

0034



Norman H. Bangertter  
Governor  
Dee C. Hansen  
Executive Director  
Dianne R. Nielson, Ph.D.  
Division Director

# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
801-538-5340

January 12, 1993

Mr. Richard H. Allison, Jr. P.E.  
Project Supervisor  
AMAX Coal Company, Belle Ayr Mine  
2273 Bishop road  
P. O.Box 3005  
Gillette, Wyoming 82717-3005

Dear Mr. Allison:

Re: Remaining Deficiencies in Pond Amendment Relative to Division Order 92A, AMAX Coal Company, Castle Gate Mine, ACT/007/004-91C, Folder #3, Carbon County, Utah

The Division has completed a review of information AMAX submitted which was intended to satisfy Division Order 92A. Some of the information provided is considered adequate, however, there still remain a number of deficiencies which must be addressed in order to satisfy the Division Order. Please review the attached technical memo which discusses the problems and provide a response to the deficiencies by no later than February 12, 1993.

Please call me or Sharon Falvey if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Daron R. Haddock".

Daron R. Haddock  
Permit Supervisor

Attachment

cc: S. Falvey  
J. Helfich  
DO92DEFI.AMA



# State of Utah

DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

Norman H. Bangerter  
Governor  
Dee C. Hansen  
Executive Director  
Dianne R. Nielson, Ph.D.  
Division Director

355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, Utah 84180-1203  
801-538-5340

January 6, 1992

TO: Daron Haddock, Permit Supervisor

FROM: Sharon Falvey, Reclamation Specialist *SF*

RE: Castle Gate Ponds DO 92A 7/14/92 Response - Amendment 91C, AMAX Coal Company, Castle Gate Mine, ACT/007/004, Folder #2, Carbon County, Utah

## SUMMARY AND RECOMMENDATION

The following review analyzes the July 14, 1992 submittal in response to the April 6, 1992 memo, and Division Order 92A. The July 9th submittal is reviewed in conjunction with the July 14th submittal. The latest revisions from this submittal are to be inserted into Section 3.4 of the July 9th submittal. The hydrology calculations are to be added to Appendix 3.4 J. **Specifically this memo addresses this Castle Gate amendment related to pond design amendments only.** Field verification is not considered a part of this analysis. All re-submittals should be updated per recent approvals. A complete review of Hardscrabble drainage changes has is not included in this review but is forthcoming.

R645-301-713, R645-301-742.221.37, R645-301-742.221.39 and R645-301-733.210 are summarized but should be reviewed by an engineer.

R645-301-742.300.#1, R645-301-742.223.#5, R645-301-731.#1, R645-301-731.520.#1, 645-301-742.221.33.#1 (pond 10 only) are addressed in the memo from Rick Summers Dated November 2, 1992.

The operator has changed the previously existing drainage at ponds 012A and 012B. These changes were presented in an amendment on November 21, 1991. However the operator never included the drainage changes in the pond revisions submitted to date. The operator needs to provide pond design analysis for the additional drainage going to pond 012A.

The operator has submitted new watershed delineations for the Hardscrabble drainage. This submittal includes changes in watershed areas and drainage plans. This submittal also demonstrates that ponds 007, 008, 010 and 011, even after reconstruction, do not meet what the Division generally considers adequate sediment storage. However, the operator has provided a commitment to remove the sediment as it reaches 60% of the maximum sediment volume. These ponds will require frequent cleaning due to the low storage. If the operator is unable to maintain adequate storage the ponds may require redesign. Currently the operator is not mining. Although the ponds are approved for the temporary cessation, they may not be adequately sized for sediment control during active mining.

## Recommendation

It should be made clear that any changes the operator submits beyond what is required here could result in denial of the submittal and would then require enforcement action. If the operator feels something related should be addressed with the following submittal, I recommend the operator discuss it with the Division first. If the operator adequately addresses each of the identified deficiencies for D.O. 92A the operator will facilitate processing. Concurrence from other agencies for the changes made at the mine must be granted prior to any approvals therefore, the operator should be requested to submit an adequate number of copies for other agency review.

