DRAFT

August 2011

SITE-SPECIFIC HEALTH AND SAFETY PLAN FOR THE MILL RIVER SEDIMENT REMEDIATION MILL RIVER AREAS I-V IN THE VICINITY OF THE EGI FACILITY

2190 BOSTON POST ROAD FAIRFIELD, CONNECTICUT

PREPARED BY:
CCA, LLC
40 OLD NEW MILFORD ROAD
BROOKFIELD, CONNECTICUT

CCA, LLC DOES NOT GUARANTEE THE HEALTH OR SAFETY OF ANY PERSON ENTERING THIS SITE. DUE TO THE POTENTIAL HAZARDS OF THIS SITE AND THE ACTIVITY OCCURRING THEREON, IT IS NOT POSSIBLE TO DISCOVER, EVALUATE, AND PROVIDE PROTECTION FOR ALL POSSIBLE HAZARDS WHICH MAY BE ENCOUNTERED. STRICT ADHERENCE TO THE HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR INJURY AT THE SITE. THE HEALTH AND SAFETY GUIDELINES IN THIS PLAN WERE PREPARED SPECIFICALLY FOR THIS SITE AND SHOULD NOT BE USED ON ANY OTHER SITE WITHOUT PRIOR RESEARCH AND EVALUATION BY TRAINED HEALTH AND SAFETY SPECIALISTS.

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SECTION I: GENERAL

1.0 Introduction

This Health and Safety Plan (HASP) was developed for impacted sediment remediation oversight and confirmation sampling activities in portions of the Mill River (the "Site") in the vicinity of the EGI Facility Property (the "Upland Site"), 2190 Boston Post Road, Fairfield, Connecticut (see Site Plan, Attachment I) This site-specific HASP was prepared to address all activities to be undertaken during the impacted sediment remediation. The procedures and protocols in this plan have been established to ensure that a mechanism is in place to protect project personnel from physical hazards associated with sample collection activities, and in the event that hazardous materials are found during the project.

This plan addresses all those activities associated with the Mill River impacted sediment remediation oversight and confirmation sampling activities.

Compliance with this HASP is required of all CCA, LLC employees who enter the working areas of this project. Sediment remediation contractors and subcontractors will be required to prepare a site specific HASP which should, at a minimum, include the guidelines outlined in this document. The content of this HASP may change or undergo revision based upon additional information made available to health and safety (H&S) personnel, monitoring results or changes in the technical scope of work. Any changes proposed must be reviewed by designated CCA, LLC staff.

1.1 Scope of Work

Sediment remediation activities will consist of the removal of impacted sediments via hydraulic dredging, the dewatering and treatment of sediments on the Upland Site, and the removal of sediments for off-site disposal, as outlined in detail in the Remedial Action Plan for Lead Impacted River Sediments Mill River Study Areas I-V (SedRAP) prepared by CCA, LLC in September 2011.

The study area (designated Areas I-V) spans from approximately 2,100 feet north of the Connecticut Turnpike to approximately 1010 feet south of Harbor Road (see Site Plans, Attachment I).

1.2 Site Information

A. General Information

The site consists of the Mill River (the "Site") Areas I-V in the vicinity of the Former Exide Battery Facility, 2190 Boston Post Road Fairfield CT (the "Upland Site"), and the Upland Site proper.

General safety practices should be followed on-site, as well as special caution during contractor oversight, confirmation sampling, and sediment handling.

B. Site History

Manufacturing activities at the Upland Site had been performed from the early 1920s until 1981. Waste types originated from lead and acid handling and storage practices on-site during battery manufacturing processes. Aluminum remained on-site from when the site was an aluminum company. Some facility wastes were directed toward the Mill River during Upland Site operations.

1.3 Project Personnel and Emergency Phone Numbers

Client Name:	Exide Group Incorporated
Site Address:	2190 Boston Post Road, Fairfield, CT
Project Name:	Mill River Sediment Remediation
Project Manager:	Ralph A. Klass, P.E. L.E.P. Phone: 203-775-6207
Persons Assigned	(see attachment III for health and safety training certificates) Ralph Klass, Paul Connelly, Richard Chandler, Jessica Bilyard, Matthew Winward, and Eric Braun.
Date of Job Initiation:	TBD
Emergency Phone Numbers:	See Attachment II

SECTION II: HEALTH AND SAFETY PERSONNEL

2.0 Health and Safety Personnel Designations

The following briefly describes the health and safety designations and general responsibilities that will be employed for this project.

2.1 Health and Safety Manager (HSM)

The HSM has overall responsibility for development and implementation of this HASP. He also shall approve any changes to this plan due to modification of procedures or newly proposed site activities.

The HSM will be responsible for the development of safety protocols and procedures necessary for field operations and will also be responsible for the resolution of any outstanding safety issues that arise during the conduct of site work. Health and safety-related duties and responsibilities will be assigned only to qualified individuals by the HSM. Before personnel may work on site, currentness of acceptable medical examination and acceptability of health and safety training must be approved by the HSM pursuant to all applicable standards.

Health and Safety Manager (HSM): *Ralph Klass* *Office Phone: (203) 775-6207*

2.2 Site Health and Safety Officers (HSO)

An HSO will be present on-site during the implementation of all activities and will be responsible for all health and safety activities. The HSO has stop-work authorization that he will execute upon his determination of an imminent safety hazard, emergency situation, or other potentially dangerous situation, such as extreme weather conditions. Authorization to proceed with work will be issued by the HSM after such action. The HSO will initiate and execute all contact with support facilities and personnel when this action is appropriate.

Health and Safety Officers(HSO): Richard Chandler & Jessica Bilyard
Office Phone: (203) 775-6207 Site Phone: 203-994-7418

SECTION III: HAZARD ASSESSMENT

3.0 Chemical Hazards:

The primary contaminant of concern for the Mill River Sediment Remediation Project is Total Lead. For the purpose of completeness, potential chemical hazards include:

- petroleum hydrocarbons,
- volatile organics,
- metals,
- organic polymers and reagents,
- PCBs.

Potential exposure scenarios (e.g. routes of exposure, respiratory dermal contact, oral, etc.) include inhalation, ingestion, and dermal contact with potentially impacted sediment. Specific compounds within parameter groups expected to be the most significant in terms of concentration include lead and aluminum.

As a default position, all materials (sediments) will be handled as if they contain metals. Site specific testing during program implementation will guide whether additional precautions are required.

Chemicals that will be brought on-site for decontamination or sample preservation are limited to sample jars and bottles which are pre-preserved. Decontamination, when necessary, will be performed by alconox, detergent, and distilled water. Wastes will be contained on-site. The work crew will wear personal protective equipment to protect themselves from incidental contact with potentially contaminated materials and to aid in decontamination.

Attachment IV contains the Toxic Material Information for potential chemical hazards.

3.1 Radiation Hazards:

CCA Personnel will be performing confirmation field screening for the presence of metals in sediment samples using a Niton X-Ray Fluorescence (XRF) Analyzer, Model XLP-712. The device's source material is Americium 241 with an activity of 30mCi. It is registered with both the CT DEEP and the US Nuclear Regulatory Commission, and is leak-tested every 6-months. Radiation is emitted through a small opening when the unit's trigger is activated. Potential exposure to small amounts of radiation may occur if the unit opening is directed at a person when activated. Therefore the unit should never be activated directed at the user or any other personnel. This includes use at a table where the user is seated with his/her legs under the active unit, as the table-top is not sufficient protection.

3.2 Physical Hazards:

General slip and fall hazards exist on site. Additionally, hazards associated with working near contractor equipment, dewatering equipment and general machinery may exist at the site. All general site safety precautions should be followed. The work crew will wear personal protective equipment to protect themselves from falling objects (hard hats, steel toed boots), projectiles (eye protection), and noise hazards (hearing protection) as necessary and determined by the site HSOs.

Physical hazards associated with the GeoTubes (geotextile dewatering structures) include slip and fall hazards. Caution should be used around geotextile and polymer additives as they are slippery. During filling operations, hazards associated with the pressurized structures (breakage, valve failure, etc.) may exist. Personnel entry to the GeoTube area should be limited.

3.3 Boating Hazards:

Sediment confirmation sampling activities and certain contractor oversight activities will take place in a 12-foot aluminum (or similar) jon boat. All personnel will be experienced and qualified. Maximum weight load for a boat will not exceed manufacturer's specified capacity. All personnel will wear a United States Coast Guard approved personal flotation device. Site Safety Personnel can modify or cancel on-board operation for safety reasons.

Personnel should stay seated in the boat. If standing is necessary for sampling/monitoring activities, personnel should keep their center of gravity as low as possible and as near to the center line of the boat as possible.

All gear should be stowed securely against unexpected shifts. On-board personnel must be able to contact shore either by cellular phone or two-way radio.

SECTION IV: TRAINING AND MEDICAL SURVEILLANCE

4.0 Basic Training Required

All Health and Safety Personnel and personnel handling sediment are required to have successfully met the 40 hour training requirement pursuant to OSHA 29 CFR 1910.120 (Hazardous Waste and Emergency Response or "Hazwoper"). In addition, all Health and Safety Personnel will be up to date with their 8-hour annual refresher course.

4.1 Site-Specific Training

Training will be provided on-site, on the first day of scheduled work, to specifically address the activities, procedures monitoring, and equipment for the site operations. It will include site layout, hazards, boating safety procedures, and emergency services at the site, and will detail all provisions contained within this HASP.

