



Sunnyside Cogeneration Associates

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

October 28, 2016

C/007/0035
Received 10/27/16
Task #5305

Daron Haddock
Division of Oil Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, UT 84116

RE: Sunnyside Refuse and Slurry C/007/0035
Permit Amendment – Road S Post Construction Update

Dear Mr. Haddock,

SCA is submitting the enclosed permit amendment to more closely reflect the post-construction conditions following completion of the Road S construction near the pasture pond.

This amendment updates ditches and culverts crossing this new road.

If you have any questions regarding this submittal, please contact me or Rusty Netz at 435-888-4476.

Sincerely,

Gerald Hascall / R.N.

Gerald Hascall
Agent for
Sunnyside Cogeneration Associates

cc: Rusty Netz
Plant Files
Scott Carlson

APPLICATION FOR COAL PERMIT PROCESSING

Permit Change New Permit Renewal Exploration Bond Release Transfer

Permittee: SUNNYSIDE COGENERATION ASSOCIATES

Mine: SUNNYSIDE REFUSE & SLURRY

Permit Number:

C/007/035

Title: UPDATE POST CONSTRUCTION - ROAD S, DRAINAGE AND CULVERTS NEAR PASTURE POND

Description, Include reason for application and timing required to implement:

Construction of Road S is completed, updated to more closely reflect conditions as constructed

Instructions: If you answer yes to any of the first eight questions, this application may require Public Notice publication.

- Yes No 1. Change in the size of the Permit Area? Acres: _____ Disturbed Area: 0.00 increase decrease.
- Yes No 2. Is the application submitted as a result of a Division Order? DO# _____
- Yes No 3. Does the application include operations outside a previously identified Cumulative Hydrologic Impact Area?
- Yes No 4. Does the application include operations in hydrologic basins other than as currently approved?
- Yes No 5. Does the application result from cancellation, reduction or increase of insurance or reclamation bond?
- Yes No 6. Does the application require or include public notice publication?
- Yes No 7. Does the application require or include ownership, control, right-of-entry, or compliance information?
- Yes No 8. Is proposed activity within 100 feet of a public road or cemetery or 300 feet of an occupied dwelling?
- Yes No 9. Is the application submitted as a result of a Violation? NOV # _____
- Yes No 10. Is the application submitted as a result of other laws or regulations or policies? _____

Explain: _____

- Yes No 11. Does the application affect the surface landowner or change the post mining land use?
- Yes No 12. Does the application require or include underground design or mine sequence and timing? (Modification of R2P2)
- Yes No 13. Does the application require or include collection and reporting of any baseline information?
- Yes No 14. Could the application have any effect on wildlife or vegetation outside the current disturbed area?
- Yes No 15. Does the application require or include soil removal, storage or placement?
- Yes No 16. Does the application require or include vegetation monitoring, removal or revegetation activities?
- Yes No 17. Does the application require or include construction, modification, or removal of surface facilities?
- Yes No 18. Does the application require or include water monitoring, sediment or drainage control measures?
- Yes No 19. Does the application require or include certified designs, maps or calculation?
- Yes No 20. Does the application require or include subsidence control or monitoring?
- Yes No 21. Have reclamation costs for bonding been provided?
- Yes No 22. Does the application involve a perennial stream, a stream buffer zone or discharges to a stream?
- Yes No 23. Does the application affect permits issued by other agencies or permits issued to other entities?
- Yes No 24. Does the application include confidential information and is it clearly marked and separated in the plan?

Please attach three (3) review copies of the application. If the mine is on or adjacent to Forest Service land please submit four (4) copies, thank you. (These numbers include a copy for the Price Field Office)

I hereby certify that I am a responsible official of the applicant and that the information contained in this application is true and correct to the best of my information and belief in all respects with the laws of Utah in reference to commitments, undertakings, and obligations, herein.

Gerald Hascall

Plant Manager

Date

Signature (Right-click above choose certify then have notary sign below)

Print Name

Position

10/27/16 GERALD HASCALL / R.N.

Subscribed and sworn to before me this 27th day of October, 2016

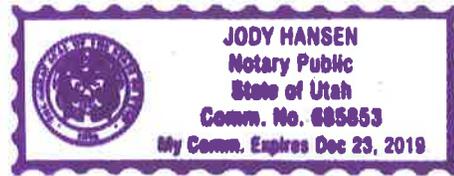
Notary Public: Jody Hansen, state of Utah.

