Canyon Fuel Company, LLC
Skyline Mines
C/007/005

2001 Annual Report

File in:
- ❑ Confidential
- ☒ Shelf
- ❑ Expandable

Refer to Record No 0015 Date 03292002
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For additional information

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GENERAL INFORMATION

Permitte Name	Canyon Fuel Company, LLC
Mine Name	Skyline Mine
Operator Name (If other then permittee)	
Permit Expiration Date	April 30, 2002
Permit Number	ACT/007/005
Authorized Representative Title	Dan Meadors, Vice President/General Manager
Phone Number	(435) 448-2619
Fax Number	(435) 448-2632
E-mail Address	dmeadors@archcoal.com
Mailing Address	Skyline Mine HC 35 Box 380 Helper, UT 84526
Resident Agent	Corporation Trust Company
Resident Agent Mailing Address	Corporation Trust Center 1209 Orange Street Wilmington, DE
Number of Binders Submitted	2

IDENTIFICATION OF OTHER PERMITS

Identify other permits that are required in conjunction with mining and reclamation activities.

Permit Type	ID Number	Description	Expiration Date
MSHA Mine ID(s)	1211-UT-09-01566-01	Skyline Mine	N/A
	1211-UT-09-0156602	Skyline Mine Waste Rock Disposal Site	N/A
MSHA Impoundment(s)	None		
NPDES/UPDES Permit(s)	Ut0023540-01, 02, 03	UPDES Permit for Skyline Mine, Rail	10-30-04
		Loadout, and Waste Rock Disposal Site	
PSD Permit(s) (Air)	147-98	Consolidation of three approval orders	N/A

Other

MSHA Mine ID(s)	1211-UT-09-01566-03	Skyline Mine Temporary Waste Rock Disposal Site	N/A
Storm Water Permit	UTR000578	Storm Water Discharge Permit	December 1, 2006

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CERTIFIED REPORTS

List the certified inspection reports as required by the rules and udder the approved plan that must be periodically submitted t the Division. Specify whether the information is included as Appendix A to this report or currently on file with the Division.

Certified Reports:	Required		Included or on file with DOGM		Comments
	Yes	No	Included	On File	
Excess Spoil Piles	☐	☒	☐	☐	
Refuse Piles	☒	☐	☐	☐	Appendix A
Impoundments	☒	☐	☐	☐	Appendix A
Other					
	☐	☐	☐	☐	
	☐	☐	☐	☐	

REPORTING OF OTHER TECHNICAL DATA

List other technical data and information as required under the approved plan, which must be periodically submitted to the Division. Specify whether the information is included as Appendix B to this report or currently on file with the Division.

Technical Data:	Required		Included or on file with DOGM		Comments
	Yes	No	Included	On file	
Climatological	☐	☒	☐	☐	
Subsidence Monitoring	☒	☐	☒	☐	Appendix B
Vegetation Monitoring	☐	☐	☒	☐	Appendix B
Raptor Survey	☐	☐	☒	☐	Appendix B
Soils Monitoring	☐	☒	☐	☐	
Water Monitoring	☐	☐	☐	☐	
First quarter	☒	☐	☐	☒	
Second quarter	☒	☐	☐	☒	
Third quarter	☒	☐	☐	☒	
Fourth quarter	☒	☐	☐	☒	
Geological / Geophysical	☐	☒	☐	☐	
Engineering	☐	☒	☐	☐	
Other Data					
James and Burnout Canyon Fish and Macroinvertabrate Studies	☒	☐	☒	☐	Appendix B
	☐	☐	☐	☐	
	☐	☐	☐	☐	
	☐	☐	☐	☐	

LEGAL, FINANCIAL, COMPLIANCE AND RELATED INFORMATION

Change in administration or corporate structure can often bring about necessary changes to information found in the mining and reclamation plan. The Division is Requesting that each permittee review

and update the legal, financial, compliance and related information in the plan as part of the annual report. Provide the department of Commerce, annual Report of Officers, or other equivalent information as necessary to ensure that the information provided in the plan is current. Provide any other change as necessary regarding land ownership, lease acquisitions, legal results from appeals of violations, or other changes as necessary to update information required in the mining and reclamation plan. Include and certified financial statements, audits or worksheets which may be required to meet bonding requirements. Specify whether the information is currently on file with the Division or included as Appendix C to the report.

Legal / Financial Update	**Required**		**Included or on File with DOGM**		**Comments**
	Yes	No	Included	On file	
Department of Commerce, Annual Report Officers	☐	☒	☐	☐	
Other					
Officers and Directors	☐	☒	☒	☐	Information used in Canyon Fuel Company, LLC permit renewal documents
	☐	☐	☐	☐	
	☐	☐	☐	☐	

MINE MAPS

Copies of mine maps, current and up-to-date through at least December 31, 2001, are to be provided to the Division as Appendix D to this report in accordance with the requirements of R 645-301-525.270. These map copies shall be made in accordance with 30 CFR 75.1200 as required by MSHA. Upon request, the Division shall keep mine maps confidential.

Map Number(s)	**Map Title/ Description**	**Confidential** Yes	No
	Skyline Mine 3 Level 1 2001 No Production	☒	☐
	Skyline Mine 3 Levels 2 and 3 2001 Longwall Production	☒	☐
	Mine 3 Level 2 5-Year Mine Plan (2002) Case 2	☒	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐
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		☐	☐
		☐	☐

OTHER INFORMATION

Please provide any comments of further information to be included as part of the Annual Report. Any other attachments are to be provided as Appendix E to this report. If information is submitted as a group rather then by individual mine, please identify each of the mine's data in the list below.

Additional attachment to this report? **Yes** ☐ **No** ☐

APPENDIX A

Certified Reports

Excess Spoil Piles
Refuse Piles
Impoundments

As required under R645-301-514

Certified Impoundment and Refuse Pile Reports

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	January 15, 2002
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Mine Site Sediment Pond	
	Impoundment Number	001	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION

Inspection Date	December 19, 2001
Inspected By	Douglas E. Johnson
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly & Annual

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

The banks of the sediment pond were generally snow covered at the time of inspection. Therefore, signs of instability are not readily observable. No instabilities in the pond embankment were noted during previous inspections performed this year by Gary Taylor. No hazardous conditions were observed during the inspection of the pond.

Required for an impoundment which functions as a SEDIMENTATION POND.	**2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.** Sediment Storage Capacity: 72,658 ft^3 60% Elevation: 8568.5 feet ASL (above sea level) 100% Elevation: 8571.5 feet ASL The current elevation of the sediment within the pond at the discharge point was approximately 8562 ft ASL. At this elevation, approximately 90% of the storage volume remains. However, a sediment delta has formed on the west end of the pond. The volume of the delta is assumed to be approximately 1,350 ft^3. Therefore, the remaining sediment volume storage capacity is approximately 64, 042 ft^3.
	3. Principle and emergency spillway elevations.

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT		

Principal and Emergency Spillway Elevations: 8579.6 feet ASL (The outlet structure for Pond 001 serves as both the Principal and Emergency Spillways)

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Water elevation at the time of inspection was 8579.7 (0.1 feet above discharge elevation). A sample of the pond discharge water has been taken on weekly basis throughout the quarter and year as required by the mine's UPDES permit. On a biweekly basis the water sample is analyzed for total iron and total dissolved solids. Weekly samples include oil and grease, total suspended solids, pH and conductivity.

Surface water and sand filter backflush water is collected from the upper mine pad and discharged through a culvert located on the west end of the pond. The culvert appeared to be functioning as designed. The outlet structure was working as designed. Currently, the mine discharges water collected in Mine #3 directly to the pond outlet structure, by-passing the pond. The maximum volume of water discharged from Mine #3 to the outlet structure is approximately 1650gpm.

A new baffle has been placed in the west end of the pond to aid in trapping sediments entering the pond. It appears to be functioning as designed. The delta forming behind this baffle will need to be removed this summer when conditions permit.

A small area on the north side of the pond has a colony of cattails. The colony poses no threat to the operation of the pond.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond does not appear to have been modified this quarter. The pond has continually discharged this quarter, therefore the minimum elevation has been no less than 8579.6. Flow depth above the level of the discharge pipe can vary between less than 0.01 and 0.26 feet. The estimated sediment in the pond in the fourth quarter of this year was 8,616 ft^3 and remaining sediment storage capacity is 64,042 ft^3. Total storage volume for water and sediment combined is 179,014 ft^3 (4.1 ac-ft). Based on the estimated volume of sediment, the estimated volume of water in the pond is 170, 398 ft^3 (3.9 ac-ft).

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Chad Hanson **Date:** 2-8-02

CERTIFIED REPORT

IMPOUNDMENT EVALUATION (If NO, explain under Comments)	YES	NO
1. Is impoundment designed and constructed in accordance with the approved plan?	Yes	
2. Is impoundment free of instability, structural weakness, or any other hazardous condition?	Yes	
3. Has the impoundment met all applicable performance standards and effluent limitations from the previous date of inspection?		No

COMMENTS AND OTHER INFORMATION

Exceedances of the UPDES permit limits of the allowable total tons per day of TDS discharged from the mine have occurred since the last inspection. These exceedances have been reported to the Utah Division of Water Quality (DWQ). Negotiations are on going with DWQ regarding methods for stopping the violations.

Certification Statement:

REGISTERED PROFESSIONAL ENGINEER
No. 160554-2202
DOUGLAS E. JOHNSON
[PE Cert Stamp]
STATE OF UTAH

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself or under my direction and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability in accordance with the Utah R645 Coal Mining Rules.

By: DOUGLAS E. JOHNSON, P.E.
(Full Name and Title) MGR. TECH. SERVICES

Signature: Douglas E Johnson **Date:** 2-8-02

P.E. Number & State: No. 160554-2202, UTAH

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	January 16, 2002
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Rail Loadout Sediment Pond	
	Impoundment Number	002	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION

Inspection Date	December 19, 2001
Inspected By	Douglas E. Johnson
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly & Annual

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

No instability of the embankment was noted during the inspection. The pond does contain water but it was frozen at the time of the inspection. Several inches of snow cover the embankments. No hazardous conditions were noted at the time of the inspection.

Required for an impoundment which functions as a SEDIMENTATION POND.	**2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.** Sediment Storage Capacity: 54,710 ft^3 60% Elevation: 7915.0 feet ASL (above sea level) 100% Elevation: 7915.6 ASL Current Sediment Level Elevation: 7914 feet ASL (from 3rd quarter 2001)
	3. Principle and emergency spillway elevations. Principle Spillway Elevation: 7919.7 feet ASL Emergency Spillway Elevation: 7922 feet ASL

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

The ice level is below discharge level of the primary spillway. Since a thick layer of ice covers the pond, the actual water level elevation was not determined. However, the base of the ice was estimated to be 18" below the elevation of the principle spillway discharge point. Therefore, the estimated water level was approximately 7,918 ft ASL. The pond has not discharged this quarter. The pond was cleaned of sediment in July 2000.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The geometry of the pond does not appear to have changed recently. The estimated sediment in the pond was not determined because of the ice cover. The sediment volume in the 3rd quarter of this year was estimated to be 5,471 ft^3 with a remaining sediment storage capacity of 49,239 ft^3. Since the area did not experience significant runoff events since the 3rd quarter inspection, the sediment volume did not likely increase significantly.

The estimated water level at the time of the inspection was approximately 7,918 ft ASL. An actual elevation was not determined because of the thick layer of ice covering the pond.

Total storage volume of water and sediment combined is 95,380 ft^3 (2.2 ac-ft). Assuming the sediment volume is approximately 5,471 ft^3, the estimated volume of water in the pond is approximately 73,279 ft^3 (1.7 ac-ft).

Qualification Statement	I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability. **Signature:** [illegible] **Date:** 2-8-02

CERTIFIED REPORT

IMPOUNDMENT EVALUATION (If NO, explain under Comments)	YES	NO
1. Is impoundment designed and constructed in accordance with the approved plan?	Yes	
2. Is impoundment free of instability, structural weakness, or any other hazardous condition?	Yes	
3. Has the impoundment met all applicable performance standards and effluent limitations from the previous date of inspection?	Yes	

COMMENTS AND OTHER INFORMATION

The pond discharged briefly in the second quarter of 2001. No exceedances of the UPDES limits occurred as a result of the discharge.

Certification Statement:

REGISTERED PROFESSIONAL ENGINEER
No. 160554-2202
DOUGLAS E. JOHNSON
STATE OF UTAH

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself or under my direction and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability in accordance with the Utah R645 Coal Mining Rules.

By: DOUGLAS E. JOHNSON, P.E.
(Full Name and Title) MGR. OF TECH. SERVICES

Signature: Douglas E Johnson **Date:** 2-8-02

P.E. Number & State: No. 160554-2202, UTAH

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			
Permit Number	C/007/005	Report Date	January 16, 2002
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company		
Impoundment Identification	Impoundment Name	Waste Rock Site Sediment Pond	
	Impoundment Number	003	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION

Inspection Date	December 19, 2001
Inspected By	Douglas E. Johnson
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Annual & Quarterly

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

The pond was not accessible at the time of inspection since the access road to the area has not passable since late November 2001 due to a thick covering of snow. Previous inspections performed during the year by Gary Taylor, an engineer employed by Canyon Fuel Company, have indicated no instability in the embankment exists.

Required for an impoundment which functions as a SEDIMENTATION POND.

2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

Sediment Storage Capacity: 6906 ft^3
60% Elevation: 7860.8 feet ASL (above sea level)
100% Elevation: 7861.3 ASL
Current Sediment Level Elevation: No significant volume of sediment was observed during the 3rd quarter of this year. No significant precipitation has fallen during this quarter. Therefore, it is assumed the elevation of the pond floor is still at 7860 ft ASL. The pond had been cleaned in October of 2000.

3. Principle and emergency spillway elevations.

Principal and Emergency Spillways Elevation: 7865.5 feet ASL (The outlet of Pond 003 serves as both the principal and emergency spillway).

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT		

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

No free water was in the pond in the 3rd quarter of this year. According to Chris Hansen, only a few inches of water was observed in the pond in mid-November of this quarter. This pond has not discharged this year, therefore no water samples have been obtained. No repairs to the pond have been needed in 2001.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond has not changed since October 2000 when the pond sediment was cleaned out. Total estimated available storage volume of water and sediment combined is 42,689 cu. ft. (0.98 ac-ft). This assumption is based on the minimal volume of water noted in the pond in November and the lack of significant infilling of sediment since the October 2000 cleanout.

Qualification Statement	I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability. Signature: [signature] Date: 2-8-02

CERTIFIED REPORT

IMPOUNDMENT EVALUATION (If NO, explain under Comments)	YES	NO
1. Is impoundment designed and constructed in accordance with the approved plan?	Yes	
2. Is impoundment free of instability, structural weakness, or any other hazardous condition?	Yes	
3. Has the impoundment met all applicable performance standards and effluent limitations from the previous date of inspection?	Yes	

COMMENTS AND OTHER INFORMATION

No water has discharged from the pond this quarter or during 2001..

Certification Statement:

REGISTERED PROFESSIONAL ENGINEER
No. 160554-2202
DOUGLAS E. JOHNSON
STATE OF UTAH

[Placed Stamp]

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself or under my direction and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability in accordance with the Utah R645 Coal Mining Rules.

By: DOUGLAS E. JOHNSON, P.E.
(Full Name and Title) MGR. OF TECH. SERVICES

Signature: Douglas E Johnson **Date:** 2-8-02

P.E. Number & State: No. 160554-2202, UTAH

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 3
Permit Number	ACT/007/005	**Report Date**	19 September 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Impoundment Identification	**Impoundment Name**	Rail Loadout Sediment Pond	
	Impoundment Number	002	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION

Inspection Date	19 September 2001
Inspected By	Gary E. Taylor
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

No instability of the embankment was noted.

Required for an impoundment which functions as a SEDIMENTATION POND.