Daily "Tailgate" meetings will be held at the discretion of the Site Health and Safety Personnel to address any safety concerns or alterations to the site Health and Safety plan.

SECTION V: PROTECTION AND COMMUNICATION

5.0 Levels of Personnel Protection

Level D protection to be worn by field personnel during the implementation of field procedures defined and controlled by the HSO with approval of the HSM.

Task	Level of Protection PPE
Site Access	D
Sediment Sample Collection	Modified D
Contractor Oversight	Modified D

Definition of Levels of Protection:

PPE:

Level D:	Steel toe boots, work gloves, eye protection (as necessary)
ModifiedLevel D:	Polycoated Tyvek disposable coveralls (as necessary)
	Nitrile/Latex sample collection gloves
	Leather (steel toe) work boots
	Hard hat and hearing protection (as necessary)
	Life Vest Floatation Device
	Neoprene Chest Waders (as necessary)

5.1 Safety Equipment

Basic emergency and first aid equipment will be available as appropriate. This shall include first aid kit, emergency eyewash, fire extinguishers, and other safety-related equipment. A supply of safety equipment will be maintained at the CCA field trailer, located on the upland site.

A. Site Safety Summary:

CCA personnel will be on-site for all activities. CCA employees will be equipped with cellular phones for possible emergency communications. A hospital location map and emergency numbers are presented in Attachment II

5.2 Communication

Telephones – Mobile cellular telephones will be on-site and hand held two-way radios will be used for communication between personnel in the boat and support staff on shore.

SECTION VI: SAFETY CONSIDERATIONS FOR SITE OPERATIONS

6.0 General

Weather

This project will be conducted in an open area, potentially year round. Temperatures in Fairfield, Connecticut range on average between 25 and 85 degrees (F) with rainy or snowy conditions, throughout the year. Extreme hot temperatures in summer months, and extreme low temperatures in winter months have been recorded for Fairfield, therefore it is very important that project personnel dress appropriately. The HSO will be responsible for suspending work during extreme weather conditions. The project will not be implemented in inclement weather conditions.

SECTION VII: DISPOSAL PROCEDURES

All discarded materials, waste materials or other objects shall be handled in such a way to avoid the potential for spreading contaminant impact, creating a sanitary hazard, or causing litter to be left on site. All material that has visible signs of chemical impact will be classified by the HSO as potentially impacted material. All potentially impacted materials (e.g., clothing, gloves) will be double-bagged or drummed as necessary and segregated for temporary storage on site for eventual disposal.

All non-impacted waste materials shall be collected and bagged for appropriate disposal as normal domestic waste. All "cleanup" liquids will be appropriately containerized disposed of.

SECTION VIII: EMERGENCY PLAN

8.0 Emergency Situations

Emergency situations can be characterized as a Fire or Explosion; an Environmental Release; or Accident or Injury to one of the field personnel.

8.1 Emergency Coordinator

The Site Emergency Coordinator is:

1. HSO
2. Health & Safety Manager (alternate)

The emergency coordinator shall implement the contingency plan whenever conditions at the site warrant such action. The coordinator will be responsible for assuring the evacuation, emergency treatment, emergency transport of site personnel, as necessary, and notification of emergency response units and the appropriate management staff designated in Section 1.2.

8.2 Evacuation

In the event of an emergency situation, all personnel in both the restricted and non-restricted areas will evacuate and assemble at the support area location determined prior to the beginning of the daily operations. For efficient and safe site evacuation and assessment of the emergency situation, the Emergency Coordinator (HSO) will have authority to initiate proper action if outside services are required. Under no circumstances will incoming personnel or visitors be allowed to proceed into the area once the emergency signal has been given.

The HSO or Field Operations Leader will ensure that access for emergency equipment is provided and that all potential combustion generating apparatus (e.g., vehicles) has been shut down once the alarm has been sounded.

The fire department and other emergency response groups will be notified by telephone of the emergency. The site evacuation plan shall be rehearsed as part of the overall training program for site operations.

8.3 Personal Injury

An ANSI compliant First Aid kit (10 people) will be kept in the CCA trailer located in the "Upland Staging Area." Emergency first aid shall be applied on-site as deemed necessary. Then, cleanup or decontaminate and transport the individual to nearest medical facility, if needed. The HSO will supply medical data sheets to appropriate medical personnel and complete an incident report on the accident or injury.

Hospital – (203) 384-3566 Emergency
Rescue – 911

The Ambulance/Rescue Squad shall be contacted for transport as necessary in an emergency.

It should be noted that contractors will be required to provide first aid kits for their employees.

8.4 Overt Personnel Exposure

SKIN CONTACT: Use copious amounts of soap and water. Wash/rinse affected area thoroughly, then provide appropriate medical attention. Eyes should be thoroughly rinsed if there is suspect chemical contamination.

INHALATION: Move to fresh air and/or, if necessary decontaminate/transport to hospital.

INGESTION: Decontamination and transport to emergency medical facility.

PUNCTURE WOUND OR LACERATION: Decontaminate and transport to emergency medical facility. HSO will provide medical data sheets to medical personnel as requested (see Section XIV).

SECTION IX: AUTHORIZATIONS

Personnel authorized to enter the Project Site must be certified by the HSO. Authorization will involve completion of appropriate training courses and medical examination requirements as required by this HASP and review and sign-off this HASP. All personnel must utilize the buddy system or trained escort, and check in with the HSO.

1. Personnel Authorized to Perform Work On-site:

2. Other Personnel Authorized to Enter Site:

SECTION X: FIELD TEAM REVIEW

Each field team member shall sign this section after site-specific training is completed and before being permitted to work on-site.

I have read and understand this Site-Specific Health and Safety Plan. I will comply with the provisions contained therein.

Name Printed	Signature	Date

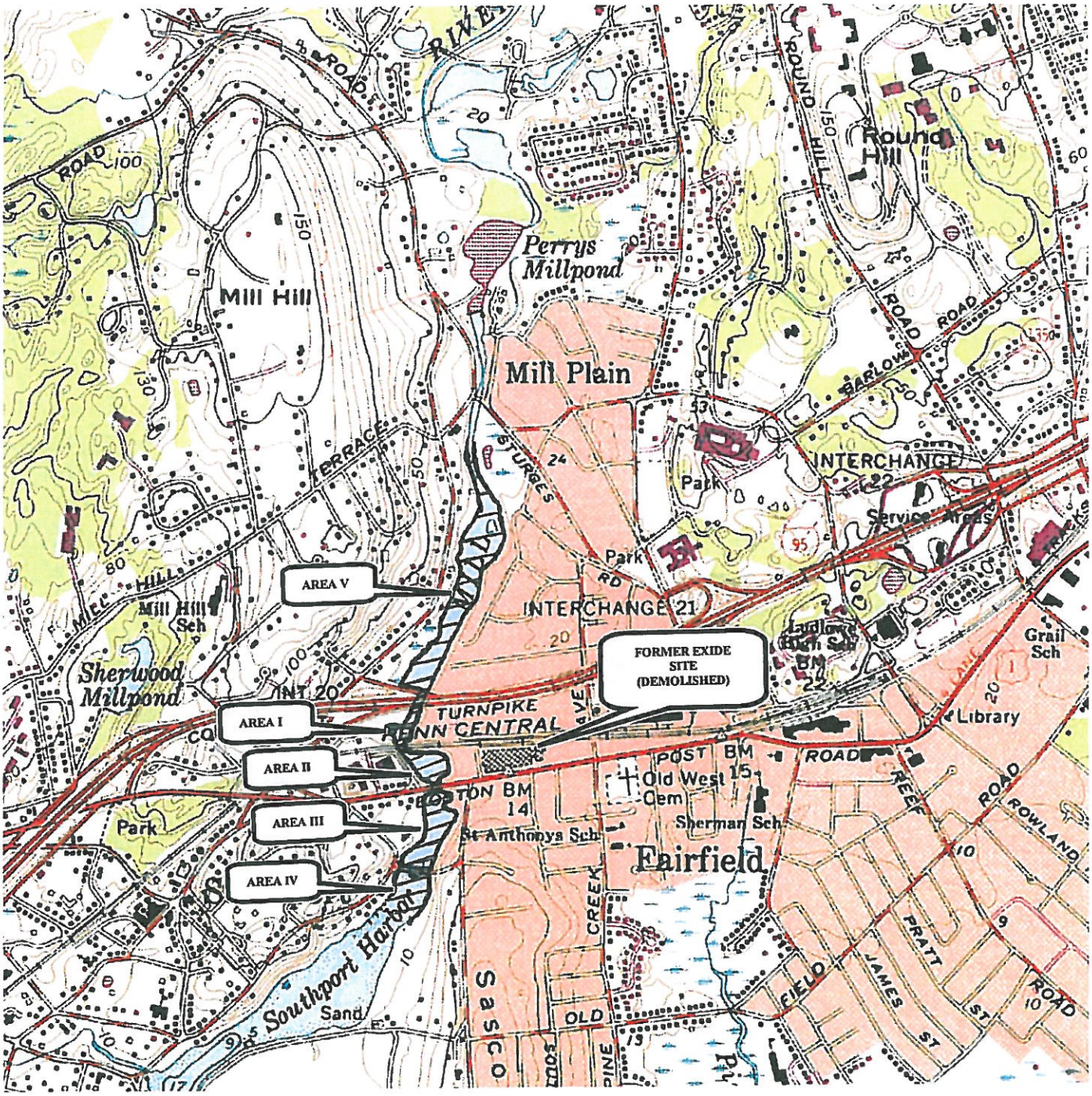
SECTION XI: APPROVALS

By their signature the undersigned certify that this HASP is approved and will be utilized during investigation activities at the subject property.