My commission Expires: 12/23/19 } ss:

Commission Number: 685853 }

Address: Utah Plant Road }

City: Sunnyside State: UT Zip: 84501 }



For Office Use Only:

Assigned Tracking Number:

Received by Oil, Gas & Mining

PASTURE SEDIMENT POND - Hydrologic Calculations

INTRODUCTION

The Pasture Sediment Pond (UPDES 009) is located north of the West Slurry Cell (see Plate 7-1). The pond is an off channel, temporary sediment control structure, with a total as-built volume of 3.08 acre-feet (top of bank). Surface water runoff and sediment runoff from a 109.25 acre watershed is captured by the pond.

The Pasture Pond has been in service for a number of decades. In 2007, SCA proposed to enlarge this pond and use it to treat runoff from the area formerly served by the Clear Water Pond and Slurry Ponds 1 and 2. These former ponds are now the site of the Excess Spoil Disposal Area #2. The new hydrologic modeling accompanying this appendix section includes the entire combined watershed and the proposed design size of the pond.

The structure is a temporary pond as addressed in R645-301-732.200. The structure does not meet the size or other qualifying criteria of the MSHA of 30 CPR 77.216(a). Therefore, it provides a combination of principal and emergency spillways that will safely discharge a 25 year, 6 hour event.

The pond contains a 2 inch drain pipe. This 2 inch pipe is normally closed but can be opened to discharge the pond after major storm events after appropriate settling times. The pond is modeled in Sedimot-II with the 2 inch drain pipe closed, however, the pond is considered empty above the level of the drain pipe when the storm begins. The maximum sediment level allowed in the pond is therefore set at the elevation of the inlet to the 2-inch drain pipe.

The pond can discharge through an 18 inch culvert when the water level reaches the stage elevation of 6490.6 (6.1 feet deep). The 18 inch pipe spillway is capable of passing the 25 year, 6 hour peak flow. The pond treats the 10 year, 24 hour storm such that effluent is well within the UPDES limits. ~~In 2015, the ditch leaving the discharge point from the Pasture Pond was re-routed to flow into the Coal Pile Sediment Pond (014). This provides a backup treatment option in the event of any discharge from the Pasture Pond.~~

Culverts and diversion ditches were designed for these watersheds previously under a very conservative storm (100 yr 6 hr). With the combined watersheds now proposed, many of the ditches and culverts will experience a different flow rate for a given storm since upper sub watersheds will now be routed through these lower ditches. Nonetheless, we have compared the previous design flows with the current modeled flows for the 10 year 6 hour storm, 10 year 24 hour storm and 25 year 6 hour storm. We have used the higher of the previous design flow or the current modeled design flow from these storms.

SUBWATERSHEDS

The Pasture Pond drainage area is divided into eighteen sub watersheds for routing analysis. These are labeled in keeping with former naming convention as follows: CW-SWS1, CW-SWS2, CW-SWS3, CW-SWS4, CW-SWS6, CW-SWS7, CW-SWS8, CW-SWS9, CW-SWS10, CW-SWS11, PAST-SWS1, PAST-SWS2, PAST-SWS3, PAST-SWS4, PAST-SWS5, PAST-SWS6, PAST-SWS7, and PAST-SWS8 (see Plate 7-1).

SOIL TYPE

According to the SCS Soil Survey of Carbon Area, Utah, the soil type found in this drainage area is predominantly SCS # 114, Strych. Three soil samples from the adjacent Reclamation Borrow Area were analyzed by Huntingdon/Chen-Northern in the early 1990s. The particle size distribution from these samples was plotted and averaged as shown in Figure One. Other soil characteristics are as follows:

SCS Soil Name	Strych
Submerged Specific Gravity	1.75
Specific Gravity	2.75
Erosion K value	0.20
Bulk Density	1.4

CURVE NUMBERS

The Pasture Pond curve numbers are based on the Soil Conservation Service graph included as Figure Two. The soil types found on the site correspond to SCS hydrologic Class B as indicated in the SCS Soil Survey for Carbon Area, Utah. The vegetation cover is relatively sparse, consisting of a mixture of Juniper-Grass, Mountain Brush, and Desert Brush. Curve numbers were averaged from these vegetation types. When the storage areas are covered with a pile of coarse refuse and refuse fines which have relatively high infiltration rates, these curve numbers will be conservative.