2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

Sediment Storage Capacity: 54,710 ft^3.
60% Elevation: 7915.0 feet ASL (above sea level).
100% Elevation: 7915.6 feet ASL.
Current Sediment Level Elevation: 7914.25 feet ASL or 10% sediment storage volume.

3. Principle and emergency spillway elevations.

Principle Spillway Elevation: 7919.7 feet ASL.
Emergency Spillway Elevation: 7922 feet ASL.

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Water level is approximately 7914.7 feet ASL, 5.0 feet below discharge level at the principle spillway. Pond was not discharging at the time of the inspection.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond does not appear to have changed during the quarter. The water elevation is 7914.7 feet ASL. The estimated sediment in the pond is 5,471 ft^3 and the remaining sediment capacity is 49,239 ft^3. Total storage volume of water and sediment combined is 95,380 ft^3 (2.2 ac-ft). Based on the volume of estimated sediment, the estimate volume of water in the pond is 46,141 ft^3 (1.06 ac-ft).

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gary E. Taylor **Date:** 19 September 2001

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 3
Permit Number	ACT/007/005	**Report Date**	19 September 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Impoundment Identification	**Impoundment Name**	Minesite	
	Impoundment Number	001	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION	
Inspection Date	19 September 2001
Inspected By	Gary E. Taylor
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

No instability of the embankment was noted.

Required for an impoundment which functions as a SEDIMENTATION POND.	**2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.** Sediment Storage Capacity: 72,658 ft^3. 60 % Elevation: 8567.3 feet ASL (above sea level). 100% Elevation: 8570.5 feet ASL. Current Sediment Level Elevation: 8561.2 feet or 10% sediment storage volume.
	3. Principle and emergency spillway elevations. Principle and emergency spillway elevation: 8579.6 feet ASL. (The outlet of Pond 001 serves as both the principle and emergency spillway).

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Water elevation at the time of inspection is 8579.86 (.26 feet above discharge elevation). A sample of the pond discharge water is taken weekly, throughout the quarter. On a biweekly basis the water sample is analyzed for total iron and total dissolved solids. Weekly samples include oil and grease, total suspended solids, pH, and conductivity. The daily maximum tonnage discharge and total suspended solids limits established for the pond by DEQ was exceeded during this quarter. The remainder of the limit were not exceeded.

The culvert that discharges water collected as surface runoff from the upper mine pad is working as designed. The discharge pipes used to direct mine water to the pond are working as designed. The outlet structure is working as designed.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond does not appear to have been modified this quarter. The pond is continually discharged this quarter, therefore the minimum elevation has been no less than 8579.6 feet. Flow depth above the level of the discharge pipe varies between .01 and .26 feet. The estimated sediment in the pond is 7,266 ft^3 and the remaining sediment capacity is 65,392 ft^3. Total storage volume of water and sediment combined is 179,014 ft^3(4.1 ac-ft). Based on the volume of estimated sediment, the estimated volume of water in the pond is 171,748 ft^3 (3.94 ac-ft).

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gary E. Taylor **Date:** 19 September 2001

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 3
Permit Number	ACT/007/005	Report Date	25 September 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Impoundment Identification	Impoundment Name	Waste Rock Site Sediment Pond	
	Impoundment Number	003	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION

Inspection Date	25 September 2001
Inspected By	Gary E. Taylor
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

No instability of the embankment was noted.

Required for an impoundment which functions as a SEDIMENTATION POND.	
	2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment. Sediment Storage Capacity: 6,906 ft^3. 60% Elevation: 7860.8 feet ASL (above sea level). 100% Elevation: 7861.3 ASL Current Sediment Level Elevation: No significant volume of sediment in the pond observed. Current elevation of pond floor is 7860 feet ASL.
	3. Principle and emergency spillway elevations. Principle and emergency spillway elevation: 7865.5 feet ASL. (The outlet of Pond 003 serves as both the principle and emergency spillway).

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

No free water is currently in the pond. No sampling or monitoring is necessary since the pond is not discharging.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond does not appear to have changed during the quarter. Total storage volume of water and sediment combined is 42,6889 ft^3 (.98 ac-ft).

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gary E. Taylor **Date:** 25 September 2001

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 3
Permit Number	ACT/007/005	**Report Date**	28 June 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Impoundment Identification	**Impoundment Name**	Minesite	
	Impoundment Number	001	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION	
Inspection Date	28 June 2001
Inspected By	Gary E. Taylor
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

No instability of the embankment was noted.

Required for an impoundment which functions as a SEDIMENTATION POND.	**2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.** Sediment Storage Capacity: 72,658 ft^3. 60 % Elevation: 8567.3 feet ASL (above sea level). 100% Elevation: 8570.5 feet ASL. Current Sediment Level Elevation: 8561.2 feet or 10% sediment storage volume.
	3. Principle and emergency spillway elevations. Principle and emergency spillway elevation: 8579.6 feet ASL. (The outlet of Pond 001 serves as both the principle and emergency spillway).

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Water elevation at the time of inspection is 8579.63 (.03 feet above discharge elevation). A sample of the pond discharge water is taken weekly, throughout the quarter. On a biweekly basis the water sample is analyzed for total iron and total dissolved solids. Weekly samples include oil and grease, total suspended solids, pH, and conductivity. The daily maximum tonnage discharge limit established for the pond by DEQ was exceeded during this quarter. The remainder of the limit were not exceeded.

The culvert that discharges water collected as surface runoff from the upper mine pad is working as designed. The discharge pipes used to direct mine water to the pond are working as designed. The outlet structure is working as designed.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond does not appear to have been modified this quarter. The pond is continually discharged this quarter, therefore the minimum elevation has been no less than 8579.6 feet. Flow depth above the level of the discharge pipe varies between .03 and .10 feet. The estimated sediment in the pond is 7,266 ft^3 and the remaining sediment capacity is 65,392 ft^3. Total storage volume of water and sediment combined is 179,014 ft^3(4.1 ac-ft). Based on the volume of estimated sediment, the estimated volume of water in the pond is 171,748 ft^3 (3.94 ac-ft).

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gary E. Taylor **Date:** 28 June 2001

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 3
Permit Number	ACT/007/005	**Report Date**	26 June 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Impoundment Identification	**Impoundment Name**	Rail Loadout Sediment Pond	
	Impoundment Number	002	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION

Inspection Date	26 June 2001
Inspected By	Gary E. Taylor
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

No instability of the embankment was noted.

Required for an impoundment which functions as a SEDIMENTATION POND.

2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

Sediment Storage Capacity: 54,710 ft^3.
60% Elevation: 7915.0 feet ASL (above sea level).
100% Elevation: 7915.6 feet ASL.
Current Sediment Level Elevation: 7914.25 feet ASL or 10% sediment storage volume.

3. Principle and emergency spillway elevations.

Principle Spillway Elevation: 7919.7 feet ASL.
Emergency Spillway Elevation: 7922 feet ASL.

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Water level is approximately 7915.7 feet ASL, 4.0 feet below discharge level at the principle spillway. Pond was not discharging at the time of the inspection.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond does not appear to have changed during the quarter. The water elevation is 7915.7 feet ASL. The estimated sediment in the pond is 5,471 ft^3 and the remaining sediment capacity is 49,239 ft^3. Total storage volume of water and sediment combined is 95,380 ft^3 (2.2 ac-ft). Based on the volume of estimated sediment, the estimate volume of water in the pond is 46,141 ft^3 (1.06 ac-ft).

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gary E. Taylor **Date:**

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 3
Permit Number	ACT/007/005	**Report Date**	29 June 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Impoundment Identification	**Impoundment Name**	Waste Rock Site Sediment Pond	
	Impoundment Number	003	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION

Inspection Date	29 June 2001
Inspected By	Gary E. Taylor
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

No instability of the embankment was noted.

Required for an impoundment which functions as a SEDIMENTATION POND.

2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

Sediment Storage Capacity: 6,906 ft^3.
60% Elevation: 7860.8 feet ASL (above sea level).
100% Elevation: 7861.3 ASL
Current Sediment Level Elevation: No significant volume of sediment in the pond observed. Current elevation of pond floor is 7860 feet ASL.

3. Principle and emergency spillway elevations.

Principle and emergency spillway elevation: 7865.5 feet ASL. (The outlet of Pond 003 serves as both the principle and emergency spillway).

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

No free water is currently in the pond. No sampling or monitoring is necessary since the pond is not discharging.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond does not appear to have changed during the quarter. Total storage volume of water and sediment combined is 42,6889 ft^3 (.98 ac-ft).

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gary E. Taylor **Date:** 29 June 2001

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 3
Permit Number	ACT/007/005	**Report Date**	14 March 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Impoundment Identification	**Impoundment Name**	Minesite	
	Impoundment Number	001	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION	
Inspection Date	14 March 2001
Inspected By	Gary E. Taylor
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

No instability of the embankment was noted.

Required for an impoundment which functions as a SEDIMENTATION POND.	**2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.** Sediment Storage Capacity: 72,658 ft^3. 60 % Elevation: 8567.3 feet ASL (above sea level). 100% Elevation: 8570.5 feet ASL. Current Sediment Level Elevation: 8561.2 feet or 10% sediment storage volume.
	3. Principle and emergency spillway elevations. Principle and emergency spillway elevation: 8579.6 feet ASL. (The outlet of Pond 001 serves as both the principle and emergency spillway).

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Water elevation at the time of inspection is 8579.77 (.17 feet above discharge elevation). A sample of the pond discharge water is taken weekly, throughout the quarter. On a biweekly basis the water sample is analyzed for total iron and total dissolved solids. Weekly samples include oil and grease, total suspended solids, pH, and conductivity. The daily maximum tonnage discharge limit established for the pond by DEQ was exceeded during this quarter. The remainder of the limit were not exceeded.

The culvert that discharges water collected as surface runoff from the upper mine pad is working as designed. The discharge pipes used to direct mine water to the pond are working as designed. The outlet structure is working as designed.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond does not appear to have been modified this quarter. The pond is continually discharged this quarter, therefore the minimum elevation has been no less than 8579.6 feet. Flow depth above the level of the discharge pipe varies between .15 and .20 feet. The estimated sediment in the pond is 7,266 ft^3 and the remaining sediment capacity is 65,392 ft^3. Total storage volume of water and sediment combined is 179,014 ft^3(4.1 ac-ft). Based on the volume of estimated sediment, the estimated volume of water in the pond is 171,748 ft^3 (3.94 ac-ft).

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gary E Taylor **Date:** 19 March 2001

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 3
Permit Number	ACT/007/005	**Report Date**	14 March 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Impoundment Identification	**Impoundment Name**	Rail Loadout Sediment Pond	
	Impoundment Number	002	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION

Inspection Date	14 March 2001
Inspected By	Gary E. Taylor
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

No instability of the embankment was noted.

Required for an impoundment which functions as a SEDIMENTATION POND.

2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.

Sediment Storage Capacity: 54,710 ft^3.
60% Elevation: 7915.0 feet ASL (above sea level).
100% Elevation: 7915.6 feet ASL.
Current Sediment Level Elevation: 7914.25 feet ASL or 10% sediment storage volume.

3. Principle and emergency spillway elevations.

Principle Spillway Elevation: 7919.7 feet ASL.
Emergency Spillway Elevation: 7922 feet ASL.

Field Information. Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

Water level is approximately 7916.4 feet ASL, 3.3 feet below discharge level at the principle spillway. Pond was discharging at the time of the inspection but has not discharge since. The discharge in March was approximately 90 gal/min. A sample of the discharge water was taken. None of the discharge limits established for the pond discharge by DEQ have been exceeded during the quarter. Deltas of sediment have formed in the southeast corner of the pond where wash down water from a conveyor belt discharged to the pond and at the west entrance of the pond where surface runoff enters the pond.

5. **Field Evaluation.** Describe any changes in the geometry of the impounding structure, average and maximum depths and elevations of impounded water, estimated sediment or slurry volume and remaining storage capacity, estimated volume of water impounded, and any other aspect of the impounding structure affecting its stability or function which has occurred during the reporting period.

The overall geometry of the pond does not appear to have changed during the quarter. The water elevation is 7919.75 feet ASL. The estimated sediment in the pond is 5,471 ft^3 and the remaining sediment capacity is 49,239 ft^3. Total storage volume of water and sediment combined is 95,380 ft^3 (2.2 ac-ft). Based on the volume of estimated sediment, the estimate volume of water in the pond is46,141 ft^3 (1.06 ac-ft).

Qualification Statement

I hereby certify that; I am experienced in the construction of impoundments; I am qualified and authorized under the direction of a Registered Professional Engineer to inspect the condition and appearance of impoundments in accordance with the certified and approved designs for this structure; that the impoundment has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

Signature: Gary E. Taylor **Date:** 19 March 2001

IMPOUNDMENT INSPECTION AND CERTIFIED REPORT			Page 1 of 3
Permit Number	ACT/007/005	**Report Date**	14 March 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Impoundment Identification	**Impoundment Name**	Waste Rock Site Sediment Pond	
	Impoundment Number	003	
	UPDES Permit Number	UT0023540	
	MSHA ID Number	NA	

IMPOUNDMENT INSPECTION

Inspection Date	14 March 2001
Inspected By	Gary E. Taylor
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)	Quarterly

1. Describe any appearance of any instability, structural weakness, or any other hazardous condition.

Sediment pond was inaccessible due to snow covering the access road.

Required for an impoundment which functions as a SEDIMENTATION POND.	**2. Sediment storage capacity, including elevation of 60% and 100% sediment storage volumes, and, estimated average elevation of existing sediment.**
	3. Principle and emergency spillway elevations

4. **Field Information.** Provide current water elevation, whether pond is discharging, type and number of samples taken, monitoring/instrumentation information, inlet/outlet conditions, or other related activities associated with the pond including but not limited to sediment cleanout, pond decanting, embankment erosion/repairs, monitoring information, vegetation on outslopes of embankments, etc.

INSPECTION AND CERTIFIED REPORT ON EXCESS SPOIL PILE OR REFUSE PILE			
Permit Number	C/007/005	**Report Date**	January 16, 2002
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Excess Spoil Pile or Refuse Pile Identification	**Pile Name**	Skyline Waste Rock Site	
	Pile Number	NA	
	MSHA ID Number	42-01566	
Inspection Date	December 19, 2001		
Inspected By	Douglas E. Johnson		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)		Quarterly	
		Attachments to Report? X No ☐ Yes	

Field Evaluation

1. Foundation preparation, including the removal of all organic material and topsoil.

NA
No gob was hauled to the site during the fourth quarter of 2001.

2. Placement of underdrains and protective filter systems.

No underdrains are present or required at this site.

3. Installation of final surface drainage systems.

Existing surface is not at final contour. Therefore, final surface drainages have not yet been constructed. The existing surface drainage system includes a temporary ditch on the north side of the pile that captures undisturbed runoff from the drainage to the east of the site, the AML reclamation slopes north of the site, and the runoff from the ditch embankment. Runoff in the temporary ditch is treated through a straw bale dike before discharge. All other surface runoff from the refuse pile is treated by the sediment pond. Runoff from the main access road below the sediment pond is treated by straw bale dikes. No changes to the drainage system have been made since the previous quarter.

4. Placement and compaction of fill materials.

No waste rock was hauled this quarter

INSPECTION AND CERTIFIED REPORT ON EXCESS SPOIL PILE OR REFUSE PILE		

5. **Final grading and revegetation of fill.**

Contemporaneous reclamation of the waste rock pile is taking place as the site is backfilled with waste rock. The backfill slopes are cut to 1 1/2h:1v or less and seeded as described in the final reclamation plan. The seed mix specified in the Reclamation Plan is planted after the placement of topsoil.

6. **Appearances of instability, structural weakness, and other hazardous conditions.**

Though the site was inaccessible due to deep snow on the date of the official inspection, no structural weaknesses had been observed during previous visits to the site. The sedimentation pond did not contain significant water during the third quarter and very little precipitation has fallen in the area in the fourth quarter. Chris Hansen has reported that the pond contained very little water earlier this quarter and assumes this is still the case.