EGI Site Health and Safety Officer _____ Date _____

ATTACHMENT I

SITE PLANS



CONNECTICUT

QUADRANGLE LOCATION

FIGURE TAKEN FROM THE WESTPORT, CONN U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP (PHOTO TAKEN 1971 PHOTOREVISED 1974)

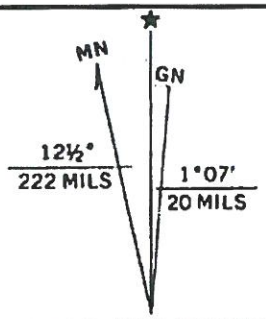
SITE LOCATION PLAN
MILL RIVER
FAIRFIELD, CONNECTICUT

Date: 3/28/08
Project Number 8014
Analyst: J.A.B
Scale: 1" =1500'

CIVIL ENGINEERING ENVIRONMENTAL SURVEYING
CCA LLC

40 Old New Milford Road
Brookfield, CT 06804
(203) 775-6207
FAX (203) 775-3628

33 Village Green Drive
Litchfield, CT 06759
(860) 567-3179
FAX (860) 567- 1716



UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Figure 2
MILL RIVER
SEDIMENT STUDY AREA

EXIDE GROUP INCORPORATED

FAIRFIELD, CONNECTICUT

LEGEND
★ STORM-WATER OUTFALL (AS FIELD LOCATED DURING JAN. 2009 SURVEY)

WETLANDS AREA

IMAGE SOURCE:
TOWN OF FAIRFIELD PLANNING AND ZONING COMMISSION, FAIRFIELD CT
AERIAL HIGH RESOLUTION TRUE COLOR COASTAL IMAGERY (SEPTEMBER 2004)

INCHES

Date:	5/27/09
Scale:	1" = 400' +/-
Proj. No.:	8014
File No.:	8014
Acad No.:	ACAD
Sheet:	1

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ENVIRONMENTAL - CIVIL - ENGINEERING - SURVEYING
CCA LLC

40 Old New Milford Road
Brookfield, CT 06804
(203)775-6207

33 Village Green Drive
Litchfield, CT 06759
(860)567-3179

ATTACHMENT II

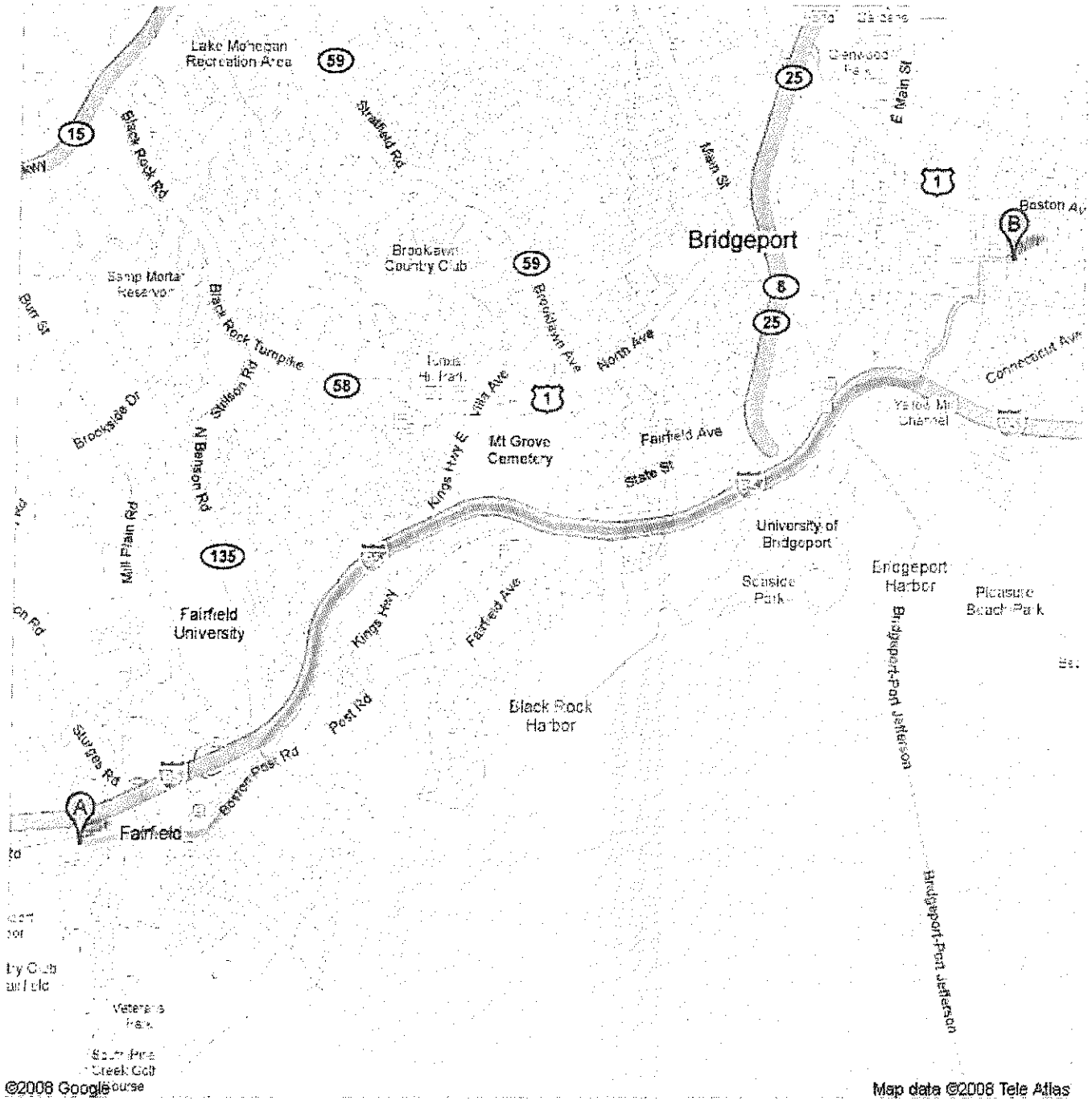
EMERGENCY FACILITIES ROUTE MAP
AND EMERGENCY NUMBERS LIST

Google Maps

Directions to 267 Grant St, Bridgeport, CT 06610

7.4 mi – about **12 mins**

Save trees. Go green
Download Google Maps on your phone at google.com/gmm



2190 Post Rd
Fairfield, CT 06824

1.	Head **east** on **Boston Post Rd/Post Rd/US-1** toward **Fairfield Pl** About 2 mins	go 1.3 mi total 1.3 mi
2.	Turn **left** at **N Benson Rd/CT-135**	go 0.1 mi total 1.4 mi
3.	Slight **right** to merge onto **I-95 N** toward **New Haven** About 5 mins	go 4.5 mi total 5.9 mi
4.	Take exit **28** toward **E Main St**	go 0.2 mi total 6.1 mi
5.	Merge onto **Ann St** About 1 min	go 0.2 mi total 6.3 mi
6.	Turn **left** at **Waterview Ave** About 2 mins	go 0.6 mi total 6.9 mi
7.	Slight **right** at **Crescent Ave**	go 472 ft total 7.0 mi
8.	Turn **left** at **Seaview Ave** About 1 min	go 0.2 mi total 7.2 mi
9.	Turn **right** at **Grant St** About 1 min	go 0.2 mi total 7.4 mi

