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Greg Lewicki And Associates

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May 20, 2015

TO: Mike Cunningham
Colorado Division of Reclamation, Mining and Safety
1313 Sherman Street 2nd Floor
Denver, CO 80203

RE: Technical Revision to Minerals Permit M-2011-009 Hector Placer **TR01**

Dear Mike:

Enclosed is the response to your adequacy letter dated April 12, 2015 for the technical revision to the Hector Placer Mine to allow the use a flocculent chemical for the gold operation to settle out suspended clays. All pages are added as an addendum to the Exhibit D Mine Plan permit section.

Sincerely,

Greg Lewicki, P. E.
Greg Lewicki and Associates

cc: Mike London

cc: Jerry Miller

✓ **AF & Report**
✓ **No Violations**

**Hector Placer Mine
M-2011-009**

**Addendum to Mining Plan
To Allow Use of Flocculent Chemical
April 10, 2015**

1. Background Data

Currently, the gold placer operation is using 2500 gallons per minute of water from the site source to the pump which pumps this water to the sluice box used to collect the gold particles. The slurry from the sluice is allowed to settle in a pond immediately downhill of the sluice box. The water is recycled into the sluice but the amount of settling time is not sufficient to allow all fine particles to settle out, where dirtier water is then pumped back to the sluice, reducing efficiency of gold recovery.

The gold operator has decided that a flocculent is the most efficient way to settle the suspended solids. The following pages describe the flocculent, which is an anionic wet flocculent Hyperfloc AF852 produced by Hychem, Inc. Of California. This chemical is not harmful to fish or other animals unless it is dumped in full concentration directly into the River in large quantities. See attached Material Data Safety Sheets. It is safer than many other chemicals used for flocculating dirty waters today and the City of Denver is using it in its drinking water plants.

2. System Design

One 150 gallon tank of water will be set up adjacent to the sluice box, wherever it is placed in the permit area. A 55 gallon steel drum of the Hyperfloc chemical will be set up next to the 150 gallon water tank and the Hyperfloc chemical and water will be pumped from both tanks using small pumps into a separate mixing tank as needed to allow the proper mixing concentration. Since the flow rate in the sluice is constant, this will be easy to accomplish. This mixing tank will be a heavy duty plastic 100 gallon tank. A fixed

mixer will accomplish the thorough mixing. A small valve and garden hose type pipe will allow the mixed solution to flow to the sluice box where the mixture will be allowed to enter the slurry from the sluice where the flocculation of the fine particles in the sluice tails pond will take place. The chemical is used in very small quantities and the solids should settle very rapidly, based on experience at other sites. The sluice tails pond is actually an old mining area which will be backfilled by the sluice tails and the flocculation effort.

The 55 gallon steel drum, the 100 gallon mixing tank and 150 gallon water tank will all sit inside a metal stock tank of a minimum of 10 feet diameter and 2 feet tall, which is more than enough to contain 110% of all tanks being ruptured.

The expected wet chemical use with water will be at the ratio of 1 gallon liquid chemical per hour for the expected flow rate of 2500 gallons per minute. This was determined from a laboratory test conducted by Hychem on the actual dirty water at the Alma Placer. Therefore, since the gold operation uses a process flow rate of 2500 gallons per minute for an expected 10 hour day, the chemical will be used at the average rate of 10 gallons per day.

See enclosed data from Hychem and Tons Per Hour Company.

The flocculent will allow all solids to settle out in the initial area of the sluice tails pond. The pond has a fine clay and silt bottom so there is no threat of chemical traveling into groundwater, in addition to the fact that the chemical is used in so low concentrations that the water is completely safe under all circumstances. Also, the chemical is not toxic to animals or people in dry or wet form. This pond is actually an older mining area that was not fully backfilled. This sluice tails pond discharges to another large lower pond where clean water is recycled to the sluice. The sluice tails gradually reclaim the sluice tails pond to its final configuration. The lower pond does not discharge to the surface.

