Nevada
Environmental
Restoration
Project

DOE/NV--682

Remedial Action Work Plan
Amchitka Island Mud Pit Closures

Controlled Copy No: ___
Revision No: 1

April 2001

Approved for public release; further dissemination unlimited.

Environmental Restoration
Division

U.S. Department of Energy
Nevada Operations Office

Available for public sale, in paper, from:

U.S. Department of Commerce
National Technology Information Service
5285 Port Royal Road
Springfield, VA 22161
phone: 800.553.6847
fax: 703.605.6900
email: orders@ntis.fedworld.gov
online ordering: ***http://www.ntis.gov/ordering.htm***

Available electronically at ***http://www.doe.gov/bridge.***

Available for a processing fee to U.S. Department of Energy and its contractors, in paper, from:

U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831-0062
phone: 865.576.8401
fax: 865.576.5728
email: reports@adonis.osti.gov

DOE/NV--682

REMEDIAL ACTION WORK PLAN
AMCHITKA ISLAND MUD PIT CLOSURES

DOE Nevada Operations Office
Las Vegas, Nevada

Controlled Copy No.: ___

Revision No.: 1

April 2001

REMEDIAL ACTION WORK PLAN
AMCHITKA ISLAND MUD PIT CLOSURES

Approved by: Signature Approved Date: 4/5/01

Monica Sanchez, Project Manager
Offsites Project

Approved by: Signature Approved Date: 4/5/01

Runore C. Wycoff, Division Director
Environmental Restoration Division

Table of Contents

Table of Contents *(Continued)*

Table of Contents *(Continued)*

Table of Contents *(Continued)*

Table of Contents *(Continued)*

Table of Contents *(Continued)*

Table of Contents *(Continued)*

Table of Contents *(Continued)*

Table of Contents *(Continued)*

List of Figures

List of Drawings

List of Tables

List of Acronyms and Abbreviations

AAC	*Alaska Administrative Code*
ADEC	Alaska Department of Environmental Conservation
AEC	U.S. Atomic Energy Commission
AK	Alaska
API	American Petroleum Institute
APIA	Aleutian/Pribilof Islands Association, Inc.
ARAR	Applicable or relevant and appropriate requirements
AS	Alaska Statute
ASTM	American Society of Testing and Materials
ATV	All-Terrain Vehicle
BTU	British Thermal Unit
CERCLA	*Comprehensive Emergency Response, Compensation, and Liability Act*
CFR	*Code of Federal Regulations*
CN	Curve number
CPQ	Coastal Project Questionnaire
CQC	Construction Quality Control
CQCP	Construction Quality Control Plan
CRZ	Contamination reduction zone
CWA	*Clean Water Act*
°F	Degrees Fahrenheit
°C	Degrees Celsius
DGC	Alaska Department of Governmental Coordination
DNR	Alaska Department of Natural Resources
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOE/NV	U.S. Department of Energy, Nevada Operations Office
DOE-PE	U.S. Department of Energy, Project Engineer

List of Acronyms and Abbreviations (Continued)

DOT	U.S. Department of Transportation
EA	Environmental Assessment
ERD	Environmental Restoration Division
EPA	U.S. Environmental Protection Agency
EZ	Exclusion Zone
FADL	Field Activity Daily Log
GC	Gas Chromatography
GC/MS	Gas Chromatography Mass Spectrometry
H	Horizontal
H&S	Health and Safety
HPLC	High Performance Liquid Chromatography
IDW	Investigation-derived waste
LCS	Laboratory Control Sample
LQC	Laboratory Quality Control
M&TE	Measurement and test equipment
mm	Millimeter
NCR	Nonconformance Report
NEPA	*National Environmental Policy Act*
NOI	Notice of Intent
NOT	Notification of Termination
NPDES	National Pollutant and Discharge Elimination System
NTSWAC	Nevada Test Site Waste Acceptance Criteria
NV ERP	Nevada Environmental Restoration Program
NWP	Nationwide Permit
PCB	Polychlorinated biphenyl
PID	Photoionization detector
PPE	Personal protective equipment

List of Acronyms and Abbreviations (Continued)

ppm	Parts per million
psi	Pounds per square inch
psig	Pounds per square inch gauge
QA/QC	Quality assurance and quality control
QAC	Quality Assurance Coordinator
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	*Resource Conservation and Recovery Act*
REOP	Real Estate/Operations Permit
RPD	Relative Percent Difference
SEDCAD	Sediment Erosion Discharge Computer Aided Design
SQP	Standard Quality Practice
SSHASP	Site-specific health and safety plan
SSO	Site Safety Officer
SWPPP	Storm Water Pollution Prevention Plan
SZ	Support zone
TCLP	Toxicity characteristic leaching procedure
TCN	Technical Change Notice
TSD	Treatment, Storage or Disposal
USC	*United States Code*
USCS	Unified Soil Classification System
USFWS	U.S. Fish and Wildlife Service
USN	U.S. Navy
UST	Underground storage tank
UXO	Unexploded Ordnance
V	Vertical
VHS	Very High Speed

List of Acronyms and Abbreviations (Continued)

VOA	Volatile Organic Analysis
WM/EC	Waste Management and Environmental Compliance
WWII	World War II

1.0 Introduction

This remedial action work plan presents the project organization and construction procedures developed for the performance of the remedial actions at the six U.S. Department of Energy's (DOE's) drill sites, and the hot mix plant located on Amchitka Island, Alaska.

1.1 Background

Amchitka Island is located near the far western end of the Aleutian Islands, approximately 1,340 miles west-southwest of Anchorage, Alaska (see Figure 1-1). It is part of the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge, which is administered by the U.S. Fish and Wildlife Service (USFWS). Since World War II (WWII), Amchitka has been used by multiple United States government agencies for a variety of military and research activities. From 1943 to 1950, it was used as a forward air base for the U.S. Armed Forces. During the late 1960s and early 1970s, it was used by the U.S. Department of Defense (DoD) and the U.S. Atomic Energy Commission (AEC) (predecessor agency to DOE) as a site for three underground nuclear tests. Most recently, during the late 1980s and early 1990s, the U.S. Navy (USN) constructed and operated a radar station on the island. Amchitka is currently uninhabited and access to the island is restricted. Visitors are required to obtain access authorization from either the USFWS or the USN. However, trespassing by commercial fishermen is common.

Three underground nuclear tests were conducted on Amchitka Island. The DoD, in conjunction with the AEC, conducted the first nuclear test (Long Shot) in order to provide data that would improve the United States capability of detecting underground nuclear explosions. The Long Shot device (approximately 80 kilotons) was detonated on October 29, 1965. The second nuclear test (Milrow) was conducted by the AEC as a means to study the feasibility of detonating a much larger device in the future. The Milrow device (approximately 1,000 kilotons) was detonated on October 2, 1969. The third nuclear test (Cannikin) was weapons-related and detonated on November 6, 1971. The locations of these nuclear test sites and drill sites discussed in this section are shown in Figure 1-1.

In addition to the three sites that were used for nuclear tests, six other sites were considered for possible nuclear testing. The other potential sites were designated A, D, E, F, G, and H; Sites B and C

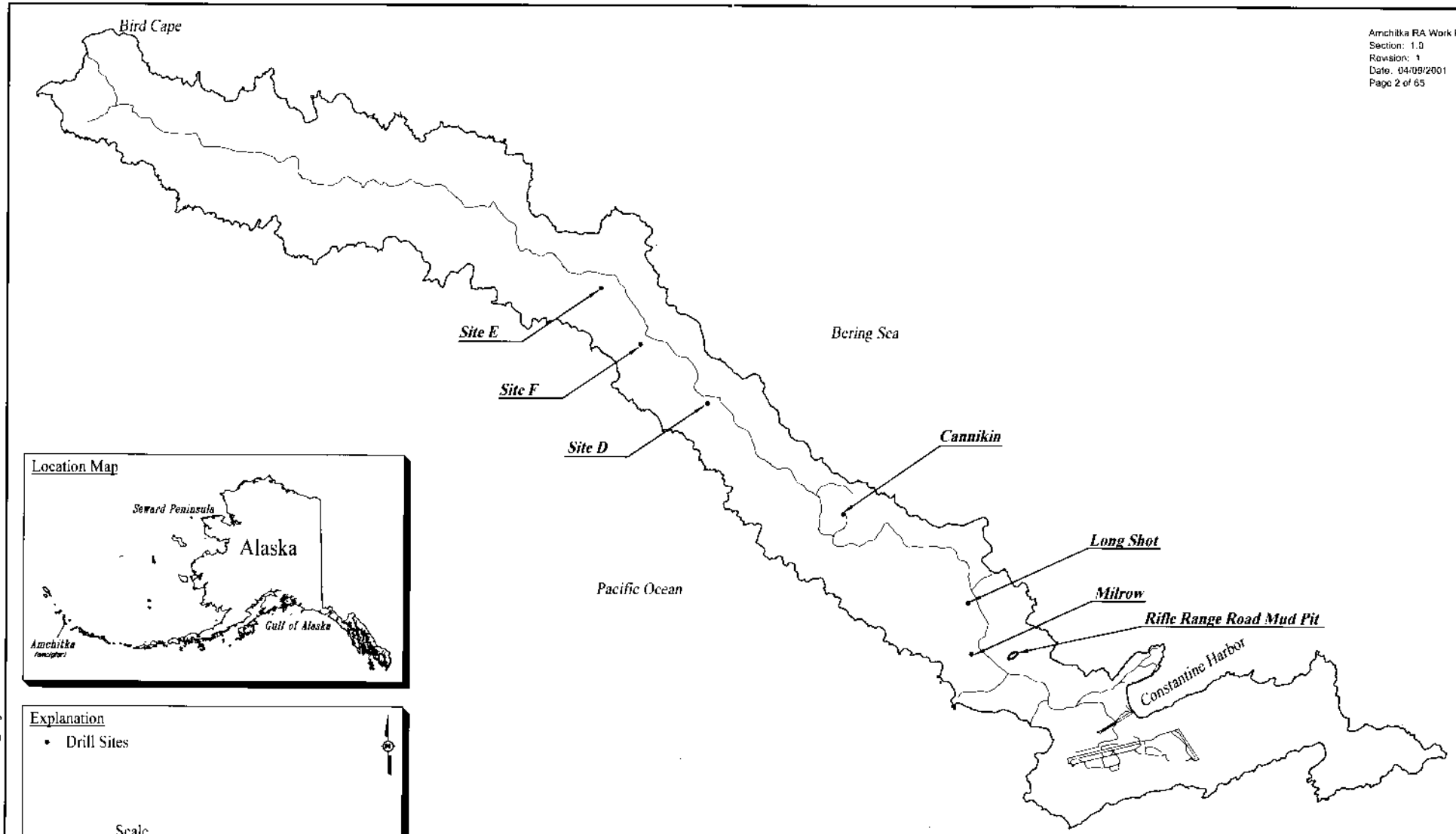


Figure 1-1
Amchitka Island Alaska
Drill Site Location Map

Sources: U.S. Geological Survey Map, 1975

n:\Amchitka\AMdrill_b.dgn
30-NOV-2000

were later renamed Milrow and Cannikin, respectively. Large-diameter emplacement holes were drilled at Sites D and F, but were not used. An exploratory hole was drilled at Site E. Site H was graded in preparation for drilling activities that did not occur. Sites A and G were located and staked, but no further preparation was made. It was estimated that approximately 195 acres were disturbed by drilling or preparation for drilling at Sites B, C, D, E, F, and H. This area includes access roads and spoil-disposal areas (Fuller and Kirkwood, 1977). Drill Sites D, E, F, and the three test sites, contain mud pits which have impacted the environment.

1.1.1 Physical Environment

The island's coastline is very rugged with sea cliffs, isolated sandy and gravel beaches, and grassy slopes. The lowest elevations are on the eastern third of the island, which is characterized by isolated, shallow ponds and heavily vegetated drainages. The central portion of the island has higher elevations, is more prone to wind erosion, and has fewer lakes. The westernmost 3 miles of the Island is a barren, windswept rocky plateau with sparse vegetation, except for those areas (e.g., stream drainages) protected from the wind. The average surface elevation at the western end of the island is approximately 800 feet. The highest elevation on the island is approximately 1,600 feet.

1.1.1.1 Climate

Amchitka is characterized by a pronounced maritime climate, including frequent storms, strong winds, and often cloudy skies. There is no prevailing wind on Amchitka, although during the summer months the winds are generally out of the southwest. The mean wind speed between December and February is 30 miles per hour; between March and May it is 26 miles per hour, between June and August it is 22 miles per hour, and between September and November it is 27 miles per hour. The maximum-recorded wind velocity on Amchitka is 115 miles per hour. The ocean moderates temperatures, which average 31 degrees Fahrenheit (°F) in winter (January) and 48°F in summer (August). Annual precipitation is about 33 inches, including approximately 71 inches of snow.

1.1.1.2 Geology and Soils

Amchitka apparently formed in early Tertiary time (roughly 50 million years ago) as a result of tectonic uplift and deposition of volcanic flow and marine sediments collectively known as the Amchitka Formation. Most of the island contains only a thin, discontinuous veneer of unconsolidated

sediments overlying the volcanic bedrock. Over most of the island, organic soils, including peat, overlie the unconsolidated sediments. The principal organic soil on the island blankets much of the poorly drained areas, marine terraces and other topographically low areas, and contain constituent plant materials that have decomposed and often contain horizons of peat. In the most topographically depressed and wettest parts of the island, the soils are typically peaty, with a thick mat of vegetation and little organic decomposition. In the drier and topographically higher areas, the soils are folists (well-drained organic soil). Limited areas of poorly developed sandy soils exist in dune areas in a narrow strip along the Bering Sea coastal bluffs.

1.1.1.3 Hydrology

Amchitka is covered with hundreds of small, shallow ponds up to 330-feet wide and up to 10-feet deep. The smaller ponds are considerably shallower, typically ranging from 12- to 20-inches deep. Ponds are most numerous on the eastern two-thirds of the island (approximately 26 ponds per square mile), where they have developed above marine terraces and are confined by thick vegetation peat. Many lakes in this region lack a definite inlet or outlet. Fewer ponds are present on the western third of the island, where they typically occupy bedrock depressions. Larger pond sediments are either floc (suspension of low-density detrital organic material) over gravel; organic silts over gravel; or clean gravel. The bottoms of smaller ponds are usually composed of peat or fine sediment covered with floc.

Watersheds on Amchitka Island are generally limited to 1 to 3 miles in length since all streams drain perpendicular to the long axis of the island into either the Bering Sea or the Pacific Ocean. Streams on the eastern part of the island flow slowly through tundra-covered watersheds, range from 3- to 10-feet wide, are up to 12-inches deep, and are characterized by low gradients and flow velocities. Streams in the central and western regions range from 6- to 13-feet wide and are up to 14-inches deep. Most of the streams in the island flow year-round. During relatively dry periods, stream flows are sustained by baseflow from soils and the underlying weathered bedrock; surface runoff and baseflow contribute to flows during wet periods.

The groundwater system on Amchitka Island can be divided into three zones: (1) a shallow water-bearing zone developed entirely within the organic soils and peat; (2) an intermediate groundwater zone developed within the shallow, weathered bedrock where fractures are relatively

open; and (3) a deep groundwater zone developed in less weathered bedrock where fractures are less open. The shallow water-bearing zone occurs largely in the tundra vegetation, peat, and underlying organic soils, and accumulates due to the high porosity and low vertical permeability characteristics of these materials. Perched groundwater is likely widespread in the eastern half of the island, as indicated by the large number of ponds in the region. Groundwater in the intermediate zone occurs in open fractures and within the volcanic rock matrix, where weathering processes have resulted in increased effective porosity. The intermediate zone may extend over most of the island and have a depth extending several hundred feet below the base of the shallow groundwater zone. Groundwater in the deep zone occurs in less weathered bedrock at depths greater than several hundred feet, and appears isolated from the surface water/shallow perched groundwater. Groundwater discharging springs are common on Amchitka. The best example is Constantine Spring. This spring served as a water supply during U.S. Army, USN, and AEC occupation of the island. Some of the island's deeper lakes (e.g., Pumphouse Lake, Long Lake, and Jones Lake) are also fed by bedrock springs.

The water in streams, lakes, and springs on Amchitka Island is generally of excellent quality. However, the chemical character of surface water on the island is quite varied. The surface water generally has less than 200 milligrams per liter total dissolved solids, with sodium and chloride as the dominant cation and anion, respectively.

1.1.2 Archaeology

Numerous prehistoric archaeological sites have been documented on Amchitka Island. Most of the sites occur along the coast in the southeastern half of the island. In addition, there are sites relating to historic occupation of the island. Three are located in the Constantine Harbor area, which will be the focal point of much of the proposed remediation activities. Others may be located near other areas proposed for cleanup.

Nonnative materials remaining on Amchitka Island are derived from three major occupations: WWII U.S. Armed Forces; AEC/DOE nuclear testing period; and Navy ROTHR. In considering these materials, it is important to remember that all of them were designed to be temporary in nature.

The first group, WWII facilities, were the subject of a U.S. Army Corps of Engineers cleanup effort in 1986. At that time, several buildings were left in place because of potential historic significance.

These were the North and South Hangars, the Officer's Club, and the Chapel. The North Hangar was subsequently demolished by the USN. The Chapel and the Officer's Club are collapsed, or nearly so, and no cleanup of these structures is anticipated. However, the South Hangar, potentially eligible for inclusion on the National Register of Historic Places, is slated for removal.

The nuclear testing period buildings that are proposed for demolition (including some that were reused by the USN during the ROTHR occupancy) all date from the middle to late 1960s. They do not appear to be architecturally significant and are probably not eligible for inclusion on the National Register. The landscapes of the three surface ground zeros; however, may be eligible.

Finally, the USN's buildings from the 1987 to 1993 period are not considered eligible for inclusion on the National Register because the antenna system did not become operational until after 1989, the defined end of the Cold War era.

Cleanup activities will be confined to existing roads and disturbed areas. This includes the potential borrow sources. Therefore, there will be no adverse effect on the prehistoric sites from these activities. On-island personnel will be required to undergo training emphasizing that unauthorized excavation and collection are prohibited by the *Archaeological Resources Protection Act* of 1979, as amended, and that violation carries both criminal and civil penalties, including jail time. This training will be accomplished by both written materials and on-site briefings.

1.2 Remedial Action Objective

The remedial action objective is to eliminate human and ecological exposure to contaminants by capping drilling mud pits and removing the tank contents at the hot mix plant, which was utilized to support asphalt-paving operations on the island. The remedial action will meet the substantive requirements of Alaska regulations, refuge management goals of the USFWS, address stakeholder concerns, and address the cultural beliefs and practices of native people.

1.3 Applicable, Relevant, and Appropriate Requirements

Remediation work on Amchitka is being conducted by the DOE/NV under the authority of the *Comprehensive Emergency Response, Compensation, and Liability Act* (CERCLA). This statute specifies that on-site remedial actions shall attain federal and state standards, requirements, criteria,

and limitations determined to be applicable or relevant and appropriate. Applicable or Relevant and Appropriate Requirements (ARARs) are site-specific and represent the universal enforceable standards by which the CERCLA remedial action will be assessed. The DOE/NV developed ARARs specific to the proposed remedial action on Amchitka (Table 1-1). These ARARs are required to be met on site, that is, at the location of the remedial action. Activities in areas off site (e.g., in support areas) are not required to comply with identified ARARs, but must comply with all applicable laws and regulations. For example, the ARARs listed in Table 1-1 must be met at the Amchitka locations where DOE/NV remedial action is scheduled to take place (e.g., the hot mix plant, mud pits, and monitoring wells). These ARARs are not applicable to base camp operations.

Within this table, ARARs are further delineated as chemical-, action-, and location-specific requirements. In general, chemical-specific ARARs include those requirements which are health- or risk-based numerical values specific to contaminants expected to be present on site. Such values may represent the acceptable concentration at which a particular contaminant may be found in, or released to, the environment (i.e., cleanup levels). Action-specific ARARs are technology or activity-based. These ARARs regulate remedial activities involving the design or use of certain equipment (e.g., incinerator design and operation standards), or regulate discrete actions. Location-specific ARARs are requirements that relate directly to the physical location of a remediation site. For example, location-specific ARARs may involve floodplains, wetlands, historic places, and sensitive ecosystems or habitats.

1.4 Scope of Work

The scope of work for the remedial action is comprised of the following components:

- Mobilization
- Site setup
- Site preparation
- Soil processing
- Water treatment and discharge (water on the mud pits)
- Drilling mud stabilization
- Cap placement
- Drilling mud excavation and consolidation (Cannikin only)
- Confirmatory sampling and analyses of the excavated drilling mud (Cannikin only)
- Backfill of excavated areas (Cannikin only)
- Collection, treatment, and disposal of accumulated water (decontamination rinsate)

Table 1-1
Applicable, Relevant and Appropriate Requirements
Amchitka Remedial Action
Summer 2001
(Page 1 of 9)

Requirements	Authority	Prerequisite	Description	Comments
ACTION-SPECIFIC REQUIREMENTS				
National Environmental Policy Act and implementing regulations	42 *United States Code* (USC) 4321 et seq. (2000) 40 *Code of Federal Regulations* (CFR) 1500 et seq. (1999)	Implementation of a major federal action	Requires various levels of impact analyses relating to proposed project; discusses alternatives to proposed project and related impacts	**Applicable.** The DOE is required to ensure that the proper NEPA documentation exists for all major project undertaken. The USFWS, as owner and administrator of Amchitka Island, has completed an Environmental Assessment (EA) for DOE and other federal agency actions on the island.
Comprehensive Environmental Response, Compensation, and Liability Act and implementing regulations	42 USC 9620 et seq. (2000) 40 CFR 300 (1999)	Existence of an abandoned hazardous waste site	Governs cleanup of abandoned hazardous waste sites; defines process for preparation and implementation of cleanup	**Applicable.** DOE remedial action is being performed under the CERCLA process.
Occupational Safety and Health Act and implementing regulations	29 CFR 1910.120 (1999)	Employment of federal and contractor employees	Regulations pertaining to protection of workers in an occupational setting	**Applicable.** Federal and contractor employees stationed on Amchitka in support of the remedial action field effort will be working under the *Hazardous Waste Operations and Emergency Response* regulations.
Generator Requirements	40 CFR 261 (1999) 40 CFR 262, Subparts A-C (1999)	Generation of a *Resource Conservation and Recovery Act* hazardous waste	Requires that a hazardous waste determination be made; sets requirements for the on-site accumulation of hazardous waste, including container requirements, inspections, and pretransport requirements	**Applicable** to hazardous investigation-derived waste, or as-generated waste, which will be disposed of off-site.

Table 1-1
Applicable, Relevant and Appropriate Requirements
Amchitka Remedial Action
Summer 2001
(Page 2 of 9)

Requirements	Authority	Prerequisite	Description	Comments
ACTION-SPECIFIC REQUIREMENTS - continued				
Underground Storage Tanks (USTs)	18 *Alaska Administrative Code* (AAC) 78.085-100 (1998)	Underground storage tank	Permanent closure of an UST; site characterization and assessment	**Applicable** to USTs that held petroleum products.
Leaking USTs	18 AAC 78.200-276 (1998)	UST release	Release investigation, notification, corrective action	**Applicable** if an UST release is discovered as a result of sampling activities.
Clean Water Act (CWA)-Wetlands Permitting	40 CFR 122 (1999) 33 CFR 330 (1999) Appendix A (Nationwide Permit #38, Cleanup of Hazardous and Toxic Waste)	Dredging or filling wetlands	Authorizes activities under a general permit that typically result in minimal adverse effects on the aquatic environment	**Applicable** to standing water on mud pits. DOE to apply Nationwide Permit #38, Cleanup of Hazardous and Toxic Waste, to activities within the mud pits.
National Pollutant Discharge Elimination System Stormwater Program	33 USC 1329 (2000) 40 CFR 122.26 (1999)	Construction activity resulting in disturbance of at least five acres or less than five acres as part of development with potential to disturb five or more acres	Controls discharge of pollutants from non-point sources (stormwater) into waterbodies	**Applicable.** Construction activities at Amchitka will result in the cumulative disturbance of five or more acres of land. DOE will apply the nationwide Construction General Permit to construction activities on Amchitka.
Alaska (AK) Air Quality Regulations	18 AAC 50.045(d) (1998)	Handling, transporting, or storage of bulk materials	Dust control requirements; reasonable precautions must be taken to prevent emission of particulate matter into ambient air	**Applicable.** DOE shall implement a dust control plan, as needed, to address dust-producing activities, such as movement of dirt by heavy equipment, mixing of mud with solidification agents/soil, and movement of vehicles around island.

Table 1-1
Applicable, Relevant and Appropriate Requirements
Amchitka Remedial Action
Summer 2001
(Page 3 of 9)

Requirements	Authority	Prerequisite	Description	Comments
ACTION-SPECIFIC REQUIREMENTS - continued				
	18 AAC 50.055(a-c) (1998)	Industrial process or fuel-burning equipment	Industrial processes and fuel-burning equipment; Addresses opacity, particulate matter emissions, and sulphur-compound emissions	**Applicable.** Portable generators used on site do not require construction or operating air permits; however, they must meet opacity, particulate matter, and sulphur-compound emissions standards.
Recommended Practices for Monitoring Well Design, Installation and Decommissioning (April 1992)	Incorporated by reference in 18 AAC 75.345(j) (1998)	Groundwater monitoring wells	Plugging and abandonment requirements for monitoring wells	**Relevant and Appropriate.** The regulations in which the Practices are adopted pertain to monitoring wells installed for the purposes of determining compliance with site cleanup rules. The Practices are also adopted by reference for monitoring wells installed under the solid waste landfill closure requirements. Plugging and abandonment regulations exist for wells drilled under oil and gas commission regulations; however, the purpose of the monitoring wells is more aligned with that of compliance monitoring wells.
AK Fish and Game Regulations	*Alaska Statutes* (AS)16.05.840 (1999) AS16.05.870 (1999)	Activities affecting freshwater streams, ponds, and/or anadromous fish	*Fishway Act* and *Anadromous Fish Act*	**Applicable.** If DOE activities involve stream crossing, culvert installation, or other activity that may affect a fishway, or are carried out in waterbodies that support anadromous fish, these statutes require the acquisition of specific permits.

Table 1-1
Applicable, Relevant and Appropriate Requirements
Amchitka Remedial Action
Summer 2001
(Page 4 of 9)

Requirements	Authority	Prerequisite	Description	Comments
CHEMICAL-SPECIFIC REQUIREMENTS				
AK Water Quality Standards	18 AA C70.005-050 (1998)	Potential for degradation/ pollution of a waterbody	Antidegradation policy, protected water use classes, water quality standards table	**Applicable.** Contaminated surface water and sediment standards are relevant to stormwater discharge activities. Note: The most applicable water use classification is 1C (freshwater: growth and propagation of fish, shellfish, other aquatic life, and wildlife). Others do not apply due to the remoteness and lack of population on island. Groundwater standards of this section do not apply to sites being cleaned up under 18 AAC 75 (site cleanup rules).
AK Water Toxics Criteria	40 CFR 131.36 (1999)	Potential for degradation/ pollution of a waterbody	Federally-promulgated water toxics criteria that have been adopted as Alaska water quality standards	**Applicable** to stormwater discharge activities.
AK Wastewater Disposal	18 AAC 72.500-510 (1998) 18 AAC 72.600 (1998) 18 AAC 72.610 (1998)	Discharge of nondomestic wastewater onto land, surface water, or groundwater; construction or use of a nondomestic wastewater treatment works	Submission and approval of engineering plans; plan review and permit fees	**Applicable** to stormwater discharges from construction activity. DOE will apply State of Alaska Wastewater General Permit #9640-DB004 to the discharge of standing water from the mud pits. DOE will operate a nondomestic wastewater treatment system for the standing water.

Table 1-1
Applicable, Relevant and Appropriate Requirements
Amchitka Remedial Action
Summer 2001
(Page 5 of 9)

Requirements	Authority	Prerequisite	Description	Comments
CHEMICAL-SPECIFIC REQUIREMENTS - continued				
	18 AAC 72.900-990 (1998)	Disposal of nondomestic wastewater into or onto the land, surface water, or groundwater in Alaska	General permit procedures, reports, emergency notice, inspections, appeals	**Applicable** to proposed activity involving the discharge of standing water from the top of the mud pits. DOE will apply State of Alaska Wastewater General Permit #9640-DB004 to the discharge of standing water from the mud pits.
AK Oil and Hazardous Substances Pollution Control Regulations	18 AAC 75.325 (1998)	Discharge/release of oil or hazardous substance	Site cleanup rules	**Applicable.** Groundwater in the areas of concern have not been, and will not be, used as a drinking water source on the island. Drinking water is provided by Constantine Spring, which is not hydraulically connected to the aquifers in the vicinity of the mud pits. As such, the groundwater cleanup standards to be applied are those which are 10 times the listed values.
	18 AAC 75.335-341 (1998)		Site characterization and soil cleanup levels	
	18 AAC 75.345 (1998)		Groundwater and surface water cleanup. Requires groundwater and surface water to be cleaned up to certain numerical standards and establishes point of compliance and monitoring requirements.	
	18 AAC 75.350-360 (1998)		Groundwater use, sampling and analysis, cleanup requirements	

Table 1-1
Applicable, Relevant and Appropriate Requirements
Amchitka Remedial Action
Summer 2001
(Page 6 of 9)

Requirements	Authority	Prerequisite	Description	Comments
CHEMICAL-SPECIFIC REQUIREMENTS - continued				
	18 AAC 75.375-390 (1998)		Institutional controls, final reporting requirements and site closure, waiver or modification	
	18 AAC 75.990 (1998)		Definitions	
LOCATION-SPECIFIC REQUIREMENTS				
AK Coastal Zone Management Program	AS 16.20 (1999) 15 CFR 930.30-40 (1999)	Activity within a coastal zone	Requires a project consistency review; results in determination of state and federal permitting requirements	**Applicable**. Although Amchitka is located within the "Aleutians West Coastal Resource Service Area" designated coastal zone district boundary, federal lands are excluded from Alaska's coastal zone boundaries. However, activities on federal lands are subject to the consistency determination provisions of the Alaska Coastal Management Program.
Coastal Zone Management Act	16 USC 1541 et seq. (2000)			
National Wildlife Refuge System Administration Act & Implementing Regulations	16 USC 668dd-ee (2000) 50 CFR 25-36 (1999)	Activity within a national wildlife refuge	Administration and management of areas in the National Wildlife Refuge System	**Applicable**. Amchitka Island is part of the Alaska Maritime National Wildlife Refuge.

Table 1-1
Applicable, Relevant and Appropriate Requirements
Amchitka Remedial Action
Summer 2001
(Page 7 of 9)

Requirements	Authority	Prerequisite	Description	Comments
LOCATION-SPECIFIC REQUIREMENTS - continued				
Refuge Recreation Act	16 USC 460k-3 (2000)	Activity within a national wildlife refuge	Authority for establishment of fees and charges and issuance of permits	**Applicable**. Amchitka Island is part of the Alaska Maritime National Wildlife Refuge.
Executive Order 11990, Protection of Wetlands	--	Federal action potentially affecting wetlands	Requires a federal agency to review actions for potential wetlands impacts	**Applicable**. Wetlands at the DOE work areas and potential impacts are discussed in the USFWS EA.
Executive Order 11988, Floodplain Management	--	Federal action within a floodplain or that may affect a floodplain	Evaluation and avoidance of floodplain impacts	
Compliance with Floodplain-Wetlands Environmental Review Requirements	10 CFR 1022 (1999)	Federal action with the potential to effect wetlands and/or floodplains	Evaluation and assessment of wetlands and floodplains that may be impacted by DOE activity	
Endangered Species Act	16 USC 1531 et seq. (2000) 50 CFR 402 (1999)	Federal action	Requires a federal agency to review proposed actions in order to determine any effect on endangered/threatened species and/or their habitat; mandates consultation with USFWS if species or habitat may be adversely affected by federal actions	**Applicable.** The Aleutian Canada Goose is a threatened species that has been identified on Amchitka. The presence of this species requires USFWS consultation. The USFWS addressed impacts to endangered and threatened species in the EA.

Table 1-1
Applicable, Relevant and Appropriate Requirements
Amchitka Remedial Action
Summer 2001
(Page 8 of 9)

Requirements	Authority	Prerequisite	Description	Comments
LOCATION-SPECIFIC REQUIREMENTS - continued				
Fish and Wildlife Coordination Act	16 USC 661 et seq. (2000)	Federal actions resulting in control or modification of a natural stream or water body	Requires federal agencies to assess impacts of water-related projects on fish and wildlife; prevent loss and/or damage to these resources; and provides for the development and improvement of the resources	**Applicable** only to DOE water-related actions. The discharge of pollutants into a body of water or wetland is within the jurisdiction of this law.
National Historic Preservation Act	16 USC 470 (2000) 36 CFR 63 (1999) 36 CFR 800 (1999)	Federal action	Identification, evaluation, registration, protection, and preservation of historic properties; requires federal agencies identify and evaluate potential impacts on historic properties; discusses federal consultation with State Historic Preservation Officer	**Applicable.** The USFWS evaluated the potential impact to historic properties in the Environmental Assessment.

Table 1-1
Applicable, Relevant and Appropriate Requirements
Amchitka Remedial Action
Summer 2001
(Page 9 of 9)

Requirements	Authority	Prerequisite	Description	Comments
REQUIREMENTS TO-BE-CONSIDERED				
AK Solid Waste Regulations	18 AAC 60.430 (1998) 18 AAC 60.440 (1998)	Permitted drilling waste disposal facility or inactive reserve pit	Closure of a permitted disposal facility to include removal of fluids, capping requirements, and revegetation and closure of inactive reserve pits	**To Be Considered.** Relevant, but not appropriate. Mud pits meet definition of monofill, waste constitution and site characteristics are similar to those for which the regulation was written. However, capping and design standards are implemented assuming the disposal facility met minimum location and design standards in order to be permitted (e.g., liner, monitoring), which the Amchitka pits do not.
Stormwater Treatment Plan Review Guidance Manual Municipality of Anchorage)	January 1999	Construction activity in Alaska	Erosion and sediment guidance; best management practices; stormwater site plans	**To Be Considered.** Instructions and guidance are applicable to statewide projects.
Erosion and Sediment Control and Materials Containment Guidance Manual (Municipality of Anchorage)	January 1998	Construction activity in Alaska	Preparation and implementation of Erosion and Sediment Control Plans	**To Be Considered.** Applies strictly to projects operating within Municipality of Anchorage, but requirements may be used to comply with CWA requirements prohibiting unpermitted discharges to water bodies.

- Closing the hot mix plant
- Plugging and abandoning existing shallow groundwater monitoring wells
- Site restoration
- Demobilization

All labor, supervision, equipment, materials, and transportation necessary to perform this remedial action will be provided by the DOE.

1.5 Project Organization

The following sections describe the organization that will be adhered to throughout the project. Field operations for the investigation will be conducted by DOE and contracted personnel. Figure 1-2 is the Organizational Work Chart for the remedial actions.

1.5.1 Contractor Roles and Responsibilities

The following sections describe the roles and responsibilities of the various parties.

1.5.1.1 Contractor Project Manager

The Project Manager will represent the contractor's central authority for the project and will have full responsibility for project performance and responsiveness to the U.S. Department of Energy, Nevada Operations Office (DOE/NV) requirements. This position will report directly to the DOE/NV Project Manager to ensure that project needs and scope are understood and addressed. The Project Manager will establish project policies; monitor schedule and cost; coordinate reporting; ensure necessary personnel, equipment, and materials are available; identify and resolve potential problems and conflicts in consultation with the DOE/NV Project Manager; ensure that health and safety (H&S) and quality control (QC) requirements are adhered to; and ensure that the quality of work is maintained. The Project Manager will also act as the DOE Project Engineer (DOE-PE) and have the responsibilities described in Section B.3.1.3.

1.5.1.2 Contractor Site Supervisor

The Site Supervisor will serve as the on-site manager during field operations. The Site Supervisor will coordinate all field activities through a combined and coordinated effort of staff and subcontractors. The Site Supervisor's responsibilities include:

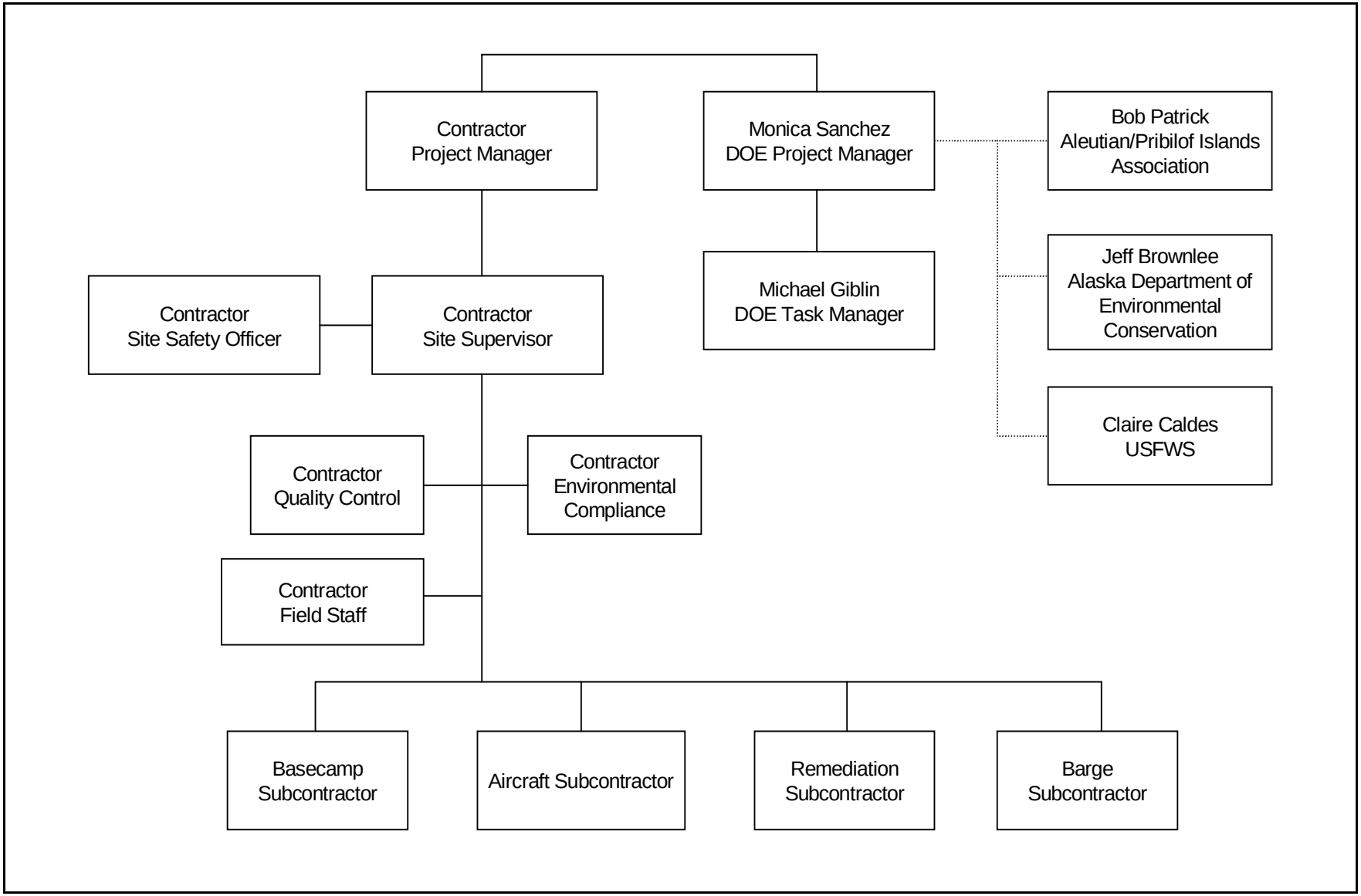


Figure 1-2
Organizational Work Chart

- Assist with the procurement of subcontractors and vendors
- Procure project materials
- Manage all subcontractors
- Manage, review, and certify subcontractor vendor invoices
- Execute the technical scope of work
- Ensure complete documentation execution of scope of work
- Report the status and progress of project to the Project Manager according to the established project reporting schedule
- Track the project cost and schedule and report this information to the Project Manager
- Comply with all H&S, Quality Assurance and Quality Control (QA/QC), and waste management (WM) procedures and requirements
- Ensure that all training records for site personnel are complete
- Coordinate work assignments for all site work
- Coordinate with DOE/NV on any interactions with the media
- Address audit findings as delegated by the Project Manager
- Assist in the preparation of report(s) generated by field programs

The Site Supervisor reports directly to the Contractor Project Manager. All contractor field staff will report directly to the Site Supervisor.

1.5.1.3 Contractor Field Staff

The field staff will execute the oversight tasks assigned by the Site Supervisor in accordance with the project-specific requirements. The responsibilities include:

- Perform the assigned quality control tasks to confirm that the scope of work is completed in accordance with contract documents
- Report any H&S, Environmental Compliance (EC)/WM, QA/QC, or technical issues to the Site Supervisor as they arise and aid in their resolution

- Document field activities in accordance with project-specific requirements
- Support the Site Supervisor in addressing audit findings
- Direct all requests by regulators and media to the Site Supervisor
- Prepare report(s) upon project completion, as applicable

The field staff will report directly to the Site Supervisor for project task assignment.

1.5.1.4 Contractor Health and Safety Officer

The Site Safety Officer (SSO) is responsible for establishing a safety culture and ensuring the requirements of the site-specific health and safety plan (SSHASP) are met during the field effort. The SSO will be intimately involved with preparation of the SSHASP and will report to and assist the Site Supervisor, as needed, to ensure that the scope of work is completed safely.

1.5.1.5 Contractor Waste Management and Environmental Compliance

Environmental compliance and use of appropriate waste management practices are a high priority. The Waste Management and Environmental Compliance (WM/EC) Liaison will:

- Prepare plans and work documents prior to mobilization to the field that will enable the field staff to comply with applicable laws, rules, regulations, and orders.
- Review the results of analytical sampling in order to determine the ultimate disposition if wastes are generated during activities on the island.

1.6 U.S. Department of Energy, Nevada Operations Office

The DOE/NV Project Manager is Monica Sanchez, who will have the overall management responsibilities for the project. The DOE/NV Task Manager, Michael Giblin or his designee, will be on the island during the remedial activities and has the overall responsibility for the on-site field investigation. The DOE/NV Project Manager will plan, authorize, and control project work so that activities are completed in accordance with the Field Instructions, on schedule, and within budget. The DOE/NV Task Manager will be the primary point of contact with the Alaska Department of Environmental Conservation, (ADEC) Contaminated Sites Group, USFWS, and the Aleutian/Pribilof

Islands Association, Inc. (APIA) while on the island. The Contractor's Project Manager will report to the DOE/NV Project Manager to ensure that project needs and scope are understood and addressed.