267 Grant St
Bridgeport, CT 06610

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

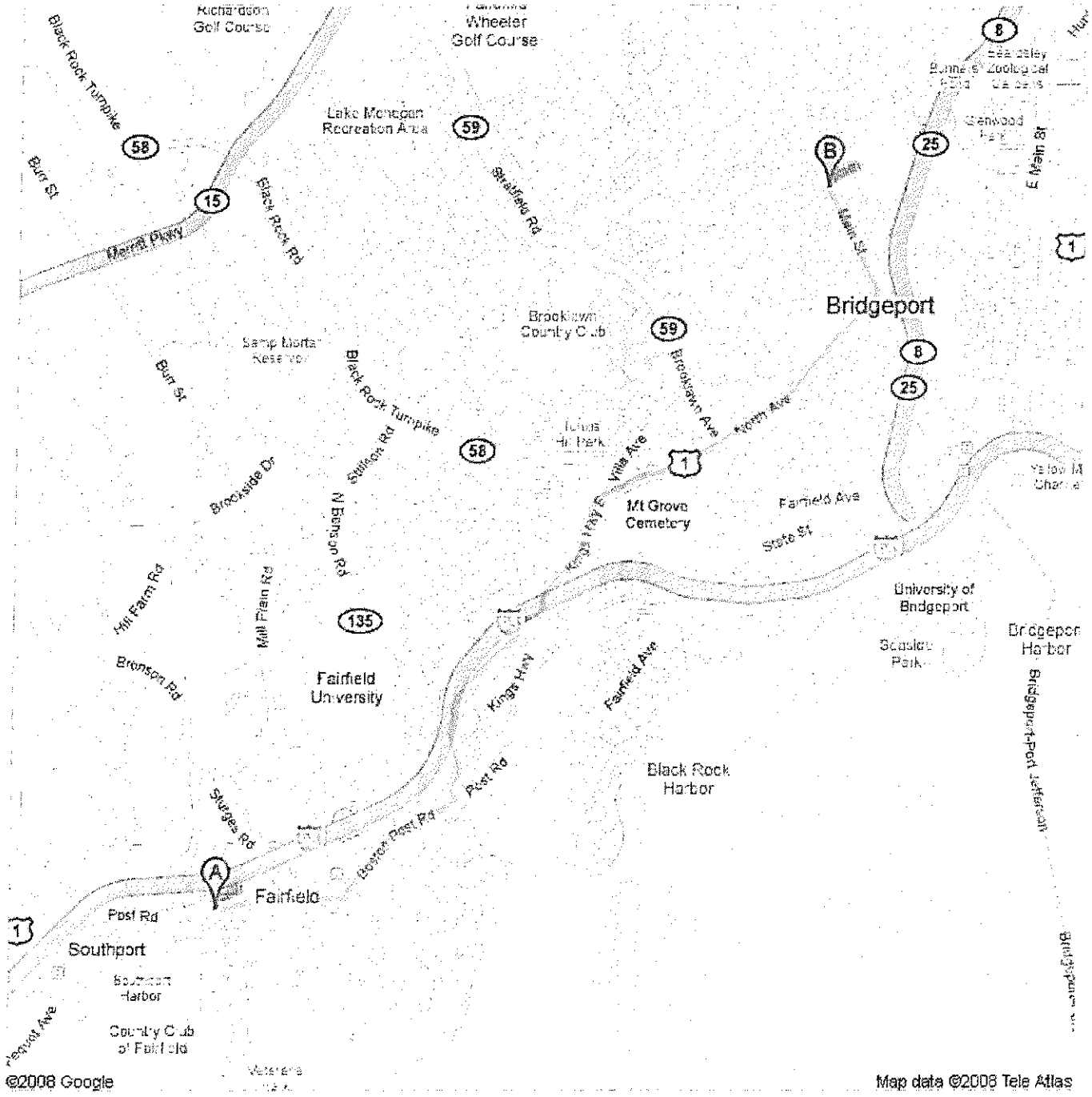
Map data ©2008 Tele Atlas

Google Maps

Directions to 2800 Main St, Bridgeport, CT 06606

6.5 mi – about **11 mins**

Save trees. Go green
Download Google Maps on your phone at **google.com/gmm**



A 2190 Post Rd
Fairfield, CT 06824

1. Head **east** on **Boston Post Rd/Post Rd/US-1** toward **Fairfield Pl** Continue to follow US-1 About 5 mins	go 2.9 mi total 2.9 mi
2. Slight **left** to stay on **US-1** About 4 mins	go 2.9 mi total 5.8 mi
3. Turn **left** at **Main St** About 1 min	go 0.7 mi total 6.5 mi

B 2800 Main St
Bridgeport, CT 06606

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2008 Tele Atlas

ATTACHMENT III

HEALTH AND SAFETY TRAINING CERTIFICATES

THE NATIONAL ENVIRONMENTAL TRAINERS

Paul Connelly

has satisfactorily passed an exam and completed an 8-hour annual refresher training course entitled

Hazardous Waste Operations and Emergency Response

meeting the requirements identified in Title 29 CFR 1910.120.

This course has been awarded 1.34 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals

NATIONAL ENVIRONMENTAL TRAINERS, Inc.

July 27, 2011

Course Number 1001, Awarded 8 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor

Clay A. Bednarz, MS, RPIH

THE NATIONAL ENVIRONMENTAL TRAINERS

Richard Chandler

has satisfactorily passed an exam and completed an 8-hour annual refresher training course entitled

Hazardous Waste Operations and Emergency Response

meeting the requirements identified in Title 29 CFR 1910.120.

This course has been awarded 1.34 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals

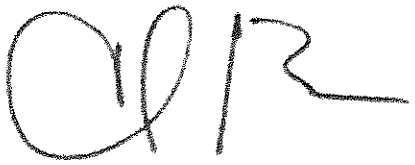
NATIONAL ENVIRONMENTAL TRAINERS, Inc.

August 01, 2011

Course Number 1001, Awarded 8 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor



Clay A. Bednarz, MS, RPIH

THE NATIONAL ENVIRONMENTAL TRAINERS

Ralph Klass

has satisfactorily passed an exam and completed an 8-hour annual refresher training course entitled

Hazardous Waste Operations and Emergency Response

meeting the requirements identified in Title 29 CFR 1910.120.

This course has been awarded 1.34 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals

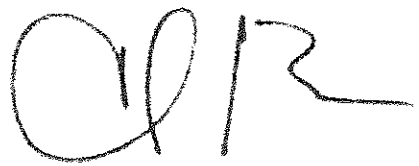
NATIONAL ENVIRONMENTAL TRAINERS, Inc.

August 20, 2011

Course Number 1001, Awarded 8 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor



Clay A. Bednarz, MS, RPIH

THE NATIONAL ENVIRONMENTAL TRAINERS

Matthew Winward

has satisfactorily passed an exam and completed an 8-hour annual refresher training course entitled

Hazardous Waste Operations and Emergency Response

meeting the requirements identified in Title 29 CFR 1910.120.

This course has been awarded 1.34 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals

NATIONAL ENVIRONMENTAL TRAINERS, Inc.

August 18, 2011

Course Number 1001, Awarded 8 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor

Clay A. Bednarz, MS, RPIH

THE NATIONAL ENVIRONMENTAL TRAINERS

Jessica Bilyard

has satisfactorily passed an exam and completed an 8-hour annual refresher training course entitled

Hazardous Waste Operations and Emergency Response

meeting the requirements identified in Title 29 CFR 1910.120.

This course has been awarded 1.34 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for .66 Continuance of Certification (COC) points from the Board of Certified Safety Professionals

NATIONAL ENVIRONMENTAL TRAINERS, Inc.

August 15, 2011

Course Number 1001, Awarded 8 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

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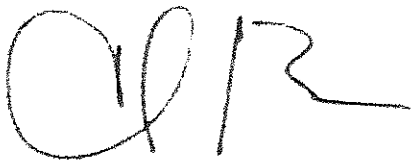
Signature of Instructor



Clay A. Bednarz, MS, RPIH

ATTACHMENT IV

TOXIC MATERIAL INFORMATION

Lead compounds

Formula	Not applicable
Description	Generic CHRIS entry

Registry Numbers and Inventories.

UN (DOT)	2291
Beilstein/Gmelin	NA

Properties.

Hazards and Protection.

Protection	Wear appropriate protective gloves, clothing and goggles.
Respirators	Wear positive pressure self-contained breathing apparatus (SCBA).
Small spills/leaks	Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Stop leak if you can do it without risk. Cover with plastic sheet to prevent spreading. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. DO NOT GET WATER INSIDE CONTAINERS.

Fire.

Fire fighting	Use method most appropriate to fight surrounding fire.
Fire potential	Non-Combustible
Combustion products	Fire may produce irritating, corrosive and/or toxic gases.

Health.

Exposure limit(s)	50 µg/m3 PEL
Carcinogin	G-A3, I-2B, CP65

Exposure effects

Inhalation	Highly toxic, may be fatal if inhaled, swallowed or absorbed through skin. Effects of contact or inhalation may be delayed.
Skin	Avoid any skin contact. See Inhalation.
Eyes	See Inhalation.

First aid

Ingestion	Seek medical assistance.
Inhalation	Move victim to fresh air. Apply artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult.
Skin	Remove and isolate contaminated clothing and shoes. Remove material from skin immediately. Immediately flush with running water for at least 20 minutes. For minor skin contact, avoid spreading material on unaffected skin.
Eyes	Immediately flush with running water for at least 20 minutes.

Transport.

UN number	2291
Response guide	151
Hazard class	6.1
Packing Group	III
USCG CHRIS Code	LEE

Polychlorinated biphenyls

- PCB
- Chloro-1,1'-biphenyl

Formula	$C_{12}H_9Cl_x$
Description	Pale yellow viscous liquid with a mild hydrocarbon odor

Registry Numbers and Inventories.

CAS	27323-18-8
EC (EINECS/ELINCS)	248-405-3
RTECS	DV2063000
RTECS class	Mutagen
UN (DOT)	2315
Beilstein/Gmelin	8189262

Properties.

Formula	C12H9Clx
Melting point, °C	10
Boiling point, °C	365
Solubility in water	Insoluble

Hazards and Protection.

Storage	Keep in a cool, dry, dark location in a tightly sealed container or cylinder. Keep away from incompatible materials, ignition sources and untrained individuals. Secure and label area. Protect containers/cylinders from physical damage.
Handling	All chemicals should be considered hazardous. Avoid direct physical contact. Use appropriate, approved safety equipment. Untrained individuals should not handle this chemical or its container. Handling should occur in a chemical fume hood.
Protection	Wear appropriate protective gloves, clothing and goggles.

Respirators	Wear positive pressure self-contained breathing apparatus (SCBA).
Small spills/leaks	Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent dust cloud. Avoid inhalation of asbestos dust.
Stability	No data.

Fire.

Flash Point,°C	348-356
Fire fighting	Small Fires: Dry chemical, carbon dioxide, water spray or regular foam. Large Fires: Water spray, fog or regular foam.
Fire potential	May burn but does not ignite readily.
Hazards	Containers may explode when heated.
Combustion products	Fire may produce irritating, corrosive and/or toxic gases.
NFPA **Health**	2
Flammability	1
Reactivity	0

Health.

