APPENDIX D

LETTERS

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APPENDIX D

LETTER NO. 1

CLARIFICATION OF HDPE PIPE SPECIFICATIONS
February 21, 2013

City of Los Angeles
Bureau of Engineering
1149 South Broadway Street, Suite 120
Los Angeles, California 90015

Attn: Mr. Mark Oborne

RE: CLARIFICATION OF HDPE PIPE SPECIFICATIONS, WHITE POINT DEWATERING PROJECT, LOS ANGELES, CA

This letter presents our response to a request by Mr. Robert Lackaye, City Inspector for the White Point Dewatering Project (Project), to describe the HDPE pipe specifications for drain installation at the Project.

SPECIFICATIONS

Hayward Baker, Inc. (HBI) provided a submittal on January 9, 2013 entitled “HDPE Pipe Materials HDPE – White Point Landslide” concerning the HDPE pipe HBI intended to install as dewatering drains at the Project. The submittal referenced the final plans and specifications prepared by Shannon & Wilson on December 18, 2012. The plans and specifications stated “The pipe shall be transversely slotted at 0.06 inches (60-slot) increments” under Part 2, Section 2.01, and Paragraph B. Shannon & Wilson specified that the pipe be slotted transversely to the long pipe axis with a slot thickness of 0.06 inches (60-thousandths of one inch).

MODIFICATIONS TO THE SPECIFICATIONS

In the HDPE pipe submittal, HBI calculated pipe tensile strength using longitudinal slotting instead of transverse slotting. The City, HBI, and S&W discussed the modification to slotting direction in a conference call on January 23, 2013. During the discussion, HBI indicated that the tensile capacity of transversely slotted pipe would be inadequate for the required installation loading. HBI alternatively proposed longitudinal pipe slotting at 4.3% open area in accordance
with the pipe manufacturer’s recommendations. Shannon & Wilson accepted the design modification in an e-mail to the City dated January 24, 2013 (attached).

Respectfully,

SHANNON & WILSON, INC.

[Signature]

for R. Travis Deane, P.E., G.E.
Senior Associate

JZB:RTD/jzb

c: Mr. Christopher Johnson, City of Los Angeles (electronic copy only)

Enc: January 24, 2013 e-mail to Mark Oborne of the City of Los Angeles
Mark,

Shannon & Wilson accepts the longitudinally slotted product pipe proposed by HBI on our conference call yesterday. We prefer to use the 4.3% open area pipe HBI originally proposed. If this pipe proves inadequate for tensile loading according to the bench test, we recommend following Maskell’s recommendation of 3.0% open area.

Jason

---------- Forwarded message ----------
From: Johnson, Matthew <MGJohnson@haywardbaker.com>
Date: Wed, Jan 23, 2013 at 2:24 PM
Subject: FW: Mill slot pipe
To: "Mark Oborne (mark.oborne@lacity.org)" <mark.oborne@lacity.org>

Attached is a sample of the HDPE pipe being prepped for testing.

Matt Johnson | Project Manager
Hayward Baker Inc.
tel: 805-933-1331 | email: mgjohnson@haywardbaker.com

-----Original Message-----
From: Henri, Chase
Sent: Wednesday, January 23, 2013 2:16 PM
To: Johnson, Matthew
Subject: FW: Mill slot pipe

-----Original Message-----
From: Tim Nelson [mailto:tim@maskellpipe.com]
Sent: Tuesday, January 22, 2013 3:39 PM
To: Henri, Chase
Subject: FW: Mill slot pipe

Chase

Per your request

-----Original Message-----
From: Dwight Becker [mailto:DBecker@bearism.com]
Sent: Tuesday, January 22, 2013 3:22 PM
To: tim@maskellpipe.com
Subject: Mill slot pipe

This e-mail (including any attachments to it) is intended solely for the use of the individual(s) or entity named above. It may contain confidential or privileged information. If you are not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify the sender immediately and delete the original message.
APPENDIX D
LETTER NO. 2
FLUID DISCHARGE AT HORIZONTAL DIRECTIONAL DRILLING (HDD) BREAKOUT
March 4, 2013

City of Los Angeles
Bureau of Engineering
1149 South Broadway Street, Suite 120
Los Angeles, California 90015

Attn: Mr. Mark Oborne

RE: FLUID DISCHARGE AT HORIZONTAL DIRECTIONAL DRILL (HDD) BREAKOUT, WHITE POINT DEWATERING PROJECT, LOS ANGELES, CA

This letter presents our response to a request by Mr. Mark Oborne, Project Manager for the White Point Dewatering Project (Project), to clarify our observations of the turbid discharge observed during the exit of HDD performed by Hayward Baker (HBI) from the slope face on February 28, 2013.

