A MEMBER OF THE ENVIRONMENTAL RESOURCES MANAGEMENT GROUP

WORKPLAN FOR PLANT 3 CHEM MILL CLEAN LINE SOIL REMEDIATION

Naval Weapons Industrial Reserve Plant
Bethpage, New York

27 February 1997

Prepared For:

Northrop Grumman Corporation
South Oyster Bay Road
Bethpage, New York 11714

Prepared By:

ERM-NORTHEAST
175 Froehlich Farm Boulevard
Woodbury, New York 11797

ERM

NYSDEC 063635

ERM-Northeast's Commitment to Quality

Our Quality Policy

We will fully understand and document our clients' requirements for each assignment.

We will conform to those requirements at all times and satisfy the requirements in the most efficient and cost effective manner.

Our quality policy and procedures include an absolute commitment to provide superior service and responsiveness to our clients

Our Quality Goals

To serve you.

To serve you well.

To continually improve that service.

Our Quality Improvement Process

Train each employee.

Establish and implement requirements based on a preventative approach.

Maintain a standing Quality Improvement Team to ensure continuous improvement.

Empower Corrective Action Teams to analyze, correct and eliminate problems.

Continually strive to improve our client relationships.

John A. DeFilippi, P.E.
Chairman

Howard Wiseman, P.E.
President

NORTHROP GRUMMAN

Grumman Aerospace Corporation
Electronics & Systems Integration Division
A Subsidiary of Northrop Grumman
South Oyster Bay Road
Bethpage, New York 11714

March 12, 1997
ETC97-072

Mr. John Barnes
NYS Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233

RECEIVED
MAR 13 1997
Bureau of Eastern
Remedial Action

Subject: **Northrop Grumman Corporation**
Bethpage, New York
Plant 03, Chem Mill Clean Line Chromic Acid Spill

Enclosure: Workplan for Plant 3 Chem Mill Clean Line soil Remediation

Dear Mr. Barnes:

As requested by Robert DeCandia of NYSDEC's Stony Brook office (spills unit), please find enclosed a copy of a work plan that has been developed for the remediation of chromium contaminated soil associated with the former chem mill clean line in plant 03 (NYSDEC Spill # 92-07766).

We would appreciate your expeditious review of this work plan so that we may begin the remediation work. If you have any questions, please call me at 516-575-2333 or J. Susco at 516-575-7171.

Very truly yours,

Larry Leskovjan, Manager
Environmental, Health, Safety
& Medical Services

cc: Robert DeCandia
NYSDEC, Stony Brook

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Prepared By:

ERM-NORTHEAST
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NYSDEC 063638

WORKPLAN FOR PLANT 3 CHEM MILL CLEAN LINE SOIL REMEDIATION

Naval Weapons Industrial Reserve Plant
Bethpage, New York

27 February 1997

Prepared For:

Northrop Grumman Corporation
South Oyster Bay Road
Bethpage, New York 11714

Prepared By:

ERM-NORTHEAST
175 Froehlich Farm Boulevard
Woodbury, New York 11797
560008

NYSDEC 063639

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NYSDEC 063641

Section 1

1.0 INTRODUCTION

On behalf of Northrop Grumman Corporation (Northrop Grumman), Environmental Resources Management (ERM) is tasked to conduct a remedial action to cleanup chromium contaminated soils within Plant 3, at the Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage, New York. The NWIRP is a Government-Owned Contractor Operated (GOCO) facility operated by Northrop Grumman. The general location of the proposed soil cleanup action is shown in Figure 1.

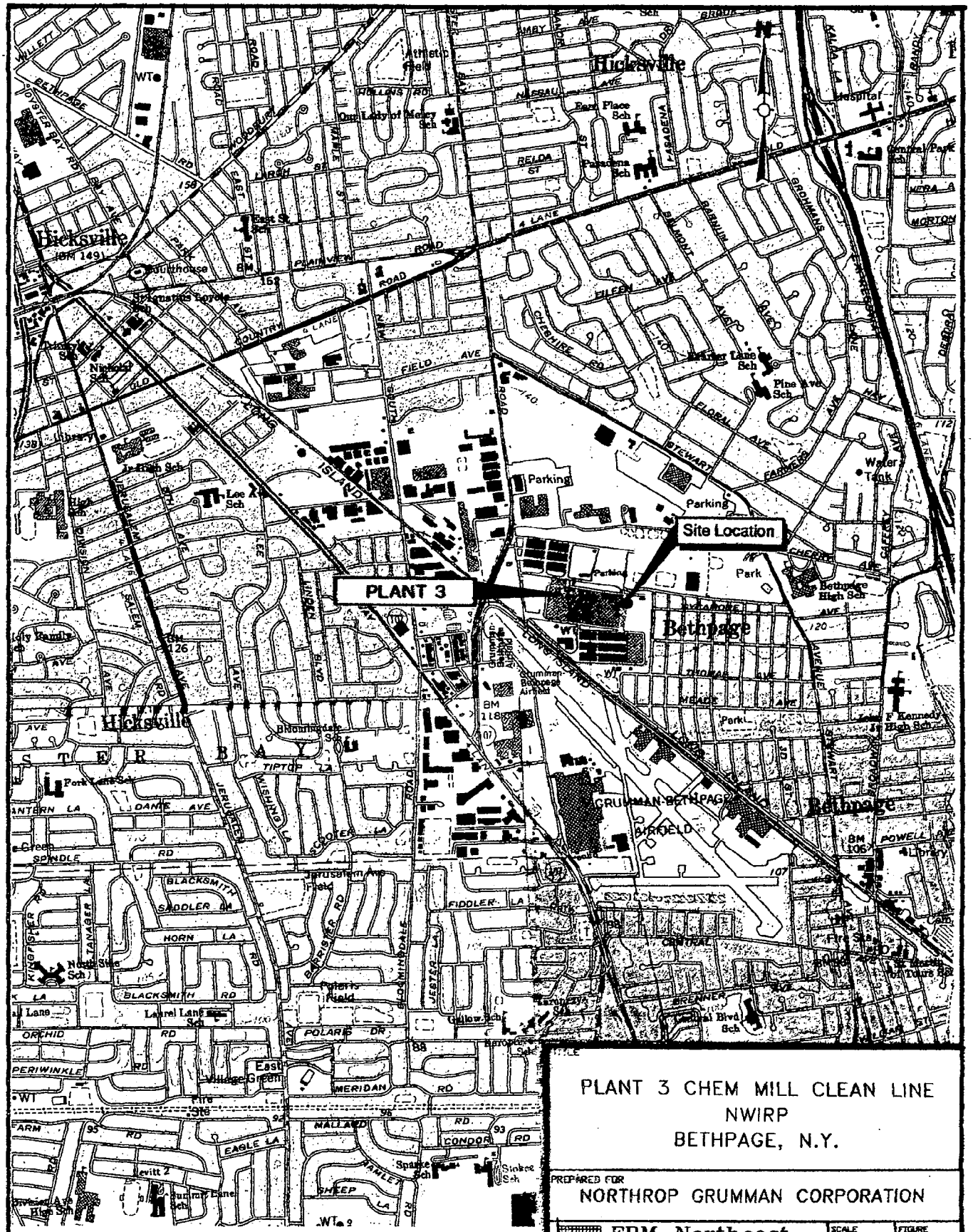
1.1 BACKGROUND

In October 1992, Northrop Grumman reported a chromic/nitric acid spill to the New York State Department of Environmental Conservation (NYSDEC) caused by a pipe leak from Tank 958 at the Chem Mill Clean Line in Plant 3 (NYSDEC Spill #92-07766). Tank 958 contained 10-20% by volume 42° baume nitric acid with 2-6 ounces per gallon of Parker +Amchem Deoxidizer No. 7 Makeup and/or No. 17. Deoxidizer No. 7 Makeup consists of more than 60% potassium dichromate. The MSDS for this compound is presented in Appendix A.

The leak occurred in the weld joints of an elbow in the piping that connected the tank to a nearby transfer pump. The acid deteriorated the concrete floor and entered the soil below the floor through an approximately 6-inch hole. Soon after the leak was identified, Northrop Grumman repaired the leak and patched the hole in the concrete floor.

In February-March 1993, the transfer pump pad adjacent to Tank 958 was removed, resulting in a void through the concrete approximately 8 feet long, 2 feet wide and 2.25 feet deep. The contaminated soil and concrete removed at this time were placed into drums. Surficial soil samples were

NYSDEC 063643



SOURCE: U.S.G.S. QUADRANGLE MAPS, HICKSVILLE N.Y.
FREEPORT, HUNTINGTON, AMITYVILLE N.Y.

PLANT 3 CHEM MILL CLEAN LINE
NWIRP
BETHPAGE, N.Y.

PREPARED FOR
NORTHROP GRUMMAN CORPORATION

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
1" =2000'	1

DRAWN	JOB NO.	FILE NAME	DATE
M.M.	560.008	chemmill	2/19/97

NYSDEC 063644

collected and found to contain total chromium ranging from 111 to 3,590 mg/kg.

In June 1994, Northrop Grumman advanced three borings through the concrete floor in an area west of Tank 958 and just south of the process wastewater trench. Soil samples were collected to a depth of 11 feet below grade and found to contain total chromium at a concentration of 350 mg/kg. At this time, Northrop Grumman asked NYSDEC permission to hold off further investigation and soil removal until production ceased at the end of 1994 and Tank 958 could be safely removed (See Appendix B).

In September 1995, Northrop Grumman completed a sampling program to delineate the lateral and vertical extent of chromium in soils beneath the concrete slab in the vicinity of the former Tank 958. A total of 107 soil samples were collected from 16 locations. Samples were collected in two foot increments at depths ranging from 0 to 60 feet below grade.

The results of this investigation identified the presence of chromium contamination in the soil to a depth of 60 feet. As shown in Table 1, with the exception of samples B-7 (24'-26') at 150 mg/kg and B-3 (20'-22') at 78 mg/kg, all soil sample results greater than 18 feet below grade were less than 50 mg/kg.

In 1995, the NYSDEC, Division of Hazardous Waste Remediation proposed a revision to the Technical and Administrative Guidance Memorandum (TAGM), Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, establishing a recommended soil cleanup objective of 50 ppm (mg/kg) for total chromium.

NYSDEC 063645

TABLE 1
SUMMARY OF SOIL QUALITY
PLANT 3 CHEM MILL CLEAN LINE
CHROMIC ACID SPILL AREA
NWIRP, BETHPAGE, NEW YORK

CHROMIUM ANALYSIS
TAGM GUIDANCE = 50 MG/KG

TOTAL CHROMIUM ANALYSIS (MG/KG)

26-Feb-97

SAMPLE DESIGNATION	B-1	B-2	B-3	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8
SAMPLING DATE	6/21/94	6/21/94	6/21/94	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95	9/8-28/95
SAMPLING DEPTH (Feet)																			
0 to 2							***190***	5	10	7	5.7		6.3	7.7	***59***	4.3	9.9	13	***230***
2 to 4																			
4 to 6													10	2.8	7.1	3.7	4.1	6.2	***130***
6 to 8		9.6	***1,200***				***330***	9.6	10	5	***860***								
8 to 10	***150***		***58 to 120***										27	16	2.6	2.1	12	3.1	***80***
10 to 12	***330***																		
12 to 14							***130***	***55***	45	13	**43**								
14 to 16													23	2.1	3.5	1.5	18	4.3	44
16 to 18				***93***	39	39													
18 to 20				43	38	42	16	38	30	35	22								
20 to 22				18	15	***78***													
22 to 24				18	48	29													
24 to 26				7.8	17	15	4.8	8.4	14	***150***	5.4		17	14	40	1.7	18	4.5	35
28 to 30													16	13	21	8.5	21	7.5	24
30 to 32				28	34	12	13	15	35	25	15								
34 to 36																10	27	6.4	9.5
36 to 38				16	16	28													
38 to 40												4							
48 to 50												3.2							
58 to 60												2.9							

Notes:

Detections exceeding criteria are identified in bold italic format.