The operator has reassessed the ponds and has clarified some discrepancies. However, problems still exist. The outstanding deficiencies are summarized below.

1. Prior to extending culverts on ponds 007 and 008 to the undisturbed bypass notification and approval for the discharge points by the Department of Health and UPDES permit must be approved and the UPDES permit, and any other necessary documentation submitted to the Division.
2. Obtain approval from the Department of Environmental Quality for the elevation difference on decants and 60 % clean out level are which are less than 1.5'. If decant elevation is not acceptable to the Department of Environmental Quality, the Division would consider the operator raising the decant elevation dependent on pond design specifics.
3. Demonstrate that pond 012 meets the R645 requirements with the additional drainage carried by ditch D17.
4. Demonstrate that pond 009 meets the requirements of R645-301-742.33.(The operator has submitted a proposal for pond 009. Review is under way.
5. Crosssections and maps for all ponds must be certified.
6. Discuss the basis for assuming soil type C exists for watersheds in Hardscrabble Canyon where type D is shown to be extensive.
7. The operator must follow the methodology indicated and use the correct side slope for determining the sizing on riprapped channels inlets and spillway outlets. Justify the use of a 3:1 slope at the culvert outlets. Use a representative Manning's "n" for

earthen spillways where design calculations indicates no riprap is required, or indicate riprap requirements. Existing riprap designs must be upgraded to meet design requirements.

8. Correct information identified under R645-301-120-#2.

The following analyses is completed by General Category or Canyon Area.

**R645-301-120          Application Format**

1. *Provide a list indicating the intended replacement pages for the amendment addressing this memo in a table with the amendment. Identify pages to be removed and inserted in a cover letter.*

**ANALYSIS:**

The Operator submitted the changes indicating replacement pages in a table format. The operator indicates the changes as part of D.O. 91 D. The operator should be aware the correct Division Order is 92 A. The Operator indicates in the table that new appendices are included. These appendices are found in the July 9, 1992 submittal.

**DEFICIENCIES:**

None.

**R645-301-120          Application Format**

2. *Correct conflicting information presented in the application including items 1-7 above.*

**PROPOSAL:**

All conflicting information relative to the adequacy of sedimentation ponds 007,008,010, 012A, 012B and 015 is eliminated.

## ANALYSIS:

### **Preparation Plant Area**

Pond 010 pg. 3.5-3 states no culverts are present in the audit area. The operator proposed to place a 1/2 round culvert at the section around the sediment pond to convey drainage to the pond. The operator installed a full culvert and created a small basin adjacent to the pond.

pg. 3.3-5 inflow to pond 010 is primarily via overland flow down the slope on the west side of the pond. It is not feasible to construct a diversion ditch along the entire slope. The velocity of this flow is considered erosive. This was previously identified as a deficiency. The operator must provide hydrology designs that minimize erosion therefore the operator should provide a design for a ditch or berm preventing water from reaching the slope where erosive velocities will occur.

Pond 012A is shown to have a decant on Exhibit 11.9 however, the decant is not designed as depicted in the drawing of the typical decant.

Pond 012B is now indicated to be designed with a 7' width open channel spillway. Pg. 3.4-12 indicates the primary spillway elevation for Pond 12B is 93.0 ft. This conflicts with the design information.

The minimum embankment height for the spillway on pond 012B as indicated in cross section E-E' shows the embankment outside of the spillway is 92.5 feet.

### **Crandall Canyon**

The Maximum sediment volume and elevation is increased from the previous as-built submittal. The text values were corrected. The operator indicates on Pg 3.7-22 the existing stream channel riprap is adequate for the primary outlet velocity. However the computations on page 30 of 31 indicate a D50 of 1/2" exists at the principle spillway outlet and is not adequate.

### **Hardscrabble Canyon**

The operator makes reference to the UDOGM 1990 statement on pg 3.36 the statement is taken out of context and has no bearing on the operators responsibility for the material presented in this submittal. The operator must remove the reference from the document.