3. Sluice Tails Pond Cleanout

Using the laboratory test result of 3.4% solids in the dirty water, this means that, for a total flow of 330 cubic feet/minute, the solids are 11.3 cubic feet per minute. Assuming that the settled solids have 40% water by weight, this means that 15.8 cubic feet/minute

of “muck” will be produced from the sluice. For 10 hours of operation, this is 9,500 cubic feet per day, or 352 cubic yards. Cleanout of the pond will may not be needed since the pond area will be reclaimed by the deposition of sluice tails, however, some amount of fines may be used for reclamation or backfilling purposes elsewhere, and these calculations provide an estimate of how much material could be provided. Any muck extracted will be allowed to drain for a few days and the semi-dry material will be hauled to various locations on site for possible use as substitute topsoil in the reclamation. Much of the water will drain rapidly from the muck as it is placed on the bank along the pond. The dry solids removed from the pond are expected to be approximately 208 cubic yards.

Shown below is the e-mail from Tons Per Hour showing the results of the laboratory tests of the dirty water from the sluice at Alma Placer, which is similar to the Hector Placer site.

greg@lewicki.biz

From: "Charles Schulte" <tphcolorado@msn.com>
To: <greg@lewicki.biz>
Sent: Thursday, July 20, 2006 5:04 PM
Attach: TPH Quote 1.pdf; TPH Quote 2.pdf; floc sys pic 1.jpg; floc sys pic 2.jpg
Subject: Dry Floc System for Alma Sleuth Mine

Greg,

I was good talking to you on the phone yesterday. After we talked, I spoke with Jerry Miller and gave him pricing information on the TPH Dry Flocculent Blending and Metering System for Alma Sleuth Mine. Our price quote is based on the information that I received from Jerry and Zane as summarized below.

- They are moving about 80 yards of material an hour.
- The owner estimates there flow at about 3000 gpm.
- They screen out 1/2" and above. Most of the heavies drop out drop out in the first 50 ft or so after weirs.
- This is followed by 3 small settling ponds then a larger fresh water pond where water from the river is pumped into to replenish and water for washing is pumped out of.
- They want the mud to drop out in the settling ponds after the natural heavies drop out with clean water flowing back into their fresh water pond.

After our meeting I picked up a sample of their slurry. Following is the analysis of that sample.

PH ; 7.71
Dry solids SpG : 2.75
Slurry SpG : 1.0227
% solids : 3.4527

It took 1 ml of 0.1 % AF-307 to settle 4.75 inches/Min with a crystal clear overflow. This dosage converts to 0.1416 pounds/T (71 ppm) for clarifier process and 211 ppm for Belt Press dewatering. No coagulant was needed for the clarification

Based on the above information, two quotes are attached. The first is for the TPH Automated Dry Flocculant System and the second is for the Dry System Plus a Self Contained Stainless Steel Building. I am also including two Hychem Documents pertaining to the Dry Flocculant AF-307. The first being the Technical Data Sheet and the second being the Material Safety Data Sheet. Finally I am attaching several pictures of a TPH Dry Flocculant System that is very similar to system being proposed for Alma.

If you have any questions please do not hesitate to contact me.

Best regards,

Charlie Schulte
Tons Per Hour

ANIONIC EMULSION FLOCCULANT

DESCRIPTION

HYPERFLOC® AE 852 is a medium charge, very high molecular weight anionic polyacrylamide flocculant supplied as a low viscosity emulsion. It is effective over the pH range of 5 -12.

