

NITROGEN 0.5 0.5 0.6

SULFUR 0.4 N/A N/A

OXYGEN (IND) 31.7 38.1 29.1

HEATING VALUE (BTU/LB) 7944 9530 11216

ASH - INITIAL DEFORMATION 2310 F

SOFTENING TEMP. 2420 F

FLUID TEMP. 2500 F

SULFUR FORMS

SULFATE N

PYRITIC N

ORGANIC N

MISCELLANEOUS COMMENTS: SAMPLE FROM THE STATE OF OREGON.
COUNTY: WHATCOM

SAMPLE NUMBER: (003)03-75

COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: GLACIER
SAMPLE SITE ELEVATION (FT): 4250

QUARTER SECTION: SE
SECTION: 29
TOWNSHIP: 39N
RANGE: 07E
QUADRANGLE: MT. BAKER 15

GEOLOGIC FORMATION: CHUCKANUT
AGE: CRETACEOUS-TERTIARY

STRIKE: N54E
DIP: 56NW
MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED

TOTAL SECTION MEASURED (FT): 14.3
COAL THICKNESS (FT): 14.3
SAMPLE THICKNESS (FT): 14.3

OVERBURDEN THICKNESS (FT): N
SAMPLE COLLECTOR: VONHEEDER (DGEC)

DATE OF SAMPLING: 08-13-75
DATE OF ANALYSIS: 11-11-76

LABORATORY: USBM

LAB. NUMBER: K67734

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<td>NITROGEN</td>
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<td>SULFUR</td>
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<tr>
<td>OXYGEN(IND)</td>
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</table>

| HEATING VALUE (BTU/LB) | 12799 | 14737 | 15211 |

| ASH - INITIAL DEFORMATION | 2415 | F     |
| SOFTENING TEMP.          | 2525 | F     |
| FLUID TEMP.              | 2620 | F     |

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<tr>
<td>PYRITIC</td>
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MISCELLANEOUS COMMENTS: NEAR DISCOVERY MINE, TUNNEL #1.
COUNTY: WHATCOM

SAMPLE NUMBER: (005)01-76 COAL NAME: UNNAMED

MINE NAME: NONE QUARTER SECTION: SE
COAL AREA: RACEHORSE SECTION: 2
SAMPLE SITE ELEVATION (FT): 475 TOWNSHIP: 39N RANGE: 05E
AGE: CRETAZOCOUS-TERTIARY QUADRANGLE: VAN ZANDT 15

GEOLOGIC FORMATION: CHUCKANUT STRIKE: N40E
AGE: CRETACEOUS-TERTIARY DIP: 40NW
MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: ROADCUT TOTAL SECTION MEASURED (FT): 2.6
SAMPLE TYPE: CHANNEL COAL THICKNESS (FT): 1.1
SAMPLE CONDITION: FRESH SAMPLE THICKNESS (FT): 1.1

OVERBURDEN THICKNESS (FT): 25 DATE OF SAMPLING: 03-31-76
SAMPLE COLLECTOR: VONHEEDER (DGER) DATE OF ANALYSIS: N/A

LABORATORY: USGS LAB. NUMBER: D18312

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| HEATING VALUE (BTU/LB) | 8878 | 14119 | 14979 |

| ASH - INITIAL DEFORMATION | 2215 | F |
| SOFTENING TEMP | 2300 | F |
| FLUID TEMP | 2420 | F |

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<tr>
<td>ORGANIC</td>
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</table>

MISCELLANEOUS COMMENTS: TOP AND BOTTOM OF SECTION NOT EXPOSED. STRATIGRAPHIC POSITION IN CHUCKANUT FM. NOT KNOWN. COAL REPORTED TO YIELD 4.5 COKE BUTTON.
COUNTY: WHATCOM

SAMPLE NUMBER: (006)02-76

COAL NAME: UNNAMED

MINE NAME: VAN ZANDT
COAL AREA: VAN ZANDT
SAMPLE SITE ELEVATION (FT): N

GEOLOGIC FORMATION: CHUCKANUT
AGE: CRETACEOUS-TERTIARY

EXPOSURE TYPE: MINE DUMP
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): N
SAMPLE COLLECTOR: VONHEEDER (DGER)

QUARTER SECTION: SE
SECTION: 12
TOWNSHIP: 38N
RANGE: 04E
QUADRANGLE: VAN ZANDT 15

STRIKE: N45E
DIP: 27NW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): N
SAMPLE THICKNESS (FT): N

DATE OF SAMPLING: 01-04-76
DATE OF ANALYSIS: N/A

LAB. NUMBER: UNKNOWN

LABORATORY: C.T. & E. CO.