NYSDEC 063646

Section 2

Section 2

2.0 PROPOSED REMEDIAL ACTION

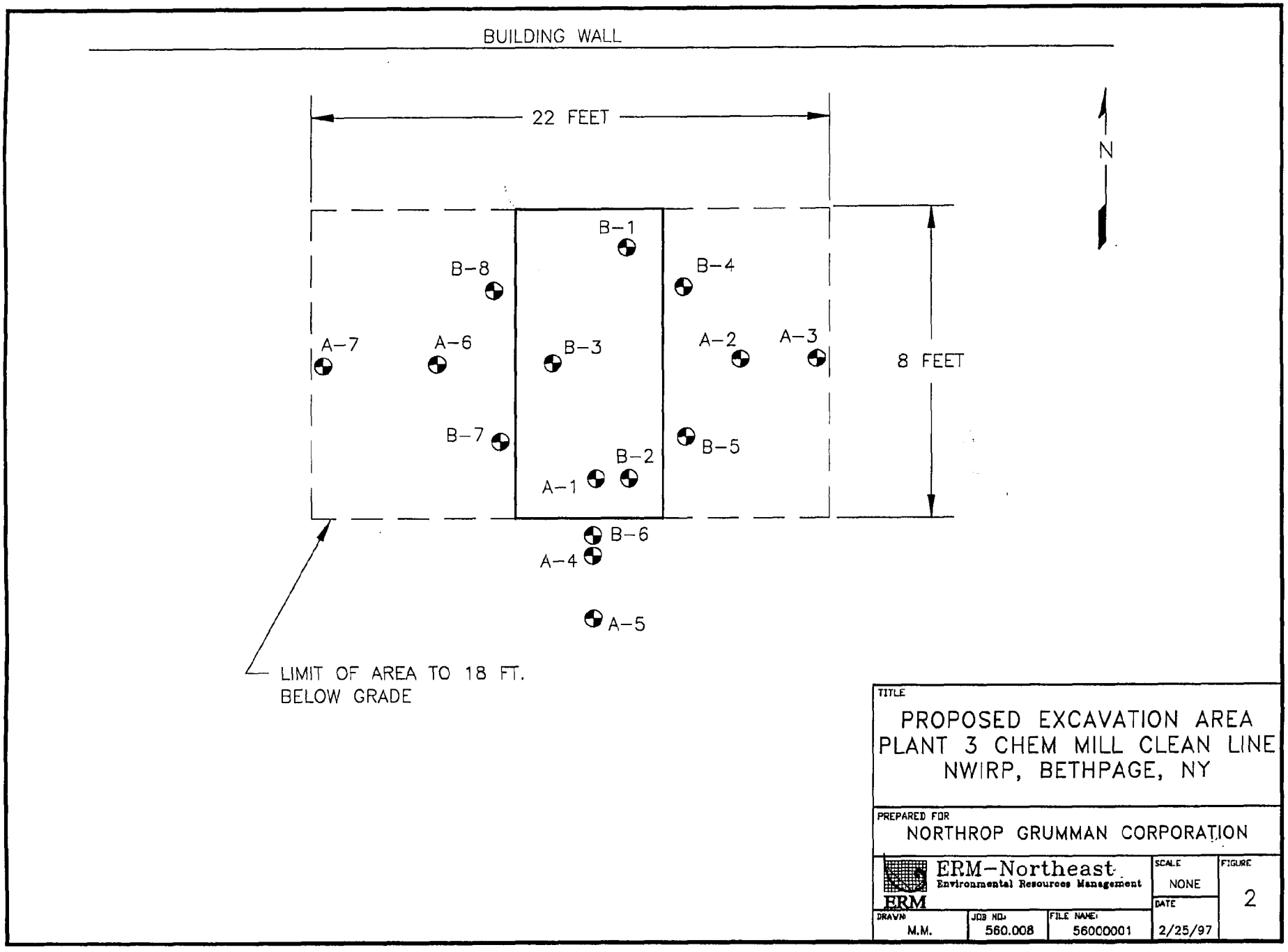
2.1 EXCAVATION/DISPOSAL

According to Occupational Safety and Health Administration regulations (OSHA 29 CFR Part 1910), a site-specific Health and Safety Plan (HASP) must be developed prior to initiating site activities. The HASP includes any considerations that would apply to the excavation of chromium contaminated soil and all other related aspects of this scope of work (e.g. collection of samples from the completed excavation, decontamination, etc.). Prior to the initiation of site activities, ERM will review the Health and Safety Plan, presented in Appendix C, with all personnel who will be working on site.

ERM will clear access to all work areas, moving miscellaneous equipment and debris to other open areas within Plant 3. The areas to be excavated will also be cleared by Northrop Grumman site personnel responsible for identifying the locations of buried utilities.

Using a concrete saw, the floor will be saw cut approximately ten feet on either side of the existing opening in the concrete floor, parallel to the existing trench. The cut will be made about eight feet wide. The concrete within this area will be broken up using an air operated jackhammer. ERM plans to break up and remove the concrete slab in an area with dimensions of approximately 22 feet by 8 feet, extending the existing excavation as shown in Figure 2. The concrete shall be removed and stockpiled away from the proposed excavation area. If the concrete appears to be visually clean, with no staining or discoloration, it will be used as backfill, along with certified clean backfill, once all contaminated soil has been removed from the excavation.

NYSDEC 063648



NYSDEC 063649

A diesel powered, rubber tired back hoe will be used to excavate the soil in the designated area to a depth of about 18 feet below grade. Initially soil will be stockpiled inside the building and then moved to an outside area adjacent to Plant 3 where it will be placed temporarily on a double polyethylene liner. The soil pile will be covered with six-mil polyethylene sheeting.

Based upon the dimensions of the excavation, it is assumed that no more than 120 cubic yards of contaminated soil/debris will need to be removed to attain the NYSDEC's HWR-94-4046 soil cleanup objective for chromium (50 mg/kg).

ERM proposes to complete this excavation to 18 feet without sheeting and shoring. The excavation will be completed a significant distance from any load bearing walls or support columns.

In the event contamination extends beyond 18 feet below grade, ERM will re-evaluate the method of excavation. Potential options include benching down (excavating in steps) using a track excavator and/or installing sheeting and shoring to remove all contaminated soils.

A composite waste characterization sample will be obtained from the stockpiled soil and sent to a laboratory for hazardous waste analysis. In addition, a sample of the concrete removed from the excavation will be sent to a laboratory for analysis. Based upon the sampling results and consultation with Northrop Grumman, a disposal facility will be selected and all contaminated material will be loaded onto trucks and transported off site for proper disposal.

NYSDEC 063650

2.2 *BACKFILLING AND COMPACTION*

Once samples have been analyzed and it is determined that all chromium-contaminated soil has been removed, the excavation will be backfilled with certified-clean fill. Slab subbase will be placed in loose lifts not exceeding 12 inches and compacted to 95% of the modified Proctor maximum dry density. To ensure safety, compaction will be performed remotely and no personnel will be permitted to enter the excavation.

Compaction testing will be performed by an approved testing laboratory during and at the end of backfilling operations to ensure proper compaction (if required by Northrop Grumman). A new concrete slab will be installed in accordance with Northrop Grumman specifications, meeting welding wire fabric and expansion joint requirements.

NYSDEC 063651

Section 3

Section 3

3.0 SAMPLING AND ANALYSIS PLAN

3.1 POST-EXCAVATION SOIL SAMPLING

Following excavation of contaminated soil, ERM will remotely collect surficial soil samples from the bottom and side walls of the excavation. Post-excavation soil sample locations for the bottom of the excavation are shown in Figure 3. Six sidewall soil samples will also be collected in the general locations of samples: P3CML-2, P3CML-3, P3CML-5, P3CML-8, P3CML-10, and P3CML-11. Soil samples will be collected using a clean hand auger with extensions. Upon retrieval of each sample from different locations within the excavation, sufficient portions will be placed in pre-cleaned, labeled, bottles provided by the laboratory and then placed into a cooler with ice. The cooler will be shipped under continuing chain-of-custody to the laboratory via overnight carrier.

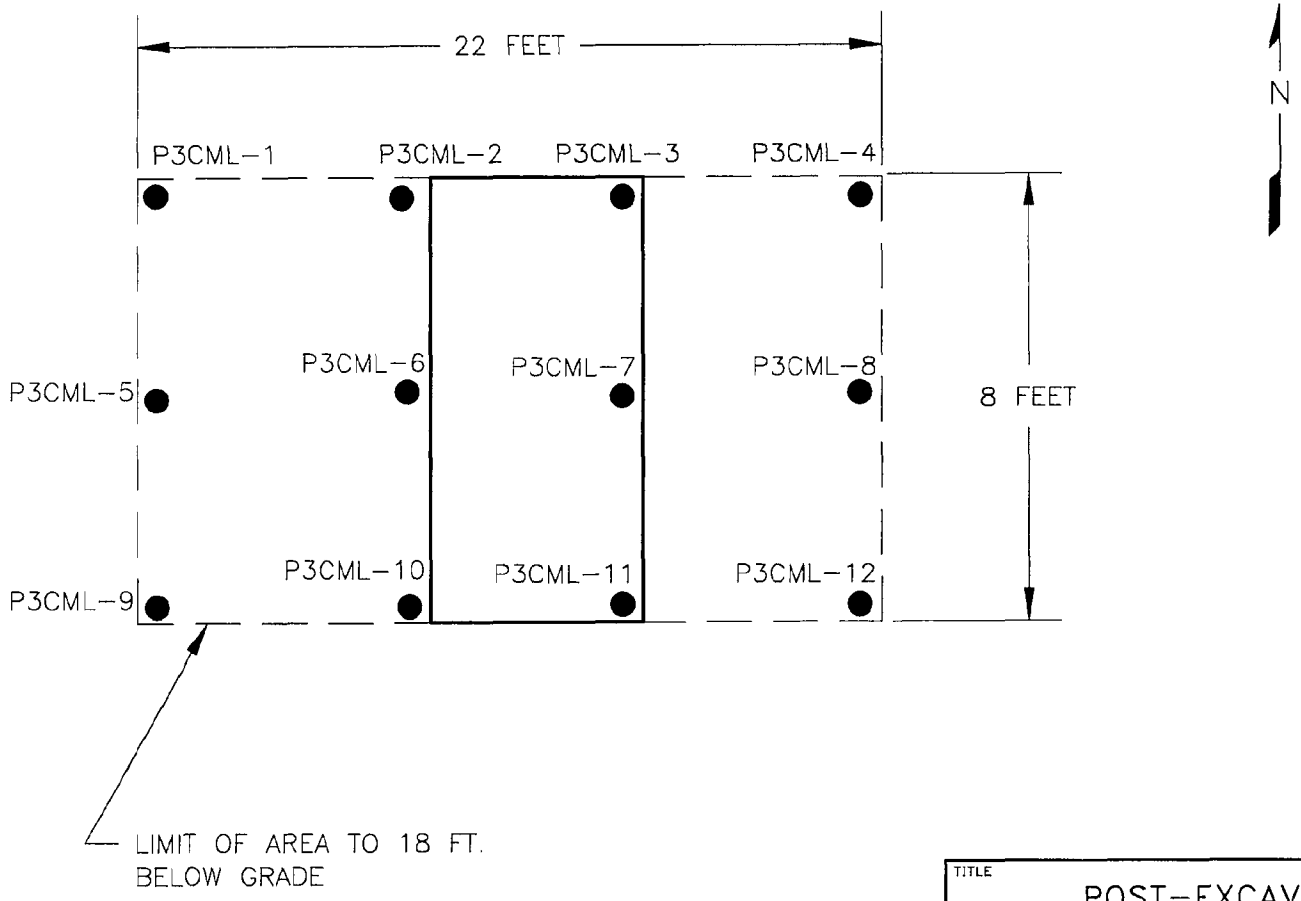
QC samples will be collected to aid in evaluation of the soil sampling data, including: MS/MSD, field blank, sample duplicate, and trip blank samples. These samples are used during validation procedures to determine data quality.

The soil and QC samples will be shipped to EnviroTest Laboratories, Inc., Newburgh, New York, under chain-of-custody via overnight courier. Samples will be analyzed for the presence of total chromium and hexavalent chromium.

3.2 LABORATORY DATA VALIDATION

In order to assess any potential limitations in the laboratory results, each data set will be evaluated in accordance with specific guidance developed

NYSDEC 063653



LEGEND

P3CML-1 ● SURFICIAL SOIL SAMPLE LOCATION AND DESIGNATION

TITLE

POST-EXCAVATION
SAMPLE LOCATION MAP
PLANT 3 CHEM MILL CLEAN LINE
NWIRP, BETHPAGE, NY

PREPARED FOR
NORTHROP GRUMMAN CORPORATION

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
NONE	3

DRAWN	JOB NO.	FILE NAME	DATE
M.M.	560.008	56000002	2/25/97

NYSDEC 063654

by the USEPA and the reviewer's professional judgment. The validation review will include the following items/criteria (as applicable):

- Quantitation limits;
- Holding times;
- Instrument tuning and performance;
- Initial and continuing calibration data;
- Field duplicate results;
- Procedural, field and trip blank data;
- Internal standard areas, retention times, summary and data;
- Surrogate recoveries, summary and data;
- MS/MSD recoveries and summary;
- Chromatograms and mass spectra;
- Qualitative and quantitative compound identifications; and
- Case narrative and deliverable compliance.

Exceptions relative to these items/criteria will be described in detail within a summary report prepared by the reviewer following completion of the validation. Qualifications to the laboratory data derived from the validation will be noted and provided in summary tables as part of the Post-Remedial Action Summary Report discussed in Section 4.0.