1.7 Alaska Department of Environmental Conservation

The ADEC, Contaminated Sites Group, representative will be on the island during the remedial activities and is responsible for ensuring the State's responsibilities/interests are represented.

1.8 U.S. Fish and Wildlife Service

The USFWS contact, Claire Caldes, or his designated alternative will be on the island during the remedial activities and is responsible for ensuring that the USFWS's interests are represented. In particular, the USFWS will assist in identifying hazing of the Aleutian Canada Goose habitat to ensure that activities on the island do not adversely affect nesting geese.

1.9 Aleutian/Pribilof Islands Association, Inc.

The APIA contact, Bob Patrick, will be on the island during the remedial activity to ensure that the APIA's interests are represented.

1.10 Project Documentation

Site operations shall include documenting all site activities, surveying, mud pit closure, water treatment, waste management, video and photo documentation, and quantity determinations. The following sections describe the documentation procedures, documents, records, and paperwork involved in the field investigation to be generated by the Contractor.

1.10.1 On-Site Training Documentation

All on-site personnel are required to have completed the following training and have the documentation on site prior to beginning work at the site for entrance into an exclusion zone. These records shall be maintained and be current throughout the activities:

- 29 *Code of Federal Regulations* (CFR) 1910, "Hazardous Waste Operations Training Records;" initial 40-hour Hazardous Waste Operations and Emergency Response, and 8-hour refresher courses

- Medical Clearances that state that the worker is qualified to perform the work
- No on-site personnel will be authorized to enter a designated exclusion zone unless they are current with above training and medical requirements, and the files are in the on-site project records

1.10.2 Project Documents

Contractor Documents: This Remedial Action will be conducted in accordance with the documents listed below. A controlled copy of each of these documents must be on site during all field activities:

- Storm Water Pollution Prevention Plan (SWPPP) (Appendix A)
- Construction Quality Control Plan (CQCP) (Appendix B)
- Quality Assurance Project Plan (QAPP) (Appendix C)
- Site-Specific Health and Safety Plan (Appendix D)
- Contractor Standard Quality Practices
- Real Estate/Operations Permit (REOP) (DOE requirement)

All technical field operations will be conducted in accordance with applicable contractor procedures. Table 1-2 lists the procedures and other relevant program and project-specific documents applicable to the remedial action.

Subcontractor Documents: In addition to their health and safety training records, subcontractors must provide the following documents to the Site Supervisor before mobilization to the site:

- Material Safety Data Sheets for all materials brought on site
- Material and equipment specifications and calibrations
- Licenses and certifications, as required

1.10.3 Field Documentation

Field documentation shall be sufficient in content and detail to facilitate the reconstruction of field activities and shall be performed in accordance with Section C.6.3 of the QAPP (Appendix C). All operations will be documented on appropriate forms or through the use of other methods. Paper and/or electronic means will be used to document field operations; however, a hard copy of the completed information will be the official record. Regardless of the method chosen, it is the

Table 1-2
Applicable Contractor Procedures

Title
Readiness Process
Field Activities Documentation
Chain of Custody
Sample Handling, Packaging, and Shipping
Collection of Field Quality Control Samples
Sampling Equipment Decontamination
Photodocumentation
Measuring and Testing Equipment Calibration, Maintenance, and Control
Receipt Inspection of Quality-Affecting Items
Surveying
Field Mapping with a Global Positioning System
Control of Hazardous Substances
Spill Management
Sediment Sampling
Soil Sampling Compositing
Surface Water Sampling

responsibility of the document generator to ensure that the information is accurate, complete, and properly acknowledged.

1.10.3.1 Daily Field Activities

All operations will be documented. Daily field activities will be recorded chronologically in an approved logbook or on Field Activity Daily Log (FADL) forms. When more than one field activity is being completed at the same time and separate FADLs or logbooks are prepared on site, the logbook should reference the additional activities and associated documents. Daily QC observations/inspections shall be logged into the FADL.

1.10.3.2 Tailgate Safety Briefings

Tailgate Safety Briefings will be conducted prior to the beginning of work each day, at shift change (if applicable), when a new worker comes on site, or any time the work scope changes such that new or different safety concerns arise. The completed forms shall be delivered to the Site Supervisor for review on a daily basis. If formal technical changes are made to the SSHASP during the course of the field work, the changes will be communicated and documented in the tailgate safety briefing.

1.10.3.3 Photo Documentation, Still Imagery

The Site Supervisor will ensure that photographs are taken of each major activity during the field investigation. A digital camera or 35-millimeter (mm) camera may be used. Each photograph must be taken and logged. A central photograph log will be prepared and maintained on site. Photography permits are not required on the island. If digital images are made, they should be downloaded on a daily basis and archived.

1.10.3.4 Photo Documentation, Videography

The Site Supervisor will ensure that all activities are adequately videotaped. A very high speed (VHS), 8-mm, or digital video camera may be used. Each videotape must be taken and logged. The items videotaped must be marked plainly on the videocassette. A central video log will be prepared and maintained on site.

1.10.3.5 Instrumentation/Equipment Calibration

Instrument calibration will be completed and logged into the Instrument Calibration Log as discussed in Appendix C.

1.10.3.6 Technical Field Changes

Technical field changes are variations in a prescribed activity or field method due to uncontrollable field conditions or operational necessity. Field changes on the island will be logged on a Technical Change Notice (TCN) form. The Quality Processes Manager and the Project Manager shall approve technical changes to Contractor documents. The DOE documents will require approval by the persons originally approving the DOE document or their designee. Verbal approval may be obtained

by the approving parties in the field before documenting the change. If the changes could potentially have an impact on the SSHASP or the workers, the SSO shall review the TCN and initial the document.

1.10.3.7 Sample Collection Log and Chain of Custody Forms

A Sample Collection Log and Chain of Custody form will be completed for all samples collected on the island. All samples will be handled according to the QAPP located in Appendix C and contractor-approved procedures.

1.10.3.8 Quality Assurance

The following will be done to ensure that documents generated are of a high quality, the data are defensible and comply with applicable quality assurance practices:

- Indelible dark ink will be used, and all written entries on forms must be clearly and legibly printed.
- Handwritten errors in the logbook or on a form will be drawn through with a single line, then initialed and dated.
- Forms, as required, shall be reviewed for completeness prior to filing in the on-site files. The individual checking the form shall sign or initial, and date the original form, indicating that the form has been checked.
- Checkprints will be completed on data transferred from handwritten forms to computer records.
- The on-site computers, if used, will be backed up at least once per 24-hour period.
- Original documents will be filed in the contractor's Central Files at the completion of the remedial activities. Working copies may be made for use prior to submittal of the originals to Central Files.

1.10.3.9 Maintenance of Field Documents

All completed field documents will be maintained in an on-site file controlled by contractor site personnel and overseen by the Site Supervisor.

2.0 Remedial Action

The following sections describe the remedial action activities as they will be performed.

2.1 Preliminary Activities

Several preliminary activities must be performed prior to mobilization for efficient and effective performance. These activities are required to provide necessary information, as well as the necessary material, equipment, and labor to complete the remedial action. The following sections detail the required preliminary activities.

2.1.1 Procurement Activities

Procurement is an important aspect of this project because at least three major subcontracts will be required for the implementation of the field activities. The major subcontracts anticipated are listed below:

- Base camp services
- Emergency medical services
- Barge transportation
- Air transportation
- Remediation services

In addition, material purchases, equipment rentals, and other miscellaneous subcontractor services necessary for field activities will be procured prior to and during implementation of the remedial action. All procurement activities will be conducted in accordance with government rules and regulations.

2.1.2 Permitting Activities

Specific activities discussed in this work plan and those associated with the operation of a base camp will require the acquisition of federal and state permits and/or authorizations. Remedial action and base camp permits/authorizations will be obtained by the respective DOE subcontractor.

All required environmental permits for the project will be obtained prior to mobilization to the island. The following represent the potentially applicable permitting/authorization requirements for remedial activities and base camp operations on the island. The following list consists of permits that may be required, but does not imply that all such permits will be necessary to complete the project.

Access Requirements:

- ***Access to the Maritime National Wildlife Refuge, Amchitka Island.*** Amchitka Island is part of the Alaska Maritime National Wildlife Refuge, which is administered by the USFWS. Access to the island is currently restricted to government agencies and entities specifically approved by the USFWS. The DOE will submit a Special Use Permit application to the USFWS to obtain authorization to access the island and conduct remedial activities and base camp operations. The DOE and/or its contractors may not access the island until USFWS authorization is given through issuance of the Special Use Permit.

- ***Coastal Zone Impacts.*** Federal activities that may impact the coastal zone in Alaska are required to document consistency with the requirements of the Alaska Coastal Management Program. This program is administered by the Alaska Department of Governmental Coordination (DGC) and includes: (1) a Coastal Project Questionnaire (CPQ) and (2) a consistency review and certification. The CPQ is designed to assist a project in determining the State permits required for a particular activity and to streamline the permitting process. The consistency review and certification involves the examination of project activities in relation to established State and regional coastal zone management standards and a certification that such standards will be met. The State must issue a consistency determination in order for work to begin on the island.

- ***Vessel Landings.*** Although not anticipated, the shoreline may be used to land personnel and equipment transportation vessels. If a vessel(s) is landed on the beach, a State of Alaska tideland permit will be required. A permit application will be submitted to the Alaska Department of Natural Resources (DNR).

- ***Stream Encroachment.*** Several of the streams near DOE working areas on the island are inhabited by anadromous fish species. The only foreseeable impact that DOE remedial activities could have on such streams is in the event of culvert repair and/or replacement. In this event, a Fish Habitat permit may be required by the Alaska Department of Fish and Game.

Activities specific to the remedial action:

- ***Construction Activities Disturbing Greater Than Five Acres.*** The federal National Pollutant Discharge Elimination System (NPDES) program requires a permit for the discharge of storm water resulting from construction activities that disturb greater than five acres of earth. The

capping of mud pits on Amchitka will involve the disturbance of a cumulative total greater than five acres and will require a NPDES storm water permit. The DOE intends to apply the Construction General Permit, a nationwide permit, to remediation construction activities. As required by regulation, a Notice of Intent (NOI) will be submitted to the Environmental Protection Agency (EPA) stating DOE's intent to apply this nationwide permit to Amchitka remedial activities. This NOI must be submitted to EPA at least two days prior to initiation of construction activities; however, DOE does not require a response from EPA in order to operate under the permit.

- ***Containment/Stabilization of Hazardous or Toxic Waste.*** The remedial action at the mud pits will involve stabilization of mud pit material and subsequent isolation from the environment through application of a cap. However, prior to stabilization, several thousands of gallons of standing water (resulting from precipitation) will be discharged from the mud pits. Emergent wetland vegetation has been identified in some of the mud pits, prompting the mud pits to be considered wetlands for the purposes of the USFWS environmental assessment currently being drafted. To address remedial action within a wetland, the DOE intends to apply for use of Nationwide Permit (NWP) #38, Cleanup of Hazardous and Toxic Waste, under the *Clean Water Act* Section 404 program. A Pre-Construction Notification will be submitted to the U.S. Army Corps of Engineers, Alaska District, to determine if DOE may apply this NWP to remedial activities within the mud pits on Amchitka. Approval may require up to 30 days once all information is submitted satisfactorily.

- ***Discharge of Standing Water from Mud Pits.*** As indicated above, several thousand gallons of standing water will be discharged from the mud pits in preparation for capping. This water will be discharged directly to the ground surface under State of Alaska wastewater general permit #9640-DB004. A Notice of Disposal will be submitted to the ADEC in order to conduct discharge activities under this general permit. The discharge of water to a surface water body is not authorized under this State permit and will not occur during DOE operations.

- ***Disposal of Mud Pit Structures.*** Debris from the dismantling of two structures associated with one of the mud pits may be disposed of on the island at the landfill operated by the U.S. Navy. The structures, a wooden boardwalk used to access the center of the mud pit and a metal manifold used historically to distribute mud, will be dismantled and transported to the U.S. Navy landfill for disposal.

Activities specific to base camp operation:

- ***Operation of Food Service Facilities.*** The base camp will provide hot and cold meals for site workers throughout the duration of the project. This service will require a State of Alaska food service operator's permit.

- ***Use of Constantine Spring Water.*** Current plans call for the use of water from Constantine Springs to support base camp operations. The water will be used for drinking, laundry,

shower facilities, and cooking. Drinking water may require treatment prior to use. A State permit will be required to operate a drinking water treatment system on the island.

- ***Disposal of Grey Water.*** Grey water will be generated from the use of shower, laundry, and kitchen facilities in the base camp. It is currently unknown if the USFWS will permit the discharge of base camp grey water to the ground surface or will require containerization and off-site disposal of the water. If on-site discharge is acceptable, a State of Alaska wastewater discharge permit will be required.

2.1.3 Borrow Area Study

A Borrow Area Study was conducted on all of the proposed borrow areas on the island during June 2000 field activities. The Borrow Area Study consisted of a geotechnical testing program to confirm that the materials would meet the requirements of the closure design. The results of the study are included in Appendix E to this plan.

2.2 Mobilization

All equipment, materials, and personnel will be mobilized from Anchorage, Alaska, on board chartered carriers.

2.2.1 Personnel

Sufficient construction personnel, equipment, and materials will be mobilized to the site by chartered aircraft and seagoing vessels to initiate remedial action activities. All remedial action activities will be completed by an Alaska-licensed contractor. Personnel providing oversight for the DOE will consist of the following:

- Task Manager
- Site Supervisor
- Unexploded Ordnance (UXO) Technician
- Site Administrator
- Project Engineer
- Four Quality Control Engineers
- Health and Safety Officer

An environmental compliance specialist will be mobilized to oversee the removal of any waste from the island. Additionally, personnel will be mobilized as necessary to perform site audits and assessments in accordance with DOE policy.

2.2.2 Equipment

The major equipment required for the remedial action may consist of one or more of the following items:

- Base camp equipped with living quarters, dining, and sanitary facilities
- Tracked excavators
- Low ground-pressure bulldozers
- Vacuum truck
- 30,000-gallon modular tanks
- Rubber-tired backhoes
- Rubber-tired loaders
- Sheepsfoot compactor
- Vibratory drum roller
- Tracked loaders
- Road grader
- Articulated dump trucks
- Soil processing plant equipped with a vibrating screen and crusher
- 4-inch trash pumps
- 2-inch trash pumps
- Hoses, fittings, and related materials
- Pick-up trucks
- Activated carbon water treatment system
- HNu photoionization detector (PID)
- Explosimeter/oxygen analyzer

Miscellaneous office and H&S materials, as well as the geosynthetic membrane and material needed for general site restoration, will also be obtained and brought on site prior to the remedial action.

2.3 Site Setup

The first work activities performed as part of the remedial action will be site setup. The primary purpose of site setup is to establish the field facilities necessary to accomplish the remedial action. Site setup activities will include:

- Inspecting all sites for nesting Aleutian Canada Geese and implementing the USFWS-approved hazing plan

- Establishing a base camp complete with sleeping, dining, and sanitary facilities as well as telephone/telefax service

- Identifying and designating the temporary laydown areas as well as specific locations for storage/stockpiling of construction equipment and materials and staging of materials
- Identifying and designating the exclusion, contamination reduction, and support zones
- Performing an inventory and inspection of equipment and materials, including health and safety-related items, to verify readiness to perform the remedial action

Each of these tasks are described in detail in the following sections.

2.3.1 Aleutian Canada Goose Survey

The Aleutian Canada Goose, a threatened species, is abundant on Amchitka. In order to complete the remedial actions with as little disturbance of nesting geese as possible, prior to any site activities, biologists will survey all proposed areas of activity for the presence of nesting geese. The proposed mobilization date of mid-May is well before the mating time of the goose, so no nesting pairs are anticipated. But, if nesting pairs are found, the mitigation procedures developed by the USFWS will be adhered to. As part of the *National Environmental Policy Act* (NEPA) Environmental Assessment process, the USFWS is currently in formal consultation regarding the geese. If no nests are located in the vicinity of the proposed areas, the approved USFWS procedures for hazing the geese and prohibiting them from nesting in the vicinity of the sites will be implemented.

2.3.2 Base Camp Establishment

Approximately 2 weeks prior to personnel mobilization, a base camp to support approximately 50 DOE personnel will be set up in the vicinity of Baker or Charlie Runway. The base camp will be installed and maintained in accordance with all applicable federal, state, and local regulations. The base camp will provide sleeping quarters, dining, and sanitary facilities for all personnel. The base camp operator will be responsible for obtaining all permits regarding black water, grey water, and solid waste disposal. Within the base camp, an office tent will be constructed to support DOE's field activities. The tent will be equipped with office equipment, copier, satellite telephone/telefax service and will be of adequate size to provide room for the QC records, which will be filed and available at all times. An additional office tent will be constructed at the Cannikin site. The tent will be equipped with electricity and office equipment to support all construction activities.

2.3.3 Work Area Identification

The various work areas required to complete the remedial action will be designated prior to initiating work activities. The equipment and material laydown area will be used to store construction machinery, equipment, and tools, and stage construction materials and supplies needed during the remedial action. Other containers, such as 55-gallon drums, used to contain used personal protective equipment (PPE) will also be placed in this area. A waste storage area will be constructed to store drums of used PPE and other nonbase camp-related waste generated during the remedial action.

2.3.4 Contamination Control Zone Delineation

Contamination control zones consisting of an exclusion zone (EZ), contamination reduction zone (CRZ), and a support zone (SZ) will be established. The zones will be delineated with warning signs and barrier tape. A brief description of each zone is included in the following:

- EZ - The EZ includes the mud pits and contiguous areas. This area is known to contain contaminated materials and has the highest potential for exposure to the contaminants by contact; therefore, appropriate PPE must be worn when working in this zone.
- CRZ - The CRZ is comprised of the personnel decontamination facility, the equipment decontamination pad, and a portion of the temporary site access road. This is the corridor through which all personnel and equipment must pass through to enter or exit the EZ. Personnel and equipment decontamination will also occur here.
- SZ - The SZ consists of all other areas. This zone is an uncontaminated area used for storage and general administrative functions.

Additional information discussing the contamination control zones is presented within the SSHASP included in Appendix D.

2.3.5 Personnel Decontamination Facility Establishment

A personnel decontamination facility will be established within the CRZ to provide personnel with a controlled transition from the EZ to the SZ. A step-off area will be located at the entrance to the personnel decontamination facility. A boot wash, hand wash, and emergency eyewash will be provided in this area. Personnel will doff PPE in this area. Lined drums will be positioned within this area to dispose of PPE.

2.3.6 Equipment and Material Inventory

An inventory and inspection of construction equipment and material mobilized and/or procured for the remedial action will be conducted to verify that the equipment and material are in good working order and have not been damaged during mobilization. The inventory and inspection will include confirmation of the following:

- Proper equipment and materials are on hand and in good working order and are of acceptable quality for their intended use
- Sufficient quantity of the required equipment and materials are on site or are readily available to prevent unnecessary delays or downtime

Particular attention will be paid to the condition of H&S apparatus and PPE to make sure it is functional and of sound integrity since these items are critical to worker health and safety.

2.4 Site Preparation

The next work activities will prepare the site for all subsequent construction operations required to fulfill the remedial action. These initial tasks will include:

- Protecting all site features from damage which may occur during performance of the remedial action
- Constructing stabilized construction exits at the entrance to each of the DOE's sites and constructing/upgrading temporary access roads and laydown areas at each site prior to initiating earth disturbance activities
- Installing erosion and sedimentation controls consisting of diversion ditches and berms upgradient and silt fence and strawbale check dams downgradient of all work areas
- Constructing a sediment trap in Site D to collect, clarify, and discharge storm water runon
- Constructing equipment decontamination pads

2.4.1 Protection of Site Features

Prior to and during the performance of the remedial action, site features, such as monitoring wells, will be protected, as necessary, to prevent damage which may result from construction operations. Existing site features which are to remain in place, or to be reused, will be protected from damage of

heavy equipment and vehicular traffic by placing high-visibility ribbon, as necessary, around the site feature.

If a warning of high winds is issued, the necessary precautions will be taken to minimize the danger to persons and protect the work. Precautions will include, but are not limited to, closing openings, removing loose materials, tools, and equipment from exposed locations and removing or securing temporary work.

2.4.2 Temporary Access Road and Stabilized Construction Exit Installation

Access to mud pit at Drill Site E will require a temporary site access roadway to be constructed from the drill pad to the mud pit. Actual locations of the access road will be determined in the field. The access road will be constructed of a nonwoven geotextile and 6 inches (minimum) of stone. Site traffic will be kept to a minimum and will be confined to the temporary site access roadway. No travel on the undisturbed tundra is anticipated; however, if it should become necessary, all-terrain vehicles (ATVs) with tire pressure less than 5 pounds per square inch (psi) will be utilized. At the completion of the remedial action, the aggregate will be removed, stockpiled within the soil borrow area, and the area will be revegetated.

A stabilized construction exit will be constructed at each of the DOE's sites. The construction site exit as shown on Detail 2 of Sheet C-32 will be stabilized with large aggregate (riprap) to prevent the traveling of drilling mud, dirt, or sediment onto Infantry Road. The construction site exit will be constructed with a layer of nonwoven geotextile overlain with aggregate. The geotextile will be placed on the ground prior to riprap. The stabilized construction exit will be maintained during the remedial action and may require periodic cleaning to remove accumulated mud, dirt, sediment, or other debris and/or top dressing, with additional riprap as conditions demand.

2.4.3 Erosion and Sedimentation Control Structure Installation

Temporary controls to minimize erosion and sedimentation will be installed at each site and contiguous work areas during the remedial action as shown on Sheet C-32. The primary erosion and sedimentation control structures to be utilized will be diversion trenching and silt fencing. A sediment trap (D-1) at Drill Site D will also be constructed as shown on Sheet C-23. If necessary,

erosion and sedimentation control measures will be field modified to suit construction operations. All erosion and sedimentation controls are detailed in the SWPPP, which is included as Appendix A to this document.

2.4.4 Equipment Decontamination Pad Construction

An equipment decontamination pad will be constructed at each mud pit site within the CRZ at the designated locations as shown on Detail 1 of Sheet C-31. All equipment leaving the EZ, which may have contacted contaminated material, will be decontaminated at this location. The equipment decontamination pad will consist of an area approximately 15 by 40 feet, will be graded to drain to one corner, and will be covered with 2 layers of 30-mil liner and geotextile placed on grade with earthen (or other) berms approximately 1 foot in height around the perimeter. The entrance and exit berms will be constructed to allow passage of construction machinery, equipment, and site vehicles, and still contain the decontamination fluids. At the designated low corner, a hole will be excavated to allow for installation of a sump. Liner will then be placed on the ground and over the earthen berms. The liner will be securely anchored around the perimeter by shoveling soil (or sandbagging) onto the outer edge. Plywood, timbers, or similar material that will withstand a heavy load, but will not inflict damage to the liner, will be placed across the length of the equipment decontamination pad to provide access and egress for construction machinery, equipment, and site vehicles. A portable, 2-inch submersible pump will be set in the sump to periodically transfer the decontamination water via hoses to a storage tank temporarily staged nearby. All rinsewater generation will be treated as discussed in Section 2.5.2. Decontamination will be accomplished using a high-pressure washer with makeup water from Constantine Springs.

2.5 Drilling Mud Pit Remediation

The remediation of the drilling mud pits consists of constructing geosynthetic caps over each mud pit. A general cross section of the cap system is shown on Detail 2 of Sheet C-31. The remedial action will be completed by performance of several sequential tasks using conventional earth-moving equipment. These tasks are discussed in the following sections and will include treatment and discharge of standing water in the mud pits, operation of several soil-processing areas, stabilization of the drilling mud, installation of the geosynthetic cap, and site restoration. All activities associated with the remedial action will be completed in accordance with the CQCP located in Appendix B.

2.5.1 Dust Control and Road Maintenance

The spread of dust will be prevented as much as possible to avoid the creation of a nuisance or hazard in the surrounding areas. With the anticipated weather on the island, dust control is not considered a major problem; however, a water truck or hoses will be utilized for dust suppression on an as-needed basis. Care will be taken not to create slippery work conditions or sticky mud as a result of dust control activities. Concrete areas in the base camp will be swept as often as necessary to control the spread of dust/debris.

Routine maintenance of the Infantry Road will be performed as necessary to ensure safety of the vehicles and work crews.

2.5.2 Water Treatment and Discharge

In order to stabilize the drilling mud, it is necessary to pump all standing water from the mud pits. In order to do this, several high-output, portable trash pumps will be utilized to pump the water from the pits. Analytical data on the standing water shows that, as long as the underlying mud is not disturbed, the water can be discharged without prior treatment. Therefore, the suction hose will be attached to a float to prevent the drilling mud from becoming disturbed during pumping operations. The pumps will discharge onto the concrete drill pad, into a sediment trap for activities at Drill Site D, or into an energy dissipater constructed of 6-inch diameter rock. The dissipater will prevent erosion downgradient of the pump discharge point. When the standing water has been drawn down to approximately 2 feet from the mud surface, or whenever a sheen on the water surface is observed, the water will be treated prior to discharge. The water will be pumped into a large modular tank constructed on each site, and treated in batches. The water will be treated by flocculation and carbon adsorption.

Each batch will be treated by the addition of ferric chloride and alum, the pH of the water would then be adjusted with the addition of lime. An anionic polymer will then be added to flocculate out free product. The water will then be passed through a series of bag filters, and finally activated carbon canisters to remove any organics. Treated water will be sampled at the discharge point at the frequency required in ADEC's Wastewater General Permit Number 9640-DB-004. Sheet P-1 presents a process flow diagram. In addition to the standing water within the mud pits, all other water

generated as a result of equipment decontamination will be treated by this method prior to discharge. All sampling and analyses will be done in accordance with the CQCP and the Quality Assurance Project Plan (QAPP), which are attached as Appendix B and Appendix C to this document.

2.5.3 Soil Processing

During the remedial activities, it will be necessary to process soils from several borrow areas. A large borrow area located at Mile Marker 8 on Infantry Road will be utilized to supply soil for the Cannikin and Long Shot mud pits. Borrow areas in the vicinity of the Rifle Range Road mud pit and within Drill Sites D, E, and F will be utilized to supply soil for pits at each of those locations. All proposed borrow areas are located within previously disturbed areas; no virgin tundra will be utilized for borrow material.

As stated in Section 2.4.3, prior to any earth disturbance activities, erosion and sediment control structures will be installed. The soil excavated from the borrow areas will be utilized for several different applications. The applications and the required gradation of soils are as follows:

- Soil to stabilize the drilling mud <6-inch maximum diameter
- Intermediate cover (1 foot below liner) <1-inch maximum diameter
- Protective cover (1 foot above liner)<1-inch maximum diameter
- Soil cover <2-inch maximum diameter
- Vegetated layer <3-inch maximum diameter
- Energy dissipaters 4- to 6-inch diameter

Soils will be excavated from the borrow areas and placed into the processor equipped with a series of vibratory screens. Processed material will be segregated and stockpiled based on gradation. Stockpiled material will be loaded into dump trucks for use, as required. Care will be taken during borrow area operations to minimize any disturbance outside of the previously disturbed borrow area footprint. At the conclusion of the project, the borrow areas will be restored in accordance with Section 2.5.9.

2.5.4 Drilling Mud Excavation and Consolidation

The Cannikin site contains three mud pits, one at the surface ground zero drilling pad, and two at the post shot drill back well. The drilling mud within the southern post shot drill back mud pit

(approximately 550 cubic yards) will be removed and consolidated into the northern mud pit. The following sections detail this activity.

2.5.4.1 Drilling Mud Excavation

After the standing water on the mud pit has been removed, a tracked excavator will remove all of the drilling mud from the southern mud pit and load it into dump trucks to be transported approximately 120 yards to the northern mud pit for consolidation.

2.5.4.2 Confirmatory Sampling

After visual inspection determines that all drilling mud has been removed from the southern mud pit, confirmatory sampling will be completed on the *in situ* soils to verify that the contaminants are below the regulatory cleanup levels. The samples will be collected and analyzed for diesel-range organics by Method AK102. All sampling and analyses will be done in accordance with the CQCP and the QAPP, which are attached to this document as Appendices B and C, respectively.

2.5.5 Drilling Mud Stabilization

After the standing water has been removed from each of the mud pits, screened solidification soils will be hauled from the borrow area and end-dumped into the mud pit. A tracked excavator, or similar equipment, will mix the screened material with the drilling mud at a ratio of 4 parts screened material to 1 part drilling mud, by weight. The tracked excavator will mix the solidification soils into the drilling mud, taking care to mix the full thickness of drilling mud. The solidification soils, when mixed with the drilling mud, will stabilize the mixture to allow the excavator to construct a working platform out of the mixture. The excavator will work off of the platform, and will then be able to reach the full extent and depth of drilling mud. Table 2-1 presents estimated quantities of drilling mud and solidification soils necessary for stabilization of each mud pit.

The mixing will continue until the Quality Control Engineer determines that a homogeneous mixture has been obtained. Nuclear density tests will be performed on the solidified drilling mud as solidification soils are added. The tests will serve to monitor the solidification process and to document the final conditions. Additional solidification soils may be added at the Quality Control Engineer's discretion to achieve the desired consistency. The solidified drilling mud will then be

Table 2-1
Amchitka Drilling Mud Pits

Site Name	Drilling Mud Pit Name	Drilling Mud (Wet Bentonite)	Solidification Soils Required
Milrow	Rifle Range Road Mud Pit	0 Tons	0 Tons
Long Shot	West Mud Pit	1,050 Tons	4,200 Tons
	East Mud Pit	1,050 Tons	4,200 Tons
Cannikin	Northwest Mud Pit	1,670 Tons	6,680 Tons
	Post Shot Drill Back Hole South	0 Tons	0 Tons
	Post Shot Drill Back Hole North	0 Tons	0 Tons
Drill Site D	Southern Mud Pit	3,000 Tons	12,000 Tons
	Northwest Mud Pit	9,900 Tons	39,600 Tons
	Northeast Mud Pit	6,920 Tons	27,680 Tons
Drill Site E	Northern Mud Pit	0 Tons	0 Tons
	Southern Mud Pit	0 Tons	0 Tons
Drill Site F	Remnant of Mud Pit	0 Tons	0 Tons

graded with a low ground-pressure bulldozer to promote runoff from the mud pit and to meet required lines and grades of overlying geomembrane.

2.5.6 Equipment Decontamination

All site vehicles, construction machinery, and equipment exiting the EZ at each drill site will be decontaminated at the equipment decontamination pad. Vehicle and equipment decontamination will be accomplished with a hot water pressure washer.

All vehicles and equipment will be washed thoroughly with the pressure washer and brushes, as appropriate. Washing will proceed from the top down, and special care will be taken to ensure the undercarriage and treads are free of dirt and debris. The washing will continue until the vehicle is visually free of dirt and debris.

The decontamination rinsewater will be collected in the sump of the decontamination pad, and then pumped periodically to a storage container staged near the water treatment system awaiting treatment.

Accumulated dirt and sediment will be placed in one of the mud pits prior to capping. The water used for decontamination will be obtained from Constantine Spring.

2.5.7 Cap Construction

Once the drilling mud is stabilized, a geosynthetic cap constructed of soil layers and a geomembrane cover will be installed. The following sections detail the placement of the cap layers, beginning at the lowest layer. Details 2 and 3 on Sheet C-31 present a typical cross-section of the cap system. Table 2-2 lists the drawings that present grading plans for each site.

Table 2-2
Mud Pit Grading Plans

Site	Drawing
Rifle Range Road	Sheet C-3
Long Shot	Sheet C-6
Cannikin Ground Zero	Sheet C-11
Cannikin Drill Back Hole	Sheet C-12
Drill Site D	Sheets C-17 and C-18
Drill Site E	Sheet C-25
Drill Site F	Sheet C-28

2.5.7.1 Intermediate Cover Placement

Once the drilling mud mixture is brought to grade, a one-foot minimum layer of intermediate cover (maximum particle size 1-inch) will be placed in a 1-foot lift and compacted with a minimum of four passes by a drum roller. If additional material is needed to bring the drilling mud mixture to grade, fill material will be utilized. The intermediate cover will act as the base for the geosynthetic liner; therefore, the surface must be free of sharp rocks, sticks, and other deleterious material that could potentially damage the liner.

2.5.7.2 Anchor Trench Construction

A perimeter berm or bench will be constructed around each mud pit to help contain the drilling mud during solidification and to accommodate the anchor trench. The alignment of the perimeter or bench

will be over-excavated to remove any organic, peaty soils. Fill material from the borrow area will then be placed in 1-foot lifts and compacted to bring the area back to grade. An anchor trench will be excavated around the perimeter of each mud pit to secure the geomembrane. An anchor trench will be excavated in the compacted fill around the entire perimeter of each mud pit. Care will be taken to ensure that the wall of the anchor trench does not contain any sharp, protruding rocks that could potentially damage the geomembrane.

2.5.7.3 Geomembrane Placement

Once the intermediate cover has been placed and the anchor trench installed, a 30-mil polyester geomembrane, XR-5® as manufactured by Seaman Corporation or approved equivalent, will be installed over the intermediate cover. The geomembrane is manufactured in panels up to 40,000 square feet in size, minimizing the required number of field welds. Any field seams that will be done will be hot welded. Care will be taken to ensure that wrinkles, fishmouths, and other defects are prevented. The geomembrane will extend into the base of the anchor trench. After the geomembrane is in place, the anchor trench will be backfilled in 1-foot lifts and compacted with a hand compactor. Installation will be in accordance with the CQCP located in Appendix B.

2.5.7.4 Protective Cover Soil Placement

After geomembrane deployment has been completed and approved by the QC Engineer, a 1-foot layer of protective cover soil will be placed over the geomembrane with low ground-pressure bulldozers, and compacted with a drum roller. The protective cover will have a maximum particle size of 1-inch, and will protect the liner from damage during subsequent construction. Care will be taken during placement to minimize any wrinkles that could occur in the underlying geomembrane.

2.5.7.5 Soil Cover Layer

After the protective cover layer has been placed, an 18-inch layer of soil cover will be placed to provide additional frost protection for the geomembrane cover. This layer will be placed in one lift and compacted by 4 passes of a drum roller. The maximum particle size of this material is 2 inches.

2.5.7.6 Vegetated Layer Placement

The final six-inch lift of material will be placed and proof-rolled by one pass of a drum roller.

2.5.8 Revegetation

The mud pit caps will be revegetated with a USFWS-approved seed mixture. Prior to seeding, the top 4 inches of soil will be scarified to produce an adequate seed bed. The soil will be amended with a USFWS-approved fertilizer. After the seed has been placed, an erosion control blanket such as Curlex I®, as manufactured by American Excelsior Company, or approved equal will be installed over the seeded areas. All revegetation will be done in accordance with the CQCP.

2.5.9 Site Restoration

All disturbed areas, including borrow areas, will be reseeded with the USFWS seed mix, and covered with the erosion control blanket to minimize erosion. The soil borrow areas will be graded in such a way as to blend into the surrounding contours, and no slopes steeper than 2 horizontal (H) to 1 vertical (V) will remain at the conclusion of the site restoration activities. Site restoration will be completed in accordance with the CQCP. Sheets C-19 and C-30 present the grading plans for the Drill Site D Borrow Area and the Mile Maker 8 Borrow Area, respectively.

2.6 Hot Mix Plant Closure

The hot mix plant is located adjacent to Charlie Runway and consists of two underground storage tanks (USTs). A 1998 USACE plan describes the plant as consisting of two 25,000-gallon railroad tank cars located approximately 20-feet apart (USACE, 1998). The orientation of the tanks (i.e., side-by-side, end-to-end, or otherwise) is not indicated. Historical records suggest that the tank(s) held asphalt used in constructing and/or maintaining the nearby runways. A sample of one of the tanks was collected in 1995 and was analyzed for metals, total halogens, polychlorinated biphenyls (PCBs), hydrocarbon scan, and British Thermal Unit (BTU) content (USACE, 1996). The hydrocarbon scan was the only analysis that yielded detects: 309,000 parts per million (ppm) and 124,000 ppm of “unknown petroleum” compounds. The BTU content was 18,000 BTU per pound. Only one tank opening was observed in the most recent site visit, although two openings were noted in the1995 site visit (USACE, 1998). No associated piping or distribution system is referred to in

historical documents or was observed in the most recent site visit. Estimates of the existing tank contents from recent and historical site visits range from 6,000 to 19,000 gallons.

2.6.1 Site Assessment

Samples of the subsurface soils associated with each tank shall be collected in accordance with 18 *Alaska Administrative Code* (AAC) 78.090(d)(iii) for in-place tank closure. Based on historic estimation, each tank capacity is approximately 25,000 gallons. From this estimation, possible tank dimensions were back-calculated, resulting in a 66-feet long, 8-feet diameter tank. In accordance with 18 AAC 78.090(d)(vii), the surface area used to determine the number of soil samples required for each tank equals ~925 square feet. This equates to collection of a total of six soil samples.

2.6.1.1 Soil Sample Collection

Because the exact dimensions of the tanks and their orientation is unknown, the number and location of soil samples may be altered by the DOE-PE in the field, in consultation with the ADEC on-site representative. An excavator or similar will be used to scrape the surface soil and locate the tank perimeter. Once the confines of the tanks are evident, test pits will be installed and field screening and soil sampling will commence. Samples will be collected from test pits using an excavator or similar equipment. Each excavator bucket, or similar, will be field screened using a PID instrument to determine the areas of most likely contamination. The results of field screening will be used to locate five soil samples in biased locations. The sixth sample will be collected adjacent to the tank opening, if visible. All soil samples will be collected within five feet horizontal distance of the tank and at an elevation below and within two feet of the tank bottom, if possible. Based on the orientation of the tanks underground (e.g., side-by-side, end-to-end), the same test pit may be used to satisfy the requirements applicable to more than one tank, as permitted in 18 AAC 78.090(d)(2)(A)(iii).

Due to the nature of the island, it is anticipated that groundwater will be encountered prior to reaching a depth within two feet of the bottom of the tanks. Once groundwater is encountered, a sample will be collected within the first six inches of the vadose zone above groundwater as close as possible to the original sample locations. In addition, at least one soil sample will be collected from the first six inches of groundwater-saturated soil in each instance that groundwater is encountered.

Samples will be analyzed by an Alaska-approved laboratory for all parameters identified in Table 1, Part A, of the *Underground Storage Tanks Procedures Manual*, December 1998, which is reproduced for reference here in Table 2-3. The sampling suite required may be altered upon consultation with ADEC.

It is not known if a release from the tank(s) ever occurred. If a release is identified through sampling, closure of the tank will proceed under corrective action regulations at 18 AAC 78.200 - 276. If a release is not evident, no further action is required as long as soil cleanup levels in 18 AAC 75 are not exceeded.

2.6.1.2 Waste Characterization Sampling

A representative sample of the liquid from each tank will be collected by lowering a disposable bailer, or other device, into the tank. If the liquid has multiple phases, each phase will be sampled and analyzed. The samples will be labeled appropriately and put into resealable "bubble-wrap" packing material, then immediately placed in a cooler with ice to maintain a shipping temperature of 4 degrees Celsius (°C), and then shipped to the designated laboratory. The following suite of parameters will be analyzed for:

- PCBs
- Ignitability
- Corrosivity
- Reactivity
- Toxicity Characteristic Leaching Procedure (TCLP)
  - Semivolatile Organics
  - Volatile Organics
  - Metals

All analytical methods are presented in Appendix C.

2.6.2 Tank Content Removal

After the results from the characterization sampling have been obtained, the liquid will be pumped out of the tanks and placed into drums or other appropriate containers. Waste from the hot mix plant will be stored in a bermed, lined area enclosed with safety fencing. Appropriate signage will be posted, as necessary. Once all of the liquid has been pumped out, the tanks will be rinsed with a

Table 2-3
Reference Guide to Sample Collection and Laboratory Analysis
Soils, Sediments, Sludges, and Fill Materials
(Page 1 of 2)

Parameter	Preparation/ Analytical Method[1]	Method Detection Limit[2]	Practical Quantitation Limit[3]	Container Description (Minimum) [Clear glass may be substituted for amber; if samples are protected from exposure to light, this exception does not apply to metals]	Preservation/ Holding Time
Gasoline-range organics	AK101	2.0 mg/kg	20 mg/kg	4 oz. amber glass, TLS	Methanol preservative, <25°C / 28 days
Diesel-range organics	AK102	2.0 mg/kg	20 mg/kg	4 oz. amber glass, TLC	Cool 4° ± 2°C / 14 days to extraction, less than 40 days to analysis of extract
Residual-range organics	AK103	10 mg/kg	100 mg/kg	4 oz. amber glass, TLC	Cool 4° ± 2°C / 14 days to extraction, less than 40 days to analysis of extract
Aliphatic gasoline-range organics	AK101AA	25 mg/kg	250 mg/kg	4 oz. wide-mouth amber glass jar with Teflon®-lined silicon rubber septum seal	Methanol preservative / 28 days from sampling
Aromatic gasoline-range organics	AK101AA	2.5 mg/kg	25 mg/kg	4 oz. wide-mouth amber glass jar with Teflon®-lined silicon rubber septum seal	Methanol preservative / 28 days from sampling
Aliphatic diesel-range organics	AK102AA	.4 mg/kg	4 mg/kg	4 oz. wide-mouth amber glass jar, TLC	No preservative / 14 days to extraction, less than 40 days to analysis of extract
Aromatic diesel-range organics	AK102AA	.4 mg/kg	4 mg/kg	4 oz. wide-mouth amber glass jar, TLC	No preservative / 14 days to extraction, less than 40 days to analysis of extract
Aliphatic residual-range organics	AK103AA	1 mg/kg	10 mg/kg	4 oz. wide-mouth amber glass jar, TLC	No preservative / 14 days to extraction, less than 40 days to analysis of extract
Aromatic residual-range organics	AK103AA	1 mg/kg	10 mg/kg	4 oz. wide-mouth amber glass jar, TLC	No preservative / 14 days to extraction of sample, less than 40 days to analysis of extract
Benzene	AK101† or 8260B	0.007 mg/kg	0.07 mg/kg	4 oz. amber glass, TLS	Methanol preservative, <25°C / 28 days
Toluene	AK101† or 8260B	0.007 mg/kg	0.07 mg/kg	4 oz. amber glass, TLS	Methanol preservative, <25°C / 28 days
Ethylbenzene	AK101† or 8260B	0.007 mg/kg	0.07 mg/kg	4 oz. amber glass, TLS	Methanol preservative, <25°C / 28 days
Total xylenes	AK101† or 8260B	0.007 mg/kg	0.07 mg/kg	4 oz. amber glass, TLS	Methanol preservative, <25°C / 28 days
Total benzene, toluene, ethyl benzene, and xylene (BTEX)	AK101† or 8260B	0.007 mg/kg	0.07 mg/kg	4 oz. amber glass, TLS	Methanol preservative, <25°C / 28 days
Polynuclear Aromatic Hydrocarbons (PAH)	8270C or 8310	0.1 mg/kg	1.0 mg/kg	4 oz. amber glass, TLS	Cool 4° ± 2°C / 14 days to extraction, less than 40 days to analysis of extract
Total Volatile Chlorinated Solvents*	8260B	0.008 mg/kg	0.08 mg/kg	4 oz. amber glass, TLS	Cool 4° ± 2°C / 14 days

Table 2-3
Reference Guide to Sample Collection and Laboratory Analysis
Soils, Sediments, Sludges, and Fill Materials
(Page 2 of 2)

Parameter	Preparation/ Analytical Method[1]	Method Detection Limit[2]	Practical Quantitation Limit[3]	Container Description (Minimum) [Clear glass may be substituted for amber; if samples are protected from exposure to light, this exception does not apply to metals]	Preservation/ Holding Time
Polychlorinated biphenyls (PCBs)	8081A or 8082	0.01 mg/kg	0.05 mg/kg	4 oz. amber glass, TLC	Cool 4° ± 2°C / 14 days to extraction, less than 40 days to analysis of extract
Total Arsenic	6010B, 6020, 7060A, or 7061A	1 mg/kg	10 mg/kg	4 oz. amber glass, TLC	Cool 4° ± 2°C / 6 months
Total Cadmium	6010B, 6020, 7130, or 7131A	1 mg/kg	10 mg/kg	4 oz. amber glass, TLC	Cool 4° ± 2°C / 6 months
Total Chromium	6010B, 6020, 7190, or 7191	1 mg/kg	10 mg/kg	4 oz. amber glass, TLC	Cool 4° ± 2°C / 6 months
Total Lead	6010, 6020, 7420, 7421	1 mg/kg	10 mg/kg	4 oz. amber glass, TLC	Cool 4° ± 2°C / 6 months

PAH - Naphthalene, fluorene, anthracene, pyrene, benzo-a-anthracene, acenaphthene, chrysene, benzo-a-pyrene, dibenzo-a, h-anthracene, benzo-b-fluoranthene, benzo-k-fluoranthene, ideno-123-cd-pyrene
VOA - Volatile Organic Analysis
TLC - Teflon®-lined screw caps
TLS - Teflon®-lined septa sonically bonded to screw caps

[1]Unless otherwise noted, all preparation and analytical methods refer to those contained in EPA's *Methods for Chemical Analysis of Water & Wastes* (March 1983) or EPA's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, adopted for reference in 18 AAC 78.090.
[2]Method detection limits (MDLs), specified in 40 CFR, Part 136, Appendix B, revised as of July 1, 1996, adopted by reference, are determined at the department's chemistry laboratory. A laboratory's MDL must equal or have a value lower than the MDL in the table.
[3]Practical quantitation limits (PQLs) must be established by each laboratory and must equal or have a value lower than the PQL in the table. For purposes of this table, PQL = 10 x MDL, except for PCBs which are PQL = 5 x MDL (56 CFR 26511).

