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Roma, 03/07/2018

Prot. MPA/AB/SF/RA/030718-01

A:

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Gestione Sviluppo del Territorio
protocollo@pec.comune.arona.no.it

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Regione Piemonte
Ufficio Ambiente – Bonifica siti contaminati
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ASL 13
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c.a. geom. M. Camardella

Oggetto: **PV Q8 0822, via Milano n° 39/A - Arona (NO).**
Cronoprogramma test di campo e proposta preliminare griglia per l'applicazione della tecnologia Ekogrid.

Nell'ambito del procedimento ambientale in essere per il sito in oggetto ai sensi del D.Lgs. 152/06 Parte Quarta Titolo V, e con riferimento a quanto concordato in sede di Tavolo Tecnico (di seguito TT) svoltosi in data 28 maggio 2018 presso l'Ufficio Settore Ambiente della Provincia di Novara, con la presente si trasmette il cronoprogramma del test di campo previsto nell'ambito della presentazione del Progetto di Bonifica – Fase III.

Il test di campo verrà eseguito tramite lo studio del microcosmo di sito accoppiato con lo *Stable Isotope Probing (SIP)*, nello specifico verranno inseriti all'interno del piezometro PZ06 (**Tavola 1**) tre campionatori di tipo Bio–Trap® (**Allegato 1**) caricati con 13C- MTBE che funge da tracciante per valutare l'efficacia dei trattamenti di *bioremediation* e dimensionare il quantitativo di ossigeno necessario per l'applicazione della tecnologia Ekogrid™; se la biodegradazione avviene, il tracciante viene incorporato, e quindi rilevato nei prodotti finali della biodegradazione (biomassa e CO_2).

Il sistema sarà allestito con:

- una Bio–Trap® senza reagente (MNA Unit), per determinare il consumo di ossigeno in condizioni ambientali standard;
- una Bio–Trap® arricchita con un ammendante (Bio-Stim Unit);
- una Bio–Trap® arricchita con Provect-ORS (BioAug Unit), prodotto a lento rilascio di ossigeno (in **Allegato 2** la scheda tecnica).

Il cronoprogramma prevede:

- 20 gg lavorativi per la fornitura delle Bio–Trap®;
- 1 gg lavorativo per l'installazione;
- 45 gg lavorativi di permanenza in sito delle Bio–Trap®;
- 60 gg lavorativi per l'esecuzione delle analisi chimiche di laboratorio e la successiva interpretazione dei risultati.

Sarà comunque cura della scrivente comunicare con congruo anticipo la data di avvio del test di campo.

Come richiesto dagli Enti nel TT su detto in **Tavola 1** si fornisce proposta preliminare di griglia per l'applicazione della tecnologia Ekogrid™.

La dott.ssa Anna Maria Bellone (e-mail: annamariabellone@maresitalia.it; cell. 345.4739131) e l'ing. Sara Fedeli (email: sarafedeli@maresitalia.it, cell. 345.4781848) sono a Vs. completa disposizione per informazioni e chiarimenti in merito.

Si coglie l'occasione per porgere cordiali saluti.

dott.ssa Anna Maria Bellone

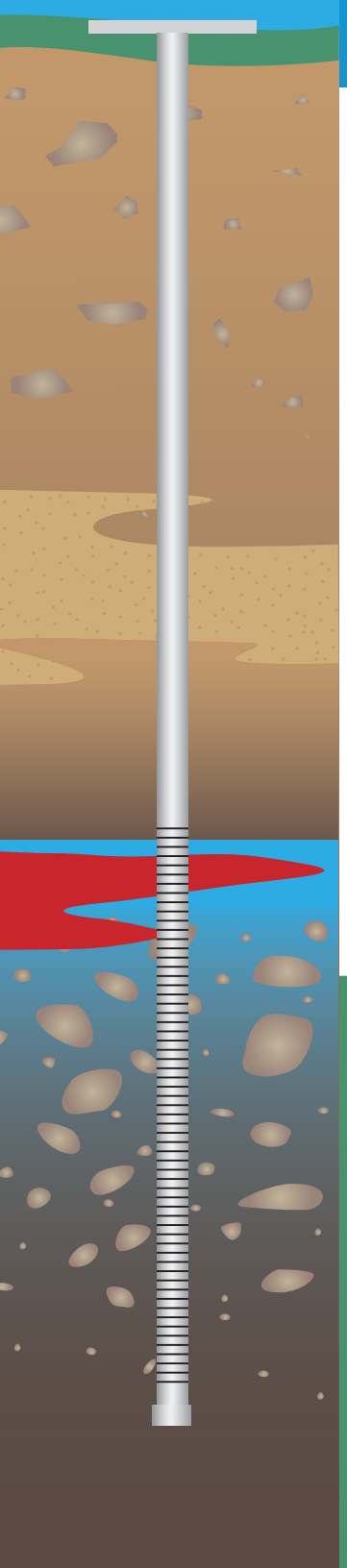
Mares S.r.l.

