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November 13, 2002

Ms. Laureen Borochaner
U.S. Army Corps of Engineers, New England District
696 Virginia Road
Concord, MA 01742-2751

CONTRACT NO. DACW33-01-D-0004
DELIVERY ORDER: 01
SUBMITTAL OF DELIVERABLE -- Amended Attachment E, Final Health and Safety Plan, Interim Data Collection, Centredale Manor Restoration Project Site

Dear Ms. Borochaner:

Enclosed please find two (2) copies of amended Attachment E and an updated approval page for the Health and Safety Plan (HASP) for the Interim Data Collection effort at the Centredale Manor Restoration Project Site. This amendment documents changes in the permissible exposure limit for dioxin and action level for respirable dust from the values provided in the Final HASP dated September 27, 2002.

If you have any questions regarding the addendum, please contact William Steinhauer at (781) 952-5319 or Ms. Patty White at (781) 952-5279.

Sincerely,

William Steinhauer
Project Manager

Karen Ebster
Program Manager

encl.

cc: A. Krasko, USEPA
A. Beliveau, USEPA
L. Maccarone, RIDEM

SDMS DocID 48758

HASP APPROVALS

By their signatures, the undersigned certify that this amendment to the HASP (Attachment E) will be used for the protection of the health and safety of all persons entering the Centredale Manor Restoration Project Site. Signatures also serve as certification of completion of the Hazard Assessments as required by 29CFR 1910.132.

Site Safety Officer — Date 11/13/02

Project Manager — Date 11/13/02

Health and Safety Manager — Date 11/12/02

ATTACHMENT E

HASP Addendum – Dioxin Hazards

Amended 11/12/02

HEALTH AND SAFETY PLAN ADDENDUM FOR THE CENTERDALE SITE
DIOXIN HAZARDS

THIS HEALTH AND SAFETY ADDENDUM WAS CREATED FOR USE IN CONJUCTION WITH THE HARDING ESE HASP, ISSUED ON MAY 4, 2001. THIS DOCUMENT HAS BEEN REVIEWED AND AUTHORIZED FOR USE IN CONJUNCTION WITH THIS HASP ISSUED ON SEPTEMBER 26, 2002 AS IT APPLIES TO THE CURRENT SCOPE OF WORK (SURFACE SOIL, SUBSURFACE SOIL, AND GROUNDWATER SAMPLING).

THIS DOCUMENT IS INTENDED TO COVER THE HAZARDS OF DIOXIN, PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIREMENTS, AND LEVEL OF PROTECTION UPGRADE INFORMATION.

CONTROLS, PPE, ETC. FOR ALL OTHER SITE CONTAMINANTS ARE COVERED UNDER THE CURRENT HASP.

Harding ESE, Inc.

IDENTIFIED/SUSPECTED SITE CONTAMINANTS

Contaminant Name (Synonyms)	Appearance & Physical Form (Pure substance)	Exposure Limit	STEL	IDLH	Routes of Entry	Potential Health Effects (Acute & Chronic)	PID Ionization Potential
Dioxin (2,3,7, 8-Tetrachlorodibenzo-p-Dioxin (TCDD))	Colorless to white, crystalline solid.	200 pg/m^3 as TCDD[1]		Ca	Inhalation Ingestion Absorption Contact	Irrit eyes; allergic derm; chloriacne; porphyria; GI dist; possible reproductive, terato effects; one dioxin, 2,3,7,8-tetrachlorodibenzo-p-Dioxin (TCDD) is listed as a known human carcinogen with the National Toxicology Program (listed in the January 2001 addendum to the Ninth Report on Carcinogens).	Unknown

[1] Based on limit in "A Proposed Occupational Exposure Limit for 2,3,7,8-Tetrachlorodibenzo-p-dioxin" by Hon-Wing Leung, F. Jay Murray and Dennis J. Paustenbach, AIHA Journal, September, 1989.

