0028

PSOMAS

Information and Engineering Solutions

August 16, 2004

COPY

INCOMING
C0070042

Pam Grubaugh Littig
Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
P.O. Box 145801
Salt Lake City, Utah 84114-5801

RE: Permit #C/007/042
Clean Text – Culvert Amendment

Dear Pam:

SCA has requested that I deliver to you the enclosed seven sets of the culvert amendment with the redline/strike out changes accepted for the approved SCA Star Point Permit.

If you have any questions or comments, please call me or Rusty Netz at (435) 888-4476.

Sincerely,
PSOMAS

Scott Carlson, PE, PLS
Senior Project Manager

Enclosures

RECEIVED
AUG 19 2004
DIV. OF OIL, GAS & MINING

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

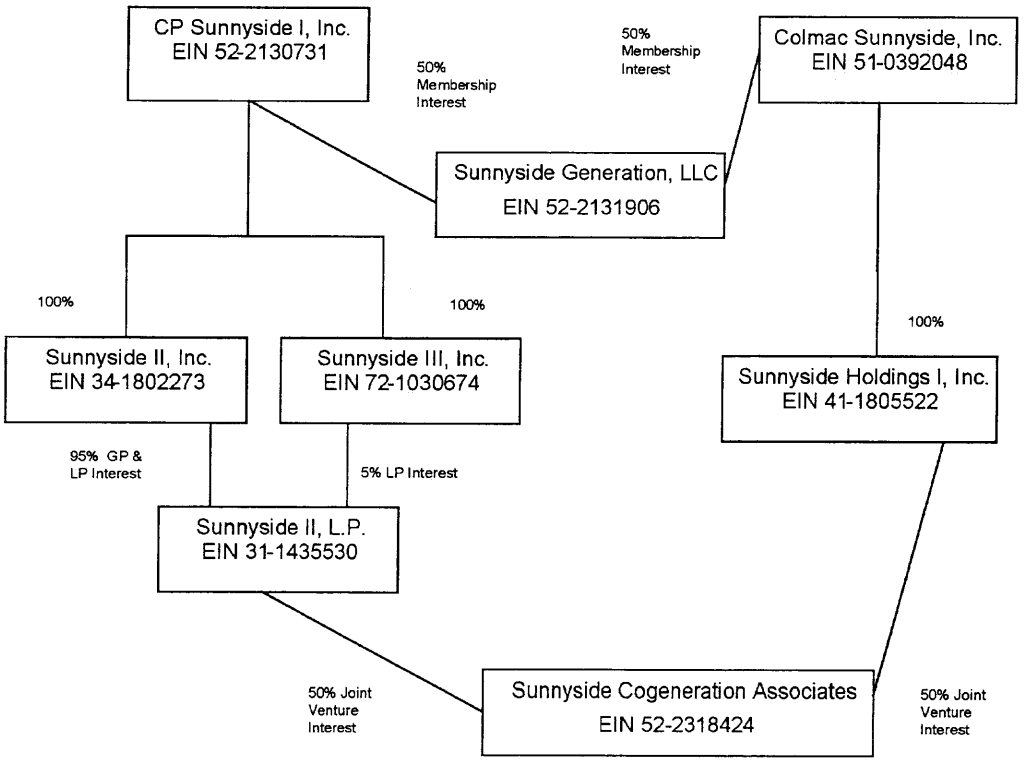
Refer to Record No 0028 **Date** 08162004
In C 0070042 Incoming

2825 E. Cottonwood Parkway
Suite 120
Salt Lake City, UT 84121

801.270.5777
801.270.5782 Fax
www.psomas.com

The information relevant to Sunnyside II, L.P. traces to the parentage of CP Sunnyside I, Inc, and the information relevant to Sunnyside Holdings I, Inc. traces to the parentage of Colmac Sunnyside, Inc., as follows:

Sunnyside Organization Chart



CP Sunnyside I, Inc:

Directors:	John T. Long	
	Steven B. Gross	
Officers:	John T. Long	Chairman of the Board and President
	Stephen B. Gross	Vice President
	Robert V. Escalante	Vice President
	Steven L. Miller	Secretary
	Daniel L. Haught	Treasurer

The address for the officers and directors is 111 Market Place, Suite 200, Baltimore, Maryland 21202. All Directors and Officers were elected in 2003.

CP Sunnyside Inc. is the Managing Member of Sunnyside Generation, LLC.

Sunnyside II, Inc. & Sunnyside III, Inc.:

Directors:	John T. Long	
	Stephen B. Gross	
Officers:	John T. Long	Chairman of the Board and President
	Stephen B. Gross	Vice President
	Robert V. Escalante	Vice President
	Steven L. Miller	Secretary
	Daniel L. Haught	Treasurer

The address for the officers and directors is 111 Market Place, Suite 200, Baltimore, Maryland 21202. All Directors and Officers were elected in 2003.

Colmac Sunnyside, Inc.:

Directors:	Willis S. McLeese	
	Greg B. Lawyer	
	Gilbert B. Warren	
Officers:	Willis S. McLeese	Chairman and CEO
	Greg B. Lawyer	President
	Robert S. McLeese	Secretary and CFO
	Gilbert B. Warren	Assistant Secretary

The address for the officers and directors is 103 Springer Building, 3411 Silverside Road, Wilmington, DE 19810. The Directors' and Officers' start date was October 15, 1999.