Settore Protezione Ambiente

Allegato 1: Schema Bio – Trap®

Allegato 2: _Scheda tecnica Provect-ORS

Tavola 1: Tavola generale del sito con ipotesi progettuale delle griglie Ekogrid



BIO-TRAP®

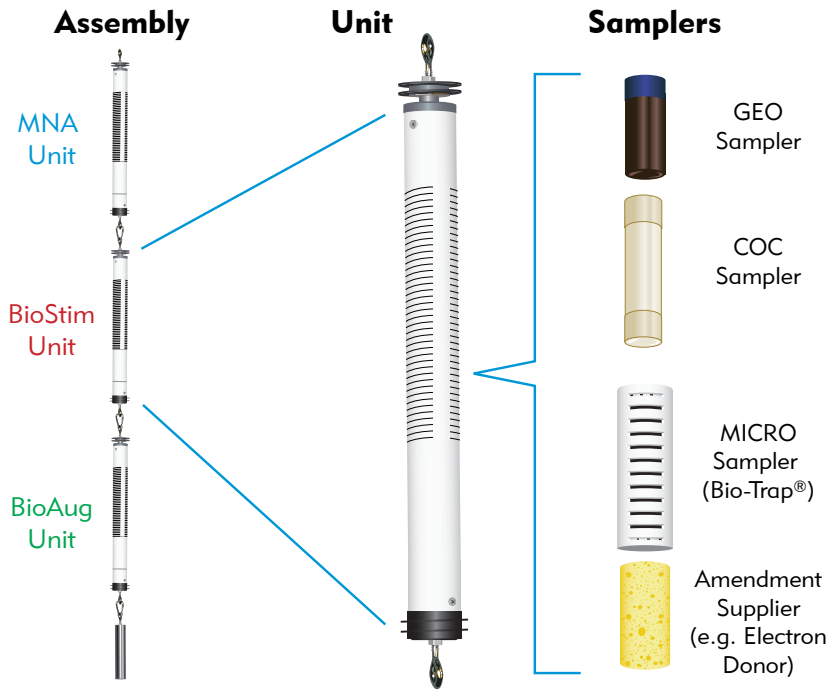
ADVANCED DIAGNOSTIC SAMPLERS

Rationale

Site managers have frequently turned to laboratory microcosms or small pilot studies to evaluate bioremediation. However, duplication of *in situ* conditions in the laboratory is difficult and the results often do not correlate to the field. Pilot studies are performed in the field but are often prohibitively expensive as an investigative tool. Bio-Trap® *In Situ* Microcosm studies provide microbial, chemical, and geochemical evidence to cost-effectively evaluate biodegradation and screen remedial alternatives.

Designing an *In Situ* Microcosm Study

Bio-Trap® *In Situ* Microcosms can be tailored to investigate a wide variety of remediation approaches but often consist of three units each corresponding to one of the most common bioremediation options:



Applications:

- **MNA at chlorinated solvent- and petroleum hydrocarbon- impacted sites**
- **Evaluate the effectiveness of electron acceptor addition (e.g. oxygen, sulfate)**
- **Assess the feasibility of electron donor addition to stimulate reductive dechlorination**
- **Assess the need and effectiveness of bioaugmentation**
- **Can be used in combination with Stable Isotope Probing (SIP) or Compound Specific Isotope Analysis (CSIA)**

Control (MNA Unit)	The Control Unit contains no additional electron donor or amendments and represents MNA or existing site conditions.
Biostimulation (BioStim Unit)	The BioStim Unit contains a specified electron donor (sodium lactate, EOS®, HRC®, molasses, etc), electron acceptor (e.g. oxygen, nitrate, sulfate), or other amendment.
Bioaugmentation (BioAug Unit)	The BioAug Unit is pre-inoculated with a commercial culture (e.g. *Dehalococcoides*) and amended with an electron donor.

microbialinsights

www.microbe.com

BIO-TRAP®
ADVANCED DIAGNOSTIC SAMPLERS

Providing Multiple Lines of Evidence

Each *In Situ* Microcosm unit contains passive sampling devices to provide microbial, chemical, and geochemical evidence to quantitatively compare remedial alternatives.