Exposure effects	The toxological properties of this substance have not been fully investigated.
Inhalation	Inhalation of material may be harmful.
Skin	Contact may cause burns.
Eyes	See Skin.

First aid

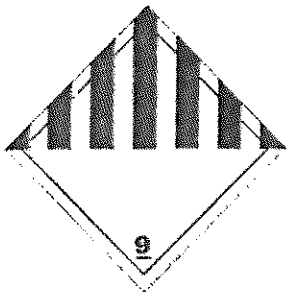
Ingestion	Seek medical assistance.
Inhalation	Move victim to fresh air. Apply artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult.
Skin	Remove and isolate contaminated clothing and shoes. Immediately flush with running water for at least 20 minutes.

Eyes Immediately flush with running water for at least 20 minutes.

Transport.

UN number 2315

Response guide 171



Hazard class 9

Packing Group II

Chromium

- Chrome

Formula	Cr
Structure	
Description	Steel-grey, lustrous metal, odorless, available as lumps, granules, powder or high purity single crystals.
Uses	Incr resistance & durability of metals, chromeplating other metals.

Registry Numbers and Inventories.

CAS	7440-47-3
EC (EINECS/ELINCS)	231-157-5
RTECS	GB4200000
RTECS class	Tumorigen; Mutagen
UN (DOT)	3089
Merck	12,2288
Beilstein/Gmelin	16274 (G)
RCRA	D007
Swiss Giftliste 1	G-6529
Canada DSL/NDSL	DSL
US TSCA	Listed
Austrailia AICS	Listed
New Zealand	Listed
Korea ECL	Listed

Properties.

Formula	Cr

Formula mass	51.996
Melting point, °C	1840
Boiling point, °C	2469
Vapor density (air=1)	7.14
Density	7.2 g/cm3 (20 C)
Solubility in water	Insoluble
Heat of fusion	679.0 kJ/mol
Heat of vaporization	298.8 kJ/mol

Hazards and Protection.

Storage	Keep away from heat, sparks, and flame. Store in a tightly closed container. Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from acids. Keep containers tightly closed. Do not expose to air. Store under an inert atmosphere.
WHMIS	Insufficient information
Handling	Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Minimize dust generation and accumulation. Use spark-proof tools and explosion proof equipment. Avoid contact with skin and eyes. Keep container tightly closed. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Handle under an inert atmosphere.
Protection	Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Skin: Wear appropriate gloves to prevent skin exposure. Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators	Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Small spills/leaks	Clean up spills immediately, using the appropriate protective equipment. Sweep up or absorb material, then place into a suitable clean, dry, closed container for disposal. Avoid generating dusty conditions. Remove all sources of ignition. Isolate area and deny entry. Place under an inert atmosphere. Do not use combustible materials such as paper towels to clean up spill.
Stability	Stable under normal temperatures and pressures. Powder or liquid is pyrophoric.
Incompatibilities	Ammonium nitrate, hydrogen peroxide, lithium, nitric oxiode, potassium chlorate, sulfuri dioxide, strong oxidizers, hydrochloric acid, sulfuric acid, nitrogen oxide,
Decomposition	Toxic chromium oxide fumes.

Fire.

Autoignition, °C	400
Fire fighting	DO NOT USE WATER, FOAM OR carbon dioxide. Dousing metallic fires with water may generate hydrogen gas, an extremely dangerous explosion hazard, particularly if fire is in a confined environment. Use DRY sand, graphite powder, dry sodium chloride based extinguishers, G-1 or Met-L-X powder. Confining and smothering metal fires is preferable rather than applying water.
Fire potential	Moderately flammable. Combustion with moderate heating.
Hazards	Oxides from metallic fires are a severe health hazard. Fire may produce irritating, corrosive and/or toxic gases.
NFPA Health	2
Flammability	1
Reactivity	1

Health.

Exposure limit(s)	OSHA PEL: TWA 1 mg/m3 See Appendix C *Note: The PEL also applies to insoluble chromium salts. NIOSH REL: TWA 0.5 mg/m3 See Appendix C NIOSH IDLH: 250 mg/m3 (as Cr)
Poison_Class	-

Exposure effects	Prolonged inhalation may cause respiratory tract inflammation and lung damage.
Ingestion	May cause irritation of the digestive tract. May cause liver damage.
Inhalation	Causes respiratory tract irritation. Inhalation of fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May cause asthma and shortness of breath. May cause headache, coughing, fever, weight loss, and pneumoconiosis.
Skin	Causes skin irritation. Prolonged and/or repeated contact may cause irritation and/or dermatitis. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Eyes	Causes eye irritation. May cause conjunctivitis.

First aid

Ingestion	Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation	Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. DO NOT use mouth-to-mouth respiration.
Skin	Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.
Eyes	Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately.

Response guide	170
Hazard class	4.1
Packing Group	II; III
USCG CHRIS Code	CRR
HS Code	8112 29 00

http://www.epa.gov/iaq/voc.html
Last updated on Wednesday, September 17th, 2008.

Indoor Air Quality

An Introduction to Indoor Air Quality

Organic Gases (Volatile Organic Compounds - VOCs)

Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. VOCs are emitted by a wide array of products numbering in the thousands. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions.

Pollutants and Sources of Indoor Air Pollution

- Asbestos
- Biological Pollutants
- Carbon Monoxide
- Formaldehyde/Pressed Wood Products
- Household Cleaning and Maintenance, Personal Care, or Hobbies
- Lead
- Nitrogen Dioxide
- Pesticides
- Radon
- Respirable Particles
- Secondhand Smoke/Environmental Tobacco Smoke
- Stoves, Heaters, Fireplaces, and Chimneys

Read "The Inside Story: A Guide to Indoor Air Quality"

Organic chemicals are widely used as ingredients in household products. Paints, varnishes, and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic, degreasing, and hobby products. Fuels are made up of organic chemicals. All of these products can release organic compounds while you are using them, and, to some degree, when they are stored.

EPA's Total Exposure Assessment Methodology (TEAM) studies found levels of about a dozen common organic pollutants to be 2 to 5 times higher inside homes than outside, regardless of whether the homes were located in rural or highly industrial areas. Additional TEAM studies indicate that while people are using products containing organic chemicals, they can expose themselves and others to very high pollutant levels, and elevated concentrations can persist in the air long after the activity is completed.

Contents

Sources

Household products including: paints, paint strippers, and other solvents; wood preservatives; aerosol sprays; cleansers and disinfectants; moth repellents and air

fresheners; stored fuels and automotive products; hobby supplies; dry-cleaned clothing.

Health Effects

Eye, nose, and throat irritation; headaches, loss of coordination, nausea; damage to liver, kidney, and central nervous system. Some organics can cause cancer in animals; some are suspected or known to cause cancer in humans. Key signs or symptoms associated with exposure to VOCs include conjunctival irritation, nose and throat discomfort, headache, allergic skin reaction, dyspnea, declines in serum cholinesterase levels, nausea, emesis, epistaxis, fatigue, dizziness.

The ability of organic chemicals to cause health effects varies greatly from those that are highly toxic, to those with no known health effect. As with other pollutants, the extent and nature of the health effect will depend on many factors including level of exposure and length of time exposed. Eye and respiratory tract irritation, headaches, dizziness, visual disorders, and memory impairment are among the immediate symptoms that some people have experienced soon after exposure to some organics. At present, not much is known about what health effects occur from the levels of organics usually found in homes. Many organic compounds are known to cause cancer in animals; some are suspected of causing, or are known to cause, cancer in humans. For more information on health effects, see EPA's Substance Registry System on VOCs.

Levels in Homes

Studies have found that levels of several organics average 2 to 5 times higher indoors than outdoors. During and for several hours immediately after certain activities, such as paint stripping, levels may be 1,000 times background outdoor levels.

Steps to Reduce Exposure

Increase ventilation when using products that emit VOCs. Meet or exceed any label precautions. Do not store opened containers of unused paints and similar materials within the school. Formaldehyde, one of the best known VOCs, is one of the few indoor air pollutants that can be readily measured. Identify, and if possible, remove the source. If not possible to remove, reduce exposure by using a sealant on all exposed surfaces of paneling and other furnishings. Use integrated pest management techniques to reduce the need for pesticides.

- Use household products according to manufacturer's directions.
- Make sure you provide plenty of fresh air when using these products.
- Throw away unused or little-used containers safely; buy in quantities that you will use soon.
- Keep out of reach of children and pets.
- Never mix household care products unless directed on the label.

Follow label instructions carefully.

Potentially hazardous products often have warnings aimed at reducing exposure of the user. For example, if a label says to use the product in a well-ventilated area, go outdoors or in areas equipped with an exhaust fan to use it. Otherwise, open up windows to provide the

maximum amount of outdoor air possible.

Throw away partially full containers of old or unneeded chemicals safely.

Because gases can leak even from closed containers, this single step could help lower concentrations of organic chemicals in your home. (Be sure that materials you decide to keep are stored not only in a well-ventilated area but are also safely out of reach of children.) Do not simply toss these unwanted products in the garbage can. Find out if your local government or any organization in your community sponsors special days for the collection of toxic household wastes. If such days are available, use them to dispose of the unwanted containers safely. If no such collection days are available, think about organizing one.

Buy limited quantities.

