

Environmental, Planning, and Engineering Consultants

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April 24, 2018

Mr. Matthew Hubicki Project Manager NYSDEC Division of Environmental Remediation 625 Broadway, 12th Floor Albany, New York 12233-7016

Subject: Enhanced Bioremediation Design Package – Submittal #5

Polychrome West (C360099)

City of Yonkers, Westchester County

BCP Site Number C360099

Dear Mr. Hubicki:

The following Submittal #5, prepared by AKRF, Inc. on behalf of Avalon Yonkers Sun Sites, LLC (AVB), provides additional detail regarding the Enhanced Bioremediation Design Package identified in the Polychrome West Remedial Action Workplan (RAWP). The Polychrome West Site is located at 137-145 Alexander Street in Yonkers, New York (the "site"). Section 3.7.6 and Section 3.9 of the RAWP identify that oxygen release compound (ORC) is to be placed in areas with visible shallow non-aqueous phase liquid (NAPL).

ORC placement is as a supplemental remedial strategy for the upcoming excavation work associated Excavation Area H, Exaction Area I and the ATI Peninsula, where NAPL impacts in soil borings and test pits are documented. During remedial excavation activities in these areas, the remedial contractor will place ORC into the bottom of the excavations with observed NAPL or NAPL impacted soil. The type of ORC proposed is ORC Advanced® Pellets, which are a pellet formulation of calcium oxyhydroxide. The ORC Advanced® Pellets release oxygen and form simple calcium hydroxide and water upon hydration. This specific formulation of ORC is designed to release oxygen into the formation for 6 to 9 months and for direct application into open excavations. Additional information regarding this product is in the technical specification and safety data sheet (SDS) enclosed as Attachment A. AVB is currently anticipating the placement of approximately 1,000 lbs. of ORC Advanced® Pellets.

Please confirm if the proposed modifications will meet the ORC requirements outlined in Sections 3.7.6 and 3.9 as well as the submittal requirement in Section 6.2 of the RAWP.

Please contact me at (914) 922 -2356 or Patrick McHugh at (914) 922-2387, if you have any questions or require additional information.

Sincerely, AKRF, Inc.

Marc S. Godick, LEP Sr. Vice President

cc: David Crosby – NYSDEC Scott Deyette – NYSDEC Aaron Levy – AVB Barry White – AVB

Christopher Capece - AVB Patrick McHugh - AKRF Steven Grens – AKRF

Enclosures:

Attachment A – ORC Advanced® Technical Specifications and SDS



ORC Advanced® Pellets Technical Specification

ORC Advanced Pellets are a dust-minimizing, dry application, pelletized form of the widely-used ORC Advanced controlled-release oxygen compound.

They are designed specifically for the treatment of dissolved-phase petroleum hydrocarbons through direct application into excavations, petroleum storage tank pits, trenches and backfill.

Oxygen is released from ORC Advanced for a period of 9 to 12 months in situ.



 $CaO(OH)_2 + H_2O \rightarrow \frac{1}{2}O_2 + Ca(OH)_2 + H_2O$ Example

Example of ORC Advanced Pellets

ORC Advanced is a formulation of calcium oxyhydroxide which, upon hydration, releases oxygen and forms simple calcium hydroxide and water.

For a list of treatable contaminants with the use of ORC Advanced, view the Range of Treatable Contaminants Guide.

Chemical Composition

- Calcium Oxyhydroxide
- Calcium Hydroxide
- Monopotassium Phosphate
- Ammonium Phosphate Dibasic

Properties

- Pellet size: 3-10 mm
- Contains micro-nutrients such as nitrogen, phosphorous, and potassium (N,P,K) which can be beneficial to aerobic biodegradation processes



ORC Advanced® Pellets Technical Specification

Storage and Handling Guidelines

Storage

Store in a cool, dry place out of direct sunlight

Store in original tightly closed container

Store in a well-ventilated place

Do not store near combustible materials

Store away from incompatible materials

Provide appropriate exhaust ventilation in places where dust is formed

Handling

Minimize dust generation and accumulation

Keep away from heat

Routine housekeeping should be instituted to ensure that dust does not accumulate on surfaces

Observe good industrial hygiene practices

Take precaution to avoid mixing with combustibles

Keep away from clothing and other combustible materials

Avoid contact with water and moisture

Avoid contact with eyes, skin, and clothing

Avoid prolonged exposure

Wear appropriate personal protective equipment

Applications

- In situ or ex situ out of the bag
- Direct application into open excavations, petroleum storage tank pits and trenches
- Direct application to contaminated backfill or contaminated soils
- Ex situ biopile applications (requires a source of hydration)

Health and Safety

Wash thoroughly after handling. Wear protective gloves, eye protection, and face protection. Please review the Material Safety Data Sheet for additional storage, usage, and handling requirements here: <u>ORC Advanced SDS</u>.