7. **Other Comments. Describe any changes in the geometry of the Excess Spoil/Refuse Pile structure, instrumentation, average and maximum lifts of materials placed in the pile, elevations of active benches, total and remining storage capacityof the structure, evidence of fires in the pile and abatement of such fires, volumes of materials placed in the structure during the year, and any other aspect of the structure affecting its stability or function which has occurred during the reporting period.**

The pile has a remaining storage capacity of approximately 55,231 tons. The total storage capacity as designed is 334,125.

Certification Statement

REGISTERED PROFESSIONAL ENGINEER
[Cert. Stamp] No. 160554-2202
DOUGLAS E. JOHNSON
STATE OF UTAH

I hereby certify that; I am experienced in the construction of earth and rockfills; I am qualified and authorized in the State of Utah to inspect and certifythe condition and appearance of earth and rockfills in accordance with the certified and approved designs for this structure; that the fill structure has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability

By: DOUGLAS E. JOHNSON, P.E.
(Full Name and Title) MGR. OF TECH. SERVICES

Signature: Douglas E Johnson **Date:** 2-8-02

P.E. Number & State: 160554-2202, UTAH

INSPECTION AND CERTIFIED REPORT ON EXCESS SPOIL PILE OR REFUSE PILE			Page 1 of 2
Permit Number	ACT\007\005	**Report Date**	28 September 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Excess Spoil Pile or Refuse Pile Identification	**Pile Name**	Skyline Waste Rock Site	
	Pile Number	NA	
	MSHA ID Number	42-01566	
Inspection Date	28 September 2001		
Inspected By	Douglas E. Johnson		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)		Quarterly	
		Attachments to Report? X No ☐ Yes	

Field Evaluation

1. Foundation preparation, including the removal of all organic material and topsoil.

NA
No gob was hauled to the site during the second quarter of 2001.

2. Placement of underdrains and protective filter systems.

No underdrains are present or required at this site.

3. Installation of final surface drainage systems.

Existing surface is not at final contour. Therefore, final surface drainages have not yet been constructed. The existing surface drainage system includes a temporary ditch on the north side of the pile that captures undisturbed runoff from the drainage to the east of the site, the AML reclamation slopes north of the site, and the runoff from the ditch embankment. Runoff in the temporary ditch is treated through a straw bale dike before discharge. All other surface runoff from the refuse pile is treated by the sediment pond. Runoff from the main access road below the sediment pond is treated by straw bale dikes. No changes to the drainage system have been made since the previous quarter.

4. Placement and compaction of fill materials.

No waste rock was hauled this quarter

5. **Final grading and revegetation of fill.**

Contemporaneous reclamation of the waste rock pile is taking place as the site is backfilled with waste rock. The backfill slopes are built to 1 1/2h:1v or less and seeded as described in the final reclamation plan. The seed mix specified in the Reclamation Plan is planted after the placement of topsoil.

6. **Appearances of instability, structural weakness, and other hazardous conditions.**

No apparent signs of instability, structural weakness or other hazardous conditions were noted. The sediment pond was dry.

7. **Other Comments. Describe any changes in the geometry of the Excess Spoil/Refuse Pile structure, instrumentation, average and maximum lifts of materials placed in the pile, elevations of active benches, total and remaining storage capacity of the structure, evidence of fires in the pile and abatement of such fires, volumes of materials placed in the structure during the year, and any other aspect of the structure affecting its stability or function which has occurred during the reporting period.**

The pile has a remaining storage capacity of approximately 55,231 tons. The total storage capacity as designed is 334,125. No evidence of fire was noted during the inspection.

Certification Statement

REGISTERED PROFESSIONAL ENGINEER
[Cert. No. 160554-2202]
DOUGLAS E. JOHNSON
STATE OF UTAH

I hereby certify that; I am experienced in the construction of earth and rock fills; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of earth and rock fills in accordance with the certified and approved designs for this structure; that the fill structure has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

By: DOUGLAS E. JOHNSON, MGR TECH SERVICES
(Full Name and Title)

Signature: Douglas E Johnson **Date:** 10-2-01

P.E. Number & State: 160554-2202, UTAH

INSPECTION AND CERTIFIED REPORT ON EXCESS SPOIL PILE OR REFUSE PILE			Page 1 of 2
Permit Number	ACT\007\005	**Report Date**	29 June 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Excess Spoil Pile or Refuse Pile Identification	**Pile Name**	Skyline Waste Rock Site	
	Pile Number	NA	
	MSHA ID Number	42-01566	
Inspection Date	28 June 2001		
Inspected By	Douglas E. Johnson		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)		Quarterly	
		Attachments to Report? X No ☐ Yes	

Field Evaluation

1. Foundation preparation, including the removal of all organic material and topsoil.

NA
300 tons of gob was hauled to the site during the second quarter of 2001.

2. Placement of underdrains and protective filter systems.

No underdrains are present or required at this site.

3. Installation of final surface drainage systems.

Existing surface is not at final contour. Therefore, final surface drainages have not yet been constructed. The existing surface drainage system includes a temporary ditch on the north side of the pile that captures undisturbed runoff from the drainage to the east of the site, the AML reclamation slopes north of the site, and the runoff from the ditch embankment. Runoff in the temporary ditch is treated through a straw bale dike before discharge. All other surface runoff from the refuse pile is treated by the sediment pond. Runoff from the main access road below the sediment pond is treated by straw bale dikes. No changes to the drainage system have been made since the previous quarter.

4. Placement and compaction of fill materials.

300 tons of waste rock was hauled this quarter

5. **Final grading and revegetation of fill.**

Contemporaneous reclamation of the waste rock pile is taking place as the site is backfilled with waste rock. The backfill slopes are built to 1 1/2h:1v or less and seeded as described in the final reclamation plan. The seed mix specified in the Reclamation Plan is planted after the placement of topsoil.

6. **Appearances of instability, structural weakness, and other hazardous conditions.**

No apparent signs of instability, structural weakness or other hazardous conditions were noted. The sediment pond was dry.

7. **Other Comments. Describe any changes in the geometry of the Excess Spoil/Refuse Pile structure, instrumentation, average and maximum lifts of materials placed in the pile, elevations of active benches, total and remaining storage capacity of the structure, evidence of fires in the pile and abatement of such fires, volumes of materials placed in the structure during the year, and any other aspect of the structure affecting its stability or function which has occurred during the reporting period.**

The pile has a remaining storage capacity of approximately 55,231 tons. The total storage capacity as designed is 334,125. No evidence of fire was noted during the inspection.

Certification Statement

I hereby certify that; I am experienced in the construction of earth and rock fills; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of earth and rock fills in accordance with the certified and approved designs for this structure; that the fill structure has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

REGISTERED PROFESSIONAL ENGINEER
No. 160554-2202
DOUGLAS E. JOHNSON
STATE OF UTAH

[Cert. Stamp]

By: DOUGLAS E. JOHNSON, MGR TECH SERVICES
(Full Name and Title)

Signature: Douglas E Johnson **Date:** 6-29-01

P.E. Number & State: 160554-2202, UTAH

INSPECTION AND CERTIFIED REPORT ON EXCESS SPOIL PILE OR REFUSE PILE			Page 1 of 2
Permit Number	ACT\007\005	**Report Date**	April 10, 2001
Mine Name	Skyline Mines		
Company Name	Canyon Fuel Company, LLC		
Excess Spoil Pile or Refuse Pile Identification	**Pile Name**	Skyline Waste Rock Site	
	Pile Number	NA	
	MSHA ID Number	42-01566	
Inspection Date	No access during 1st quarter of 2001		
Inspected By	No inspections made		
Reason for Inspection (Annual, Quarterly or Other Periodic Inspection, Critical Installation, or Completion of Construction)		Quarterly	
		Attachments to Report? X No ☐ Yes	

Field Evaluation

1. Foundation preparation, including the removal of all organic material and topsoil.

NA
No gob was hauled to the site during the first quarter of 2001and no snow plowing was conducted during this quarter. Deep snow precluded any inpsections.

2. Placement of underdrains and protective filter systems.

No underdrains are present or required at this site.

3. Installation of final surface drainage systems.

Existing surface is not at final contour. Therefore, final surface drainages have not yet been constructed. The existing surface drainage system includes a temporary ditch on the north side of the pile that captures undisturbed runoff from the drainage to the east of the site, the AML reclamation slopes north of the site, and the runoff from the ditch embankment. Runoff in the temporary ditch is treated through a straw bale dike before discharge. All other surface runoff from the refuse pile is treated by the sediment pond. Runoff from the main access road below the sediment pond is treated by straw bale dikes. No changes to the drainage system have been made since the previous quarter.

4. Placement and compaction of fill materials.

No waste rock was hauled this quarter

5. **Final grading and revegetation of fill.**

Contemporaneous reclamation of the waste rock pile is taking place as the site is backfilled with waste rock. The backfill slopes are built to 1 1/2h:1v or less and seeded as described in the final reclamation plan. The seed mix specified in the Reclamation Plan is planted after the placement of topsoil.

6. **Appearances of instability, structural weakness, and other hazardous conditions.**

The site was inaccessible this quarter since snow covered both the site and the access road. During winter months the road is generally cleared of snow only if waste rock is hauled to the site.

7. **Other Comments. Describe any changes in the geometry of the Excess Spoil/Refuse Pile structure, instrumentation, average and maximum lifts of materials placed in the pile, elevations of active benches, total and remaining storage capacity of the structure, evidence of fires in the pile and abatement of such fires, volumes of materials placed in the structure during the year, and any other aspect of the structure affecting its stability or function which has occurred during the reporting period.**

The pile has a remaining storage capacity of approximately 55,531 tons. The total storage capacity as designed is 334,125. As stated above, the site was inaccessible for the fourth quarter 2000 inspection.

Certification Statement

REGISTERED PROFESSIONAL ENGINEER
Cert. Stamp
No. 160554-2202
DOUGLAS E. JOHNSON
STATE OF UTAH

I hereby certify that; I am experienced in the construction of earth and rock fills; I am qualified and authorized in the State of Utah to inspect and certify the condition and appearance of earth and rock fills in accordance with the certified and approved designs for this structure; that the fill structure has been maintained in accordance with approved design and meet or exceed the minimum design requirements under all applicable federal, state and local regulations; and, that inspections and inspection reports are made by myself and include any appearances of instability, structural weakness or other hazardous conditions of the structure affecting stability.

By: Douglas E Johnson, TECH SERV MGR
(Full Name and Title)

Signature: Douglas E Johnson **Date:** 4-10-01

P.E. Number & State: 160554-2202, UTAH

APPENDIX B

Reporting of Technical Data

Including monitoring data, reports, maps, and other information
As required under the approved plan or as required by the Division

In accordance with the requirement of R645-310-130 and R645-301-140

Raptor Survey Map
Subsidence Monitoring Map
Vegetation Data
James and Burnout Canyon Creeks Fish and Macroinvertebrate Monitoring data for 2000 and 2001

RAPTOR SURVEY

The areas to be mined in 2001 were surveyed on the ground during the summer months of 2000 and 2001. The enclosed raptor map is based on information collected in field by USFS, CFC contractors, and CFC personnel. A goshawk nest is located outside of any anticipated areas that will be subsided by coal mining activities. The single nest was observed by USFS personnel. During the summer of 2001 survey, a single Goshawk was responded to calling in Burnout Canyon but was well east of the known nest site. A search was made of the call response area for a nest. However, a new nest was not located and the call was not answered again.

Surveys of the Burnout Canyon area were performed in June and July 2000 and April and May 2001. The survey of the James Canyon area was performed in August and September of 2001. The area of anticipated mining in 2001 and early 2002 was surveyed aerially in May of 2001 by DWR, Gary Taylor (CFC), and Paul Baker (DOGM). No new nests were located during the flight and it was determined that aerial surveying of the Skyline Mine property was not an entirely effective method of surveying for raptor nests. No escarpments exist within the permit area that would be suitable for raptors. The majority of the raptor nests found in the past in the permit area has been in trees. Tree nests are somewhat difficult to locate from the air. Therefore, it was agreed that ground surveys for raptor nests would be the preferred method.

Vegetation Report for Skyline Mine

Based on the results of the 1999 site visit and report prepared by Keith Zobell (former Environmental Coordinator for Skyline Mine), the upper steep conveyor bench slope located just below the main mine site was spot reseeded in the fall of 2000. (the 1999 report was included in the 1999 annual report.) This was done in an effort to continue to establish vegetation in this area. In addition to the seeding, an attempt was made to gather seeds from the native and successful transplants growing in the upper bench area and the conveyor bench area at the mouth of Whiskey Creek. Seeds were collected from wild rose, sage brush, rabbit brush, and bitter brush. Because of the dry climatic conditions during the late summer and early fall, the seed crop was generally low in the bench areas. Seeds from the same plant species were obtained in 2001 and again the harvest was minimal due to climatic conditions.

Because of the lack of available seed from the native plants located along the conveyor bench, seedlings have been ordered from the Lone Peak Nursery. The plants ordered have been grown from seeds collected from plants in Utah and Colorado at elevations similar to the mine site. The following plants have been ordered: Woods Rose (200), Snowberry (200), and Rubber Rabbitbrush (200). These plants will be planted in early May of 2002 in the former test plot area of the conveyor bench. We have been unable to locate Mountain Sage Brush seedlings as of this date but are still pursing obtaining them from other nurseries. Seed will continued to be collected from the native plants along the conveyor bench until such time an appropriate amount can be delivered to the Lone Peak nursery and seedlings can be raised.

ESTIMATES OF FALL 2000 CUTTHROAT TROUT POPULATION DENSITIES IN BURNOUT CREEK & JAMES CANYON CREEK, TRIBUTARIES TO ELECTRIC LAKE, HUNTINGTON CREEK DRAINAGE

Prepared by

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Patrick D. Collins, Ph.D.

for

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Skyline Mines
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November 2000

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ESTIMATES OF FALL 2000 CUTTHROAT TROUT POPULATION DENSITIES IN BURNOUT CREEK & JAMES CANYON CREEK, TRIBUTARIES TO ELECTRIC LAKE, HUNTINGTON CREEK DRAINAGE

INTRODUCTION

Electric Lake, Huntington Canyon, Emery County, Utah, has a population of cutthroat trout originating from the original Strawberry Reservoir population (a mixture of Yellowstone cutthroat trout and Colorado River cutthroat trout). These trout spawn in the tributaries to Electric Lake. The land beneath this area is being mined for coal and eventual subsidence will occur. The Utah Division of Wildlife Resources requested that Canyon Fuel Company's, Skyline Mines (HC 35 Box380, Helper, Utah 84526) establish base line data on the fish and macrobenthos in both Burnout Creek and James Canyon Creek. These are tributaries to Electric Lake. This report focuses on the fall 2000 fish population estimates.

METHODS

Burnout Creek was sampled on October 16, 2000 and James Canyon Creek was sampled on October 17, 2000. Both streams enter Electric Lake near the upstream end of the reservoir. A total stream length of 162 meters (528 feet) was marked off in each stream. The designated stream length began at the reservoir high water mark as determined from shoreline bench marks (beach and littoral shelf) and vegetation. Fish populations estimates were based on removal summation sampling applied to the measured sections of stream. The fish were captured with a Smith-Root Model 12 battery powered backpack electrofisher. All captured fish were transferred to buckets and were held in flow-through holding pens until three passes had been completed. Fish were then identified, counted and measured to the nearest millimeter. The catch data from each run were then used to project the population size with the Zippen removal summation method (Moran 1951; Zippen 1956, 1958).

RESULTS AND DISCUSSION

Two waterfalls were located within the 162 meter section of Burnout Creek. The first waterfall was 97 meters upstream from the high water line. This waterfall was a partial barrier to upstream fish movement but the presence of a plunge pool indicated that fish passage was possible. The second waterfall was 30 meters above the first. This waterfall appeared to be a stronger barrier to fish passage, although it was low enough to be potentially passable, especially during high water periods. The sample reach extended an additional 35 meters above the second waterfall.