Sunnyside Holdings I, Inc.

Directors:	Willis S. McLeese Greg B. Lawyer	
Officers:	Willis S. McLeese	Chairman and CEO
	Greg B. Lawyer	President and COO
	Robert S. McLeese	Secretary and CFO

The address for the officers and directors is 103 Springer Building, 3411 Silverside Road, Wilmington, DE 19810. The Directors' and Officers' start date was August 27, 1999.

112.340-420. Further Information Regarding Owners and Controllers.

Neither Sunnyside II, L.P., nor Sunnyside Holdings I, Inc., nor their owners or controllers, has owned or controlled a coal mining and reclamation operation in the United States within five years preceding the date of this application, except for the following, nor do they have any interest in any pending coal mine operation permit applications.

Sunnyside Cogeneration Associates
Sunnyside Refuse/Slurry
Permit # C/007/035

112.500. Surface and Mineral Property.

The applicant, Plateau Mining Corporation, and the United States Bureau of Land Management (BLM) own surface properties within the permit area. SCA has purchased the waste coal pile located within the permit area pursuant to the Bill of Sale dated January 31, 2002 included in Exhibit 114.200a. The southern portion of the permit area, owned by the BLM, has been made available to SCA as detailed in the Assignment and Assumption of Federal Right-of-Way included in Exhibit 114.100a. Plateau Mining Corporation owns the surface property where SCA's substitute topsoil pile is stored. There are no purchasers of record under a real estate contract for the property to be mined.

Right of Entry documents have been recorded that reflect interest in the property to be mined. These easements are reflected on the Star Point Permit Boundary that is shown in Exhibit 111.100a. Owners of contiguous property to the permit area are shown on the Star Point Permit Boundary shown in Exhibit 111.100a. A summary table of land classifications within the Permit Area is included in Exhibit 112.500a.

Plateau Mining has assumed responsibility for paying royalties associated with Star Point Waste Coal Pile.

112.600. Contiguous Property.

The name and address of each owner of record of all property (surface and subsurface) contiguous to any part of the proposed permit area:

Plateau Mining Corporation 9100 E. Mineral Circle Englewood, CO 80112	United States Government Bureau of Land Management Price, UT 84501	Carbon County 120 East Main Street Price, Utah 84501

112.700. MSHA Numbers.

The name of the mining operations for which this application is submitted is:
STAR POINT WASTE FUEL
Mine I.D. Number 42-02334

On January 28, 2004 SCA received a letter from MSHA officially abandoning the Coarse Refuse pile (formerly identified as ID No. 1211-UT-09-02334-01), see exhibit 513. MSHA Inspection and reporting requirements will be focused on the surface mining operation and will follow a semi-annual inspection frequency.

112.800. Applicants Interest in Contiguous Lands.

Exhibit 111.100a, shows ownership interests in lands contiguous to the permit area. The applicant has no leasehold interest, options, or pending bids on any of these lands. The existing permit application is not limited to any future by-pass acquisitions, lease modifications, or areas designated in expressions of interest, or areas under investigation that are contiguous to the present permit application boundaries.

LIST OF EXHIBITS

Hydrology is shown on Maps 722.100a, 722.100b, 731.720b, and 731.720e. Groundwater and surface water rights are shown on Maps 731.800a and 731.800b. Details on the design of Ponds 5, 6, and 9 are shown on Maps 733.120e, 733.120f, and 733.120j. A map of the reclamation watershed delineation is shown on Map 761c.

512.200. Plans and Engineering Designs.

All required plans and engineering designs are certified by a qualified, registered, professional engineer, or an appropriate variance has been obtained.

Coal processing refuse pile designs are located in Section 500 of this permit application.

Impoundment designs are located in Sections 500 and 700 of this permit application.

Primary Road designs are located in Section 500 of this permit application.

513. COMPLIANCE WITH MSHA REGULATIONS AND MSHA APPROVALS.

SCA will comply with all applicable MSHA Regulations and obtain all required MSHA Approvals. The MSHA identification number for the mine operation is 42-02334. Documents included in Exhibit 513 detail the abandonment of the Coarse Refuse Pile (formerly 1211-UT-09-02334-01). Currently there are no specific surface facilities with individual MSHA identification numbers and semi-annual MSHA inspections will focus on the surface mining operations.

514. INSPECTIONS.

All required engineering inspections will be conducted by a qualified, registered, professional engineer or other qualified professional specialist under the direction of the professional engineer. Unless a variance is received, impoundments will be inspected regularly at least yearly until removal of the structure or release of the performance bond, and a certified report will be delivered annually to the regulatory agency as required under 514.230. Inspection reports, including colored photographs when necessary, will be certified by the professional engineer "that the refuse pile has been constructed and maintained as designed and in accordance with the approved plan and R645 rules" and provided to the Division. Copies of all reports will be retained at the mine office. Regular quarterly inspections of other impoundments, not subject to MSHA, 30 CFR 77.216, will be conducted by a qualified person designated by SCA.

523. MINING METHOD(S).

Mining Refuse Pile – SCA's activities will include excavation and handling of coal mine waste. Approximately 100,000 to 300,000 tons per year of coal mine waste will be excavated by SCA from the Permit Area. Table 523.100a shows the estimated refuse excavation rates based on an average of 200,000 tons per year. It is expected that the annual, monthly, and daily mined quantities projected will vary widely as various fuel sources are blended to meet the needs of the SCA Power Plant. The projections shown on the table should only be regarded as estimated averages.