The operator states that the maximum water level corresponds to the 25-year 6-hour storm event. The maximum water level should correspond to the 10 year 24 hour event pg. 3.3-18, 19, and 20.

**DEFICIENCY:**

**Preparation Plant Area**

1. Provide berm or ditch designs for the erosive velocities at pond 010, this may require a change to the main inlet design. Correct reference to the 1/2 round culvert on pg.3.5-3.
2. Correctly depict the decant drawing for pond 012A.
3. Correct the primary spillway elevation text for Pond 012B on Pg. 3.4-12.

**Crandall Canyon**

4. Provide adequate designs for the primary spillway outlet on pond 015.

**Hardscrabble Canyon**

5. Remove the reference to the UDOGM 1990 in the statement on pg 3.36.
6. Correct reference to design event for maximum water levels.

**R645-301-713.      Inspection. Impoundments will be inspected as described under R645-301-514.300. and**

1. *Include a certified report addressing R645-301-514.312 for the impoundments following construction changes.*

**R645-301-742.221.37.      Ensure against excessive settlement; and**

1. *Indicate how the construction method ensures against excessive settlement since, standard engineering practices were not used.*

**R645-301-742.221.39.      Be compacted properly.**

1. *Demonstrate adequate compaction.*

**PROPOSAL:**

The Operator has submitted certified as-built design maps, calculations and text. Certified reports submitted state that the impoundments meet or exceed minimum design requirements.

**ANALYSIS:**

These sections should be reviewed by an engineer.

**General**

The information on the previously certified maps and crosssections were corrected then re-certified for design calculations. While changing information on the as-built certification, the cross sections and maps were not validated. Certification that was included on the drawings applied only to designs.

The pond designs varied from the original approved ponds to varying degrees. However, the certification states the ponds meet or exceed, or appear to meet the design requirements.

**Prep Plant Area**

Pond 010 certification statement states the steep slope from the road to pond was buttressed by large rocks and filled. The riprap buttressed road slope should be shown on pond drawing.

The spillway design does not show the riprap extending to the edge of the permit area. However, it will be assumed that all spillways are riprapped the length of the spillway.

The certified as-built report for pond 010 dated 6/8/92 states a decant and a 12" CMP inlet were added to the pond. The embankment was raised only slightly and the pond was dugout approximately 5.5'. The survey dated 10/6/91 states a decant and emergency spillway only were added to the pond. The current pond designs are smaller than the volume indicated on the inspection report.

The applicant has provided a certified report located in Appendix 3.4N for Ponds 011, 012A and 012B.

The engineer certifying the design indicates that pond 011 "appears" to meet design requirements. This language is vague. Anything that does not meet the design requirements should be indicated as to the changes made within the certified document. Pond 011 is referenced to be an incised pond however, one natural embankment exists adjacent to the undisturbed drainage where there is relief between drainage and pond embankment.

The certified report states Pond 012A was cleaned out and no embankment work was completed. While Pond 012B was widened toward the road side. The west embankment was raised and shifted toward the railroad. The embankment was compacted in 1' lifts by running

over the material with the loader and a full bucket. All small cut areas were compacted with a hand compactor. The west embankment was raised a second time and extended to the north with native fill material: 1' lifts were compacted with a 5-ton roller.

### **Crandall Canyon**

An open channel spillway was added to the pond.

### **Hardscrabble:**

Pond 007 certification statement states material was added above the retaining wall. There was no raising of the embankment. No discussion of method of compaction was included in the construction description. The engineer indicates retaining wall on north side appears "OK" 9/27/91 certified inspection report. The engineer again uses vague language.

Pond 008 The embankment was raised approximately 2' using material removed from the pond and compacted in 1 ft lifts with wheels of loader and trackhoe bucket. Decant and emergency spillway cut areas were compacted with hand compactor.

Pond 009 upper (A) cross-braces were removed. The outlet of the pond was raised using material from pond clean out.