SAFETY DATA SHEET

1. Identification

Product identifier Oxygen Release Compound Advanced (ORC Advanced®)

Other means of identification Non

Recommended use Soil and Groundwater Remediation.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Regenesis

Address 1011 Calle Sombra

San Clemente, CA 92673

Telephone 949-366-8000

E-mail CustomerService@regenesis.com

Emergency phone number CHEMTREC® at 1-800-424-9300 (International)

2. Hazard(s) identification

Physical hazardsOxidizing solidsCategory 2Health hazardsSkin corrosion/irritationCategory 1

Serious eye damage/eye irritation Category 1

OSHA defined hazards Not classified.

Label elements



Signal word Danger

Hazard statement May intensify fire; oxidizer. Causes skin irritation. Causes serious eye damage.

Precautionary statement

Prevention Keep away from heat. Keep/Store away from clothing and other combustible materials. Take any

precaution to avoid mixing with combustibles. Wash thoroughly after handling. Wear protective

gloves/eye protection/face protection.

Response If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes.

Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. In case of fire: Use appropriate media to extinguish.

clothing and wash before reuse. In case of file, ose appropriate in

Storage Store away from incompatible materials.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)

None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Calcium hydroxide oxide	682334-66-3	≥85
Calcium hydroxide	1305-62-0	≤15
Dipotassium Phosphate	7758-11-4	<5
Monopotassium Phosphate	7778-77-0	<5

Composition comments All concentrations are in percent by weight unless otherwise indicated.

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4. First-aid measures

Inhalation

Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact

IF ON CLOTHING: rinse immediately contaminated clothing and skin with plenty of water before removing clothes. Rinse skin with water/shower. If skin irritation occurs: Get medical

advice/attention. Wash contaminated clothing before reuse.

Eye contact

Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Ingestion

Never give anything by mouth to a victim who is unconscious or is having convulsions. Rinse mouth. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Dusts may irritate the respiratory tract, skin and eyes. Skin irritation. May cause redness and pain.

Indication of immediate medical attention and special treatment needed

Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information

Take off all contaminated clothing immediately. Contact with combustible material may cause fire. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media Unsuitable extinguishing media Water spray, fog (flooding amounts). Foam. Dry chemical powder. Carbon dioxide (CO2). None known.

Specific hazards arising from the chemical

Greatly increases the burning rate of combustible materials. Containers may explode when heated. During fire, gases hazardous to health may be formed. Combustion products may include: metal oxides.

Special protective equipment and precautions for firefighters

Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions

In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk. Use water spray to cool unopened containers.

Specific methods
General fire hazards

Cool containers exposed to flames with water until well after the fire is out. May intensify fire; oxidizer. Contact with combustible material may cause fire.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep away from clothing and other combustible materials. Wear appropriate protective equipment and clothing during clean-up. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Collect dust using a vacuum cleaner equipped with HEPA filter. Keep combustibles (wood, paper, oil, etc.) away from spilled material. Ventilate the contaminated area. Stop the flow of material, if this is without risk. Absorb in vermiculite, dry sand or earth and place into containers.

Large Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Shovel the material into waste container. Minimize dust generation and accumulation. Avoid the generation of dusts during clean-up. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. Place all material into loosely covered plastic containers for later disposal. For waste disposal, see section 13 of the SDS. Wear appropriate protective equipment and clothing during clean-up.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

SDS US

7. Handling and storage

Precautions for safe handling

Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Keep away from heat. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from clothing and other combustible materials. Take any precaution to avoid mixing with combustibles. Avoid contact with water and moisture. Do not get this material in contact with eyes. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep away from heat. Store in a cool, dry place out of direct sunlight. Store in original tightly closed container. Store in a well-ventilated place. Do not store near combustible materials. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Туре	Value	Form
Calcium hydroxide (CAS 1305-62-0)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
US. ACGIH Threshold Limit Value	es		
Components	Туре	Value	
Calcium hydroxide (CAS 1305-62-0)	TWA	5 mg/m3	
US. NIOSH: Pocket Guide to Che	mical Hazards		
Components	Туре	Value	
Calcium hydroxide (CAS	TWA	5 mg/m3	

Biological limit values

1305-62-0)

Appropriate engineering

controls

No biological exposure limits noted for the ingredient(s).

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If engineering measures are not sufficient to maintain concentrations of dust particulates below the Occupational Exposure Limit (OEL), suitable respiratory protection must be worn. 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. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Use dust-tight, unvented chemical safety goggles when there is potential for eye contact.

Skin protection

Hand protection Wear appropriate chemical resistant gloves. Frequent change is advisable. Recommended gloves

include rubber, neoprene, nitrile or viton.

Other Wear appropriate chemical resistant clothing.

Respiratory protection If engineering controls do not maintain airborne concentrations below recommended exposure

limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Recommended use: Wear respirator with

dust filter.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Keep from contact with clothing and other combustible materials. Remove and wash contaminated clothing promptly. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical stateSolid.FormPowder.

Color White to pale yellow.

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Odor Odorless.

Odor threshold Not available.

pH 12.5 (3% suspension/water)

Melting point/freezing point Not available.

Initial boiling point and boiling Not available.

range

Not available.

Flash point

Evaporation rate

Flammability (solid, gas)

Not available.

Oxidizer.