*May be analyzed out of AK101 methanol preserved sample
†The AK101 method can be extended for specific determination of volatile aromatics (BTEX) as specified in EPA Method 8021B for solids utilizing the methanol preservation option only. All AK101 samples must be preserved with methanol.

high-pressure steam cleaner to remove as much residual as practical. Additional heat, by way of immersible heaters, will be applied to the tank contents as necessary to loosen the material for removal. At no time will anyone enter the tank.

2.6.3 Tank Closure

Once the tank contents are removed, the tank will be filled with native soils to prevent the possibility of future collapse. The native soil will be taken from one of the island's designated borrow areas. Once the tank has been filled as much as possible through the manway opening, the opening will be grouted closed with lean concrete.

2.6.4 Closure Supervision and Reporting

As required in 18 AAC 78.400, the closure of the two underground tanks will be conducted and/or supervised by an Alaska State UST-certified individual. Within 30 days of tank closure, a completed post-closure notice will be forwarded to ADEC. Within 60 days of tank closure, a site assessment report meeting the requirements of 18 AAC 78.090(d)(5) and the UST Procedures Manual will be submitted to ADEC. The collection and interpretation of field data and reporting of site characterization/assessment data will be conducted or supervised by a "qualified person," as specified in the UST Procedures Manual.

2.7 Monitoring Well Abandonment

A total of 24 monitoring wells at Milrow and Long Shot will be abandoned as part of the remedial activities. Well abandonment will consist of excavating and removing the well casing to a depth of 5 feet below grade or to the groundwater table, whichever is less, and filling the remaining casing with a bentonite slurry. A one-foot thick bentonite cap will then be placed over the well casing and bottom of excavation, and the remaining excavation will be backfilled. A well abandonment log will then be prepared for each well to document this activity.

2.8 Final Survey

A final survey of all work areas will completed prior to demobilization. The survey will be completed by a surveyor licensed in the State of Alaska. The survey will be utilized to provide as-built drawings of all mud pit caps and borrow areas.

2.9 Waste Management

The remedial action contractor is responsible for the characterization, on-site management, transportation, and ultimate disposal of all wastes, hazardous or nonhazardous, generated by remediation activities. The following wastes/materials are anticipated to be generated during remediation activities:

- Nonhazardous solid waste, such as used PPE (Tyvek® coveralls, booties), disposable sampling equipment, plastic liner, and other materials that may come in contact with drilling mud
- Nonhazardous decontamination fluid, resulting from decontamination of heavy equipment and other materials
- Recyclable material, in the form of used motor oil, hydraulic fluid, and the like, resulting from the routine maintenance of heavy equipment and vehicles
- Unknown waste generated in the closure of the hot mix plant. The contents of the hot mix plant tanks will be characterized through direct sampling, as detailed in Section 2.6.1. If the tank contents are determined to be hazardous waste, they will be managed in accordance with all applicable regulations.

2.9.1 Transportation

The transportation of waste and other hazardous materials via vessel is regulated by the U.S. Department of Transportation (DOT), U.S. Coast Guard, EPA, United Nations Recommendations and International Maritime Dangerous Goods Code as adopted in 49 CFR 100-178, and State of Alaska regulations. If hazardous waste is generated during remediation activities, it will be transported off the island to a permitted treatment, storage, or disposal (TSD) facility in accordance with all applicable requirements. The Aleutians West Costal Resources Service Area representative must be notified of any hazardous waste shipment from Amchitka.

The movement of wastes and/or hazardous materials between working sites or the waste staging area on the island is not regulated under DOT because the roads on Amchitka are not accessible to the public. Therefore, the use of shipping papers or hazardous waste manifests for the movement of waste/hazardous material on the island is not required. Containers certified under DOT regulation will be used for the storage and movement of wastes generated during remediation activities.

2.9.2 Disposal

The remedial action contractor is responsible for coordination of all disposal activities for wastes and recyclable materials generated during the remedial action. No remedial action wastes/materials will be disposed of on the island; all wastes will be transported off the island for disposal. Ocean disposal of remedial action-generated wastes/materials is not permitted.

The DOE will review all TSD facilities proposed for use by the contractor prior to disposal. This review will include verification that the proposed disposal facility is permitted to accept the type of waste proposed for disposal, and confirmation that the facility is in good standing with state and/or federal regulators. The contractor may only utilize facilities approved by the DOE.

2.10 Demobilization

Final demobilization will consist of removing all personnel, equipment, and remaining materials at the completion of the remedial action. Prior to demobilization, the site will be inspected with the ADEC Contaminated Sites Group, USFWS, and APIA to verify that all equipment and materials have been removed and the site restored, as much as practical, to its preconstruction condition.

3.0 References

Fuller, R.G., and J.B. Kirkwood. 1977. "Ecological Consequences of Nuclear Testing." In *The Environment of Amchitka Island, Alaska*, pp 627-650. Albuquerque, NM.

Merritt, M.L., and R.G. Fuller. 1977. *The Environment of Amchitka Island, Alaska.*

R&M Consultants. 1989. "Electronic Installation, Amchitka Island, Alaska, Horizontal and Vertical Networks." Anchorage, AK.

R&M Consultants. 2000. "Topographic Survey of DOE Mud Pit Sites, Amchitka Island, Alaska." Anchorage, AK.

USACE, see U.S. Army Corps of Engineers.

U.S. Army Corps of Engineers. 1996. Phase I Remedial Investigation Management Plan. Anchorage, AK.

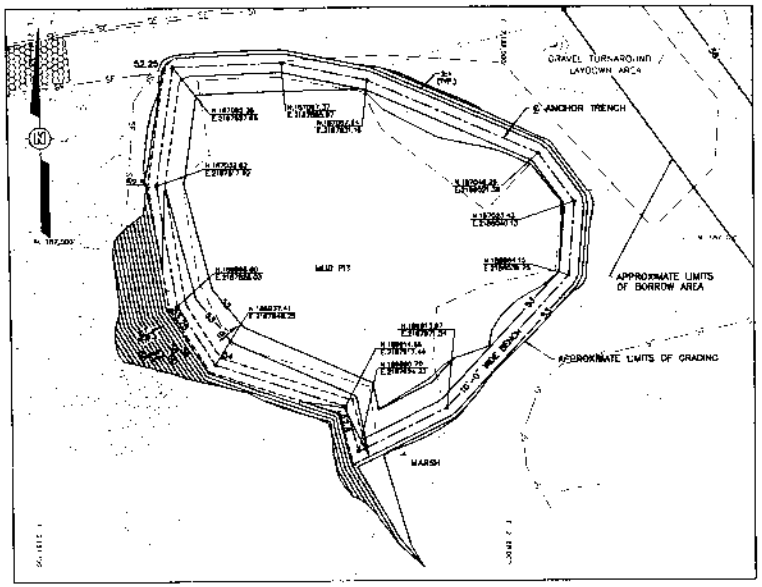
U.S. Army Corps of Engineers. 1998. Phase II Remedial Investigation Management Plan. Anchorage, AK.

U.S. Geological Survey. 1975. "Amchitka Island Quandrangle Map." In *The Environment of Amchitka Island, Alaska*. Edited by M.L. Merritt and R.G. Fuller in 1977. Washington, DC: Energy Research and Development Administration.

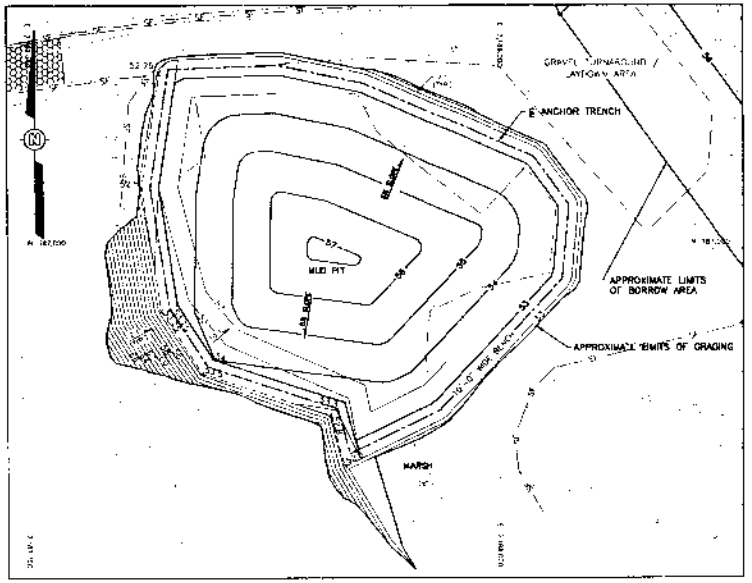
4.0 Drawings

Number	Title
Sheet C-3	Grading Plan, Rifle Range Road Mud Pit
Sheet C-6	Grading Plan, Long Shot Site Mud Pits
Sheet C-11	Grading Plan, Cannikin Site Mud Pits (Sheet 1 of 2)
Sheet C-12	Grading Plan, Cannikin Site Mud Pits (Sheet 2 of 2)
Sheet C-17	Grading Plan, Drill Site D Mud Pits (Sheet 1 of 2)
Sheet C-18	Grading Plan, Drill Site D Mud Pits (Sheet 2 of 2)
Sheet C-19	Grading Plan, Drill Site D Borrow Area
Sheet C-23	Grading Plan, Sediment Trap D-1 Plan, Sections, and Details
Sheet C-25	Grading Plan, Drill Site E Mud Pit
Sheet C-28	Grading Plan, Drill Site F Mud Pit
Sheet C-30	Grading Plan, Mile Marker 8 Borrow Area
Sheet C-31	Miscellaneous Details (Sheet 1 of 2)
Sheet C-32	Miscellaneous Details (Sheet 2 of 2)
Sheet P-1	Process Flow Diagram, Water Treatment System

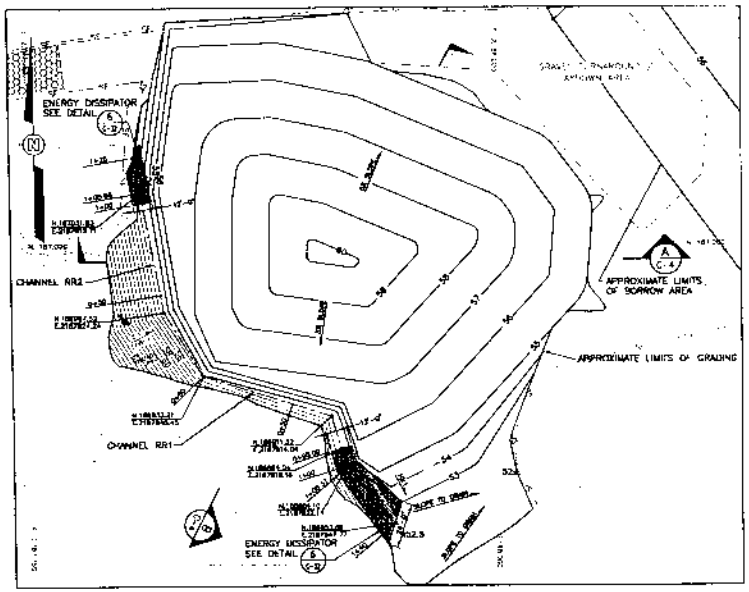
OFFICE	DRAWING NUMBER
Pittsburgh, PA	799419-E2



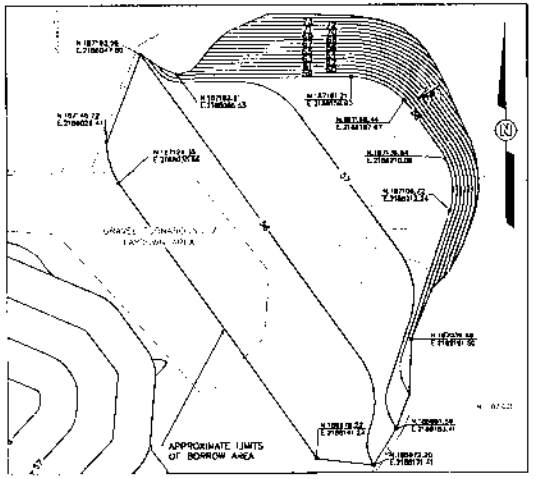
INITIAL GRADING PLAN



TOP OF GEOMEMBRANE COVER



FINAL GRADING PLAN



BORROW AREA

NOTE:

1. LIMITS OF BORROW AREA AND GRADING SHOWN ARE APPROXIMATE. ACTUAL LIMITS AND GRADES MAY VARY BASED ON MATERIAL ENCOUNTERED AND ACTUAL VOLUMES REQUIRED. ADDITIONAL MATERIAL MAY BE OBTAINED FROM THE MILE MARKER 5 BORROW AREA.
2. ALL DISTURBED AREAS SHALL BE REVEGETATED AND COVERED WITH EROSION CONTROL MAT, SEE DETAILS 3 AND 4, SHEET C-12.

SCALE
0 30 60 90 FEET

REV	DATE	BY	CHK'D	APPVD	DESCRIPTION/ISSUE
B	11/8/00	GSJ	P.A		90% DESIGN SUBMITTAL
A	9/15/00	GSJ	P.A		60% DESIGN SUBMITTAL

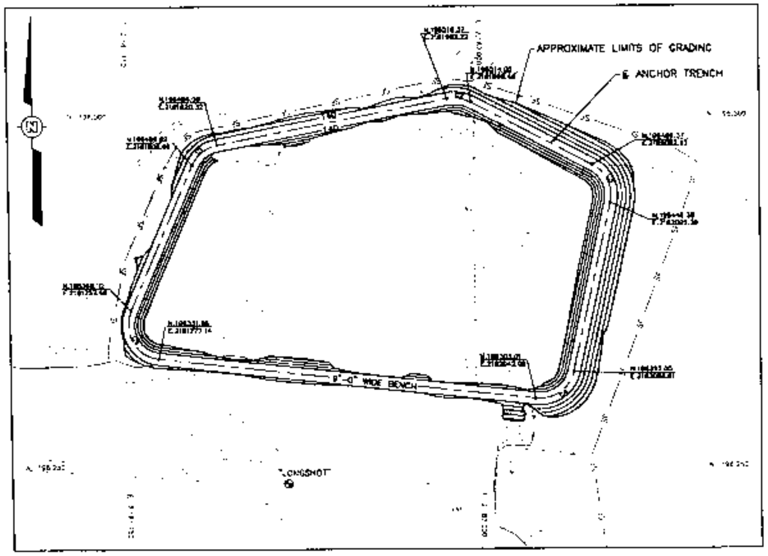
IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

GRADING PLAN
RIFLE RANGE ROAD MUD PIT
MILE MARKER 2.4 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

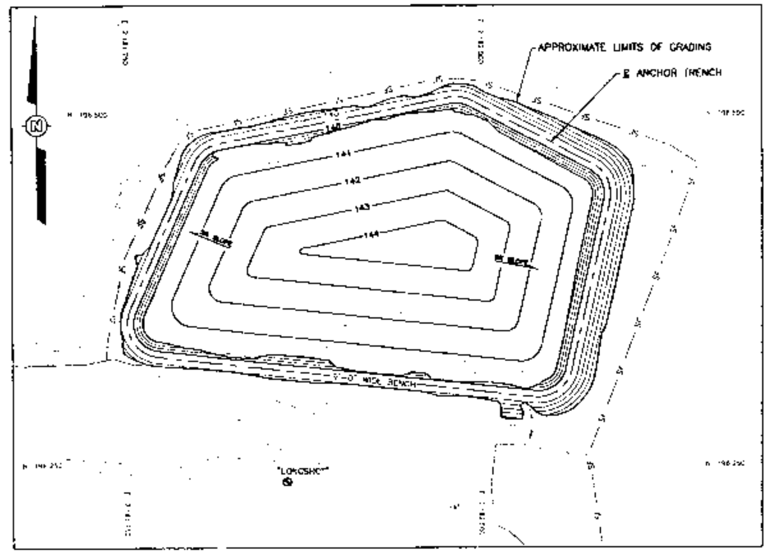
DESIGNED BY	P. Ingersoll	8/9/00	CHECKED BY	G. Stein	11/30/00
DRAWN BY	C. Jones	8/9/00	APPROVED BY		

SCALE:	DRAWING NO.	SHEET NO	REVISION NO.
AS SHOWN	799419-E2	C-3	B



INITIAL GRADING PLAN

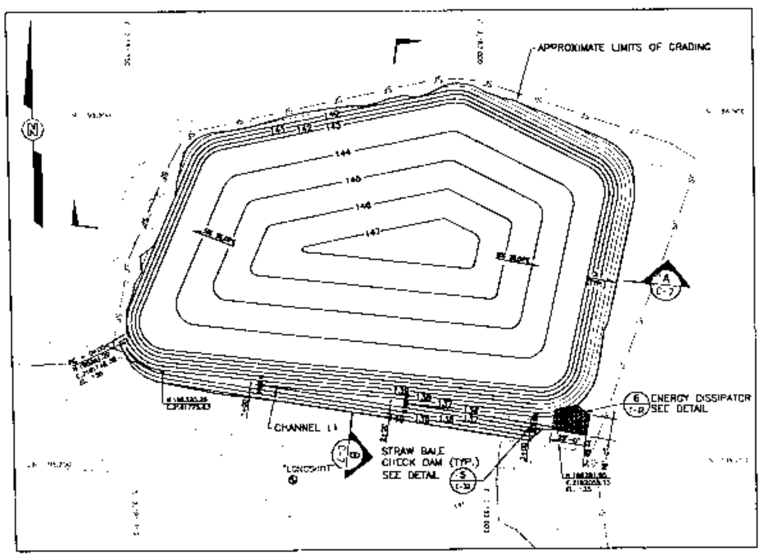
SCALE: 1" = 40'-0"



TOP OF GEOMEMBRANE COVER

SCALE: 1" = 40'-0"

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	DELTA ANGLE	TANGENT
C1	24.50'	23.58'	22.69'	55°10'44"	12.80'
C2	24.50'	16.74'	16.41'	39°08'28"	8.71'
C3	24.50'	31.94'	29.72'	74°41'29"	18.69'
C4	24.50'	35.76'	32.67'	83°36'46"	21.91'
C5	24.51'	45.74'	39.38'	106°28'12"	33.08'



FINAL GRADING PLAN

SCALE: 1" = 40'-0"

NOTE:

1. LIMITS OF GRADING SHOWN ARE APPROXIMATE. ACTUAL LIMITS AND GRADES MAY VARY BASED ON MATERIAL ENCOUNTERED AND ACTUAL VOLUMES REQUIRED. BORROW MATERIAL SHALL OBTAINED FROM THE MILE MARKER 6 BORROW AREA.
2. ALL DISTURBED AREAS SHALL BE REVEGETATED AND COVERED WITH EROSION CONTROL MAT. SEE DETAILS 3 AND 4, SHEET C-32.
3. FOR CHANNEL PROFILE AND DETAILS, SEE SHEET C-7.

SCALE 0 40 80 120 FEET

REV	DATE	BY	CHK'D	APRV'D	DESCRIPTION/ISSUE
B	11/2/00	CSU	P.I.		90% DESIGN SUBMITTAL
A	1/11/00	CSU	P.I.		60% DESIGN SUBMITTAL

IT CORPORATION

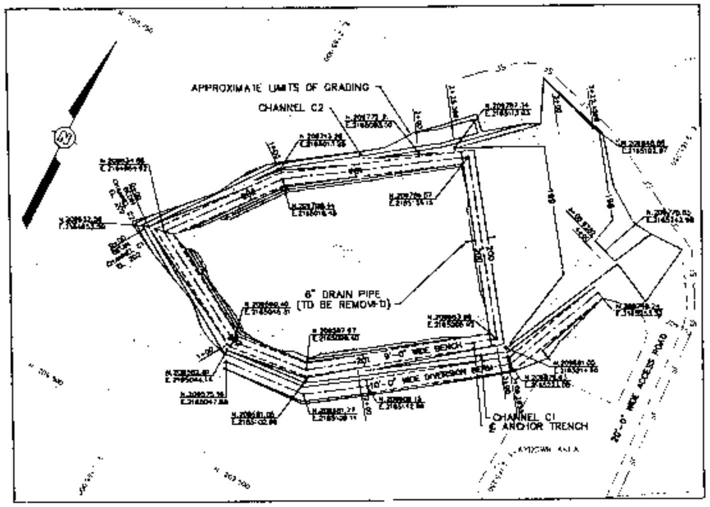
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

GRADING PLAN
LONG SHOT SITE MUD PITS
MILE MARKER 4.6 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Ingersoll	8/9/00	CHECKED BY	D. Stahl	11/30/00
DRAWN BY	C. Joyner	8/9/00	APPROVED BY		
SCALE: AS SHOWN	DRAWING NO. 799419 E3		SHEET NO. C-6	REVISION NO. B	

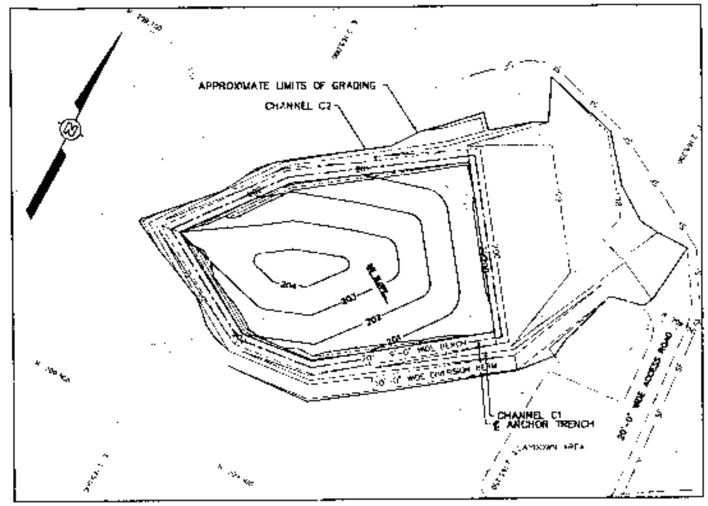
OFFICE Pittsburgh, PA | DRAWING NUMBER 799419-E3

OFFICE	DRAWING NUMBER
Pittsburgh, PA	799419-E5



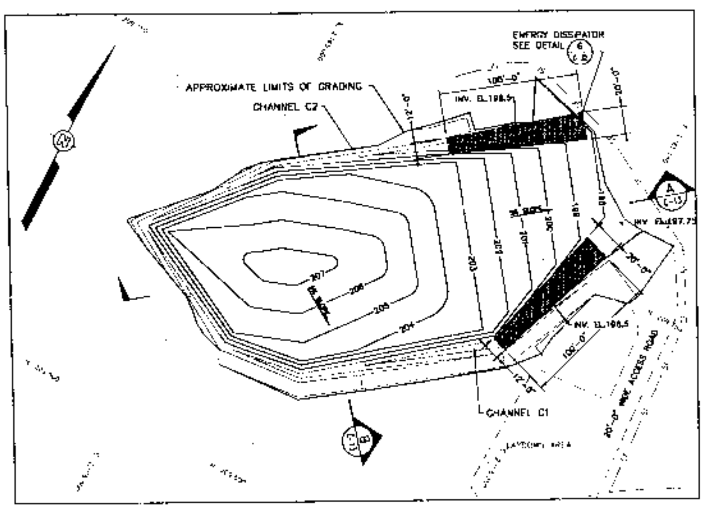
INITIAL GRADING PLAN

SCALE: 1" = 40'-0"



TOP OF GEOMEMBRANE COVER

SCALE: 1" = 40'-0"



FINAL GRADING PLAN

SCALE: 1" = 40'-0"

NOTE:

1. LIMITS OF GRADING SHOWN ARE APPROXIMATE. ACTUAL LIMITS AND GRADES MAY VARY BASED ON MATERIAL ENCOUNTERED AND ACTUAL VOLUMES REQUIRED. BORROW MATERIAL SHALL OBTAINED FROM THE MILE MARKER 8 BORROW AREA.
2. ALL DISTURBED AREAS SHALL BE REVEGETATED AND COVERED WITH EROSION CONTROL MAT, SEE DETAILS 3 AND 4, SHEET C-32.
3. FOR CHANNEL PROFILE AND DETAILS, SEE SHEET C-14.

SCALE 0 40 80 120 FEET

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

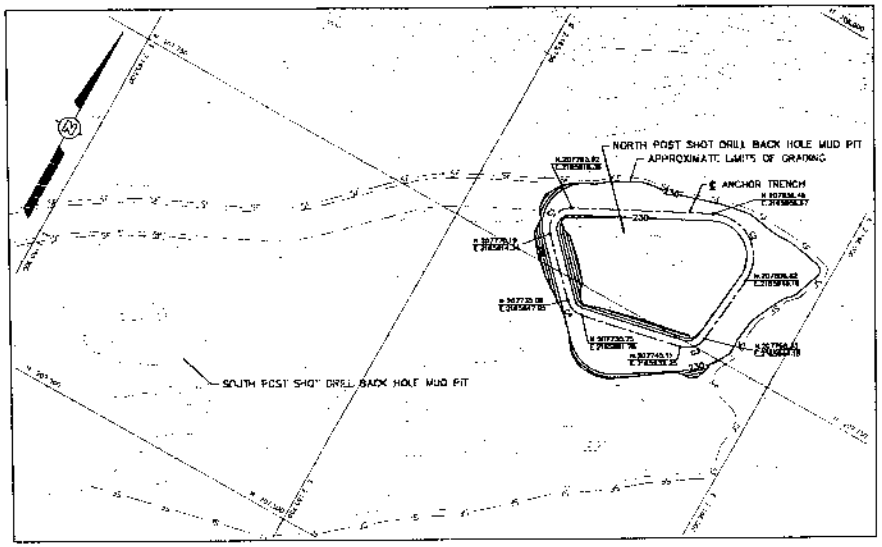
IT CORPORATION

GRADING PLAN
CANNIKIN SITE MUD PITS (SHEET 1 OF 2)
MILE MARKER 10.4 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION/ISSUE
B	11/30/00	CSJ	PJ		SITE DESIGN SUBMITTAL
A	9/15/00	CSJ	PJI		SITE DESIGN SUBMITTAL

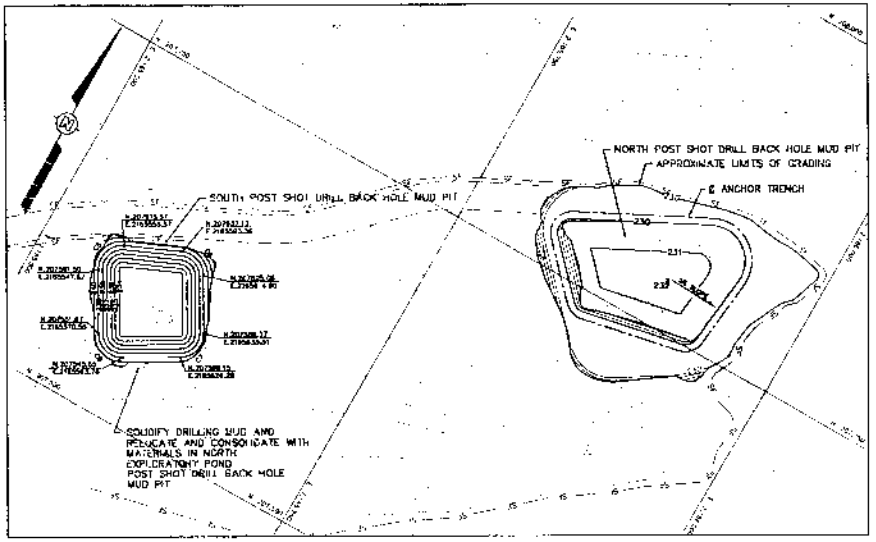
DESIGNED BY	P. Ingersoll	8/9/00	CHECKED BY	C. Stahl	11/30/00
DRAWN BY	G. Jones	8/9/00	APPROVED BY		
SCALE: AS SHOWN	DRAWING NO.: 799419-E5		SHEET NO.: C-11		REVISION NO.: B

OFFICE Pittsburgh, PA | DRAWING NUMBER 799419-E4



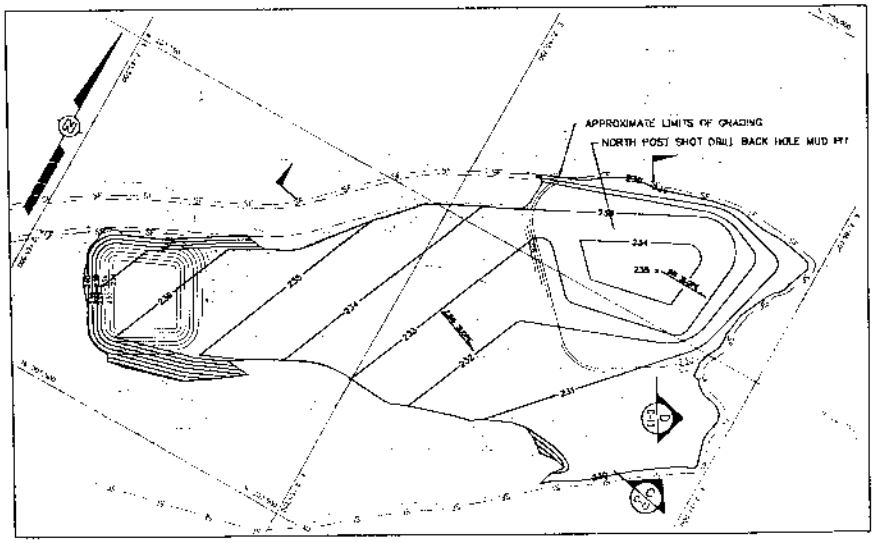
INITIAL GRADING PLAN

SCALE: 1" = 40'-0"



TOP OF GEOMEMBRANE COVER

SCALE: 1" = 40'-0"



FINAL GRADING PLAN

SCALE: 1" = 40'-0"

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	DELTA ANGLE	TANGENT
C1	15.00'	27.84'	24.07'	106°22'30"	20.18'
C2	30.00'	64.23'	52.65'	122°40'15"	54.66'
C3	15.00'	19.07'	17.81'	72°51'14"	11.07'
C4	15.00'	15.12'	14.48'	57°46'00"	8.27'
C5	17.00'	28.56'	25.33'	85°20'23"	18.99'
C6	17.00'	24.82'	22.66'	83°38'35"	15.22'
C7	17.00'	26.70'	24.04'	90°00'00"	17.00'
C8	17.00'	26.70'	24.04'	90°00'00"	17.00'

NOTE:

1. LIMITS OF GRADING SHOWN ARE APPROXIMATE. ACTUAL LIMITS AND GRADES MAY VARY BASED ON MATERIAL ENCOUNTERED AND ACTUAL VOLUMES REQUIRED. BORROW MATERIAL SHALL OBTAINED FROM THE MILE MARKER 8 BORROW AREA.
2. ALL DISTURBED AREAS SHALL BE REVEGETATED AND COVERED WITH EROSION CONTROL MAT, SEE DETAILS 3 AND 4, SHEET C-32.
3. THE LIMITS OF EXCAVATION FOR THE SOUTH EXPLORATORY HOLE POND ARE APPROXIMATE. THE ACTUAL LIMITS WILL BE BASED ON VERIFICATION SAMPLING AND ANALYSIS TO BE PERFORMED IN ACCORDANCE WITH THE SAP.
4. FOR CHANNEL PROFILE AND DETAILS, SEE SHEET C-14.

SCALE
0 40 80 120 FEET

REV	DATE	BY	CHK'D	APPVD	DESCRIPTION/ISSUE
B	11/13/00	GSJ	RJI		90% DESIGN SUBMITTAL
A	9/13/00	GSJ	RJI		60% DESIGN SUBMITTAL

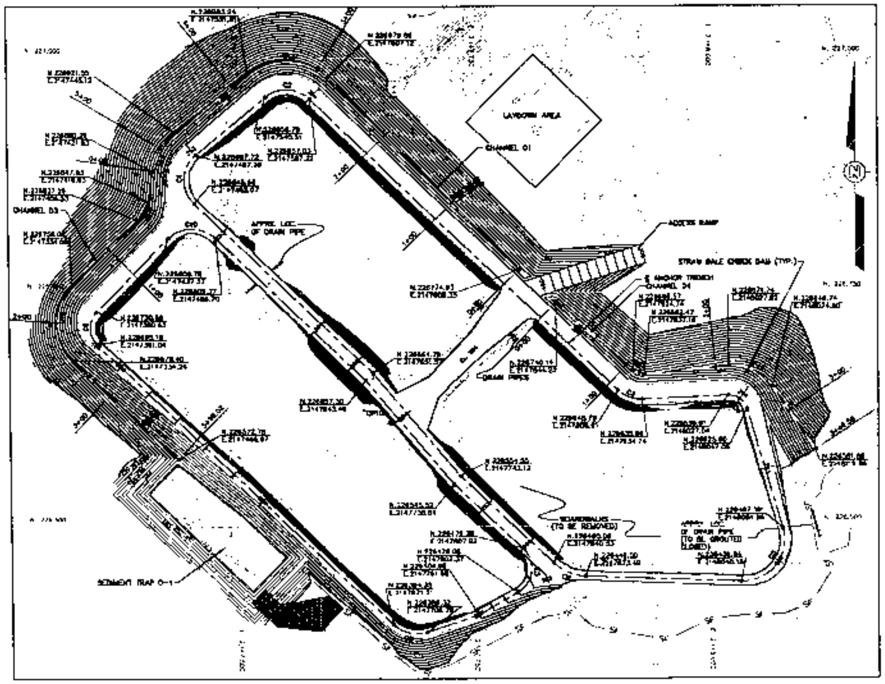
IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

GRADING PLAN
CANNIKIN SITE MUD PITS (SHEET 2 OF 2)
MILE MARKER 10.4 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY: P. Ingersoll 8/9/00	CHECKED BY: D. Shaw 11/30/00		
DRAWN BY: G. Jones 8/9/00	APPROVED BY:		
SCALE: AS SHOWN	DRAWING NO.: 799419-E4	SHEET NO.: C-12	REVISION NO.: B

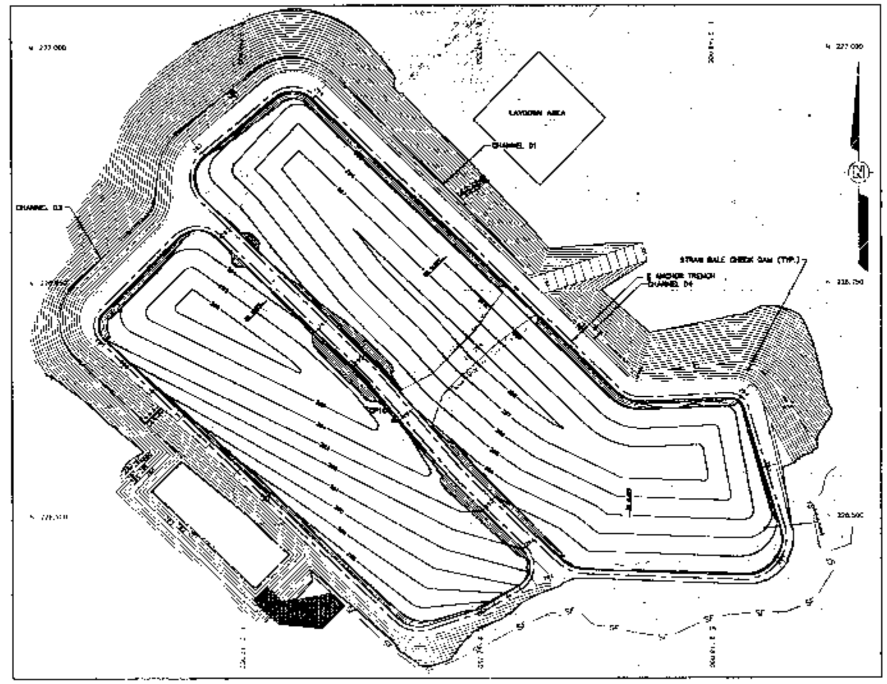
D:\Projects\799419\799419E4.dwg
Plot Date/Time: 01/26/01 03:48pm
Plotted Revised: 11/16/00



INITIAL GRADING PLAN

SCALE: 1" = 60'-0"

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	DELTA ANGLE	TANGENT
C1	35.00'	58.72'	52.07'	96°07'50"	38.96'
C2	35.00'	51.19'	46.75'	83°47'42"	31.40'
C3	35.00'	28.40'	27.63'	46°28'30"	15.03'
C4	20.00'	26.51'	24.61'	75°56'48"	15.61'
C5	45.00'	85.30'	73.09'	108°36'39"	62.63'
C6	50.00'	36.86'	35.84'	42°00'32"	19.20'
C7	30.00'	55.05'	47.84'	105°07'31"	39.19'
C8	35.00'	38.38'	38.46'	62°47'19"	21.38'
C9	25.00'	39.43'	35.47'	90°22'08"	25.16'
C10	35.00'	54.75'	49.34'	89°37'53"	34.78'
C11	50.00'	54.23'	51.61'	62°08'38"	30.13'
C12	16.00'	13.47'	13.06'	48°14'54"	7.17'
C13	65.00'	96.13'	87.60'	84°43'57"	59.28'
C14	65.00'	48.60'	47.47'	42°50'15"	25.50'
C15	35.00'	23.18'	22.76'	37°58'41"	12.03'
C16	55.00'	89.02'	79.60'	92°42'52"	57.67'



TOP OF GEOMEMBRANE COVER

SCALE: 1" = 60'-0"

NOTE:

1. LIMITS OF GRADING SHOWN ARE APPROXIMATE. ACTUAL LIMITS AND GRADES MAY VARY BASED ON MATERIAL ENCOUNTERED AND ACTUAL VOLUMES REQUIRED. BORROW MATERIAL SHALL OBTAINED FROM DRILL SITE D BORROW AREA
2. ALL DISTURBED AREAS SHALL BE REVEGETATED AND COVERED WITH EROSION CONTROL MAT, SEE DETAILS 3 AND 4, SHEET C-32
3. FOR CHANNEL D1 PROFILE AND DETAILS, SEE SHEET C-20.
4. FOR CHANNEL D3 PROFILE AND DETAILS, SEE SHEET C-21.
5. FOR CHANNEL D4 PROFILE AND DETAILS, SEE SHEET C-22.