TYPICAL PROPERTIES

Appearance	Opaque Liquid
Specific Gravity at 25°C	1.04 ± 0.02
Viscosity as supplied at 25°C	500 – 1500 cps
Viscosity* (1% Solution)	1000–1400 cps
pH of 1.0% Solution at 25°C	7.0 ± 1.0
Freeze Point	5°F (-15°C)
Flash Point	>200°F (93°C)
Shelf Life	6 Months

*Brookfield LVT, 30 rpm at 25°C in deionized water

APPLICATIONS

HYPERFLOC® AE 852 is used in a broad range of solid-liquid separation processes in water and waste treatment and mineral processing applications for settling, thickening and dewatering. It can be used alone or in conjunction with alum or ferric salts, polyaluminum chloride, polyamines and polyDADMACs.

Depending on the application, the following dosage levels are recommended:

Water & Waste Treatment:

Settling/Clarification	0.5 to 20 ppm
Thickening/Dewatering	1.0 to 20 lbs/ton

Minerals Processing:

Settling/Thickening	0.01 to 0.2 lbs/ton
Dewatering	0.1 to 2 lbs/ton

03/02

PREPARATION & FEEDING

Solutions of HYPERFLOC® AE 852 are prepared by adding the neat polymer to water below 120°F (50°C) either through an automatic polymer feed unit or into the vortex of a stirred tank of water to prepare a solution of 1% concentration (as is). Aging for 30 - 60 minutes is recommended, followed by in-line dilution to 0.1% or less. Avoid excessive mixing as this can lead to polymer degradation. Use of gear or positive displacement pumps is recommended.

STORAGE & HANDLING

HYPERFLOC® AE 852 should be stored in a heated building, 5° - 35°C (40° - 95°F). If frozen, the product should be allowed to thaw completely and agitated prior to use. Storage in stainless steel, plastic or epoxy lined steel is recommended. Mild steel, iron, aluminum or copper are to be avoided in both storage and feed equipment. Bulk material should be mixed every 1 – 2 days using a low shear recirculating pump, bottom to top. Mixers can be used in drums or liqui-bins if necessary. Spills should be wiped up with an absorbent material and then washed down with a bleach solution.

Toxicity is low, but normal precautionary clothing should be worn when handling this material. For additional information, see relevant Material Safety Data Sheet.

SHIPPING

HYPERFLOC® AE 852 is shipped in 55 gallon non-returnable steel drums at 450 pounds net; in non-returnable liqui-bins at 2300 pounds net; or in bulk.



MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product: HYPERFLOC® AE 833, AE 843, AE 852, AE 853, AE 855, AE 863, AE 873, AE 874
AE 875, AE 877, AE 883, AE 843G, AE 852G, AE 853G, AE 873G, AE 899

Supplier: HYCHEM, INC.
10014 N. Dale Mabry Highway, Suite 213
Tampa, FL 33618

Current Revision Date: 2/7/06 **Last Revision Date:** 1/12/06

Emergency Telephone Numbers: (800) 327-2998 - Hychem, Inc. (weekdays)
(800) 424-9300 - Chemtrec (24 Hours)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Family: Anionic acrylamide copolymer emulsion in hydrocarbon oil.

Hazardous Components:

3. HAZARDOUS IDENTIFICATION

Spills produce extremely slippery surfaces.

4. FIRST AID MEASURES

Inhalation: Move to fresh air. Consult a physician in case of irritation or other symptoms.

Skin Contact: Wash off immediately with soap and plenty of water. In case of skin irritation, consult a physician.

Eye Contact: Rinse with plenty of water. If eye irritation persists, consult a specialist.

Ingestion: The product is not considered toxic based on studies on laboratory animals.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release, and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process unless specified in the text.

Product Name: HYPERFLOC® AE 833, AE 843, AE 852, AE 853, AE 855, AE 863, AE 873, AE 874
AE 875, AE 877, AE 883, AE 843G, AE 852G, AE 853G, AE 873G, AE 899

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media: Water, water spray, foam, dry powder, carbon dioxide (CO₂)

Special Fire-Fighting Precautions: Spills produce extremely slippery surfaces.

Special Protective Equipment for Firefighters: No special protective equipment required.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: No special precautions required.

Environmental Precautions: Avoid contaminating water.