TIME OF CONCENTRATION

Each sub watershed requires a certain time for the water to reach the outlet following the longest path. The runoff from these sub watersheds is approximated by Sedimot-II unit "Disturbed" unit hydrograph for areas with poor vegetative cover. The overland flow velocity was estimated using the Soil Conservation Service Upland Curves (SCS 1972) corresponding to the slope and vegetation of the drainage areas. Time of concentration was calculated by dividing the average velocity into the distance to the sub watershed outlet.

SUB WATERSHED CHARACTERISTICS

Drainage Area	SCS Hydro Class	Vegetation Cover Density	Juniper Grass CN	Mt. Brush CN	Desert Brush CN	Average Curve Number	Area acres	Distance to Outlet (ft)	Average Velocity (ft/s)	Concentration (hrs)
CW-SWS1	B	50%	58	57	80	65	27.7	1800	2.8	0.18
CW-SWS2	B	40%	63	66	81	60	14	1000	1.4	0.20
CW-SWS3	B	40%	63	66	81	65	8.6	800	1.1	0.20
CW-SWS4	B	40%	63	66	81	65	5.5	600	1.2	0.14
CW-SWS6	B	40%	63	66	81	60	3	900	1.3	0.19
CW-SWS7	B	40%	63	66	81	60	7.4	800	1.1	0.20
CW-SWS8	B	40%	63	66	81	65	4.1	500	1.3	0.11
CW-SWS9	B	40%	63	66	81	70	10.3	400	1.1	0.10
CW-SWS10	Reclaimed	0%	-	-	-	60	7.9	250	1.9	0.04
CW-SWS11	Reclaimed	0%	-	-	-	60	3.2	100	1.3	0.02
Past-SWS1	B	30%	69	73	83	65	3.9	900	1.79	0.14
Past-SWS2	B	15%	76	79	83	79	1.2	300	2.08	0.04
Past-SWS3	B	15%	76	79	83	79	2	950	1.76	0.15
Past-SWS4	B	15%	76	79	83	79	1.9	800	1.85	0.12
Past-SWS5	B	15%	76	79	83	79	3.6	700	0.78	0.25
Past-SWS6	B	30%	69	73	83	75	2.4	900	1	0.25
Past-SWS7	B	15%	76	79	83	79	1.7	400	1.59	0.07
Past-SWS8	B	15%	76	79	83	79	0.55	40	1.11	0.01

ROUTING COEFFICIENTS

"Sedimot-II" uses Muskingum routing methods. Flows must be routed between structures or from a subwatershed outlet to the corresponding structure (if the outlet is not at the structure). No routing is used through sub watersheds that do not have inflow from a previous watershed, or structure (this water flow is accounted for with the time of concentration and the unit hydrograph). Areas requiring routing coefficients are indicated in the program output data. Muskingum coefficients K and X are used as follows:

K = Travel time through diversion.

$$X = \frac{0.5 * \text{Velocity}}{1.7 + \text{Velocity}}$$

RIPRAP SIZING

Riprap is placed along steep channel slopes and at select culvert outlets to control erosion. The size of the stones is based on the expected maximum velocity of water flowing. When peak velocities in the smooth channel are expected to reach 5 ft/s, riprap is required. Figure Three is used to determine the median stone diameter (D_{50}). The riprap mixture should approximate the following gradation:

Stone Size	% Finer
$2*D_{50}$	100
D_{50}	50
$0.5*D_{50}$	20
$0.2*D_{50}$	0

In areas where the increased roughness from riprap does not reduce the velocity below 5 ft/s, a filter blanket (or gravel bedding in a layer $3*D_{50}$) will be used.

STORM RUNOFF VOLUMES AND SEDIMENT VOLUMES

Storm Event	Total Runoff (acft)	Total Sediment (acft)	Pond Stage Elevation	Pond Discharge
10yr 6 hr	0.56	0.01 acft	6487.4	0 cfs
10yr 24 hr	1.93	0.03 acft	6490.5	0 cfs
25yr 6 hr	1.27	0.02 acft	6489.0	0 cfs
100yr 6 hr	2.65	0.05 acft	6491.0	4 cfs

The flowline of the primary discharge (decant) pipe is at elevation 6486.6. Sediment levels in the pond are allowed to fill to a maximum of 6485.5 (1.1 ft below the pipe flowline) prior to a required cleaning. The volume of the pond below the sediment fill line is approximately 0.2 acre feet. Ample storage exists to contain the calculated storm runoff volumes and the projected sediment volume from the modeled storms.

The permittee is encouraged to perform the periodic cleaning to elevations lower than the minimum design depth to allow for additional sedimentation storage between cleaning events. Factor of safety values for the berm allow for additional depths for the pond of up to 4 feet as long as these additional depths are at least 12 feet from the interior edge of the berm (3:1 slope from the toe of the berm).