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<th>COAL (MMMF)</th>
<th>COAL (DMMF)</th>
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PROXIMATE ANALYSIS

ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) ... 6744 .......... 11204 .......... 11774

ASH - INITIAL DEFORMATION .......... N F
SOFTENING TEMP. .......... N F
FLUID TEMP. .......... N F

SULFUR FORMS

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<td>N</td>
</tr>
<tr>
<td>ORGANIC</td>
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</tbody>
</table>

MISCELLANEOUS COMMENTS: VAN ZANDT MINE LAST ACTIVE CIRCA 1946. ADIT CURRENTLY FLOODED. APPROX. 4 FT. DUMP MATERIAL EXCAVATED BEFORE SAMPLING. 3 EXCAVATIONS MADE WITH ABOUT 10 POUNDS TOTAL SAMPLE TAKEN BEFORE SPLITTING.

-B125-
SAMPLE NUMBER: (014)10-76
COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: GLACIER
SAMPLE SITE ELEVATION (FT): 4380

QUARTER SECTION: NE
SECTION: 22
TOWNSHIP: 39N
RANGE: 06E
QUADRANGLE: CANYON LAKE 7.5

GEOLOGIC FORMATION: CHUCKANUT
AGE: CRETAUCEOUS-TERTIARY

STRIKE: N45E
DIP: 78NW
MAJOR JOINTS IN COAL: N/A

EXPOSURE TYPE: OUTCROP
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

TOTAL SECTION MEASURED (FT): 6.0
COAL THICKNESS (FT): 4.0
SAMPLE THICKNESS (FT): 4.0

OVERBURDEN THICKNESS (FT): N
DATE OF SAMPLING: 10-12-76
SAMPLE COLLECTOR: VONHEEDER (DGER)
DATE OF ANALYSIS: 07-20-77

LABORATORY: USBM
LAB. NUMBER: K74807

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</thead>
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<tr>
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<tr>
<td>OXYGEN(IND)</td>
</tr>
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<tr>
<td>HEATING VALUE (BTU/LB)</td>
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<tr>
<td>ASH - INITIAL DEFORMATION</td>
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<tr>
<td>SOFTENING TEMP.</td>
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<tr>
<td>FLUID TEMP.</td>
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<td>SULFUR FORMS</td>
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<td>SULFATE</td>
</tr>
<tr>
<td>PYRITIC</td>
</tr>
<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: SAMPLE FROM POSSIBLE LANDSLIDE AREA. COAL BRECCIATED.

-8126-
**COUNTY:** WHATCOM

**SAMPLE NUMBER:** (015)11-76

**COAL NAME:** UNNAMED

**MINE NAME:** NONE

**COAL AREA:** GLACIER

**SAMPLE SITE ELEVATION (FT):** 3480

**QUARTER SECTION:** SW

**SECTION:** 22

**TOWNSHIP:** 39N

**RANGE:** 06E

**QUADRANGLE:** CANYON LAKE 7.5

**GEOLOGIC FORMATION:** CHUCKANUT

**AGE:** CRETAUCEOUS-TERTIARY

**EXPOSURE TYPE:** OUTCROP

**SAMPLE TYPE:** CHANNEL

**SAMPLE CONDITION:** WEATHERED

**STRIKE:** N22E

**DIP:** 54NW

**MAJOR JOINTS IN COAL:** N/A

**OVERBURDEN THICKNESS (FT):** N

**SAMPLE COLLECTOR:** VONHEEDER (DGER)

**TOTAL SECTION MEASURED (FT):** 2.5

**COAL THICKNESS (FT):** 1.3

**SAMPLE THICKNESS (FT):** 1.3

**DATE OF SAMPLING:** 10-13-76

**DATE OF ANALYSIS:** 07-20-77

**LABORATORY:** USHM

**LAB. NUMBER:** K74808

**AIR DRY LOSS:** 10.6

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<th>COAL (MMMF)</th>
<th>COAL (DMMF)</th>
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<td>ASH</td>
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**ULTIMATE ANALYSIS**

| HYDROGEN | 4.7            | 4.5          | 4.5       |
| CARBON    | 44.4           | 59.8         | 80.9      |
| NITROGEN  | 0.7            | 0.9          | 1.2       |
| SULFUR(IND)| 0.4           | N/A          | N/A       |
| OXYGEN(IND)| 25.1          | 35.1         | 16.1      |