Pond 009 lower (B) embankment was raised 2.5' with imported material. The roadside rail wall was raised using 5/16" steel plate compaction was achieved by wheel from the loader. Bowing had occurred previously where a cross brace was removed. The engineers inspection report(10/6/91) for pond 009B suggests considering more cross bars.

### **DEFICIENCIES:**

1. All pond maps and cross sections must be certified.

**R645-301-733.210. Permanent and temporary impoundments will be designed to meet the requirements of 533.100.**

1. *Supply information to demonstrate the safety factor and meet the requirements of R645-301-533.100, include all engineering reports containing information methods of pond construction.*

### **PROPOSAL:**

#### **Preparation Plant**

The operator provides analysis on ponds use in a computer program GEOSLOPE.

Pond 010 is primarily incised and is shown with safety factors of 1.5 for the inslope analyzed. pg 3.5-8. Pond 011 at cross section D-D' is has a safety factor of 1.16, pg. 3.4-18. This inslope cross section is adjacent to an undisturbed drainage ditch. Pond 012A cross section G-G' calculated factor of safety is 1.2 pg 3.4-19. This cross section is below a mining road leading to a truck dump. Pond 012B is shown by the operator to have safety factors of 1.68, and 1.46. Pond 012B is adjacent to a railroad.

The operator states that in the event of any sloughing of material on the inside of the pond(s), the material will be removed to maintain the design volume capacity.

### **Crandall Canyon**

The operator provides analysis on pond 015 showing the two cross sections meet or exceeded the safety factor stability criteria. The minimum safety factor demonstrated to be 2.33 for cross section C-C' and 1.37 for cross section D-D'.2.81.

### **Hardscrabble Canyon**

Ponds 007, is shown by the operator to have a 2.82 safety factor. The inslope is shown by the operator to have a factor of safety of 1.31. The vertical log retaining walls are not analyzed for stability.

Ponds 008 embankment is shown to have a safety factor of 2.81 and inslope is shown to have a safety factor of 1.48.

Pond 009 embankment is shown to have a stability factor of 2.90 and inslope is shown to have a safety factor of 1.38

### **ANALYSIS:**

This information must be assessed by an engineer.

**R645-301-734. Discharge Structures. Discharge structures will be constructed and maintained to comply with R645-301-744.**

1. *Demonstrate adequacy of discharge structures on ponds that do not discharge to a designed drainage channel.*

### **PROPOSAL:**

The operator has presented design for the Emergency Spillway outslope on Pond 011 resulting in a required riprap size of 5". Pg. 3.4-10 An average riprap diameter of 5 " is required on the emergency spillway outlet slope on Pond 011.

### **ANALYSIS:**

Presently the riprap is not shown to extend to the undisturbed channel drainage on Exhibit 11.8. Either the map is not current or the operator has not implemented the designs on the ground. The method used calls for a median diameter of 5" of well graded materials.

**The discussion in of the design methods used from Chapter 7 states the operator will use the channel side slope unless the channel slope is greater for riprap sizing.** In some cases this slope is not representative of either presented bottom slope or side slope. The slope is incorrectly represented in designs for Pond 012 B inlet channel and spillway outflow. The channel slope for some primary outlets for ponds 012A and 015 assumed the slope to be 3:1, no justification for the assumption is presented.

Primary spillway outlet on Pond 014 shows the existing D50 is approximately 0.5" design riprap required is approximately 7.2".

Pond 015 was re-analyzed using the Type B storm for the peak runoff event from a 25 yr 6 hr storm. Previous reports included design for a 25 yr. 24 hr event using the SCS Type II hydrograph. Therefore the design peak inflow has changed from 7.8 cfs to 3.96 cfs and design peak outflow has changed from 5.8 cfs to 3.0 cfs.

Pond 012A emergency spillway, uses Manning's "n" = 0.035 to determine that riprap is not required. The value used is high for an unlined channel an accurate value would be Manning's "n" of 0.025 for earthen channels.