If you use products only occasionally or seasonally, such as paints, paint strippers, and kerosene for space heaters or gasoline for lawn mowers, buy only as much as you will use right away.

Keep exposure to emissions from products containing methylene chloride to a minimum.

Consumer products that contain methylene chloride include paint strippers, adhesive removers, and aerosol spray paints. Methylene chloride is known to cause cancer in animals. Also, methylene chloride is converted to carbon monoxide in the body and can cause symptoms associated with exposure to carbon monoxide. Carefully read the labels containing health hazard information and cautions on the proper use of these products. Use products that contain methylene chloride outdoors when possible; use indoors only if the area is well ventilated.

Keep exposure to benzene to a minimum.

Benzene is a known human carcinogen. The main indoor sources of this chemical are environmental tobacco smoke, stored fuels and paint supplies, and automobile emissions in attached garages. Actions that will reduce benzene exposure include eliminating smoking within the home, providing for maximum ventilation during painting, and discarding paint supplies and special fuels that will not be used immediately.

Keep exposure to perchloroethylene emissions from newly dry-cleaned materials to a minimum.

Perchloroethylene is the chemical most widely used in dry cleaning. In laboratory studies, it has been shown to cause cancer in animals. Recent studies indicate that people breathe low levels of this chemical both in homes where dry-cleaned goods are stored and as they wear dry-cleaned clothing. Dry cleaners recapture the perchloroethylene during the dry-cleaning process so they can save money by re-using it, and they remove more of the chemical during the pressing and finishing processes. Some dry cleaners, however, do not remove as

much perchloroethylene as possible all of the time. Taking steps to minimize your exposure to this chemical is prudent. If dry-cleaned goods have a strong chemical odor when you pick them up, do not accept them until they have been properly dried. If goods with a chemical odor are returned to you on subsequent visits, try a different dry cleaner.

Standards or Guidelines

No standards have been set for VOCs in non industrial settings. OSHA regulates formaldehyde, a specific VOC, as a carcinogen. OSHA has adopted a Permissible Exposure Level (PEL) of .75 ppm, and an action level of 0.5 ppm. HUD has established a level of .4 ppm for mobile homes. Based upon current information, it is advisable to mitigate formaldehyde that is present at levels higher than 0.1 ppm.

Additional Resources

Indoor Air Fact Sheet No. 4 (revised) - Sick Building Syndrome

Explains the term "sick building syndrome" (SBS) and "building related illness" (BRI). Discusses causes of sick building syndrome, describes building investigation procedures, and provides general solutions for resolving the syndrome.

- HTML Version
- **[EPA 402-F-94-004, April 1991]**

Indoor Air Pollution: An Introduction for Health Professionals

Assists health professionals (especially the primary care physician) in diagnosis of patient symptoms that could be related to an indoor air pollution problem. Addresses the health problems that may be caused by contaminants encountered daily in the home and office. Organized according to pollutant or pollutant groups such as environmental tobacco smoke, VOCs, biological pollutants, and sick building syndrome, this booklet lists key signs and symptoms from exposure to these pollutants, provides a diagnostic checklist and quick reference summary, and includes suggestions for remedial action. Also includes references for information contained in each section. This booklet was coauthored with the American Lung Association, the American Medical Association, and the U.S. Consumer Product Safety Commission.

- HTML Version
- **[EPA 402-R-94-007, 1994]**

APG

Analytical Products Group, Inc.

2730 Washington Blvd., Belpre, OH 45714
740-423-4200 800-272-4442 Fax 740-423-5588

Material Safety Data Sheet

Date prepared on: 10/11/05

Last revised on: 1/20/08

Page 1

Section I: Product Identification

CATALOG NUMBER: 4790, 4792, 224790	PRODUCT NAME: Total Petroleum Hydrocarbons

Section II - Hazardous Ingredients/Identity Information

Chemical Name	CAS Reg. No.	OSHA PEL (TWA)	% Composition*
Acetone	67-64-1	750ppm	>90%
Stearic Acid	57-11-4	Not available	<0.02%
Hexadecane	544-76-3	Not available	<0.02%

Non-Hazardous Ingredients/Identity Information

Chemical Name	CAS Reg. No.	OSHA PEL (TWA)	% Composition*

* Components are calculated on a weight/weight basis.

Section III - Physical/Chemical Characteristics of Hazardous Ingredients

Acetone

BOILING POINT: 56 C (132 F) @ 760 mm Hg		SPECIFIC GRAVITY: 0.79 (water=1)
VAPOR PRESSURE: 181 (20 C)	SOLUBILITY IN WATER: Complete	APPEARANCE/ODOR: Clear, colorless liquid, sweet odor (acetone)

Section IV - Fire and Explosion Hazard Data

FLASH POINT (Method used): -18 C (-2 F) Closed Cup.	AUTO IGNITION TEMPERATURE: 464 C (869 F)	FLAMMABLE LIMITS Not available	LEL 2.5%	UEL 13%
EXTINGUISHING MEDIA: Use alcohol foam, dry chemical or carbon dioxide (water may be ineffective). Use extinguisher media appropriate for surrounding fire.				
SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face piece operated in positive mode. Move containers from fire area if it can be done without risk. Use water to keep fire exposed containers cool.				
UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors may flow along surfaces to distant ignition sources and flash back. Closed containers exposed to heat may explode. Contact with strong oxidizers may cause fire.				

Section V - Reactivity Data

STABILITY:	Unstable ☐	Stable ☒	Conditions to Avoid: Heat, flame, other sources of ignition.
INCOMPATIBILITY (Materials to avoid): Strong oxidizing agents, strong bases, halogen acids and halogen compounds, caustics, amines and ammonia, chlorine and chlorine compounds, strong acids, esp. sulfuric, nitric, hydrochloric.			
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide, toxic fumes of chlorine.			
HAZARDOUS POLYMERIZATION:	May Occur ☐	Will Not Occur ☒	Conditions to Avoid: NA

Section VI - Health Hazard Data

ROUTES OF ENTRY	Inhalation? YES	Skin? YES	Ingestion? YES
HEALTH HAZARDS (Acute and Chronic): ACUTE: Irritation of the nose and throat. CHRONIC: Kidney damage, liver damage.			
COMPONENTS LISTED AS CARCINOGENS OR POTENTIAL CARCINOGENS: Total of acid extractable compounds are less than 1%. Some are on the IARC list.			
SIGNS AND SYMPTOMS OF EXPOSURE: Irritation of skin, eyes, nose and throat. Headache, dizziness, vomiting, nausea, central nervous system despression, low blood pressure and respiratory failure. Prolonged contact may cause dermatitis.			
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Skin disorders, eye disorders, chronic respiratory disease.			
EMERGENCY AND FIRST AID PROCEDURES: Seek medical assistance for treatment, observation and support if necessary. EYE CONTACT: Flush with water for 15 minutes. Seek medical attention. SKIN CONTACT: Wash with soap and water, use protective creams. INHALATION: Remove to fresh air, if not breathing give artificial respiration. If breathing difficult, give oxygen, obtain medical assistance.			

Section VII - Precautions for Safe Handling and Use

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Diluted standard can be absorbed with sand or other non-combustible absorbent material and placed into a container for later disposal. Sample solutions should be absorbed with charcoal or other organic absorbent and incinerated. Flush area with water.
WASTE DISPOSAL METHOD: Dispose in accordance with all applicable federal, state, and local regulations.
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep container tightly closed. Store in a cool, dry, well ventilated, flammable liquid storage area. Isolate from incompatible materials.
OTHER PRECAUTIONS* Do not heat or evaporate analytical standards to dryness.

Section VIII - Control Measures

RESPIRATORY PROTECTION (Please specify): Respiratory protection required if airborne concentration exceeds PEL (750 ppm). At concentrations up to 5000 ppm a chemical cartridge respirator with an organic vapor cartridge is recommended. Above this level, self -contained breathing apparatus is recommended. (20,000 ppm is immediately dangerous to life or health).	
VENTILATION: Local exhaust	
PROTECTIVE GLOVES: Butyl rubber gloves.	EYE PROTECTION: Safety glasses or goggles.
OTHER PROTECTIVE EQUIPMENT: Impervious Clothing	
EMERGENCY WASH FACILITIES: Maintain eye wash and quick drench showers in work area.	

The information stated in this Material Safety Data Sheet (MSDS) is believed to be correct on the date of publication and must not be considered all conclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. Persons not specifically and properly trained should not handle this chemical or its container. This MSDS is provided without any warranty expressed or implied, including merchantability or fitness for any particular purpose.

This product is furnished for laboratory use ONLY! Our standards may not be used as drugs, cosmetics, agricultural or pesticidal products, food additives or as house hold chemicals.

* Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Environmental Protection Agency, and others) may have specific regulations concerning the transportation, handling, storage or use of this product which may not be contained herein. The customer or user of this product should be familiar with these regulations.

Appendix F- MSDS

Organic Cationic Coagulant
Solve 416

Material Safety Data Sheet

Date Issued: 10 01 2006
Date Revised: 09 26 2006

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: SOLVE 416
CHEMICAL FAMILY: Quatenary ammonium homopolymer
SYNONYMS: Polydimethyldially ammonium chloride
Molecular Formula: Polymer
Molecular Weight: Polymer

COMPANY: WaterSolve LLC, Starr St. SE, Grand Rapids, MI 49546 USA
For Product information call 616-575-8693

EMERGENCY PHONE: For emergency involving spill, leak, fire, exposure or accident call CHEMTREC 1-800-424-9300 Outside the USA and Canada call 703-527-3887.