TABLE 523.100a.
Coal Refuse Excavation Rates

	Tons of Refuse
Average annual fuel requirement	200,000 tons/year
Average daily basis (240 days)	833 tons/day
Average hourly basis (1,920 hours)	104 tons/hour
Number of trips per day (56.5 tons)	15 trips/day
Trips per operating hour	2 trips/hour

SCA will use a standard mobile fleet of excavation equipment that may include all or some of the following: dozers, front-end loaders, end-dump trucks, belly dump haul trucks, scrapers, back-hoes, and support equipment (water truck, maintenance vehicles). Excavation will be carried out in lifts across the top of the pile. These methods have been selected to assure continued stability of the refuse pile, while providing ability to segregate non-combustible materials as they are encountered. No crushing or screening operations will take place at the SCA - Star Point Permit Area.

The equipment typically used for loading and hauling services are Caterpillar 980C type front-end loaders with a modified 7.0 cubic yard bucket and haulers with dual trailer rated at 60 tons capacity. Based on one 10-hour shift and a 5-day workweek, this equipment allocation is more than adequate to consistently deliver the amount of waste coal fuel required by the cogeneration facility.

Sampling and testing may be used to insure that materials provided to SCA's cogeneration facility meet minimum levels of combustibility. Materials will be segregated as they are excavated for handling by: 1) direct hauling to the power plant site or 2) redisposal within the SCA disposal area. Noncoal waste will be disposed in a permitted landfill and spoil will be disposed in the disposal area.

Existing pads, primary roads, ancillary roads, and pit roads will be utilized.

The spoil will be placed in the designated area in a controlled manner to ensure mass stability and prevent mass movement during and after construction. The material will be placed in four-foot maximum lifts and the placement will ensure that regrading will not be required during reclamation procedures. The spoil will be routinely compacted to prevent combustion and wind-borne transport. When the disposal is completed, a soil cover of four feet will exist over the disposal area, and the area will be revegetated in accordance with the approved reclamation plan. The disposal areas will be inspected as required in Section 514.

528.322. Refuse Piles.

Detailed plan views and cross sections and grades for the Refuse Pile are shown in Maps 521.100d and Map 521.100e. This plan shows the limits of the refuse pile. The refuse pile maintains a maximum 27 degree (2 horizontal:1 vertical) outslope.

Geotechnical investigation of the refuse pile were conducted in 1985 presented in Exhibit 528.322a. The 1985 work indicated that slopes should be maintained at a slope of 2H:1V to maintain a factor of safety greater than 1.5. Cross-sections on Map 542.200b indicate the coarse refuse pile embankment maintained the slope criteria established in the geotechnical investigations.

The coarse refuse pile will be in a state of ongoing excavation throughout the permit period. Excess spoil material and coal mine waste not suitable as fuel will be separated from the combustible material; transported and placed in a controlled manner in horizontal lifts not exceeding four feet in thickness; concurrently compacted as necessary to ensure mass stability and to prevent mass movement during and after construction; graded so that surface and subsurface drainage is compatible with the natural surroundings; and covered with topsoil or substitute material if required. The disposal area is shown in Map 521.100f.

All surface drainage from the area above the refuse pile will be diverted away from the fill into stabilized diversion channels designed to pass safely the runoff from a 100-year, 6-hour precipitation event. Calculations are found in Section 700.

The refuse pile will be inspected as outlined in Section 514.

Maintenance of the embankments will focus on maintaining a safe and stable slope and on controlling the surface runoff from the top of the pile such that it does not run uncontrolled down the outer slopes. Ditches will be cleaned and graded as need warrants.

Subsidence will not affect the refuse pile as the structure does not overlie any coal seam and is lower in elevation than the nearest outcrop. Mud flows, rock debris falls, or other landslides are not expected to be a problem. Possibility of failure near the sides and downhill of the refuse piles is limited to a thin layer of colluvial material on bedrock. Failure of this material would not threaten the refuse pile.

533.500. Submerged Highwalls.

There are no submerged highwalls within the SCA - Star Point Permit Area.

533.600-700. MSHA Impoundments.

There are no impoundments that meet or exceed 30 CFR 77.216(a) criteria. Also, See Exhibit 513.

534. ROADS.

There are three ancillary roads, Road G, Road H, and Road L, which are within the SCA - Star Point Permit Area. In addition, there is one existing primary road, the Haul Road, and two proposed primary roads, Road K to access the Subsoil Area and Road M to access Refuse Pile B and C. The plan, profile, and cross section of Roads G, H, K, L, M and the Haul Road are shown on Maps 534.100a through 534.100f. All other roads are temporary pit roads, which may change per progress of excavation. Existing access roads are in place to the Subsoil Area, additional roads may be desired at the time of reclamation to improve the operation of hauling soil material. Prior to construction of Road K, topsoil will be salvaged in accordance with the plan outlined in Section 232. Additional design and sediment control facilities for these roads if needed will be provided prior to construction of new roads. Road specifications can be found on Table 534.200a, Road Specifications. Exhibit 534 includes the calculation of the road embankments meeting the safety factor of 1.3 or greater.