The operator is inconsistent with the methodologies indicated to be used and that which is presented in the riprap analysis.

**DEFICIENCY:**

1. The operator must follow the methodology indicated and use the correct side slope for determining the sizing on riprapped channels and justify the use of a 3:1 slope at the culvert outlets.
2. Use an accurate Manning's "n" for earthen channels for designs that demonstrate no riprap is required, or indicate that the existing riprap is the design requirement.
3. Existing riprap designs must be upgraded to meet design requirements.

**R645-301-742.221.31. Provide adequate sediment storage volume**

1. Provide areas and elevations used to determine the pond volume curve. Include methods and programs used to develop the curves.
2. Re-evaluate method used to determine pond volume on Ponds 009A and 009B, consideration needs to be given to the volume of sediment contained in the ponds. see R645-734-221.36.

**PROPOSAL:**

Sediment removal will be performed when the sediment reaches 60% clean out level. The sediment will then be tested for acid/toxic material and transported to the refuse pile and deposited.

**ANALYSIS:**

**GENERAL**

Pond volumes and sediment containment were re-evaluated. Some of the ponds have a sediment volume less than the Division's accepted 3 year's storage volume standard. Current regulations do not specify what is considered adequate storage. The operator has not presented a demonstration that the designs provide adequate storage specific to operations and conditions at the site. However, the operator commits to clean out at the 60 % level.

**Preparation Plant**

**Pond 010**

The Operator proposed to provide sediment storage volume of 1,488 ft<sup>3</sup>, predicted erosion storage volume. The re-assessed maximum sediment storage is 742 ft<sup>3</sup> or 1.5 years predicted erosion volume.

**Pond 011**

The operator proposed to provide storage for 3 years predicted erosion volume. The as-built provides maximum sediment for 0.81 years predicted erosion volume.

**Pond 012A and 012B**

The operators submittal provides sediment storage for approximately 9 years predicted erosion volume in Pond 012A, an increase over the proposed as-built. However, the operator does not include sediment coming from the all drainage areas at the site.

The operator submittal provides sediment storage for Pond 012B with 3 years predicted erosion sediment volume of 7,216 ft<sup>3</sup>. This volume has not changed.

**Crandall Canyon**

**Pond 015**

The Operator has increased the proposed sediment volume from 14,000 ft<sup>3</sup> to 19,857 ft<sup>3</sup>, according to the submitted pond volume curve, exceeding the predicted 3 year sediment erosion volume.

## **Hardscrabble Canyon**

### **Pond 007**

The operator proposes sediment storage volume of 7,353 ft<sup>3</sup> for approximately 0.69 years predicted erosion volume a decrease from the approved 11,827 ft<sup>3</sup>. The sediment volume proposed was based on the site while it received drainage from disturbed area HCWS-D1. Following completion of No. 4 mine this area will not report to the pond.

### **Pond 008**

The operator proposes sediment storage volume of 3,880 ft<sup>3</sup> for approximately 1.5 years predicted erosion volume a decrease from the approved 7,785 ft<sup>3</sup>.

### **DEFICIENCIES:**

1. Demonstrate that pond 012A contains adequate sediment storage for all drainage areas contributing to the pond.

**R645-301-742.221.34. Provide a non-clogging de-watering device adequate to maintain the detention time required under R645-301-742.221.32.**

### **PROPOSAL:**

Ponds 008, 009B, 010, 012A, 012B were provided with decant systems at the maximum sediment elevation level. Pond 015 was provided with a decant above the maximum sediment elevation level. Ponds 009A, 011, 013, 014, 015 are provided with portable pumps and will decant to the maximum sediment level.

### **ANALYSIS:**

The August 28, 1991 memo for pond approval required the operator to make decant design changes required by the Department of Environmental Quality in the August 23, 1991 memo. That memo stated the distance between the decant and the 60 % level be 1.5'. The operator provides a distance of 0.55', 0.65, 0.6' and 0.5' between the decant and 60 % clean out elevation for Ponds 008, 010, 012A, 012B respectively.