FIELD OBSERVATIONS

The Shannon & Wilson field activity report (FAR) dated February 28, 2013 (attached) states:

Beginning at 12:00, with 25 LF of drilling to exit, HBI and I observed small plumes of turbid discharge in ocean water (Photo 2). The discharge originated from between 5 to 10 points underwater and located directly seaward from the proposed HDD exit location. The cumulative discharge totaled approximately 1-2 gallons per minute (gpm). Immediately after HBI and I discovered the discharge, VDD reduced drilling mud pressure and drilled the final 25 LF pumping only enough mud to turn the tri-cone bit. HBI instructed VDD to drill as rapidly as possible, regardless of inclination, to quickly break out of the slope and alleviate the fluid pressure.

The plumes noted above appeared 30 feet from the slope face, while the drill bit was 30 LF from breakout. Shannon & Wilson additionally observed no obvious sheen or slippery feeling in the discharged fluid. The discharge slowed after HBI broke out of the slope and stopped altogether an hour following breakout.

DRILLING POLYMER

Ventura Directional Drilling (VDD) used the drilling polymer PureGold Clean Drill to create drilling fluid required to maintain borehole integrity and promote cuttings return to the upper drill pit. PureGold is a biodegradable, bentonite free polymer typically used to drill groundwater...
wells. The specifications are attached to this letter. VDD typically mixed thicker, more viscous polymer than recommended by the manufacturer to seal several zones of discontinuities encountered during drilling and promote cuttings return to the upper drill pit.

**FLUID DISCHARGE**

Based on our observations, the properties of the fluid discharge observed during HDD breakout were not consistent with the properties of the thick, viscous polymer used by VDD. In addition, the viscous polymer is intended to adhere to soil and rock particles and create a filter cake around the borehole and seal discontinuities. While some penetration of the polymer into the rock mass is likely to occur, in our opinion it is unlikely the polymer migrated through 30 feet of fractured rock and 30 feet of beach deposits to discharge into ocean waters.

In our opinion, the fluid discharge was more likely composed of groundwater that discharged due to temporarily increased hydrostatic conditions associated with standard HDD operation. VDD generally operated under annular fluid pressures of 50 psi to help keep the borehole open and return cuttings to the upper drill pit. This pressure likely increased the existing hydrostatic pressure in the ground around the HDD borehole, resulting in a temporary increase in the groundwater flow gradient, which may have resulted in temporary increased turbidity and flow.

Respectfully,

SHANNON & WILSON, INC.

R. Travis Deane, P.E., G.E.
Senior Associate

JZB:DCW:RTD/jzb
City of Los Angeles  
Attn: Mr. Mark Oborne  
March 4, 2013  
Page 3 of 1

c: Mr. Christopher Johnson and Mr. Gene Edwards, City of Los Angeles (electronic copy only)

Enc: February 28, 2013 FAR No. 11 (8 pages)  
PureGold Clean Drill Specifications (6 pages)
CONSTRUCTION OBSERVATIONS