Methods for Cleaning Up: Do not flush with water. Dam up. Soak up with inert absorbent material. If liquid has been spilled in large quantities clean up promptly by scoop or vacuum. Keep in suitable and closed containers for disposal. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin and eyes. When preparing the working solution ensure there is adequate ventilation. When using do not smoke.

Storage: Keep in a dry, cool place (0 - 30°C). When preparing the working solution ensure there is adequate ventilation. Freezing will affect the physical condition and may damage the material.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.

Personal Protection Equipment

- **Respiratory Protection:** In case of insufficient ventilation and/or misty conditions, wear NIOSH approved organic filter respirator
- **Hand Protection:** Rubber gloves.
- **Eye Protection:** Safety glasses with side shields. Do not wear contact lenses.
- **Skin and Body Protection:** Chemical resistant apron or protective suit if splashing or repeated contact with solution is likely.

Hygiene Measures: Wash hands before breaks and immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice.

Product Name: HYPERFLOC® AE 833, AE 843, AE 852, AE 853, AE 855, AE 863, AE 873, AE 874
AE 875, AE 877, AE 883, AE 843G, AE 852G, AE 853G, AE 873G, AE 899

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	Viscous liquid
Color:	Milky
Odor:	Aliphatic
pH:	6 - 8 @ 5 g/l for product series. See Technical Bulletin for specific value.
Melting Point (°C):	Not applicable
Flash Point (°C):	>212°F (100°C)
Autoignition Point (°C):	>392°F (200°C)
Vapor Pressure (mm Hg):	0.002 @ 68°F (20°C)
Bulk Density:	See Technical Bulletin
Water Solubility:	See Technical Bulletin
Viscosity (mPa s):	See Technical Bulletin

10. STABILITY AND REACTIVITY

Stability:	Product is stable, no hazardous polymerization will occur.
Materials to Avoid:	Oxidizing agents may cause exothermic reactions.
Hazardous Decomposition Products:	Thermal decomposition may produce: carbon oxides and nitrogen oxides (NO _x).

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

- **Oral:** LD50/oral/rat > 5000 mg/kg
- **Dermal:** The product is not toxic in contact with the skin.
- **Inhalation:** The product is not expected to be toxic by inhalation.

Irritation

- **Skin** May cause skin irritation with susceptible persons.
- **Eyes:** May cause eye irritation with susceptible persons.

Sensitization: The product is not expected to be sensitizing.

Chronic Toxicity: Prolonged skin contact may defat the skin and produce dermatitis.

Product Name: HYPERFLOC® AE 833, AE 843, AE 852, AE 853, AE 855, AE 863, AE 873, AE 874
AE 875, AE 877, AE 883, AE 843G, AE 852G, AE 853G, AE 873G, AE 899

12. ECOLOGICAL INFORMATION

Ecotoxicity

- **Fish:** LC50/Danio rerio/96 hours > 100 mg/L (OECD 203)
(Based on the toxicity of the components using the conventional method)
- **Algae:** IC50/ Scenedesmus subspicatus 72hr /> 100 mg/L (OECD 201)
(Based on the toxicity of the components using the conventional method)
- **Daphnia:** EC50 / Daphnia magna / 48 hr > 100mg/L (OECD 202)
(Based on the toxicity of the components using the conventional method)

Persistence / Degradability: Not readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: In accordance with federal, state and local regulations.

Contaminated Packaging: Rinse empty containers with water and use the rinse water to prepare the working solution. Can be landfilled or incinerated, when in compliance with local regulations.

14. TRANSPORT INFORMATION

Not regulated by the Department of Transportation

15. REGULATORY INFORMATION

All components of this product are on TSCA and DSL inventories.

RCRA status: Not a hazardous waste.

Hazardous Waste Number: Not applicable.

Reportable Quantity (40 CFR 302): Not applicable.

Threshold Planning Quantity (40 CFR 355): Not applicable.