NYSDEC 063655

Section 4

Section 4

4.0 *POST-REMEDIAL ACTION SUMMARY REPORT*

Following the completion of the tasks described in Section 2.0 and 3.0, ERM will prepare one report detailing all project activities. This report will include descriptions of site excavation, investigatory techniques utilized, all analytical data, conclusions and recommendations. The summary report will also include copies of the manifests and/or bills of lading showing the ultimate disposition of all contaminated materials.

NYSDEC 063657

Appendices

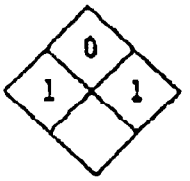
A

APPENDIX A:

MSDS for Parker +Amchem Deoxidizer No. 7 Makeup

Parker+Amchem

HENKEL CORPORATION
31100 Stephenson Highway
Madison Heights, Michigan 48071



MATERIAL SAFETY DATA SHEET

CUSTOMER #

PRODUCT TRADE NAME	DEOXIDIZER 7 MAKE-UP
DOT PROPER SHIPPING NAME	Oxidizer, N.O.I., UN1479.
DOT HAZARD CLASSIFICATION	Oxidizer
TECHNICAL CONTACT (NAME)	Product Acceptance Office
TELEPHONE NUMBER	(313) 583-9300 EMERGENCY NUMBER 1-517-263-9430

3PC0205

1 HAZARDOUS INGREDIENTS

MATERIAL	CAS NO.	CONTENTS (% WT/WT)	HAZARD	TLV/PEL
*Potassium Dichromate	7778-50-9	>60	Carcinogen, IARC, NTP, Corrosive	0.05 mg/m³ as Cr 0.50 mg/m³ as Cr
Potassium Nitrate	7757-79-1	10-30	Oxidizer	None
Sodium Bifluoride	1333-83-1	1-10	Corrosive	2.5 mg/m³ as F 2.5 mg/m³ as F

This product contains a chemical (*) subject to the reporting requirements of Section 313, Title III of SARA, Part 372.

2 PHYSICAL DATA

APPEARANCE	Orange powder		
SOLUBILITY IN WATER	Complete		
ODOR	Bland	pH of CONCENTRATE	N/A
SPECIFIC GRAVITY	N/A	BOILING POINT, °F.	N/A
OTHER:	None		

234345

0578

NYSDEC 063661

3 FIRE & EXPLOSION DATA

FLASH POINT: None

TEST METHOD: N/A

EXTINGUISHING MEDIA: As required to extinguish surrounding fire.

UNUSUAL FIRE OR EXPLOSION HAZARDS

Over 212°F material decomposes to sodium fluoride and poisonous and corrosive hydrogen fluoride. Also oxygen and toxic oxides of chromium and nitrogen.

SPECIAL FIRE FIGHTING PROCEDURES

Wear positive pressure self-contained breathing apparatus and full protective clothing.

4 REACTIVITY DATA

STABLE ☒ UNSTABLE ☐

CONDITIONS TO AVOID

Not applicable

INCOMPATIBLE MATERIALS

Keep separate from alkalies.
Organic materials, paint thinners or reducing agents.

HAZARDOUS POLYMERIZATION: WILL OCCUR ☐ WILL NOT OCCUR ☒

CONDITIONS TO AVOID

Not applicable

HAZARDOUS DECOMPOSITION PRODUCTS

Hydrogen fluoride, chromic oxide, oxides of nitrogen.

0580

NYSDEC 063662

5 HEALTH HAZARD DATA

EYES: Eye contact can cause severe burns and loss of vision.

SKIN: Contact with skin can cause irritation. Can cause skin sensitization.

INHALATION: Inhalation of dust can cause injury (burns) to the entire respiratory tract.

INGESTION: Can result in gastrointestinal damage; burns of the digestive tract. Chromic acid is considered very toxic. (As sodium dichromate, oral-rat LD50: 51.10 +/- 9.90 mg/kg.)

CHRONIC: Prolonged or repeated skin contact may cause "chrome sores". Long-term exposure can cause liver damage, kidney damage and dermatitis. Prolonged or repeated inhalation of mist may cause ulceration and perforation of the nasal septum.

POSSIBLE CANCER HAZARD: There is laboratory evidence that aqueous sodium dichromate administered directly into the lung, at the highest tolerated dose, over the lifetime of rats, causes a significantly increased incidence of lung cancer. It is expected that if chromic acid was tested in the manner as aqueous sodium dichromate, it would give similar response. There is sufficient evidence for the carcinogenicity of chromium and certain chromium compounds both in humans and experimental animals.
Reference: NTP (National Toxicology Program), Annual Report on Carcinogens, 1983.
IARC (International Agency for Research on Cancer), Annual Report, 1982.

Medical Conditions Generally Aggravated by Exposure: Persons with a history of asthma, allergies or known sensitizations to chromic acid or chromates.

CHRONIC: Contains fluorides. Exposure to fluorides over years may cause fluorosis.

Medical Conditions Generally Aggravated by Exposure: Pre-existing skin disorders.

0584

NYSDEC 063663

6 FIRST AID RECOMMENDATIONS

EYES: Immediately flush eyes in a directed stream of water for at least 15 minutes while forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. GET MEDICAL ATTENTION.

SKIN: Immediately remove contaminated clothing and shoes. Flush skin thoroughly with water for at least 15 minutes. Rinse clothing. If irritation persists, GET MEDICAL ATTENTION.

INGESTION: Drink large quantities of water. CORROSIVE. DO NOT INDUCE VOMITING. If vomiting occurs, drink more water. GET MEDICAL ATTENTION. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air and remove contaminated clothing. If breathing is difficult, administer oxygen. If respiration stops, give mouth to mouth resuscitation. GET MEDICAL ATTENTION.

7 SPILL PROCEDURES & WASTE DISPOSAL

SPILL PROCEDURES

Wear protective clothing.
Sweep up or otherwise collect and store in suitable drum.
Flush the contaminated area with water.
Neutralize with an excess of lime (calcium hydroxide) and collect for disposal.
Do not permit substance to enter sewers or streams.

WASTE TREATMENT

This chemical contains chromium compounds and fluoride compounds Waste treatment and neutralization may be required prior to discharge to a sewer.
Contact a licensed disposal agent.
Dispose of in compliance with all applicable federal, state and local regulations.

0588

NYSDEC 063664

8 PERSONAL PROTECTION

VENTILATION REQUIREMENTS	GENERAL AREA EXHAUST	☐
	LOCAL EXHAUST	☒
	NO EXHAUST NECESSARY	☐
PERSONAL PROTECTIVE EQUIPMENT		
EYE PROTECTION	Chemical goggles or face shield.	
SKIN PROTECTION	Neoprene or polyvinyl gloves, apron, boots as needed.	
RESPIRATORY PROTECTION	Provide sufficient mechanical (general and/or local exhaust ventilation to maintain exposure below TLV(s). As required to keep exposure to chromium below recommended exposure levels.	
OTHER REQUIRED EQUIPMENT	Eye wash facility and emergency shower should be in close proximity.	

9 SPECIAL PRECAUTIONS & STORAGE

DO NOT BREATHE DUST.

DO NOT GET IN EYES, ON SKIN OR ON CLOTHING.

Wash thoroughly after handling.

For industrial use only.

DO NOT TAKE INTERNALLY.

PREPARED BY Product Acceptance Office DATE 03/02/89

TITLE

CHEMICAL EMERGENCY TELEPHONE 1-800-424-9300

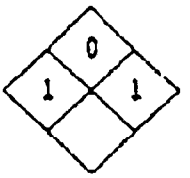
Conditions; although the information presented herein is to the best of our knowledge true and accurate, no warranty or guarantee, express or implied, whether of merchantability, fitness for any particular purpose or otherwise, is made regarding the information or the performance of any product. In each case we strongly recommend that purchasers before using any product in full production make their individual tests to verify to their own satisfaction whether the product is of acceptable quality and is suited for their specific purposes under their own manufacturing conditions. Further, no representative of ours has any authority to waive or change the foregoing provisions. However, subject to such provisions, our technical personnel are available to assist purchasers in applying our products for use consistent with their needs and conditions in existence in their business. Nothing contained herein shall be construed as a recommendation to use a product in infringement of any existing patents, and we assume no responsibility or liability for operations which do infringe any such patents. We assume no liability for incidental, consequential or direct damages of any kind, no matter what the cause, including negligence. The above includes confidential and proprietary information of Parker+Amchem and is furnished to you for your use solely on products or processes supplied by us to you and should not be otherwise used or disclosed.

0588

NYSDEC 063665

Parker+Amchem

HENKEL CORPORATION
32100 Stephenson Highway
Madison Heights, Michigan 48071



MATERIAL SAFETY DATA SHEET

CUSTOMER #

3PC0206

PRODUCT TRADE NAME	DEOXIDIZER 17 REPLENISHER
DOT PROPER SHIPPING NAME	Corrosive solid, N.O.I., UN1759.
DOT HAZARD CLASSIFICATION	Corrosive
TECHNICAL CONTACT (NAME)	Product Acceptance Office
TELEPHONE NUMBER	(313) 583-9300 EMERGENCY NUMBER 1-517-263-9430

1 HAZARDOUS INGREDIENTS

MATERIAL	CAS NO.	CONTENTS (% WT/WT)	HAZARD	TLV/PEL
+Potassium Dichromate	7778-50-9	>60	Carcinogen, IARC, NTP, Corrosive	0.05 mg/m³ as Cr 0.10 mg/m³ as Cr
Sodium Bifluoride	1333-83-1	10-30	Corrosive	2.5 mg/m³ as F 2.5 mg/m³ as F
+Potassium Ferricyanide	13746-66-2	1-10	Irritant	None

This product contains a chemical (+) subject to the reporting requirements of Section 313, Title III of SARA, Part 372.

2 PHYSICAL DATA

APPEARANCE	Orange-red powder		
SOLUBILITY IN WATER	Complete		
ODOR	None	pH of CONCENTRATE	N/A
SPECIFIC GRAVITY	N/A	BOILING POINT, °F	N/A
OTHER:	N/A		

0586

NYSDEC 063666

3 FIRE & EXPLOSION DATA

FLASH POINT: None

TEST METHOD: N/A

EXTINGUISHING MEDIA: As required to extinguish surrounding fire.

UNUSUAL FIRE OR EXPLOSION HAZARDS

Over 212°F material decomposes to sodium fluoride and poisonous and corrosive hydrogen fluoride. Also oxygen and toxic oxides of chromium.

SPECIAL FIRE FIGHTING PROCEDURES

Wear positive pressure self-contained breathing apparatus and full protective clothing.

4 REACTIVITY DATA

STABLE ☒ UNSTABLE ☐

CONDITIONS TO AVOID

Not applicable

INCOMPATIBLE MATERIALS

Keep separate from alkalies.
Organic materials, paint thinners or reducing agents.

HAZARDOUS POLYMERIZATION: WILL OCCUR ☐ WILL NOT OCCUR ☒

CONDITIONS TO AVOID

Not applicable

HAZARDOUS DECOMPOSITION PRODUCTS

Hydrogen fluoride, chromic oxide. Heat, strong mineral acid, oxidizing agents may release toxic and flammable hydrogen cyanide gas.

0586

NYSDEC 063667

5 HEALTH HAZARD DATA

EYES: Eye contact can cause severe burns and loss of vision.

SKIN: Contact with skin can cause irritation. Can cause skin sensitization.

INHALATION: Inhalation of dust can cause injury (burns) to the entire respiratory tract.

INGESTION: Can result in gastrointestinal damage; burns of the digestive tract. Chromic acid is considered very toxic. (As sodium dichromate, oral-rat LD50: 51.10 +/- 5.93 mg/kg.)

CHRONIC: Prolonged or repeated skin contact may cause "chrome sores". Long-term exposure can cause liver damage, kidney damage and dermatitis. Prolonged or repeated inhalation of mist may cause ulceration and perforation of the nasal septum.

POSSIBLE CANCER HAZARD: There is laboratory evidence that aqueous sodium dichromate administered directly into the lung, at the highest tolerated dose, over the lifetime of rats, causes a significantly increased incidence of lung cancer. It is expected that if chromic acid was tested in the manner as aqueous sodium dichromate, it would give similar response. There is sufficient evidence for the carcinogenicity of chromium and certain chromium compounds both in humans and experimental animals.
Reference: NTP (National Toxicology Program), Annual Report on Carcinogens, 1983.
IARC (International Agency for Research on Cancer), Annual Report, 1982.

Medical Conditions Generally Aggravated by Exposure: Persons with a history of asthma, allergies or known sensitizations to chromic acid or chromates.

CHRONIC: Contains fluorides. Exposure to fluorides over years may cause fluorosis.

Medical Conditions Generally Aggravated by Exposure: Pre-existing skin disorders.