**HEATING VALUE (BTU/LB) **: 7317

**ASH - INITIAL DEFORMATION** : 2400 F

**SOFTENING TEMP.** : 2520 F

**FLUID TEMP.** : 2620 F

**SULFUR FORMS**

| SULFATE | 0.01 |
| PYRITIC | 0.25 |
| ORGANIC | 0.11 |

**MISCELLANEOUS COMMENTS:** CORRELATION WITH OTHER COAL SEAMS IN AREA DIFFICULT DUE TO LIMITED EXPOSURE.
COAL NAME: UNNAMED

SAMPLE NUMBER: (016)12-76
COAL AREA: GLACIER
SAMPLE SITE ELEVATION (FT): 4080

MINE NAME: NONE
AGE: CRETACEOUS-TERTIARY
EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED
OVERBURDEN THICKNESS (FT): N
SAMPLE COLLECTOR: VONHEEDER (DGER)

GEologic FORMATION: CHUCKANUT
QUARTER SECTION: SE
SECTION: 17
TOWNSHIP: 39N
RANGE: 06E
QUADRANGLE: CANYON LAKE 7.5
STRIKE: N-S
DIP: 31E
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): 2.2
COAL THICKNESS (FT): 1.7
SAMPLE THICKNESS (FT): 1.7
DATE OF SAMPLING: 09-27-76
DATE OF ANALYSIS: 07-20-77

LABORATORY: USBM
LAB. NUMBER: K74809

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ASH - INITIAL DEFORMATION: 2455 F
SOFTENING TEMP: 2550 F
FLUID TEMP: 2645 F

SULFUR FORMS
| SULFATE | 0.01 |
| PYRITIC | 0.15 |
| ORGANIC | 0.58 |

MISCELLANEOUS COMMENTS: ABOUT 1.5 FT. WEATHERED COAL EXCAVATED BEFORE SAMPLING.
COUNTY: WHATCOM

SAMPLE NUMBER: (020)04-77  COAL NAME: UNNAMED

MINE NAME: NONE  QUARTER SECTION: SW
COAL AREA: ROCKY CREEK  SECTION: 35
SAMPLE SITE ELEVATION (FT): 2850  TOWNSHIP: 39N
GEOLOGIC FORMATION: CHUCKANUT  RANGE: 06E
AGE: CRETACEOUS-TERTIARY  QUADRANGLE: MT. BAKER 15
EXPOSURE TYPE: ROADCUT  STRIKE: NO2E
SAMPLE TYPE: CHANNEL  DIP: 56W
SAMPLE CONDITION: WEATHERED  MAJOR JOINTS IN COAL: N/A
OVERBURDEN THICKNESS (FT): 25  TOTAL SECTION MEASURED (FT): 5.3
SAMPLE COLLECTOR: VONHEEDER (DGER)  COAL THICKNESS (FT): 3.9
LABORATORY: USBM  SAMPLE THICKNESS (FT): 3.9
LAB. NUMBER: K7481C  DATE OF SAMPLING: 10-14-76

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| HEATING VALUE (BTU/LB) | 2958 | 11150 | 13628 |

ASH - INITIAL DEFORMATION 2800 F
SOFTENING TEMP. 2800 F
FLUID TEMP. 2800 F

SULFUR FORMS
SULFATE 0.01
PYRITIC 0.23
ORGANIC 0.11

MISCELLANEOUS COMMENTS: FROM BASAL PORTION OF THE CHUCKANUT FORMATION.
COUNTY: WHATCOM

SAMPLE NUMBER: (O21)05-77 COAL NAME: UNNAMED

MINE NAME: NONE QUARTER SECTION: NE
COAL AREA: STEWART PK. SECTION: 22
SAMPLE SITE ELEVATION (FT): 1950 TOWNSHIP: 38N
GEOLIGIC FORMATION: CHUCKANUT RANGE: 06E QUADRANGLE: MT. BAKER 15
AGE: CRETACEOUS-TERTIARY STRIKE: N82E
EXPOSURE TYPE: ROADCUT DIP: 38NW
SAMPLE TYPE: GRAB MAJOR JOINTS IN COAL: N/A
SAMPLE CONDITION: WEATHERED TOTAL SECTION MEASURED (FT): 3.3
OVERBURDEN THICKNESS (FT): 200 COAL THICKNESS (FT): 1.3
SAMPLE COLLECTOR: VONHEEDER (OGER) SAMPLE THICKNESS (FT): 1.3
LABORATORY: USBM DATE OF SAMPLING: 10-14-76
LAB. NUMBER: K74811 DATE OF ANALYSIS: 07-26-77