Note:
ACGIH = American Conference of Governmental Industrial Hygienists
STEL = Short Term Exposure Limit (STEL)
IDLH = Immediately Dangerous to Life and Health
OSHA = Occupational Safety and Health Administration
PEL = Permissible Exposure Limit
TLV = Threshold Limit Value
ppm = parts per million
NRC = National Research Council
NIOSH = National Institute of Occupational Safety and Health
ND = Not Determined
NA = Not Applicable
NE - Not Established
mg/m^3 = milligrams per cubic meter
Ca/carc = Carcinogen

Abbreviations in table taken from the NIOSH *Pocket Guide to Chemical Hazards*

NOTES:

Based on the information provided on 5/31/01 from Drew Sutton regarding the concentration of dioxin in the soil, incidental skin contact with soil/sediment would not increase the exposure potential to dioxin as long as proper decon and personal hygiene practices are followed. If performing the sampling activities causes large amounts of soil/dust to become attached to clothing, Harding ESE shall don Tyvek or an equivalent coverall and follow appropriate decon procedures.

Information obtained from the EPA, FDA, and other Government agencies regarding Dioxin:

Dioxins are a group of chemical compounds that share certain similar chemical structures and characteristics. Several hundred of these toxic compounds exist and are members of three closely related families. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is one of the most toxic of the dioxins. Dioxins are created into the air from combustion processes such as commercial or municipal waste incineration and from burning fuels (wood, coal, or oil). Small amounts of dioxins can also be formed during forest fires, chlorine bleaching of pulp and paper, chemical manufacturing and processing, and other industrial processes.

TCDD is listed in the January 2001 addendum to the *Ninth Report on Carcinogens as a Known Human Carcinogen*. TCDD is not believed to be mutagenic. One health effect from exposure to dioxin is chloracne, which is a skin disease with acne-like lesions that occur mainly on the face and upper body. Other effects of exposure include skin rashes, skin discoloration, excessive body hair, and possibly mild damage.

Dioxins are widespread environmental contaminants and they bioaccumulate throughout the food chain. Apparently food is a major source of human exposure.

TCDD is almost insoluble in water, and slightly soluble some solvents including methanol.

Harding ESE, Inc.

LEVELS OF PROTECTION

TASK (Describe)	Anticipated LOP		Upgrade LOP			
	LOP	Sustained Airborne Levels	LOP	Sustained Airborne Levels	LOP	Sustained Airborne Levels
Task: Sediment and Floodplain Soil and Invertebrate Sampling	D	0 – 1.5 mg/m^3 respirable dust	Stop Work and Characterize Ambient Air	>1.5 mg/m^3 respirable dust		

NOTES:

Based on historical site analytical data, Harding ESE used standard Industrial Hygiene calculations to determine that dioxin at a concentration of 22,600 nanograms per kilogram (ng/kg) results in a respirable dust exposure limit of 2.21 mg/m^3. In other words, the airborne respirable dust level would need to reach 2.21 mg/m^3 in order for the airborne concentration of dioxin to reach its exposure limit of 200 pg/m^3 (with safety factor). Harding ESE added the maximum concentration of other non-volatile compounds (those compounds with low vapor pressures that travel through the air with soil particles) detected on site to the calculation and determinded that the combined dust exposure level would be 1.6 mg/m^3. As this level is above one-half the ACGIH TLV for respirable nusiance dust of 1.5 mg/m^3, this number will be used instead. Please keep in mind that this calculation results in a "worse case" exposure level since not all compounds would be detected at their maximum concentration together.

Airborne dust can be reduced through the use of engineering controls (e.g., water spray).

If respirable dust levels exceed 1.5 mg/m^3, sampling must be performed to determine if airborne dioxin is present.

THE DEFINITION OF "SUSTAINED": THE AIRBORNE BREATHING ZONE CONCENTRATION REMAINS CONSTANT FOR 1 MINUTE.

Chemical Hazards:

Air Monitoring

EQUIPMENT REQUIRED TO MONITOR SITE DUST LEVELS

Air monitoring equipment to be used on site for dust monitoring includes:

- Total dust Meter (RAM-1, Mini-RAM or equivalent) capable of monitoring airborne respirable dust

FREQUENCY

- Continuous dust monitoring shall be performed during all activities that have the potential to disturb site soil/dust.

- The Project Manager shall review laboratory analytical data as it arrives to determine if detected dioxin (and other non-volatile compounds) levels are greater than the level used in the Industrial Hygiene calculations (22,600 ng/kg). If lab data shows that dioxin (or other non-volatile compounds) levels are increasing, site work will cease and the HASP updated based on that new lab data.