Geochemical Fingerprint (GEO)

Quantification of geochemical parameters including electron acceptors (nitrate, sulfate, etc.), dissolved gases (methane, ethene, ethane), and chloride production.

Contaminant of Concern (COC)

A passive diffusion sampler designed for analysis of a variety of COCs including chlorinated solvents and petroleum hydrocarbons.

Microbial Populations (MICRO)

Bio-Trap® sampler containing Bio-Sep® beads which provide a large surface area for microbial attachment and were designed for analysis by a variety of molecular biological tools.

Post-Deployment Analyses

Although in-depth interpretation of results will be different for each study, the general approach involves comparison of chemical, geochemical, and microbiological data between units to quantitatively evaluate treatment options.

Microbiology

- CENSUS: Quantify organisms or processes responsible for contaminant biodegradation (e.g. *Dehalococcoides*)
- PLFA: Quantify viable biomass and evaluate microbial community composition
- Stable Isotope Probing: Incorporation of a ^{13}C labeled contaminant into biomass and dissolved inorganic carbon conclusively demonstrates that biodegradation is occurring

Chemistry

- Contaminant loss
- Daughter product formation
- Contaminant destruction/end product formation (e.g. CO_2, ethene, ethane)

Geochemistry

- Anions: Effect of treatment approach on redox conditions/ availability of electron acceptors
- Dissolved Gases: Production of methane, ethene, and ethane
- pH

microbialinsights
www.microbe.com
10515 Research Drive
Knoxville, TN 37932
Phone: 865.573.8188

1. PRODUCT IDENTIFICATION:

PRODUCT USE:

I-ORS (Injectable Oxygen Release Substrate)
Soil and water treatment; Used for injections and screened wells.

MANUFACTURER:

PROVECTUS ENVIRONMENTAL
2871 W. Forest Rd., Suite 2
Freeport, IL 61032 USA

EMERGENCY PHONE:

USA: 1 (815) 650-2230

TRANSPORTATION OF DANGEROUS GOOD
CLASSIFICATION: Oxidizing Solid, n.o.s. (Calcium Peroxide), Class 5.1, PG II, UN1479

WHMIS CLASSIFICATION:
Oxidizer

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	Chemical Formula	CAS No.	Percentage
Calcium Peroxide	CaO_2	1305-79-9	75%-85%
Inorganic Nutrients	Proprietary	NA	15%-25%

3. PHYSICAL DATA

Appearance	White & brown granules
Physical state	Solid
Odor threshold	None
Bulk Density	500~650g/L
Solubility in Water	Insoluble
pH	~11
Decomposition Temperature	Self-accelerating decomposition with oxygen release starting from 275 degrees Celsius

4. HAZARDS IDENTIFICATION

Emergency overview

Oxidizing agent, contact with other material may cause fire. Under fire conditions this material may decompose and release oxygen that intensifies fire. This product contains <1% **non-respirable** crystalline silica. The NTP and OSHA have not classified **non-respirable** crystalline silica as carcinogenic. Long term exposure to hazardous levels of *respirable* silica dusts can cause lung disease (silicosis). ORS does not contain respirable crystalline silica.

Potential Health Effects:

- General: Irritating to mucous membrane and eyes.

- Inhalation ..... Irritating to respiratory tract. Long term inhalation of elevated levels may cause lung disease (silicosis).
- Eye contact ..... May cause irritation to the eyes; Risks of serious or permanent eye lesions.
- Skin contact ..... May cause skin irritation.
- Ingestion ..... Irritation of the mouth and throat with nausea and vomiting.

5. FIRST AID MEASURES

- Inhalation ..... Remove affected person to fresh air. Seek medical attention if effects persist.
- Eye contact ..... Flush eyes with running water for at least 15 minutes with eyelids held open. Seek specialist advice.
- Skin contact ..... Wash affected skin with soap and mild detergent and large amounts of water.
- Ingestion ..... If the person is conscious and not convulsing, give 2-4 cupfuls of water to dilute the chemical and seek medical attention immediately. Do not induce vomiting.

6. FIRE FIGHTING MEASURE

Flash Point
- Not applicable

Flammability
- Not applicable

Ignition Temperature
- Not applicable

Danger of Explosion
- Non-explosive

Extinguishing Media
- Water

Fire Hazards
- Oxidizer. Storage vessels involved in a fire may vent gas or rupture due to internal pressure. Damp material may decompose exothermically and ignite combustibles. Oxygen release due to exothermic decomposition may support combustion. May ignite other combustible materials. Avoid contact with incompatible materials such as heavy metals, reducing agents, acids, bases,

combustible (wood, papers, cloths etc.) Thermal decomposition releases oxygen and heat. Pressure bursts may occur due to gas evolution. Pressurization if confined when heated or decomposing. Containers may burst violently.