Based on the Zippen removal-summation estimate, the population size between the high water mark and the first waterfall was 280 fish. One 51mm cottid was collected in this portion of Burnout Creek, and the remainder of fish were cutthroat trout. The trout density, based on linear meters of stream was 2.89 fish per meter (0.88 fish per foot). The majority of these were young of the year (See Figure 1). The trout had a mean length of 61.12mm (standard deviation =16.43). A small number of fish were over 100 mm in total length and these appear to be holdovers from the previous year. These fish make up less than 5% of the population. The first waterfall does appears to act as a partial barrier to spawning trout. We estimated 22 fish between the first and second waterfall, less than a tenth of the density below the waterfall. These fish were smaller, having a mean length 60.05 mm (standard deviation = 18.60) and consisted almost entirely of young of the year individuals. Only one fish appeared to be from the previous year's cohort (Figure 2). The density between the two waterfalls was 0.73 fish per meter (0.22 fish per linear foot). The low numbers above the first waterfall may be due to fewer spawning trout successfully ascending the first waterfall, or it could relate to downstream movements of fry and young of the year, since they would be unable to reenter the upper section once they had drifted over the waterfall. All fish were confined to the lower two sections of Burnout Creek. No fish were collected above the second falls.

The total population estimate, for Burnout Creek, between high water mark and the second waterfall was 304 fish. This translates to an average of 2.39 fish per linear meter of stream over the two sections. If the distance above the second waterfall is included, the total is still 304 fish, but with the

additional distance, the number of fish per linear meter of stream falls to 1.90 fish.

James Canyon Creek did not have any waterfalls within the 162 meter section sampled. We estimated a total trout population size of 587 fish using the Zippen removal-summation estimator. This is a density of 3.62 fish per meter (1.11 per linear foot). Three cottids, 120 mm, 114 mm, and 87 mm total length, were also collected. No young of the year cottids were collected, indicating that no cottid reproduction has occurred in the stream this year. The cottids in James Canyon Creek, as in Burnout Creek, may have migrated into the stream from another source population in the upper Huntington Creek drainage. The trout in James Canyon Creek were about 20% more abundant than those in Burnout Creek. The mean total length of the trout in James Canyon Creek was 59.03 mm (standard deviation = 19.06).

The size structure of the trout in the two streams may also be indicative of some differences in habitat between the streams. While we did not examine scales or otoliths to determine age, the size frequency histograms (Figures 1-3) show several distinct cohorts which we interpret as being age 0, age I, and in the case of James Canyon Creek, age II fish. The largest specimens in James Canyon Creek were over 180mm in length, which we assumed were from the 1998 year class, or potentially older. Based on this age designation, approximately 3.6% of the fish collected in Burnout Creek were age I, with the remaining 96.4% being young of the year. James Canyon Creek, in contrast, had about 8.5% of the population in the size range of what we would expect were one year old individuals (age I). Two additional fish were potentially 2 year old residents (about 0.5%). The remaining 91% of the population would have been age 0 fish. James Canyon Creek had more deep pools and associated undercut banks than did Burnout Creek, and this may have been important in survival of the fish, not only through the summer, but also in terms of overwintering. The presence of the waterfalls in Burnout Creek suggests that the topsoil may be slightly thinner in that drainage. Both streamswere incised with steep, often vertical banks, and we noted that the banks in James Canyon Creek seemed higher than those in Burnout Creek. In both streams we noted the presence of water voles (Microtus richardsonii), with higher numbers of individuals being seen in James Canyon Creek. The burrowing activities of these large semiaquatic voles was likely one of the main factors in

modifying the stream banks (Zeveloff 1988) so that more cover was available to the trout.

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Figure 1. Length frequency histogram for Burnout Creek below the first waterfall. Total sample size = 260 individuals.

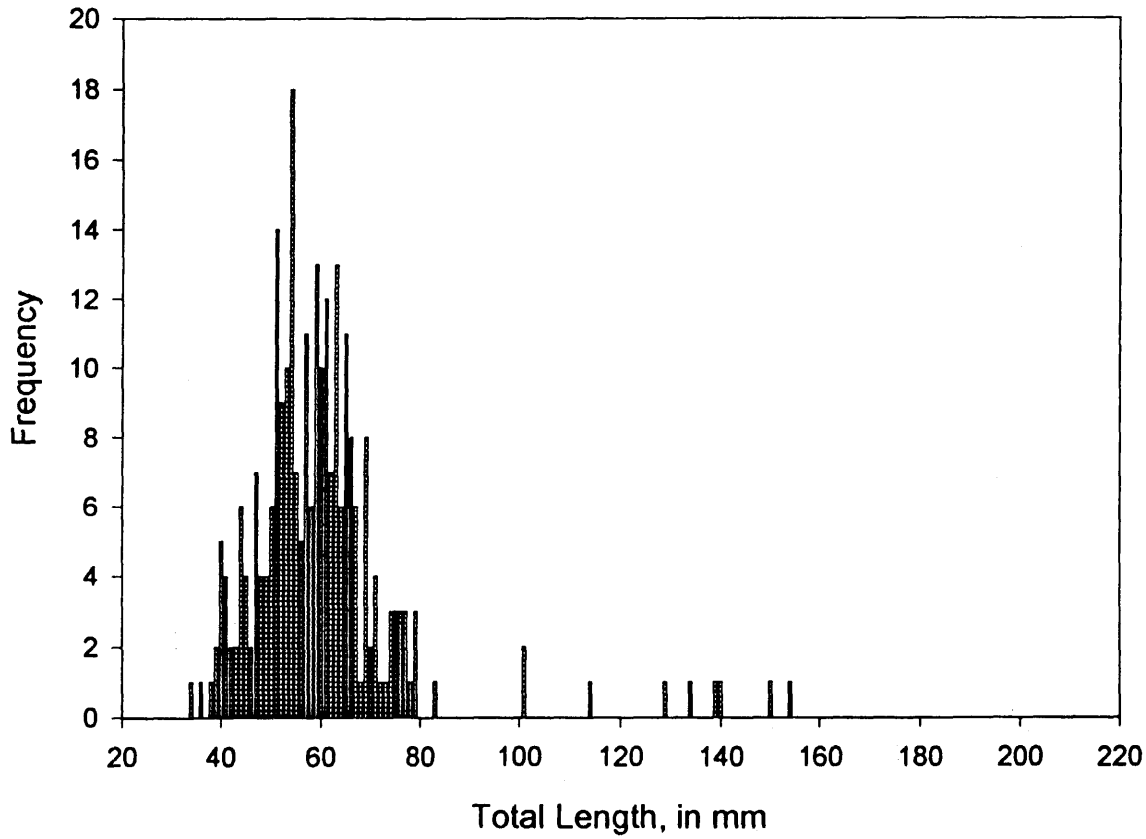


Figure 2. Length frequency histogram for Burnout Creek, above the first waterfall. Total sample size = 21 individuals.

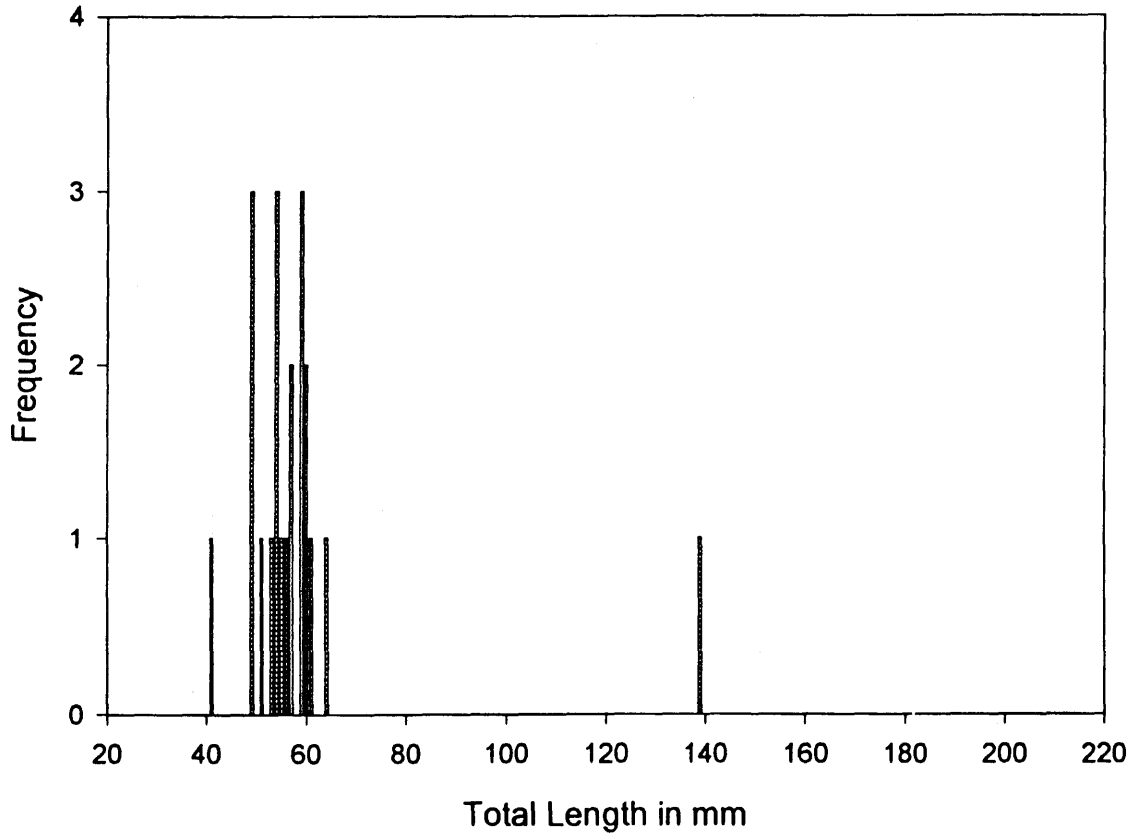
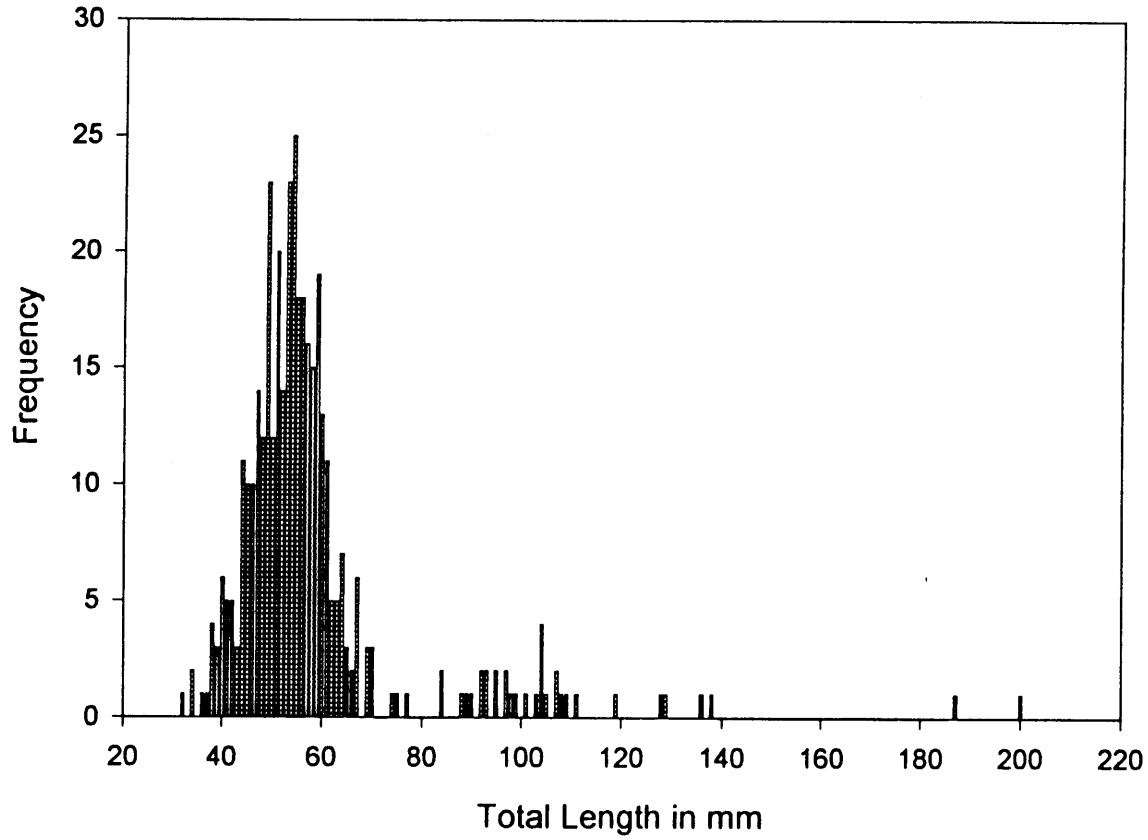


Figure 3. Length frequency histogram for James Canyon Creek. Total sample size = 376 individuals.



The Macrobenthos of Burnout Creek & James Canyon Creek, Tributaries to Electric Lake, Huntington Creek Drainage.

October 2000

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INTRODUCTION

Benthic invertebrate surveys are routinely used to monitor environmental conditions in aquatic systems. Their use as a monitoring tool in place of water chemistry has the advantage that the organisms must complete part or all of their life cycle immersed in the aquatic medium. Thus even transient perturbations, for example a toxicant slug flow that occurs between scheduled sampling periods, will be detectable by the change in the invertebrate community.

PURPOSE

This benthic sampling study was conducted to establish base-line information for two streams, Burnout Creek and James Canyon Creek.

METHODS

Burnout Creek was sampled on October 16, 2000 and James Canyon Creek was sampled on October 17, 2000. Both streams enter Electric Lake near the upstream end of the reservoir. The benthic samples were taken 162 meters (528 feet) above the reservoir. The designated stream distance began at the reservoir high water mark as determined from shoreline bench marks (beach and littoral shelf) and vegetation.

Quantitative samples were taken with a modified box sampler (Shiozawa 1986) with a net mesh of 253 microns. Three samples were taken at each stream. The samples were field preserved in ethyl alcohol. They were returned to the laboratory for processing. Samples were sorted in a pan illuminated from below. Small and questionable specimens were examined under magnification. Specimens were identified to the lowest possible taxonomic level using the keys of Merritt and Cummins (1994). The mean and standard deviation was calculated for each taxon and the mean values were used to determine the density per square meter. Standing crop was estimated from wet weights of total invertebrates collected at each station.

Calculations of the USFS Biotic Condition Index (Winget and Mangum 1979) were completed using the abundances of the benthic taxa to generate the dominance weighted community tolerant quotient (CTQd). The predicted community tolerant quotient (CTQp) was calculated using water chemistry data provided in Winget (1972) for the Huntington Creek drainage. Gradient data was taken from the USGS 7.5 minute topographic map for the Scofield Quadrangle. The data required for calculating the CTQp are broad so these sources were adequate for determining the expected community quality value.

RESULTS AND DISCUSSION

Both Burnout Creek and James Creek contained 35 taxa (Table 1). Larvae and adults of the same taxon and unidentifiable immature insects were included as separate taxa. Ostracods (Crustacea: Ostracoda), chironomids (Diptera: Chironomidae) and *Paraleptophlebia* (Ephemeroptera: Leptophlebidae) were the most abundant taxa in Burnout Creek, and it had moderate numbers of *Baetis* (Ephemeroptera: Baetidae), *Cinygmula* (Ephemeroptera: Heptageniidae), *Heterlimnius* (Coleoptera: Elmidae) and oligochaets (Annelida: Oligochaeta). The remaining taxa were in low abundance. The dominant taxa in James Canyon Creek (Table 2) were *Baetis*, *Ephemerella* (Ephemeroptera: Ephemerellidae), *Neothremma alicia* (Trichoptera: Neothremidae), ostracods, and chironomids. Moderately abundant taxa included *Cinygmula* and early instar Plecoptera. The taxa unique to Burnout Creek included *Rhithrogena, Diura, Sweltsa, Lepidostoma, Ecclisocosmoecus, Moselyana,* Oligophlebodes, *Tipula, Ptychoptera*, and *Asellus*. Taxa unique to James Canyon Creek include *Arctopsyche grandis, Dicosmoecus, Allomyia, Atherix pachypus, Wiedemannia, Chelifera*, Ceratopogonidae, and Copepoda. With the exception of *Allomyia* all of the unique taxa were in low densities. Because of this it is likely that a larger sample size would have picked them up. It is doubtful that any taxon is unique to either stream.