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6 FIRST AID RECOMMENDATIONS

EYES: Immediately flush eyes in a directed stream of water for at least 15 minutes while forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. GET MEDICAL ATTENTION.

SKIN: Immediately remove contaminated clothing and shoes. Flush skin thoroughly with water for at least 15 minutes. Rinse clothing. If irritation persists, GET MEDICAL ATTENTION.

INGESTION: Drink large quantities of water. CORROSIVE. DO NOT INDUCE VOMITING. If vomiting occurs, drink more water. GET MEDICAL ATTENTION. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air and remove contaminated clothing. If breathing is difficult, administer oxygen. If respiration stops, give mouth to mouth resuscitation. GET MEDICAL ATTENTION.

7 SPILL PROCEDURES & WASTE DISPOSAL

SPILL PROCEDURES

Wear protective clothing.
Sweep up or otherwise collect and store in suitable drum.
Flush the contaminated area with water.
Do not permit substance to enter sewers or streams.

WASTE TREATMENT

This chemical contains chromium compounds and fluoride compounds
Waste treatment and neutralization may be required prior to discharge to a sewer.
Contact a licensed disposal agent.
Dispose of in compliance with all applicable federal, state and local regulations.

8 PERSONAL PROTECTION

VENTILATION REQUIREMENTS	GENERAL AREA EXHAUST	☐
	LOCAL EXHAUST	☒
	NO EXHAUST NECESSARY	☐

PERSONAL PROTECTIVE EQUIPMENT

EYE PROTECTION	Chemical goggles or face shield.
SKIN PROTECTION	Neoprene or polyvinyl gloves, apron, boots as needed.
RESPIRATORY PROTECTION	Provide sufficient mechanical (general and/or local exhaust ventilation to maintain exposure below TLV(s). As required to keep exposure to chromium below recommended exposure levels.
OTHER REQUIRED EQUIPMENT	Eye wash facility and emergency shower should be in close proximity.

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9 SPECIAL PRECAUTIONS & STORAGE

DO NOT BREATHE DUST.

DO NOT GET IN EYES, ON SKIN OR ON CLOTHING.

Wash thoroughly after handling.

For industrial use only.

DO NOT TAKE INTERNALLY.

PREPARED BY Product Acceptance Office DATE 03/02/89

TITLE

CHEMICAL EMERGENCY TELEPHONE 1-800-424-9300

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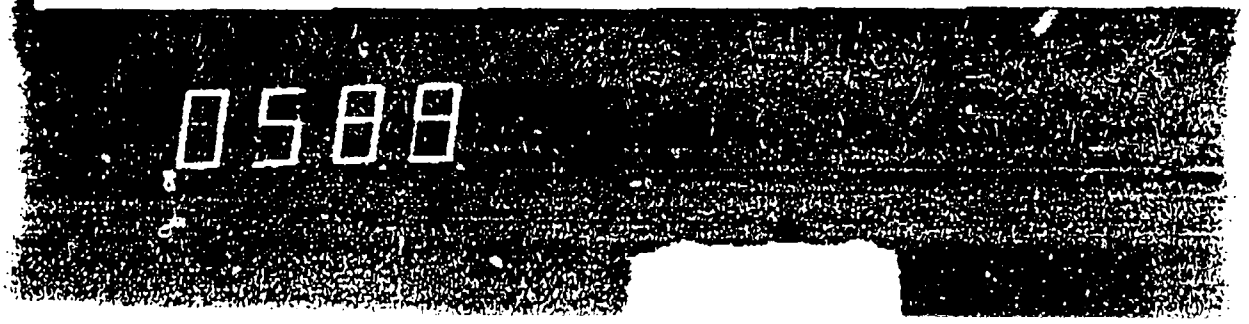


B

APPENDIX B

Soil Sampling Results
Plant 03 Chem Mill Line, Chromic Acid Spill
NWIRP, Bethpage, NY
29 July 1994

Grumman Corporation
Bethpage, New York 11714-3580

July 29, 1994
CETC94-371

NYS Department of Environmental Conservation
SUNY - Building 40
Stony Brook, New York 11790-2356

Attention: Robert DeCandia, Environmental Engineer I

Subject: **Chromic-Nitric Acid Spill, Plant 03 Chem Mill Clean Line - Spill #92-07766**

Enclosures: 1) Sketch
2) Lab Analyses (6 pages)

Dear Mr. DeCandia:

As you requested, please find enclosed the total chromium analyses for the soil samples taken during your visit on June 21, 1994 from the excavation located near the Chem Mill Clean Line inside Plant 03.

The analyses indicate that chromium contamination exists at a concentration of 330 mg/kg at a depth of approximately 11 feet in the area of the original spill (sample location B1). The two other sample locations, B2 and B3, indicate chromium contamination at concentrations of 9.6 mg/kg at a depth of 7.5 feet and 120 mg/kg at a depth of 10 feet, respectively. We have enclosed a sketch of the excavation showing approximate sample locations and the analytical results from the last round of sampling.

As you know, production activity in Plant 03 is scheduled to stop by the end of 1994. Grumman requests that further remedial efforts in this area be held off until production ceases. This will allow for the removal of the tank that is located very close to the excavation. This tank is in danger of being undermined if further soil removal were to proceed while it remains in place. We believe that delaying further soil removal will not cause the present contamination to extend beyond its current location as there is no driving force that will cause contamination to migrate.

We will, of course, notify you when remediation is to resume and will keep you apprised of any new developments and/or findings as remediation progresses.

If you have any questions, please call me at 516/575-2385 or J. Susco, of my staff, at 516/575-7171.

Very truly yours,

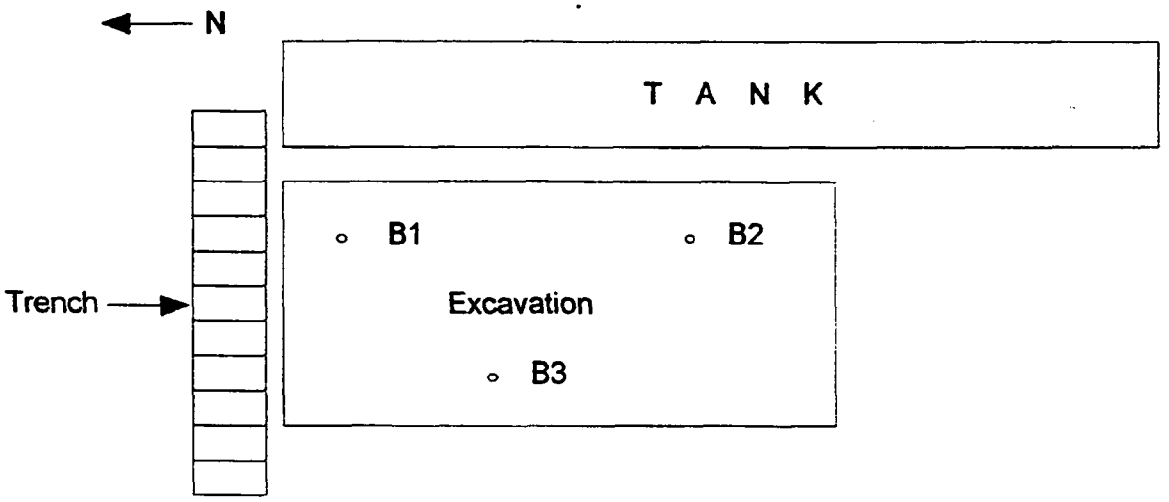
GRUMMAN CORPORATION

J. Ohlmann, P.E., Director
Corporate Environmental Technology
& Compliance
Mail Stop: D08-GHQ

JO/JAS:tmd
TMD-1570

bcc:

Plant 03 Chem Mill Clean Line Chromic Acid Spill
Soil Sampling Locations and Data



Sample Location	Depth from Grade	Total Cr Conc.
B1	8' - 10'	150 mg/kg
B1	10.4' - 11.4'	330 mg/kg
B2	6' - 7.5'	9.6 mg/kg
B3	6' - 8'	1200 mg/kg
B3	8' - 9'	58 mg/kg
B3	9' - 10'	120 mg/kg

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C942722/1 07/13/94

Grumman Aerospace Corporation
Mail Station D08-GHQ
Bethpage, NY 11714-3582
ATTN: Joe Susco PO# 30-88997

SOURCE OF SAMPLE: Plant #3-Chem. Mil Clean Line
COLLECTED BY: MEG DATE COL'D:06/21/94 RECEIVED:06/21/94

SAMPLE: Soil sample, B1 8'-10'

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Chromium as Cr	mg/Kg	150	

cc:Bill Fisher, MEG

REMARKS:

DIRECTOR

NYSDOH ID# 10320

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ECOTEST LABORATORIES, INC. ENVIRONMENTAL TESTING

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C942722/3 07/13/94

Grumman Aerospace Corporation
Mail Station D08-GHQ
Bethpage, NY 11714-3582
ATTN: Joe Susco PO# 30-88997

SOURCE OF SAMPLE: Plant #3-Chem. Mil Clean Line
COLLECTED BY: Client DATE COL'D:06/21/94 RECEIVED:06/21/94

SAMPLE: Soil sample, B2 6'-7'6''

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Chromium as Cr	mg/Kg	9.6	

cc:Bill Fisher, MEG

REMARKS:

DIRECTOR

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C942722/2 07/13/94

Grumman Aerospace Corporation
Mail Station D08-GHQ
Bethpage, NY 11714-3582
ATTN: Joe Susco PO# 30-88997

SOURCE OF SAMPLE: Plant #3-Chem. Mil Clean Line
COLLECTED BY: MEG DATE COL'D:06/21/94 RECEIVED:06/21/94

SAMPLE: Soil sample, B1 10'4''-11'4''

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Chromium as Cr	mg/Kg	330	

cc:Bill Fisher, MEG

REMARKS:

DIRECTOR _____

ECOTEST LABORATORIES, INC. *ENVIRONMENTAL TESTING*

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C942722/5 07/13/94

Grumman Aerospace Corporation
Mail Station D08-GHQ
Bethpage, NY 11714-3582
ATTN: Joe Susco PO# 30-88997

SOURCE OF SAMPLE: Plant #3-Chem. Mil Clean Line
COLLECTED BY: Client DATE COL'D:06/21/94 RECEIVED:06/21/94

SAMPLE: Soil sample, B3 8'-9'

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Chromium as Cr	mg/Kg	58	

cc:Bill Fisher, MEG

REMARKS:

DIRECTOR _____

ECOTEST LABORATORIES, INC. ENVIRONMENTAL TESTING

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C942722/4 07/13/94

Grumman Aerospace Corporation
Mail Station D08-GHQ
Bethpage, NY 11714-3582
ATTN: Joe Susco PO# 30-88997

SOURCE OF SAMPLE: Plant #3-Chem. Mil Clean Line
COLLECTED BY: Client DATE COL'D:06/21/94 RECEIVED:06/21/94

SAMPLE: Soil sample, B3 6'-8'

ANALYTICAL PARAMETERS		ANALYTICAL PARAMETERS
Chromium as Cr	mg/Kg 1200	

cc:Bill Fisher, MEG

REMARKS:

DIRECTOR _____

ECOTEST LABORATORIES, INC. ENVIRONMENTAL TESTING

377 SHEFFIELD AVE. • N. BABYLON, N.Y. 11703 • (516) 422-5777 • FAX (516) 422-5770

LAB NO. C942722/6 07/13/94

Grumman Aerospace Corporation
Mail Station D08-GHQ
Bethpage, NY 11714-3582
ATTN: Joe Susco PO# 30-88997

SOURCE OF SAMPLE: Plant #3-Chem. Mil Clean Line
COLLECTED BY: Client DATE COL'D:06/21/94 RECEIVED:06/21/94

SAMPLE: Soil sample, B3 9'-10'

ANALYTICAL PARAMETERS			ANALYTICAL PARAMETERS
Chromium as Cr	mg/Kg	120	

cc:Bill Fisher, MEG

REMARKS:

DIRECTOR _____

APPENDIX C

Health and Safety Plan

HEALTH & SAFETY PLAN

Soil Excavation, Sampling and Backfill at
Northrop Grumman Corporation
Bethpage, New York

February, 1997

Prepared for:

Northrop Grumman Corporation
Bethpage, NY

Prepared By:

ERM-NORTHEAST, INC.
175 Froehlich Farm Boulevard
Woodbury, NY 11797

HEALTH & SAFETY PLAN

Soil Excavation, Sampling and Backfill at
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February, 1997

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Woodbury, NY 11797

56000807.324

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1.0 *HEALTH AND SAFETY PROGRAM*

1.1 *HEALTH AND SAFETY INTRODUCTION*

This Health and Safety Plan (HASP) has been developed by ERM - Northeast (ERM) for the excavation and sampling of chromium contaminated soil and backfill with clean fill at Northrop Grumman Aerospace Corporation located in Bethpage, New York.