No. | Topic and Location | Description of Field Activity, Observations and Recommendations to Owner | Further Action Recommended to Owner
--- | --- | --- | ---
1 | Personnel | Personnel on site included Doug Hargrath, Chase Henri, Matt Johnson, four laborers, and two crane operators from HBI; four drillers, and two ProGuide HDD surveyors from VDD; and Rolando Baga from the City of Los Angeles (City Inspector). Mark Oborne from the City of Los Angeles and Travis Deane from Shannon & Wilson (S&W) arrived shortly after noon and departed around 15:00. | None.
2 | HDPE Pipe | HBI delivered HDPE pipe to the site around 08:30. I observed that the pipe slotting thickness was approximately 0.030 to 0.040 inches, which is less than 0.060 inches as required on the plans and specifications. I recommended to the City Inspector that the pipe be rejected. The City Inspector agreed and rejected the pipe. Note: HBI did not install the rejected HDPE pipe in drain D-2 (see attached). The pipe HBI installed in drain D-2 was delivered to the site and fused during the previous week’s work. | None.
3 | Correction | The previous field activity report (2/27/13) indicated that VDD advanced to 530 LF before halting drilling operations for that day. This statement was incorrect. VDD halted drilling at 493 LF on 2/27/13. | None.
4 | Drilling | VDD began drilling the final 100 LF of boring shortly before 08:00. I observed that VDD maintained an inclination of <89.3° for the first 60 LF of drilling. VDD repeatedly swabbed the borehole, stating that the swabbing was necessary to achieve the required inclination. ProGuide indicated drilling at that inclination will result in >1% slope, which satisfies the plans and specifications. At 09:30, after VDD completed the first 60 LF of drilling, I departed the drill staging area and relocated to the beach. | None.
5 | Break Out | I began observing the slope face at the beach at 09:45. I did not observe slope instability or drilling mud discharge from 09:45 to 11:45, while VDD drilled 10 LF and repeatedly swabbed that section. HBI reported that VDD was able to hold the inclination angle at <89° during that section of drilling. At around 10:30 I observed HBI move the steel sheeting into place to block drilling mud discharged from the beach. | None.

LIMITATIONS: The Shannon & Wilson field representative is present on site solely to observe the field activities of the contractor identified and keep our client informed of the progress and quality of the work. The presence and activities of the Shannon & Wilson field representative and our acceptance of any non-conforming work or failure to reject any non-conforming work does not relieve the contractor from complying with its contract documents. Shannon & Wilson does not have the authority to direct the contractor’s work. Any information provided by the Shannon & Wilson field inspector is intended solely to advise the contractor of the technical requirements of the plans and specifications and/or design concept. The contractor is solely responsible for its means, methods, sequences, construction site safety, quality of work, and adherence to the contract documents.
CONSTRUCTION OBSERVATIONS (continued)

<table>
<thead>
<tr>
<th>NO.</th>
<th>TOPIC AND LOCATION</th>
<th>DESCRIPTION OF FIELD ACTIVITY, OBSERVATIONS AND RECOMMENDATIONS TO OWNER</th>
<th>FURTHER ACTION RECOMMENDED TO OWNER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>borehole under pressure (Photo 1). Beginning at 12:00, with 25 LF of drilling to exit, HBI and I observed small plumes of turbid discharge in ocean waters (Photo 2). The discharge originated from between 5 to 10 points underwater and located directly seaward from the proposed HDD exit location. The cumulative discharge totaled approximately 1-2 gallons per minute (gpm). Immediately after HBI and I discovered the discharge, VDD reduced drilling mud pressure and drilled the final 25 LF pumping only enough mud to turn the tri-cone bit. HBI instructed VDD to drill as rapidly as possible, regardless of inclination, to quickly break out of the slope and alleviate the fluid pressure. VDD broke out of the slope at 12:30 at elevation 9.4 (Photo 3). Drilling mud discharged from of the borehole at 6 to 8 gpm and flowed into the containment (Photo 4). HBI intermittently pumped out the containment area as needed and continued to contain fluid discharging from the borehole for the remainder of the day (Photo 5). After the flow of drilling mud stabilized, HBI removed the tri-cone bit from the drill head and installed the pipe pulling tool.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Grouting Length</td>
<td>Around 14:00, S&amp;W recommended to the City that HBI install unslotted pipe for the final 60 LF of drain nearest the current exit point. S&amp;W also recommended that HBI seal the final 55 LF of borehole annulus with grout. This recommendation constitutes a variance to the plans and specifications, which calls for only 20 LF of unslotted pipe and 15 LF of borehole seal. S&amp;W recommended this variance to seal the existing discontinuities VDD encountered in the final 25 LF of drilling, as evidenced by the turbid groundwater discharge. The increase in grouting length will provide a barrier between groundwater discharging from the HDPE drain and the existing discontinuities. The City verbally agreed to the variance at 14:15 and directed HBI to perform the work. I observed HBI cutting and fusing the recommended 60 LF of unslotted HDPE pipe on the pipe string.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>HDPE Pull Back</td>
<td>HBI began pulling pipe back through the drilled borehole beginning at 17:30 (Photo 6). HBI moved the pipe into position through a combination of manual labor at the beach and a mini-excavator stationed in the graben. VDD reported that tensile loads when pulling the pipe were generally no greater than the weight of the rods (Photo 7). HBI concluded pullback operations around 20:30 (Photo 8).</td>
<td></td>
</tr>
</tbody>
</table>