The variance to mean ratios were examined to evaluate the number of taxa demonstrating a contagious distribution (Elliott 1977). A Chi Square value (Tables 1 and 2) of 8 or above indicates that the taxa is contagiously distributed. Sixteen taxa in both Burnout Creek and James Canyon Creek were contagiously distributed. The remaining 19 taxa in each stream followed a

Poisson distribution. The latter were those taxa collected in low abundance. This indicates that abundant taxa are contagiously distributed. The total invertebrate densities in each samples were also examined for their fit to a Poisson distribution, and the results showed that both Burnout Creek (Chi sq. = 819.42) and James Canyon Creek (Chi sq. = 1477.80) are highly contagious. The problem of contagious distributions in benthic invertebrate surveys is well known. In a study of Prosser Creek, California, Needham and Usinger (1957) reported that an entire riffle would need to be sampled to estimate its invertebrate densities with 95% confidence. While their example may be extreme, and alternative approaches exist for reducing the number of samples required, it is clear that quantitative studies, if they are to give good accuracy, require significantly more samples than have traditionally been taken in standard surveys. As a general rule a minimum of 16 samples is required and statisticians often recommend 30 since the distribution of means based on 30 random samples each will tend to converge to a normal distribution. However increasing the number of samples is expensive, so the trend is to reduce sample size. In a survey of quantitative sampling in biomonitoring Resh and McElravy (1993) reported that over 80% of lotic studies took five or fewer samples and 37% took 3 or fewer samples. The three samples prescribed for this study are in that lower group. The degree of contagion detected in these streams indicates that the results must be interpreted with an awareness of the bias involved. With the above cautions in mind, additional discussion of the differences between the two streams will be pursued.

Despite the similarities in the total number of taxa, total macroinvertebrate densities and biomass differed between the two streams. The total density at Burnout Creek was 12,596 per square

meter. The total density in James Canyon Creek was approximately 2.75 times greater, at 34,758 organisms. Biomass for Burnout Creek was estimated at 103.74 grams per square meter. Standing crop for James Canyon Creek was again higher, at 272.12 grams per square meter, approximately 2.6 times greater. The difference is related to the most abundant taxa. In Burnout Creek chironomids make up 31% of the organisms (3,919/m^2), while in James Canyon Creek chironomids comprise almost 68% of the macrobenthos (23,535/m^2). *Baetis* increased from 3.2% (404/m^2) in Burnout Creek to 8.2% (2,849/m^2) in James Canyon Creek. *Neothremma* increased from about 2% in Burnout Creek to 8.6% in James Canyon Creek. In contrast, *Paraleptophlebia* fell from 9.2% in Burnout Creek to about 0.1% in James Canyon Creek and Ostracods fell from 33% in Burnout Creek to 5% in James Canyon Creek. No clear changes in predatory invertebrate densities were detected. Both streams had (excluding predaceous chironomid species) approximately 1.9% invertebrate predators, based on the functional groupings of Merritt and Cummins (1996).

Fish densities were also estimated in the two streams (Shiozawa and Collins, 2000). Burnout Creek had a total of 304 fish while James Canyon Creek had a total trout population size of 587 fish. More critical is the fact that two waterfalls were located within the 162 meter section of Burnout Creek below the sample site. The first waterfall, 97 meters upstream from the high water line of Electric Lake was a partial barrier to upstream fish movement. The second waterfall was 30 meters above the first and no fish were collected above it. The benthic sample site was prescribed to be at the end of the 162 meter section so the Burnout Creek samples were taken 35

meters above the second waterfall in a fish-less reach. Fish were collected in the benthic sample area in James Canyon Creek.

This leads to a question as to whether the absence of fish at the sample site for Burnout Creek, or the presence of fish in the James Canyon Creek sample site, had any impact on the invertebrate community structure. One would expect that in the absence of fish predation the density of invertebrate predators would increase. But as noted above, no changes were detected in predatory invertebrate densities. This may be a function of sample variability and the lack of precision with three replicate samples. But it may also be simply related to differences in productivity of the two streams. The area below the waterfall in Burnout Creek had an average density of 2.8 fish per linear meter of stream, while James Canyon Creek averaged 3.6 fish per linear meter. Shiozawa and Collins (2000) reported that "James Canyon Creek had more deep pools and associated undercut banks than did Burnout Creek, and this may have been important in survival of the fish, not only through the summer, but also in terms of overwintering. While both streams had incised channels, the presence of the waterfalls in Burnout Creek suggests that the topsoil may be slightly thinner in that drainage." The differences in trout densities strongly argues for differences in overall stream productivity. Further the fish size structure in James Canyon Creek indicated that fish overwintered in the stream, while that did not appear to be the case in Burnout Creek. If conditions favor fish overwintering in the stream, it is likely that invertebrate winter survival also benefits. The general riparian habitat in James Canyon Creek appeared to be better than that in Burnout Creek and the grasses likely input a significant detrital load for the

invertebrates. We therefore tentatively attribute the difference in invertebrate densities and biomass between the two streams to be due mainly to differences in watershed condition.

The Biotic Condition Index (BCI) was also calculated for the two streams. This index, developed by Winget and Mangum (1979) for the US Forest Service is independent of biomass and is weighted for differences in densities. The calculation of the BCI requires two types of data, one is the quantitative data gathered with our sampling and the other is physical and chemical data used to determine the predicted community tolerant quotient as prescribed in Winget and Mangum (1979). Both streams had sulfate levels of approximately 8 mg/l and total alkalinity (the existing pH of 8.5) should of approximately 170 (Winget 1972). Their slopes were between 5 and 6%. This gives a predicted community tolerant quotient, CTQp, of 80. The CTQd for Burnout Creek based on the ratings of the individual invertebrate taxa (Table 2) was 87.91. The BCI is the ratio of CTQd to the CTQp times 100. The **BCI for Burnout Creek was 109.9.** The CTQd for James Canyon Creek based on the ratings of the individual invertebrate taxa (Table 2) was 91.384 and the **BCI for James Canyon Creek was 114.23.** Based on these values both streams are in excellent condition.

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Winget, R. N. 1972. Aquatic environmental impact study of Huntington Canyon generating station and Electric lake. Annual Report No. 2. Center for Environmental Studies. Brigham Young University.

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Table 1. Summary statistics for Burnout Creek

	Burnout Creek	1	2	3	mean	sd	Chi sq.	#/m2
Ephemeroptera	Baetis sp.	35	0	5	13.33	18.93	53.75	403.9
	Cinygmula	52	0	4	18.67	28.94	89.71	565.8
	Ephemerella sp.	12	6	0	6	6	12	877
	Heptagenia	6	3	0	3	3	6	181.8
	Paraleptophlebia sp.	100	12	3	38.33	53.59	149.86	1161.2
	Rhithrogena sp.	0	0	1	0.33	0.58	2	10
Plecoptera	Diura knowltoni	0	0	2	0.67	1.15	4	20.2
	Early instar Plecoptera	5	0	0	1.67	2.89	10	50.6
	Isoperla sp.	7	0	0	2.33	4.04	14	70.6
	Malenka californica	13	0	1	4.67	7.23	22.43	141.5
	Sweltsa sp.	3	2	0	1.67	1.53	2.8	50.6
	Zapada	1	0	0	0.33	0.58	2	10
Trichoptera	Lepidostoma sp.	0	1	0	0.33	0.58	2	10
	(Limnephilidae)Ecclisocosmoecus	0	2	0	0.67	1.15	4	20.2
	(Limnephilidae)Moselyana	0	2	0	0.67	1.15	4	20.2
	(Limnephilidae)Oligophlebodes	0	4	0	1.33	2.31	8	40.3
	Micrasema bactro	0	0	1	0.33	0.578	2	10
	Rhyacophila	9	2	1	4	4.36	9.5	121.2
	Neothremma alicia	25	0	0	8.33	14.43	50	252.4
Coleoptera	Heterlimnius (larva)	6	29	0	11.67	15.31	40.17	353.6
	Heterlimnius (adult)	0	0	4	1.33	2.31	8	40.3
	Optioservus (larva)	0	4	3	2.33	2.08	3.71	70.6
Diptera	Chironomidae (larva)	256	45	87	129.33	111.69	192.90	3919
	Simulium sp.	7	0	5	4	3.61	6.5	121.2
	(Tipulidae) Antocha	4	0	0	1.33	2.31	8	40.3
	(Tipulidae) Tipula	0	0	1	0.33	0.577	2	10
	(Tipulidae) Dicranota	2	0	0	0.67	1.15	4	20.2
	(Psychodidae) Pericoma	5	6	0	3.67	3.21	5.64	111.2
	(Ptychopteridae) Ptychoptera	6	2	0	2.67	3.06	7	80.9
	(Stratiomyidae) Euparyphus	2	0	0	0.67	1.15	4	20.2
Crustacea	Asellus tomalensis	1	0	0	0.33	0.58	2	10
	Ostracoda	327	40	49	138.67	163.16	383.98	4202
Arachnid	Hydracarina	1	0	1	0.67	0.58	1	20.2
Mollusca	Sphaerium sp.	1	0	3	1.33	1.53	3.5	40.3
	Oligochaeta	6	6	18	10	6.93	9.6	303
TOTAL		892	166	189	415.67	412.68	819.42	12,596.1

Table 2. Summary statistics for James Canyon Creek

	James Canyon Creek	1	2	3	mean	sd	Chi sq.	#/m2
Ephemeroptera	Baetis sp.	75	21	186	94	84.12	150.57	2848.5
	Cinygmula	0	0	31	10.33	17.90	62	313
	Early instar ephemerellidae	0	3	0	1	1.73	6	30.3
	Ephemerella sp.	0	2	95	32.33	54.28	182.25	979.2
	Heptagenia	0	3	0	1	1.73	6	30.3
	Paraleptophlebia sp.	0	0	4	1.33	2.31	8	40.3
Plecoptera	Early instar plecoptera	1	7	56	21.33	30.17	85.34	646.4
	Isoperla sp.	0	1	6	2.33	3.21	8.86	70.3
	Malenka californica	0	1	0	0.33	0.578	2	10
	Zapada	0	2	22	8	12.16	37	242.4
Trichoptera	Arctopsyche grandis	0	0	5	1.67	2.89	10	50.6
	Dicosmoecus	0	1	0	0.33	0.58	2	10
	(Limniphilidae) Allomyia	0	0	13	4.33	7.51	26	131.2
	Limniphilidae (adult)	0	2	0	0.67	1.16	4	20.2
	Micrasema bactro	0	0	8	2.67	4.62	16	80.9
	Neothremma alicia	81	93	123	99	21.63	9.45	3000
	Rhyacophila	0	8	31	13	16.09	39.85	393.9
Coeleoptera	Heterlimnius (larva)	0	0	3	1	1.73	6	30.3
	Optioservus (larva)	0	1	0	0.33	0.58	2	10
Diptera	Antocha monticola	0	0	1	0.33	0.578	2	10
	Atherix pachypus	1	0	0	0.33	0.58	2	10
	Chironomidae (larva)	939	31	1360	776.67	679.21	1187.96	23535.5
	Chironomidae (pupa)	0	0	2	0.67	1.16	4	20.2
	Simulium sp.	5	3	1	3	2	2.67	90.9
	Ceratapogonidae	0	0	4	1.33	2.31	8	40.3
	(Stratiomyidae) Euparyphus	0	0	1	0.33	0.578	2	10
	(Tipulidae) Dicronata	0	0	2	0.67	1.15	4	20.2
	(Psychodidae) Pericoma			3	1	1.711	6	30.3
	(Empididae) Wiedemania	0	0	8	2.67	4.62	16	80.9
	(Empididae) Chelifera	0	0	5	1.67	2.89	10	50.6
Crustacea	Ostracoda	132	2	42	58.67	66.58	151.14	1777.9
	Copepod	0	0	1	0.33	0.58	2	10
Arachnida	Hydracarina	0	0	1	0.33	0.58	2	10
Mollusca	Sphaerium sp.	2	0	0	0.67	1.16	4	20.2
	Oligochaeta	5	2	3	3.33	1.53	1.4	100.9
TOTAL		1241	183	2017	1147	920.61	1477.80	34757.6

Table 3. Biotic Condition Index values for the taxa collected (based on Winget and Mangum 1979)

Baetis sp.	*72*
Cinygmula	*21*
Ephemerella sp.	*48*
Heptagenia	*48*
Paraleptophlebia sp.	*30*
Rhithrogena sp.	*21*
Diura knowltoni	*24*
Early instar Plecoptera	*108*
Isoperla sp.	*48*
Malenka californica	*36*
Sweltsa sp.	*24*
Zapada	*16*
Arctopsyche grandis	*18*
Dicosmoecus	*24*
(Limnephilidae) Allomyia	*108**
Lepidostoma sp.	*18*
(Limnephilidae)Ecclisocosmoecus	*108**
(Limnephilidae)Moselyana	*108**
(Limnephilidae)Oligophlebodes	*24*
Micrasema bactro	*24*
Rhyacophila	*18*
Neothremma alicia	*8*
Heterlimnius (larva)	*108*
Heterlimnius (adult)	*108*
Optioservus (larva)	*108*
Chironomidae (larva)	*108*
Simulium sp.	*108*
(Tipulidae) Antocha	*40*
(Tipulidae) Tipula	*36*
(Tipulidae) Dicranota	*24*
Atherix pachypus	*66*
Ceratapogonidae	*108*
(Psychodidae) Pericoma	*36*
*(Ptychopteridae) Ptychoptera**	*108**
(Stratiomyidae) Euparyphus	*108*
(Empididae) Wiedemannia	*108*
(Empididae) Chelifera	*108*
Asellus tomalensis	*108*
Copepoda	*108*
Ostracoda	*108*
Hydracarina	*98*
Sphaerium sp.	*108*
Oligochaeta	*108*

The Macro benthos of Burnout Creek & James Canyon Creek, Tributaries to Electric Lake, Huntington Creek Drainage.

Fall 2001

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INTRODUCTION

This report includes the analysis presented in our previous two reports, with the addition of a third set of samples taken in the Fall of 2001. As stressed in our previous analysis, additional samples taken in distinct seasons give a more accurate picture of the actual environmental state of James Canyon and Burnout Creek.

PURPOSE

Benthic invertebrate samples will enhance the base-line information acquired by the previous Fall and Spring samples and present a closer estimation of the invertebrate populations present in Burnout and James Canyon Creek.

METHODS

Both Burnout Creek and James Canyon Creek were sampled on October 17, 2001. The same two benthic sites that were sampled in the previous Fall and Spring were examined. They are located 162 meters (528 feet) above the reservoir on both streams.

Quantitative samples were taken with a modified box sampler. The three samples taken at each stream were field preserved in 70% ethyl alcohol and returned to the laboratory for processing. The samples were sorted and invertebrates were identified to the lowest possible taxonomic level using the keys of Merritt and Cummins (1994). Those of questionable identity were further examined and identified under magnification. The mean, standard deviation, density per square meter, and standing crop were calculated and estimated using the same methods as in previous analysis.

Calculations of the USFS Biotic Condition Index (Winget and Mangum 1979) were completed using the abundances of the benthic taxa to generate the dominance weighted community tolerant quotient (CTQd). The predicted community tolerant quotient (CTQp) was calculated using water chemistry data provided in Winget (1972) for the Huntington Creek drainage.

Cluster analysis was run using the Bray-Curtis dissimilarity index with the UPGM clustering algorithm. Data from all sampling periods (Fall-2000, Spring-2001, and Fall-2001) and both streams were combined in the analysis.