This plan designates health and safety procedures for personnel who may be exposed to hazardous materials and conditions that may be present during these excavation and sampling activities at the site.

The activities at the site may involve a subcontractor. The Project Manager or Site Safety Officer (Project Geologist) will ensure that pertinent health and safety information is communicated to the subcontractors involved in site activities.

The procedures set forth in this plan are designed to reduce the risk of exposure to chemical substances which may be present in the soil and air and to reduce the physical hazards during excavation, sampling and backfill activities. The procedures described herein conform to Occupational Safety and Health Administration (OSHA) standards for protecting workers during activities at the site promulgated by Title 29 Code of Federal Regulations, Part 1910.120 (29 CFR 1910.120). Additionally, this plan presents specific construction safety and health standards pertinent to the project activities as required by OSHA in 29 CFR 1926. These OSHA requirements include, but are not limited to mechanical equipment operation; excavation safety; general health and safety concerns; environmental controls; personal protective equipment; and overhead protection.

NYSDEC 063689

1.2 *PROJECT ACTIVITIES*

The activities of this project include soil excavation, sampling and backfill of the excavated area. The area to be excavated will be based upon previously performed investigations by others. Excavation depth is anticipated to be 18 feet and end point samples will be collected to ensure remediation objectives have been achieved. All sampling will be performed utilizing methods which do not require entry into the excavated area. Backfill and compaction of the excavated area will be performed after end point samples indicate clean-up objectives have been achieved. Compaction of the backfill will be performed utilizing remote controlled compaction equipment.

NYSDEC 063690

2.0 *HAZARDS*

2.1 *POTENTIAL SITE HAZARDS*

Soils have been analyzed for the presence of chromium due to the known presence of a chromic-nitric acid spill from a pipe fitting. The analytical data indicate the concentrations of these compounds in the soil are above New York State Technical Administrative Guidance Manual (TAGM) Guideline Levels. The highest chromium concentration detected at the spill location was 1200 mg/kg at a depth interval of 6' to 8'.

The area to be excavated is indoors in Plant 3. Since the excavation will be performed by a diesel fueled excavator, there is a potential for build up of diesel exhaust gases. This will be prevented by opening three garage doors and windows in the area of excavation.

In addition to health and safety concerns related to chromium and diesel exhaust gasses, there are potential physical hazards associated with soil/concrete excavation and sampling until backfill of the excavated area has been completed. Physical hazards may be encountered during activities involving mechanized equipment such as the excavator and transport vehciles, overhead and underground utilities. The excavation itself represents a potential full hazard as well as a potential for unstable side slopes. The excavation will be performed in a manner which will allow the excavator to work from a stable position relative to the excavation. It is not anticipated that the excavation will be in close proximity to footings or load bearing columns which would undermine the structural support of Plant 3. Barriers will be utilized to prevent falls. These physical hazards and related hazards are summarized in Table A-1.

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Routes Of Exposure

The primary routes of exposure to chemical substances contained within the soil are through inhalation of dust, and contact of chromium with the skin and eyes. Respiratory protection should not be required during work activities such as soil excavation, soil sampling and soil stock piling or transport due to the low anticipated dust levels and implementation of engineering controls if fugitive dust emissions are observed. In addition, the highest detected concentration of chromium was 1200 mg/kg. This means the maximum chromium content of dust particles is 1200 mg chromium/1,000,000 mg soil particle of 0.12%. Therefore, to reach a chromium concentration of 0.5 mg/m^3 in air, th edust level required would be 416.7 mg/m^3. Intrusive activities may cause a release of dust and soil particles containing chromium into the air, potentially requiring the use of respiratory protection in those affected areas. Respiratory protection may be required if field personnel can not control the fugitive dust emission through the use of water sprays, tarps or other engineering controls.

Prior to the implementation of personal protective equipment; engineering controls and/or additional safe work procedures will be initiated to minimize the release of contaminants into the air. Engineering controls are discussed in a later section.

The primary route of exposure to heavy metals are by inhalation of dust, and by direct contact with the skin and eyes. Ingestion through the consumption of contamination due to poor hygiene practices is also possible. Direct contact with soil potentially containing chromium will be avoided through the use of disposable coveralls, boots and gloves.

NYSDEC 063692

3.0 *PERSONNEL RESPONSIBILITIES*

ERM has assigned an employee to act as Site Safety Officer to ensure implementation health and safety procedures for this project. The Site Safety Officer's (SSO) function is to ensure that all of the provisions of this HASP are implemented in the work area.

3.1 *PROJECT MANAGER*

The Project Manager will distribute the Health and Safety Plan to all ERM and subcontractor personnel and discuss the plan prior to the start of excavation activities. All project personnel will sign documentation attesting they have read and are familiar with the contents of this Health and Safety Plan. All field personnel will also complete a Field Medical Data Sheet prior to field work.

3.2 *SITE SAFETY OFFICER*

The Site Safety Officer has the following responsibilities:

- ensure that all field personnel and subcontractors have reviewed the Plan;
- responsibility for the field implementation, evaluation and any necessary field modifications of this Health and Safety Plan; responsibility for maintaining adequate supplies of all personal protective equipment (PPE) for ERM personnel as well as calibration and maintenance of all monitoring instruments. Subcontractors will provide the appropriate PPE to their own personnel; and
- authority to suspend subcontractor operations at the site due to any ineffectiveness of this Health and Safety Plan.

When the primary Site Safety Officer is unable to supervise and maintain health and safety responsibilities on site, an alternate Site Safety Officer may be designated to act accordingly. All site safety personnel will have

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received the appropriate level of training necessary to perform applicable duties.

All subcontractors will ensure that its employees working at the site have met the training, respirator and medical surveillance requirements of the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standards promulgated by 29 CFR 1910.120 and other OSHA required training of 29 CFR 1926.

Certain sections of 29 CFR 1910 (General Industry) are applicable to 29 CFR 1926, (Construction). All subcontractors shall be aware of those General Industry standards applicable to construction. This HASP references some construction standards; implementation of construction standards beyond what is discussed in this document will be the responsibility of the subcontractor through its established "health and safety program". The ERM SSO will inform any ERM or subcontractor employee if non-compliance to OSHA 1926 is recognized.

NYSDEC 063694

4.0 MEDICAL SURVEILLANCE AND PERSONNEL TRAINING REQUIREMENTS

4.1 MEDICAL SURVEILLANCE PROGRAM

The Occupational Safety and Health Administration (OSHA) has established requirements as promulgated by 29 CFR 1910.120(f), for a medical surveillance program designed to monitor the effects of potential health risks on employees who may be exposed to hazardous materials. Medical surveillance programs have been designed to provide baseline medical data for each employee involved in hazardous waste operations or emergency response. The medical examination will include a review of field activities and a determination of an individual's ability to wear personal protective equipment, such as chemical resistant clothing and respirators. Medical examinations must be administered on a pre-employment, post-employment and annual basis, and as warranted when symptoms of overexposure are observed. These examinations are provided by employers without cost or loss of pay to the employee.

All project personnel involved with intrusive site activities where there is a potential to exposure to chemical substances are required to participate in a medical surveillance program meeting specifications of 29 CFR 1910.120(f). The examining physician is required to make a report to the employer of any medical condition which would place an employee at increased risk of wearing a respirator or other personal protective equipment. ERM and its subcontractors shall assume the responsibility of maintaining their own site personnel medical records as regulated by 29 CFR 1910.20, Employee Exposure and Medical Records, where applicable.

A medical program is required for all those employees who wear or may wear respiratory protection as specified by 29 CFR 1910.120 Appendix B and 29 CFR 1910.134, Respiratory Protection. This program must

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determine an individual's ability to wear respiratory protection while performing designated duties. Respirator use will be in compliance with 29 CFR 1910.134 and with 29 CFR 1926.58 where applicable.

4.2 *PERSONNEL TRAINING*

According to OSHA regulations published in 29 CFR 1910.120(e); "site workers engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor."

HAZWOPER training must provide information regarding "safety, health, site hazards, use of personal protective equipment, work practices by which the employee can minimize risks from hazards, safe use of engineering controls and equipment on site, and medical surveillance requirements". This program must instruct employees on general health and safety principles and procedures, proper operation of monitoring instruments, and use of personal protective equipment.

As dictated by the nature of site activities, additional specialized training must also be provided. Specialized training for this project may include specific training in hazards associated with open excavations. Employees involved in specialized activities such as sampling while outside of the excavated area shall be instructed in the potential hazards involved in those activities. Additionally, the ERM SSO will reinforce appropriate health and safety procedures.

All personnel involved in project activities are required to have received the basic Hazard Communication training and other OSHA training requirements discussed above, where applicable.

NYSDEC 063696

5.0 ENGINEERING CONTROLS AND SITE MONITORING

Field tasks associated with excavation and sampling activities may potentially create hazards, such as the release of chromium containing dust into the breathing zone or the environment. As previously discussed, chemical substances in the form of dust can enter the body through ingestion, inhalation, or absorption. Monitoring for chromium will be performed utilizing a digital dust indicator (due to no direct reading instruments available to determine chromium concentrations directly). Protective measures based upon dust action levels will be taken to ensure appropriate personal protection during site activities. In conjunction with monitoring, engineering controls and safe work practices can greatly reduce the risk of exposures to hazardous substances. Safe work practices are discussed in a later section and engineering controls are discussed below.

5.1 ENGINEERING CONTROLS

A primary concern for the planned project activities is the potential exposure to contamination that may be potentially contained in the soil. Direct contact will be minimized primarily through the use of engineering controls and secondarily through the use of appropriate personal protective equipment (PPE). The primary exposure concern is through the air via dust generation. To reduce this risk, excavation, stockpiling and transportation activities will be conducted in a manner to minimize dust generation.

If dust generation is a observed, dust suppression controls such as a water spray will be used to moisten soils prior to, and during excavation activities. Additionally, personnel will be directed to stand up wind from the potential direction of airborne dust. Stockpiled soils will be contained with a mobile fence and enclosed in polyethylene sheeting. Care will be

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exercised to ensure sufficient clearance exists for all personnel routinely performing tasks (e.g., in the vicinity of buildings or other structures) or in the event of an emergency within the immediate work area. The excavation area will also be secured with a barrier fence to minimize the potential for a fall hazard to exist.

Garage doors and windows near the work are will be opened to insure sufficient ventillation is present to prevent the build up of diesel exhaust gasses.

5.2 *SITE MONITORING*

The following describes the monitoring criteria to be implemented during soil excavation, stockpiling, sampling and transport activities. Recommended monitoring instruments to be used are also discussed. All instruments to be used during site activities will be classified as Class I, Division I Groups A, B, C and D for intrinsic safety and be certified by UL or another nationally recognized testing laboratory as being intrinsically safe. Action levels based on monitoring results are discussed in the following section.

The primary exposure concern during site activities is the generation of fugitive dusts. The development of fugitive dust may trigger the cessation of work, increased engineering controls or the use of respiratory protection. Air purifying respirators will be fitted with combination high efficiency particulate air (HEPA) filters.

The airborne concentration of fugitive dust will be used as action level criteria for evacuating the work area, upgrading or downgrading the level of personal protection, or implementing additional precautions, procedures, or engineering controls. For the purposes of this project an

NYSDEC 063698

action level of 0.25 milligrams per cubic meter (mg/m3) over background airborne dust concentration has been developed.

All site monitoring will be conducted by or under the supervision of the ERM SSO. All readings obtained will be recorded in a dedicated site notebook. The Site Safety Officer will maintain the required monitoring instrument(s) throughout the site investigation to ensure their reliability and proper operation.

NYSDEC 063699

6.0 *ACTION LEVELS*

Action levels have been established for activity cessation, site evacuation, emergency response, implementation of special procedures, and the upgrade or downgrade in the level of personal protective equipment. The action levels are based upon OSHA Permissible Exposure Limits (PELs) promulgated by 29 CFR 1910.1000 (Air Contaminants), and chemical and physical characteristics of the known contaminants. The PEL is defined as the airborne concentration of a substance a worker can be exposed to for 8 hours per day for five days per week, over a forty hour work week without the need for respiratory protection. Action levels are generally one half of the PEL.

Table A-2 describes the chemical hazards in further detail. Descriptions of the various levels of personal protection are presented in the next section. Level C personal protective equipment, as described later in the plan, will be available if needed during work activities. Level D personal protective equipment, as described later in this plan, will be permitted for all initial excavation and sampling activities.

6.1 *CHROMIUM*

An inhalation hazard may arise from activities where significant amounts of dust are generated. The following action levels will apply based upon readings conducted utilizing a digital dust indicator.

Chromium Concentration (mg/m^3)	**Required Action and/or Level of Personal Protection**
Detectable limit to 0.5 mg/m3	Level D personal protection
0.5 mg/m3 to 5.0 mg/m3	Evacuate all personnel from the area, implement engineering controls and/or upgrade to Level C personal protection with full face air purifying respirators

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	with HEPA cartridges and/or implement engineering controls.
Above 5.0 mg/m3	Cease all site soil disturbance activities, secure area and reevaluate appropriate engineering controls.