The operator indicates the water will be decanted to the maximum sediment level. It should be noted however, that if the pond has sediment near the maximum sediment level the operator should not completely remove the water to that level because the sediments could be discharged into the stream and result in an exceedence of the water quality standards. However this is only likely to be a problem on ponds where the 60% clean out level and Maximum sediment level are close in elevation.

**DEFICIENCIES:**

1. Obtain approval from the Department of Environmental Quality for the elevation difference on decants and 60 % clean out level are less than 1.5'. If decant elevation is not acceptable to the Department of Environmental Quality, the Division would consider the operator raising the decant elevation dependent on pond design specifics.

**R645-301-742.221.36. Provide periodic sediment removal sufficient to maintain adequate volume for the design event;**

1. *Provide a specific description of when the ponds will be cleaned and how the Operator will maintain the 60% clean out level commitment.*

**PROPOSAL:**

A commitment to remove sediment from the ponds once it reaches the 60 % clean out level, as well as a disposal plan are included in the main text.

**ANALYSIS:**

The Operator included a commitment to maintain the pond at a 60% clean out level.

**DEFICIENCIES:**

None.

**R645-301-742.221.33 Contain or Treat the 10-year 24-hour precipitation event**

**PROPOSAL:**

The operator states the ponds contain the 10-year 24-hour precipitation event but, does not include calculations for Pond 009. Following revision of the Hardscrabble area drainage the operator determined the pond unable to hold the required event using the identified assumptions. A proposal for demonstration that the pond meets the requirement is under review.

**ANALYSIS:**

Pond 007, 008, 0010, 011, and 015 are demonstrated by the operators presented designs to contain the 10 year 24 hour event.

Pond 009 is not submitted or reviewed at this time.

The operator has changed the previously existing drainage at ponds 012A and 012B. These changes were presented in an amendment on November 21, 1991. However the operator never included the drainage changes in the pond revisions submitted to date. The

operator needs to provide pond design analysis for the additional drainage going to pond 012A.

The Watersheds at the Hardscrabble canyon have changed. New computations are presented by the operator. Some of the watershed Curve Numbers (CN) based on vegetative type and soil type vary from the Divisions determination. This information did affect the volume of the runoff determined for pond 008. The main variance was for the curve number on WSU-19. The Divisions CN was higher based on the soil type in the watershed. Exhibit 8-1 and 8-6 indicate this watershed has a majority type D soil. Additional variances on pond 007 did not change the volume but may affect peak flows when drainage designs are reviewed.

The operator states pg. 3.3-4, the curve numbers in Chapter VII are in the high range for the soil type and vegetative cover. Therefore the calculations provide a conservative design. The operator indicates a type C soil is used for the operations area. However a large percentage of the undisturbed watersheds contain soils in the Hydrologic group D which would result in a higher CN.

Vegetative cover is determined by photography and Exhibit 9-2 however portions of Exhibit 9-2 do not appear to correspond with the vegetation identified in the calculations. For instance the disturbed area reaches an elevation of 6900 ft. at the southeast end of the site. The upper most portion of disturbance in HCWS is 6700 ft. It appears the current operations disturbed area boundary and the boundary on Exhibit 9-2 may have prompted this error.

DEFICIENCIES:

1. Demonstrate that pond 012A meets the requirements of R645-301-742.221.33
2. Discuss the basis for assuming soil type C exists for watersheds where type D is shown to be extensive.
3. Demonstrate that pond 009 meets the requirements of R645-301-742.221.33.