SCALE
0 60 120 180 FEET

IT CORPORATION

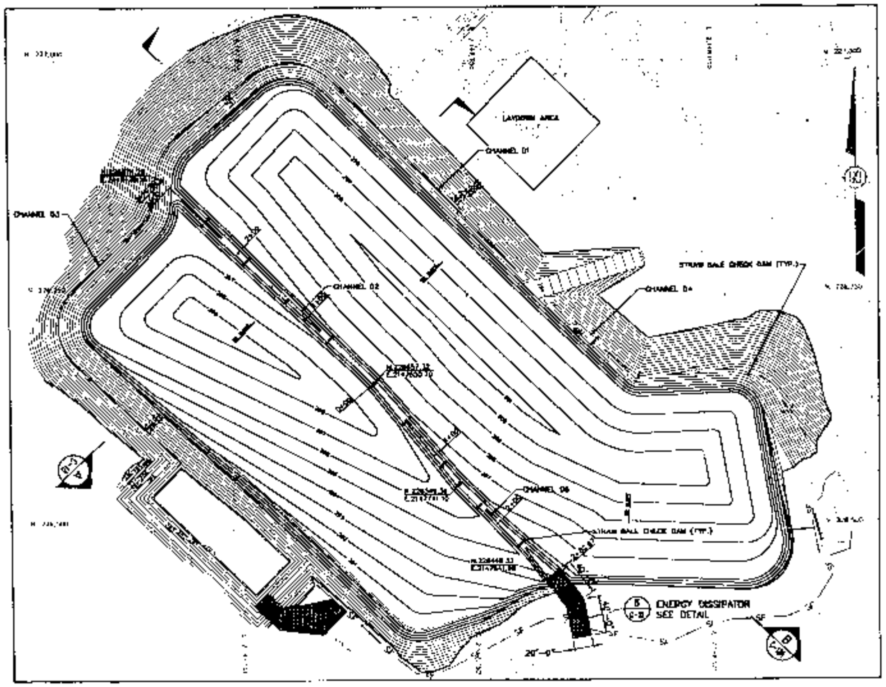
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

GRADING PLAN
DRILL SITE D MUD PITS (SHEET 1 OF 2)
MILE MARKER 16.1 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Ingersock	8/8/00	CHECKED BY	D. Stant	11/30/00
DRAWN BY	G. Jones	8/9/00	APPROVED BY		
SCALE: AS SHOWN	DRAWING NO. 799419-E6		SHEET NO. C-17		REVISION NO. B

REV	DATE	BY	CHK'D	APPR'D	DESCRIPTION/ISSUE
B	11/30/00	CSJ	PJI		90% DESIGN SUBMITTAL
A	8/15/00	CSJ	PJI		60% DESIGN SUBMITTAL

OFFICE: Pittsburgh, PA
DRAWING NUMBER: 799419-E6



FINAL GRADING PLAN
SCALE: 1" = 80'-0"

NOTE:

1. LIMITS OF GRADING SHOWN ARE APPROXIMATE. ACTUAL LIMITS AND GRADES MAY VARY BASED ON MATERIAL ENCOUNTERED AND ACTUAL VOLUMES REQUIRED. BORROW MATERIAL SHALL OBTAINED FROM DRILL SITE D BORROW AREA.
2. ALL DISTURBED AREAS SHALL BE REVEGETATED AND COVERED WITH EROSION CONTROL MAT, SEE DETAILS 3 AND 4, SHEET C-32.
3. FOR CHANNEL D2 AND D5 PROFILE AND DETAILS, SEE SHEET C-22.

SCALE: 0 60 120 180 FEET

REV	DATE	BY	CHK'D	APPR'VD	DESCRIPTION/ISSUE
B	11/3/00	GS	PJI		90% DESIGN SUBMITTAL
A	8/11/00	GS	PJI		60% DESIGN SUBMITTAL

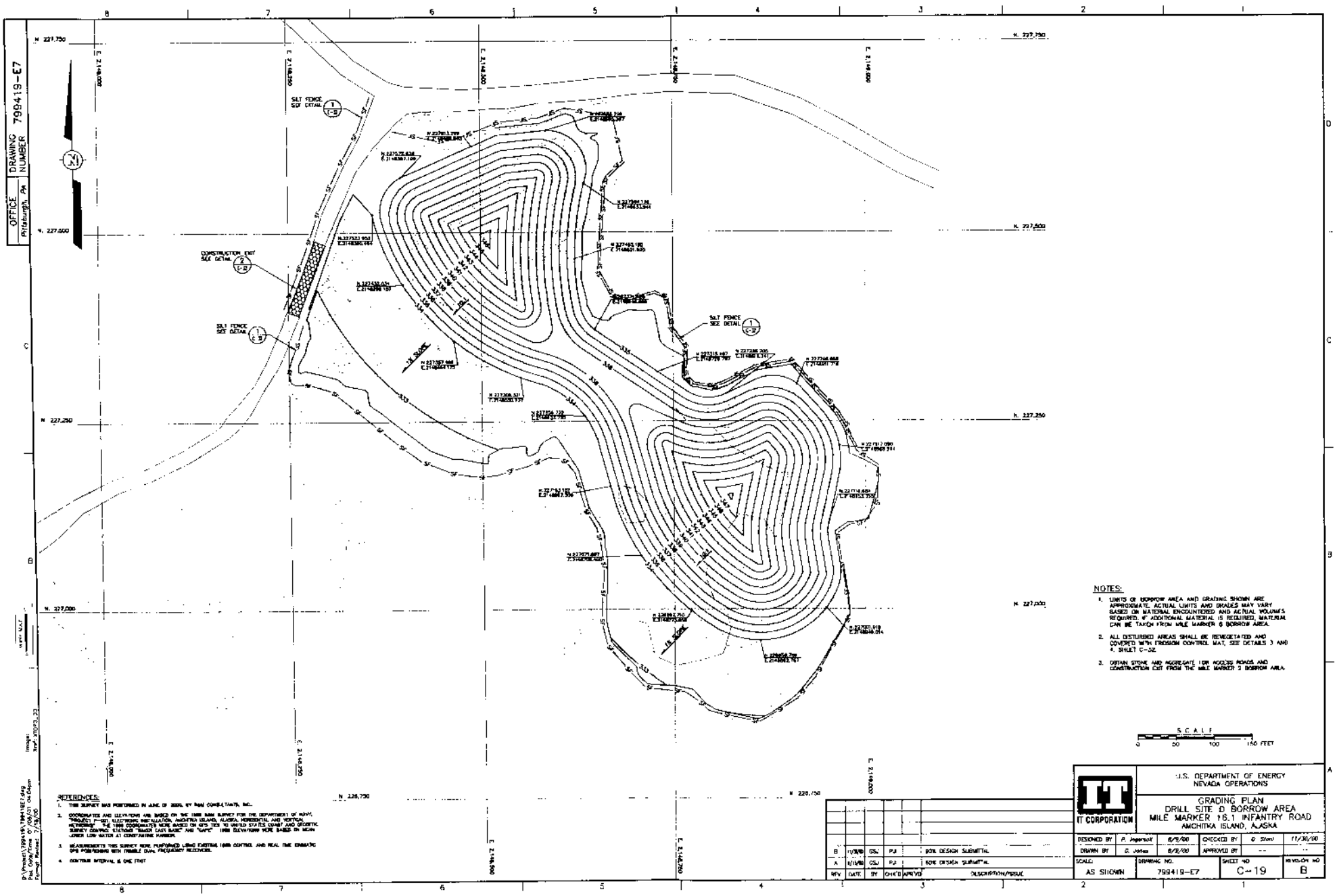
IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

GRADING PLAN
DRILL SITE D MUD PITS (SHEET 2 OF 2)
MILE MARKER 16.1 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY: P. Ingersoll	8/9/00	CHECKED BY: D. Stein	11/30/00	
DRAWN BY: G. Jordan	8/9/00	APPROVED BY:		
SCALE: AS SHOWN	DRAWING NO.: 799419-E29	SHEET NO.: C-18	REVISION NO.: B	

OFFICE: Pittsburgh, PA | DRAWING NUMBER: 799419-E29



OFFICE: Pittsburgh, PA
DRAWING NUMBER: 799419-E7

NOTES:

1. LIMITS OF BORROW AREA AND GRADING SHOWN ARE APPROXIMATE. ACTUAL LIMITS AND GRADES MAY VARY BASED ON MATERIAL ENCOUNTERED AND ACTUAL VOLUMES REQUIRED. IF ADDITIONAL MATERIAL IS REQUIRED, MATERIAL CAN BE TAKEN FROM MILE MARKER 8 BORROW AREA.
2. ALL DISTURBED AREAS SHALL BE REVEGETATED AND COVERED WITH EROSION CONTROL MAT, SEE DETAILS 3 AND 4, SHEET C-32.
3. OBTAIN STONE AND AGGREGATE FOR ACCESS ROADS AND CONSTRUCTION EXIT FROM THE MILE MARKER 3 BORROW AREA.

SCALE: 0 50 100 150 FEET

REFERENCES:

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC.
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1998 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-081, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA HORIZONTAL AND VERTICAL NETWORKS". THE 1998 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "RANGE (LAST BASE)" AND "CAPE". 1998 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1998 CONTROL AND REAL TIME KINEMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT

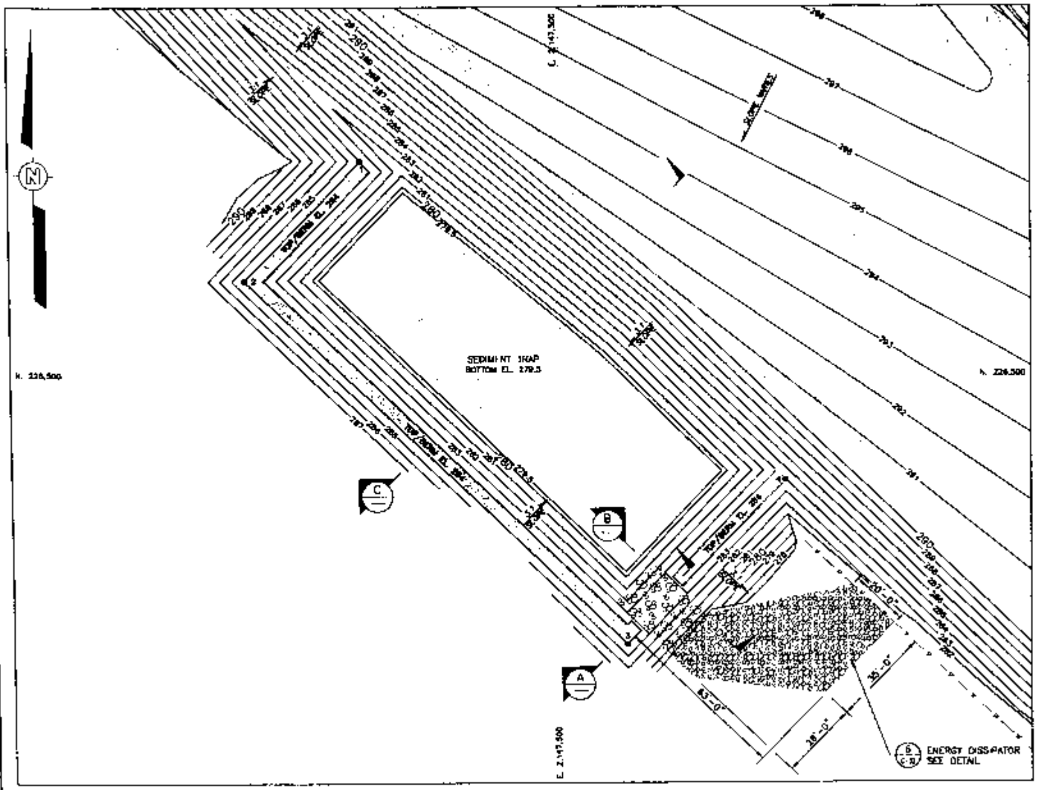
REV.	DATE	BY	CH'K'D	APP'VD	DESCRIPTION/ISSUE
B	11/30/00	GSJ	PJI		90% DESIGN SUBMITTAL
A	8/15/00	GSJ	PJI		50% DESIGN SUBMITTAL

IT CORPORATION

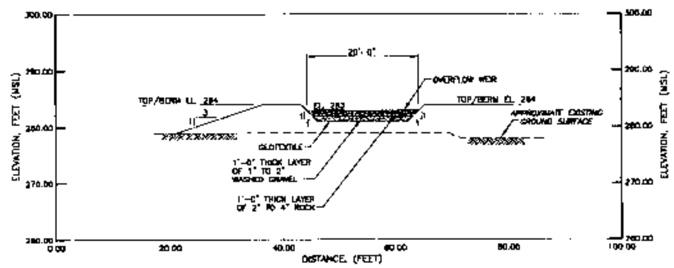
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

GRADING PLAN
DRILL SITE D BORROW AREA
MILE MARKER 16.1 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

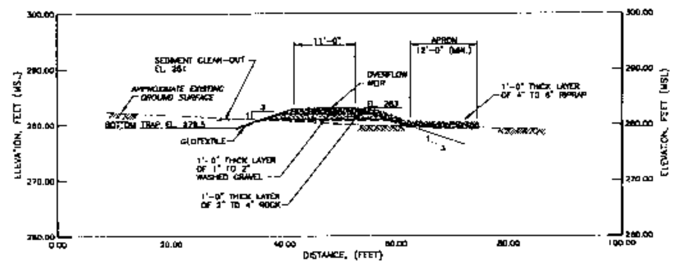
DESIGNED BY	P. Ingersoll	8/29/00	CHECKED BY	G. Stanu	11/30/00
DRAWN BY	G. Jones	8/29/00	APPROVED BY	--	--
SCALE: AS SHOWN	DRAWING NO. 799419-E7	SHEET NO C-19	REVISION NO B		



PLAN



SECTION A



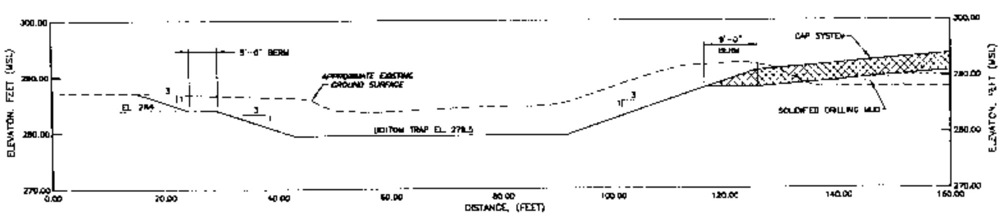
SECTION B

REFERENCES:

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY RAM CONSULTANTS, INC.
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1998 [illegible] SURVEY FOR THE DEPARTMENT OF NAVY. "PROJECT P [illegible] ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1998 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "[illegible] CAST BASE" AND "CAPE". 1998 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1998 CONTROL AND REAL TIME KINEMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

SEDIMENT TRAP CONTROL POINTS

POINT	NORTHING (FT.)	EASTING (FT.)	ELEVATION TOP OF BERM (FT.)
1	228,577.56	2,147,4[illegible]	284
2	228,535.10	2,147,[illegible]	284
3	228,404.90	2,147,522.16	284
4	228,483.81	2,147,260.07	284



SECTION C

B	11/30/00	CSJ	PJI		90% DESIGN SUBMITTAL	
A					NOT ISSUED	
REV	DATE	BY	CHK'D	APRV'D	DESCRIPTION/ISSUE	

IT CORPORATION

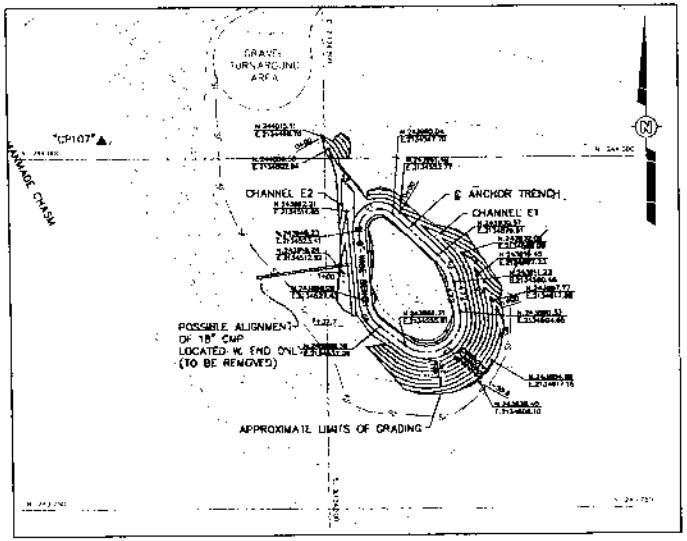
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

SEDIMENT TRAP D-1
PLAN, SECTIONS, AND DETAILS
AMCHITKA ISLAND, ALASKA

DESIGNED BY	C. P. Ingersoll	9/16/00	CHECKED BY	D. Stone	11/30/00
DRAWN BY	C. Jones	9/16/00	APPROVED BY		
SCALE: AS SHOWN		DRAWING NO. 799419-E28		SHEET NO. C-23	REVISION NO. B

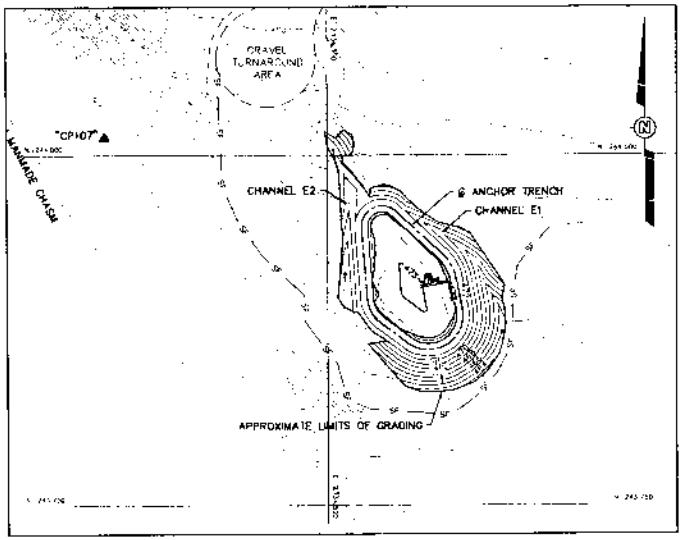
OFFICE: Pittsburgh, PA — DRAWING NUMBER 799419-E28

OFFICE Pittsburgh, PA | DRAWING NUMBER 799419-E8



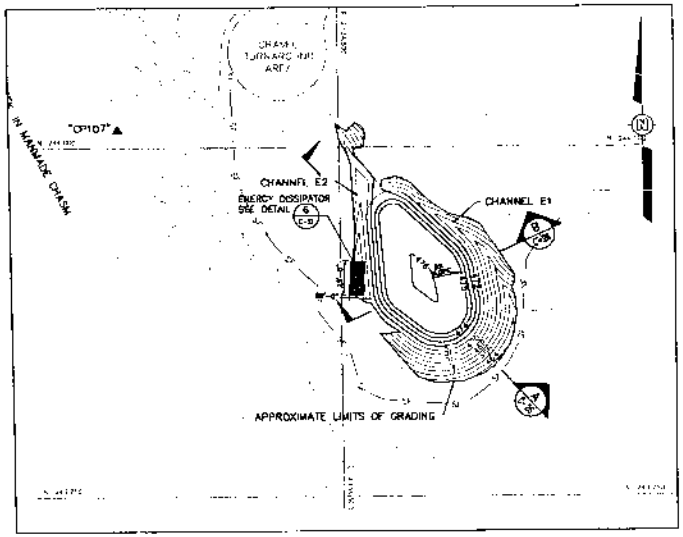
INITIAL GRADING PLAN

SCALE: 1" = 40'-0"



TOP OF GEOMEMBRANE COVER

SCALE 1" = 40'-0"



FINAL GRADING PLAN

SCALE: 1" = 40'-0"

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	DELTA ANGLE	TANGENT
C1	14.0'	34.9'	27.0'	137°-9'14"	27.1'
C2	36.0'	22.6'	22.2'	35°53'51"	11.7'
C3	24.5'	58.2'	45.8'	136°30'44"	84.2'
C4	23.0'	21.1'	20.4'	48°16'11"	11.3'
C5	81.2'	46.4'	45.9'	29°07'35"	23.7'
C6	38.5'	19.4'	19.2'	28°07'41"	9.9'
C7	76.9'	21.5'	21.5'	15°39'24"	10.8'
C8	40.8'	44.8'	43.8'	55°49'18"	24.3'

NOTE:

1. LIMITS OF GRADING SHOWN ARE APPROXIMATE. ACTUAL LIMITS AND GRADES MAY VARY BASED ON MATERIAL ENCOUNTERED AND ACTUAL VOLUMES REQUIRED. BORROW MATERIAL SHALL BE OBTAINED FROM DRILL SITE D BORROW AREA.
2. ALL DISTURBED AREAS SHALL BE REVEGETATED AND COVERED WITH EROSION CONTROL MAT, SEE DETAILS 3 AND 4, SHEET C-32.
3. FOR CHANNEL PROFILE AND DETAILS, SEE SHEET C-26

SCALE
0 40 80 120 FEET

REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION/ISSUE
B	11/13/00	GSJ	RJL		90% DESIGN SUBMITTAL
A	8/15/00	GSJ	RJL		60% DESIGN SUBMITTAL

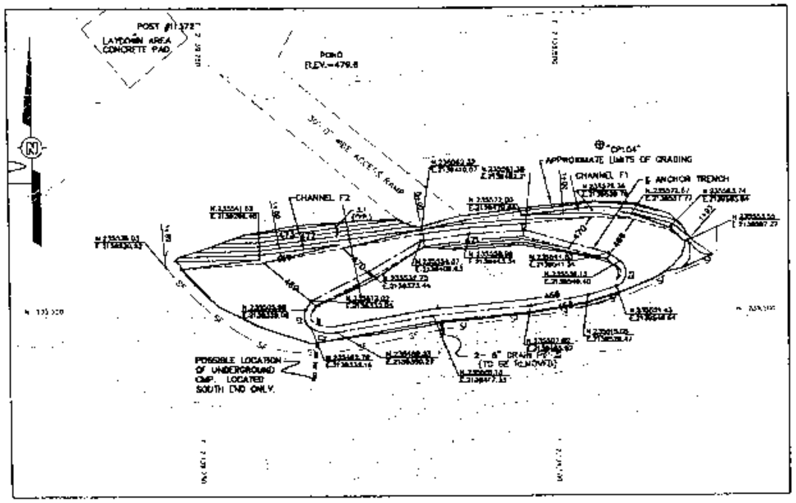
IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

GRADING PLAN
DRILL SITE E MUD PIT
MILE MARKER 20.25 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

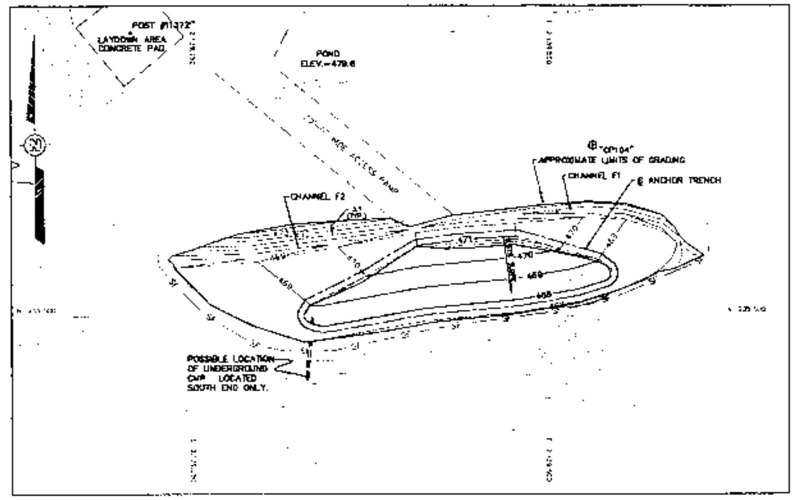
DESIGNED BY	P. Ingersoll	8/8/00	CHECKED BY	G. Shaw	11/30/00
DRAWN BY	G. Jones	8/8/00	APPROVED BY		

SCALE:	DRAWING NO.	SHEET NO.	REVISION NO.
AS SHOWN	799419-E8	C-25	B



INITIAL GRADING PLAN

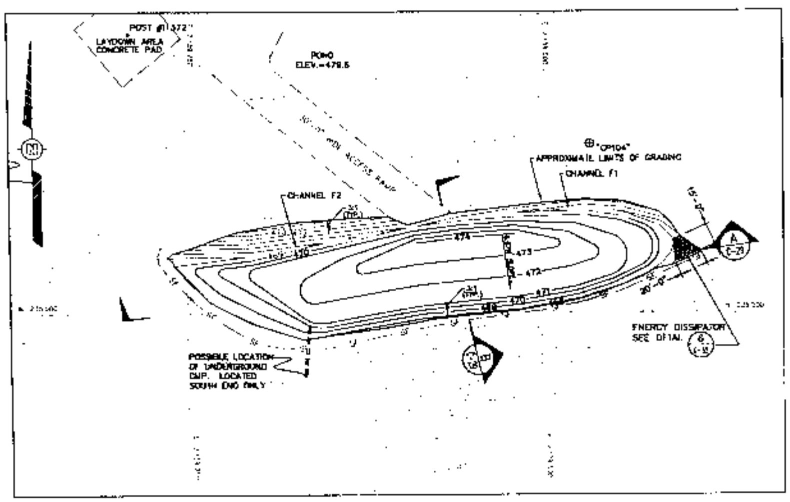
SCALE: 1" = 40'-0"



TOP OF GEOMEMBRANE COVER

SCALE: 1" = 40'-0"

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	DELTA ANGLE	TANGENT
C1	9.73'	14.52'	13.21'	85°31'56"	9.00'
C2	26.00'	18.84'	18.43'	41°31'18"	9.00'
C3	10.00'	22.20'	17.92'	127°12'48"	20.15'



FINAL GRADING PLAN

SCALE: 1" = 40'-0"

NOTE:

1. LIMITS OF GRADING SHOWN ARE APPROXIMATE. ACTUAL LIMITS AND GRADES MAY VARY BASED ON MATERIAL ENCOUNTERED AND ACTUAL VOLUMES REQUIRED. BORROW MATERIAL SHALL OBTAINED FROM DRILL SITE D BORROW AREA.
2. ALL DISTURBED AREAS SHALL BE REVEGETATED AND COVERED WITH EROSION CONTROL MAT. SEE DETAILS 3 AND 4, SHEET C-32.
3. FOR CHANNEL PROFILE AND DETAILS, SEE SHEET C-29.

SCALE: 0 40 80 120 FEET

REV	DATE	BY	CHK'D	APPR'D	DESCRIPTION/ISSUE
B	11/3/00	GSJ	PJI		90% DESIGN SUBMITTAL
A	9/5/00	GSJ	PJI		60% DESIGN SUBMITTAL

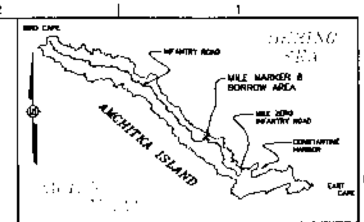
IT CORPORATION

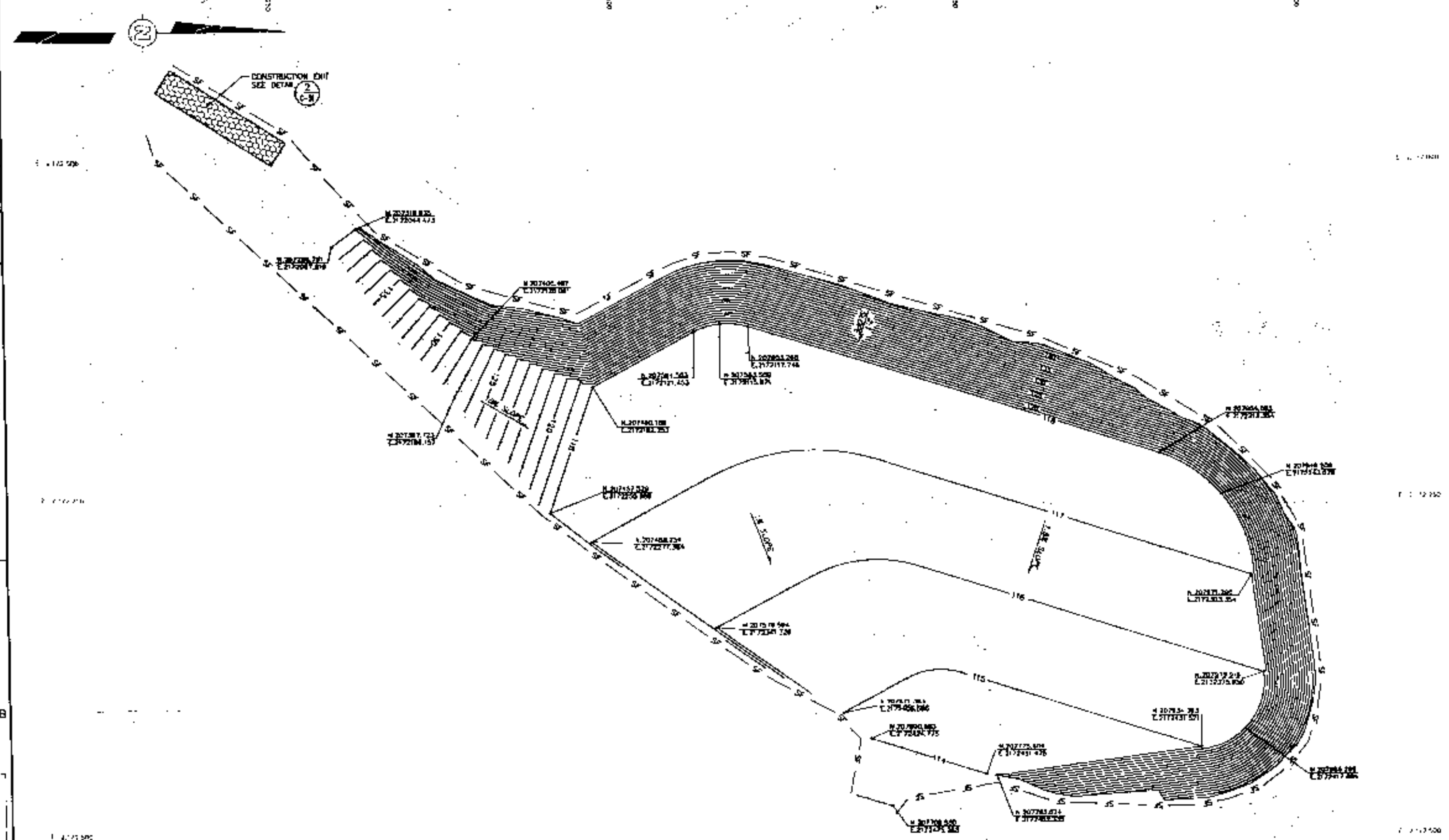
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

GRADING PLAN
DRILL SITE F MUD PIT
MILE MARKER 18.8 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Ingersol	8/9/00	CHECKED BY	B. Stone	11/10/00
DRAWN BY	G. Jones	8/9/00	APPROVED BY		
SCALE: AS SHOWN	DRAWING NO. 799419-L9		SHEET NO. C-28		REVISION NO. B

OFFICE Pittsburgh, PA | DRAWING NUMBER 799419-E9





NOTES:

1. LIMITS OF BORROW AREA AND GRADING SHOWN ARE APPROXIMATE. ACTUAL LIMITS AND GRADES MAY VARY BASED ON MATERIAL ENCOUNTERED AND ACTUAL VOLUMES REQUIRED.
2. ALL DISTURBED AREAS SHALL BE REVEGETATED AND COVERED WITH EROSION CONTROL MATTING. SEE DETAILS 3 AND 4, SHEET C-32.

REFERENCES:

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC.
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1988 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1988 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BARUR EAST BASE" AND "CAPE". 1988 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS FOR SURVEY WERE PERFORMED USING EXISTING 1988 CONTROL AND REAL TIME KINEMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

SCALE: 0 40 80 120 FEET

REV	DATE	BY	CHK'D	APRV'D	DESCRIPTION/ISSUE
B	11/30/00	GSJ	PJI		90% DESIGN SUBMITTAL
A					NOT ISSUED

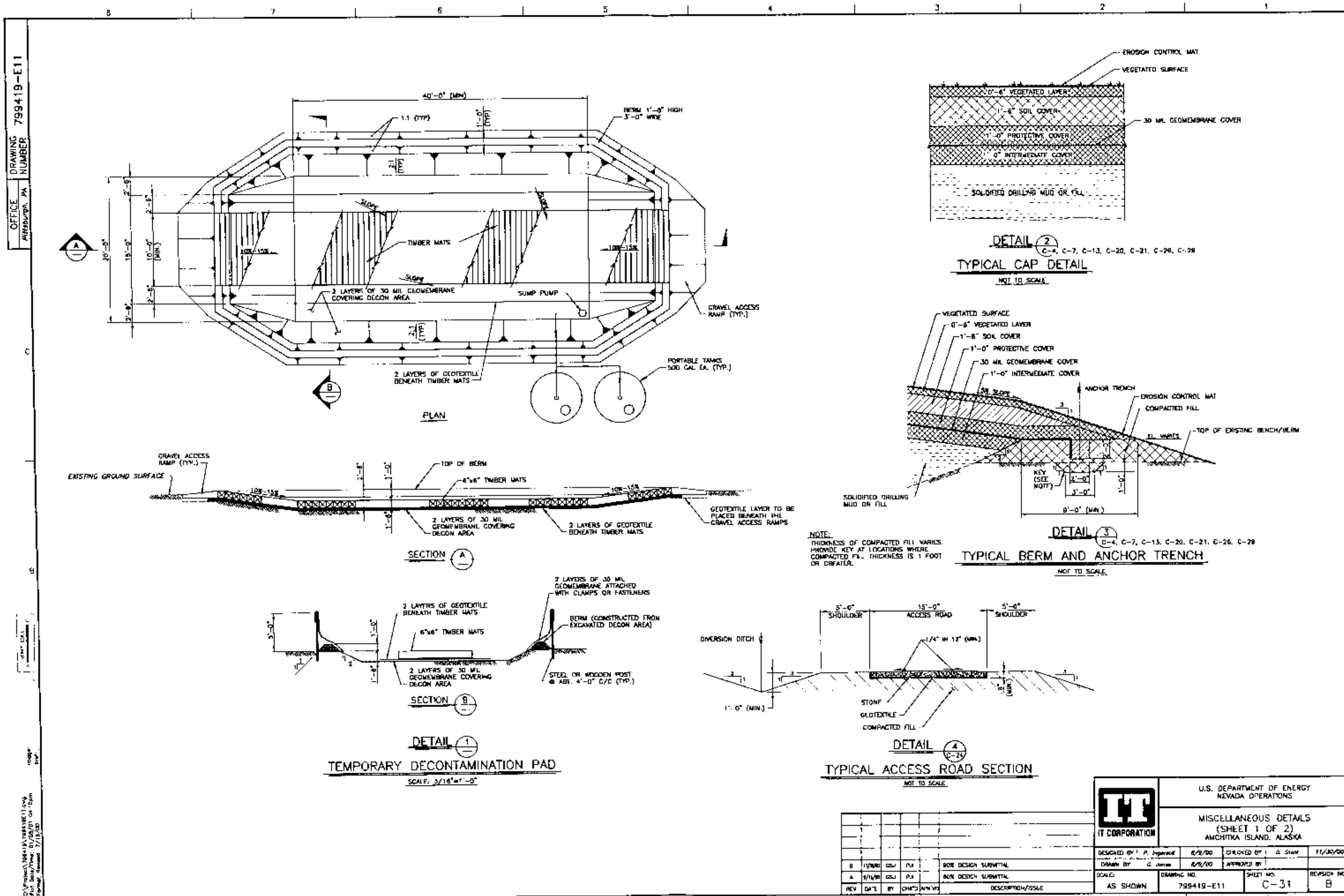
IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

GRADING PLAN
MILE MARKER 8 BORROW AREA
MILE MARKER 8 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

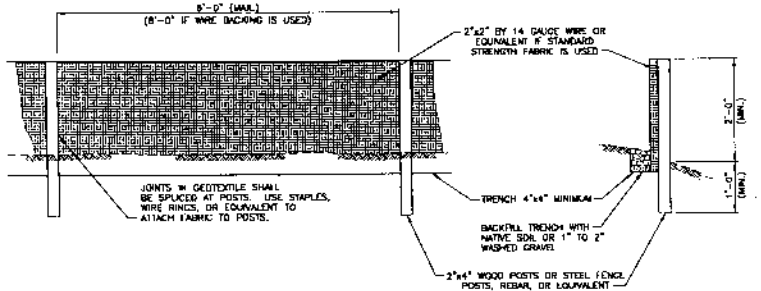
DESIGNED BY	P. Ingersoll	8/9/00	CHECKED BY	D. Stahl 11/30/00
DRAWN BY	S. Jones	8/9/00	APPROVED BY	
SCALE: AS SHOWN	DRAWING NO. 799419-E32		SHEET NO. C-30	REVISION NO. B

OFFICE	DRAWING NUMBER
Pittsburgh, PA	799419-E32



DETAIL 1 TEMPORARY DECONTAMINATION PAD
SCALE: 3/16"=1'-0"
PLAN
40'-0" (MIN)
1:1 (TYP)
BERM 1'-0" HIGH 3'-0" WIDE
TIMBER MATS
SLOPE
10%-15%
2 LAYERS OF 30 MIL GEOMEMBRANE COVERING DECON AREA
SUMP PUMP
GRAVEL ACCESS RAMP (TYP.)
PORTABLE TANKS 500 GAL EA. (TYP.)
2 LAYERS OF GEOTEXTILE BENEATH TIMBER MATS
20'-0"
15'-0"
10'-0" (MIN.)
2'-6"
SECTION A
GRAVEL ACCESS RAMP (TYP.)
EXISTING GROUND SURFACE
TOP OF BERM
6"x6" TIMBER MATS
2 LAYERS OF 30 MIL GEOMEMBRANE COVERING DECON AREA
2 LAYERS OF GEOTEXTILE BENEATH TIMBER MATS
GEOTEXTILE LAYER TO BE PLACED BENEATH THE GRAVEL ACCESS RAMPS
SECTION B
2 LAYERS OF GEOTEXTILE BENEATH TIMBER MATS
6"x6" TIMBER MATS
2 LAYERS OF 30 MIL GEOMEMBRANE COVERING DECON AREA
2 LAYERS OF 30 MIL GEOMEMBRANE ATTACHED WITH CLAMPS OR FASTENERS
BERM (CONSTRUCTED FROM EXCAVATED DECON AREA)
STEEL OR WOODEN POST @ ABT. 4'-0" C/C (TYP.)
DETAIL 2 TYPICAL CAP DETAIL
C-4, C-7, C-13, C-20, C-21, C-26, C-29
NOT TO SCALE
EROSION CONTROL MAT
VEGETATED SURFACE
0'-6" VEGETATED LAYER
1'-6" SOIL COVER
30 MIL GEOMEMBRANE COVER
1'-0" PROTECTIVE COVER
1'-0" INTERMEDIATE COVER
SOLIDIFIED DRILLING MUD OR FILL
DETAIL 3 TYPICAL BERM AND ANCHOR TRENCH
C-4, C-7, C-13, C-20, C-21, C-26, C-29
NOT TO SCALE
VEGETATED SURFACE
0'-6" VEGETATED LAYER
1'-6" SOIL COVER
1'-0" PROTECTIVE COVER
30 MIL GEOMEMBRANE COVER
1'-0" INTERMEDIATE COVER
ANCHOR TRENCH
EROSION CONTROL MAT
COMPACTED FILL
EL VARIES
TOP OF EXISTING BENCH/BERM
KEY (SEE NOTE)
2'-0"
3'-0"
9'-0" (MIN)
SOLIDIFIED DRILLING MUD OR FILL
NOTE:
THICKNESS OF COMPACTED FILL VARIES. PROVIDE KEY AT LOCATIONS WHERE COMPACTED FILL THICKNESS IS 1 FOOT OR GREATER.
DETAIL 4 TYPICAL ACCESS ROAD SECTION
C-24
NOT TO SCALE
5'-0" SHOULDER
15'-0" ACCESS ROAD
1/4" IN 12" (MIN)
DIVERSION DITCH
1'-0" (MIN.)
STONE
GEOTEXTILE
COMPACTED FILL
U.S. DEPARTMENT OF ENERGY NEVADA OPERATIONS
MISCELLANEOUS DETAILS (SHEET 1 OF 2) AMCHITKA ISLAND, ALASKA
IT CORPORATION
DESIGNED BY P. Ingersoll 8/9/00
CHECKED BY A. Stahl 11/30/00
DRAWN BY G. Jones 8/9/00
APPROVED BY
SCALE: AS SHOWN
DRAWING NO. 799419-E11
SHEET NO. C-31
REVISION NO B
B 11/30/00 GSJ PJI 90% DESIGN SUBMITTAL
A 9/11/00 GSJ PJI 60% DESIGN SUBMITTAL
REV DATE BY CHK'D APP'VD DESCRIPTION/ISSUE
OFFICE Pittsburgh, PA
DRAWING NUMBER 799419-E11

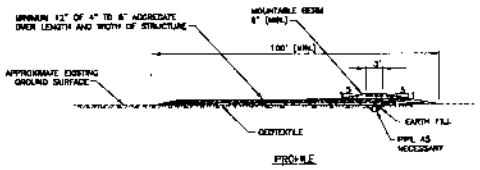
OFFICE Pittsburgh, PA | DRAWING NUMBER 799419-E27

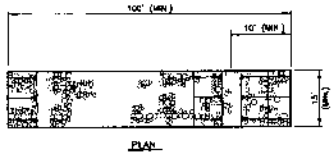


DETAIL (1) C-2, C-5, C-9, C-10, C-16, C-18, C-24, C-27, C-30

TYPICAL SILT FENCE DETAIL

NOT TO SCALE



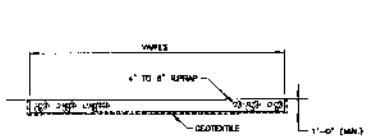


DETAIL (2) C-2, C-5, C-9, C-10, C-16, C-19, C-24, C-27, C-30

STABILIZED CONSTRUCTION EXIT

NOT TO SCALE

1. GEOTEXTILE SHALL BE PLACED OVER THE EXISTING GROUND PRIOR TO PLACING STONE.
2. CRUSHED AGGREGATE (4" TO 6") SHALL BE PLACED AT LEAST 12" DEEP OVER THE LENGTH AND WIDTH OF THE ENTRANCE.



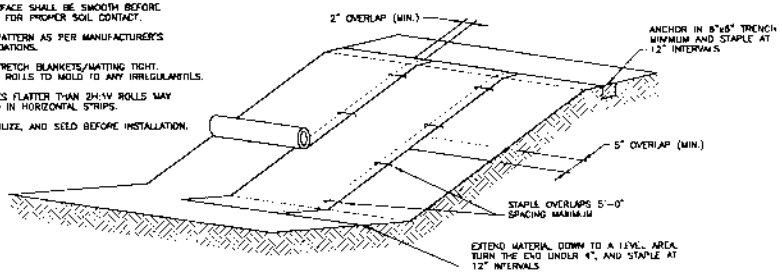
DETAIL (6) C-3, C-5, C-11, C-16, C-18, C-23, C-25, C-28

TYPICAL ENERGY DISSIPATOR AND OUTFALL SECTION

NOT TO SCALE

INSTALLATION NOTES:

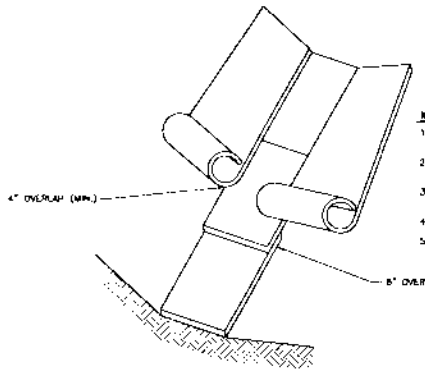
1. SLOPE SURFACE SHALL BE SMOOTH BEFORE PLACEMENT FOR PROPER SOIL CONTACT.
2. STAPLING PATTERN AS PER MANUFACTURER'S RECOMMENDATIONS.
3. DO NOT STRETCH BLANKETS/MATTING TIGHT. ALLOW THE ROLLS TO MOLD TO ANY IRREGULARITIES.
4. FOR SLOPES FLATTER THAN 2H:1V ROLLS MAY BE PLACED IN HORIZONTAL STRIPS.
5. LIME, FERTILIZE, AND SEED BEFORE INSTALLATION.