The OSHA PEL for Chromium is 0.5 milligrams per cubic meter (mg/m^3) averaged over an 8 hour work day. Because the highest detected concentration of chromium at the spill area is 1200 mg/kg or 0.12%, a required concentration of dust in air must be 416.7 mg/m^3 to exceed the PEL. Since the PEL for respirable dust not otherwise regulated is 5 mg/m^3, this PEL would be exceeded well before the chromium PEL is exceeded. An action level of 0.5 mg/m^3 has been selected as a significantly conservative action level which will prevent dust from migrating into other areas of the building. If the airborne concentration of dust exceeds 0.5 mg/m^3; these requirements will remain in effect until subsequent air monitoring results indicate that engineering controls have been effective and airborne concentrations have been reduced below 0.5 mg/m^3.

Dust control measures are to be utilized when significant amounts of dust are observed. Since there is currently no real time instrumentation to quantify the airborne concentration of chromium, an estimate has been made based on the concentration of chromium contained within the dust and real time measurements.

NYSDEC 063701

7.0 *PERSONAL PROTECTIVE EQUIPMENT*

Types of protective clothing and equipment to be used during the site activities are discussed in this section. The levels of personal protection specified in this section are based upon OSHA guidelines presented in 29 CFR 1910.120, Appendix B. All personal protective equipment (PPE) used must meet ANSI-requirements. All PPE used by subcontractor employees shall be supplied by the subcontractor. ERM will supply its own personal protective equipment for its employees.

Level C protection, as described in this plan, will be available at a minimum for all soil disturbance activities.

The Site Safety Officer (SSO) will determine when it is necessary to upgrade, downgrade or modify levels of protection. The SSO will make entries in the dedicated site logbook when changes in the level of PPE are made; the reason for the change shall be noted. Level D protection will be used for those activities that do not pose a potential threat of exposure to fugitive dusts. The requirement for optional protective equipment will be determined by the or SSO. Descriptions of Levels D and C personal protection follow:

7.1 *LEVEL D PROTECTION*

- Outer coveralls. If contact with contaminated soil is anticipated, disposable coveralls made of tyvek or equivalent are to be used.
- Work gloves. Where contact with contaminated soil is anticipated, nitrile outer gloves are to be worn at a minimum. Inner latex original surgical gloves are recommended where practical. Leather palm work gloves may be worn over nitrile gloves where necessary.
- Steel-toe leather work boots. Where contact with contaminated soil is possible, disposable PVC booties or outer neoprene overboots are to be worn over leather work boots.

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- Level C protection readily available.

- Optional equipment as required:

  - Hard hat
  - Safety glasses
  - Hearing protection

7.2 *LEVEL C PROTECTION*

- Full-face air purifying respirator (APR) equipped with appropriate HEPA cartridges. All personnel requiring respiratory protection must be annually "fit-tested" with the make and model of the respirator to be used in the field. Workers will perform a negative and positive pressure check prior to donning an air purifying respirator. Combination Organic Vapor/HEPA filter cartridges will be available and utilized as warranted by site conditions.

- Disposable coveralls such as tyvek or equivalent.

- Outer nitrile gloves and inner latex surgical gloves. Leather palm work gloves may be worn over nitrile gloves when appropriate.

- Steel-toe leather work boots with neoprene overboots. Disposable PVC booties may be substituted for neoprene overboots.

- Optional equipment as required:

  - Supplied Air Respirator
  - Hard hat
  - Hearing protection
  - Leather Palm Work Gloves

NYSDEC 063703

8.0 *DECONTAMINATION*

8.1 *GENERAL PERSONNEL DECONTAMINATION*

Personnel involved with remedial activities may be exposed to contaminants in a number of ways, despite the most stringent protective procedures. While performing site duties, site personnel may come in contact with dusts and particulates in the air. Use of monitoring instruments and site equipment can also result in exposure to hazardous substances.

In general, decontamination involves scrubbing with a detergent/water solution followed by clean water rinses. All disposable items shall be disposed of in a dry container. Certain components of contaminated respirators , such as harness assemblies and cloth components, are difficult to decontaminate. If grossly contaminated, they may have to be discarded. Rubber components can be soaked in detergent water and scrubbed with a brush. In addition to being decontaminated, if rubber components become soiled from exhalation or perspiration. All respirators, non-disposable protective clothing, and other personal articles must be sanitized before they can be used again. The manufacturer's instructions shall be followed when sanitizing respirator facepiece. The Site Safety Officer will be responsible for the ensuring proper maintenance, decontamination, and sanitizing of all respiratory equipment.

8.2 *DECONTAMINATION PROCEDURE*

The following procedures have been established to provide site personnel with minimum guidelines for proper decontamination. These minimum procedures must be followed by personnel leaving the point of operation who have donned personal protective equipment to protect themselves

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from contaminated soil. The decontamination process shall take place in the contamination reduction zone away from any area of potential contamination.

Personnel leaving the point of operations and entering the contamination reduction zone will be required to follow these decontamination procedures. At a minimum, contaminated outer boots shall be removed first and stored in an appropriate area for reuse or disposed of properly. Outer boots to be reused must be washed when gross contamination is evident. Personnel shall then remove and dispose of disposable coveralls. Personnel should remove the disposable coveralls so that inner clothing does not come in contact with any contaminated surfaces. After disposable coverall removal, personnel shall remove and discard outer gloves.

Due to the use of disposable PPE and the availability of emergency water should an evergency arise, the need for a portable wash station is not anticipated. If portable wash stations are utilized, their access shall be unobstructed. The wash station shall consist of a potable water supply, hand soap and clean towels. Two portable sprayer units filled with detergent/water solution and clean potable water may be used to wash and rinse off grossly contaminated boots, gloves and equipment. The Site Safety Officer will monitor decontamination procedures to ensure their effectiveness. Modifications of the decontamination procedure may be necessary as determined by the Site Safety Officer's observations.

8.3 *PRESCRIBED LEVELS OF DECONTAMINATION PROCEDURE*

The following decontamination procedures should be implemented during site operations for the appropriate level of protection.

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Level D - Personal Protection Decontamination Procedure

- Step 1 - Segregated Equipment Drop: Deposit contaminated equipment (tools, sampling devices, notes, monitoring instruments, etc.) used on the site onto plastic drop cloths.

- Step 2 - Boot Clean: Brush boots free of residual soils. If necessary, wash with Alconox solution and rinse with potable water.

- Step 3 - Disposable Equipment Removal: Remove disposable boot covers, disposable coveralls, and outer gloves in that order. Place contaminated covers, coveralls, and gloves into container with plastic liner. Remove inner gloves (if used) and place in container

- Step 4 - Field Wash: Wash hands and face thoroughly, as soon as possible.

Level C - Personal Protection Decontamination Procedure

- Step 1 - Segregated Equipment Drop: Previously described.

- Step 2 - Overboot and Glove Wash: Remove disposable overboots and outer gloves. If necessary, srub with a decontamination solution of detergent and water.

- Step 3 - Rinse off Overboots and Outer Gloves: Decontamination solution should be rinsed off boots and gloves using generous amounts of water. Wastewater is to be collected and disposed of as contaminated waste.

- Step 4 - Removal of Overboots and Outer Gloves: Remove overboots and place them in a container with a plastic liner. Next, remove outer gloves and place in container.

- Step 5 - Remove Chemical-Resistant Clothing: With care, remove chemical resistant suit. The exterior of the suit should not come into contact with any inner layers of clothing.

- Step 6 - Inner Glove Wash and Rinse: Inner gloves should be washed with a mild decontamination solution (detergent/water) and then rinsed with water.

- Step 7 - Remove Respirator: Remove respirator. Attempt to keep face/glove contact to a minimum.

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- Step 8 - Inner Glove Removal: Remove inner glove and deposit in plastic-lined container.

- Step 9 - Field Wash: Wash hands and face thoroughly. A shower should be taken as soon as possible.

8.4 *EQUIPMENT DECONTAMINATION*

A decontamination station for equipment will be set up at the site. The actual location will be determined by the SSO. The station will be used to completely decontaminate excavator parts that have come into contact with contaminated soil. The station will include shovels, brushes, a power washer or steam jenny and provisions to collect decontamination rinse water within the contaminated soil. All contaminated equipment exiting the site will be completely decontaminated at the station. All visible materials will be removed from the excavator using shovels and brooms. A high pressure spray will then be used to remove any residue materials on the machinery. All contaminated water and detergent used for decontamination will be collected for disposal with the contaminated soil. Any observed free liquids will be eliminated by the use of speedi dry.

At the completion of soil disturbance activities, personnel wearing appropriate PPE will remove gross soil contamination from the equipment that was used during those activities. The equipment will then be moved to the contamination reduction zone for final decontamination.

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9.0 *SITE SECURITY*

Access into the established points of operations will be limited to authorized personnel. The active operating areas will also be monitored by the Site Safety Officer to ensure unauthorized personnel do not enter the area and authorized personnel enter with proper personal protection when required.

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10.0 SITE CONTROL

In areas where site activities are implemented, both physical and chemical hazards can be minimized by the establishment and maintenance of work zones. The Site Safety Officer will be responsible for establishing and maintaining the following work zones:

10.1 EXCLUSION ZONE

An exclusion zone (EZ) will established at the area of excavation. The EZ may be delineated by barricades or barricade tape to take into account the limits of the operating area, and the spatial requirements of equipment and personnel. All persons within the EZ shall wear the required level of personal protection. The operating area shall remain an exclusion zone until operations are completed and the area is restored.

10.2 CONTAMINANT REDUCTION ZONE

The contamination reduction zone (CRZ) is the transition area between an exclusion zone where potential contamination is present in an area and the support zone (clean area). If required, preliminary equipment and personnel decontamination will take place in the CRZ. Two types of CRZs may be established.

The decontamination pad can be constructed by placing a liner on a prepared smooth surface. The pad should be large enough to accommodate the largest piece of equipment used on site. The perimeter of the decontamination pad consists of a soil berm that is up to one foot high. All wash waters will be utilized so that they fall into the contaminated soil pile. Any free liquids will be eliminated by the use of speedi dry. A high pressure washer should be used to decontaminate all equipment and materials before leaving the site. All liquids generated

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during the decontamination procedure will be disposed of along with the contaminated soil.

10.3 SUPPORT ZONE

The support zone (SZ) is considered to be outside the work area and is considered free of physical hazards or hazardous substances. SZ are usually established to aid those work activities occurring in the exclusion zone. Protective clothing and equipment is not required in this area but should be available for use. Clean equipment and materials are stored and maintained within the SZ. When activities within contaminated areas or exclusion zones occur, protective clothing is to be donned in the SZ prior to entering the CRZs. The support zone will be identified by the SSO before field work. Generally, the support zone covers all areas which are not designated as EZs or CRZs.

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11.0 *MEDICAL & FIRE EMERGENCY RESPONSE*

11.1 *ON SITE NOTIFICATION OF SITE EMERGENCIES*

In the event of an emergency, site personnel shall signal distress with three long (5 second) blasts from an appropriate horn, (car horn, air horn, etc.). All appropriate authorities will then be immediately notified of the nature and extent of the emergency. Medical personnel will be informed of site hazards and activities prior to project initiation so that emergency situations can be handled most efficiently.

11.2 *RESPONSIBILITIES*

The Site Safety Officer will be responsible for administratively responding to all emergencies. The Site Safety Officer will:

- Notify appropriate individuals, authorities, and/or health care facilities as needed. Emergency telephone numbers will be posted in the support zone.
- Ensure that a working eyewash station, a stocked first aid kit and ABC rated dry chemical extinguishers are on site. The eyewash station shall provide at least fifteen minutes of potable water. At least one ten pound ABC or BC rated dry chemical or equivalent fire extinguisher shall be on site, within thirty feet of the work area.
- Have working knowledge of all safety equipment available at the site.
- Establish a safe distance of refuge (an assembly area) from the work area and inform all employees and contractors of approved evacuation routes, if necessary.
- Ensure that directions or a map which details the most direct route to the nearest hospital and the list of emergency telephone numbers are posted on site.
- Prior to initiating work activities, the contractor will supply the SSO with the names of employees working that shift. In the event of a catastrophe, the SSO or designee will account for all ERM employees,

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subcontractor employees and other personnel on site at the designated assembly area.

11.3 *ACCIDENTS AND INJURIES*

Prevention of injuries is paramount to ERM. Any worker recognizing a potential safety hazard shall immediately correct the hazard if possible or bring the hazard to the attention of the SSO or Supervisor. The Supervisor or SSO will be responsible for ensuring correction of the hazard. If the hazard is not addressed or corrected by the SSO or Supervisor, the employee shall bring it to Project Manager's attention.