ATTACHMENTS

C-4.0 (Drain Plan) (Note: Drain numbering reconfigured to match HBI convention)
C-6.0 (Drain Profile) (Note: Drain numbering reconfigured to match HBI convention)

LIMITATIONS: The Shannon & Wilson field representative is present on site solely to observe the field activities of the contractor identified and keep our client informed of the progress and quality of the work. The presence and activities of the Shannon & Wilson field representative and our acceptance of any non-conforming work or failure to reject any non-conforming work does not relieve the contractor from complying with its contract documents. Shannon & Wilson does not have the authority to direct the contractor’s work. Any information provided by the Shannon & Wilson field inspector is intended solely to advise the contractor of the technical requirements of the plans and specifications and/or design concept. The contractor is solely responsible for its means, methods, sequences, construction site safety, quality of work, and adherence to the contract documents.
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CONSTRUCTION OBSERVATIONS (continued)

Photo 5: Containment Area Post-Breakout

Photo 6: Pulled Pipe Section
LIMITATIONS: The Shannon & Wilson field representative is present on site solely to observe the field activities of the contractor identified and keep our client informed of the progress and quality of the work. The presence and activities of the Shannon & Wilson field representative and our acceptance of any non-conforming work or failure to reject any non-conforming work does not relieve the contractor from complying with its contract documents. Shannon & Wilson does not have the authority to direct the contractor’s work. Any information provided by the Shannon & Wilson field inspector is intended solely to advise the contractor of the technical requirements of the plans and specifications and/or design concept. The contractor is solely responsible for its means, methods, sequences, construction site safety, quality of work, and adherence to the contract documents.
TECHNICAL DATA

PUREGOLD® CLEANDRILL
BIODEGRADABLE DRILLING FLUID

DESCRIPTION
PUREGOLD CLEANDRILL is a bentonite free powder designed for special conditions associated with drilling horizontal directional recovery wells for groundwater remediation. PUREGOLD CLEANDRILL maintains formation permeability and porosity.

RECOMMENDED USE
PUREGOLD CLEANDRILL is designed for use in drilling operations where bentonite based drilling fluids are restricted and a biodegradable drilling fluid is recommended.

CHARACTERISTICS
- Decreases filtration rate in unconsolidated formations
- Elevated yield point and gel strength for efficient cutting suspension and transport
- Enhanced viscosity for efficient borehole cleaning
- Improved borehole stability for easy well installation
- Increases recovery rate of contaminants during remediation
- Preserves porosity and permeability of formation
- Soluble in water, and disperses easily with moderate shear

MIXING AND APPLICATION
PUREGOLD CLEANDRILL is compatible with a wide range of make-up waters. Add slowly and uniformly through a high shear jet-type mixer over one or more cycles of the volume of slurry. Continue to mix and agitate the slurry until all ingredients are dispersed. PUREGOLD CLEANDRILL breaks down chemically by adding calcium hypochlorite or LEB-CD.

PROPERTIES

<table>
<thead>
<tr>
<th>Properties</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Tan powder, odorless</td>
</tr>
<tr>
<td>Density</td>
<td>35-45 lbs/ft³</td>
</tr>
<tr>
<td></td>
<td>(0.56-0.72 kg/l)</td>
</tr>
<tr>
<td>pH (2% slurry in water)</td>
<td>7.0-7.5</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.2</td>
</tr>
</tbody>
</table>

PACKAGING
50 lb (22.7 kg) bag, 40 per pallet. All pallets are plastic-wrapped.

| Normal consolidated formations | 8 to 15 pounds per 100 gallons water (3.5 to 6.5 lbs/bbl) |
| Unconsolidated formations     | 12 to 27 pounds per 100 gallons water (5 to 9 lbs/bbl)    |
|                              | 5.5 to 12 kg per 380 liters water (2.5 to 4 kg/bbl)       |
1. Product and Company Identification

Material name: PUREGOLD® CLEAN DRILL
Version #: 02
Revision date: 27-September-2010
Chemical description: Proprietary Carbohydrate Blend
Manufacturer information: CETCO
Drilling Products Group
2870 Forbes Avenue
Hoffman Estates, IL 60192 US
safetydata@amcol.com
http://www.cetco.com/
General Information (800) 527-9948
CHEMTREC® (800) 424-9300

2. Hazards Identification

Emergency overview: Material can be slippery when wet. Product may form explosive dust/air mixtures if high concentration of product dust is suspended in air.