TABLE 534.200a. Road Specifications

ROAD*	SURFACE TYPE	SURFACE WIDTH	LENGTH	MAXIMUM GRADE %	MINIMUM GRADE %	AVERAGE GRADE %
G'	Dirt & Gravel	10-12'	0.4 miles	14.6	0	4.7
H	Dirt & Gravel	12-24'	0.6 miles	12.24	0.83	3.8
K	Dirt & Gravel	12-24'	0.05 miles	22.6	11.5	17.3
L	Dirt & Gravel	10-24"	0.3 miles	7.3	0	3.3
M	Dirt & Gravel	10-24""	0.05 miles	10.9	0	8.5
Haul Road	Dirt & Gravel	12-30'	0.16 miles	10.88	0	4.6

Exhibit 513, MSHA Determination

U. S. Department of Labor

Mine Safety and Health Administration
P O Box 25367
Denver, Colorado 80225

Coal Mine Safety and Health
District 9

JAN 28 2004

Randy J. Scott
Plant Manager
Sunnyside Cogeneration Associates
One Power Plant Road
Sunnyside, UT 84539

RE: Star Point Refuse Pile
Mine ID No. 42-02334
Coarse Refuse Pile
ID No. 1211-UT-09-02334-01
Refuse Pile Abandonment

Dear Mr. Scott:

The request for final abandonment of the referenced refuse pile is approved in accordance with 30 CFR 77.215-4. The request for final abandonment was submitted in a letter dated October 14, 2003.

MSHA personnel have inspected the site and reviewed the documentation and have determined that the refuse pile meets the requirements for abandonment which include provisions for major slope stability and the prevention of both burning and the future impoundment of water.

The referenced refuse pile identification number will be removed from the mine file. MSHA inspection and reporting requirements no longer apply to the referenced structure.

If you have any questions regarding this approval, please contact Billy Owens at 303-231-5590 or Ronald Gehrke at 303-231-5587.

Sincerely,

Allyn C. Davis

Allyn C. Davis
District Manager

Enclosure

FDO

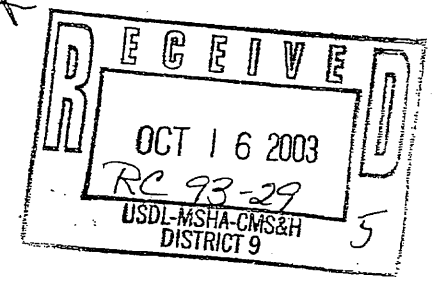
10/17/03

Sunnyside Cogeneration Associates

P.O. Box 10, East Carbon, Utah 84520 • (435) 888-4476 • Fax (435) 888-2538

October 14, 2003

RC



Allyn C. Davis
District Manager
Mine Safety & Health Administration
P.O.Box 25367 D.F.C.
Denver, Co. 80225

RE: Request for Abandonment of the Star Point Refuse Pile
Sunnyside Cogeneration Associates (SCA)
Star Point Refuse Pile, Mine I.D. Number 42-02334
Coarse Refuse Pile, Number 1211-UT-09-02334-01

Dear Mr. Davis

SCA would like to petition for an abandonment classification of its Star Point Refuse Pile (#1211-UT-09-02334-01) located in Sage Brush Canyon 23 miles Southwest of Price, Utah. CFR 30 Part 77.215-4 requires, for a refuse pile abandonment classification, that provisions have been met to prevent burning and future impoundment of water, and provide for major slope stability. SCA believes that the Star Point Refuse Pile meets the requirements for abandonment and poses No safety hazard to the general public, due to the location of the refuse pile, the way in which the refuse pile was constructed, and the way in which SCA is now removing material from the refuse pile.

SCA acquired the Star Point Refuse Pile in year 2002, as a source of fuel for its power generation facility located in Sunnyside, Utah. The Star Point material will be loaded into haulage trucks, using a front-end loader, and transported directly to the SCA facility.

Historical records, to date, show no history of fires/burning of the Star Point Refuse pile. The coal refuse was placed in two-foot lifts and compacted when the pile was being constructed. This method of placement and compaction limits the potential for burning. Also, SCA will be removing material on an ongoing basis, which also helps limit the potential for burning. If burning should occur, we will be onsite to immediately extinguish it.

The Star Point Refuse Pile does not impound water. The top of the pile slopes from North to South. Culverts on the South side of the pile, collecting all precipitation, report to a sedimentation pond at the base of the pile. SCA, while removing material, will maintain positive drainage to eliminate impoundment.

Major slope stability was achieved by placing and compacting the material in two-foot lifts, while maintaining an approximate slope of 3H:1V. Also, historical data indicates no surface water or shallow subsurface water within the footprint of the refuse pile, which if present could have an effect on slope/pile stability. Additionally, SCA will be continually removing material; lowering the overall height of the

Again, SCA believes the Star Point Refuse Pile meets the requirements of CFR 30 part 77.215-4, and would like to request, from the Coal Mine Health and Safety District Manager, an abandonment classification. If you have any questions or if further clarification is needed please contact me or Rusty Netz at (435) 888-4476.