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SULFUR FORMS

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<tr>
<td>ORGANIC</td>
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MISCELLANEOUS COMMENTS: NO EXCAVATION OF WEATHERED MATERIAL DONE BEFORE SAMPLING.
SAMPLE NUMBER: (022)06-77        COAL NAME: NORTHSIDE

MINE NAME: NONE                  QUARTER SECTION: NE
COAL AREA: VAN ZANDT            SECTION: 34
SAMPLE SITE ELEVATION (FT): 675  TOWNSHIP: 39N
GEOLOGIC FORMATION: CHUCKANUT   RANGE: 05E
AGE: CRETAUCEOUS-TERTIARY
EXPOSURE TYPE: STREAMCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH
OVERBURDEN THICKNESS (FT): 55
SAMPLE COLLECTOR: VONHEEDER (DGER)

LABORATORY: USGS-DENVER

AIR DRY LOSS: 1.0

PROXIMATE ANALYSIS

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<th>Component</th>
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<th>DMMMF</th>
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<td>Fixed Carbon</td>
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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) 8673

ASH - INITIAL DEFORMATION 2100 F
SOFTENING TEMP. 2195 F
FLUID TEMP. 2395 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: 2 FT. OF COAL EXCAVATED BEFORE SAMPLE TAKEN. LOCALITY ON STATE-ADMINISTERED LANDS.
COUNTY: WHATCOM

SAMPLE NUMBER: (078)32-79
COAL NAME: UNNAMED

MINE NAME: DISCOVERY
COAL AREA: GLACIER
SAMPLE SITE ELEVATION (FT): N

GEOLOGIC FORMATION: CHUCKANUT
AGE: CRETAUCEOUS-TERTIARY

EXPOSURE TYPE: TUNNEL
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 25
SAMPLE COLLECTOR: VONHEEDER (DGER)

QUARTER SECTION: SE
SECTION: 29
TOWNSHIP: 39N
RANGE: 07E
QUADRANGLE: MT. BAKER 15

STRIKE: N68E
DIP: 67NW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): 14.3
SAMPLE THICKNESS (FT): 4.0

DATE OF SAMPLING: 09-13-79
DATE OF ANALYSIS: 12-06-79

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K97351

AIR DRY LOSS: 6.0

PROXIMATE ANALYSIS

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<th>Component</th>
<th>AR (%)</th>
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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) 3009 10406 15456

ASH - INITIAL DEFORMATION 2240 F
SOFTENING TEMP. 2330 F
FLUID TEMP. 2450 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS:
COUNTY: WHATCOM

SAMPLE NUMBER: (080)34-79

MINE NAME: NONE
COAL AREA: GLACIER
SAMPLE SITE ELEVATION (FT): 4500

GEOLOGIC FORMATION: CHUCKANUT
AGE: CRESCEDUS-TERTIARY

EXPOSURE TYPE: DOZER CUT
SAMPLE TYPE: GRAB
SAMPLE CONDITION: WEATHERED

OVERBURDEN THICKNESS (FT): 0
SAMPLE COLLECTOR: VONHEEDER (DGER)

LABORATORY: DOE-PITTSBURG
LAB. NUMBER: K97353

QUARTER SECTION: SE
SECTION: 29
TOWNSHIP: 39N
RANGE: 07E
QUADRANGLE: MT. BAKER 15

STRIKE: N/A
DIP: N/A
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION Measured (FT): N
COAL THICKNESS (FT): N
SAMPLE THICKNESS (FT): N

DATE OF SAMPLING: 09-13-79
DATE OF ANALYSIS: 12-06-79

AIR DRY LOSS: 2.0

PROXIMATE ANALYSIS

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<th>NITROGEN</th>
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ULTIMATE ANALYSIS