In the event of a safety or health emergency at the site, appropriate emergency measures must immediately be taken to assist those who have been injured or exposed and to protect others from hazards. The Site Safety Officer will be immediately notified and will respond according to the seriousness of the injury. Emergency telephone numbers are:

Emergency	**911**
Northrop Grumman Security Headquarters	**(516) 575-3895**
Nassau County Police Department	**911**
Fire Department	**911**
North Shore University Hospital at Plainview	**(516) 681-8900**

If the emergency involves personnel injuries, an ambulance will be immediately contacted. If designated, individuals trained in first aid or CPR and who are currently certified may perform first aid treatment until the ambulance arrives. Individuals performing or expected to perform first aid will receive bloodborne pathogens training. Areas contaminated with blood will be appropriately disinfected with approved agents. The person assigned to contact the rescue squad should be prepared to provide the following information:

- Exact location of the emergency

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- Phone number he/she is calling from
- Type of injury
- How many persons have been injured
- What assistance or first aid is being given to the injured person(s)

Do NOT hang up unless told to do so. In most cases, the police or ambulance dispatcher will require the caller to stay on the phone.

When ambulance, police or fire department authorities arrive, site personnel should immediately inform them of the details of the situation and what type of chemicals and hazards may be encountered within the work area, near the injured person.

If the injury is not serious, the person is conscious, can walk, is willing to travel and an ambulance is not immediately available; the person may be taken to the nearest hospital emergency room. The injured worker's supervisor should accompany the injured worker to the hospital.

Incidents or accidents must be reported to the SSO using ERM's or the subcontractor accident reporting form. Additionally, an OSHA 101 Accident Reporting Form may be used as well.

Early and proper recognition of the symptoms of various injuries and exposures is important. Table A-3 lists the signs and symptoms of various injuries, chemical exposure and shock.

11.4 FIRST AID

First aid is to be administered only by currently certified persons trained in First Aid procedures or by an individual who is directed by the ambulance dispatcher. Table A-4 lists basic procedures for assisting an injured person.

NYSDEC 063713

12.0 SPECIAL PRECAUTIONS AND PROCEDURES

12.1 POTENTIAL RISKS

Sampling at the excavated area may present additional chemical and physical hazards. The potential for chemical exposure to hazardous substances is significantly reduced through the use of personal protective equipment, engineering controls and implementation of safe work practices. Personnel performing sampling are to use extension tools when collecting samples from the excavated area. Under no circumstances shall excavated area be entered. Personnel collecting samples are not to break the plane of the excavated space with any part of their body.

Physical hazards associated with site activities may include the excavator striking or making contact with underground or overhead utilities. Physical hazards may be encountered from the actual operation of the excavator as well. Heat stress/cold exposure, site traffic and rail traffic may cause additional hazards.

This plan establishes precautionary measures to reduce the risks of these hazards. Hazards and general safety precautions are addressed in following sections. Hazards related to specific work activities are addressed below.

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13.0 HEAT/COLD STRESS

Work/rest regimens will be employed as necessary so that personnel do not suffer adverse effects from heat stress or cold exposure. Special clothing and appropriate diet and fluid intake will be recommended to all site personnel to further reduce these temperature related hazards.

13.1 COLD STRESS

Persons working outdoors in temperatures at or below freezing may be frostbitten. Table A-5 presents exposure limits at low temperatures. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body that have high surface-area-to-volume ratio such as fingers, toes, and ears, are the most susceptible.

Local injury resulting from cold temperatures is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost nip or initial frostbite: characterized by suddenly blanching or whitening of skin.
- Superficial frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep frostbite: tissues are cold, pale, and solid; extremely serious injury.

Another form of cold stress that can be quite serious is hypothermia. Hypothermia results when the body loses heat faster than it can produce it. When this situation first occurs, blood vessels in the skin constrict in an attempt to conserve vital internal body heat. Hands and feet are first affected. If the body continues to lose heat, involuntary muscle contractions begin. Involuntary muscle contractions are the body's way of

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attempting to produce more heat; and it is usually the first real warning sign of hypothermia. Further heat loss produces speech difficulty, forgetfulness, loss of manual dexterity, collapse, and finally death.

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

1. shivering;
2. apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95 oF;
3. unconsciousness, glassy stare, slow pulse, and slow respiratory rate;
4. freezing of the extremities; and finally
5. death.

Two factors influence the development of a cold injury; ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 oF with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at -l8 °F.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

13.2 *HEAT STRESS*

Heat Stress is an aggregate of environmental and physical work factors that constitute the total heat load imposed on the body. Heat strain is the series of physiological responses to heat stress. When the strain is

NYSDEC 063716

excessive, a feeling of discomfort or distress may result; heat disorder may ensue. The severity of the strain will not only depend on the magnitude of the prevailing heat stress, but also on the age, physical fitness, degree of acclimatization and dehydration of the worker.

Prevention of dehydration can be accomplished by frequent small intakes of water prior to entering the work area or exclusion zone. Once workers leave the zone and are fully decontaminated, they shall be encouraged to drink more water.

Heat disorder is a term used to described one of the following heat related illnesses or conditions:

- Heat Cramps - Painful intermittent spasms of the muscles following hard physical work in a hot environment. Cramps usually occur after heavy sweating and often towards the end of the work shift.
- Heat Exhaustion - Profuse sweating, weakness, rapid pulse, dizziness, nausea and headache. The skin is usually cool, sometimes pale and clammy with sweat. Body temperature is usually normal.
- Heat Stroke - Sweat is diminished or absent. The skin is hot and dry to the touch and is usually flushed. Increased body temperature is found and if uncontrolled, can lead to delirium, coma, convulsions and death. Medical care is urgently needed.

The following control measures will aid in controlling heat disorders.

- Provide adequate liquids (cool water) and encourage workers to drink more than the amount to satisfy thirst.
- Establish work rest periods to allow for the body to cool down. Inform workers of the importance of rest acclimatization and proper diet.
- Wear cooling devices such as ice vests.
- Do not assign tasks to workers who are on rest breaks.

NYSDEC 063717

Appropriate clothing and work/rest regimes shall be used during this project. These items shall be discussed with the field team members by the SSO.

NYSDEC 063718

14.0 GENERAL SAFETY PRACTICES

The following are important safety precautions which will be enforced during activities at the site.

- Eating, drinking, chewing gum or tobacco, smoking or any practice that increases that probability of hand-to-mouth transfer and ingestion of hazardous material is prohibited within any active work area.

- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking, or any other activity.

- Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.

- All personnel utilizing respiratory protection must be clean shaven. No facial hair which interferes with the effectiveness of a respirator will be permitted on personnel required to wear respiratory protection. Mustaches are permitted provided they are above the lip line. The respirator must seal against the face so that the wearer receives air only through the air purifying cartridges attached to the respirator. Fit testing shall be performed prior to respirator use, and annually thereafter, to ensure a proper seal is obtained by the wearer.

- All subcontractors using respiratory protection shall possess a written respiratory protection program as outlined in 29 CFR 1910.134 (b). The written program shall discuss selection, use maintenance, cleaning, storage, inspection and periodic evaluation. Respirators will be issued for exclusive use of each worker and will be cleaned and disinfected after every use. Respirators will not be hung from straps and will be stored in clear plastic bags. Cartridges for air purifying respirators will be changed daily at a minimum. Used cartridges will be disposed of as contaminated waste.

- Contact with potentially contaminated surfaces should be avoided whenever possible. Individuals are not to walk through puddles, mud, or other discolored surfaces; kneel on ground; lean, sit or place equipment on drums, containers, vehicles or the ground potentially contaminated with hazardous substances.

- Medicine and alcohol can increase the effect of exposure to certain compounds. Illegal drugs and alcoholic beverages are not to be consumed on site by personnel involved in the project. Prescribed medication may be administered by an employee providing the SSO

NYSDEC 063719

has been made aware of the prescription requirements and has verified with the employee's physician that exposure to on-site contaminants will not influence the medication's effect.

- Personnel and equipment in the work areas should be minimized, consistent with effective site operations.
- Work areas for various operational activities should be established.
- Procedures for leaving the work area must be planned and implemented prior to going to the site. Work areas and decontamination procedures must be established on the basis of prevailing site conditions.
- When required, safety gloves and boots shall be taped to the disposable, chemical-protective suits as necessary.
- All unsafe equipment shall be removed from service and identified by a "DANGER, DO NOT OPERATE" tag.
- Noise muffs may be required for all site personnel working around heavy equipment where high noise is generated. This requirement will be at the discretion of the Site Safety Officer.

NYSDEC 063720

15.0 EXCAVATOR AND SUPPORT VEHICLES

Attachments (bucket) to the excavator shall be adequately secured when not in use. All controls shall be set in neutral, motors stopped and brakes set when not in use. Whenever the equipment is parked, the parking brake shall be set. If parked on an incline, the wheels shall be chocked. If applicable outriggers will be fully extended.

All vehicles shall possess operable braking and emergency braking systems. All brake lights shall be operating properly.

No vehicle with an obstructive view to the rear shall be used unless it possesses an audible backup alarm or an observer to signal the operator to back up.

All vehicles equipped with cabs shall have windshields and powered wipers. All cracked and broken glass of the vehicle cab shall be replaced. Where necessary, operable defogging or defrosting equipment shall be maintained on the vehicle.

Vehicles used to transport employees shall possess seats firmly secured and adequate for the number of employees carried. Employees will not be allowed to ride outside of the seated cab of any vehicle during operation.

All vehicles shall be checked at the beginning of each shift to assure its equipment, parts and accessories are in a safe operating condition and free of apparent damage.

Vehicles are to be operated on roadways and grades in a safe manner. The excavator operator shall comply with the manufacturer's specifications and limitations applicable to the operation of the excavator. A copy of the operators manual shall remain in the cab of the excavator. Where the

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manufacturer's specifications are not available, limitations shall be determined by a registered professional engineer.

Attachments to the excavator shall not exceed the capacity, rating or scope recommended by manufacturer.

No modifications or additions which affect the capacity or safe operation of the excavator shall be made without manufacturer's written approval or approval by a registered professional engineer.

Instruction, rated load capacities, speeds and special hazard warnings shall be conspicuously posted so that it is visible to the operator. Only qualified operators familiar with the excavator shall operate it. The operator or competent person shall be designated to inspect the excavator daily prior to and during use to ensure its safe operating condition. Any deficiency found shall be repaired before continued use.

All belts, gears, shafts, drums, flywheels (rotating or reciprocating moving parts) shall be guarded if such parts are exposed to contact by employees. Platforms and walkways on the excavator shall be non skid surfaces.

A portable "BC" class fire extinguisher of at least 5 pounds shall be maintained in the cab.

If the supporting soil below the excavator is soft, substantial mats or planking (cribbing) shall be installed prior to work.

For overhead electrical lines 50 KV or below, the minimum clearance between the excavator or load is ten feet. For lines over 50 KV, the minimum clearance shall be ten feet plus4 inch for each 1 KV.

NYSDEC 063722

Whenever electricity is used for to power equipment by the excavator operator, ground fault interrupt circuit breakers shall also be used to minimize the potential for electrical shock.

NYSDEC 063723

16.0 *WORK AREA PROTECTION*

Where site activities are occurring adjacent to airport runways, public thoroughfares and parking lots, adequate protection of the public shall be instituted. Construction barriers such as a 42 inch high orange polyethylene barricade fencing are considered acceptable barriers. Barricade fencing will remain around excavated areas until the excavation has been backfilled.

When necessary, approved work area protection devices such as traffic warning signs, cones, stanchions and barricades shall be extensively utilized. Workers exposed to the hazards of motor vehicles on public roads shall wear reflectorized traffic vests to alert drivers of their presence. "People Working" signs shall be to be placed accordingly to warn vehicular traffic when work is commencing on or near public roadways.

Barricade tape will be utilized to separate the work area (exclusion zone) from non work areas (support zone) where work exposure to the public is minimized.

Work activities shall not commence within eight feet of railway track bed.

NYSDEC 063724

17.0 *HAZARD COMMUNICATION*

ERM will be provided with copies of updated Material Data Safety Sheet (MSDS) of all chemical substances and compounds to be brought on site by subcontractors prior to use. ERM will approve or disapprove chemical substances brought on site by subcontractors based on its need, quantity, flammability, reactivity and health effects. Based on the information and MSDSs provided, ERM will maintain a chemical inventory and a listing of MSDSs for those materials found on site. All subcontractors will ensure that their workers have been made aware of the chemical hazards stemming from their own operations or the operations of other subcontractors while on site. A written hazard communication plan shall be available for review and all chemical compounds used on site shall be appropriately labeled.

NYSDEC 063725

18.0 *FIRE PREVENTION*

Adequate fire protection shall be provided during the site activities. Flames or spark producing devices shall be prohibited within fifty feet of a work zone unless all flammable or combustible liquids or solvents have been appropriately stored in appropriate closed containers.