DETAIL (3)

EROSION CONTROL MAT SLOPE INSTALLATION DETAIL

NOT TO SCALE



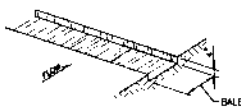
INSTALLATION NOTES:

1. DO NOT STRETCH BLANKETS/MATTING TIGHT. ALLOW THE ROLLS TO MOLD TO ANY IRREGULARITIES.
2. SLOPE SURFACE SHALL BE SMOOTH BEFORE PLACEMENT FOR PROPER SOIL CONTACT.
3. ANCHOR, STAPLE, AND INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS.
4. AVOID JOINING MATERIAL IN THE CENTER OF THE CHANNEL.
5. LIME, FERTILIZE, AND SEED BEFORE INSTALLATION

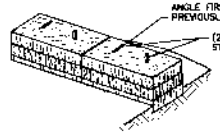
DETAIL (4)

EROSION CONTROL MAT FLOW CHANNEL INSTALLATION

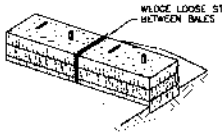
NOT TO SCALE



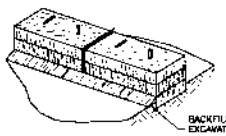
1. EXCAVATE THE TRENCH



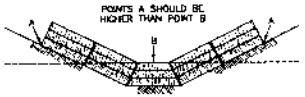
2. PLACE AND STAKE BALES



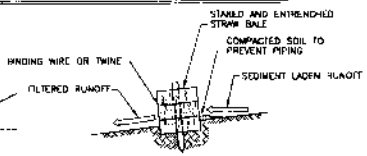
3. WEDGE LOOSE STRAW BETWEEN BALES



4. BACKFILL AND COMPACT EXCAVATED SOIL



PROPER PLACEMENT OF STRAW BALE BARRIER IN DRAINAGE CHANNELS



CROSS SECTION OF PROPERLY INSTALLED STRAW BALE BARRIER

DETAIL (5) C-6, C-17, C-18

TYPICAL STRAW BALE INSTALLATION DETAILS

NOT TO SCALE

REV	DATE	BY	CHKD	APVD	DESCRIPTION/ISSUE
B	7/30/00	DSJ	PJJ		BOE DESIGN SUBMITTAL
A					NOT ISSUED

IT CORPORATION

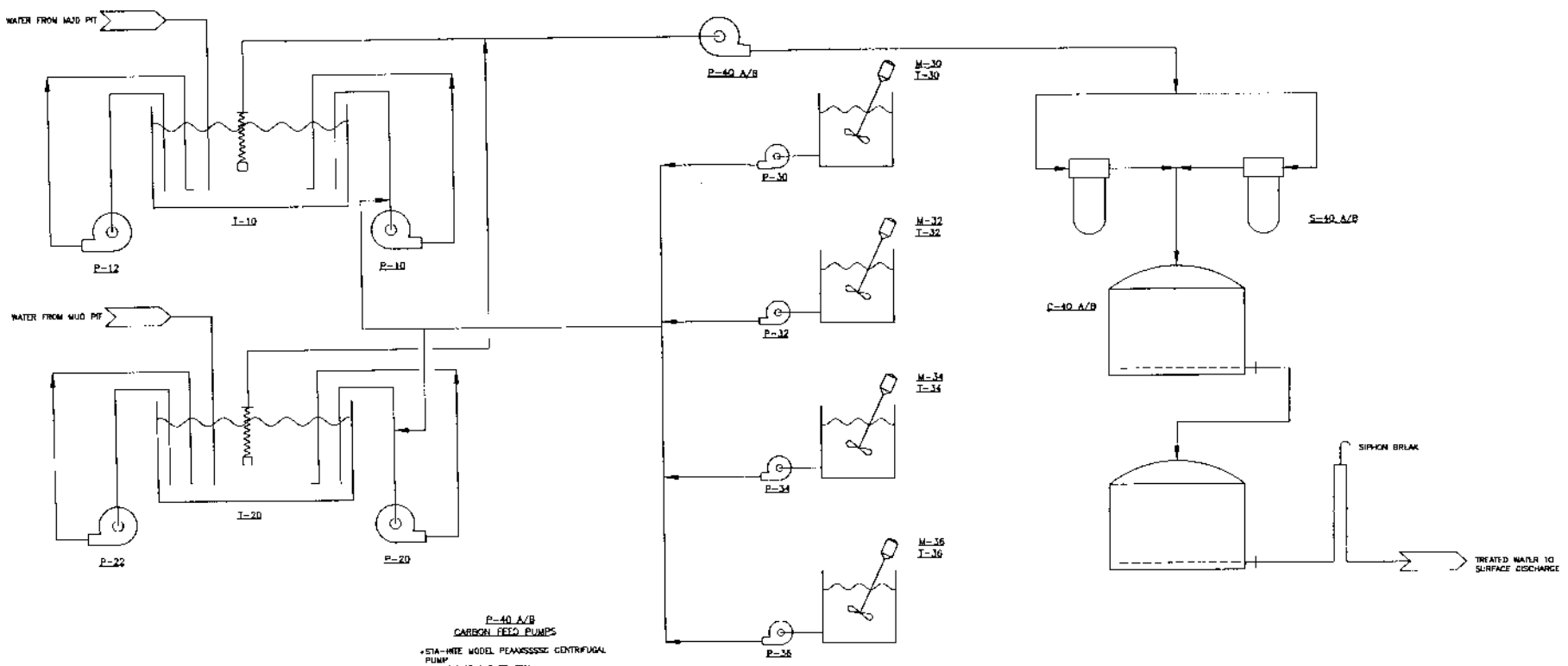
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

MISCELLANEOUS DETAILS
(SHEET 2 OF 2)
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Ingersoll	8/9/00	CHECKED BY	D. Sloan	7/30/00
DRAWN BY	D. Jones	8/9/00	APPROVED BY		

SCALE:	DRAWING NO.	SHEET NO.	REVISION NO.
AS SHOWN	799419-E27	C-32	B

D:\Projects\799419\799419E27.dwg
Plot Date/Time: 07/28/01 04:10pm
Permit Required: 7/30/01



P-40 A/B
CARBON FEED PUMPS

- STA-RITE MODEL PEAAXSSSSC CENTRIFUGAL PUMP
- 30 GPM AT 110 FT. TDH
- 2.0 HP ODP MOTOR, 3450 RPM
- PROVIDE PRESSURE GAUGE ON PUMP OUTLET

T-10 AND T-20
BATCH TREATMENT TANKS

- MODUTANK, 30 FT. DIA. BY 5 FT DEEP.
- XR - 5 LINER (30 MIL REINFORCED OIL RESISTANT VINYL).
- WALL DESIGN TO INCLUDE BASE PLATES FOR INSTALLATION ON GRAVEL FOUNDATION
- INSTALLATION TO INCLUDE MINIMUM OF 6 INCHES OF SAND BASE, SLOPED TO LOW POINT FOR SLUDGE REMOVAL

P-10, P-12 AND P-20, P-22
TREATMENT TANK MIX PUMPS

- 200 GPM AT 25 FT TDH (3-INCH INLET X 2 INCH OUTLET)
- SELF-PRIMING CENTRIFUGAL PUMPS, GASOLINE OR DIESEL DRIVEN

P-30
FERRIC CHLORIDE FEED PUMP

- MARCH PUMPS MODEL TE-5.5C-MD, MAGNETIC DRIVE, CENTRIFUGAL PUMP W. POLYPROPYLENE HEAD
- 20 GPM AT 25 FT. TDH
- 0.33 HP TEFC MOTOR, 3450 RPM
- SUPPLY 16 MESH STRAINER ON INLET OF PUMPS

P-32
ALUM FEED PUMP

- MARCH PUMPS MODEL TE-5.5C-MD, MAGNETIC DRIVE CENTRIFUGAL PUMP W. POLYPROPYLENE HEAD
- 20 GPM AT 25 FT. TDH
- 0.33 HP TEFC MOTOR, 3450 RPM
- SUPPLY 16 MESH STRAINER ON INLET OF PUMPS

P-34
CAUSTIC FEED PUMP

- MARCH PUMPS MODEL TE-5.5C-MD, MAGNETIC DRIVE CENTRIFUGAL PUMP W. POLYPROPYLENE HEAD
- 20 GPM AT 25 FT. TDH
- 0.33 HP TEFC MOTOR, 3450 RPM
- SUPPLY 16 MESH STRAINER ON INLET OF PUMPS

P-36
POLYMER FEED PUMP

- ROBBINS MYERS MODEL 34459, PROGRESSIVE CAVITY PUMP
- 16 GPM AT 5 PSIG
- 0.5 HP TEFC MOTOR, 1725 RPM
- CARBON STEEL WITH NITRILE STATOR

T-30
FERRIC CHLORIDE MIX TANK

- 65 GALLON, OPEN TOP, FLAT BOTTOM, POLYETHYLENE (22 IN. DIA. BY 40 IN. DEEP)
- INSTALL 0.5 IN. FPT BULKHEAD FITTING 3 IN. FROM TANK BOTTOM

T-32
ALUM MIX TANK

- 65 GALLON, OPEN TOP, FLAT BOTTOM, POLYETHYLENE (22 IN. DIA. BY 40 IN. DEEP)
- INSTALL 0.5 IN. FPT BULKHEAD FITTING 3 IN. FROM TANK BOTTOM

T-34
CAUSTIC MIX TANK

- 65 GALLON, OPEN TOP, FLAT BOTTOM, POLYETHYLENE (22 IN. DIA. BY 40 IN. DEEP)
- INSTALL 0.5 IN. FPT BULKHEAD FITTING 3 IN. FROM TANK BOTTOM

T-36
POLYMER MIX TANK

- 65 GALLON, OPEN TOP, FLAT BOTTOM, POLYETHYLENE (22 IN. DIA. BY 40 IN. DEEP)
- INSTALL 0.5 IN. FPT BULKHEAD FITTING 3 IN. FROM TANK BOTTOM

M-30
FERRIC CHLORIDE MIXER

- 0.25 HP, 350-400 RPM (SINGLE SPEED)
- 4 IN. DIA. PROPELLERS
- SHAFTS ARE 0.5 IN. DIA. BY 36 IN. LONG

M-32
ALUM MIXER

- 0.25 HP, 350-400 RPM (SINGLE SPEED)
- 4 IN. DIA. PROPELLERS
- SHAFTS ARE 0.5 IN. DIA. BY 36 IN. LONG

M-34
CAUSTIC MIXER

- 0.25 HP, 350-400 RPM (SINGLE SPEED)
- 4 IN. DIA. PROPELLERS
- SHAFTS ARE 0.5 IN. DIA. BY 36 IN. LONG

M-36
POLYMER MIXER

- 0.33 HP, 50-400 RPM (VARIABLE -SPEED)
- 4 IN. DIA. PROPELLER
- SHAFT IS 0.5 IN. DIA. BY 36 IN. LONG

S-40 A/B
BAG FILTERS

- 8 IN. DIA. BY 30 IN.
- 10 MICRON BAGS
- 100 PSIG DESIGN PRESSURE
- PROVIDE PRESSURE GAUGES ON INLET AND OUTLET

C-40 A/B
CARBON ADSORBER

- CARBONAIR LPC 13
- 48 IN. DIA.
- 1000 LBS OF VARGON 8X30 MESH ACTIVATED CARBON
- DESIGN PRESSURE 15 PSIG
- PROVIDE PRESSURE GAUGE AND RELIEF VALVE ON ADSORBER INLET

REV	DATE	BY	CHK'D	APPVD	DESCRIPTION/ISSUE
B	11/30/00	GSJ	P.T.		BDM DESIGN SUBMITTAL
A					NOT ISSUED

IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

PROCESS FLOW DIAGRAM
WATER TREATMENT SYSTEM
AMCHITKA ISLAND, ALASKA

DESIGNED BY	C. Mosher	11/15/00	CHECKED BY	G. Stahl	11/30/00
DRAWN BY	G. Jones	11/15/00	APPROVED BY		
SCALE: AS SHOWN	DRAWING NO. 799419-E33		SHEET NO. P-1	REVISION NO. B	

OFFICE: Pittsburgh, PA
DRAWING NUMBER: 799419-E33

Appendix A

Storm Water Pollution Prevention Plan
Amchitka Island Mud Pit Closures

A.1.0 Introduction

This Storm Water Pollution Prevention (SWPP) Plan was developed following the municipality of Anchorage *Erosion and Sediment Control and Materials Guidance Manual* (January 1998), the *Storm Water Treatment Plan Review Guidance Manual* (January 1999), and the 1992 U.S. Environmental Protection Agency (EPA) guidance manual entitled, *Storm Water Management For Construction Activities, Developing Pollution Prevention Plans and Best Management Practices* (EPA, 1992). This plan outlines the erosion and sediment controls and the storm water management structures proposed for the closure of mud pits located on Amchitka Island, Alaska. This plan is intended to act as a guide for the closure of the mud pits. During implementation of the plan, field conditions may necessitate revisions to the procedures outlined in this plan; therefore, the plan may be revised, as necessary, to meet field conditions.

A.1.1 Organization of the Report

The SWPPP is organized into six sections and four attachments:

- Section A.1.0 contains the introduction and site information.
- Section A.2.0 discusses the site controls, including erosion and sediment controls, and storm water management controls.
- Section A.3.0 contains the sequence of construction.
- Section A.4.0 discusses inspection and maintenance of the site controls.
- Section A.5.0 discusses the certification and notification of the plan.
- Section A.6.0 provides a list of references.
- Attachment A-1 presents the SWPP Site Drawings.
- Attachment A-2 presents supporting calculations for the site controls.
- Attachment A-3 presents certification forms.
- Attachment A-4 presents the National Pollutant and Discharge Elimination System (NPDES) General Permit for Storm Water Discharges from Construction Activities.

A.1.2 Site Description

This SWPPP addresses the closure of 11 existing mud pits located on Amchitka Island, Alaska. These mud pits are located at the following sites:

- Rifle Range Road (1)
- Long Shot Site (2)
- Cannikin Site (1)
- Cannikin Post Shot Drill Back Hole Sites (2)
- Drill Site D (3)
- Drill Site E (1)
- Drill Site F (1)

The closure of these pits will involve the following soil-disturbing activities: clearing and grubbing; installing erosion and sediment controls, and permanent storm water management controls; grading; and preparing for permanent seeding.

Amchitka Island is home to the Aleutian Canada Goose, currently a threatened species under federal wildlife protection law. The presence of geese has been confirmed at all of the DOE locations of interest. Formal consultation with the U.S. Fish and Wildlife Service (USFWS) under the *Endangered Species Act* is currently ongoing. It is anticipated that this consultation will result in the issuance of a Biological Opinion concerning the geese, which will include mitigative measures to protect the geese during remedial actions.

The U.S. Department of Energy (DOE) currently plans to send biologists to the island prior to commencement of remediation activities to ensure that geese do not establish nests in the intended remediation areas. These biologists will remain on the island for the duration of the project to ensure that the geese and/or their habitat are not impacted by any aspect of remediation activity, including the discharge of storm water. Biologists will conduct periodic visual inspections of discharge outfalls and drainage areas throughout any discharge activity and after storm events to ascertain impacts to geese habitat.

A.1.3 Design Information

Storm information for Amchitka Island, Alaska, was collected to design erosion and sediment controls and permanent storm water controls at each site. According to the Natural Resources

Conservation Service, Alaska is categorized as a Type I storm. A 25-year, 24-hour storm event was used for design purposes at each site. From the *Engineering Field Manual for Conservation Practices* by the U.S. Soil Conservation Service, the rainfall depth from a 25-year, 24-hour storm event is approximately 4.82 inches on Attu, which is near Amchitka. The Curve Number (CN) is used to calculate runoff and is a function of land use and hydrologic soil group. A CN of 79 was selected for each site based on a grassland cover type in fair hydrologic condition and hydrologic Soil Group C.

Using the information above, the peak discharges for the drainage channels were calculated with the Sediment Erosion Discharge Computer Aided Design (SEDCAD) 4 for Windows computer software (Warner, et al., 1998 and 1999). Sizing of the drainage channels was also completed using this software.

A.1.4 Site Areas

Total site area and area of disturbance were estimated for each site and are discussed below. The total estimated area of disturbance is approximately 28 acres. Disturbance and drainage boundaries are indicated on the SWPPP site drawings located in Attachment A-1.

Rifle Range Road Site

Approximately 2.30 acres of this site will be disturbed by construction activities. The SWPPP site drawing of the Rifle Range Road, showing the limit of disturbance and the drainage area boundaries, is provided as Sheet No. 1 of Attachment A-1.

Long Shot Site

Approximately 2.16 acres of this site will be disturbed by construction activities. The SWPPP site drawing of Long Shot Site, showing the limit of disturbance and the drainage area boundary, is provided as Sheet No. 2 of Attachment A-1.

Cannikin Site

Approximately 1.62 acres of this site will be disturbed by construction activities. The SWPPP site drawing of the Cannikin Site, showing the limit of disturbance and the drainage area boundaries, is provided as Sheet No. 3 of Attachment A-1.

Cannikin Post Shot Drill Back Hole Sites

Approximately 1.76 acres of this site will be disturbed by construction activities. The SWPPP site drawing of the Cannikin post shot drill back hole sites, showing the limit of disturbance, is provided as Sheet No. 4 of Attachment A-1.

Drill Site D

Approximately 8.26 acres of this site will be disturbed by construction activities. The SWPPP site drawing of Drill Site D, showing the limit of disturbance and the drainage area boundaries, is provided as Sheet No. 5 of Attachment A-1.

Drill Site D Borrow Area

Approximately 6.51 acres of this site will be disturbed by construction activities. The SWPPP site drawing of the Drill Site D Borrow Area, showing the limit of disturbance, is provided as Sheet No. 6 of Attachment A-1.

Drill Site E

Approximately 0.73 acres of this site will be disturbed by construction activities. The SWPPP site drawing of Drill Site E, showing the limit of disturbance and the drainage area boundaries, is provided as Sheet No. 7 of Attachment A-1.

Drill Site F

Approximately 0.71 acres of this site will be disturbed by construction activities. The SWPPP site drawing of Drill Site F, showing the limit of disturbance and the drainage area boundaries, is provided as Sheet No. 8 of Attachment A-1.

Mile Marker 8 Borrow Area

Approximately 4.02 acres of this site will be disturbed by construction activities. The SWPPP site drawing of Mile Marker 8 Borrow Area, showing the limit of disturbance, is provided as Sheet No. 9 of Attachment A-1.

A.2.0 Site Controls

Erosion and sediment controls, along with storm water management controls, will be installed at each site to address storm water issues during and after construction. The following sections provide detailed information about the controls to be installed at the sites.

A.2.1 Erosion and Sediment Controls

A total of approximately 28.1 acres of land will be disturbed for this project. To alleviate the effects of this land disturbance, erosion and sediment controls will be installed. Erosion and sediment controls include stabilization practices for disturbed areas and structural practices to divert runoff and remove sediment. These controls include temporary and permanent practices.

A.2.1.1 Stabilization Practices

Stabilization practices used in erosion and sediment control minimize erosion during and after construction. Practices used at the sites include permanent seeding, erosion control mat, and dust control.

A.2.1.1.1 Permanent Seeding

Disturbed portions of the site, where construction activities permanently cease, shall be stabilized with permanent seed no later than 14 days after the completion of each site. The permanent seed mix, approved by the USFWS, shall be applied at the specified rate. Prior to seeding, ground agricultural limestone and 10-20-10 fertilizer shall be applied to each acre to be stabilized at the specified rate.

A.2.1.1.2 Erosion Control Mat

All portions of the site, where permanent seeding has been completed, shall be stabilized with an erosion control mat. The erosion control mat shall be Curlex I, as manufactured by American Excelsior Company, or an approved equal. The mat shall be installed in accordance with the manufacturer's recommendations.

A.2.1.1.3 Dust Control

Site access roads, mud pit areas, and borrow areas shall be sprayed with water, as necessary, to control dust.

A.2.1.2 Structural Practices

Structural practices used in sediment and erosion control reduce the potential for sediment to discharge off site. Practices to be used at the sites include construction exits, silt fence, diversion berms, drainage channels, sediment traps, energy dissipaters, and straw bale check dams.

A.2.1.2.1 Construction Exits

A construction exit is an area/pad stabilized with gravel located at the exit of the site to help reduce vehicle tracking of sediments. A construction exit will be installed at each of the sites on Amchitka Island. See the SWPPP site drawings in Attachment A-1 for construction exit locations.

A.2.1.2.2 Silt Fence

Silt fence is a temporary sediment barrier consisting of geotextile attached to support posts, with the bottom of the geotextile entrenched or partially buried into the soil. Silt fence shall be installed for drainage areas measuring less than 1 acre, and shall be installed prior to earth disturbance activities. Additional fencing may be installed as site conditions change. See the SWPPP site drawings in Attachment A-1 for locations of silt fence.

Rifle Range Road Site

Silt fence will be installed along both sides of the construction exit in the northwest area of the site. The silt fence will continue on the north side of the construction exit along the access road to prevent sediment from entering the pond. In addition, silt fence will be installed in the southeast area of the site to prevent sediment from the mud pit and borrow area from entering the pond.

Long Shot Site

Silt fence will be installed along both sides of the construction exit in the southeast area of the site. In addition, silt fence will be installed around the west, north, and east sides of the mud pits to prevent sediment from leaving the disturbed area.

Cannikin Site

Silt fence will be installed along the eastern sides of the mud pit, access road, and construction exit.

Cannikin Post Shot Drill Back Hole Sites

Silt fence will be installed along both sides of the construction exit and access road. Silt fence will be installed along the perimeter of the site, except for the area south of the south exploratory hole pond.

Drill Site D

Silt fence will be installed downgradient of the southeast corner of the mud pit to prevent sediment from leaving the site.

Drill Site D Borrow Area

Silt fence will be installed around the entire borrow area including the construction exit and access road.

Drill Site E

Silt fence will be installed downgradient on the west, south, and east sides of the mud pit.

Drill Site F

Silt fence will be installed downgradient on the south side of the mud pit.

Mile Marker 8 Borrow Area

Silt fence will be installed neatly around the borrow area including the construction exit and access road.

A.2.1.2.3 Diversion Berms

A diversion berm is a permanent barrier constructed to divert runoff.

Cannikin Site

Two 10-foot wide diversion berms will be installed at this site. One berm is located north of Channel C2 and is approximately 50 feet long. The second berm is approximately 295 feet long and located south of Channel C1. Sheet No. 3, provided in Attachment A-1, shows the locations of the diversion berms.

A.2.1.2.4 Drainage Channels

A drainage channel is a permanent sediment control device used to convey runoff without causing erosion. Drainage channels constructed at each site will be stabilized with vegetative lining and their depth includes 6 inches of freeboard. Drainage channels discharge through sediment traps, existing channels, or energy dissipaters to surrounding land outside the limits of disturbance. Drainage channel calculations are documented in Attachment A-2.

Rifle Range Road Site

Two drainage channels will be installed at this site. Channel RR1 is located south of the mud pit and flows northwest to southeast. Channel RR2 flows south to north and is located west of the mud pit. Both channels are trapezoidal with side slopes of 3H to 1V and 2H to 1V; 2-foot wide bottom; and 3-foot depth. Sheet No. 1, provided in Attachment A-1, shows the locations of Channels RR1 and RR2.

Long Shot Site

One triangular drainage channel, Channel L1, which is 3 feet deep with 3H to 1V side slopes, will be installed at this site. Channel L1 is located south of the mud pit and it flows from west to east. Sheet No. 2, provided in Attachment A-1, shows the location of Channel L1.

Cannikin Site

Two triangular drainage channels will be installed at this site. Channel C1 is located south of the mud pit and Channel C2 is located north of the mud pit. Both channels will be 2 feet deep with 3H to 1V side slopes and will flow west to east. Sheet No. 3, provided in Attachment A-1, shows the locations of Channels C1 and C2.

Drill Site D

There will be five drainage channels installed at Drill Site D. Channel D1 is a triangular channel located north of the mud pit, with 3H to 1V side slopes and a depth greater than or equal to 5 feet. Channel D2 is a trapezoidal channel approximately 2 feet deep, collecting runoff from the center of the north portion of the mud pit. Channel D2 has a 5-foot bottom and 3H to 1V side slopes. Channels D1 and D2 outlet into Channel D3 located west of the mud pit. In addition to collecting the flows from Channels D1 and D2, Channel D3 collects runoff from the west portion of the mud pit. Channel D3 is a triangular channel with 3H to 1V side slopes and a depth greater than or equal to 5 feet. The flow from Channel D3 discharges into the Sediment Trap D-1. Channel D4 is a triangular channel with 3H to 1V side slopes and a depth of 2 feet. Channel D4 outlets into an existing channel. Channel D5 is a trapezoidal channel approximately 2 feet deep collecting runoff from the center of the south portion of the mud pit. Channel D5 has a 5-foot bottom, 3H to 1V side slopes, and outlets through an energy dissipater to surrounding land outside the limits of disturbance. Sheet No. 5, provided in Attachment A-1, shows the locations of Channels D1 through D5.

Drill Site E

Two triangular channels, with 3H to 1V side slopes, will be installed at Drill Site E. Channel E1, located east of the mud pit, travels from north to south and has a depth of 3 feet. Channel E2 is 1.5 feet deep and is located west of the mud pit, with its flow traveling north to south. Sheet No. 7, provided in Attachment A-1, shows the locations of Channels E1 and E2.

Drill Site F

Two triangular channels will be installed north of the mud pit at Drill Site F. Channel F1 will flow from west to east, while Channel F2 will flow from east to west. Both channels will be 2 feet deep

with 3H to 1V side slopes. Sheet No. 8, provided in Attachment A-1, shows the locations of Channels F1 and F2.

A.2.1.2.5 Sediment Trap

A sediment trap is a temporary sediment control device consisting of excavated and/or compacted berms and a stone outlet/spillway for drainage areas measuring between 1 and 10 acres. A sediment trap allows suspended sediment to settle out before runoff is passed on to surrounding land.

Drill Site D

Sediment Trap D-1 is located in the southwest corner of Drill Site D. This trap collects discharge from Channel D3 and runoff from the southern portion of the mud pit closure. The sediment trap is approximately 75 feet long by 25 feet wide with 3H to 1V side slopes. Flow is discharged over a weir and through an energy dissipater to surrounding land outside of the limits of disturbance. Sheet No. 5, provided in Attachment A-1, shows the location of the sediment trap. Sediment trap sizing calculations are documented in Attachment A-2.

A.2.1.2.6 Energy Dissipaters

An energy dissipater is a sediment control device consisting of riprap that is placed in the path of concentrated storm water flow to reduce water velocity before the flow is discharged to surrounding land. Energy dissipaters will be installed at the outlets of Channels RR1, RR2, L1, C1, C2, D5, E1, E2, and F1, and the sediment trap weir to reduce erosion and scouring. At a minimum, the riprap shall be placed across the entire channel width and shall extend a length of 10 feet. Energy dissipaters are shown on Sheet Nos. 1, 2, 3, 5, 7, and 8 provided in Attachment A-1. Energy dissipation calculations performed are documented in Attachment A-2.

A.2.1.2.7 Straw Bale Check Dam

A straw bale check dam is a temporary sediment control device consisting of a single row of straw bales placed lengthwise, oriented perpendicular to the flowline of the channel. The check dam will be utilized for drainage areas with no greater than 1/4 acre of contributing watershed per 100 feet of barrier length.

Long Shot Site

Three check dams will be installed in Channel L1 approximately 100 feet apart from each other. Sheet No. 2, provided in Attachment A-1, shows check dam locations.

Drill Site D

Four check dams will be installed at 30-foot spacing in Channels D2 and D5. Channel D4 will have 5 check dams installed at 30-foot spacings. Sheet No. 5, provided in Attachment A-1, shows check dam locations.

A.2.2 Storm Water Management Controls

Storm water management controls are constructed to prevent or control pollution of storm water during and after construction. For this project, these storm water management controls are addressed in two categories: (1) controls within mud pits and (2) controls outside mud pits.

A.2.2.1 Controls Within Mud Pits

Storm water management controls within the mud pits will include pumping, treating, and discharging of water. Standing water will be pumped from the mud pits and discharged through an energy dissipater to surrounding land outside the limits of disturbance until a sheen develops over the water surface or until the water level reaches a depth of 2 feet above the drilling mud. Once a sheen develops at the water surface or the water depth reaches within 2 feet of the drilling mud, the water will be treated by flocculation and carbon absorption prior to being discharged. After treatment, the water will be pumped and discharged through an energy dissipater to surrounding land outside the limits of disturbance at all sites except for Drill Site D. At Drill Site D, the treated water will be pumped and discharged through the sediment trap. All discharges of treated storm water from the sites will be in accordance with the State of Alaska General Waste Water Discharge Permit.

A.2.2.2 Controls Outside Mud Pits

Storm water management controls outside the mud pits include drainage channels, a sediment trap, and energy dissipaters. Information regarding these controls are presented in Section A.2.1.2.

A.3.0 Sequence of Construction

This sequence of construction (SOC) lists the major activities for work located on Amchitka Island, Alaska, at each of the sites:

A. Construct access roads and construction exit at each site.

B. Install silt fence at each site prior to starting earthwork activities.

C. Clear and grub at each site to the outline of the limits of grading.

D. Install drainage channels, straw bale check dams, and energy dissipaters.

E. Construct sediment trap.

F. Demolish and remove portions of the existing pipes, culverts, and boardwalks.

G. Remove and treat existing water within mud pits prior to discharge.

H. Solidify existing drilling mud with on-site excavated material and borrow material, including the solidification, removal, and relocation of the drilling mud from the South Exploratory Hole pond to the North Exploratory Hole pond at the Cannikin site.

I. Place intermediate cover over solidified mud pits.

J. Place geomembrane over intermediate cover.

K. Place protective cover over geomembrane.

L. Place soil cover over protective cover.

M. Grade and maintain borrow areas.

N. Place vegetated layer over closed mud pits and borrow areas and revegetate.

O. Install erosion control mat.

A.4.0 Inspection and Maintenance Plan

This section discusses the general inspection, maintenance, and record keeping for proper implementation of the SWPP Plan during construction. Because the island is in a remote location and uninhabited, no inspection or maintenance is planned after construction. The sites will be inspected periodically by USFWS personnel.

A.4.1 Inspection/Maintenance

Erosion and sediment control structures shall be inspected during construction once per week or within 24 hours of a rainfall event of 0.5 inches or greater. Any required repairs of the control structures shall be made as soon as possible. The following sections give specific inspection and maintenance requirements for the individual controls.

A.4.1.1 Construction Exit

Each construction exit shall be maintained in a condition that will prevent tracking or flow of mud outside of the site. Pads shall be dressed with 2-inch stone when they become laden with sediment.

Fencing shall be installed to prohibit vehicles from exiting the site at points other than the stabilized construction exit.

A.4.1.2 Erosion Control Matting

Repairs shall be made to damaged erosion control mats or tie-down material, as required.

A.4.1.3 Dust Control

Site access roads, mud pit areas, and borrow areas will be watered, as necessary, to keep dust to a minimum.

A.4.1.4 Silt Fence

Repairs shall be made as soon as possible to damaged portions of the silt fence. Sediment shall be removed if it reaches a depth of 6 inches during construction. Checks for clogging on the uphill side

of the silt fence shall be made. If clogging occurs, the trapped sediment shall be removed and/or the silt fence replaced to avoid channelization of flow parallel to the fence.

A.4.1.5 Diversion Berms

Diversion berms shall be checked for erosion. If erosion occurs, additional vegetation and an erosion control mat shall be added. Riprap protection may be added if necessary.

A.4.1.6 Drainage Channels

Drainage channels shall be checked for erosion of the vegetative lining. If minor erosion occurs, additional vegetation and an erosion control mat should be added to the channel bed. If major erosion occurs, riprap protection should be installed at the eroded areas in the channel bed.

A.4.1.7 Sediment Trap

Damage to the sediment trap embankments or slopes shall be repaired as soon as possible. Sediment shall be removed from the trap during construction if it reaches one-half the storage depth of the trap. Sediment traps shall be drained regularly during construction to prepare for future storms.

A.4.1.8 Energy Dissipaters

Pore spaces of the riprap energy dissipaters shall be checked for sediment. If they are filled with sediment, additional riprap shall be installed. If erosion of the energy dissipaters occurs, larger riprap shall be installed to a greater depth.

A.4.1.9 Straw Bale Check Dams

During inspection of the straw bale check dams, close attention shall be paid to repaired bales, and areas where erosion may occur. Straw bales shall be promptly repaired or replaced as needed. Sediment deposits shall be removed during construction if deposits reach approximately one-half the height of the barrier or one foot, whichever is less.

Check dams may be removed at the completion of construction or at the direction of the DOE Project Engineer (DOE PE). Sediment deposits or channel erosion that exist after the bales are removed shall be dressed to conform to the final grade.

A.4.2 Record Keeping

Records generated during the performance of project activities will be retained and managed in a central on-site location. At the end of the project, or on a periodic basis, records will be submitted to a central filing system for long-term storage. The central filing system will be controlled and will provide a suitable environment to minimize deterioration, tampering, damage, or loss. If working copies of records are desired for an extended period, then photocopies of the original document will be made for such use. Inspections will be documented on the Quality Control Engineer's daily logs. Photographs of the structures taken during inspections will be kept in the photo log.

A.5.0 Certification and Notification

Certification and notification requirements of the SWPPP are described below.

A.5.1 Certification

The SWPPP shall be signed and certified by an authorized representative upon completion of the final plan. See Attachment A-3 for the Pollution Prevention Plan Certification form.

A Contractor's Certification form must be signed by all Contractors working on the site. See Attachment A-3 for this form.

A.5.2 Notification

This work shall be performed under the EPA NPDES construction general permit, dated February 1998, for storm water discharges associated with construction activity disturbing more than five acres. Use of this permit requires a 30-day advance review of the SWPPP by ADEC and a 2-day advance notice of intent to EPA before construction begins. The notification of termination will be provided to the EPA and ADEC after the disturbed areas have been reseeded and construction activities are complete.

A.6.0 References

Municipality of Anchorage. 1998. *Erosion and Sediment Control and Materials Contaminant Guidance Manual*. Anchorage, AK.

Municipality of Anchorage. 1999. *Storm Water Treatment Plan Review Guidance Manual*. Anchorage, AK.

EPA, see U.S. Environmental Protection Agency.

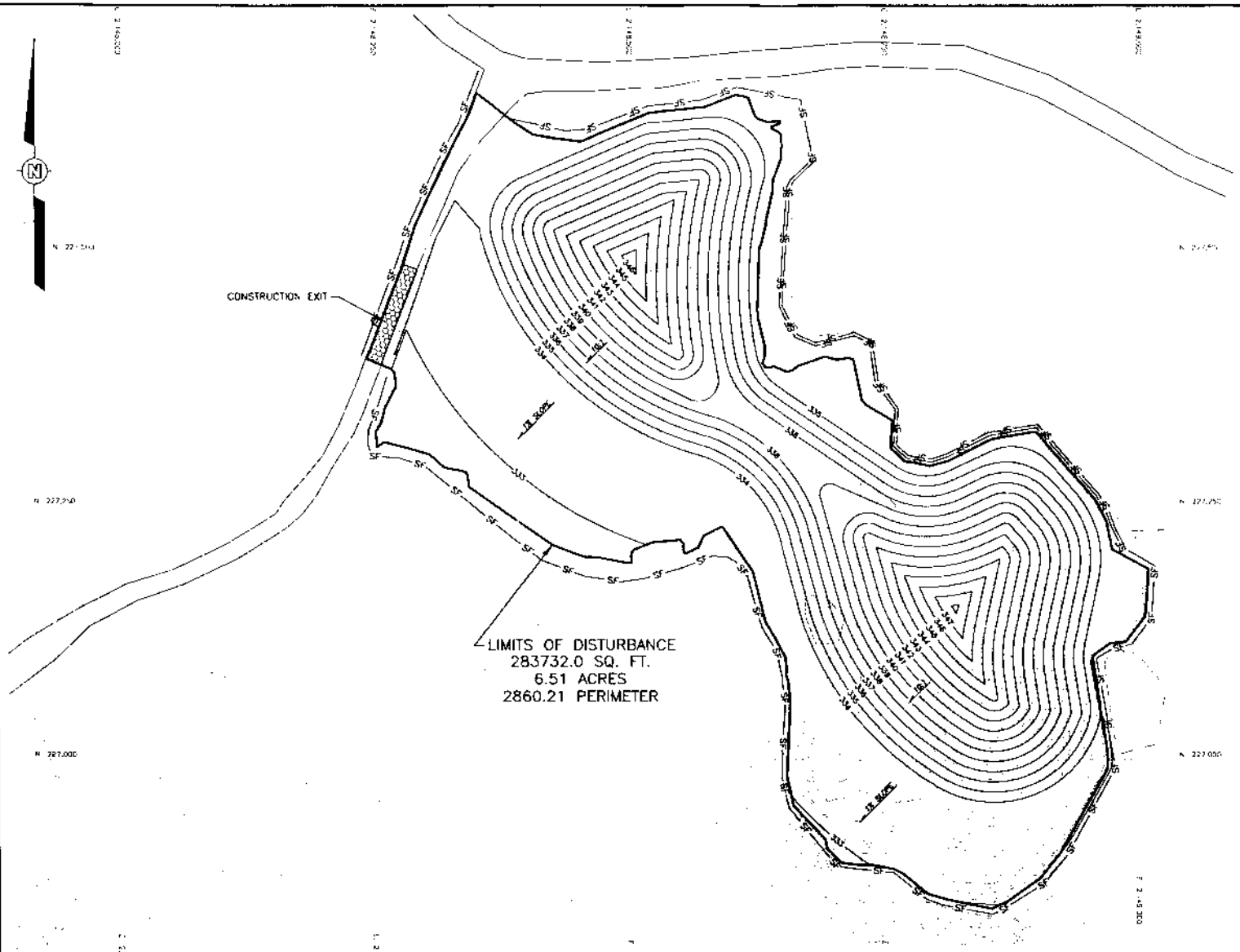
U.S. Environmental Protection Agency. 1992. *Storm Water Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices.* New York, NY.

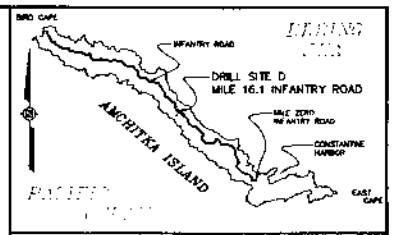
Warner, R.C., and P. Schwab. 1999. *Sediment, Erosion Discharge Computer Aided Design (SEDCAD) 4 for Windows 95/98 and NT, Design and User Manual*, Third Printing. Lexington, KY.

Attachment A-1

Storm Water Pollution Prevention Site Drawings

(10 Pages)





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES:

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC..
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P- 001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- EXISTING CONTOUR
- 332 — PROPOSED CONTOUR
- LIMITS OF DISTURBANCE

NOTES:

1. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
2. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

REV	DATE	BY	CHK'D	APPR'VD	DESCRIPTION/ISSUE
B	11/3/00	GSJ	PJ		90% DESIGN SUBMITTAL
A					NOT ISSUED

IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

SWPP PLAN SITE MAP
DRILL SITE D BORROW AREA
MILE MARKER 16.1 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

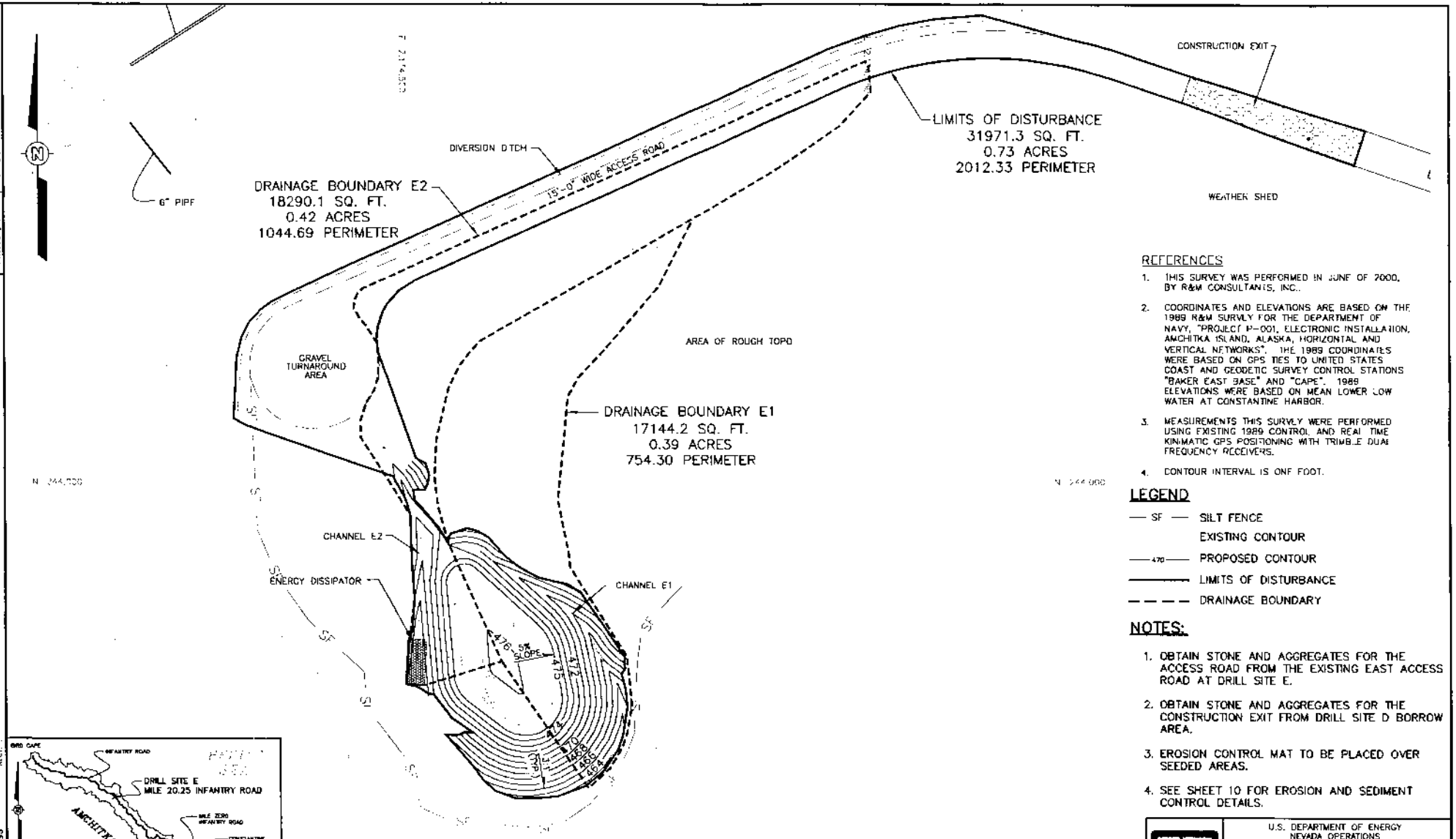
DESIGNED BY	P. Gamble	11/3/00	CHECKED BY	D. Slavi	11/30/00
DRAWN BY	S. Jones	11/3/00	APPROVED BY		

SCALE:	DRAWING NO.	SHEET NO.	REVISION NO.
AS SHOWN	799419-817	6	B

OFFICE: Pittsburgh, PA
DRAWING NUMBER: 799419-B17

Image: Xref: XTOPO_DD
O:\Project\799419\799817.dwg
Plot Date/Time: 01/08/01 04:22pm
Format Revised: 12/15/99

OFFICE Pittsburgh, PA | DRAWING NUMBER 7994 . 0-B14



REFERENCES

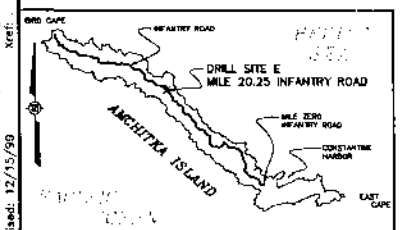
1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC..
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINEMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- — SF — SILT FENCE
- EXISTING CONTOUR
- —470— PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- — — — DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD FROM THE EXISTING EAST ACCESS ROAD AT DRILL SITE E.
2. OBTAIN STONE AND AGGREGATES FOR THE CONSTRUCTION EXIT FROM DRILL SITE D BORROW AREA.
3. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
4. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.



LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

SCALE
0 50 100 FEET

REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION/ISSUE
B	11/30/00	CSJ	PJI		90% DESIGN SUBMITTAL
A					NOT ISSUED

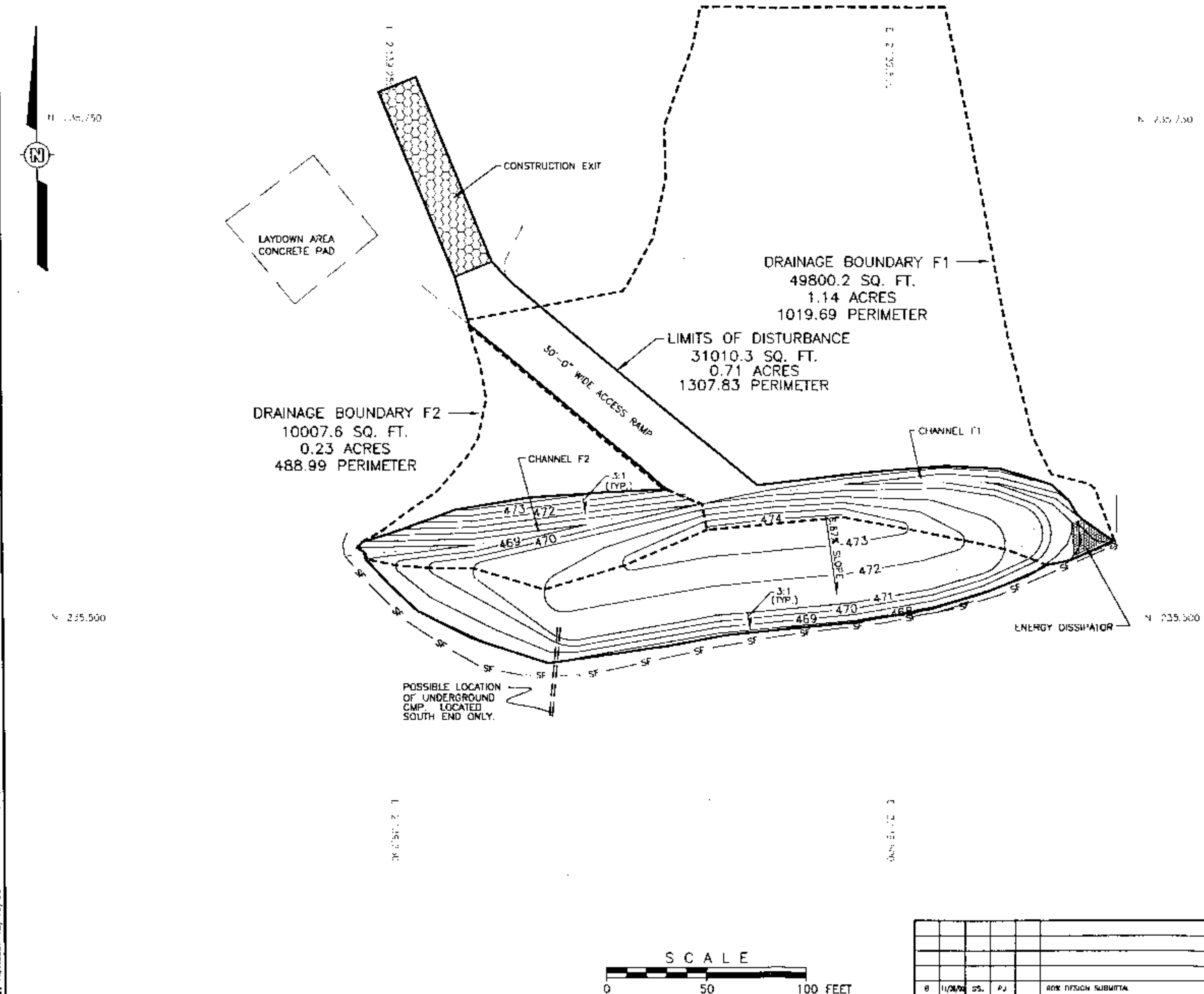
IT CORPORATION

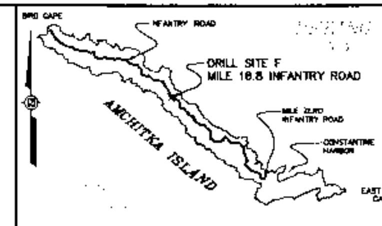
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

SWPP PLAN SITE MAP
DRILL SITE E
MILE MARKER 20.25 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Gonzalez	11/3/00	CHECKED BY	D. Stahl	11/30/00
DRAWN BY	C. Jones	11/3/00	APPROVED BY		
SCALE: AS SHOWN	DRAWING NO. 799419-B14		SHEET NO. 7		REVISION NO. B

D:\Project\7994\799419B14.dwg
Plot Date/Time: 11/28/01 04:24pm
Format Revised: 12/15/99
Images:
Xrefs:





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC.
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINEMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- — SF — SILT FENCE
- EXISTING CONTOUR
- ——455—— PROPOSED CONTOUR
- ——— LIMITS OF DISTURBANCE
- - - - DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD FROM THE EXISTING EAST ACCESS ROAD AT DRILL SITE E.
2. OBTAIN STONE AND AGGREGATES FOR THE CONSTRUCTION EXIT FROM DRILL SITE D BORROW AREA.
3. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
4. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE
B	11/28/00	GS.	PJ		90% DESIGN SUBMITTAL
A					NOT ISSUED

IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

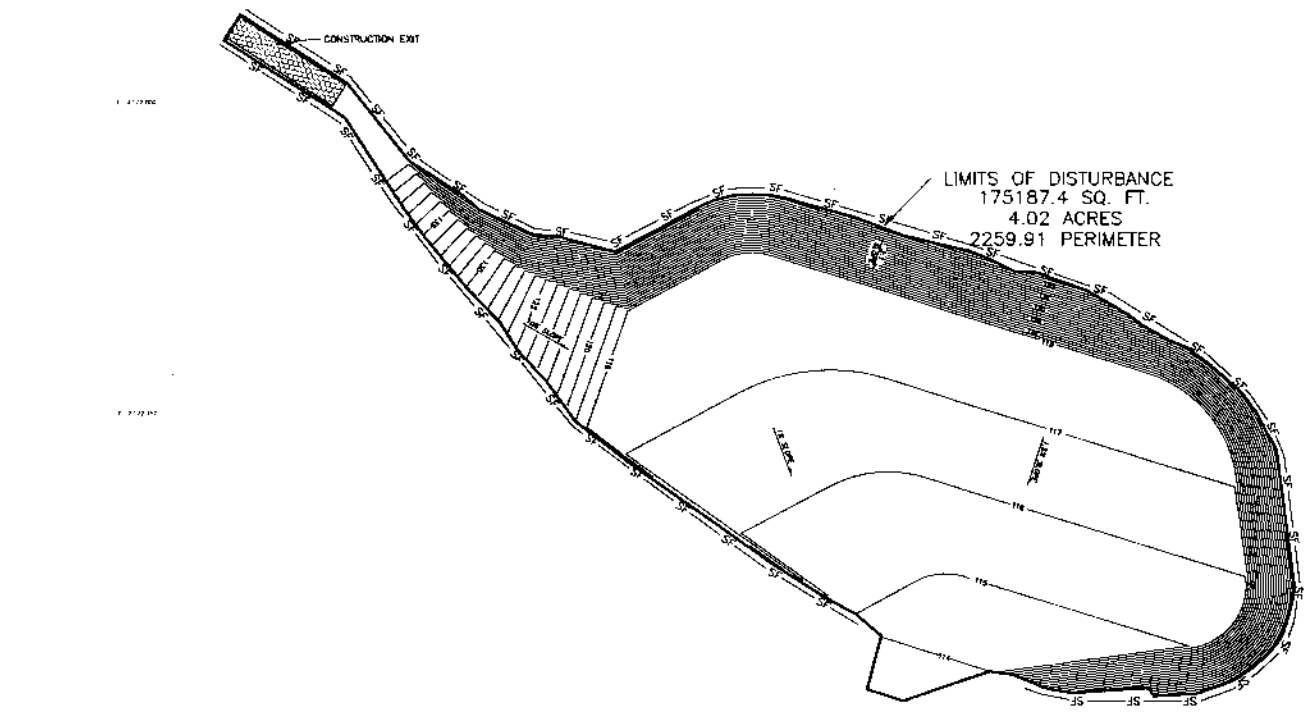
SWPP PLAN SITE MAP
DRILL SITE F
MILE MARKER 18.8 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

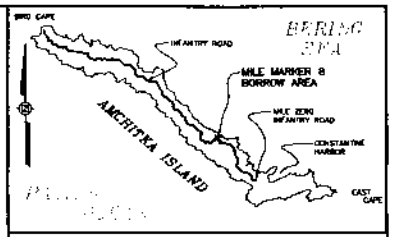
DESIGNED BY	P. Gamble	11/3/00	CHECKED BY	D. Stahl	11/30/00
DRAWN BY	G. Jones	11/3/00	APPROVED BY		
SCALE: AS SHOWN	DRAWING NO. 799419-B13		SHEET NO. 8	REVISION NO. B	

OFFICE: Pittsburgh, PA | DRAWING NUMBER: 7994__-B13

O:\Project\7994__\799419B13.dwg
Plot Date/Time: 0_/_8/01 04:25pm
Format Revised: 12/15/99
Image: -
Xref: -

OFFICE Pittsburgh, PA | DRAWING NUMBER 799419-B15





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC..
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR "HE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINEMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- EXISTING CONTOUR
- 122 — PROPOSED CONTOUR
- LIMITS OF DISTURBANCE

NOTES:

1. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
2. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

SCALE
0 100 200 FEET

REV	DATE	BY	CHK'D	APPVD	DESCRIPTION/ISSUE
B	11/30/00	CSJ	PJV		80% DESIGN SUBMITTAL
A					NOT ISSUED

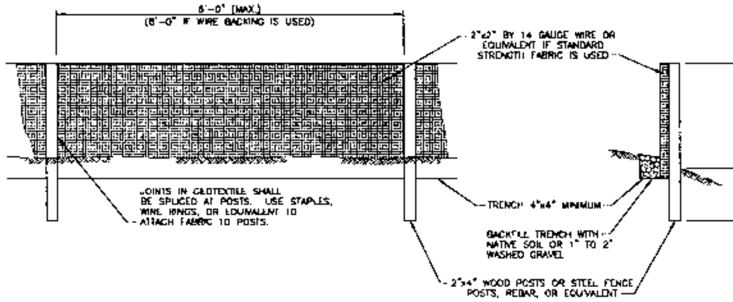
IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

SWPP PLAN SITE MAP
MILE MARKER 8 BORROW AREA
MILE MARKER 8 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

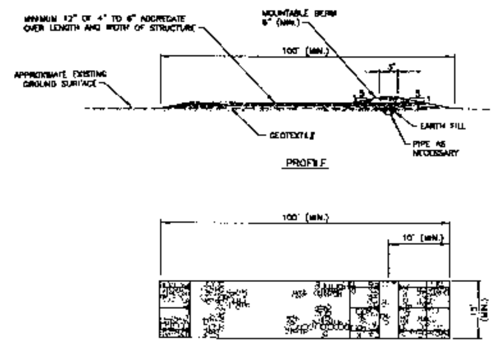
DESIGNED BY	P. Gamble	11/3/00	CHECKED BY	D. Shaw	11/30/00
DRAWN BY	C. Jones	11/3/00	APPROVED BY		
SCALE: AS SHOWN	DRAWING NO. 799419-B15		SHEET NO. 9		REVISION NO. B

O:\Project\7994\19\19B15.dwg
Plot Date/Time: 0..,.26/01 04:26pm
Format Revised: 12/15/99
Image: .
Xref: .



TYPICAL SILT FENCE DETAIL

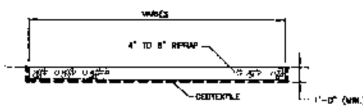
NOT TO SCALE



STABILIZED CONSTRUCTION EXIT

NOT TO SCALE

1. GEOTEXTILE SHALL BE PLACED OVER THE EXISTING GROUND PRIOR TO PLACING STONE.
2. CRUSHED AGGREGATE (4" TO 8") SHALL BE PLACED AT LEAST 12" DEEP OVER THE LENGTH AND WIDTH OF THE ENTRANCE.

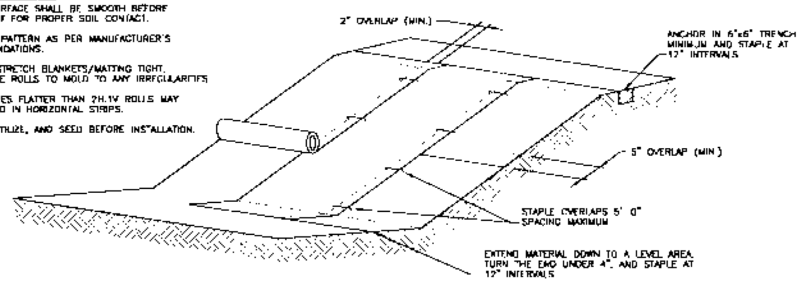


TYPICAL ENERGY DISSIPATOR AND OUTFALL SECTION

NOT TO SCALE

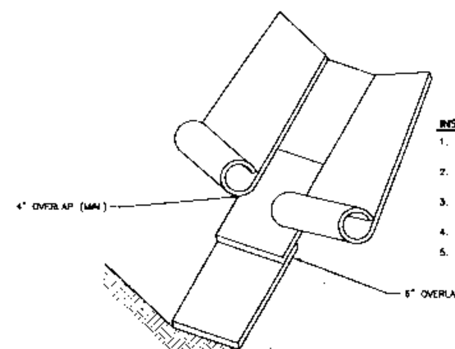
INSTALLATION NOTES:

1. SLOPE SURFACE SHALL BE SMOOTH BEFORE PLACEMENT FOR PROPER SOIL CONTACT.
2. STAPLING PATTERN AS PER MANUFACTURER'S RECOMMENDATIONS.
3. DO NOT STRETCH BLANKETS/MATTING TIGHT. ALLOW THE ROLLS TO MOLD TO ANY IRREGULARITIES.
4. FOR SLOPES FLATTER THAN 2H:1V ROLLS MAY BE PLACED IN HORIZONTAL STRIPS.
5. LIME, FERTILIZE, AND SEED BEFORE INSTALLATION.



EROSION CONTROL MAT SLOPE INSTALLATION DETAIL

NOT TO SCALE

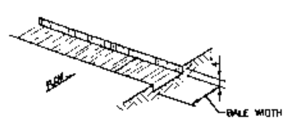


INSTALLATION NOTES:

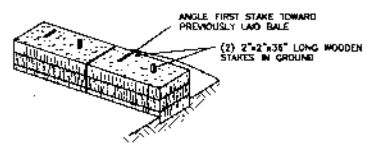
1. DO NOT STRETCH BLANKETS/MATTING TIGHT. ALLOW THE ROLLS TO MOLD TO ANY IRREGULARITIES.
2. SLOPE SURFACE SHALL BE SMOOTH BEFORE PLACEMENT FOR PROPER SOIL CONTACT.
3. ANCHOR, STAPLE, AND INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS.
4. AVOID JOINING MATERIAL IN THE CENTER OF THE CHANNEL.
5. LIME, FERTILIZE, AND SEED BEFORE INSTALLATION.

EROSION CONTROL MAT FLOW CHANNEL INSTALLATION

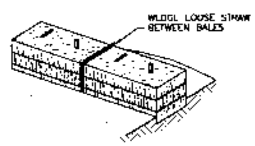
NOT TO SCALE



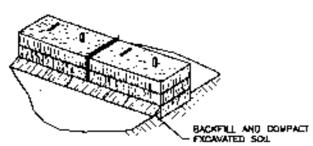
1. EXCAVATE THE TRENCH



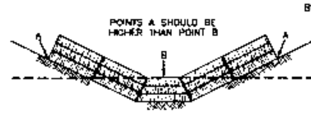
2. PLACE AND STAKE BALES



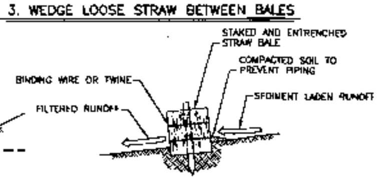
3. WEDGE LOOSE STRAW BETWEEN BALES



4. BACKFILL AND COMPACT EXCAVATED SOIL



PROPER PLACEMENT OF STRAW BALE BARRIER IN DRAINAGE CHANNELS



CROSS SECTION OF PROPERLY INSTALLED STRAW BALE BARRIER

TYPICAL STRAW BALE INSTALLATION DETAILS

NOT TO SCALE

REV	DATE	BY	CHK'D	APPR'VD	DESCRIPTION/ISSUE
B	1/26/01	GSJ	PJI		90% DESIGN SUBMITTAL
A					NOT ISSUED

IT CORPORATION

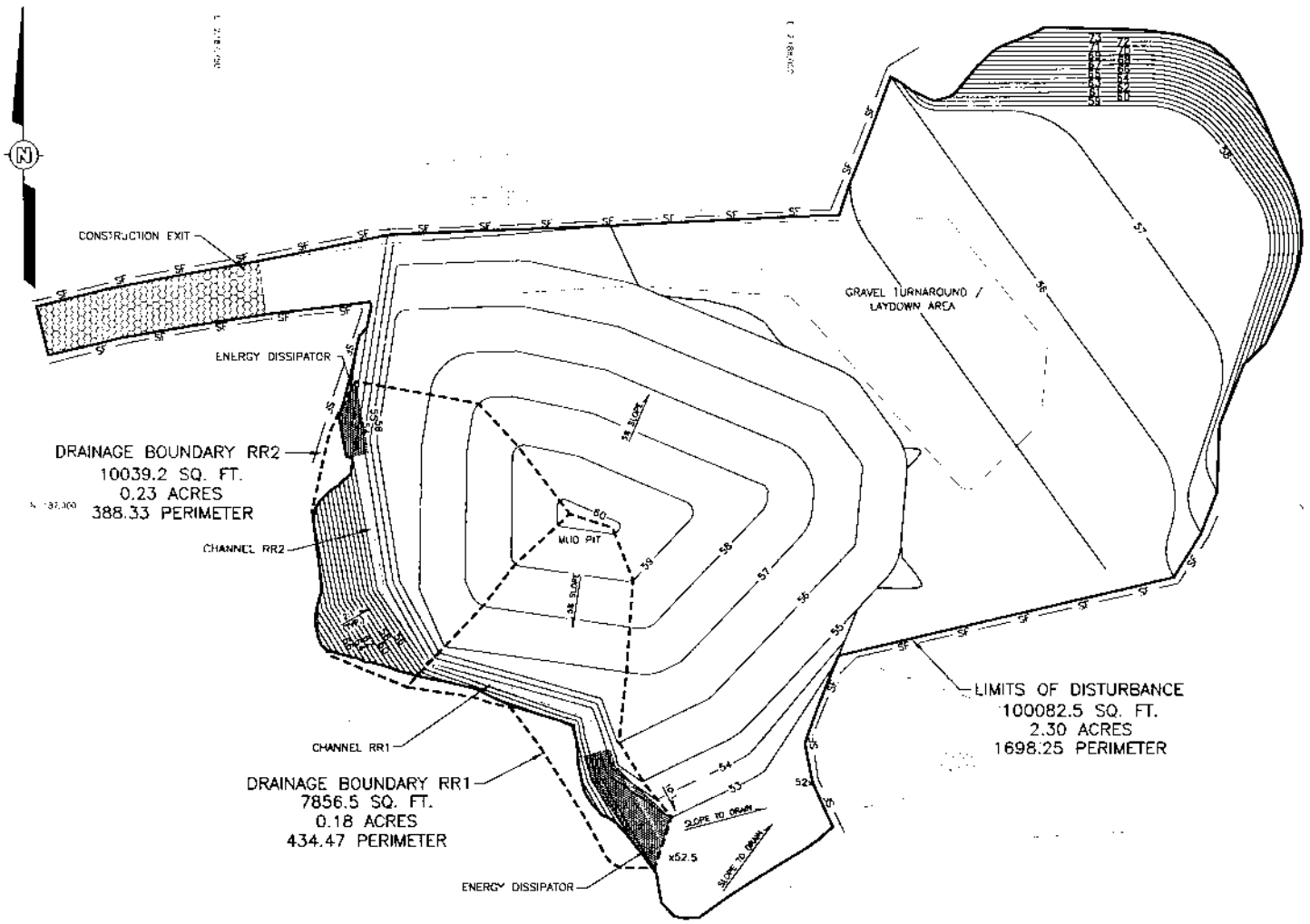
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

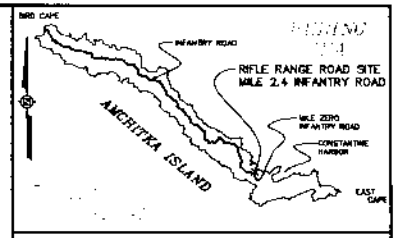
SWPP PLAN
MISCELLANEOUS DETAILS
AMCHITKA ISLAND, ALASKA

DESIGNED BY: P. Gamble	11/3/00	CHECKED BY: D. Stahl	11/30/00	
DRAWN BY: C. Jones	11/3/00	APPROVED BY:		
SCALE: AS SHOWN	DRAWING NO. 799419-B18		SHEET NO. 10	REVISION NO. B

OFFICE: Pittsburgh, PA
DRAWING NUMBER: 7994.5-B18

O:\Project\7994\799419B18.dwg
Plot Date/Time: 0?/?6/01 04:27pm
Format Revised: 12/15/99
Image: -
Xref: -





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC..
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1988 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1988 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1988 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1988 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- EXISTING CONTOUR
- 55 — PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD AND CONSTRUCTION EXIT FROM THE MILE MARKER 2 BORROW AREA.
2. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
3. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

SCALE
0 50 100 FEET

REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION/ISSUE
B	11/29/00	CSJ	PJI		90% DESIGN SUBMITTAL
A					NOT ISSUED

IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

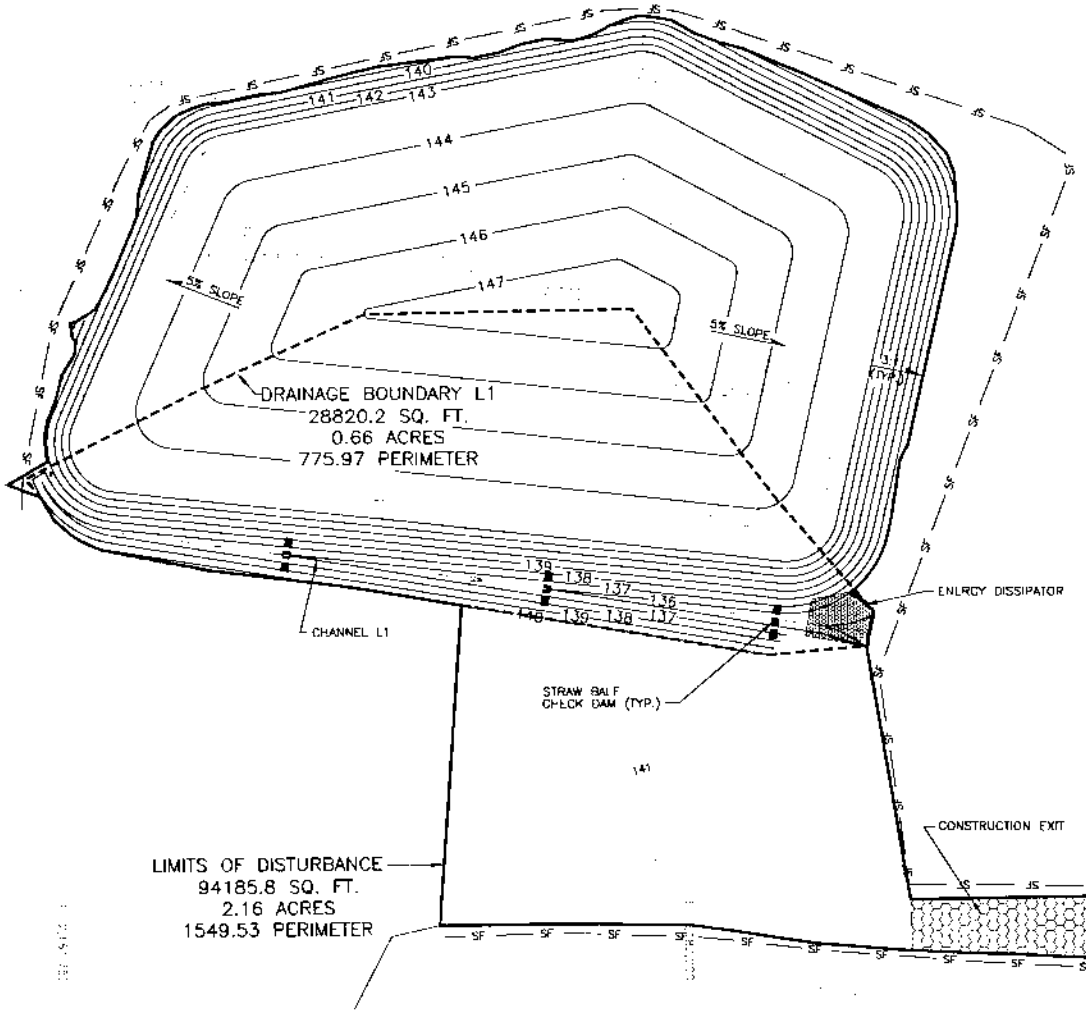
SWPP PLAN SITE MAP
RIFLE RANGE ROAD SITE MUD PIT
MILE MARKER 2.4 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

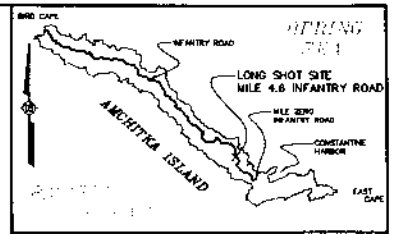
DESIGNED BY: P. Gamble	11/1/00	CHECKED BY: D. Stahl	11/10/00
DRAWN BY: C. Jones	11/1/00	APPROVED BY:	
SCALE: AS SHOWN	DRAWING NO. 799419-B8	SHEET NO. 1	REVISION NO. 8

OFFICE: Pittsburgh, PA | DRAWING NUMBER: 799419-B8

O:\Project\799419\799419B8.dwg
Plot Date/Time: 12/15/99 04:18pm
Format Revised: 12/15/99
Image:
Xref:

OFFICE: Pittsburgh, PA
DRAWING NUMBER: 799419-B9





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC.
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR "THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE" 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- EXISTING CONTOUR
- 140 — PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD AND CONSTRUCTION EXIT FROM THE MILE MARKER 2 BORROW AREA.
2. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
3. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

SCALE
0 50 100 FEET

REV	DATE	BY	CHK'D	APRV'D	DESCRIPTION/ISSUE
B	11/30/00	GSJ	PJI		90% DESIGN SUBMITTAL
A					NOT ISSUED

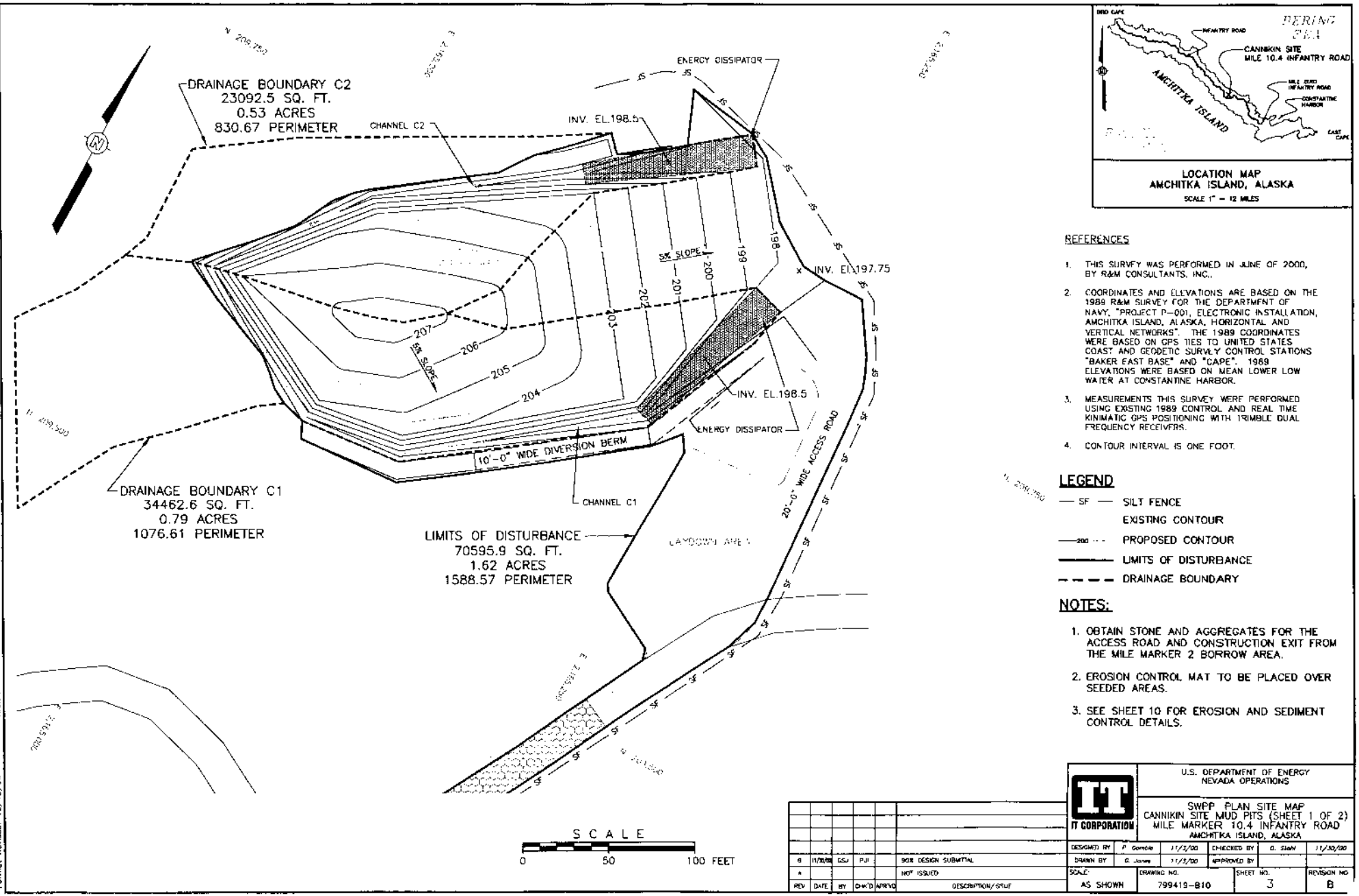
IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

SWPP PLAN SITE MAP
LONG SHOT SITE MUD PITS
MILE MARKER 4.6 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Gamble	11/3/00	CHECKED BY	D. Stein	11/30/00
DRAWN BY	G. Jones	11/3/00	APPROVED BY		
SCALE: AS SHOWN	DRAWING NO. 799419-B9		SHEET NO. 2		REVISION NO B

O:\Project\7994\CAD\799419B9.dwg
Plot Date/Time: 01/15/01 04:19pm
Format Revised: 12/15/99
Image:
Xref:



LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC..
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- EXISTING CONTOUR
- 200 - - - PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD AND CONSTRUCTION EXIT FROM THE MILE MARKER 2 BORROW AREA.
2. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
3. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

REV	DATE	BY	CHK'D	APRVD	DESCRIPTION/STAT
B	11/22/00	ESJ	PJI		90% DESIGN SUBMITTAL
A					NOT ISSUED

IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

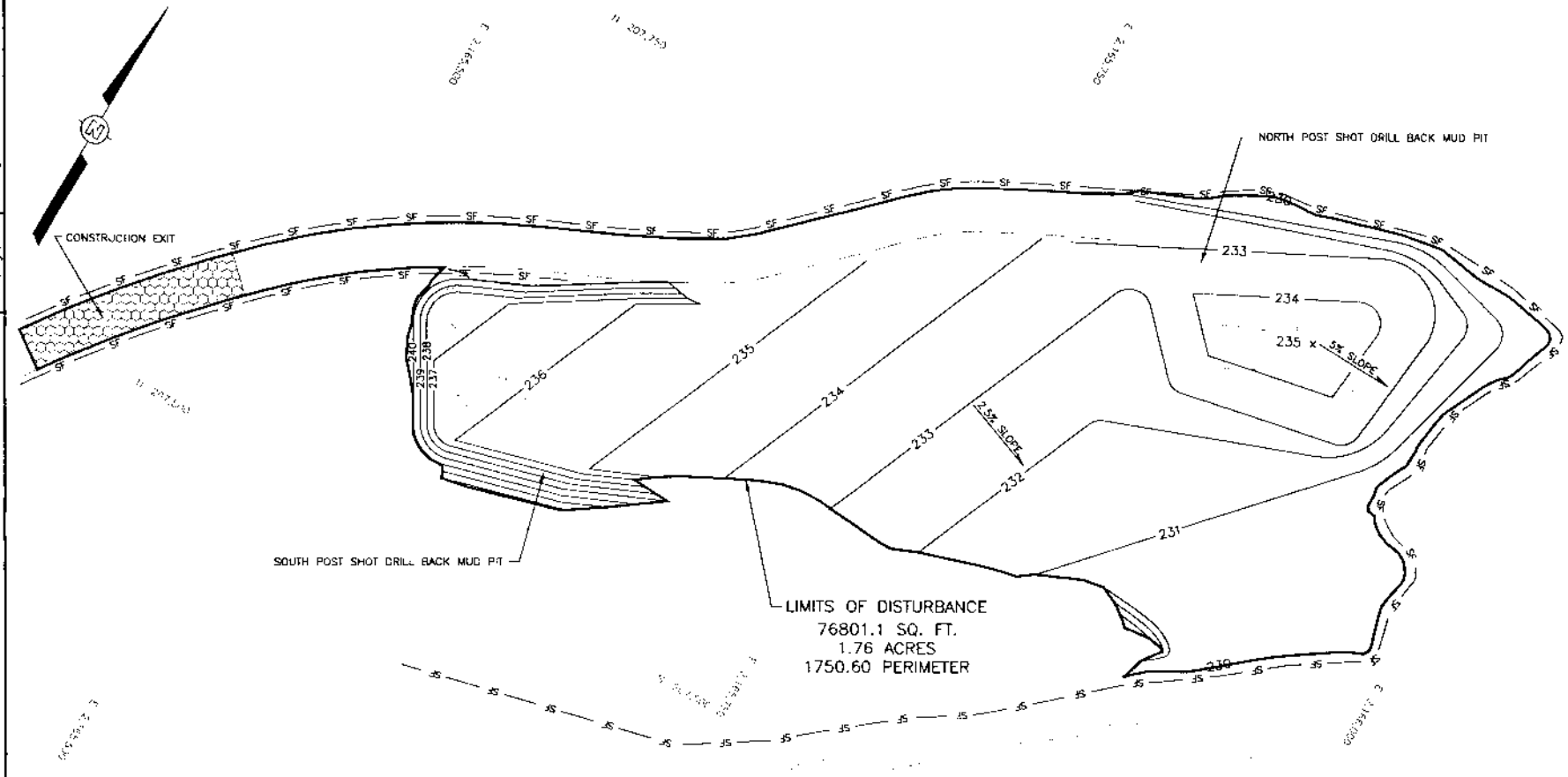
SWPP PLAN SITE MAP
CANNIKIN SITE MUD PITS (SHEET 1 OF 2)
MILE MARKER 10.4 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

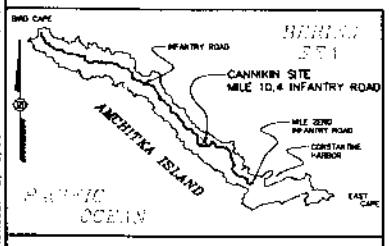
DESIGNED BY	P. Gonzalo	11/3/00	CHECKED BY	G. Stahl	11/30/00
DRAWN BY	G. Jones	11/3/00	APPROVED BY		

SCALE:	DRAWING NO.	SHEET NO.	REVISION NO
AS SHOWN	799419-B10	3	B

OFFICE Pittsburgh, PA | DRAWING NUMBER 7994 — B10

D:\Project\7994\dwg\799419B10.dwg
Plot Date/Time: 12/8/01 04:19pm
Format Revised: 12/15/99
Image:
Xref:





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC..
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD AND CONSTRUCTION EXIT FROM THE MILE MARKER 2 BORROW AREA.
2. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
3. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

LEGEND

— SF — SILT FENCE
EXISTING CONTOUR
— 230 — PROPOSED CONTOUR
LIMITS OF DISTURBANCE

SCALE
0 50 100 FEET

REV	DATE	BY	CHK'D	APRVD	DESCRIPTION/ISSUE
B	11/30/00	DS	PA		90% DESIGN SUBMITTAL
A					NOT ISSUED

IT CORPORATION

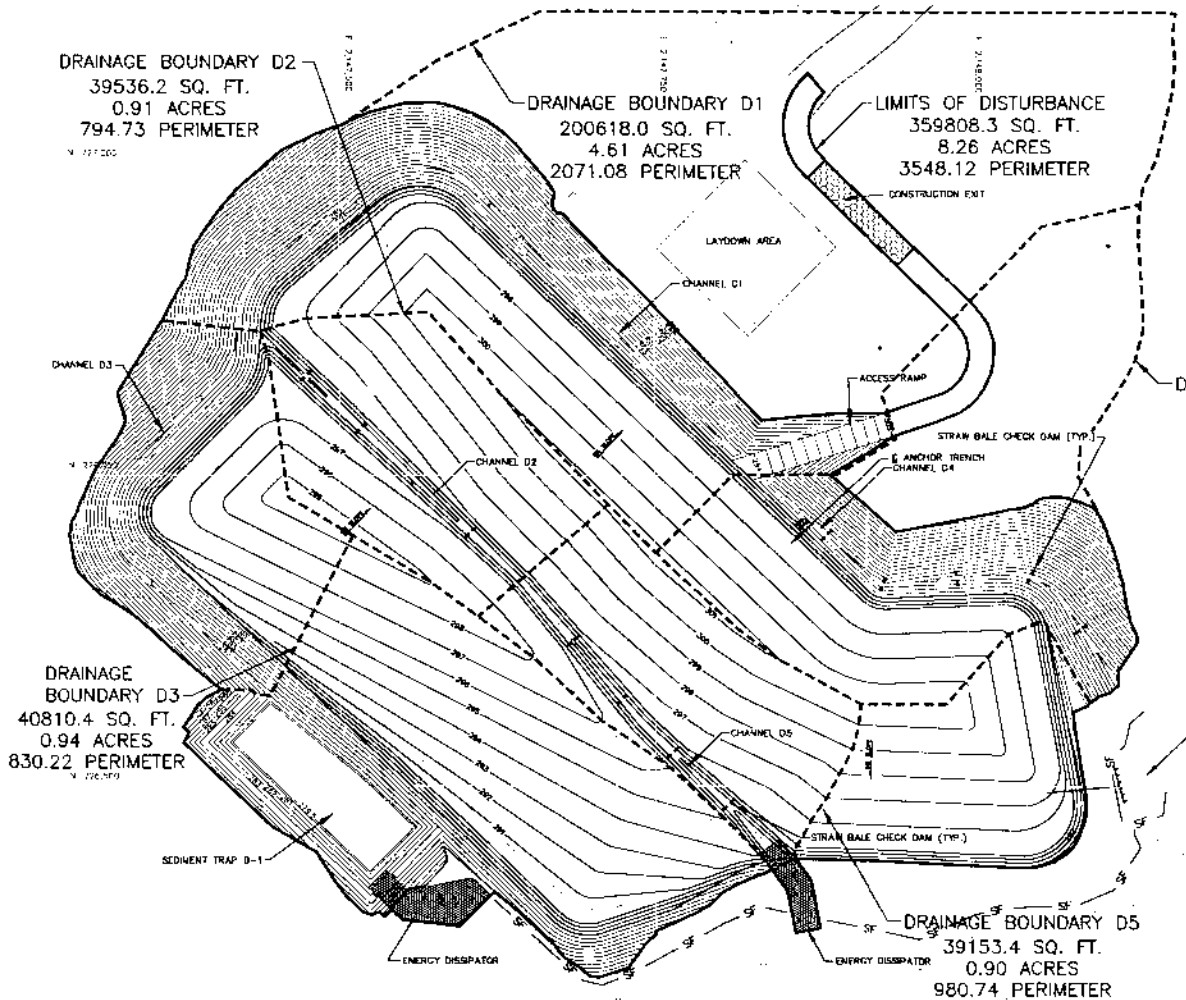
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

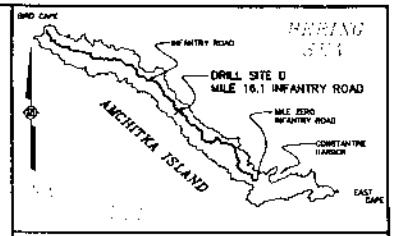
SWPP PLAN SITE MAP
CANNIKIN SITE MUD PITS (SHEET 2 OF 2)
MILE MARKER 10.4 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Gamble	11/3/00	CHECKED BY	D. Stahl	11/30/00
DRAWN BY	C. Jones	11/3/00	APPROVED BY		
SCALE: AS SHOWN	DRAWING NO 799419-B11		SHEET NO 4		REVISION NO. B

OFFICE: Pittsburgh, PA
DRAWING NUMBER: 799419-B11

O:\Project\799419B11.dwg
Plot Date/Time: 11/30/01 04:20pm
Format Revised: 12/15/99
Image:
Xref:





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC..
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMARIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- EXISTING CONTOUR
- 295 — PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD AND CONSTRUCTION EXIT FROM THE MILE MARKER 2 BORROW AREA.
2. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
3. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

SCALE
0 100 200 FEET

REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION/ISSUE
B	11/30/00	DS.	PJI		90% DESIGN SUBMITTAL
A					NOT ISSUED

IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

SWPP PLAN SITE MAP
DRILL SITE D
MILE MARKER 16.1 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Gonnale	11/3/00	CHECKED BY	D. Stein	11/30/00
DRAWN BY	C. Jones	11/3/00	APPROVED BY		

SCALE:	DRAWING NO.	SHEET NO.	REVISION NO.
AS SHOWN	799419-B16	5	B

OFFICE: Pittsburgh, PA | DRAWING NUMBER: 799419-B16

D:\Project\799419B16.dwg
Plot Date/Time: 12/18/01 04:21pm
Format Revised: 12/15/99
Image: Xref:

Attachment A-2

Calculations

(98 Pages)

IT CORPORATION
A Member of The IT Group

Revised: 11-15-00 & 11-16-00

By PMG Date 10-20-00 Subject Channel Design Sheet No. 1 of 89

Chkd. By PJL Date 11-17-00 Amchitka Closure Design Proj. No. 799419

.25 in. X .25 in.