OSHA regulatory status: While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Potential health effects:

Routes of exposure: Eye contact Inhalation.

Eyes: Dust or powder may irritate eye tissue. Symptoms include itching, burning, redness and tearing.

Skin: Substance may cause slight skin irritation. No components in this product are known to be absorbed through the skin.

Inhalation: Inhalation of dusts may produce respiratory irritation and may cause allergic respiratory sensitization reactions.

Ingestion: Ingestion of this product may cause blockage of the mouth, pharynx, trachea, esophagus, and the gastrointestinal system, which may cause choking, suffocation, or other life threatening medical conditions.

3. Composition / Information on Ingredients

The manufacturer lists no ingredients as hazardous according to OSHA 29 CFR 1910.1200.

Composition comments: Occupational Exposure Limits for constituents are listed in Section 8.

4. First Aid Measures

First aid procedures:

Eye contact: Immediately flush eyes with plenty of water for at least 20 minutes. Get medical attention if irritation develops or persists.

Skin contact: Wash affected area with mild soap and water. Get medical attention if irritation develops or persists.

Inhalation: If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop.

Ingestion: Get medical attention immediately.

Notes to physician: Provide general supportive measures and treat symptomatically.

General advice: If you feel unwell, seek medical advice (show the label where possible).

5. Fire Fighting Measures

Flammable properties: Dust concentrations greater than 0.04 oz/ft³ may ignite at 590° C or when exposed to ignition source.

Extinguishing media:

Suitable extinguishing media: Dry chemical, CO2, water spray or regular foam.
6. Accidental Release Measures

Personal precautions
Material can be slippery when wet. Forms smooth, slippery surfaces on floors, posing an accident risk. Ensure adequate ventilation. Avoid inhalation of dust from the spilled material. Wear a dust mask if dust is generated above exposure limits. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Environmental precautions
Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage if safe to do so.

Methods for containment
Stop leak if you can do so without risk.

Methods for cleaning up
Sweep up or gather material and place in appropriate container for disposal. Avoid the generation of dusts during clean-up.

7. Handling and Storage

Handling
Material can be slippery when wet. Keep formation of airborne dusts to a minimum. Take measures to prevent the build up of electrostatic charge. Provide appropriate exhaust ventilation at places where dust is formed. Refer to NFPA Pamphlet No. 654, "Prevention of Fire and Dust Explosions in the Chemical, Dye, Pharmaceutical, and Plastics Industries."

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Guard against dust accumulation of this material. Keep out of the reach of children.

8. Exposure Controls / Personal Protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>ACGIH Constituents</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
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<tbody>
<tr>
<td>INERT OR NUISANCE DUST (SEQ250)</td>
<td>TWA</td>
<td>3.0000 mg/m³</td>
<td>Respirable particles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.0000 mg/m³</td>
<td>Inhalable particles.</td>
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<table>
<thead>
<tr>
<th>U.S. - OSHA Constituents</th>
<th>Type</th>
<th>Value</th>
<th>Form</th>
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<tbody>
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<td>INERT OR NUISANCE DUST (SEQ250)</td>
<td>PEL</td>
<td>5.0000 mg/m³</td>
<td>Respirable fraction.</td>
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<tr>
<td></td>
<td></td>
<td>15.0000 mg/m³</td>
<td>Total dust.</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>5.0000 mg/m³</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.0000 mg/m³</td>
<td>Total dust.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50.0000 mppcf</td>
<td>Total dust.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.0000 mppcf</td>
<td>Respirable fraction.</td>
</tr>
</tbody>
</table>

Engineering controls
Ensure adequate ventilation, especially in confined areas. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. If engineering measures are not sufficient to maintain concentrations of dust particulates below the OEL, suitable respiratory protection must be worn.

Personal protective equipment

Eye / face protection
Wear dust goggles.

Skin protection
Normal work clothing (long sleeved shirts and long pants) is recommended.