HMIS & NFPA Ratings:	HMIS	NFPA
Health:	1	1
Flammability:	1	1
Reactivity:	0	0

California Proposition 65 Information: The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986: This product contains a chemical(s) known to the State of California to cause cancer: residual acrylamide.

16. OTHER INFORMATION

Person to Contact: A. Sands

Additional Information for Adequacy Review of April 12, 2015

1. Neither the sluice tails pond or the lower pond are lined with an engineered liner. However, it is believed that both ponds do not have any significant connection to the River. This is based on the fact that both ponds have considerable fine material from the sluice operation over the past year that has settled in the bottom of both ponds. Cleanout of the ponds occurs on an ongoing basis to provide volume for settling but the cleanout never reaches the bottom. Therefore, there is a minimum of 2 feet of silt and clay mixture at the bottom of both ponds which is not cleaned out. This material serves to line the ponds and prevent connection to the River. This fact is further supported by the observation that the ponds do not drop in water level when the sluice operation is stopped. There may be some evaporation and minor infiltration but it is minimal.

It is also known that the ponds cannot be receiving spring water to any significant degree since the water table is at least 15-20 feet below the bottom of the ponds. This was determined by excavation to the north of the sluice tails pond, where the mining excavation is occurring in May of 2015.

2. One 55 gallon drum of the Hyperfloc will be stored on site at any one time.
3. The Hyperfloc will be stored in the drum within 50 feet of the sluice so that it can be mixed and applied to the sluice tails within a short distance. See attached TR-1 Map.
4. Water flows from the sluice into a ditch which carries the water by gravity to the sluice tails pond. This pond overflows into a culvert under the access road into the lower pond. The lower pond is in the form of a narrow U shape which allows settling of the fines. As shown on the TR-1 Map, the upper pond has a pump in the northeast corner which recycles water back to the sluice.
5. The 55 gallon drum and all mixing apparatus will be in a secondary containment as described in the narrative. In addition, a standard 55 gallon drum spill kit will be placed on site to be rapidly employed in case a spill of the flocculent were to occur. All employees will be trained to check for spills of the flocculent and trained in the use of the spill kit. In addition, DRMS, CDPHE and Park County Department of Health will be immediately notified if any spill occurs from the flocculent.

6. As described in Item 1 above, the groundwater table was identified to be 15-20 feet below the level of the bottom of both the sluice tails pond and the lower pond in the current excavation area, which is approximately 500 feet north of the culvert between the two ponds. If groundwater from the hillside was entering the ponds, the level of water 500 feet to the north should be higher, not lower than the level of the ponds. Since the material below the ponds is relatively porous gravel, groundwater from the hillside must be flowing underneath the ponds. As stated above, this is further supported by the fact that the silt/clay that has been deposited in the ponds from the operation has acted to seal the ponds.

7. As seen in the aerial image on the following page, if water were to overflow from the lower pond, it would enter the lower shrub area south of the lower pond, which is east of Highway 9. This area is only a few feet lower than the surrounding area but it is large enough to contain all overflow from the lower pond in the permit area. Also, the Middle Fork of the S Platte River is more than 2100 feet to the southwest of the lower pond, along a typical flow line of water to the River.



Notes:
1) Image from Google 9/27/2013
2) Map shows only the lower portion of the permit area.

Greg Lewicki
5/20/15



Revisions	BY	DATE	DES	GL	DATE
			DRN	GL	5/20/15
			CHK	GL	
			APPD	GL	

SCALE
1" = 100'

 **Greg Lewicki And Associates**
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TR-01 Map **RECEIVED**
Hector Placer
IGWT Mining, Inc.
MAY 21 2015
DIVISION OF RECLAMATION
MINING AND SAFETY
M-2011-009

GREG LEWICKI & ASSOCIATES
11541 WARRINGTON COURT
PARKER, CO 80138

MIKE CUNNINGHAM
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1313 SHERMAN STREET 2ND FLOOR
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