2. COMPOSITION/INFORMATION ON INGREDIENTS

OSHA Regulated Components
No Permissible Exposure Limits (PEL TLV) have been established by OSHA or ACGIH

Component	CAS #	%
Polydiallyldimethyl ammonium chloride	026062-79-3	10 – 70 %
Water	007732-18-05	30 – 90 %
Diallyldimethyl ammonium chloride	007398-69-8	1 %
Sodium Chloride	007647-14-5	1 %
Ammonium Sulfate	007783-20-2	0 4 %

3. HAZARDS IDENTIFICATION

Emergency Overview
Appearance and odor: Straw liquid, characteristic odor.
Statement of Hazard: Caution! May cause skin irritation
Important! Spills of this product are very slippery when wet.

Potential Health effects
Effects of overexposure:
The acute oral (rat) LD 50, acute dermal (rabbit) LD50 and 4-hour inhalation (rat) LC 50 values are >10,000 mg kg, >10,000 mg kg, and > 20 mg L, respectively. Direct contact with this material may cause minimal eye or skin irritation

4. FIRST AID MEASURES

Ingestion
Material is not expected to be harmful by ingestion. No specific first aid measures are required.

Skin Contact
Wash immediately with plenty of water and soap.

Eye Contact:
Rinse immediately with plenty of water for at least 15 minutes.

Inhalation:
Material is not expected to be harmful if inhaled Remove to fresh air.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media:
Use water spray, carbon dioxide or dry chemical.

Protective Equipment:
Firefighters, and others exposed, wear self-contained breathing apparatus.

Special Hazards:
Keep containers cool by spraying with water if exposed to fire.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Refer to Section 8 (Exposure Controls Personal Protection) for appropriate personal protective equipment

Methods For Cleaning Up:
Products may cause a slip hazard Spilled material should be absorbed onto an inert material and scooped up. Flush spill area thoroughly with water and scrub to remove residue. If slipperiness remains apply more dry-sweeping compound.

7. HANDLING AND STORAGE

HANDLING
Precautionary Measures: Spills should be scooped up or wiped up immediately and the spill area flushed with water.
Special Handling Statements None

STORAGE
To avoid product degradation and equipment corrosion do not use iron copper or aluminum containers or equipment

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures:
Engineering controls are not usually necessary if good hygiene practices are followed.

Respiratory Protection:
Not recommended.

Eye Protection:
Wear eye face protection.

Skin Protection:
Avoid skin contact. Wear impermeable gloves

Additional Advice:
Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor:	Straw colored liquid, characteristic odor
Boiling Point:	~100°C 212°F
Melting Point:	Not applicable
Vapor Pressure:	Not applicable
Specific Gravity:	1.08 – 1.09
Vapor Density:	Not applicable
% Volatile (By Wt):	~60
pH:	5 – 7
Saturation in Air (% by Vol):	Not applicable
Evaporation Rate:	Not applicable
Solubility in Water:	Complete
Volatile Organic Content:	Not available
Flash point:	Not applicable
Flammable Limits (% by vol):	Not available
Autoignition temp:	Not available
Decomposition temp:	Not available
Odor Threshold	Not available
Partition coefficient (n-octanol/water)	Not available

10. STABILITY AND REACTIVITY

Stability:	Stable
Conditions to avoid:	None known
Polymerization:	Will not occur
Conditions to Avoid	None known
Incompatible Materials	Strong oxidizing agents.
Hazardous Decomposition Products	Oxides of nitrogen Hydrogen chloride Oxides of carbon

11. TOXICOLOGICAL INFORMATION

Toxicological information for the product is found under Section 3.
Toxicological information on the OSHA regulated components of this product is as follows

12. ECOLOGICAL INFORMATION LC50

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. All ecological information provided was conducted on a structurally similar product. Acute toxicity tests conducted on the polymer using environmentally representative water gave the following results:

Green Algae (*Selenastrum capricornutum*). 72 hr IC50 = 10 - 100 mg l
Water Flea (Daphnia magna) 48hr EC 50 = 10-100 mg l
Zebra Fish (brachydanio rerio) 96hr LC 50 10 >100 mg l

DEGRADATION
Test: CO2 Evolution: Modified Sturm (OECD 301B)
Duration: 28 day
Procedure: Ready biodegradability ~70%
This material is not readily biodegradable (OECD 301B). The large polymer size is incompatible with transport across biological membranes and diffusion; the bioconcentration factor is therefore considered to be zero.

13. DISPOSAL CONSIDERATIONS

The information on RCRA waste classification and disposal methodology provided below applies only to the product, as applied. If the material has been altered or contaminated, or it has exceeded its recommended shelf life, the guidance may be inapplicable. Hazardous waste classification under federal regulations (40 CFR Part 261 et seq) is dependent upon whether a material is a RCRA "listed hazardous waste" or has any of the four RCRA "hazardous waste characteristics." Refer to 40 CFR Part 261.33 to determine if a given material to be disposed of is a RCRA "listed hazardous waste"; information contained in Section 15 of this MSDS is not intended to indicated if the product is a "listed hazardous waste." RCRA Hazardous Waste Characteristic There are four characteristics defined in 40 CFR Section 261.21-61.24: Ignitability, Corrosivity, Reactivity, and Toxicity. To determine Ignitability, See Section 5 of this MSDS (flash point). For Corrosivity, see sections 9 and 14 (pH and DOT corrosivity). For Reactivity, see Section 10 (incompatible materials). For Toxicity, see Section 2 (composition). Federal regulations, may also apply to the classification of the material to be disposed. WaterSolve encourages the recycle, recovery and reuse of materials classified as RCRA hazardous wastes to be disposed of by thermal treatment or incineration at EPA approved facilities. WaterSolve has provided the foregoing for information only, the person generating the waste is responsible for determining the waste classification and disposal method

14. TRANSPORT INFORMATION

This section provides basic shipping classification information Refer to appropriate transportation regulations for specific requirements.
USDOT

Proper Shipping Name: Not applicable Not regulated
Hazardous Substances. Not applicable

TRANSPORT CANADA
Proper Shipping Name: Not applicable Not regulated

ICAO IATA

Proper Shipping name: Not applicable Not regulated
Packing instructions maximum net quantity per package:
Passenger Aircraft:
Cargo Aircraft:

IMO

Proper shipping name. Not applicable Not regulated

15. REGULATORY INFORMATION

INVENTORY INFORMATION

USA . All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical I inventory.

Canada: All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL

European Union (EU): All components of this product are included on the European Inventory of Existing Chemical Substances (EINECS) or are not required to be listed on EINECS.

Australia: All components of this product are included in the Australian Inventory of Chemical Substances(AICA).

China: All components of this product are included on the Chinese inventory or are not required to be listed on the Chinese Inventory.

Japan: All components of this product are included on the Japanese (ENCS) inventory or are not required to be listed ion the Japanese Inventory.

Korea: All components of this product are included on the Korean (ECL) inventory or are not required to be listed on the Korean inventory

Philippines: All components of this product are included on the Philippine (PICCS) inventory or are not required to be listed on the Philippine inventory.

OTHER ENVIRONMENTAL INFORMATION

The following components of this product may be subject to reporting requirements pursuant to Section 313 of CERCLA (40 CFR 372). Section 12(b) of TSCA. or may be subject to release

reporting requirements (40 CFR 307, 40 CFR 311, etc) See Section 13 for information on waste classification and waste disposal of this product. This product does not contain any components regulated under sections of the EPA

Product Classification under section 311 of SARA
Not applicable

16. **OTHER INFORMATION**

NFPA HAZARD RATING (National Fire Protection Association)

Health 2- Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

Fire 1 – Materials that must be preheated before ignition can occur.

Reactivity 0 –Materials that in themselves are normally stable even under fire exposure conditions

REASON FOR ISSUE New Format

This information is for the specific material described only and may not be valid if the material is used in combination with any other materials or in any process. The user is responsible to determine the completeness of the information and suitability for the user's own particular use. The knowledge and belief of WaterSolve, LLC, the information is accurate and reliable as of the date indicated but WaterSolve, LLC makes no express or implied warranty of merchantability for the material or the information. WaterSolve LLC makes no express or implied warranty of fitness for a purpose for the material or for the information

Organic Anionic Flocculant
Solve 9330

Material Safety Data Sheet

Date Issued. 10 07 2008
Date Revised: 10 07 2008

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: SOLVE 9330
CHEMICAL TYPE: Anionic emulsion polymer
COMPANY: WaterSolve LLC. 4964 Starr ST SE Grand Rapids MI 49546 USA
For Product information call 616-575-8693
EMERGENCY NUMBER (800) 424-9300 CHEMTEC

2. HAZARDS IDENTIFICATION

Emergency overview
Appearance: liquid. white

- CAUTION! MAY CAUSE EYE IRRITATION. MAY CAUSE SKIN AND RESPIRATORY TRACT IRRITATION. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE DERMATITIS AND BURNS. NOTICE: WHILE THIS MATERIAL HAS A LOW LEVEL OF TOXICITY. GOOD INDUSTRIAL HYGIENE PRACTICES ARE INCOURAGED TO MINIMIZE EXPOSURE.