Upper/lower flammability or explosive limits

Flammability limit - lower

(%)

Not available.

Flammability limit - upper

(%)

Not available.

Explosive limit - lower (%) Not available.

Explosive limit - upper (%) Not available.

Vapor pressure Not available.

Vapor density Not available.

Vapor densityNot available.Relative densityNot available.

Solubility(ies)

Solubility (water) Slightly soluble

Partition coefficient Not available.

(n-octanol/water)

Auto-ignition temperatureNot available.Decomposition temperature527 °F (275 °C)ViscosityNot available.

Other information

Bulk density 0.5 - 0.9 g/ml **Explosive limit** Non-explosive.

10. Stability and reactivity

Reactivity Greatly increases the burning rate of combustible materials.

Chemical stability Decomposes on heating. Product may be unstable at temperatures above: 275°C/527°F.

Possibility of hazardous

reactions

Reacts slowly with water.

Conditions to avoid Heat. Moisture. Avoid temperatures exceeding the decomposition temperature. Contact with

incompatible materials.

Incompatible materials Acids. Bases. Salts of heavy metals. Reducing agents. Combustible material.

Hazardous decomposition

products

Oxygen. Hydrogen peroxide (H2O2). Steam. Heat.

11. Toxicological information

Information on likely routes of exposure

Inhalation Dust may irritate respiratory system. Prolonged inhalation may be harmful.

Skin contact Causes skin irritation.

Eye contact Causes serious eye damage.

Ingestion Ingestion may cause irritation and malaise.

Symptoms related to the physical, chemical and toxicological characteristics

Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Dusts may irritate the respiratory

tract, skin and eyes. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity

Components Species Test Results

Calcium hydroxide (CAS 1305-62-0)

Acute Oral

LD50 Rat 7340 mg/kg

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye

irritation

Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicityNo data available to indicate product or any components present at greater than 0.1% are

mutagenic or genotoxic.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicityThis product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity -

single exposure

Not classified.

Specific target organ toxicity -

repeated exposure

Not classified.

Aspiration hazardDue to the physical form of the product it is not expected to be an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the

possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components Species Test Results

Calcium hydroxide (CAS 1305-62-0)

Aquatic

Fish LC50 Zambezi barbel (Clarias gariepinus) 33.8844 mg/l, 96 hours

Persistence and degradability Decomposes in the presence of water. The product contains inorganic compounds which are not

biodegradable.

Bioaccumulative potentialThe product does not contain any substances expected to be bioaccumulating.

Mobility in soilThis substance has very low solubility in water and low mobility in the environment.

Other adverse effects None known.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of

contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code

The waste code should be assigned in discussion between the user, the producer and the waste

disposal company.

Waste from residues / unused

products

Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see:

Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal.

Since emptied containers may retain product residue, follow label warnings even after container is

emptied.

14. Transport information

DOT

UN number UN1479

UN proper shipping name Oxidizing solid, n.o.s. (Calcium hydroxide oxide)

Transport hazard class(es)

5.1 Class Subsidiary risk Label(s) 5.1 Packing group Ш **Environmental hazards**

Marine pollutant No

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

62, IB8, IP2, IP4, T3, TP33 Special provisions

Packaging exceptions 152 212 Packaging non bulk 240 Packaging bulk

IATA

UN number UN1479

Oxidizing solid, n.o.s. (Calcium hydroxide oxide) **UN** proper shipping name

Transport hazard class(es)

5.1 Class Subsidiary risk Packing group Ш **Environmental hazards** No **ERG Code** 5L

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number UN1479

UN proper shipping name OXIDIZING SOLID, N.O.S. (Calcium hydroxide oxide)

Transport hazard class(es)

5.1 **Class** Subsidiary risk Ш Packing group **Environmental hazards**

Marine pollutant No F-A. S-Q

Special precautions for user Read safety instructions, SDS and emergency procedures before handling. Not applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and

the IBC Code

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication

Standard, 29 CFR 1910.1200.

All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes

Delayed Hazard - No Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - Yes

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous Yes

chemical

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SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act

Not regulated.

(SDWA)

US state regulations

US. Massachusetts RTK - Substance List

Calcium hydroxide (CAS 1305-62-0)

US. New Jersey Worker and Community Right-to-Know Act

Calcium hydroxide (CAS 1305-62-0)

Calcium hydroxide oxide (CAS 682334-66-3)

US. Pennsylvania Worker and Community Right-to-Know Law

Calcium hydroxide (CAS 1305-62-0)

US. Rhode Island RTK

Not regulated.

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region

Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes

^{*}A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

Toxic Substances Control Act (TSCA) Inventory

16. Other information, including date of preparation or last revision

Inventory name

02-April-2015 Issue date

Revision date Version # 01

United States & Puerto Rico

Further information HMIS® is a registered trade and service mark of the American Coatings Association (ACA).

Health: 3 **HMIS®** ratings

Flammability: 0 Physical hazard: 2

NFPA ratings



Oxygen Release Compound Advanced (ORC Advanced®)

Yes

On inventory (yes/no)*

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

Disclaimer

Regenesis cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.