RESULTS AND DISCUSSION

Burnout Creek contained 29 taxa (including larvae and adults and unidentifiable immature insects as separate taxa), a decrease from the previous two sampling periods. The spring of 2001 samples

contained 41 taxa and the fall of 2000 samples had 35 taxa. Ostracods (Crustacea: Ostracoda), Oligochaets (Annelida: Oligochaeta), larval Chironomids (Diptera: Chironomidae), and larval *Heterlimnius* (Coleoptera: Elmidae) are the most abundant taxa. Taxa in moderate numbers were Planaria (Class,Turbellaria: Planeriidae), Cinygmula (Ephemeroptera: Ephemerellidae), *Baetis* and *Paraleptophlebia sp.* (Ephemeroptera: Baetidae), The remaining taxa are in low abundance (see *Table 1)*. The Burnout Creek samples from the fall of 2001 had a more evenly spaced distribution of individuals within taxa than did the spring 2001 samples, but a change in taxa was found between the fall of 2000 and fall of 2001.

James Canyon Creek also had a decrease in taxa in the fall of 2001, a total of 33 taxa (including larvae and adults and unidentifiable immature insects as separate taxa) were collected. This is slightly lower than the 39 taxa found in the spring of 2001 and fall of 2000 samples. Dominant taxa for James Canyon are larval Chironomids, *Baetis* and Planaria. *Neothrema alicia* (Trichoptera: Limniphilidae), Ostracods, and early instar Ephemerillidae (immature-unidentifiable), occur in moderate numbers. All remaining taxa are present in low numbers (see *Table 2*).

The two streams also experienced a decrease in density. James Canyon Creek, in particular, exhibited a dramatic decline in density, from 378,510 in the fall of 2000 to127,875 in fall-2001, a 66.2% decline. Burnout Creek density estimates declined from 384,010 in spring-2001 to 217,800 in fall-2001, but unlike James Canyon this estimate was considerably higher than the density numbers acquired in fall of 2000 (see *Table 3*).

Biomass for Burnout Creek in the fall 2002 samples was two times larger than in the previous spring, at 696.3 grams per square meter. However, this number may be somewhat misleading since most of the estimated biomass was due to a cluster of large pupating caddisflies (Trichoptera: *Dicosmoecus)* found only in sample 2. The James Canyon Creek biomass was 256.3 grams per square meter, consistent with the biomass estimates of the previous spring and fall of 2000 (see *Table 4*).

The variance to mean ratios were examined to evaluate the number of taxa demonstrating a contagious distribution (Elliott 1977). As discussed in the previous two reports, a Chi Square value of 8 or above indicates that the taxa is contagiously distributed. Fourteen taxa in Burnout Creek and nine taxa in James Canyon Creek were contagiously distributed. The remaining taxa in each stream followed a Poisson distribution. As in the previous spring and fall 2000 samples, the conclusion is that abundant taxa are contagiously distributed. The variace to mean rations of the total densities were also examined and both Burnout Creek (Chi sq. = 846.48) and James Canyon Creek (Chi sq. = 605.79) still maintained a highly contagious distribution.

The Biotic Condition Index (BCI) was again calculated (Winget and Mangum 1979). The predicted community tolerant quotient (CTQp) remained the same with a value of 80. The CTQa for Burnout Creek in fall of 2001 was 60, and, for James Canyon Creek, it was 68.72. Both values are based on the ratings for individual invertebrate taxa found in *Table 5.* The BCI values for Burnout Creek was calculated at 132.47, while BCI for James Canyon Creek was 116.42. Again, both streams are in good condition, according to this index.

Four clusters are apparent from the cluster analysis (dissimilarity approximately 0.640; Figure 1). One cluster includes all of the fall, 2001 samples from Burnout Creek along with one Burnout Creek, fall, 2000 sample. These have between 40% to 60 % dissimilarity from one another. The fall Burnout Creek samples indicate a shift in overall community composition between the fall of 2000 (the third cluster) and the fall of 2001. This shift is due to differences in both taxa and relative densities of some key taxa. One of the fall 2000 samples (Burnout #1) is well within the cluster of the Fall 2001 samples, but the other two 2000 samples are in their own cluster and are very dissimilar. Burnout #1 for 2000 was probably pulled into the 2001 Burnout cluster because of it's high densities of *Baetis*, *Cinygmula*, and ostracods, and because of the absence of *Lepidostoma*, *Ecclisocosmoecus*, and *Moseylyana*, all of which were similar to the 2001 Burnout samples (table 4).

The reason for the shift in community structure in Burnout Creek is not clear. The impact of the extended drought may be partially responsible. The communities may have different frequencies because of changes in discharge. The potential role of disturbance by the previous sampling seasons cannot be ruled out. The stream is very small and the samples are taken from a narrow corridor barely wide enough for a single sample. The distance upstream is also predefined. It is possible that disturbance of the substrate by sampling has modified the habitat.

The second cluster contains two sub-clusters. One sub-cluster is made up of five of the six James Canyon and Burnout Creek spring 2001 samples. Two of the James Canyon, fall 2000 samples

also occur in this sub-cluster. The remaining spring 2001 sample from James Canyon occurs in the second sub-cluster along with two samples taken from James Canyon this past fall (2001).

The second cluster includes all of the spring samples, although the two fall James Canyon samples from 2000 are included in the first sub-cluster. These appear to be pulled together because of their missing taxa and high densities of chironomids and ostracods. The second sub-cluster includes two James Canyon fall 2001 samples along with one James Canyon spring sample. These are similar in the densities of *Zapada*, *Sweltza*, *Ryacophila* and chironomids, and also have a number of absent taxa that are found in other samples.

The final cluster also consists of two samples from James Canyon, one each from the fall of 2000 and 2001. These samples had a high degree of dissimilarity between each other and with the rest of the samples. James Canyon 2 of 2000 and James Canyon 1 of 2001 had similar numbers of *Baetis*, *Rhyacophila*, chironomids, simuliids, ostracods, and oligochaetes.

Both stream still appear to be in excellent condition. The fall benthos of James Canyon Creek varies more widely than that of Burnout Creek. Conversely, Burnout Creek appears to be shifting in the makeup of the community. Whether this is due to small sample size bias or to a broader environmentally induced trend cannot be determined. The spring samples show more consistency than the fall samples, which would favor the existence of an external impact, such as the intensifying drought, in Burnout Creek prior to the fall 2001 sampling period.

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Figure 1. Cluster analysis: Fall 2000, Spring 2001 and Fall 2001 Benthic Samples for Burnout(B) and James Canyon (J) Creeks

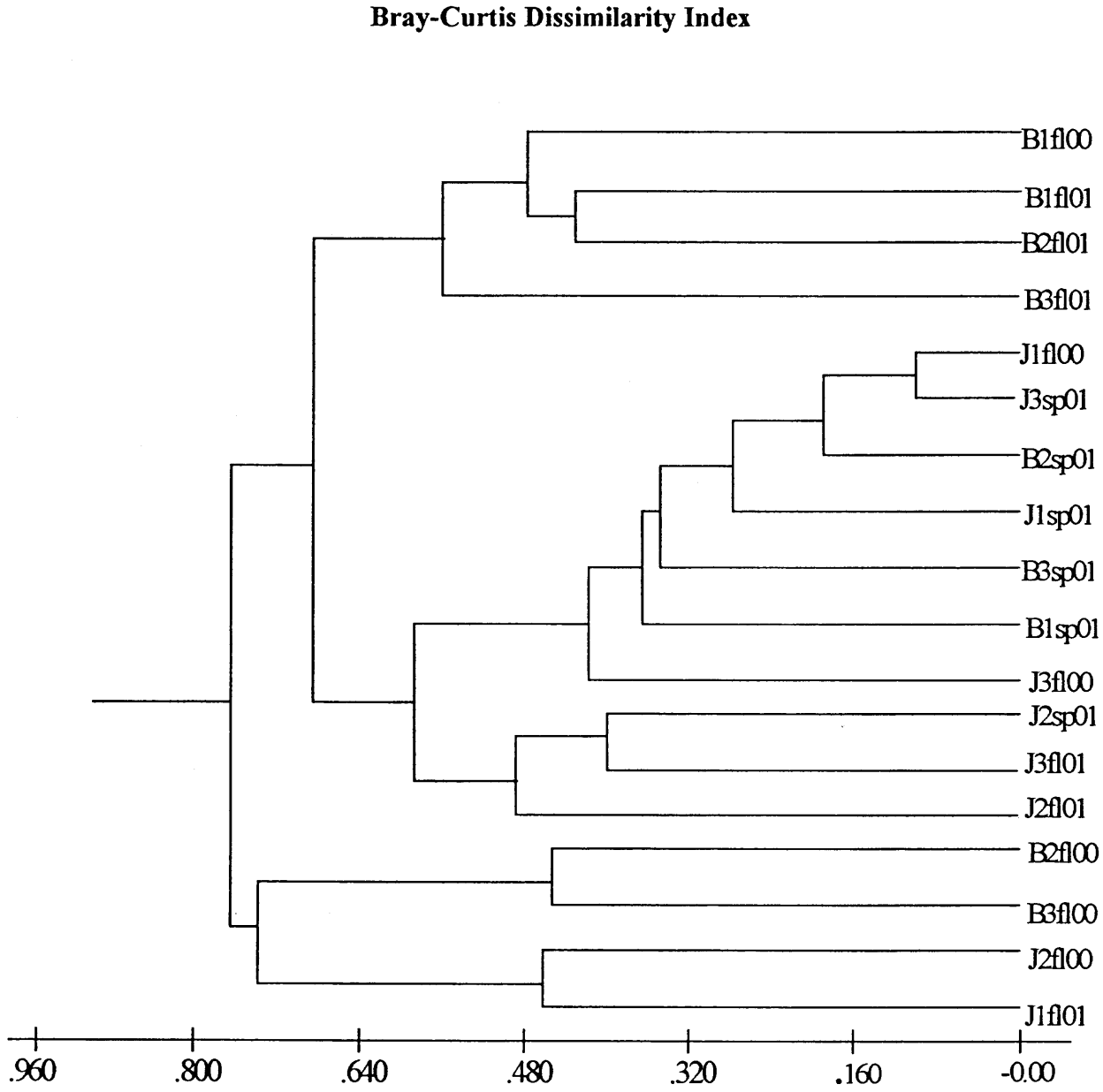

Table 1. Fall 2001 Summary Statistics for Burnout Creek

	Burnout Creek(fall 01)	1	2	3	mean	sd	chi sq.	#/m2
Ephemeroptera	*Baetis sp.*	17	52	15	28.00	20.81	30.93	9,240
	Cinygmula	13	78	13	34.67	37.53	81.25	11,440
	Drunella doddsi	0	1	0	0.33	0.58	2.00	110
	Drunella grandis	2	0	0	0.67	1.15	4.00	220
	Early instar ephemerellidae	2	1	7	3.33	3.21	6.20	1100
	Paraleptophlebia sp.	10	20	22	17.33	6.43	4.77	5,720
Plecoptera	*Isoperla sp.*	0	1	0	0.33	0.58	2.00	110
	Megarcys signata	0	1	0	0.33	0.58	2.00	110
	Sweltza sp.	0	1	1	0.67	0.58	1.00	220
Trichoptera	*Brachycentrus*	3	0	0	1.00	1.73	6.00	330
	(Brachycentridae) Micrasema sp.	3	11	0	4.67	5.69	13.86	1,540
	Dicosmoecus	0	13	0	4.33	7.51	26.00	1,430
	(Limniphilidae) Neothremma alicia	0	8	2	3.33	4.16	10.40	1,100
	(Limniphilidae)Oligophlebodes	21	25	5	17.00	10.58	13.18	5,610
	Rhyacophila (larva)	2	8	2	4.00	3.46	6.00	1,320
Coeleoptera	*Heterlimnius (larva)*	100	108	40	82.67	37.17	33.42	27,280
	Heterlimnius (adult)	0	15	0	5.00	8.66	30.00	1,650
Diptera	*Ceratopogonidae*	0	2	0	0.67	1.15	4.00	220
	Chironomidae (larva)	88	125	48	87.00	38.51	34.09	28,710
	(Psychodidae) Pericoma	1	0	0	0.33	0.58	2.00	110
	Simulium sp.	0	11	21	10.67	10.50	20.69	3,520
	(Stratiomyidae) Caloparyphus	4	0	0	1.33	2.31	8.00	440
	(Stratiomyidae) Euparyphus	1	0	0	0.33	0.58	2.00	110
	(Tipulidae) Dicranota	1	0	0	0.33	0.58	2.00	110
	(Tipulidae) Tipula	1	1	2	1.33	0.58	0.50	440
Crustacea	*Ostracoda*	324	89	147	186.67	122.42	160.57	61,600
Mollusca	*Sphaerium sp.*	9	7	9	8.33	1.15	0.32	2,750
Misc.	*Oligochaeta*	76	9	271	118.67	136.11	312.24	39,160
	Planariidae	51	48	11	36.67	22.28	27.07	12,100
TOTAL		729	635	616	660	487.16	846.48	217,800

Table 2. Fall 2001 Summary Statistics for James Canyon Creek

	James Canyon Creek (fall 01)	1	2	3	mean	sd	chi sq.	#/m2
Ephemeroptera	*Baetis sp.*	29	202	11	80.67	105.46	275.76	26,620
	Cinygmula	13	4	23	13.33	9.50	13.55	4,400
	Drunella doddsi	2	1	0	1.00	1.00	2.00	330
	Early instar ephemerellidae	11	6	32	16.33	13.80	23.31	5,390
	Ephemerella sp.	0	0	1	0.33	0.58	2.00	110
	Paraleptophlebia sp.	0	6	2	2.67	3.06	7.00	880
Plecoptera	*Early instar plecoptera*	0	2	1	1.00	1.00	2.00	330
	Isoperla sp.	2	3		2.50	0.71	2.70	825
	Malenka californica	4	6	4	4.67	1.15	0.57	1,540
	Megarcys signata	1	0	0	0.33	0.58	2.00	110
	Sweltza sp.	0	1	2	1.00	1.00	2.00	330
	Zapada	2	6	10	6.00	4.00	5.33	1,980
Trichoptera	*Arctopsyche grandis*	1	0	0	0.33	0.58	2.00	110
	(Brachycentridae) Micrasema sp.	0	3	0	1.00	1.73	6.00	330
	Lepidostoma sp.	0	1	0	0.33	0.58	2.00	110
	(Limniphilidae) Neothremma alicia	39	29	7	25.00	16.37	21.44	8,250
	(Limniphilidae)Oligoplebodes	1	1	13	5.00	6.93	19.20	1,650
	Rhyacophila (larva)	6	10	13	9.67	3.51	2.55	3,190
Coeleoptera	*Heterlimnius (larva)*	2	1	2	1.67	0.58	0.40	550
	Staphylinidae (adult)	0	1	0	0.33	0.58	2.00	110
Diptera	*Chironomidae (larva)*	44	165	233	147.33	95.73	124.40	48,620
	Chironomidae (pupa)	0	0	1	0.33	0.58	2.00	110
	(Empididae) Wiedemania	0	1	1	0.67	0.58	1.00	220
	Phoridea	0	1	0	0.33	0.58	2.00	110
	(Ptychopteridae)Ptychoptera	0	0	1	0.33	0.58	2.00	110
	Simulium sp.	2	9	0	3.67	4.73	12.18	1,210
	(Stratiomyidae) Caloparyphus	0	0	2	0.67	1.15	4.00	220
	(Stratiomyidae) Euparyphus	0	0	5	1.67	2.89	10.00	550
Crustacea	*Ostracoda*	1	2	29	10.67	15.89	47.31	3,520
Arachnid	*Hydracarina*	1	1	0	0.67	0.58	1.00	220
Mollusca	*Sphaerium sp.*	5	1	1	2.33	2.31	4.57	770
Misc.	*Oligochaeta*	2	1	1	1.33	0.58	0.50	440
	Planariidae	46	48	39	44.33	4.73	1.01	14,630
TOTAL		214	512	434	387.5	303.57	605.79	127,875

Table 3. comparison of total densities among streams and sites in all sampling periods

	Site1	Site2	Site3	mean	sd	Chi sq.	#/m2
Burnout Creek							
fall2000	892	166	189	415.67	412.68	819.42	137,170
spring2001	784	959	1,748	1,163.67	644.26	1,204.03	384,010
fall2001	729	635	616	660	487.16	846.48	217,800
James Canyon Creek							
fall2000	1,241	183	2017	1147	920.61	1477.8	378,510
spring2001	1,200	548	1,302	1,016.67	665.33	1,022.04	335,500
fall2001	214	512	434	387.5	303.57	605.79	127,875

Table 4. Mean biomass per meter square, Fall 2001

Stream	Sample1	Sample2	Sample3	Mean	Mb/m2
Burnout	1.09g	4.47g	0.78g	2.11g	696.3g
James Canyon Creek	0.86g	0.63g	0.84g	0.78g	256.3g

Table 5. Biotic Condition Index values for the taxa collected (Winget and Mangum 1979).