The 100 year 6 hour storm is projected to have a discharge from the pond. Detention time for this storm is modeled to be over 2 hours. This is expected to be adequate to allow settling to occur in the pond adequate to meet the UPDES discharge concentration volumes.

DIVERSION / CULVERT DESIGN FLOWS

Storm Event	CW D1/C1 cfs	CW D2 cfs	CW D3 cfs	CW D4 cfs	CW D5/C3 cfs	CW D6 cfs	CW D7/C4-5 cfs	Past D1 cfs	Past D3/C1 cfs	Past D4/C2 cfs	Past D6/C4 cfs	Past D8 cfs	Past D9/C5 outlet cfs
10yr 6 hr	0.20	0.62	0.07	0.30	0.90	0.11	1.06	0.75	1.24	1.41	0.88	0.61	0.00
10yr 24 hr	0.93	2.54	0.34	1.05	3.44	0.71	3.92	1.60	2.60	4.71	1.61	0.89	0.00
25yr 6 hr	0.93	2.53	0.34	1.10	3.24	0.76	3.82	1.80	2.65	4.86	1.67	1.05	0.00
100yr 6 hr	2.64	7.90	0.98	2.99	10.31	1.92	11.52	3.00	5.40	13.14	3.11	1.74	3.98
Design flows	2.40	7.80	2.50	4.80	10.10	5.00	11.5	2.20	2.80	4.86	3.60	1.70	3.98

DIVERSION DESIGN

Temporary diversions and culverts for these miscellaneous flows are required to be designed to pass the 10 year, 6 hour storm (R645-301-742.333). They were previously designed for the 100 year 6 hour storm. Combining of the watersheds as proposed in 2006 does not always allow for that same conservative design. However, the designs are still more conservative than the 10 year 6 hour storm. See the table above for design flow rates.

Permanent diversion designs are described in the permit term reclamation plan and final reclamation plan. Design summaries are given in the tables below. The diversions were designed to fit within a range of expected field values. The minimum design channel depth is conservatively calculated by using a minimum channel slope and a maximum expected Mannings N. Additional freeboard is not required in the regulations, but the operator may construct the diversions larger than required to reduce the risk of overflow from storms greater than the required design precipitation event.

The Maximum velocity expected in the channel is calculated by using minimum Manning's N values and maximum channel slopes. Manning's N for a channel bed with riprap is estimated by the equation $N=0.0395*(D_{50})^{1/6}$ with D_{50} in feet (Applied Hydrology and Sedimentology for Disturbed Areas page 188). If the normal depth of flow is less than twice D_{50} then N is estimated by the equation $N=0.456*(D_{50} * Slope)^{0.159}$ with D_{50} in inches and slope in feet/feet (*Development of Riprap Design Criteria by Riprap Testing in Flumes: Phase I* May 1987, Colorado State University, prepared for Uranium Recovery Field Office and Division of Waste Management).

While the slopes and N values are expected to be near the middle of the range provided, these values provide the maximum variance accepted without additional rip rap or lining through the channel. The cross sections may vary but must always be sufficient to provide the maximum required flow area.

DIVERSION DESIGN CRITERIA

Ditch No.	Manning N		Side Slope minH/1V	Min Bottom Width (ft)	Design Flow (cfs)	Channel Slope (%)		Flow Depth (ft)		Flow Area (ft^2)		Maximum Velocity (ft/s)	Minimum Channel Depth (ft)	Comments
	Min	Max				Min	Max	Min	Max	Min	Max			
CW-D1	0.03	0.05	2	0	2.40	1.6	5	0.53	0.8	0.60	1.30	4.3	0.80	No lining required
CW-D2	0.03	0.05	2	0	7.80	3	4	0.89	1.1	1.58	2.40	4.9	1.10	No lining required
CW-D3	0.03	0.05	2	0	2.50	2	6	0.52	0.8	0.54	1.30	4.62	0.80	No lining required
CW-D4	0.03	0.05	2	0	4.80	2	5	0.70	1.0	0.98	2.10	4.9	1.00	No lining required
CW-D5	0.03	0.05	2	0	10.10	1	2.5	1.04	1.5	2.16	4.70	4.7	1.50	No lining required
CW-D6	0.03	0.05	2	1	5.00	1	6	0.56	0.9	1.19	2.50	4.2	0.90	No lining required
CW-D7	0.03	0.05	2	1	14.50	1	2.3	0.98	1.5	2.90	6.00	5	1.50	No lining required
Past-D1	0.012	0.03	2	2	2.20	0.2	1.5	0.20	0.6	0.48	1.92	4.58	0.60	No lining required
Past-D3	0.025	0.05	2	0	2.80	1	4	0.55	0.9	0.61	1.62	4.59	0.90	No lining required
Past-D4	0.025	0.05	2	1	4.86	2	5	0.49	0.8	0.97	2.10	4.95	0.80	No lining required
Past-D5	0.025	0.05	2	1	2.50	0.5	2.5	0.38	0.8	0.67	2.08	3.73	0.80	No lining required
Past-D6	0.03	0.05	2	1	3.60	2	5	0.42	0.7	0.77	1.68	4.68	0.70	No lining required
Past-D8	0.025	0.05	2	0	1.70	1	5	0.44	0.8	0.39	1.28	4.36	0.80	No lining required
Past-D9	0.025	0.05	2	1	3.98	0.8	5	0.46	1.0	0.82	2.20	4.85	1.00	No lining required