Potential health effects

Route of exposure
Inhalation. skin absorption. skin contact. eye contact. ingestion

Eye contact
Can cause eye irritation. Symptoms include stinging. tearing. redness. and swelling of eyes

Skin contact
Can cause skin irritation. Symptoms may include redness and burning of skin. and other skin damage. Prolonged or repeated contact may dry the skin. Symptoms may include redness. burning. and drying and cracking of skin. skin burns. and other skin damage

Ingestion
Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful

Inhalation
It is possible to breathe this material under certain conditions of handling and use (for example. during heating. spraying. or stirring). Symptoms are not expected at air concentrations below the recommended exposure limits. if applicable (see Section8).

Aggravated Medical Conditions
Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: Skin. lung (for example. asthma-like conditions). skin upper respiratory tract.

Symptoms
Signs and symptoms of exposure to this material through breathing, swallowing, and or passage of the material through the skin may include: stomach or intestinal upset (nausea, vomiting, diarrhea) irritation (nose, throat, airways), lung irritation, cough, difficulty breathing, central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness) lack of coordination, confusion, irregular heartbeat, narcosis (dazed or sluggish feeling), convulsions, coma.

Target Organs
Exposure to this material (or a component) has been found to cause kidney damage in male rats. The mechanism by which this toxicity occurs is specific to the male rat and the kidney effects are not expected to occur in humans. Studies with rabbits indicate that sustained, included skin contact with undiluted surfactant may result in the development of inflammatory changes in the lung. Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals: mild, reversible liver effects mild, reversible kidney affects.

Carcinogenicity
This product (or a component) is a petroleum-derived material. Similar materials and certain compounds occurring naturally in petroleum oils have been shown to cause skin cancer in laboratory animals following repeated exposure without washing or removal. 2-Ethylhexanol did not cause cancer in male mice or in male or female rats when given to the animals through a stomach tube. It caused a possible increase in liver Tumors in female mice. This material is not listed as a carcinogen by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), or the Occupational Safety and Health Administration (OSHA).

Reproductive hazard
There are no Data available for assessing risk to the fetus from material exposure to this material. Based on the available information, risk to the fetus from maternal exposure to this material cannot be assessed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Cas#	Component	Percent
254504001-5181	Polymer	>=30-<40%
25404001-5164	Aliphatic hydrocarbon	>=20-<30%
	Nonionic surfactant	>=1.5-<5%
127087-87-0	Ethoxylated nonylphenol	>=1-<1.5%
	polyoxyalkylene	

4. FIRST AID MEASURES

Eye Contact: If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes, while holding eyelids open. Consult a physician.

Skin Contact: Remove contaminated clothing. Flush exposed area with large amounts of water. If skin is damaged, seek immediate medical attention. If skin is not damaged and symptoms persist, seek medical attention. Launder clothing before reuse

Ingestion: Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation: If symptoms develop, move individual away from exposure and into fresh air. If Symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet, seek immediate medical attention.

Notes to physician

Hazards: This material is an aspiration hazard. Potential danger from aspiration must be weighed against possible oral toxicity when deciding whether to induce vomiting
Treatment: No information available

5. FIRE FIGHTING MEASURES

Hazardous combustion products: Hydrocarbons, carbon dioxide and carbon monoxide, nitrogen oxides(NOx)
Suitable extinguishing media: Dry chemical, carbon dioxide (CO_2), water spray

Protective equipment for firefighters: Wear full firefighting turn-out gear (full Bunker gear), and Respiratory protection (SCBA). DO NOT direct a solid stream of water or foam into hot, burning pools of liquid since this may cause frothing and increase fire intensity. Frothing can be violent and possibly endanger any firefighter standing too close to the burning liquid. Use water spray to cool fire exposed containers and structures until fire is out if it can be done with minimal risk. Avoid spreading burning liquid with water used for cooling purposes.

Flammability Class for Flammable Liquids:
Combustible Liquid Class IIIB.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
For personal protection see Section 8. Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.

Environmental precautions: Prevent spreading over a wide area (e.g. by containment or oil barriers). Do not let product enter drains. Do not flush into surface water or sanitary sewer system.

Methods for cleaning up: Keep in suitable, closed containers for disposal. Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).

Other information: Comply with all applicable federal, state, and local regulations

7. HANDLING AND STORAGE

Handling: Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.

Storage: Store in a cool, dry ventilated area

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ALIPHATIC HYDROCARBON **NJTS# 254504001-5164**

ACGIH	Time weighted average	200 mg/m³	Non-aerosol
NIOSH	**Recommended exposure limit (REL)**	100 mg/m³	
ACGIH	**Time weighted average**	200 mg/m³	Non-aerosol

General advice: These recommendations provide general guidance for handling this product. Personal Protective Equipment should be selected for individual for individual applications and should consider factors which affect exposure potential, such as handling practices, chemical concentrations and ventilation. It is ultimately the responsibility of the employer to follow regulatory guidelines established by local authorities

Exposure controls: Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known suspected or apparent adverse effects

Personal protection equipment

Respiratory protection: A NOISH-approved air-purifying respirator with an appropriate cartridge and/or filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits (if applicable) or if overexposure has otherwise been determined Protection provided by air-purifying respirators is limited. Use a positive pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are not known or any other circumstances where an air-purifying respirator may not provide adequate protection.

Hand Protection: Impervious gloves (rubber or neoprene) are recommended. Discard gloves that show tears, pinholes, or signs of wear.

Eye protection: Wear chemical splash goggles when there is the potential for exposure of the eyes to liquid, vapor or mist. Maintain eye wash station near work area.

Skin/body protection: Wear resistant gloves (consult your safety equipment supplier). Wear normal work clothing including long pants, long-sleeved shirt and foot covering to prevent direct contact of the product with the skin. Launder clothing before reuse. If skin irritation develops, contact your facility health and safety professional or your local safety equipment supplier to determine the proper personal protective equipment for your use. Discard gloves that show tears, pinholes, or signs of wear.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	liquid
Color:	white
Odor:	oily
pH:	8.0 @ 20g/L
Solubility (H_2O):	soluble in water
Evaporation Rate	<1 (butyl acetate=1)
Explosion Limits:	No data.
Vapor pressure:	No data.
Vapor Density:	No data.
Density:	1.03g/cm3 @ 68°F /20°C

Partition coefficient: n-octanol water:	No data.
Log Pow	No data.
Autoignition temperature	No data.
Boiling point boiling range:	96.00°C 205°F
Melting Point (°C):	-23°F -5°C
Flash point:	212°F 100°C

10. STABILITY AND REACTIVITY

Stability: Stable under usual application conditions.
Conditions to avoid: Heat, flames and sparks.

Hazardous Decomposition Products:
Hydrocarbons, carbon dioxide and carbon monoxide, nitrogen oxides (NOx) Acid, smoke and fumes

Incompatibility: Strong oxidizing agents, acids strong reducing agents.

Hazardous Polymerization: Product will not undergo hazardous polymerization.
Thermal Decomposition: No data.

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity

Polymer	No data available.
ALIPHATIC HYDROCARBON	LD50 Rat: >8.000 mg/kg
NONIONIC SURFACTANT	NO DATA AVAILABLE
ETHOXYLATED NONYLPHENOL POLYOXYALKYLENE	NO DATA AVAILABLE

Acute inhalation toxicity

Polymer	No data available
ALIPHATIC HYDROCARBON	LD 50 Rat: >2.500ppm. 4h
ETHOXYLATED NONYLPHENOL POLYOXYALKYLENE	NO DATA AVAILABLE
NONIONIC SURFACTANT	NO DATA AVAILABLE

Acute dermal toxicity

Polymer	No data available.
ALIPHATIC HYDROCARBON	LD50 Rabbit: >4.000mg/kg
ETHOXYLATED NONYLPHENOL POLYOXYALKYLENE	NO DATA AVAILABLE
NONIONIC SURFACTANT	NO DATA AVAILABLE

5. ECOLOGICAL INFORMATION

Aquatic toxicity

Acute and Prolonged Toxicity to Fish
96 h LC50 leuciscus idus (Golden orfe) ca.175mg L
This information given is based on data on the components and the ecotoxicology of similar products

Acute Toxicity to Aquatic Invertebrates
No data.

Environmental Fate and Pathways:
Ca 470 mg g
Based on similar product information.

Ca 1.020 mg g
Based on similar product information

13. DISPOSAL CONSIDERATIONS

Disposal Instructions:
Contain and collect using absorbent material if needed Follow all federal, State and local laws

14. TRANSPORT INFORMATION

Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region specific exceptions that can be applied Consult shipping documents for descriptions that are specific to the shipment

15. REGULATORY INFORMATION

California Prop. 65
WARNING! This product contains a chemical known in the State of California to cause cancer.
ACRYLAMIDE
ETHYLENE OXIDE
ACETALDEHYDE
FORMALDEHYDE
1, 4-DIOXANE

WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm

ACRYLAMIDE
ETHYLENE OXIDE
ACETALDEHYDE
1, 4-DIOXANE

WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm
ETHYLENE OXIDE

SARA Hazard Classification: Acute Health Hazard
SARA 313 Components
Reportable quantity- Components

Cas#	Component	
254504001-5181	Polymer	NONE
25404001-5164	Aliphatic hydrocarbon	NONE
	Nonionic surfactant	NONE
127087-87-0	Ethoxylated nonylphenol	NONE
	polyoxyalkylene	

HMIS / NFPA	HEALTH	FLAMMIBILITY	REACTIVITY	other
	1	1	0	No data

16. OTHER INFORMATION

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