**R645-301-742.223. Sedimentation ponds provide a combination of principal and emergency spillways that will safely discharge a 25-year, 6-hour precipitation event**

1. *Provide text or design calculations clarifying the SEDIMENT volume curve for ponds with discrepancies in runoff volume, spillway elevation, and freeboard changes. Ponds that do not match the values of the proposed design volume curves used to run the SEDIMENT program, should have text identifying why the values are acceptable.*

2. *Indicate the maximum stage for the principle and emergency spillways for all ponds on as constructed maps and in text. Correct maps identifying existing freeboard using the elevation between the maximum stage and minimum embankment height.*
3. *Demonstrate that freeboard meets the requirements of R645-301-512.240 and R645-301-743.120.*
4. *The Operator must demonstrate the flow through the emergency spillway using weir flow for reservoirs for all emergency spillways that flow during the design event.*

**PROPOSAL:**

SEDCAD was used to evaluate the spillway of the ponds. All spillways are adequate, and the freeboard is sufficient for a 25-year 24-hour storm (July 8, 1992 deficiency response cover letter).

**ANALYSIS:**

The operator submitted spillway designs for the 25-year 6-hour storm event not the 25-year 24-hour event. However, the 25-year 6-hour event meets current regulation requirements. Pond 009 is not included in this submittal.

**Preparation Plant**

The spillways are not demonstrated to pass the design event for the additional drainage from ditch D17 to Pond 012.

Pond 010 The spillway design does not show the riprap to extend to the edge of the permit area Exhibit 11.7.

**Hardscrabble**

The operator proposes providing an extension from the primary outlets on pond 007 and 008 to the existing bypass undisturbed drainage at the south west end of the site.

Previously these ponds discharged to pond 009 and was then released to the undisturbed drainage. Prior to extending culverts on ponds 007 and 008 to the undisturbed bypass notification and approval for the discharge points by the Department of Health and UPDES permit.

**DEFICIENCIES:**

1. Prior to extending culverts on ponds 007 and 008 to the undisturbed bypass notification and approval for the discharge points by the Department of Health and UPDES permit must be approved and, the UPDES permit and any other necessary

documentation submitted to the Division.

2. Demonstrate that pond 012 meets the requirements of the R645 regulations.

**R645-301-742.233.1 A single open channel spillway of non-erodible construction and designed to carry sustained flows**

1. *Correct the as-built cross-sections and spillway designs to the minimum design existing at each modified pond.*

**PROPOSAL:**

The Dimensions of all surveys have been surveyed by Mr. Dan Guy and are included on exhibits listed in item #13 above the certification of those surveys is included in Appendices 3.3G, 3.4N and 3.7J.

**ANALYSIS:**

The Applicant uses typical spillway cross-sections. In many of the cross-sections the depth indicated from the spillway elevation to the channel embankment is greater than the depth to the freeboard at the level of the spillway. This occurs on pond 008, pond 007, 011, The Operator should realize the typical design sets the minimum design criteria therefore any design less accommodating than the certified design will result in enforcement actions.

**DEFICIENCIES:**

1. None.

**R645-301-742.300. Diversions.**

2. *Correct and clarify areas of discrepancy for pond inlet ditches either by including more contours on the as-built or other verification method.*

**PROPOSAL:**

The operator has reconstructed the inlet to Pond 012B.

**ANALYSIS:**

The operator has not extended the inlet surveys. However, design problems were noted for pond inlets. The operator assumes a 3:1 slope in some cases which is not justified.

**The discussion in of the method used in Chapter 7 states the operator will use the channel side slope to determine riprap sizing unless the channel slope is greater. In some cases this slope is not representative of either presented bottom slope or side slope. The slope is incorrectly represented in designs for Pond 011 north and south inlet, Pond 012 B inlet channel and for Pond 015 a 3:1 slope is assumed at the north and south inlets while the side slopes are greater than 3:1.**

Appendix 3.4G pg 20 south inlet to pond 011 shows the existing riprap is undersized by 2" diameter. Operator indicates they will watch for erosion and repair as necessary.

The inlet structures for pond 013 were sized for the 25 yr.-24 hr. event the current regulations require the ditches to be sized for the 100 yr. 6hr. event.

**DEFICIENCIES:**

1. Justify the assumptions for the assumed slopes which are contrary to the method discussed in Chapter 7 for riprap sizing. Existing riprap sizing must meet the demonstrated design requirements.