CULVERT DESIGN CRITERIA

Culvert No	Minimum Pipe Diameter (in)	Pipe Length (ft)	Pipe Slope %	Controlling Head Water (Ft)	Design Flow (cfs)	Design Velocity (ft/s)	Inlet / Outlet Conditions
Past-C1	18	40	1	1	2.8	2.3	No lining req'd
Past-C2	24	115	3	1.2	4.9	2.9	No lining req'd
Past-C4	12	75	3	1.65	3.6	4.6	Submerged inlet outlet Riprap D50=6"
<u>Past-C5</u>	<u>24</u>	<u>40</u>	<u>1</u>	<u>0.1</u>	<u>3.98</u>	<u>2.6</u>	<u>No lining req'd</u>
CW-C1	12	60	3.7	1.9	4	5	No lining req'd
CW-C3	4@8"	10	6	0.67	6.8	5	No lining req'd
CW-C4	36	60	1.7	1.9	3.8	4.2	No lining req'd
CW-C5	18	780	1.8	3	11.5	4.9	No lining req'd

Culverts were designed for these watersheds previously under a very conservative storm (100 yr 6 hr). With the combined watersheds now proposed, we have checked to make sure that the designs are still more conservative than the required 10 year 6 hour storm. See the table above for the design flow rates used.

The 18" CMP Emergency Spillway is required to be designed to safely pass the 25 year 6 hour storm. It is also required that the discharge be controlled in a manner to reduce erosion and to minimize disturbance to the hydrologic balance. Hydrologic modeling projects that the 25 yr 6 hr storm would not have a discharge from the pond. The 100 year 6 hour storm is projected to have a 3.98 cfs discharge (See tables above for Past D9 / outlet). The spillway and outlet ditch D9 were designed to pass the 100 year storm with velocities less than 5 ft/sec to reduce erosion and minimize disturbance to the hydrologic balance. The outlet ditch flows to ~~the Coal Pile Sediment Pond (014)~~ an existing surface drainage swale.

Pasture Pond outlet pipe capacity

Inlet Control Culvert Flow

$$\text{Area} = \frac{Q}{C \cdot (2 \cdot g \cdot h)^{0.5}}$$

	Solve for Area	Solve for Head	Solve for Flow Rate Q
Q=	4.0 cfs	4.25 cfs	17.02 cfs
C=	0.6	0.6	0.6
h=	0.5 ft	0.25 ft	4 ft
g=	32.2 ft/s ²	32.2 ft/s ²	32.2 ft/s ²
area=	169.2 in ²	254.5 in ²	254.5 in ²
d=	14.7 in	18 in	18 in

h= head of water above center of pipe

Note:

_The existing Pasture Pond 18" outlet culvert is intended to remain in place even with the pond expansion.