Sincerely,

Agent For
Sunnyside Cogeneration Associates
Randy J. Scott
Plant Manager

c.c. Ted E. Farmer/Supervisory CMS&H Inspector-Price
Rusty Netz, COSI
Plant File

Table 742a

Diversion Ditch Peak Flow Design Data

Ditch No.	Acreage	Area ($mi.^2$)	CCN	S' (in.)	Basin Length, L (ft)	Basin Average Grade (%)	Lag Time, t_L (hr)	Overall Storm Precip., P (in.)	Overall Storm Runoff, R (in.)	Time of Concentration, t_c (hr)	U.H. Time to Peak, t_p (hr)	Peak Flow, Q_p (cfs)	
												25yr-24hr	100yr-6hr
6B	7.6	0.0119	75	3.26	1,780	36	0.10	2.1	0.44	0.16	0.11	5.71	-
6C	13.9	0.0218	75	3.28	2,703	38	0.13	2.1	0.44	0.22	0.15	9.08	-
7E	4.3	0.0068	81	2.41	1,241	18	0.09	2.1	0.65	0.15	0.10	3.52	-
7G	7.6	0.0119	78	2.82	1,644	9	0.17	2.0	0.48	0.28	0.19	-	3.94
7H	1.7	0.0027	76	3.09	683	19	0.06	2.0	0.43	0.10	0.07	-	5.09
8	13.1	0.0204	70	4.29	1,698	12	0.19	2.0	0.24	0.31	0.21	-	2.45
14	221.8	0.3465	75	3.32	8,241	24	0.41	2.1	0.43	0.68	0.45	56.48	-
15A	1.7	0.0026	88	1.36	485	13	0.04	2.1	1.05	0.06	0.04	2.21	-
15B	0.3	0.0004	87	1.53	200	14	0.02	2.1	0.97	0.03	0.02	2.48	-
16A	0.6	0.0010	84	1.90	778	7	0.09	2.0	0.74	0.14	0.10	-	0.75
16B	0.7	0.0011	82	2.14	576	12	0.05	2.0	0.67	0.09	0.06	-	1.74
16Ba	0.9	0.0015	75	3.42	258	15	0.03	2.0	0.37	0.05	0.04	-	0.46
16C	0.5	0.0007	86	1.57	386	10	0.04	2.0	0.87	0.06	0.04	-	2.3
16D	2.6	0.0040	75	3.42	723	9	0.10	2.0	0.37	0.16	0.11	-	3.38
16E	2.5	0.0039	71	4.08	589	16	0.07	2.0	0.27	0.11	0.08	-	0.63
16Ea	3.4	0.0054	70	4.29	744	10	0.11	2.0	0.24	0.18	0.12	-	0.72
16F	3.1	0.0049	73	3.70	713	17	0.07	2.0	0.32	0.12	0.08	-	5.12
32	0.5	0.0008	70	4.29	158	23	0.02	2.0	0.24	0.03	0.02	-	0.11
33	0.3	0.0005	70	4.29	115	22	0.02	2.0	0.24	0.03	0.02	-	0.07
72A	1.3	0.0020	90	1.11	924	12	0.06	2.1	1.18	0.10	0.07	4.59	-
72B	0.2	0.0002	90	1.15	246	8	0.03	2.1	1.16	0.04	0.03	4.65	-
72C	0.2	0.0002	90	1.12	238	5	0.03	2.1	1.17	0.05	0.04	4.68	-
74A	1.6	0.0025	89	1.25	791	12	0.06	2.1	1.10	0.09	0.06	2.25	-
76	1.1	0.0018	70	4.29	518	22	0.05	2.0	0.24	0.09	0.06	-	0.24
77	1.2	0.0019	76	3.25	904	8	0.12	2.1	0.45	0.20	0.13	0.55	-
80A	3.8	0.0059	75	3.26	832	13	0.09	2.1	0.44	0.15	0.10	11.01	-
80B	0.3	0.0004	90	1.10	163	12	0.02	2.1	1.19	0.03	0.02	11.39	-
80C	0.7	0.0011	90	1.11	279	9	0.03	2.1	1.18	0.04	0.03	12.43	-
80D	2.3	0.0036	75	3.26	803	12	0.09	2.1	0.44	0.15	0.10	0.86	-
81	2.9	0.0046	72	3.97	860	14	0.10	2.0	0.28	0.16	0.11	-	4.53
82A	0.2	0.0003	90	1.10	236	15	0.02	2.1	1.19	0.03	0.02	0.28	-
82B	0.9	0.0014	90	1.10	495	16	0.03	2.1	1.19	0.05	0.04	1.33	-

Table 742b
Culvert Peak Flow Design Data

Culvert	Drainage Acreage	Drainage Area ($mi.^2$)	CCN	S' (in.)	Basin Length, L (ft)	Basin Average Grade (%)	Lag Time, t_L (hr)	Overall Storm Precip., P (in.)	Overall Storm Runoff, R (in.)	Time of Concentration, t_c (hr)	U.H. Time to Peak, t_p (hr)	Design Peak Flow, Q_p (cfs)
81	14.4	0.0225	70	4.29	1,134	2.6	0.29	2.0	0.24	0.49	0.32	2.30
82	7.1	0.0111	71	4.08	1,176	11	0.14	2.0	0.27	0.24	0.16	1.60
15A	Used calculated flows for Ditch 15A											2.21
15B	Used calculated flows for Ditch 15B											2.48
16A	Used calculated flows for Ditch 16A											0.75
16Ba	Used calculated flows for Ditch 16Ba											0.46
16F	Used calculated flows for Ditch 16E											5.10
33A	Used combined calculated flows for Ditch 8 and Ditch 33											2.45
33B	Used calculated flows for Ditch 8											2.45
72A	Used calculated flows for Ditch 72A											4.59
72B	Used calculated flows for Ditch 72B											4.65
72C	Used calculated flows for Ditch 72C											4.68
74B	Used calculated flows for Ditch 74A											2.25
7E	Used calculated flows for Ditch 7H											5.09
7Ea	3.4	0.0053	77	3.07	891	17	0.08	2.1	0.48	0.13	0.09	2.01
7F	Used calculated flows for Ditch 7G											3.94
80A	Used calculated flows for Ditch 7E											3.52
80B	Used calculated flows for Ditch 80A											11.01
8A	Used calculated flows for Ditch 8											2.45