Purpose: To design drainage channels that will carry the flow of a 25-year, 24-hour storm event.

References: 1) SEDCAD 4 for Windows (computer software), © 1998-1999., Pamela J. Schwab.
2) Drawing Nos. 799419, IT Corporation, 2000.
3) Engineering Field Manual for Conservation Practices, U.S. Soil Conservation Service, Washington, DC. July 1954.

Solution:

25-year, 24-hour → 4.6 inches (Reference 3, Sheet 3)

Freeboard for Channels = 0.5 ft

Sites — See Attachment

Rifle Range Road	A	(Sheets 4-16)
Long Shot Site	B	(Sheets 17-23)
Cannikin Site	C	(Sheets 24-36)
Drill Site D	D	(Sheets 37-56)
Drill Site E	E	(Sheets 57-69)
Drill Site F	F	(Sheets 70-82)
Site Maps	G	(Sheets 83-89)

IT CORPORATION
A Member of The IT Group

Revised: 11-15-00 & 11-16-00

By PMG Date 10-20-00 Subject Channel Design Sheet No. 2 of 89

Chkd. By PJL Date 11-17-00 Amchitka Closure Design Proj. No. 799419

.25 in. X .25 in.

Results:

Channel	Shape	Sideslopes	(Minimum Design) Depth	Lining	(Actual Design) Depth	Lining
RR1	Trapezoidal	3:1 & 2:1 (2' bot)	1.23'	grass	3'	grass
RR2	Trapezoidal	2:1 & 3:1 (2' bot)	1.28'	grass	3'	grass
L1	Triangular	3:1	1.80'	grass	3'	grass
C1	Tringular	3:1	1.86'	grass	2'	grass
C2	Triangular	3:1	1.68'	grass	2'	grass
D1	Triangular	3:1	2.42'	grass	>5'	grass
D2	Trapezoidal	3:1 (5' bottom)	1.45'	grass	2'	grass
D3	Triangular	3:1	2.34'	grass	>5'	grass
D4	Triangular	3:1	1.90'	grass	2'	grass
D5	Trapezoidal	3:1 (5' bottom)	1.37'	grass	2'	grass
E1	Triangular	3:1	1.30'	grass	3'	grass
E2	Triangular	3:1	1.33'	grass	1.5'	grass
F1	Triangular	3:1	1.82'	grass	2'	grass
F2	Triangular	3:1	1.41'	grass	2'	grass

ALASKA

25-YEAR 24-HOUR RAINFALL (INCHES)

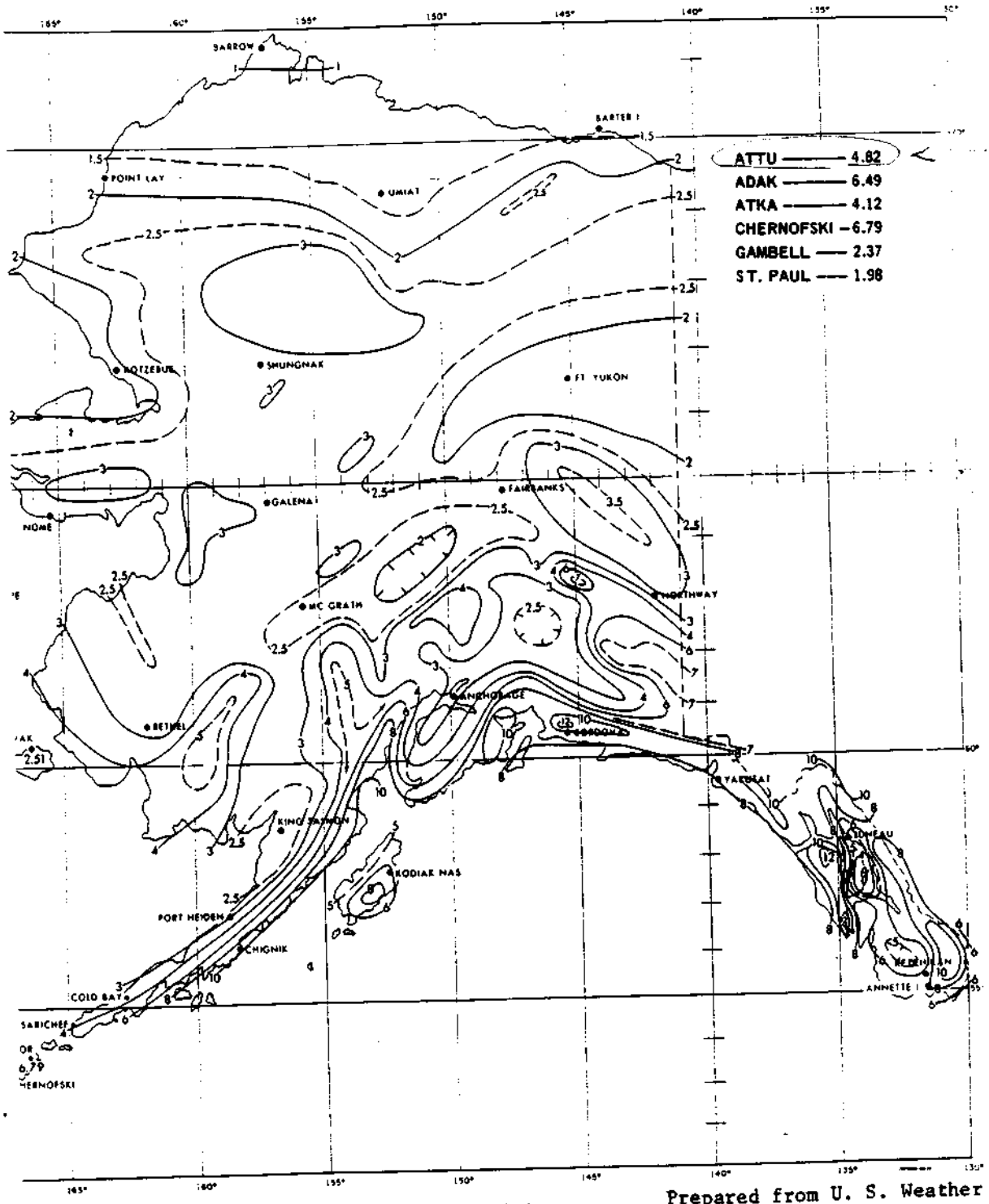


Exhibit 2-4
Sheet 4 of 5

Prepared from U. S. Weather Bureau Maps

CHECKED BY [illegible]

Attachment A

Rifle Range Road

Amchitka Closure Design
Amchitka Island, Alaska

Rifle Range Road
Channel RR1

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

General Information

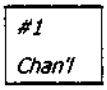
Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

SEDCAD 4 for Windows

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel RR1



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.180	0.180	0.40	0.04

Structure Detail:

Structure #1 (Vegetated Channel)

Channel RR1

Trapezoidal Vegetated Channel Inputs:

Material: Annuals for temp protection

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
2.00	3.0:1	2.0:1	1.0	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	0.40 cfs		0.40 cfs	
Depth:	0.30 ft	0.80 ft	0.73 ft	1.23 ft
Top Width:	3.50 ft	6.00 ft	5.64 ft	8.14 ft
Velocity:	0.49 fps		0.14 fps	
X-Section Area:	0.82 sq ft		2.78 sq ft	
Hydraulic Radius:	0.228		0.470	
Froude Number:	0.18		0.04	
Roughness Coefficient:	0.1141		0.6230	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.180	0.017	0.000	0.000	79.000	TR55	0.40	0.040
		0.180						**0.40**	**0.040**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	5.00	3.75	75.00	2.230	0.009
		8. Large gullies, diversions, and low flowing streams	1.00	0.90	90.00	3.000	0.008
#1	**1**	**Time of Concentration:**					**0.017**

Amchitka Closure Design
Amchitka Island, Alaska

Rifle Range Road

Channel RR2

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

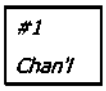
General Information

Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel RR2



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.230	0.230	0.51	0.05

Structure Detail:

Structure #1 (Vegetated Channel)

Channel RR2

Trapezoidal Vegetated Channel Inputs:

Material: Annuals for temp protection

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
2.00	2.0:1	3.0:1	1.0	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	0.51 cfs		0.51 cfs	
Depth:	0.33 ft	0.83 ft	0.78 ft	1.28 ft
Top Width:	3.66 ft	6.16 ft	5.90 ft	8.40 ft
Velocity:	0.55 fps		0.17 fps	
X-Section Area:	0.94 sq ft		3.08 sq ft	
Hydraulic Radius:	0.248		0.497	
Froude Number:	0.19		0.04	
Roughness Coefficient:	0.1074		0.5611	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.230	0.013	0.000	0.000	79.000	TR55	0.51	0.051
	---	**0.230**						**0.51**	**0.051**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	5.00	4.00	80.00	2.230	0.009
		8. Large gullies, diversions, and low flowing streams	1.00	0.50	50.00	3.000	0.004
#1	**1**	**Time of Concentration:**					**0.013**

CHK'D BY RJC
11/7/00

Attachment B

Long Shot Site

Amchitka Closure Design
Amchitka Island, Alaska

Long Shot Site

Channel L1

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

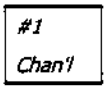
General Information

Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel L1



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.660	0.660	1.47	0.15

Structure Detail:

Structure #1 (Vegetated Channel)

Channel L1

Triangular Vegetated Channel Inputs:

Material: Annuals for temp protection

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	3.0:1	1.0	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	1.47 cfs		1.47 cfs	
Depth:	0.74 ft	1.24 ft	1.30 ft	1.80 ft
Top Width:	4.45 ft	7.45 ft	7.82 ft	10.82 ft
Velocity:	0.89 fps		0.29 fps	
X-Section Area:	1.65 sq ft		5.10 sq ft	
Hydraulic Radius:	0.351		0.619	
Froude Number:	0.26		0.06	
Roughness Coefficient:	0.0830		0.3744	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.660	0.028	0.000	0.000	79.000	TR55	1.47	0.146
		0.660						**1.47**	**0.146**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	5.00	4.00	80.00	2.230	0.009
		5. Nearly bare and untilled, and alluvial valley fans	33.00	3.96	12.00	5.740	0.000
		8. Large gullies, diversions, and low flowing streams	1.00	2.14	215.00	3.000	0.019
#1	**1**	**Time of Concentration:**					**0.028**

Attachment C

Cannikin Site

Amchitka Closure Design
Amchitka Island, Alaska

Cannikin Site

Channel C1

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

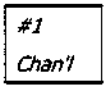
General Information

Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel C1



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.790	0.790	1.76	0.17

Structure Detail:

Structure #1 (Vegetated Channel)

Channel C1

Triangular Vegetated Channel Inputs:

Material: Annuals for temp protection

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	3.0:1	1.0	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	1.76 cfs		1.76 cfs	
Depth:	0.78 ft	1.28 ft	1.36 ft	1.86 ft ←
Top Width:	4.69 ft	7.69 ft	8.14 ft	11.14 ft
Velocity:	0.96 fps		0.32 fps	
X-Section Area:	1.83 sq ft		5.52 sq ft	
Hydraulic Radius:	0.371		0.644	
Froude Number:	0.27		0.07	
Roughness Coefficient:	0.0799		0.3478	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.790	0.045	0.000	0.000	79.000	TR55	1.76	0.174
		0.790						**1.76**	**0.174**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	11.00	4.94	44.90	3.310	0.003
		5. Nearly bare and untilled, and alluvial valley fans	8.30	4.98	59.99	2.880	0.005
		5. Nearly bare and untilled, and alluvial valley fans	6.00	3.00	50.00	2.440	0.005
		8. Large gullies, diversions, and low flowing streams	1.00	3.55	355.00	3.000	0.032
#1	**1**	**Time of Concentration:**					**0.045**

Amchitka Closure Design
Amchitka Island, Alaska

Cannikin Site

Channel C2

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

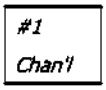
General Information

Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel C2



SEDCAD 4 for Windows

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.530	0.530	1.18	0.12

Structure Detail:

Structure #1 (Vegetated Channel)

Channel C2

Triangular Vegetated Channel Inputs:

Material: Annuals for temp protection

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	3.0:1	1.3	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	1.18 cfs		1.18 cfs	
Depth:	0.66 ft	1.16 ft	1.18 ft	1.68 ft
Top Width:	3.98 ft	6.98 ft	7.07 ft	10.07 ft
Velocity:	0.90 fps		0.28 fps	
X-Section Area:	1.32 sq ft		4.17 sq ft	
Hydraulic Radius:	0.314		0.559	
Froude Number:	0.27		0.07	
Roughness Coefficient:	0.0858		0.3985	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.530	0.027	0.000	0.000	79.000	TR55	1.18	0.117
		0.530						**1.18**	**0.117**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	10.00	2.50	25.00	3.160	0.002
		5. Nearly bare and untilled, and alluvial valley fans	6.00	3.00	50.00	2.440	0.005
		8. Large gullies, diversions, and low flowing streams	1.25	1.50	120.00	3.350	0.009
		8. Large gullies, diversions, and low flowing streams	1.65	2.64	160.00	3.850	0.011
#1	**1**	**Time of Concentration:**					**0.027**

Attachment D

Drill Site D

Amchitka Closure Design
Amchitka Island, Alaska

Drill Site D

Channels D1, D2 and D3

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

General Information

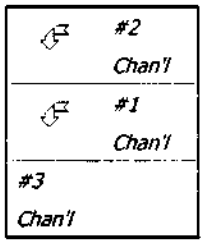
Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

SEDCAD 4 for Windows

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	#3	0.030	0.342	Channel D1
Channel	#2	==>	#3	0.030	0.342	Channel D2
Channel	#3	==>	End	0.000	0.000	Channel D3



Structure Routing Details:

Stru #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	8. Large gullies, diversions, and low flowing streams	1.50	6.00	400.00	3.67	0.030
#1	**Muskingum K:**					**0.030**
#2	8. Large gullies, diversions, and low flowing streams	1.50	6.00	400.00	3.67	0.030
#2	**Muskingum K:**					**0.030**

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2	0.910	0.910	2.03	0.20
#1	4.610	4.610	8.49	1.02
#3	0.940	6.460	10.71	1.43

Structure Detail:

Structure #2 (Vegetated Channel)

Channel D2

Trapezoidal Vegetated Channel Inputs:

Material: Annuals for temp protection

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
5.00	3.0:1	3.0:1	0.8	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	2.03 cfs		2.03 cfs	
Depth:	0.44 ft	0.94 ft	0.95 ft	1.45 ft
Top Width:	7.62 ft	10.62 ft	10.72 ft	13.72 ft
Velocity:	0.74 fps		0.27 fps	
X-Section Area:	2.76 sq ft		7.50 sq ft	
Hydraulic Radius:	0.355		0.680	
Froude Number:	0.22		0.06	
Roughness Coefficient:	0.0878		0.3685	

Structure #1 (Vegetated Channel)

Channel D1

Triangular Vegetated Channel Inputs:

Material: Annuals for temp protection

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	3.0:1	1.0	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	8.49 cfs		8.49 cfs	
Depth:	1.24 ft	1.74 ft	1.92 ft	2.42 ft ←
Top Width:	7.45 ft	10.45 ft	11.53 ft	14.53 ft
Velocity:	1.84 fps		0.77 fps	
X-Section Area:	4.62 sq ft		11.07 sq ft	
Hydraulic Radius:	0.589		0.911	
Froude Number:	0.41		0.14	
Roughness Coefficient:	0.0569		0.1826	

Structure #3 : Vegetated Channel

Channel D3

Triangular Vegetated Channel Inputs:

Material: Annuals for temp protection

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	3.0:1	1.5	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	10.71 cfs		10.71 cfs	
Depth:	1.22 ft	1.72 ft	1.84 ft	2.34 ft ←
Top Width:	7.32 ft	10.32 ft	11.04 ft	14.04 ft
Velocity:	2.40 fps		1.05 fps	
X-Section Area:	4.47 sq ft		10.16 sq ft	
Hydraulic Radius:	0.579		0.873	
Froude Number:	0.54		0.19	
Roughness Coefficient:	0.0528		0.1580	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.910	0.042	0.000	0.000	79.000	TR55	2.03	0.201
	--	**0.910**						**2.03**	**0.201**
#1	1	4.610	0.169	0.000	0.000	79.000	TR55	8.49	1.017
	--	**4.610**						**8.49**	**1.017**
#3	1	0.940	0.032	0.000	0.000	79.000	TR55	2.10	0.207
	--	**6.460**						**10.71**	**1.425**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	1.00	2.39	240.00	1.000	0.066
		5. Nearly bare and untilled, and alluvial valley fans	33.00	7.92	24.00	5.740	0.001
		5. Nearly bare and untilled, and alluvial valley fans	1.00	2.00	200.00	1.000	0.055
		5. Nearly bare and untilled, and alluvial valley fans	33.00	7.92	24.00	5.740	0.001
		8. Large gullies, diversions, and low flowing streams	1.00	5.00	500.00	3.000	0.046
#1	**1**	**Time of Concentration:**					**0.169**
#2	1	5. Nearly bare and untilled, and alluvial valley fans	5.00	4.25	85.00	2.230	0.010
		8. Large gullies, diversions, and low flowing streams	0.75	2.25	300.00	2.590	0.032
#2	**1**	**Time of Concentration:**					**0.042**
#3	1	5. Nearly bare and untilled, and alluvial valley fans	5.00	3.75	75.00	2.230	0.009
		5. Nearly bare and untilled, and alluvial valley fans	33.00	6.93	20.99	5.740	0.001
		8. Large gullies, diversions, and low flowing streams	1.50	4.50	300.00	3.670	0.022
#3	**1**	**Time of Concentration:**					**0.032**

Amchitka Closure Design
Amchitka Island, Alaska

Drill Site D

Channel D4

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

General Information

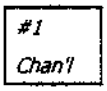
Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

CHK'D 1/17/03

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel D4



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	1.900	1.900	4.24	0.42

Structure Detail:

Structure #1 (Vegetated Channel)

Channel D4

Triangular Vegetated Channel Inputs:

Material: Annuals for temp protection

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	3.0:1	2.0	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	4.24 cfs		4.24 cfs	
Depth:	0.87 ft	1.37 ft	1.40 ft	1.90 ft
Top Width:	5.24 ft	8.24 ft	8.41 ft	11.41 ft
Velocity:	1.85 fps		0.72 fps	
X-Section Area:	2.29 sq ft		5.89 sq ft	
Hydraulic Radius:	0.415		0.665	
Froude Number:	0.49		0.15	
Roughness Coefficient:	0.0632		0.2229	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	1.900	0.107	0.000	0.000	79.000	TR55	4.24	0.419
		1.900						**4.24**	**0.419**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	1.00	1.35	135.00	1.000	0.037
		5. Nearly bare and untilled, and alluvial valley fans	33.00	7.92	24.00	5.740	0.001
		5. Nearly bare and untilled, and alluvial valley fans	1.00	2.00	200.00	1.000	0.055
		5. Nearly bare and untilled, and alluvial valley fans	33.00	9.90	30.00	5.740	0.001
		8. Large gullies, diversions, and low flowing streams	2.00	4.00	200.00	4.240	0.013
#1	**1**	**Time of Concentration:**					**0.107**

Amchitka Closure Design

Amchitka Island, Alaska

Drill Site D

Channel D5

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

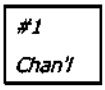
General Information

Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel D5



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.900	0.900	2.01	0.20

Structure Detail:

Structure #1 (Vegetated Channel)

Channel D5

Trapezoidal Vegetated Channel Inputs:

Material: Annuals for temp protection

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
5.00	3.0:1	3.0:1	1.0	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	2.01 cfs		2.01 cfs	
Depth:	0.40 ft	0.90 ft	0.87 ft	1.37 ft
Top Width:	7.39 ft	10.39 ft	10.22 ft	13.22 ft
Velocity:	0.81 fps		0.30 fps	
X-Section Area:	2.47 sq ft		6.62 sq ft	
Hydraulic Radius:	0.329		0.630	
Froude Number:	0.25		0.07	
Roughness Coefficient:	0.0873		0.3612	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.900	0.034	0.000	0.000	79.000	TR55	2.01	0.199
	–	**0.900**						**2.01**	**0.199**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	5.00	4.25	85.00	2.230	0.010
		8. Large gullies, diversions, and low flowing streams	1.30	3.90	300.00	3.420	0.024
#1	**1**	**Time of Concentration:**					**0.034**

Attachment E

Drill Site E

Amchitka Closure Design
Amchitka Island, Alaska

Drill Site E

Channel E1

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

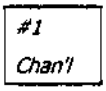
General Information

Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel E1



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.390	0.390	0.87	0.09

Structure Detail:

Structure #1 (Vegetated Channel)

Channel E1

Triangular Vegetated Channel Inputs:

Material: Annuals for temp protection

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	3.0:1	5.0	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	0.87 cfs		0.87 cfs	
Depth:	0.45 ft	0.95 ft	0.80 ft	1.30 ft ←
Top Width:	2.71 ft	5.71 ft	4.78 ft	7.78 ft
Velocity:	1.42 fps		0.46 fps	
X-Section Area:	0.61 sq ft		1.91 sq ft	
Hydraulic Radius:	0.214		0.378	
Froude Number:	0.53		0.13	
Roughness Coefficient:	0.0839		0.3811	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.390	0.026	0.000	0.000	79.000	TR55	0.87	0.086
	—	**0.390**						**0.87**	**0.086**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	12.50	10.00	80.00	3.530	0.006
		5. Nearly bare and untilled, and alluvial valley fans	5.60	5.04	90.00	2.360	0.010
		5. Nearly bare and untilled, and alluvial valley fans	9.00	4.94	54.88	3.000	0.005
		8. Large gullies, diversions, and low flowing streams	6.50	9.09	140.00	7.640	0.005
#1	**1**	**Time of Concentration:**					**0.026**

Amchitka Closure Design
Amchitka Island, Alaska

Drill Site E

Channel E2

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

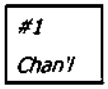
General Information

Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel E2



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.420	0.420	0.94	0.09

Structure Detail:

Structure #1 (Vegetated Channel)

Channel E2

Triangular Vegetated Channel Inputs:

Material: Annuals for temp protection

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	3.0:1	4.5	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	0.94 cfs		0.94 cfs	
Depth:	0.47 ft	0.97 ft	0.83 ft	1.33 ft ←
Top Width:	2.83 ft	5.83 ft	4.98 ft	7.98 ft
Velocity:	1.40 fps		0.45 fps	
X-Section Area:	0.67 sq ft		2.07 sq ft	
Hydraulic Radius:	0.224		0.394	
Froude Number:	0.51		0.12	
Roughness Coefficient:	0.0831		0.3744	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.420	0.041	0.000	0.000	79.000	TR55	0.94	0.093
		0.420						**0.94**	**0.093**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	8.30	9.96	120.00	2.880	0.011
		5. Nearly bare and untilled, and alluvial valley fans	12.50	10.00	80.00	3.530	0.006
		5. Nearly bare and untilled, and alluvial valley fans	5.00	5.00	100.00	2.230	0.012
		5. Nearly bare and untilled, and alluvial valley fans	7.00	4.90	70.00	2.640	0.007
		5. Nearly bare and untilled, and alluvial valley fans	10.00	1.00	10.00	3.160	0.000
		8. Large gullies, diversions, and low flowing streams	4.50	5.40	120.00	6.360	0.005
#1	**1**	**Time of Concentration:**					**0.041**

CHK'D BY
11/17/00

Attachment F

Drill Site F

Amchitka Closure Design
Amchitka Island, Alaska

Drill Site F

Channel F1

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

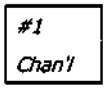
General Information

Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel F1



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	1.140	1.140	2.54	0.25

Structure Detail:

Structure #1 : Vegetated Channel

Channel F1

Triangular Vegetated Channel Inputs:

Material: Annuals for temp protection

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	3.0:1	1.6	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	2.54 cfs		2.54 cfs	
Depth:	0.79 ft	1.29 ft	1.32 ft	1.82 ft ←
Top Width:	4.73 ft	7.73 ft	7.91 ft	10.91 ft
Velocity:	1.36 fps		0.49 fps	
X-Section Area:	1.86 sq ft		5.21 sq ft	
Hydraulic Radius:	0.374		0.625	
Froude Number:	0.38		0.11	
Roughness Coefficient:	0.0716		0.2824	

SEDCAD 4 for Windows

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	1.140	0.041	0.000	0.000	79.000	TR55	2.54	0.251
		1.140						**2.54**	**0.251**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	4.20	5.04	120.00	2.040	0.016
		5. Nearly bare and untilled, and alluvial valley fans	5.90	5.01	84.91	2.420	0.009
		5. Nearly bare and untilled, and alluvial valley fans	10.00	5.00	50.00	3.160	0.004
		8. Large gullies, diversions, and low flowing streams	1.60	2.80	175.00	3.790	0.012
#1	**1**	**Time of Concentration:**					**0.041**

Amchitka Closure Design
Amchitka Island, Alaska

Drill Site F

Channel F2

P.M. Gamble

IT Corporation
2790 Mosside Boulevard
Monroeville, PA 15146

Phone: 412-372-7701

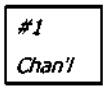
General Information

Storm Information:

Storm Type:	NRCS Type I
Design Storm:	25 yr - 24 hr
Rainfall Depth:	4.820 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Channel	#1	==>	End	0.000	0.000	Channel F2



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.230	0.230	0.51	0.05

Structure Detail:

Structure #1 (Vegetated Channel)

Channel F2

Triangular Vegetated Channel Inputs:

Material: Annuals for temp protection

Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Retardance Classes	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
3.0:1	3.0:1	1.7	D, B	0.50			2.5

Vegetated Channel Results:

	Stability Class D w/o Freeboard	Stability Class D w/ Freeboard	Capacity Class B w/o Freeboard	Capacity Class B w/ Freeboard
Design Discharge:	0.51 cfs		0.51 cfs	
Depth:	0.49 ft	0.99 ft	0.91 ft	1.41 ft
Top Width:	2.92 ft	5.92 ft	5.47 ft	8.47 ft
Velocity:	0.72 fps		0.21 fps	
X-Section Area:	0.71 sq ft		2.50 sq ft	
Hydraulic Radius:	0.231		0.433	
Froude Number:	0.26		0.05	
Roughness Coefficient:	0.1007		0.5402	

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.230	0.016	0.000	0.000	79.000	TR55	0.51	0.051
		0.230						**0.51**	**0.051**

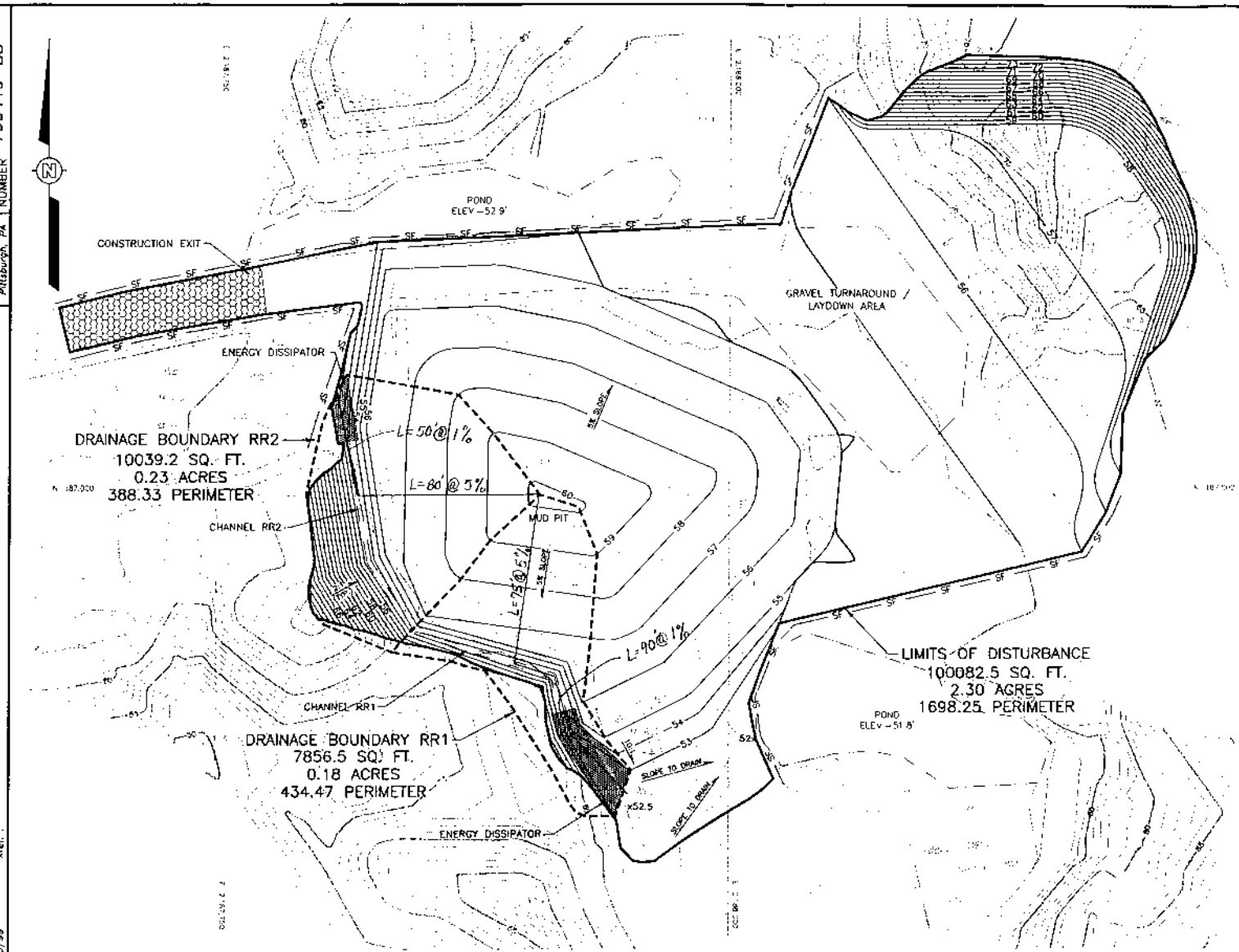
Subwatershed Time of Concentration Details:

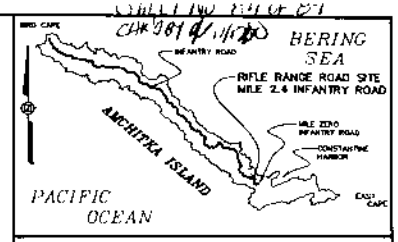
Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	5. Nearly bare and untilled, and alluvial valley fans	5.60	5.04	90.00	2.360	0.010
		5. Nearly bare and untilled, and alluvial valley fans	33.00	4.95	15.00	5.740	0.000
		8. Large gullies, diversions, and low flowing streams	1.70	1.53	90.00	3.910	0.006
#1	**1**	**Time of Concentration:**					**0.016**

Attachment G

Site Maps

OFFICE Pittsburgh, PA | DRAWING NUMBER 799419-88





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC.
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-661, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD AND CONSTRUCTION EXIT FROM THE MILE MARKER 2 BORROW AREA.
2. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
3. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

CHECKPRINT No. 4
DRAFTED BY: GS/... DATE: 11/13/00
CHECKED BY:..... DATE:.....
CHANGE AS NOTED: ☐
O.K. FOR REPRODUCTION ☐

SCALE
0 50 100 FEET

REV	DATE	BY	CHK'D/APPVD	DESCRIPTION/ISSUE

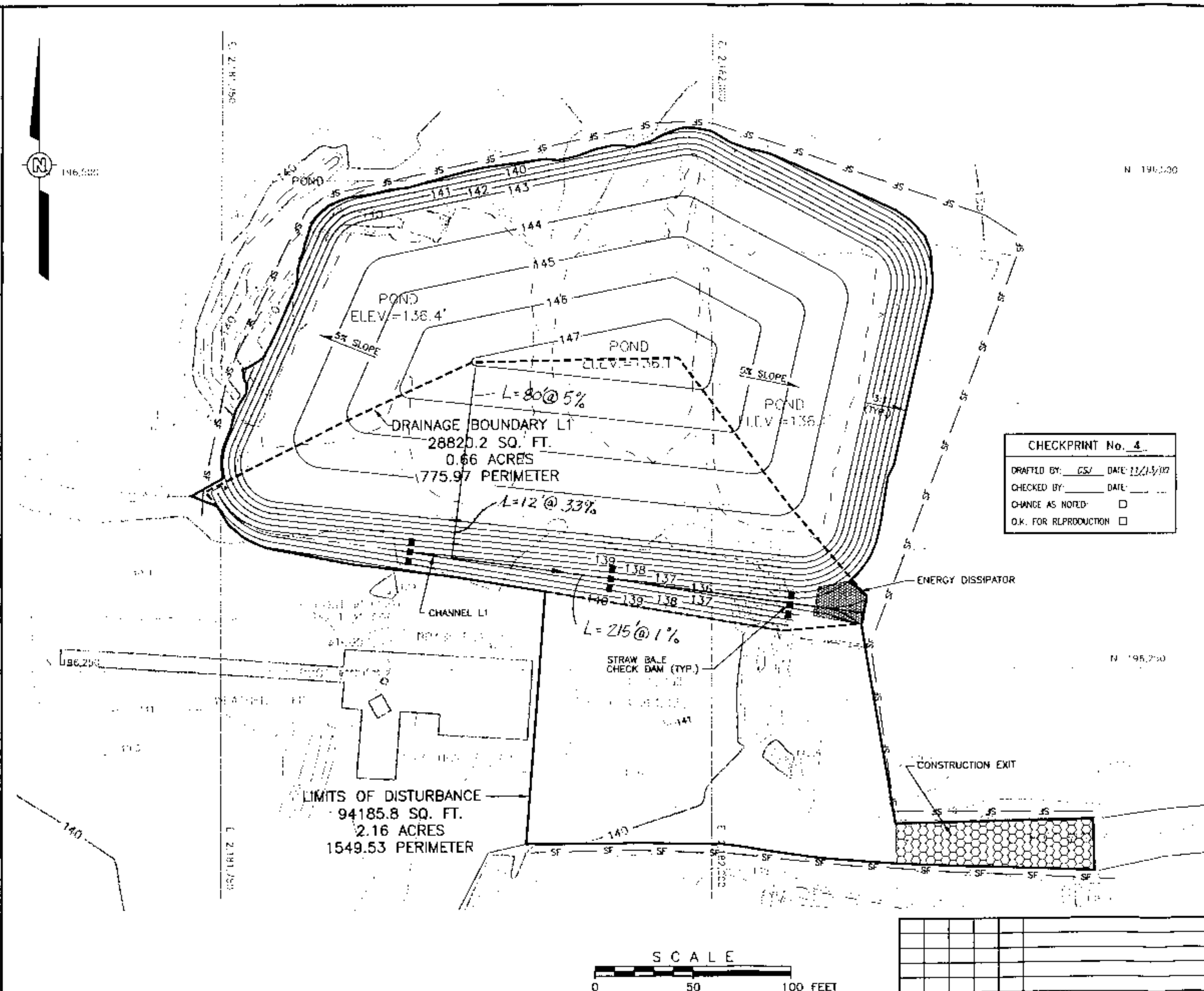
IT CORPORATION

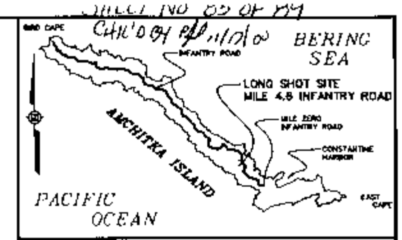
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

SWPP PLAN SITE MAP
RIFLE RANGE ROAD SITE MUD PIT
MILE MARKER 2.4 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Gamble	11/3/00	CHECKED BY	--	--
DRAWN BY	G. Jones	11/3/00	APPROVED BY	--	--
SCALE: AS SHOWN	DRAWING NO. 799419-88		SHEET NO. 1		REVISION NO. --

Q:\Project\799419\799419B8.dwg
Plot Date/Time: 11/02/00 10:32am
Format Revised: 12/15/99
Image:
Xref:





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC.
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

CHECKPRINT No. 4
DRAFTED BY: CSJ DATE: 11/13/00
CHECKED BY: ____ DATE: ____
CHANGE AS NOTED: ☐
O.K. FOR REPRODUCTION ☐

LEGEND

- — SF — SILT FENCE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD AND CONSTRUCTION EXIT FROM THE MILE MARKER 2 BORROW AREA.
2. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
3. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

IT CORPORATION

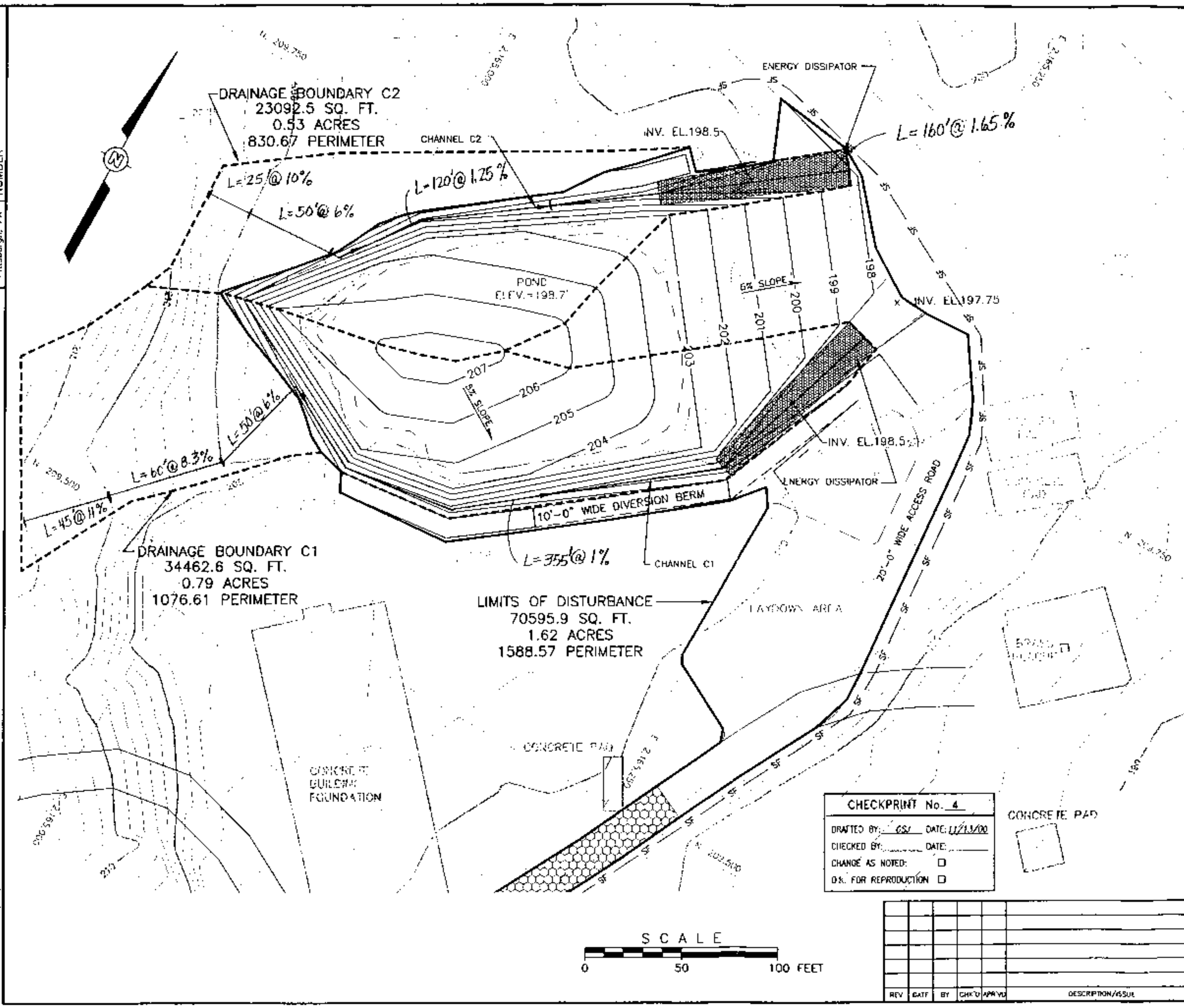
SWPP PLAN SITE MAP
LONG SHOT SITE MUD PITS
MILE MARKER 4.6 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

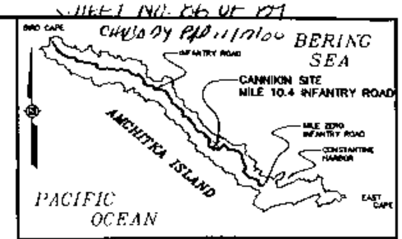
DESIGNED BY	P. Gamble	11/3/00	CHECKED BY	--
DRAWN BY	C. Jones	11/3/00	APPROVED BY	--
SCALE: AS SHOWN	DRAWING NO: 799419-B9		SHEET NO: 2	REVISION NO: --

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE

OFFICE	DRAWING NUMBER
Pittsburgh, PA	799419-B9

O:\Project\789419\79941989.dwg
Plot Date/Time: 11/02/00 10:30am
Format Revised: 12/15/99
Image:
Xref:





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC..
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- 200 — EXISTING CONTOUR
- 200 — PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD AND CONSTRUCTION EXIT FROM THE MILE MARKER 2 BORROW AREA.
2. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
3. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

DRAFT

CHECKPRINT No. 4	
DRAFTED BY: GSJ	DATE: 11/13/00
CHECKED BY:	DATE:
CHANGE AS NOTED: ☐	
O.K. FOR REPRODUCTION ☐	

IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

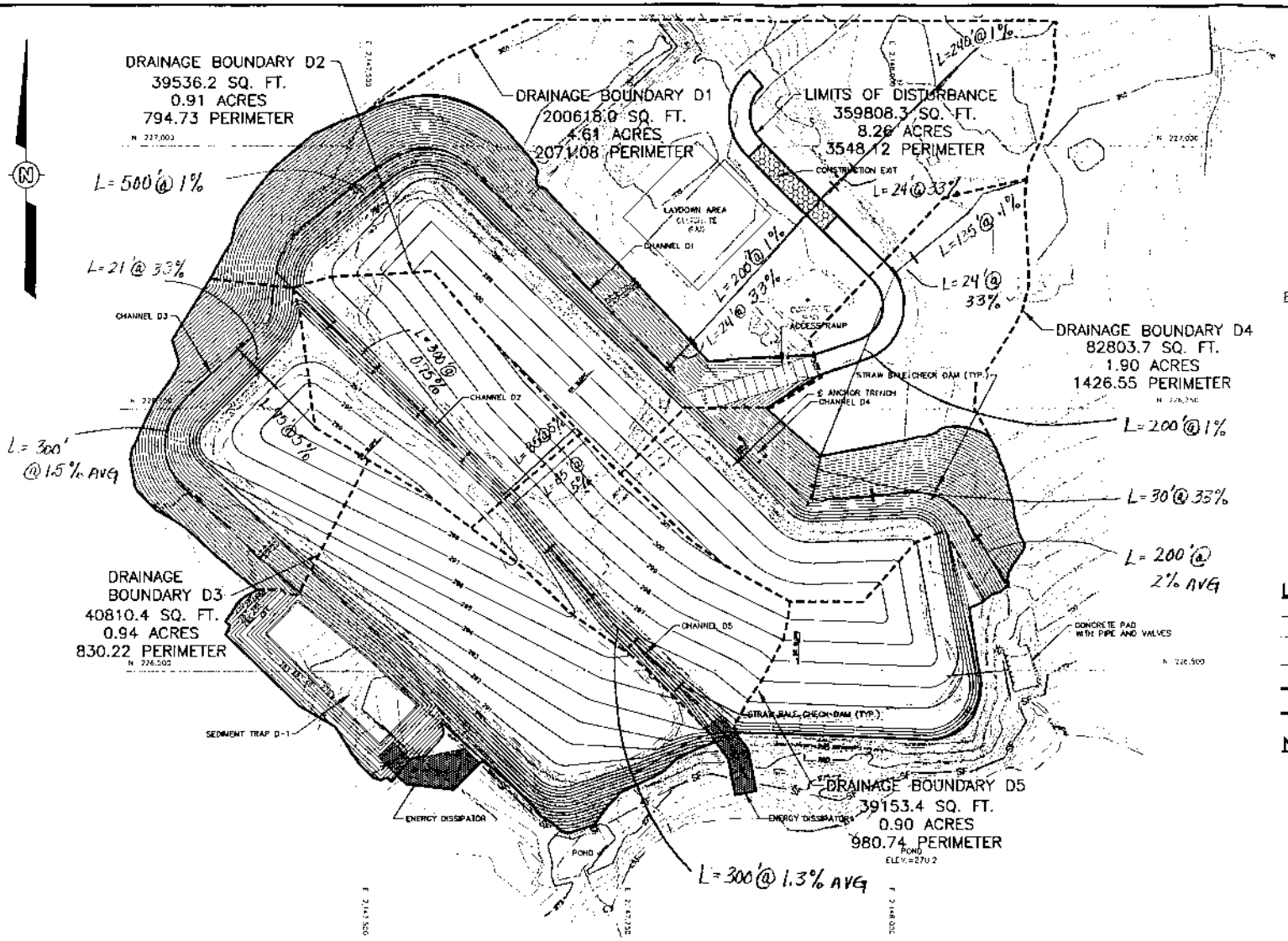
SWPP PLAN SITE MAP
CANNIKIN SITE MUD PITS (SHEET 1 OF 2)
MILE MARKER 10.4 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

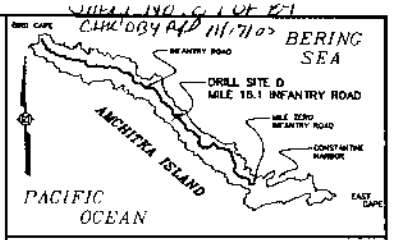
DESIGNED BY	P. Gamble	11/3/00	CHECKED BY	--	--
DRAWN BY	G. Jones	11/3/00	APPROVED BY	--	--
SCALE: AS SHOWN	DRAWING NO. 799419-B10		SHEET NO. 3		REVISION NO. --

REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION/ISSUE

OFFICE Pittsburgh, PA | DRAWING NUMBER 799419-B10

O:\Project\799419\799419B10.dwg
Plot Date/Time: 11/02/00 10:28am
Format Revised: 12/15/99
Image: -
Xref: -





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC..
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- 345 — EXISTING CONTOUR
- 295 — PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD AND CONSTRUCTION EX[illegible] FROM THE MILE MARKER 2 BORROW AREA.
2. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
3. SEE SHEET 10 FOR E[illegible]ON AND SEDIMENT CONTROL DETAILS.