Fire Fighting Measures

- Evacuate all non-essential personnel
- Wear protective clothing and self-contained breathing apparatus.
- Remain upwind of fire to avoid hazardous vapors and decomposition products.
- Use water spray to cool fire- exposed containers.

7. ACCIDENTAL RELEASE MEASURES

Spill Clean-up Procedure

- Oxidizer. Eliminate all sources of ignition. Evacuate unprotected personnel from equipment recommendations found in Section 9. Never exceed any occupational exposure limit.
- Shovel or sweep material into plastic bags or vented containers for disposal. Do not return spilled or contaminated material to inventory. Avoid making dust.
- Flush remaining area with water to remove trace residue and dispose of properly. Avoid direct discharge to sewers and surface waters. Notify authorities if entry occurs.
- Do not touch or walk through spilled material. Keep away from combustibles (wood, paper, oils, etc.). Do not return product to container because of risk of contamination.

8. HANDLING AND STORAGE

Storage

- Oxidizer. Store in a cool, well-ventilated area away from all source of ignition and out of direct sunlight. Store in a dry location away from heat.
- Keep away from incompatible materials. Keep containers tightly closed. Do not store in unlabeled or mislabeled containers.
- Protect from moisture. Do not store near combustible materials. Keep containers well sealed. Ensure pressure relief and adequate ventilation.
- Store separately from organics and reducing materials. Avoid contamination that may lead to decomposition.

Handling

- Avoid contact with eyes, skin, and clothing. Use with adequate ventilation.
- Do not swallow. Avoid breathing vapors, mists, or dust. Do not eat, drink, or smoke in work area.
- Prevent contact with combustible or organic materials.
- Label containers and keep them tightly closed when not in use.
- Wash thoroughly after handling.

9. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

- General room ventilation is required. Local exhaust ventilation, process enclosures or other engineers controls may be needed to maintain airborne levels below recommended exposure limits. Avoid creating dust or mist. Maintain adequate ventilation. Do not use in closed or confined spaces. Keep levels below exposure limits. To determine exposure limits, monitoring should be performed regularly.

Respiratory Protection

- For many condition, no respiratory protection may be needed; however, in dusty or unknown atmospheres or when exposures exceed limit values, wear a NIOSH approved respirator.

Eye/Face Protection

- Wear chemical safety goggles and a full face shield while handling this product.

Skin Protection

- Prevent contact with this product. Wear gloves and protective clothing depending on condition of use. Protective gloves: Chemical-resistant (Recommended materials: PVC, neoprene or rubber)

Other Protective Equipment

- Eye-wash station
- Safety shower
- Impervious clothing
- Rubber boots

General Hygiene Considerations

- Wash with soap and water before meal times and at the end of each work shift. Good manufacturing practices require gross amounts of any chemical removed from skin as soon as practical, especially before eating or smoking.

10. STABILITY AND REACTIVITY

Stability

- Stable under normal conditions

Condition to Avoid

- Water
- Acids
- Bases
- Salts of heavy metals
- Reducing agents
- Organic materials
- Flammable substances

Hazardous Decomposition Products

- Oxygen which supports combustion

11. TOXICOLOGICAL INFORMATION

- LD50 Oral: Min.2000 mg/kg, rat
- LD50 Dermal: Min. 2000mg/kg, rat
- LD50 Inhalation: Min. 4580 mg/kg, rat

12. ECOLOGICAL INFORMATION

Ecotoxicological Information

- Hazards for the environment is limited due to the product properties of no bioaccumulation, weak solubility and precipitation in aquatic environment.

Chemical Fate Information

- As indicated by chemical properties oxygen is released into the environment.

13. DISPOSAL CONSIDERATIONS

Waste Treatment

- Dispose of in an approved waste facility operated by an authorized contractor in compliance with local regulations.