Table 742c

Diversion Ditch Design Criteria

Ditch No.	Design Flow Rate, Q (cfs)	Manning's Roughness, n	Bottom Width, b (ft)	Side Slope, m (m/1 => H/V)	Minimum Slope Conditions						Maximum Slope Conditions						Current Depth (ft)	Available Freeboard (in.)	Lining Required?	Current Rip Rap D_{50} (ft)	Minimum Needed Rip Rap D_{50} (ft)
					Slope, S_o	Area, A (ft^2)	Wetted Perimeter, P_w (ft)	Hydraulic Radius, R_h (ft)	Velocity, v (ft/s)	Depth, y_o (ft)	Slope, S_o	Depth, y_c (ft)	Area, A (ft^2)	Wetted Perimeter, P_w (ft)	Hydraulic Radius, R_h (ft)	Velocity, v (ft/s)					
6B	5.7	0.03	2.5	1.3	0.018	1.61	4.17	0.39	3.52	0.51	0.059	0.36	1.08	3.69	0.29	5.29	1.50	11.9	YES	0.5	0.25
6C	9.1	0.03	2.5	2	0.010	2.90	5.77	0.50	3.13	0.73	0.020	0.61	2.26	5.22	0.43	4.01	1.50	9.2	NO	-	-
7E	3.5	0.03	2.7	0	0.040	0.87	3.34	0.26	4.03	0.32	0.143	0.21	0.58	3.13	1.00	18.73	1.00	8.1	YES	Variance[3]	Variance[3]
7G	3.9	0.03	0	2	0.010	1.48	3.85	0.39	2.62	0.86	0.010	0.86	1.48	3.85	0.39	2.62	1.50	7.7	NO	-	-
7H	5.1	0.03	3	2	0.067	1.03	4.29	0.24	4.95	0.29	0.200	0.21	0.71	3.93	0.18	7.10	0.75	5.5	YES	0.75	0.5
8	2.5	0.03	0.1	5.3	0.080	0.59	3.61	0.16	4.20	0.33	0.120	0.30	0.51	3.35	0.15	4.90	0.80	5.7	NO	-	-
14	56.5	0.023	(half-round CMP D = 54")		0.053	4.37	5.40	0.81	12.92	1.44	0.260	0.96	2.48	4.32	0.57	22.76	2.25	9.8	YES	N/A	N/A
15A[1]	2.2	0.03	0	2	0.11	0.39	1.98	0.20	5.58	0.44	0.130	0.43	0.37	1.92	0.19	5.95	0.75	3.7	YES	NONE	0.5
15B	2.5	0.03	0	2	0.1	0.45	2.12	0.21	5.56	0.47	0.100	0.47	0.45	2.12	0.21	5.56	0.75	3.3	YES	NONE	0.5
16A	0.8	0.03	0.1	4	0.04	0.31	2.29	0.13	2.60	0.27	0.060	0.24	0.26	2.11	0.12	3.02	0.80	6.4	NO	-	-
16B	1.7	0.03	0.1	4	0.040	0.54	3.04	0.18	3.14	0.36	0.030	0.38	0.60	3.19	0.19	2.82	0.80	5.3	NO	-	-
16Ba	0.5	0.03	1	2	0.040	0.21	1.70	0.12	2.43	0.16	0.100	0.12	0.15	1.54	0.10	3.32	0.75	7.1	NO	-	-
16C	2.3	0.03	0.1	4	0.040	0.68	3.39	0.20	3.38	0.40	0.060	0.37	0.58	3.15	0.19	3.95	0.80	4.8	NO	-	-
16D	3.4	0.03	0.1	4	0.040	0.91	3.93	0.23	3.73	0.46	0.060	0.43	0.78	3.64	0.21	4.34	0.80	4.0	NO	-	-
16E	0.6	0.03	0.1	4	0.073	2.51	6.53	0.38	7.08	0.78	0.011	0.22	0.21	1.91	0.11	1.21	0.80	0.2	NO	-	-