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HEATING VALUE (BTU/LB) 12816

ASH - INITIAL DEFORMATION 2250 F
SOFTENING TEMP 2370 F
FLUID TEMP 2470 F

SULFUR FORMS

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MISCELLANEOUS COMMENTS: THICKNESS OF COAL NOT DETERMINED BECAUSE OF SLUMPING OF BULLDOZER CUT.
SAMPLE NUMBER: (381)35-79

COAL NAME: UNNAMED

MINE NAME: NONE
COAL AREA: GLACIER
SAMPLE SITE ELEVATION (FT): 3700

GEOLIGIC FORMATION: CHUCKANUT
AGE: CRETAEGOUS-TERtiARY

EXPOSURE TYPE: ROADCUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: WEATHERED
OVERBURDEN THICKNESS (FT): 15
SAMPLE COLLECTOR: VONHEEDER (ODER)

LABORATORY: DOE-PITTSBURG

LAB. NUMBER: K97354

AIR DRY LOSS: 13.0

<table>
<thead>
<tr>
<th>PROXIMATE ANALYSIS</th>
<th>COAL (AR)</th>
<th>COAL (MMMF)</th>
<th>COAL (DMMF)</th>
</tr>
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<tbody>
<tr>
<td>MOISTURE</td>
<td>16.7</td>
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<tr>
<td>VOLATILE MATTER</td>
<td>11.3</td>
<td>32.9</td>
<td>64.2</td>
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<td>FIXED CARBON</td>
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<tr>
<td>ASH</td>
<td>60.8</td>
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<th>ULTIMATE ANALYSIS</th>
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<th>COAL (DMMF)</th>
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<td>CARBON</td>
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<tr>
<td>NITROGEN</td>
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<td>SULFUR</td>
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<td>OXYGEN(IND)</td>
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<td>62.7</td>
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HEATING VALUE (BTU/LB) 1914 5569 10858

ASH - INITIAL DEFORMATION 2540 F
SOFTENING TEMP. 2660 F
FLUID TEMP. 2750 F

SULFUR FORMS
SULFATE 0.01
PYRITIC 0.08
ORGANIC 0.04

MISCELLANEOUS COMMENTS:

-B134-
COUNTY: WHATCOM

SAMPLE NUMBER: (139)51-80

MINE NAME: NONE
COAL AREA: GLACIER
SAMPLE SITE ELEVATION (FT): 4500

GEOLOGIC FORMATION: CHUCKANUT
AGE: CRETACEOUS-TERTIARY

EXPOSURE TYPE: ROAD CUT
SAMPLE TYPE: CHANNEL
SAMPLE CONDITION: FRESH

OVERBURDEN THICKNESS (FT): 10
SAMPLE COLLECTOR: VONHEEDER (DGER)

LABORATORY: C.T. & E. CO.

COAL NAME: UNNAMED

QUARTER SECTION: SE
SECTION: 19
TOWNSHIP: 39N
RANGE: 07E
QUADRANGLE: MT. BAKER 15

STRIKE: N10E
DIP: 65NW
MAJOR JOINTS IN COAL: N/A

TOTAL SECTION MEASURED (FT): N
COAL THICKNESS (FT): 30.0
SAMPLE THICKNESS (FT): 30.0

DATE OF SAMPLING: 08-08-80
DATE OF ANALYSIS: 09-10-80

LAB. NUMBER: 72-978

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<td>AIR DRY LOSS: N</td>
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PROXIMATE ANALYSIS

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<tbody>
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<td>6.2</td>
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ULTIMATE ANALYSIS

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<th>NITROGEN</th>
<th>SULFUR</th>
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HEATING VALUE (BTU/LB) ... 12943 .......... 13669 .......... 14630

ASH - INITIAL DEFORMATION ........... >2530 F
SOFTENING TEMP. .................. >2700 F
FLUID TEMP. ..................... >2700 F

SULFUR FORMS

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<thead>
<tr>
<th>SULFATE</th>
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<th>ORGANIC</th>
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<tbody>
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<td>N</td>
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<td>N</td>
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</tbody>
</table>

MISCELLANEOUS COMMENTS: SEAM EXPOSED APPROX. 1/4 MILES NORTH OF DISCOVERY SEAM TUNNEL. ROADCUT EXCAVATED 1-2 YEARS AGO.