Respiratory protection
Use a particulate filter respirator for particulate concentrations exceeding the Occupational Exposure Limit.

General hygiene considerations
Use good industrial hygiene practices in handling this material. Wash hands before breaks and immediately after handling the product.

9. Physical & Chemical Properties

Appearance
Powder.

Color
Off-white.

Odor
Flour-like.

Odor threshold
Not available.

Physical state
Solid.

Form
Not available.
pH 5 - 8
Melting point/Freezing point Decomposes
Boiling point Not available.
Flash point > 199.4 °F (> 93 °C)
Evaporation rate Not available.
Flammability limits in air, upper, % by volume Not available.
Flammability limits in air, lower, % by volume Not available.
Vapor pressure Not available.
Vapor density Not available.
Specific gravity Not available.
Relative density Not available.
Solubility (water) Complete
Partition coefficient (n-octanol/water) Not available.
Auto-ignition temperature Not available.
Decomposition temperature Not available.
VOC 0 % estimated
Percent volatile 0 % estimated

10. Chemical Stability & Reactivity Information
Chemical stability Stable at normal conditions.
Conditions to avoid Heat, flames and sparks. Dust cloud ignition temperature 590°C.
Incompatible materials Strong oxidizing agents.
Hazardous decomposition products Upon decomposition, this product emits carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.
Possibility of hazardous reactions Will not occur.

11. Toxicological Information
Toxicological data
Product Test Results
PUREGOLD® CLEAN DRILL Acute Oral LD50 Hamster: 6000 mg/kg estimated
Acute Oral LD50 Mouse: 8100 mg/kg estimated
Acute Oral LD50 Rabbit: 7000 mg/kg estimated
Sensitization May cause sensitization of susceptible persons by inhalation of aerosol or dust.
Local effects Product dust may be irritating to eyes, skin and respiratory system.
Chronic effects Prolonged skin contact may cause skin irritation and/or dermatitis. Overexposure to dusts may result in pneumoconiosis, a lung disease due to permanent deposition of substantial amounts of particulate matter in the lungs.
Carcinogenicity Not listed by ACGIH, IARC, NIOSH, NTP OR OSHA.
Mutagenicity No data available for this product.
Teratogenicity No data available for this product.

12. Ecological Information
Ecotoxicological data
Product Test Results
PUREGOLD® CLEAN DRILL LC50 Fish: 218 mg/l 96.00 hours estimated
Ecotoxicity This product is not expected to produce significant ecotoxicity upon exposure to aquatic organisms and aquatic systems. No data is available on the product itself.
Environmental effects No data available for this product.
Persistence and degradability Not available.
13. Disposal Considerations

Disposal instructions
Dispose in accordance with all applicable regulations. Do not allow this material to drain into sewers/water supplies.

14. Transport Information

DOT
Not regulated as dangerous goods.

15. Regulatory Information

US federal regulations
OSHA Process Safety Standard: This material is not known to be hazardous by the OSHA Highly Hazardous Process Safety Standard, 29 CFR 1910.119.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

Section 302 extremely hazardous substance
No

Section 311 hazardous chemical
No

Food and Drug Administration (FDA)
GRAS additive

Inventory status

| Country(s) or region | Inventory name                                                                 | On inventory (yes/no) *
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<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
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<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
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<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
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<td>China</td>
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<td>European List of Notified Chemical Substances (ELINCS)</td>
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<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
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<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
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<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A “Yes” indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations
This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

16. Other Information

Further information
This safety datasheet only contains information relating to safety and does not replace any product information or product specification.

HMIS ratings

![HMIS ratings image](image-url)
NFPA ratings

Disclaimer

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 a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The manufacturer expressly does not make any representations, warranties, or guarantees as to its accuracy, reliability or completeness nor assumes any liability, for its use. It is the user’s responsibility to verify the suitability and completeness of such information for each particular use.

Third party materials: Insofar as materials not manufactured or supplied by this manufacturer are used in conjunction with, or instead of this product, it is the responsibility of the customer to obtain, from the manufacturer or supplier, all technical data and other properties relating to these and other materials and to obtain all necessary information relating to them. No liability can be accepted in respect of the use of this product in conjunction with materials from another supplier. 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.

Issue date

27-September-2010

This data sheet contains changes from the previous version in section(s):

Regulatory Information: United States