Baetis sp.	*72*
Cinygmula	*21*
Drunella doddsi	*24*
Drunella Grandis	*24**
Early instar ephemerellidae	*48**
Ephemerella sp.	*48**
Paraleptophlebia sp.	*24*
Early instar plecoptera	*108*
Isoperla sp.	*48*
Malenka californica	*36*
Megarcys signata	*108**
Sweltza sp.	*24*
Zapada	*16*
Arctopsyche grandis	*18*
(Brachycentridae) Micrasema sp.	*24*
Dicosmoecus	*24*
Lepidostoma sp.	*18*
(Limniphilidae) Neothremma alicia	*8*
(Limniphilidae)Oligophlebodes	*24*
Rhyacophila (larva)	*18*
Heterlimnius (larva)	*108*
Staphylinidae (adult)	*108*
Ceratopogonidae	*108*
Chironomidae (larva)(pupa)	*108*
(Psychodidae) Pericoma	*36*
(Empididae) Wiedemania	*108*
Phoridea	*108**
(Ptychopteridae)Ptychoptera	*108**
Simulium sp.	*108*
(Stratiomyidae) Caloparyphus	*108**
(Stratiomyidae) Euparyphus	*108*
(Tipulidae) Dicronata	*24*
(Tipulidae) Tipula	*36*
Ostracoda	*108*
Hydracarina	*108*
Sphaerium sp.	*108**
Oligochaeta	*108*
Planariidae	*108*

Estimates of the Fall 2001 Cutthroat Trout Population Densities in Burnout Creek & James Canyon Creek, Tributaries to Electric Lake, Huntington Creek Drainage

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Estimates of the Fall 2001 Cutthroat Trout Population Densities in Burnout Creek & James Canyon Creek, Tributaries to Electric Lake, Huntington Creek Drainage

Introduction

Electric Lake, Huntington Canyon, Emery County, Utah, has a population of cutthroat trout originating from the original Strawberry Reservoir population (a mixture of Yellowstone cutthroat trout and Colorado River cutthroat trout). These trout spawn in the tributaries to Electric Lake. The Utah Division of Wildlife Resources requested that Canyon Fuel Company's, Skyline Mines conduct a survey of the fish and benthos in Burnout Creek and James Canyon Creek, both tributaries to Electric Lake. This report focuses on the fall 2001 fish population estimates.

Methods

Both Burnout Creek and James Canyon Creek were sampled on October 19, 2001. Both streams enter Electric Lake near the upstream end of the reservoir. The sampling stations established in the fall of 2000 were utilized in this study as well. A total stream length of 162 meters (528 feet) of stream from the reservoir high water mark as determined by shoreline bench marks (beach and littoral shelf) and vegetation. Fish populations estimates were based on removal summation sampling applied to the measured sections of stream. The fish were captured with a Smith-Root Model 12 battery powered backpack electrofishing unit. All captured fish were transferred to buckets and were held

in flow-through holding pens until three passes had been completed. Fish were then identified, counted and measured to the nearest millimeter. The catch data from the runs were then used to project the population size with the Zippen removal summation method (Moran 1951; Zippen 1956, 1958).

Results and Discussion

Burnout Creek

Two waterfalls are located within the 162 meter section of Burnout Creek . The first waterfall was 97 meters upstream from the high water line. This waterfall was a partial barrier to upstream fish movement but the presence of a plunge pool indicated that fish passage was possible. The second waterfall was 30 meters above the first. This waterfall appeared to be a stronger barrier to fish passage, although it was low enough to be potentially passable, especially during high runoff periods. The sample reach extended an additional 35 meters above the second waterfall. The total population of trout in the entire stream section was estimated at 246, with 11 cottids, for a total fish population estimate of 257. In 2000 the total population estimate was 304 trout, so the population was down in 2001 by about 15%. The mean length of the trout in the 2001 population was 62.7 mm (standard deviation = 10.16). The mean length of the cottids was 72.6 mm (standard deviation = 7.96).

The population density between the high water mark and the first waterfall was 236 cutthroat trout and 11 sculpin. This contrasts with a total of 280 fish in the year 2000, for a reduction of 33 fish.

The trout density below the first waterfall, based on linear meters of stream, was 2.43 fish per meter. The largest cottid was179 mm and the largest trout collected in the section was 140 mm. The majority of the trout were young of the year (Figure 1) and were not significantly different in size from those collected in 2000 (Figure 2). The 2001 population had a mean length of 60.6 mm (standard deviation = 9.27) as opposed to a mean length of 61.1mm (standard deviation =16.43) in 2000. Just 6 fish, or less than 3%, were over 100 mm in total length and were likely holdovers from the previous year. In 2000 holdovers made up less than 5% of the population.

As noted in the 2000 report, the first waterfall appears to act as a partial barrier to spawning trout. The trout population between the first and second waterfalls was estimated to be 6 fish, with no cottids present, less than 3% of the fish density below the first waterfall. The number of fish was down from the 2000 estimate of 22 fish. The largest trout collected in this section in 2001 was 179 mm TL, and the fish were, on average, larger than in 2000, having a mean length of 99.9 mm (standard deviation = 55.92) as opposed to a mean of 60.05 mm (standard deviation = 18.60) in 2000. Two of the five fish are likely to be holdovers from the 2000 cohort and these were 160 and 179 mm TL respectively. The previous year consisted almost entirely of young of the year individuals. The density between the two waterfalls was 0.2 fish per meter as opposed to 0.73 fish per meter in 2000. Given the lower total density in the stream for the fall of 2001, the low numbers above the first waterfall are probably due to fewer spawning trout successfully ascending the first waterfall. As noted with the 2000 sample series, the lower densities could relate to downstream movements of fry and young of the year, since they would be unable to reenter the upper section once they had drifted over the waterfall. However if such downstream movement is density dependent,

one would expect this section to have retained more fish, and thus be more similar to the previous year's densities.

No fish were collected above the second falls within the study site, however one trout was sampled from a pool approximately 5 meters above the terminus of the sample station. This fish was 197 mm, and was probably two to three years of age. The second waterfall apparently does not act as a permanent barrier to fish access, but given the physical makeup of the plunge pool basin, it is likely that upstream fish passage is only possible during high runoff years. Given that the intervening year was a continuation of a severe drought, the slightly lower density of trout in Burnout Creek is not unexpected. The reservoir in the spring of 2001 was about as low as it had been in the previous fall. Thus trout would have had to swim upstream to spawn in Burnout Creek, rather than directly enter the stream from the reservoir. Since Burnout Creek is a shallow stream, this would have both exposed the fish to more predation risk and would have made physically entering the stream channel from Huntington Creek difficult because of the shallow outflow at the confluence. Spawning fish may have therefore been discouraged from entering the stream. Nevertheless, a reduction of only 15% is not a major shift in the densities of young of year, and is unlikely to constitute a decline of significance in this stream.

James Canyon Creek

In 2000, James Canyon Creek had an estimated total trout population size of 587 fish based on the Zippen removal-summation estimator, for a density of 3.62 fish per meter. In 2001 the total trout

population estimate was 93 fish within the same section, for a density of 0.57 trout per linear meter of stream. The 2001 population density was just 16% of the previous year's estimate. No cottids were collected in 2001, while 3 were collected in 2000. The mean total length of the trout in James Canyon Creek was 95.9 mm (standard deviation = 35.16) in 2001 as opposed to 59.03 mm (standard deviation = 19.06) in 2000. Thus the fish were larger and the length distribution curve was more flattened in 2001 (Figure 3) as opposed to 2000 (Figure 4). Trout were not aged in this study, but the length frequency of the 2001 James Canyon population again shows distinct cohorts (Figure 3), that were in the same general size ranges that were interpreted as being age 0, age I, and age II fish in the 2000 study (Figure 4). One additional fish in the 2001 sample, at 222 mm may be a 3 year old fish from the 1998 cohort.

This population, in the fall of 2001, has distinct differences from the 2000 samples. First is the significantly reduced population size. Second is the distinct increase in mean length of the fish in the stream. Figures 3 and 4 are very informative because they illustrate the relative abundance of each cohort in the samples from the two sample years. In 2000 the dominant cohort was due to young of the year fish, ranging in total length from about 32 to 72 mm (Figure 4). In 2001, the young of the year age class ranged in total length from about 30 to 54 mm, and was clearly not the dominant size class in the stream (Figure 3). Instead age class I, 80 to 140 mm total length, dominated, and in densities somewhat higher than in the 2000 samples. The 2001 densities of age I trout was estimated at 68 individuals while the 2000 densities of age I individuals is estimated at 49.

What appears to have occurred in this stream was a significant reduction of spawning, or of

spawning success, in the spring of 2001. This could have been induced by a number of factors. First, the Canyon Fuel Company's, Skyline Mines struck a perched aquifer in their mining operations and part of the preventative measures taken included their establishing a series of well (the James Canyon wells) to pull excess ground water away from the mines. This water was piped to Electric Lake, down James Canyon, in September of 2001. The company utilized sediment barriers and avoided any direct impacts to the stream (i.e. construction through the channel, disturbance of the riparian etc.). The presence of age I trout and the lack of young of the year fish is not concordant with impacts from the construction effort. The pipeline was buried in September 2001, yet to selectively eliminate the young of the year, construction would have had to be undertaken in the spring or early summer, when the eggs or newly hatching fry were most vulnerable to siltation.

Second, heavy grazing by sheep was permitted by the U. S. Forest Service in the upper reaches of the drainage during the summer of 2001. This grazing was more intense around riparian areas because of the extended drought in the region, and thus sedimentation induced by grazing also could have impacted the stream. Again it is likely that the grazing impact occurred later than the spawning period for the cutthroat trout, although it could have coincided with late incubation and fry emergence in the stream. Increased siltation could have selectively impacted incubating eggs, and thus could have reduced recruitment through reduced egg survival. This potential perturbation can not be easily evaluated with the existing database, but likely it had at most only a partial impact on the loss of the 2001 year class.

A final factor is the drought, and associated reduced stream flows within the James Canyon Creek

drainage in the spring of 2001. James Canyon Creek directly enters Electric Lake through a culvert that passes under a roadway built prior to construction of the dam. The road may have been part of a county road system existing prior to construction of Electric Lake, and it was clearly utilized for hauling borrow material during the construction of the dam. The stream's outflow through the culvert is normally submerged during high water, and lake waters typically inundate the stream channel east (inland) of the borrow roadway. This inundation, and normal spring high water flows, would affect the outflow pipe. The standing water behind the borrow roadway acts as a settling basin, and would retain sands transported by James Creek. This is confirmed by the change in stream channel morphology once the stream enters the lake's high water level. The fact that this area usually holds standing water during the spring runoff (highest lake levels) is significant because that is also when the majority of sediment is in downstream transport. The stream's bedload would be deposited upon entering the pooled area. The water the leaving the pool via the culvert would be low in sediment content, and thus would tend to erode sediment deposits in the culvert as it passes through. This would generate a mechanism for keeping the culvert clear of sands. Once the lake levels fall in the summer and autumn, the stream is also transporting less sediment because of the dominance of low water depositional conditions within the stream channel itself. During the spring of 2001 extremely low lake levels left the upstream end of the culvert exposed so that the water actively flowed into it, carrying transported sediments with it. The downstream end of the culvert was submerged in Electric Lake and was also observed to be covered with upwelling sand (C. Hansen personal communication). Such a situation would be generated by the slowing of the stream waters entering the lake. Once moving water slows below the fall velocity of the sands in transport, the sands are deposited, effectively blocking the culvert mouth.

Spawning fish would therefore need to swim through the suspended sand barrier if they were to enter the culvert. This change most likely resulted in few fish entering the stream to spawn. This physical blockage is concordant with the low density of young of the year fish (age class 0) found in the stream in 2001. Had mining activity induced chemical or instream physical impacts that caused acute fish mortality within the stream channel, one would expect the mortalities to impact all fish age classes, yet age I fish were more abundant in the 2001 sampling period than in the 2000 census. However, given the severity of the drought, it is more likely that low water levels and reduced spawning access are the main causative factors in the lower trout densities.

Literature Cited

Moran, P. A. P. 1951. A mathematical theory of animal trapping. Biometrika 38: 307-311.

Zippen, C. 1956. An evaluation of the removal method of estimating animal populations. Biometrics 12:163-169.

Zippen, C. 1958. The removal method of population estimation. Journal of Wildlife Management 22:82-90.