At least one ten pound ABC or BC rated fire extinguisher shall be provided an remain within 30 feet of the work zone.

NYSDEC 063726

EXHIBIT 1

HEALTH AND SAFETY PLAN REVIEW RECORD

I have read the Site Health and Safety Plan for this Project and have been briefed on the nature, level, and degree of exposure likely as a result of participation in this project. I agree to conform to all the requirements of this plan.

_____ _____

Signature Date

Name:

_____

Print

Project Manager:

_____ _____

Signature Date

EXHIBIT 2

CONTRACTOR OCCUPATIONAL HEALTH AND SAFETY CERTIFICATION

Project: _____

Contractor: _____

1. Contractor certifies that the following personnel to be employed during site activities at the Northrop Grumman Corporation site in Bethpage, New York have met the following requirements of the OSHA Hazardous Waste Operations Standard (29 CFR 1910.120) and other applicable OSHA standards. (Indicate date below.)

Contractor Personnel			
Examination	Training	Respirator Certification	Medical
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

2. Contractor certifies that it has received a copy of the Site Health and Safety Plan and will ensure that its employees are informed and will comply with its requirements.

3. Contractor further certifies that it has read and understands and will comply with all provisions of its contractual agreement with ERM.

Signed_____ Date_____

EXHIBIT 3

FIELD MEDICAL DATA SHEET

Name:_____ Phone:_____

Address:_____

Date of Birth:_____ Height:_____ Weight:_____

Allergies:_____

Particular Sensitivities:_____

Do you wear contacts: Note: Contacts are not permitted on-site

List exposures to hazardous chemicals if any and resultant illness or symptoms.

_____

_____

_____

List Medications you presently use:_____

_____

_____

List any other Medical Restrictions:_____

_____

_____

Special Medical or Incident Response Training:_____

_____

Name, Address and phone number of personal physician:_____

_____

_____

Nearest Relative:_____Phone:_____

_____ _____

Employee Signature Date

Attachment

FORM HS-401

ACCIDENT/INCIDENT REPORT

Project _____ Project # _____

Date:_____ Location_____ Manager_____

Description of incident, including injuries, property damage and emergency action taken and personnel involved (use additional sheets if needed):

_____

_____

_____

Witnesses of incident:

_____

_____

Possible or known causes:

_____

_____

_____

What actions are needed to prevent a similar incident?

_____

_____

_____

_____ _____

Reporter Site Safety Officer

_____ _____

Project Manager Health & Safety Officer

TABLE A-1
PHYSICAL SAFETY CONCERNS

List of Potential Hazards:

Hazard	Description	Location	Procedures Used to Monitor/Reduce Hazard
Heavy Equipment	Excavators	Identified spill area of contaminated soil	Personnel maintain eye contact with operators; hard hats and safety glasses worn during equipment operation.Provide adequate ventillation
Utilities	Electrical, water, sewer, gas	At site	Locate prior to and during site operations
Power Line and Electrical Equip.	Building Utility	To be determined	Locate prior to and during site operations.
Pedestrian Traffic	Hazards to Pedestrians	Adjacent to work area	Use work area protection
Noise	During certain work activities	To be determined	Hearing Protectors with proper noise reduction rating
Temperature Extremes	Cold / Heat Stress	All tasks	Protection as designated by Safety Officer.

TABLE A-3
SYMPTOMS OF VARIOUS TYPES OF INJURIES, EXPOSURES, AND SHOCK

Type of Injury or Exposure	Symptom
Bone Fracture	Signs and symptoms of fractures include the sound of bone "snapping", a grating sensation of bones burring together, obvious deformities, pain, tenderness, swelling, bruising, and an inability to move the injured part. Victims with fractured ribs may feel pain as they breathe.
Dislocation	Signs and symptoms of a dislocation are similar to those of a fracture. They include swelling, deformity, pain in a joint, loss of movement, and tenderness.
Sprain	Signs and symptoms of sprains include pain at the joint, tenderness when touched, discoloration, and swelling.
Internal Bleeding	Signs and symptoms of internal bleeding are: · Bruised, swollen, tender, or rigid abdomen. · Bruises on chest or signs of fractured ribs. · Blood in vomit. · Wounds that have penetrated the chest or abdomen. · Bleeding from the rectum or vagina. · Fractures of the pelvis. · Abnormal pulse and difficult breathing. · Cool, moist skin.

TABLE A-3 (CONTINUED)

Type of Injury or Exposure	Symptom
Shock	Shock has many signs and symptoms. These include confused behavior, very fast or very slow pulse rate; very fast or very slow breathing; trembling and weakness in arms and legs; cool and moist skin; pale or bluish skin, lips, and fingernails; and enlarged pupils.
Chemical Exposure, Ingestion or Inhalation	Symptoms of chemical exposure, ingestion or inhalation may include one or more of the following: Abnormal Pulse Behavioral changes Breathing difficulties or abnormal breathing Changes in complexion or skin color Convulsions Coordination difficulties Coughing Dizziness or drowsiness Drooling Diarrhea Fatigue and/or weakness Irritation of eyes, nose, respiratory tract, skin, throat, mouth, or lips Headache Itching Light-headedness Nausea/vomiting Skin irritation or rash Sneezing Sweating Tearing Tightness in the chest Unconsciousness

TABLE A-3 (CONTINUED)

Type of Injury or Exposure	Symptom
Heat Stroke	Signs and symptoms of heat stroke are hot, red skin; very small pupils; and very high body temperature - sometimes as high as 105 degrees. If the victim was sweating from heavy work or exercise, his or her skin may be wet; otherwise, it will feel dry.
Heat Exhaustion	The usual signs and symptoms of heat exhaustion are cool, pale, and moist skin; heavy sweating; dilated pupils, headache, nausea; dizziness; and vomiting. Body temperature will be nearly normal.
Frostbite	The first sign of frostbite may be that the skin is slightly flushed. The skin color of the frostbitten area then changes to white or grayish yellow and finally grayish blue, as the frostbite develops. Pain is sometimes felt early on but later goes away. The frostbitten part feels very cold and numb. The victim may not be aware of the injury.
Hypothermia	The signs and symptoms of hypothermia include shivering, dizziness, numbness, confusion, weakness, impaired judgement, impaired vision, and drowsiness. The stages are: 1. Shivering 2. Apathy 3. Loss of consciousness 4. Decreasing pulse rate and breathing rate 5. Death As hypothermia progresses, the victim may move clumsily and have trouble holding thins. In the later stages, he or she may stop shivering.

TABLE A-4
BASIC FIRST AID PROCEDURES

1. Be calm and quickly evaluate the emergency.

2. Contact the rescue squad or EMS.

3. Do not move the injured person unless necessary or instructed to do so.

4. If possible, move any physical and chemical hazards away from the area of the injured person. Control bleeding if properly trained.

5. Cover injured person to keep warm.

TABLE A-5
MAXIMUM DAILY TIME LIMITS FOR EXPOSURE AT LOW TEMPERATURES

Temperature Range		Maximum Daily Exposure
Celsius (degrees)	Fahrenheit (degrees)	
0 to -18	30 to 0	No limit, providing that the person is properly clothed.
-18 to -34	0 to -30	Total work time; 4 hours. Alternate one hour in and one hour out of the low temperature area.
-34 to -57	-30 to -70	Two periods of 30 minutes each, at least 4 hours apart. Total low temperature work time allowed; one hour. (Note that some difference exists among individuals: one report recommends 15-minute periods - not over four periods per work 8-hour shift; another limits periods to one hour out of every four; with a low chill factor, i.e., no wind; a third says that continuous operation for 3 hours at -53 has been experienced without ill effect.
-57 to -73	-70 to -100	Maximum permissible work time: 5 minutes during an 8-hour working day. At these extreme temperatures, completely enclosed headgear, equipped with a breathing tube running under the clothing and down the leg to preheat the air is recommended.

TABLE A-2
CHEMICAL HAZARDS AND ASSOCIATED EXPOSURE LIMITS

	PERSONAL EXPOSURE LIMITS					
Substance	PEL	STEL	CEIL	SKIN	Characteristics	Health Effects
Chromium	0.5 ug/m3	2.5 mg/m^3	–	–	Properties vary depending upon specific compound.	Irritated Eyes, Sensitization Dermatitis

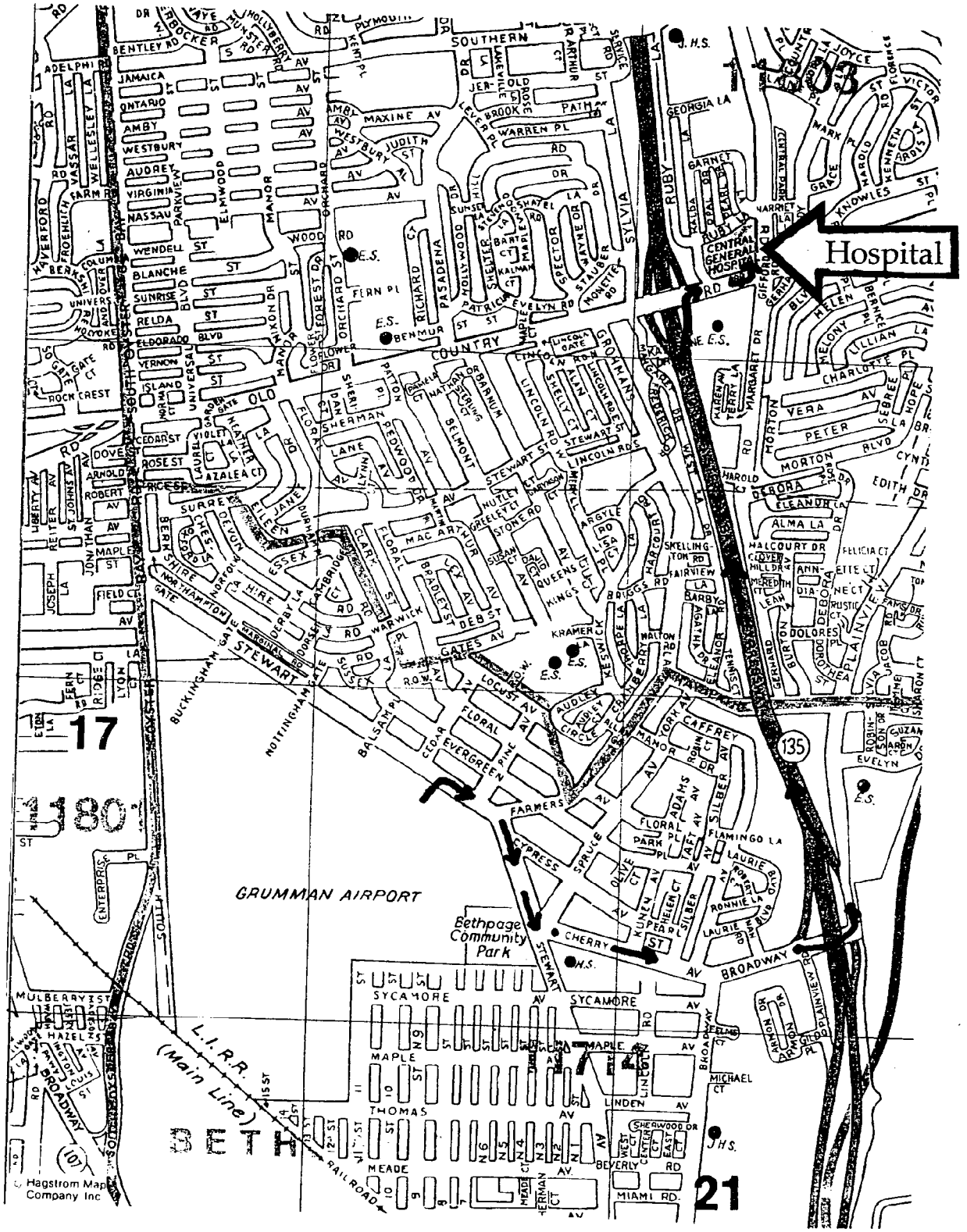
PEL: Permissible Exposure Limit defined by OSHA as the allowable airborne concentration a healthy worker can be exposed to, 8 hours per day, five days a week without respiratory protection.

CEIL: Ceiling value is an airborne concentration which can never be exceeded at anytime.

SKIN: Skin designation denotes skin absorption which contributes to overall exposure of a substance.

IDLH: Immediately Dangerous to Life or Health: means an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere.

NYSDEC 063737



Hospital Emergency Route

A MEMBER OF THE ENVIRONMENTAL RESOURCES MANAGEMENT GROUP

SOIL REMEDIATION REPORT FOR PLANT 3 CHEM MILL CLEAN LINE

Naval Weapons Industrial Reserve Plant
Bethpage, New York

2 June 1997

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NYSDEC 063739