Package Treatment

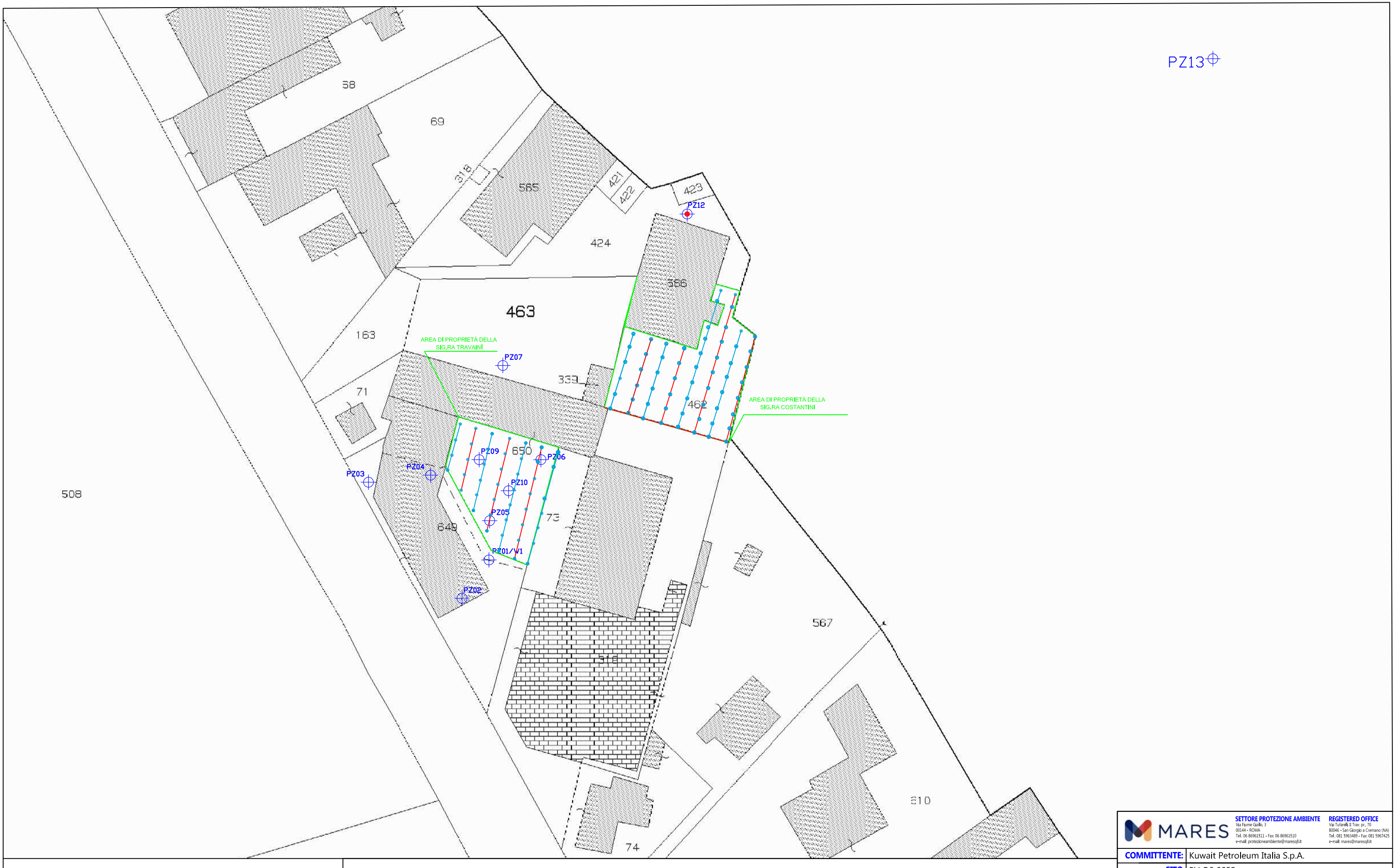
- The empty and clean containers are to be recycled or disposed of in conformity with local regulations.

14. TRANSPORT INFORMATION

- Proper Shipping Name: I-ORS™
- Hazard Class: 5.1
- Labels: 5.1 (Oxidizer)
- Packing Group: II

15. REGULATORY INFORMATION

- SARA Section..... Yes
- SARA (313) Chemicals..... No
- EPA TSCA Inventory..... Appears
- Canadian WHMIS Classification ..... C, D2B
- Canadian DSL..... Appears
- EINECS Inventory..... Appears



LEGENDA:

- Piezometri di monitoraggio
- Punti previsti per l'infissione degli elettrodi
- Griglia ipotetica Ekogrid
- Cavi elettrici previsti

Print Format	A3
Scale	1:500

Graphic scale: 0 10 25 50 m

MARES

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COMMITTENTE:	Kuwait Petroleum Italia S.p.A.
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COMUNE:	Arona (NO)
INDIRIZZO	via Milano n. 39/A
DATA:	luglio 2018
DOCUMENTO:	-
TAVOLA:	1 — Tavola generale del sito con ipotesi progettuale delle griglie Ekogrid