16Ea	0.7	0.03	1	2	0.040	0.26	1.84	0.14	2.68	0.19	0.100	0.15	0.19	1.65	0.11	3.69	0.75	6.7	NO	-	-
16F	5.1	0.03	0.1	4	0.040	1.23	4.58	0.27	4.13	0.54	0.060	0.50	1.06	4.24	0.25	4.81	0.80	3.1	NO	0.6	0
18A	1.6	0.03	0	1.5	0.003	1.16	3.17	0.37	1.39	0.88	0.019	0.62	0.58	2.24	0.26	2.77	1.40	6.2	NO		
18B	0.3	0.03	0	1.5	0.005	0.28	1.55	0.18	1.11	0.43	0.005	0.43	0.28	1.55	0.18	1.11	1.00	6.8	NO		
18C	2.1	0.03	0	1.5	0.038	0.54	2.16	0.25	3.83	0.60	0.050	0.57	0.49	2.06	0.24	4.24	1.10	6.0	NO		
18D	2.2	0.03	3	1.5	0.022	0.84	3.90	0.22	2.65	0.25	0.085	0.17	0.55	3.61	0.15	4.13	0.80	6.6	NO		
18E	2.2	0.03	3	1.5	0.050	0.62	3.69	0.17	3.39	0.19	0.120	0.15	0.48	3.54	0.14	4.55	1.00	9.7	NO		
32	0.1	0.03	0.6	2.6	0.100	0.60	2.72	0.22	5.74	0.38	0.100	0.06	0.05	0.95	0.05	2.12	0.60	2.6	NO	-	-
33	0.1	0.03	0.6	6.7	0.060	0.05	1.32	0.04	1.38	0.05	0.060	0.05	0.05	1.32	0.04	1.38	0.60	6.6	NO	-	-
72A	4.6	0.038	3	2	0.060	1.16	4.43	0.26	3.93	0.32	0.290	0.20	0.69	3.90	0.18	6.62	1.40	13.0	YES	0.75	0.5
72B	4.7	0.035	2	2	0.125	0.81	3.38	0.24	5.78	0.31	0.125	0.31	0.81	3.38	0.24	5.78	1.50	14.3	YES	0.5	0.5
72C	4.7	0.035	2	2	0.065	1.02	3.66	0.28	4.61	0.37	0.065	0.37	1.02	3.66	0.28	4.61	1.50	13.5	NO	-	-
74A	2.3	0.03	0	2	0.090	0.44	2.09	0.21	5.24	0.47	0.090	0.47	0.44	2.09	0.21	5.24	0.60	1.6	YES	-	0.5
76	0.2	0.03	0.1	6.3	0.120	0.09	1.54	0.06	2.62	0.11	0.120	0.11	0.09	1.54	0.06	2.62	0.63	6.2	NO	-	-
77[2]	0.6	0.03	0.1	4	0.060	-	-	-	-	0.31	0.080	0.32	0.29	1.95	0.15	4.10	1.00	8.3	NO	-	-
80A	11.0	0.038	6	2	0.050	2.59	7.71	0.34	4.23	0.38	0.065	0.35	2.37	7.58	0.31	4.60	1.00	7.4	NO	-	-
80B	11.4	0.03	10	10	0.010	5.19	17.58	0.30	2.20	0.377	0.010	0.38	5.19	17.58	0.30	2.20	1.00	7.5	NO	-	-
80C	12.4	0.042	10	2	0.240	2.12	10.91	0.19	5.82	0.204	0.240	0.20	2.12	10.91	0.19	5.82	1.00	9.6	YES	2	0.5
80D	0.9	0.03	1	1	0.026	0.59	2.17	0.27	3.33	0.414	0.026	0.41	0.59	2.17	0.27	3.33	1.00	7.0	NO	-	-
82A	0.2	0.03	0	2	0.005	0.11	1.05	0.11	0.78	0.235	0.016	0.19	0.07	0.85	0.08	1.21	0.75	6.2	NO	-	-
82B	1.3	0.03	0	2	0.002	0.64	2.52	0.25	0.77	0.564	0.090	0.28	0.15	1.23	0.12	3.68	1.00	5.2	NO	-	-