Figure 1. Burnout Creek length frequency for 2001, based on n = 217

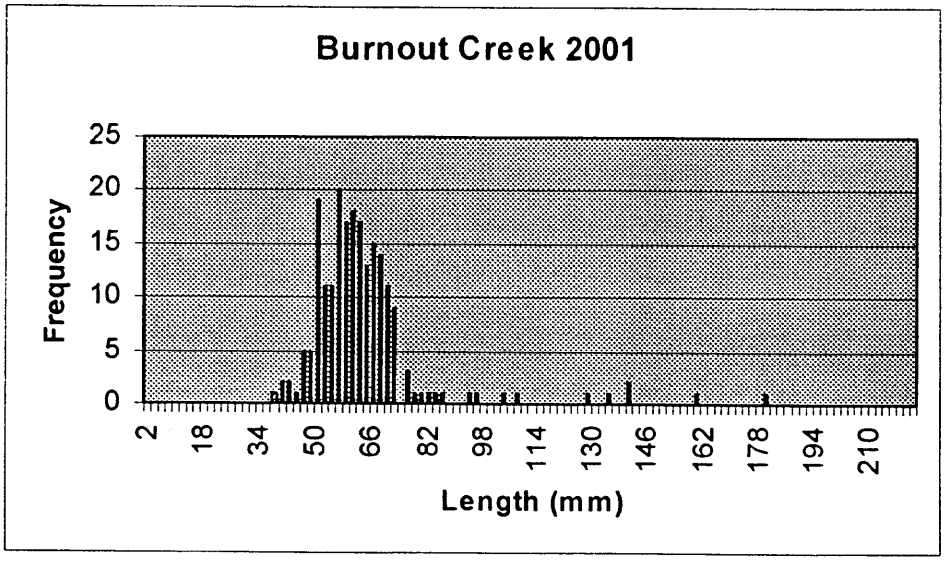


Figure 2. Burnout Creek length frequency for 2001, based on n = 281

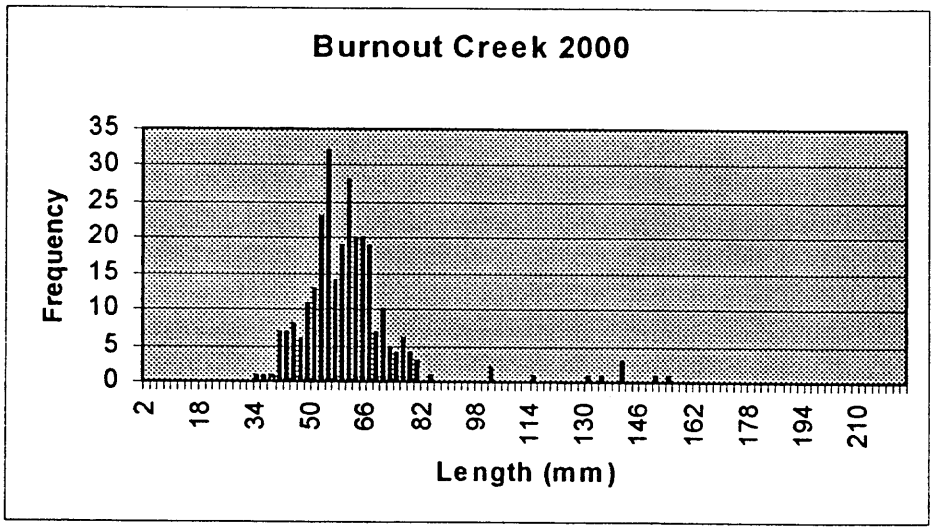


Figure 3. James Canyon Creek length frequency for 2001, based on n = 86

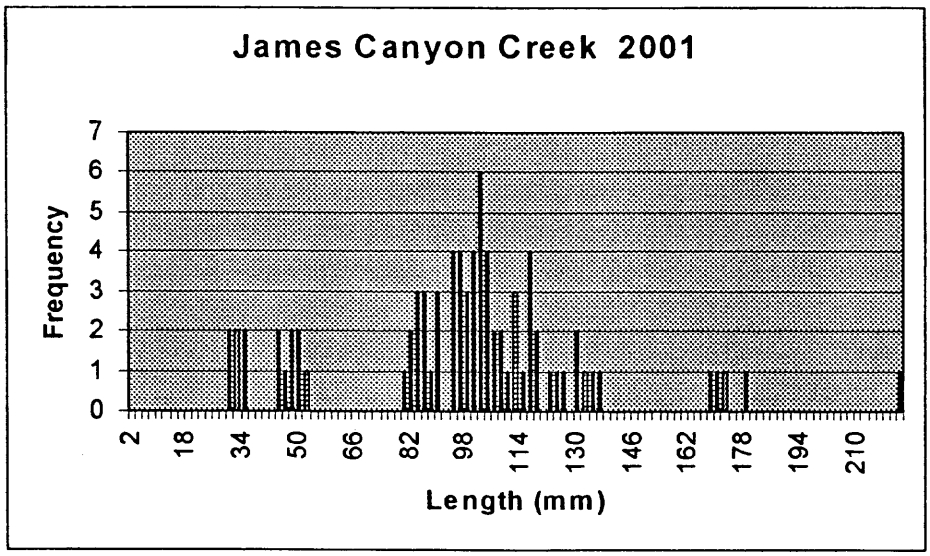
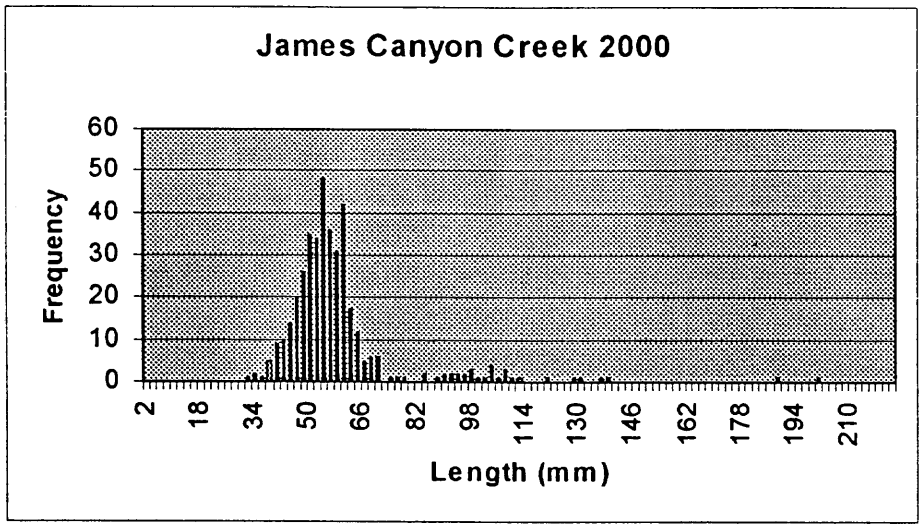


Figure 4. James Canyon Creek length frequency for 2000, based on n = 376



Appendix 1. Raw data utilized in generating population estimates.

Burnout Creek total fish

Run	i-1	y_i	$(i-1)*y_i$
1	0	143	0
2	1	51	51
3	2	32	64
		226	115

R= sum[(i-1)*y_i] / sum[y_i] = 115/226 = 0.5088 $(1-q^k) = 0.92$
Total = 226/0.92 = 246

Burnout Creek trout below waterfall

Run	i-1	y_i	$(i-1)*y_i$
1	0	131	0
2	1	49	49
3	2	32	64
		212	113

R= sum[(i-1)*y_i] / sum[y_i] = 113/212 = 0.5330 $(1-q^k) = 0.90$
Total = 212/0.90=236

Burnout Creek sculpin

Run	i-1	y_i	$(i-1)*y_i$
1	0	8	0
2	1	1	1
3	2	1	2
		10	3

R= sum[(i-1)*y_i] / sum[y_i] = 3/10 = 0.3000 $(1-q^k) = 0.98$
Total = 10/0.98=11

Burnout Creek between Waterfalls

Run	i-1	y_i	$(i-1)*y_i$
1	0	4	0
2	1	1	1
3	2	0	0
		5	1

R= sum[(i-1)*y_i] / sum[y_i] = 1/5 = 0.2000 $(1-q^k) = 0.99$
Total = 5/0.99=6

James Canyon Creek

Run	i-1	y_i	$(i-1)*y_i$
1	0	56	0
2	1	19	19
3	2	11	22
		86	41

R= sum[(i-1)*y_i] / sum[y_i] = 41/86 = 0.4767 $(1-q^k) = 0.93$
Total = 86/0.93= 93

James Canyon Creek age 1 fish 2001

Run	i-1	y_i	$(i-1)*y_i$
1	0	46	0
2	1	13	13
3	2	6	12
		65	25

R= sum[(i-1)*y_i] / sum[y_i] = 25/65 = 0.3846 $(1-q^k) = 0.96$
Total = 65/0.96= 68

James Canyon Creek age 1 fish 2000

Run	i-1	y_i	$(i-1)*y_i$
1	0	22	0
2	1	14	14
3	2	6	12
		42	26

R= sum[(i-1)*y_i] / sum[y_i] = 26/42 = 0.6190 $(1-q^k) = 0.85$
Total = 42/0.85= 49

APPENDIX C

Legal Financial, Compliance and Related Information

Annual Report of Officers
As submitted to the Utah Department of Commerce

Other change in ownership and control information
As required under R645-301-110

Report of Officers and Directors

Officers and Directors

This section identifies those persons who own or control Canyon Fuel Company, LLC. Canyon Fuel Company, LLC, is a Delaware limited liability company with two members; Arch Western Resources, LLC holding 65% interest, and ITOCHU Coal International Inc. holding 35% interest.

Arch Western Resources, LLC, is owned 99% by Arch Western Acquisition Corporation, a wholly owned subsidiary of Arch Coal, Inc., and 1% by Delta Housing, Inc., a wholly owned subsidiary of Atlantic Richfield Company.

ITOCHU Coal International Inc. is a wholly owned subsidiary of ITOCHU Corporation, a Japanese corporation.

ADDRESSES:

Arch Western Resources, LLC
City Place One, Suite 300
St. Louis, MO 63141

Arch Western Acquisition Corporation
City Place One, Suite 300
St. Louis, MO 63141

Arch Coal, Inc.
City Place One, Suite 300
St. Louis, MO 63141

Delta Housing, Inc.
515 South Flower Street
Los Angeles, CA 90071

Atlantic Richfield Company
515 South Flower Street
Los Angeles, CA 90071

ITOCHU Coal International Inc.
555 17th Street, Suite 845
Denver, Colorado 80202

ITOCHU Corporation, 5-1
Kita-Aoyama 2-Chome
Minato-ku, Tokyo 107-77, Japan

The following lists describe the officers and directors of Canyon Fuel Company, LLC, Arch Western Resources, LLC, Arch Acquisition Corporation, Arch Coal, Inc., ITOCHU Corporation, and ITOCHU Coal International Inc. The addresses for the officers, directors, representatives to the management board listed are the same as those of the respective business entities as listed above, for which the individuals are officers, directors or representatives.

CANYON FUEL COMPANY, LLC:

Directors:

Robert W. Shanks — Chairman
SSN [redacted]
Effective : 06/01/1998

Yuzo Hirono — Director
SSN : Not Applicable
Effective : 12/14/1999

Steven F. Leer — Director
SSN [redacted]
Effective : 06/01/1998

Masayoshi Araya — Director
SSN : [redacted]
Effective : 06/01/2001

Joe Y. Nakazawa — Alternative Representative
SSN : Not Applicable
Effective : 06/01/2001

Tsutomu Niwa — Alternative Representative
SSN : Not Applicable
Effective : 10/09/2001

Officers

Richard D. Pick — President, Chief Executive Officer and General Manager
SSN : [redacted]
Effective : 06/01/1998

Robert G. Messey — Chief Financial Officer
SSN : [redacted]
Effective : 10/09/2001

James E. Florczak — Vice President, Finance
SSN: : [redacted]
Effective : 05/25/1999

John W. Eaves — Vice President, Marketing
SSN: [redacted]
Effective : 06/23/1998

Robert G. Jones — Vice President, General Counsel and Assistant Secretary
SSN: : [redacted]
Effective : 03/08/2000

Janet L. Hogan — Secretary
SSN: : [redacted]
Effective : 10/11/2000

William H. Rose — Assistant Secretary
SSN: [redacted]
Effective : 06/01/1998

ARCH COAL, INC.:

Directors:

James R. Boyd — Director
SSN : [redacted]
Effective : 01/01/1990

Frank M. Burke — Director

SSN [redacted]
Effective :12/01/2000

Robert L. Hintz Director
SSN [redacted]
Effective : 06/30/1997

Douglas H. Hunt Director
SSN [redacted]
Effective : 04/04/1995

Steven F. Leer Director
SSN [redacted]
Effective : 02/11/1992

James L. Parker Director
SSN [redacted]
Effective : 04/04/1995

A. Michael Perry Director
SSN [redacted]
Effective : 09/28/1998

Ignacio Dominguez Urquijo Director
SSN : Not Applicable
Effective :12/11/1998

Robert G. Potter Director
SSN [redacted]
Effective : 02/22/2001

Theodore D. Sands Director
SSN [redacted]
Effective : 02/25/1999

Officers:

James R. Boyd Chairman of the Board
SSN [redacted]
Effective : 01/01/1990

Steven F. Leer President and Chief Executive Officer
SSN [redacted]
Effective : 02/11/1992

Kenneth G. Woodring Executive Vice President-Mining Operations
SSN [redacted]
Effective : 07/01/1997

Robert J. Messey SSN [redacted] Effective : 12/01/2000	Senior Vice President and Chief Financial Officer
Robert G. Jones SSN [redacted] Effective : 10/16/2000	Senior Vice President - Law, Secretary and General Counsel
C. Henry Besten, Jr. SSN [redacted] Effective : 07/01/1997	Vice President - Strategic Marketing
John W. Eaves SSN [redacted] Effective : 02/24/2000	Senior Vice President - Marketing
Terry O'Connor SSN: [redacted] Effective : 07/22/1998	Vice President - External Affairs
David B. Peugh SSN [redacted] Effective : 07/01/1997	Vice President - Business Development
Robert W. Shanks SSN [redacted] Effective : 07/01/1997	Vice President - Operations
Larry R. Brown SSN [redacted] Effective : 07/01/1997	Vice President and Chief Information Officer
William H. Rose SSN [redacted] Effective : 04/22/1998	Vice President - Tax Planning
Brad Allbritten SSN [redacted] Effective : 02/24/2000	Vice President - Human Resources
Deck S. Slone SSN [redacted] Effective : 04/27/2001	Vice President - Investor and Public Relations
James E. Florczak SSN [redacted] Effective : 08/17/1998	Treasurer

Janet L. Hogan — Assistant Secretary and Counsel
SSN [redacted]
Effective : 10/16/2000

Charles David Steele — Internal Auditor
SSN [redacted]
Effective : 06/22/1998

John Lorson — Controller
SSN [redacted]
Effective : 04/09/1999

Arch Western Resources, LLC,:

Officers:

Robert W. Shanks — President
SSN [redacted]
Effective : 06/02/1998

David B. Peugh — Vice President
SSN [redacted]
Effective : 03/17/1998

Robert G. Jones — Vice President and Assistant Secretary
SSN [redacted]
Effective : 03/14/2001

Janet L. Hogan — Secretary
SSN [redacted]
Effective : 10/16/2000

William H. Rose — Assistant Secretary
SSN [redacted]
Effective : 03/17/1998

James E. Florczak — Treasurer
SSN [redacted]
Effective : 09/15/1998

Arch Western Acquisition Corporation:

Officers:

Robert G. Jones — President
SSN [redacted]
Effective : 03/01/2000

David B. Peugh — Vice President
SSN [redacted]
Effective : 05/07/1998

James E. Florczak — Treasurer
SSN [redacted]
Effective : 09/15/1998

Janet L. Hogan — Secretary
SSN [redacted]
Effective : 10/16/2000

William H. Rose — Assistant Secretary
SSN [redacted]
Effective : 05/07/1998

Directors:

David B. Peugh — Director
SSN [redacted]
Effective : 05/07/1998

Robert G. Jones — Director
SSN : [redacted]
Effective : 03/01/2000

C. Henry Besten, Jr. — Director
SSN [redacted]
Effective : 07/01/1997

ITOCHU Coal International Inc. Representatives to the Management Board:

Masayoshi Araya
SSN : [redacted]
Effective : 11/30/1996

Yuzo Hirono
SSN [redacted]
Effective: : 12/31/1999

Alternates:

Tsutomu Niwa
SSN : Not Applicable
Effective : 6/01/2001

Yutaka Nakazawa
SSN [redacted]
Effective : 12/20/1996

The following individuals listed as directors and officers of ITOCHU Corporation and ITOCHU Coal International Inc. are Japanese nationals and do not have social security numbers unless listed.

ITOCHU CORPORATION

Name	Title	Date of Appointment
Minoru Murofushi	Chairman	April 1998
Masahisa Naitoh	Vice Chairman	April 2000
Uichiro Niwa	President, CEO	April 1998
Hiroshi Sumie	Executive Vice President	April 2000
Makoto Kato	Executive Vice President	April 2001
Yushin Okazaki	Executive Vice President	April 2001
Sumitaka Fujita	Executive Vice President	April 2001
Mitsuaki Fukuda	Sr. Managing Director	April 2000
Akira Yokota	Sr. Managing Director	April 2001
Masaya Takei	Managing Director	April 2000
Kiyomi Yamada	Managing Director	April 2001
Motonori Toyota	Managing Director	June 2001

ITOCHU COAL INTERNATIONAL INC.

Masayoshi Araya — Chairman of the Board
SSN [redacted]
Effective : Dec. 1999

Yuzo Hirono — President and Chief Executive Officer
SSN [redacted]
Effective: : Dec. 1999

Tsutomu Niwa — Chief Financial Officer
SSN : Not Applicable
Effective : June 1996

Dietz Fry — Vice President, Finance and Administration
SSN [redacted]
Effective : March 1997

Yutaka Nakazawa — Vice President Commercial and Secretary
SSN : [redacted]
Effective : Dec. 1996

Hiroshi Akiba — Assistant Secretary
SSN : Not Applicable
Effective : Feb. 2000

APPENDIX D

Mine Maps

As required under R645-302-525-270

Mine 3 Level 1 2001 Production Map – No Production
Mine 3 Levels 2 and 3 2001 Production Map – Longwall Production
Mine 3 Level 1 Five Year Mine Plan
Abandoned Equipment Location Map – Mine 3 Level 2

APPENDIX E

Other Information

In accordance with the requirements of R645-301 and R645-302

No Contents