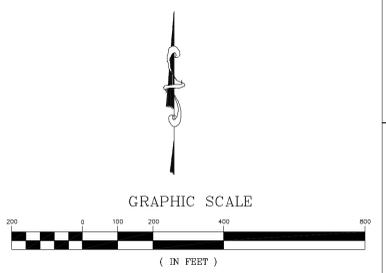
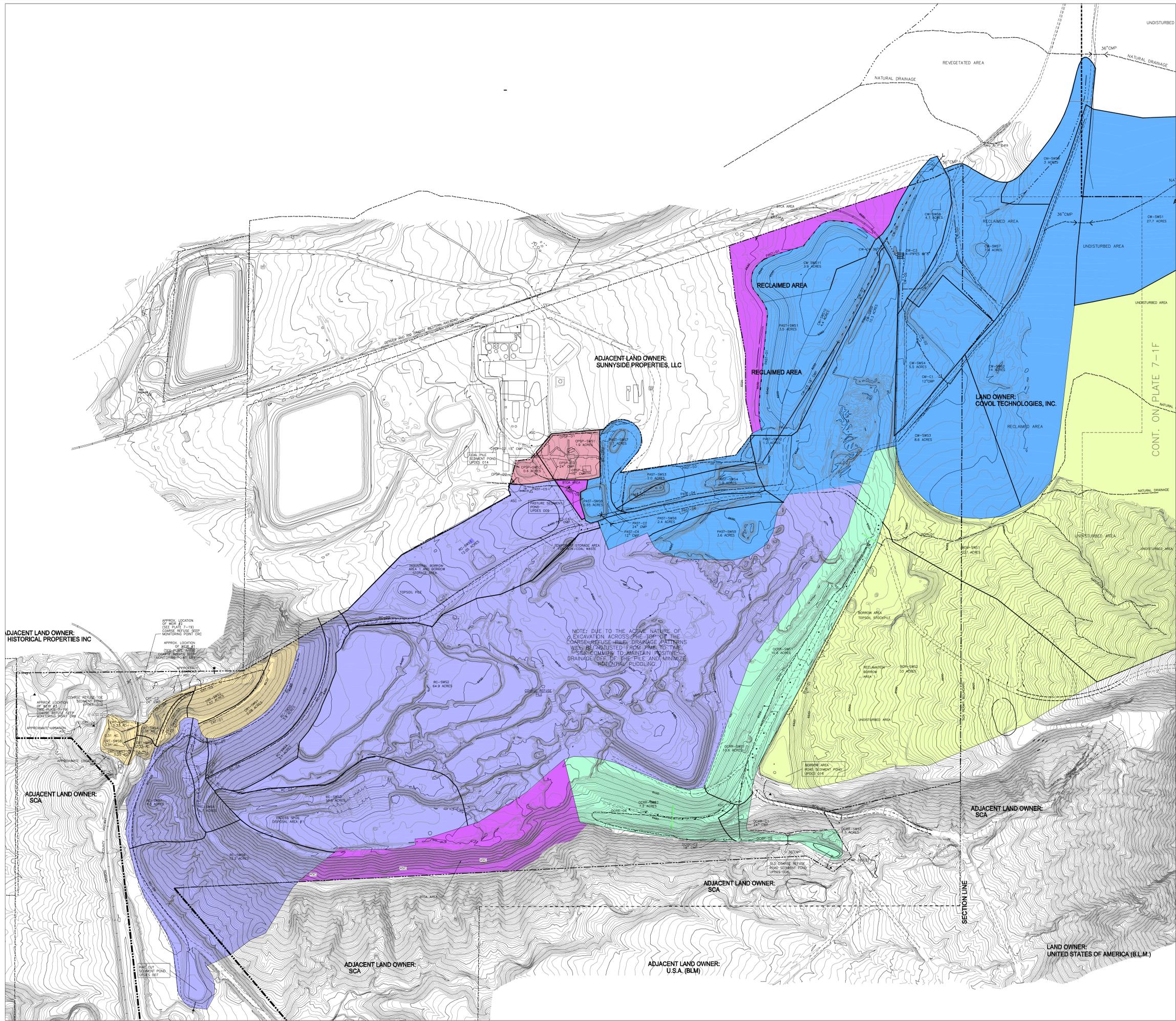
_The hydrologic modeling projects that the 10 year 24 hour design storm will be totally contained without discharge

_The smaller volume of the 25 year 6 hour storm would also be contained with no discharge.

_The 100 year 6 hour storm is projected to have a discharge of approximately 4 cfs.

_The existing 18 inch culvert is calculated to pass 4 cfs with only 0.25 feet of head above the center of the pipe.