[1] Ditch geometry assumed the same as for Ditch 15B.

[2] Channel geometry varies. Some values taken from CPMC permit. However, peak flows have now decreased, making the design conservative.

[3] Variance was granted since channel had already eroded down to bedrock.

Table 742d

Culvert Design Criteria

Orifice Coefficients C = 0.49804 (projecting inlet, from nomograph)
C = 0.555 (mitered inlet, from nomograph)

Culvert No.	Design Flow, Q (cfs)	Manning's Roughness, n[3]	Slope, S_o	Diameter, D (in.)	Length, L (ft)	Area, A $(ft^2)^2$	Hydraulic Radius, R_h $(ft)^2$	Available HW/D Ratio	Available HW (ft)	Flow Capacity (cfs) Pipe Flow[2]	Flow Capacity (cfs) Inlet Control	Avg. Velocity, v (ft/s)[1]	Comments
81	2.30	0.013	0.200	27	200	3.98	6.75	2.2	5.00	138.50	31.28	13.04	Projecting steel inlet/outlet
82	1.60	0.013	0.034	27	42	3.98	6.75	2.3	5.23	57.10	32.18	6.29	Projecting steel inlet/outlet
15A	2.21	0.013	0.105	14	82	1.07	3.50	2.1	2.48	17.41	5.89	11.16	Projecting steel inlet/outlet; D50 < 0.5 ft - monitor outlet for erosion.
15B	2.48	0.024	0.088	15	80	1.23	3.75	2.1	2.63	10.34	6.94	6.94	Projecting inlet/outlet
16A	0.75	0.024	0.098	18	130	1.77	4.50	1.6	2.45	17.81	9.21	4.99	Projecting inlet/outlet
16Ba	0.46	0.024	0.010	30	17	4.91	7.50	1.0	2.50	22.22	21.93	1.81	Projecting inlet/outlet
16F	5.10	0.024	0.066	18	130	1.77	4.50	2.5	3.80	14.61	12.33	7.53	Projecting inlet/outlet
33A	2.45	0.024	0.187	24	41	3.14	6.00	1.6	3.10	53.00	20.28	8.58	Mitered inlet; monitor outlet for erosion.
33B	2.45	0.024	0.020	24	40	3.14	6.00	2.7	5.45	17.33	26.49	3.90	Projecting inlet/outlet
72A	4.59	0.024	0.070	18	80	1.77	4.50	2.3	3.50	15.05	11.71	7.47	Projecting inlet; monitor outlet for erosion.
72B	4.65	0.024	0.077	32	80	5.59	8.00	2.2	5.83	73.22	47.35	7.33	Projecting inlet; D50 < 0.5 ft - monitor outlet for erosion.
72C	4.68	0.024	0.080	18	102	1.77	4.50	3.1	4.70	16.09	14.04	7.89	Projecting inlet; D50 < 0.5 ft - monitor outlet for erosion.
74B	2.25	0.024	0.031	24	400	3.14	6.00	3.3	6.50	21.57	29.45	4.44	Projecting inlet; D50 < 0.5 ft - monitor outlet for erosion.
7E	5.09	0.024	0.068	24	40	3.14	6.00	3.1	6.10	31.95	28.36	7.44	Projecting inlet; rocks placed in Pond 5.
7Ea	2.01	0.024	0.010	24	80	3.14	6.00	3.3	6.50	12.25	29.45	2.88	Projecting inlet
7F	3.94	0.024	0.190	12	480	0.79	3.00	1.5	1.50	8.41	3.14	10.53	Projecting inlet; D50 = 1.5 ft.
80A	3.52	0.013	0.250	24	67	3.14	6.00	2.1	4.10	113.11	22.11	16.29	Projecting steel inlet/outlet; D50 = 1.5 ft.
80B	11.01	0.013	0.220	30	55	4.91	7.50	2.2	5.50	192.39	40.45	21.26	Projecting steel inlet/outlet; D50 = 1.5 ft.
8A	2.45	0.024	0.320	24	60	3.14	6.00	4.4	8.70	69.32	38.83	10.36	Mitered inlet; D50 < 0.5 ft - monitor outlet for erosion.
18A	1.90	0.024	0.016	12	54	0.79	3.00	2.0	2.00	2.40	4.28	3.50	Projecting inlet/Outlet Vel<5.0 fps
18B	2.10	0.024	0.042	18	20	1.77	4.50	3.5	5.25	11.70	16.70	5.00	Projecting inlet/Monitor Outlet (14)
18C	2.20	0.024	0.405 (5)	12	160	0.79	3.00	1.3	1.30	24.4 (7)	3.13	9.80	Projecting inlet/Outlet to DSO=0.5 ft
18D	0.91	0.024	0.065	15	20	1.23	3.75	1.0	1.25	8.90	4.32	4.80	Projecting inlet/Outlet Vel <5.0 fps
18E	0.79	0.024	0.070	12	20	0.79	3.00	1.7	1.70	5.10	3.83	4.70	Projecting inlet/Outlet Vel <5.0 fps

NOTE: All culverts made of corrugated metal pipe (CMP) unless otherwise indicated as steel.

[1] If pipe flow not adequate to convey design flow, then inlet control assumed. Average velocity based on design flow.

[2] Full flow conditions assumed.

[3] Manning's roughness, n, assumed 0.024 and 0.013 for corrugated metal pipe (CMP) and steel pipe respectively.

using natural rock or riprap splash piles, no calculations are provided since calculation techniques are not currently available for their design on such steep slopes as encountered for the SCA-Star Point Permit area.

Some pond outlet designs have considered not only riprap basins, but also concrete energy dissipation boxes. To date, riprap solutions appear to be more feasible than concrete energy dissipation boxes with the understanding that routine maintenance may be required. A description of the inlet and outlet conditions for each pond follows.

Pond 5. With the installation of Pond 9, only one culvert (7E) was required to divert disturbed area water into Pond 5. Culvert 7E has been constructed to minimize erosion through the installation of a conveyor belt liner attached to its outlet.

The pond outlet consists of a CMP downspout that carries discharge waters down a steep slope and into a natural drainage channel to the south. The CMP outlet from the pond has been placed directly over a rock rubble pile to dissipate excess energy before continuing downstream. The presence of the rubble pile at the pond outlet appears to be effectively controlling erosion downstream of the pond outlet. Specific calculations pertaining to Pond 5 can be found in Exhibit 742a.

Pond 6. Inflows into Pond 6 are derived mainly from an upstream unlined natural channel. Since the immediate upstream channel has not been disturbed through mining activities, plans have not been made to install any sort of erosion protection at the inlet to Pond 6. The intent is to leave the channel in as natural a condition as possible while still maintaining compliance with mining regulations.

Discharge waters from Pond 6 exit into a channel section containing rock and vegetative stands. According to calculations presented in Exhibit 742.221h, the flow velocity from the pond outlet culvert is less than five feet per second and therefore does not require erosion protection. No significant erosion is believed to be occurring at the outlet from this pond.

Pond 9. Inflows into Pond 9 are carried through Ditch 80C and Ditch 80D. Ditch 80C entering Pond 9 is lined with riprap having a D_{50} equal to 1.5 feet.

Design details are shown on Map 733.120j.