AIR MONITORING TECHNIQUES

- Air monitoring shall be conducted on the employee(s) who have the potential for the highest exposure to the contaminant(s). Monitoring shall be performed in such a way that personal exposures to the contaminants may be calculated. Airborne levels of contaminants shall be noted periodically in the field log book, and every reading shall be recorded on an appropriate personal monitoring form. If only representative employees will be monitored, the names of other employees represented by the monitoring shall be noted in the field log book and on the personal monitoring forms. Integrated, full-shift monitoring requiring laboratory analysis shall not be relied on as the sole means of exposure assessment for any work area or task where conditions may change rapidly.

- There is a potential for inhalation of dust particles that contains dioxin and other non-volatile compounds. The maximum level of dioxins and other non-volatile compounds detected on site are listed below. Using standard Industrial Hygiene calculations, Harding ESE determined what the airborne concentration of respirable dust would need to be in order to reach the exposure limit for each substance. This concentration is listed in the last column in the table below.

Contaminant	Exposure Limit (mg/m^3) of Contaminant	Maximum Soil Concentration On Site (mg/kg)	Exposure Limit Based on Single Compound (EL Mix, mg/m^3)
Aluminum	5	19,100	65.45
Antimony	0.5	28	4,496.4
Arsenic	0.01	18	138.89
Barium	0.5	322	388.2
Beryllium	0.002	42	119.05
Cadmium	0.005	15	83.33
Chromium	0.5	536	233.21
Cobalt	0.02	30	166.11
Copper	1	419	596.66
Cyanides	5	82	1.52E+5
Dioxins (tetra)	2.0E-7	0.022	2.21
Lead	0.05	1,090	11.47
Mercury	0.025	7.4	844.59
Nickel	1	93	2,688
PCBs	0.5	560	223.21
Silver	0.01	16	156.25
Thallium	0.1	0.8	3,676.47
Vanadium	0.05	111	112.61
		Dust Exposure Level at Mixture PEL =	Sum 1.617 mg/m^3
		Action limit for site =	1.5 mg/m^3

- In this HASP, Harding ESE has established a very conservative, maximum sustained concentration for Level D PPE protection of 1.5 mg/m^3 respirable dust. This action limit is based on one-half of the ACGIH TLV for nuisance dust, which is lower than the action limit established based on the site contaminants. Site work will cease if levels are sustained at greater than 1.5 mg/m^3, and the ambient air will be characterized to determine if dioxins are present.

- The Harding ESE on-site supervisor will ensure that measures are taken to reduce airborne dust levels when visible airborne dust becomes present.

CALIBRATION

- All air monitoring instruments shall be calibrated according to manufacturer's instructions and standard Industrial Hygiene practice. Direct reading instruments shall be calibrated prior to (each day's) use, and at any time the operator of the instrument suspects instrument drift or malfunction. Air sampling pumps shall be calibrated prior to and after each use. Each calibration shall be recorded in the individual instrument log book, as well as on appropriate personal monitoring forms.

Levels of Protection

LEVEL D FOR SEDIMENT AND FLOODPLAIN SOIL AND INVERTEBRATE SAMPLING:

- Appropriate work clothes, including long-sleeve shirts, and long pants;

- Outer chemical resistant gloves (type: heavy nitrile);

- Inner Gloves (type: nitrile);
- Chemical resistant boot covers (rubber) and steel toe inner boots;
- Safety glasses with side shields;
- Splash goggles will be the minimum eye protection worn when handling concentrated acids or caustics;
- Additional PPE as required by the Company H&S Program.

Certification of PPE Hazard Assessment

I certify that the hazard assessment performed on in June 4, 2001 regarding personal protective equipment for Harding ESE's Sediment and Floodplain Soil and Invertebrate Sampling work at Centerdale Site (based on the information provided by Drew Sutton) by Annette McLean in accordance with 29 CFR 1910.132 and Company Personal Protective Equipment Program. The results of the hazard assessment are incorporated in the PPE requirements noted above.

(*signature on file*)_____
Signature of Project Manager

Engineering Control

- Measures shall be taken on site to reduce airborne dust levels when visible airborne dust becomes present. Water or other appropriate dust suppressant materials shall be applied to work and traffic areas as appropriate to reduce the amount of dust generated.