_The existing 18 inch culvert is calculated to pass as much as 17 cfs with approximately 4 feet of head in the stand pipe structure



- LEGEND**
- PERMIT BOUNDARY
 - COLLECTOR DITCH
 - WATERSHED BOUNDARY
 - SUB-WATERSHED BOUNDARY
 - ROAD
 - ALTERNATE SEDIMENT CONTROL (ASC)
 - ▲ UPDES POINTS
 - COARSE REFUSE TOE SEDIMENT POND DRAINAGE
 - BORROW AREA POND DRAINAGE
 - OLD COARSE REFUSE ROAD SEDIMENT POND DRAINAGE
 - PASTURE SEDIMENT POND DRAINAGE
 - RAIL CUT SEDIMENT POND DRAINAGE
 - BTCA AREA
 - COAL PILE SEDIMENT POND DRAINAGE

NOTE:
AREAS HATCHED ARE BASED ON DRAINAGE PATTERNS AND MAY INCLUDE BOTH DISTURBED AND UNDISTURBED GROUND.

**Sunnyside Cogeneration Asso
HYDROLOGIC INDEX MAP**

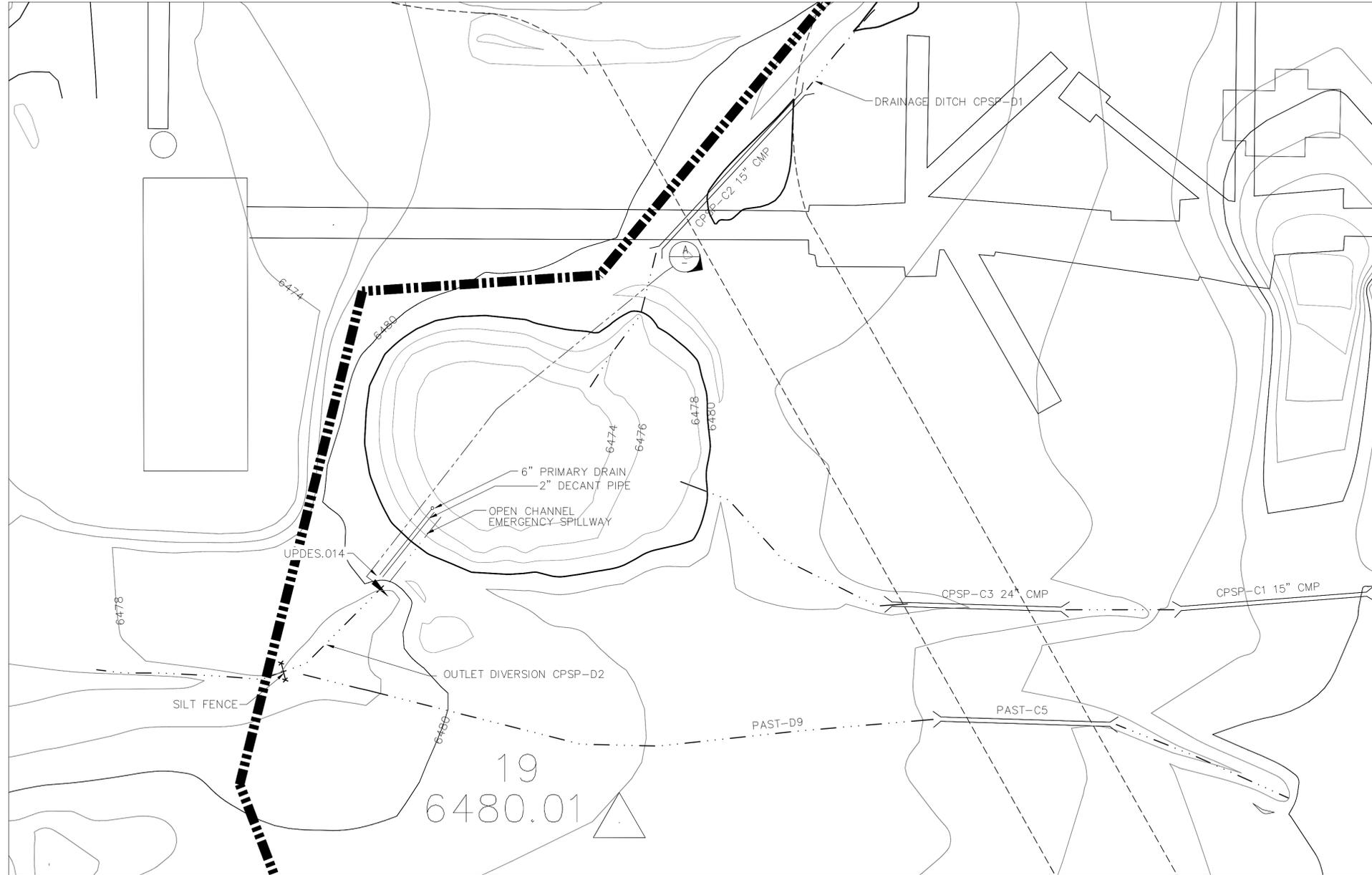
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DESIGNED:			

TWIN PEAKS
Engineering & Land Surveying
2264 NORTH 1450 EAST LEHI, UTAH 84043
(801) 430-3511, (801) 439-0700 FAX

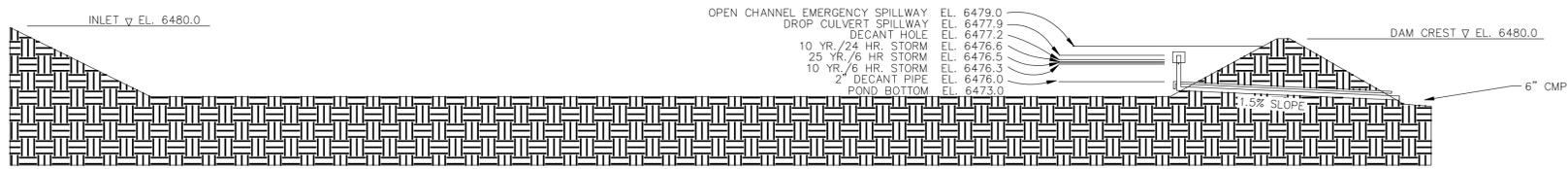
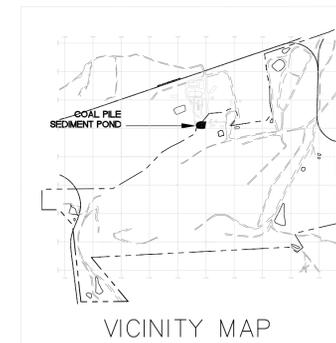
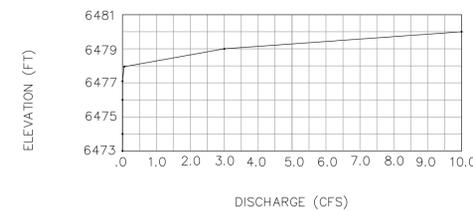
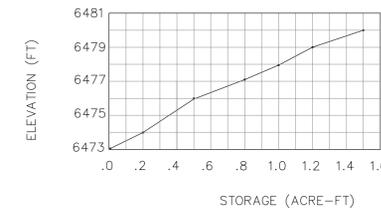
Electronically signed by
S. Scott Carlsson
10-24-16
STATE OF UTAH

REV	DATE	DESCRIPTION
1	10/16	POST CONSTRUCTION UPDATE FOR ROAD S
2	1/16	EXCESS SOIL DISPOSAL AREA RECLAMATION UPDATE
3	7/15	REMOVE CULVERTS IN PASTURE POND DRAINAGE AREA
4		ADD DITCHES AND CULVERTS IN RAIL CUT DRAINAGE
5	11/10	BOUNDARY UPDATE
6	8/10	UPDATE SITE AND TOPO
7	5/08	MOVE PASTURE POND CULVERT-C1
8	5/07	UPDATE PASTURE POND

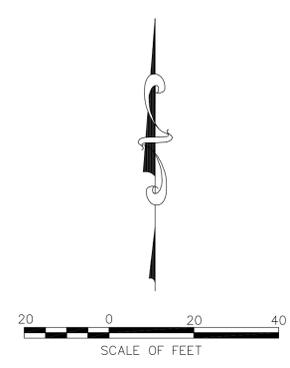
SHEET **7-1**



ELEVATION (FT)	AREA (ACRES)	DISCHARGE (CFS)	STORAGE (AC-FT)
6473.0	.14	0.0	0.0
6474.0	.17	0.0	0.2
6476.0	.21	0.0	0.5
6477.2	.23	0.0	0.8
6477.9	.24	3.0	1.0
6479.0	.26	10	1.2
6480.0	.28	10	1.5



A COAL PILE SEDIMENT POND CROSS-SECTION
SCALE: 1" = 10"



Sunnyside Cogeneration Associates
COAL PILE/SEDIMENT POND
AND CROSS-SECTION



DWG DATE: OCTOBER 2015
PLOT DATE: 20 October 2016

REV	DATE	DESCRIPTION	BY	APP'D
△	10/15	REDIRECTED WATER FROM PASTURE POND	AH	
△	9/02	2002 PERMIT RENEWAL		
△	8/95	ADDED 6' SILT FENCE		
△	1/95	ADDED 2" DECANT PIPE		
△	6/93	ADDED SLOPE TO CMP		