DRAFT

CHECKPRINT No. 5

DRAFTED BY: GSJ DATE: 11/13/00
CHECKED BY: _____ DATE: _____
CHANGE AS NOTED: ☐
O.K. FOR REPRODUCTION ☐

REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION / ISSUE

IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

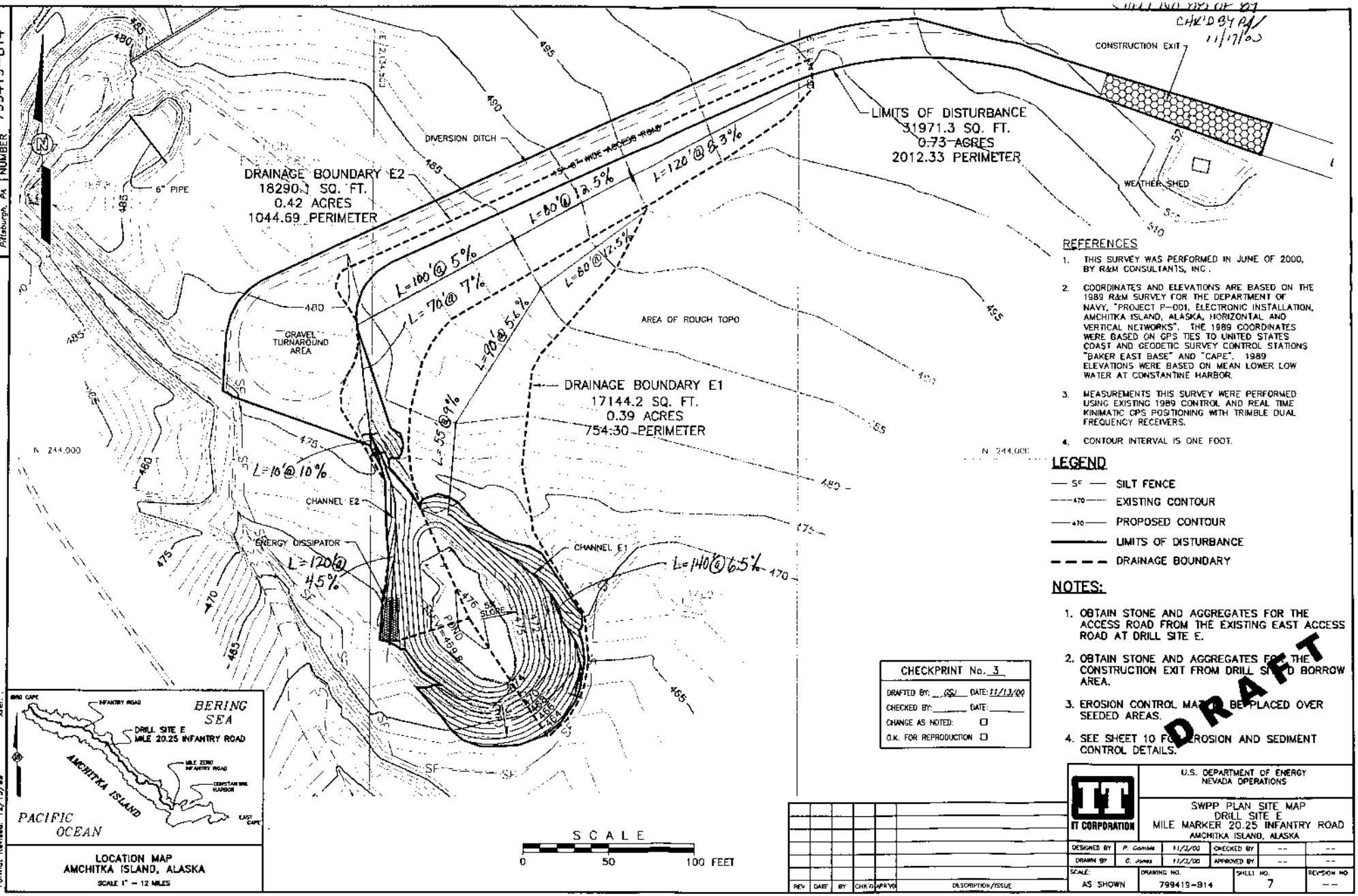
SWPP PLAN SITE MAP
DRILL SITE D
MILE MARKER 16.1 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Gamble	11/3/00	CHECKED BY	--	--
DRAWN BY	G. Jones	11/3/00	APPROVED BY	--	--

SCALE:	DRAWING NO	SHEET NO	REVISION NO.
AS SHOWN	799419-816	5	--

OFFICE: Pittsburgh, PA
DRAWING NUMBER: 799419-816

O:\Project\799419\799419816.dwg
Plot Date/Time: 11/03/00 08:49am
Format Revised: 12/15/99
Image:
Xref:



LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

OFFICE: Pittsburgh, PA
DRAWING NUMBER: 799419-B14

CHK'D BY PA 11/17/00

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC.
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- 470 — EXISTING CONTOUR
- 470 — PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD FROM THE EXISTING EAST ACCESS ROAD AT DRILL SITE E.
2. OBTAIN STONE AND AGGREGATES FOR THE CONSTRUCTION EXIT FROM DRILL SITE E BORROW AREA.
3. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
4. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

DRAFT

CHECKPRINT No. 3		
DRAFTED BY: GSJ	DATE: 11/13/00	
CHECKED BY:	DATE:	
CHANGE AS NOTED:	☐	
O.K. FOR REPRODUCTION	☐	

REV	DATE	BY	CHK'D	APPVD	DESCRIPTION/ISSUE

IT CORPORATION

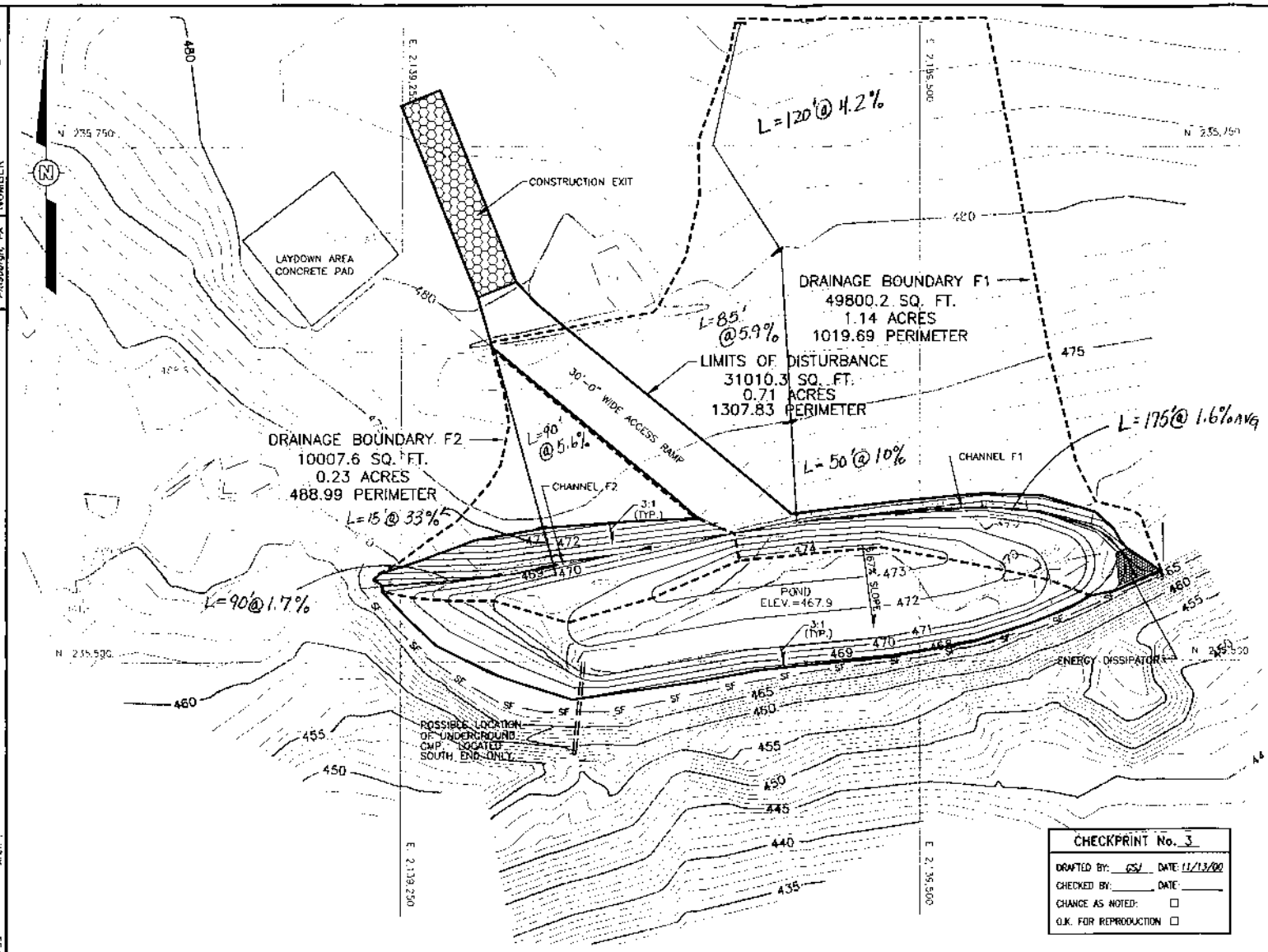
U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

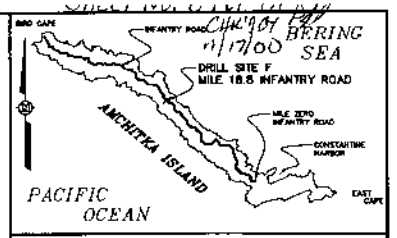
SWPP PLAN SITE MAP
DRILL SITE E
MILE MARKER 20.25 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Gamble	11/1/00	CHECKED BY	--	--
DRAWN BY	C. Jones	11/1/00	APPROVED BY	--	--

SCALE:	DRAWING NO.	SHEET NO.	REVISION NO
AS SHOWN	799419-B14	7	--

Image: .
Xref: .
O:\Project\799419\799419814.dwg
Plot Date/Time: 11/02/00 01:48pm
Format Revised: 12/15/99





LOCATION MAP
AMCHITKA ISLAND, ALASKA
SCALE 1" = 12 MILES

REFERENCES

1. THIS SURVEY WAS PERFORMED IN JUNE OF 2000, BY R&M CONSULTANTS, INC..
2. COORDINATES AND ELEVATIONS ARE BASED ON THE 1989 R&M SURVEY FOR THE DEPARTMENT OF NAVY, "PROJECT P-001, ELECTRONIC INSTALLATION, AMCHITKA ISLAND, ALASKA, HORIZONTAL AND VERTICAL NETWORKS". THE 1989 COORDINATES WERE BASED ON GPS TIES TO UNITED STATES COAST AND GEODETIC SURVEY CONTROL STATIONS "BAKER EAST BASE" AND "CAPE". 1989 ELEVATIONS WERE BASED ON MEAN LOWER LOW WATER AT CONSTANTINE HARBOR.
3. MEASUREMENTS THIS SURVEY WERE PERFORMED USING EXISTING 1989 CONTROL AND REAL TIME KINIMATIC GPS POSITIONING WITH TRIMBLE DUAL FREQUENCY RECEIVERS.
4. CONTOUR INTERVAL IS ONE FOOT.

LEGEND

- SF — SILT FENCE
- 465 — EXISTING CONTOUR
- 455 — PROPOSED CONTOUR
- LIMITS OF DISTURBANCE
- DRAINAGE BOUNDARY

NOTES:

1. OBTAIN STONE AND AGGREGATES FOR THE ACCESS ROAD FROM THE EXISTING EAST ACCESS ROAD AT DRILL SITE E.
2. OBTAIN STONE AND AGGREGATES FOR THE CONSTRUCTION EXIT FROM DRILL SITE E BORROW AREA.
3. EROSION CONTROL MAT TO BE PLACED OVER SEEDED AREAS.
4. SEE SHEET 10 FOR EROSION AND SEDIMENT CONTROL DETAILS.

DRAFT

CHECKPRINT No. 3
DRAFTED BY: GSJ DATE: 11/13/00
CHECKED BY: DATE:
CHANGE AS NOTED: ☐
O.K. FOR REPRODUCTION ☐

REV	DATE	BY	CHK'D	APP'D	DESCRIPTION/ISSUE

IT CORPORATION

U.S. DEPARTMENT OF ENERGY
NEVADA OPERATIONS

SWPP PLAN SITE MAP
DRILL SITE F
MILE MARKER 18.8 INFANTRY ROAD
AMCHITKA ISLAND, ALASKA

DESIGNED BY	P. Gamble	11/3/00	CHECKED BY	--	--
DRAWN BY	C. Jones	11/3/00	APPROVED BY	--	--

SCALE:	DRAWING NO.	SHEET NO.	REVISION NO.
AS SHOWN	799419-813	8	--

OFFICE: Pittsburgh, PA
DRAWING NUMBER: 799419-813

O:\Project\799419\799419813.dwg
Plot Date/Time: 11/02/00 01:16pm
Format Revised: 12/15/99
Image:
Xref:

IT CORPORATION
A Member of The IT Group

By PJI Date 11/06/00 Subject AMCHITKA ISLAND Sheet No. 1 of 3

Chkd. By PMG Date 11-16-00 ENERGY DISSIPATOR DESIGN Proj. No. 799419

.25 in. X .25 in.

PURPOSE: THE PURPOSE OF THE FOLLOWING CALCULATION IS TO DETERMINE THE SIZE OF THE ENERGY DISSIPATORS LOCATED AT THE END OF VARIOUS CHANNELS

GIVEN: CHANNEL DESIGN CALCULATIONS BY PMG DATED 10-20-00

REFERENCES: 1) EROSION AND SEDIMENT POLLUTION CONTROL MANUAL, PADEP, 2000

SOLUTION:

SITE	CHANNEL	SHAPE	SIDESLOPES	DESIGN DEPTH	FLOW (CFS)
RIFLE RANGE ROAD	RR1	TRAP - 2FT BOT	3:1 & 2:1	1.3 FT	0.40
	RR2	TRAP - 2FT BOT	3:1 & 2:1	1.3 FT	0.51
LONG SHOT	L1	TRIANGULAR	3:1	1.6 FT	1.47
CANNIKIN	C1	TRIANGULAR	3:1	1.9 FT	1.76
	C2	TRIANGULAR	3:1	1.7 FT	1.18
DRILL SITE D	D5	TRAP - 5 FT BOT	3:1	1.4 FT	2.01
DRILL SITE E	E2	TRIANGULAR	3:1	1.4 FT	0.94
DRILL SITE F	F1	TRIANGULAR	3:1	1.9 FT	2.54

IT CORPORATION
A Member of The IT Group

By PJI Date 11/06/00 Subject AMCHITKA ISLAND Sheet No. 2 of 3

Chkd. By PNG Date 11-16-00 ENERGY DISSIPATOR DESIGN Proj. No. 799419

.25 in. X .25 in.

ALL CHANNEL FLOW ARE LESS THE 4 CFS; THEREFORE, 4CFS WILL BE THE DESIGN FLOW FOR ALL DISSIPATORS. FOR SHEET 3 OF 3

THE MINIMUM LENGTH, $L_j = 7^{FT}$ USE 10^{FT} MIN

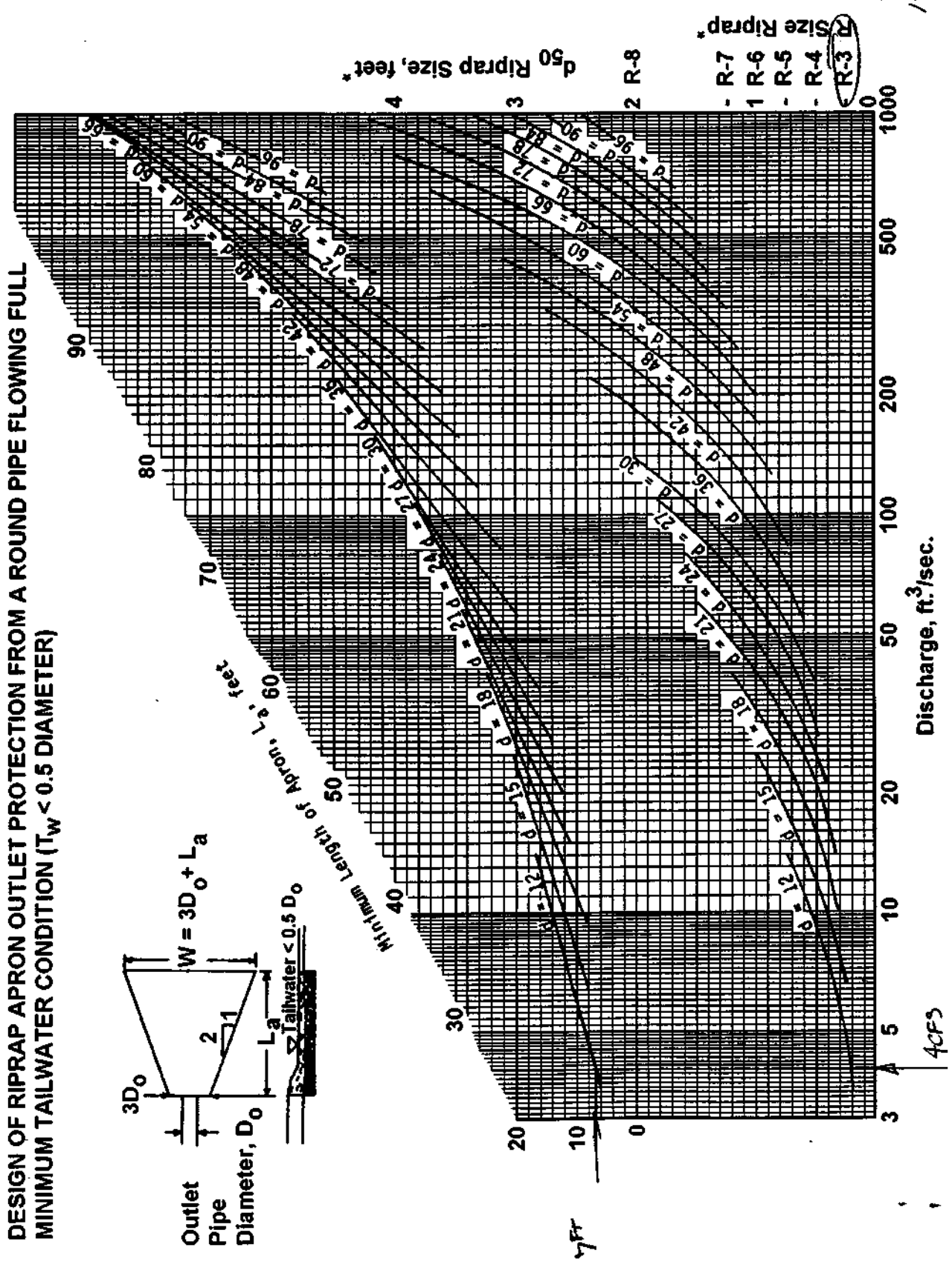
MIN WIDTH WILL EQUAL CHANNEL WIDTH THEREFORE

CHANNEL	DEPTH	BOT.	S1	S2	WIDTH (MIN)
BR1	1.3'	2	3:1	2:1	$W = 1.3'(3+2)+2 = 8.5^{FT}$ USE 10^{FT}
BR2	1.3'	2	3:1	2:1	$W = 1.3(3+2)+2 = 8.5^{FT}$ USE 10^{FT}
L1	1.8'	0	3:1	3:1	$W = 1.8'(3+3)+0 = 10.8^{FT}$ USE 12^{FT}
C1	1.9'	0	3:1	3:1	$W = 1.9'(3+3)+0 = 11.4^{FT}$ USE 12^{FT}
C2	1.7'	0	3:1	3:1	$W = 1.7'(3+3)+0 = 10.2^{FT}$ USE 12^{FT}
D5	1.4'	5	3:1	3:1	$W = 1.4'(3+3)+5^{FT} = 13.4^{FT}$ USE 15^{FT}
E2	1.4'	0	3:1	3:1	$W = 1.4'(3+3)+0 = 8.4^{FT}$ USE 10^{FT}
F1	1.9'	0	3:1	3:1	$W = 1.9'(3+3)+0 = 11.4^{FT}$ USE 12^{FT}

Checked By: PMG 11-16-00

SHEET NO. 5 OF 3 (REF 1)

FIGURE 21
Riprap Apron Design, Minimum Tailwater Condition



* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

IT CORPORATION
A Member of The IT Group

By PJI Date 10/17/00 Subject AMCHITKA ISLAND Sheet No. 1 of 6

Chkd. By PMG Date 11-14-00 SEDIMENT TRAP DESIGN Proj. No. 799419

.25 in. X .25 in.

PURPOSE: THE PURPOSE OF THE FOLLOWING CALCULATION IS TO DESIGN THE SEDIMENT TRAP TO BE INSTALLED AT DRILL SITE D.

GIVEN: APPROXIMATE DRAINAGE AREA = 4.5 ACRES (SHEET NO. 5 OF 6)
BASIC CONFIGURATION SHOWN OF IT DWG NO. 799419 – EC (SHEET NO 6 OF 6)
$A_{279.5} = 7185\ SF$
$A_{263} = 11715\ SF$

REFERENCES:

1) EROSION AND SEDIMENT CONTROL AND MATERIALS CONTAINMENT GUIDANCE MANUAL, MUNICIPALITY OF ANCHORAGE, JANUARY 1998

2) 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, MDE, 1994

SOLUTION:

FROM REFERENCE 1), THE SEDIMENT TRAP SHALL BE DESIGNED TO MEET THE FOLLOWING REQUIREMENTS:

- 1,800 CF OF STORAGE PLUS 1.5 FT OF SEDIMENT STORAGE
- SURFACE AREA OF 2,000 SQUARE FEET PER CFS
- SIDE SLOPES 3H:1V (MAXIMUM)
- LENGTH TO WIDTH RATIO = 3:1
- BOTTOM LEVEL

IT CORPORATION
A Member of The IT Group

By PJI Date 10/19/00 Subject AMCHITKA ISLAND Sheet No. 2 of 6

Chkd. By PMG Date 11-14-00 SEDIMENT TRAP DESIGN Proj. No. 799419

.25 in. X .25 in.

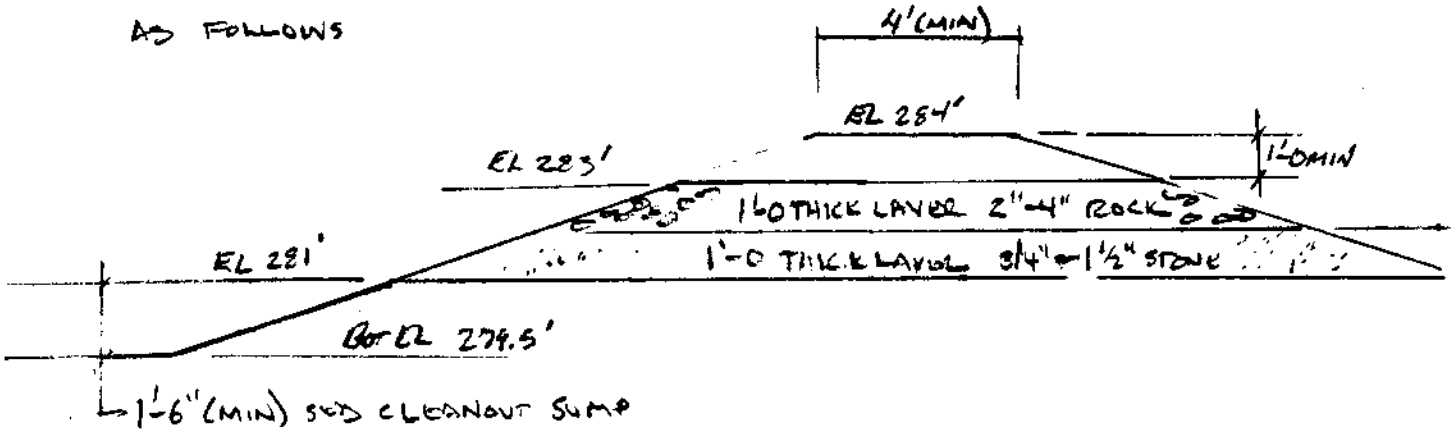
REFERENCE 1) INDICATES THAT A SEDIMENT TRAP SHALL HAVE A MAXIMUM DRAINAGE AREA OF 3 ACRES. HOWEVER, DUE TO SITE CONSTRAINTS, ONLY ONE TRAP CAN BE CONSTRUCTED. PAST EXPERIENCE HAS SHOWN THE SEDIMENT TRAP ARE EFFECTIVE FOR DRAINAGE AREAS MEASURING 5 TO 10 ACRES, WHICH IS GREATER THAN THIS CASE.

DETERMINE STORAGE REQUIREMENTS -

PER REFERENCE 1)

V_{REQ} = 4.5 ACRES x 1800 CF/ACRE = 8100 CF + 1.5 FT OF SEDIMENT CLEANOUT SUMP

REFERENCE 1) ~~DESC~~ STIPULATES A MINIMUM TOTAL DEPTH OF 3.5 FT AS FOLLOWS



IN ORDER TO MEET THE SECOND CRITERIA THE MAX AREA WILL BE USED BY USING THE MIN DEPTH OF 3.5 FT

IT CORPORATION
A Member of The IT Group

By PJI Date 10/17/00 Subject AMCHITKA ISLAND Sheet No. 3 of 6

Chkd. By PMG Date 11-14-00 SEDIMENT TRAP DESIGN Proj. No. 719419

.25 in. X .25 in.

DETERMINE RETURN STORAGE ~

$$A_{281} = A_{279.5} + \frac{1.5'}{3.5'}\left(A_{283} - A_{279.5}\right)$$

$$= 7185\,SF + \frac{1.5'}{3.5'}\left(11715\,SF - 7185\,SF\right) = 9125\,SF$$

$$\therefore V_{PROVIDED} = \frac{(3.5-1.5)}{3}\left(9125\,SF + 11715\,SF + \sqrt{(9125\,SF)(11715\,SF)}\right)$$

$\approx$ 20,785 CF $>>$ 9100 CF REQ $\therefore$ OK USE ADDITIONAL VOLUME FOR SEDIMENT STORAGE

ALSO IF DISCHARGE FROM THE REMOVAL OF EXISTING WATER IS 2000 gpm THEN

$$Q = 2000\,\frac{GAL}{MIN} \times \frac{1\,MIN}{60\,SEC} \times \frac{CF}{7.48\,GAL} = 4.46\,CFS$$

$$\therefore \text{MIN } A = 4.46\,CFS \times 2000\,SF/CFS = 8912\,SF < 9125\,SF(\text{MIN}) \therefore OK$$

CHECK LENGTH TO WIDTH RATIO ~

$L = 150\,FT$

$$W_{AVG} = \frac{7185\,SF}{150\,FT} = 47.9\,FT$$

$$\frac{L}{W_{AVG}} = \frac{150\,FT}{47.9\,FT} = 3.13 \approx 3 \therefore OK$$

IT CORPORATION
A Member of The IT Group

By PSI Date 10/17/00 Subject Amchitka Island Sheet No. 4 of 6

Chkd. By PMG Date 11-14-00 Sediment Trap Design Proj. No. 799419

.25 in. X .25 in.

Determine Weir Length

For Reference 1) $(L_{WEIR})_{MIN} = 6^{FT}$

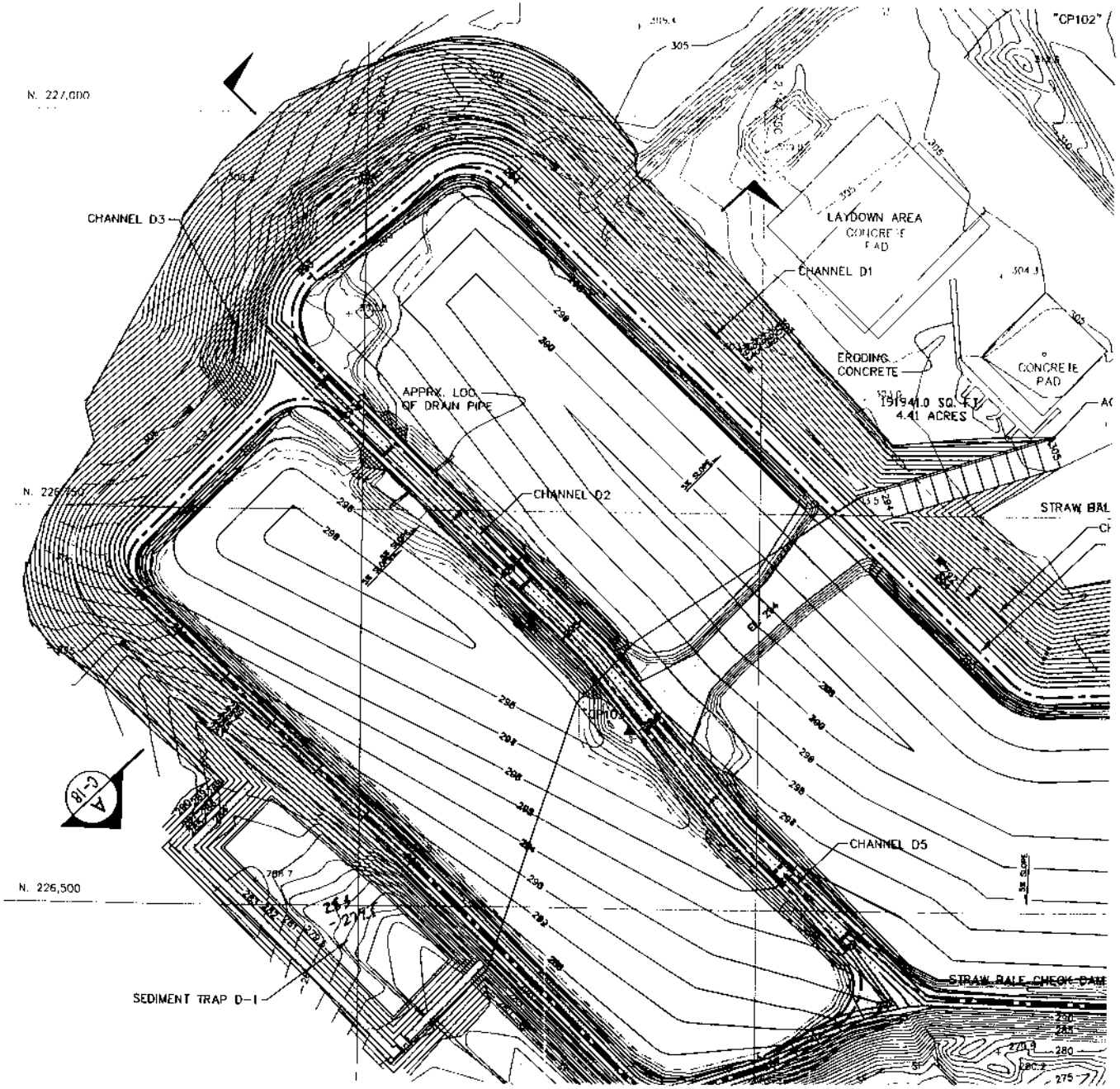
For Reference 2) $L = \frac{4^{FT}}{ACRE} \times$ Drainage Area (Acres)

$= 4^{FT}/_{ACRE} \times 4.5 \text{ ACRES} = 16^{FT}$

Use 20^{FT}

Checked by PMG
11-14-00

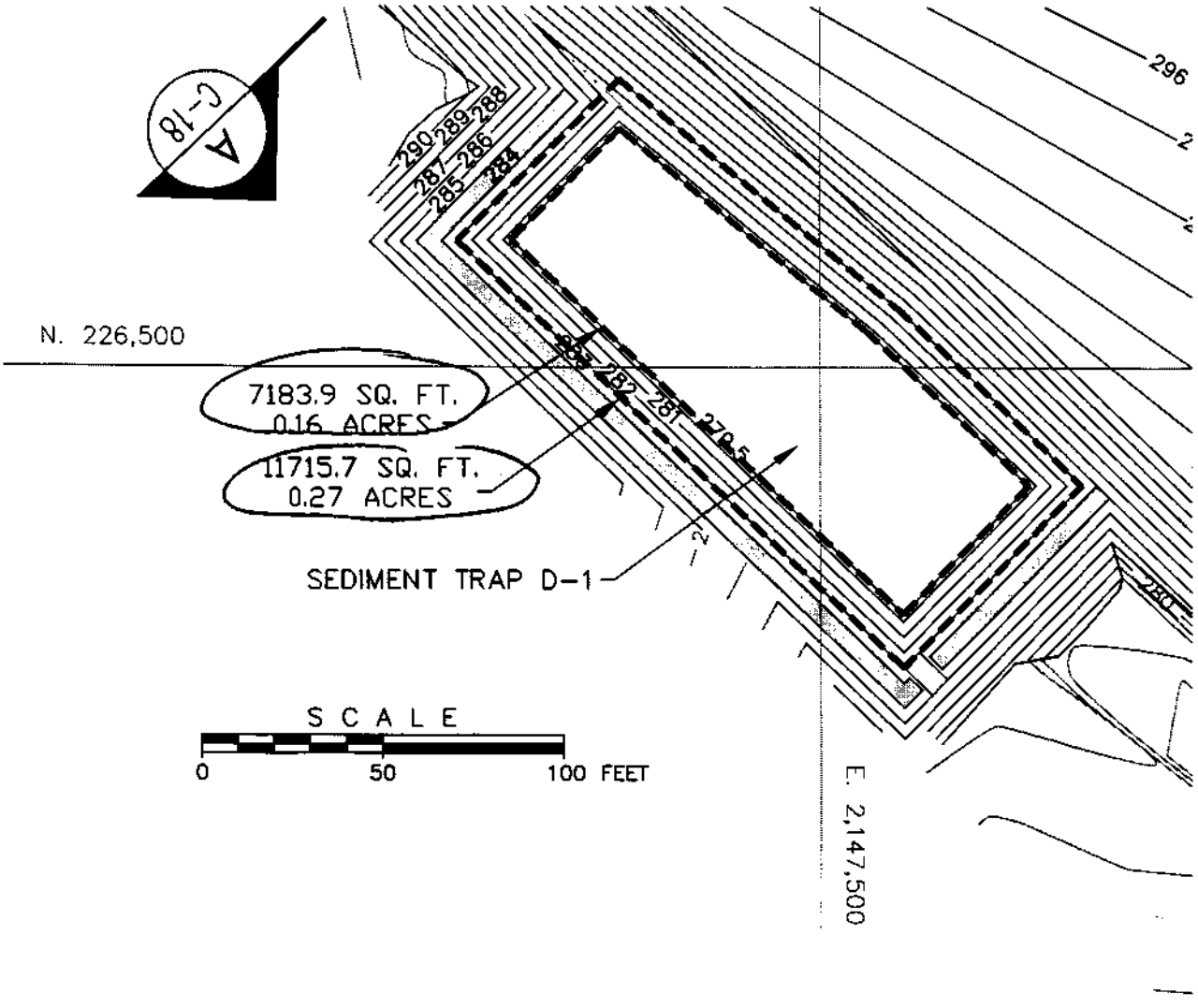
SHEET NO. 5 OF 6



45 x 150

NTS

Checked By: PMG
11-14-00



Attachment A-3

Pollution Prevention Plan Certification, Notice of Termination Certification, and Contractor's Certification Form

(2 Pages)

POLLUTION PREVENTION PLAN CERTIFICATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Date: _____

Signed: _____

Printed: _____

NOTICE OF TERMINATION CERTIFICATION

"I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that authorized by a general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act."

Date: _____

Signed: _____

Printed: _____

CONTRACTOR'S CERTIFICATION

"I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

Date: _____

Signed: _____

Printed: _____

Company Name: _____

Company Address: _____

Responsible for: _____

Date: _____

Signed: _____

Printed: _____

Company Name: _____

Company Address: _____

Responsible for: _____

Date: _____

Signed: _____

Printed: _____

Company Name: _____

Company Address: _____

Responsible for: _____

Attachment A-4

NPDES General Permit for Storm Water Discharges from Construction Activities

(20 Pages)

U.S.C. 1251 et. seq.), except as provided in Part I.B.3 of this permit, operators of construction activities located in an area specified in Part I.A. and who submit a Notice of Intent in accordance with Part II, are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein.

This permit shall become effective on February 17, 1998.

This permit and the authorization to discharge shall expire at midnight, February 17, 2003.

Signed and issued this 22nd day of January, 1998.

Thomas Maslany,

Water Management Director.

This signature is for the permit conditions in Parts I through IX and for any additional conditions in Part X which apply to facilities located in the corresponding State, Indian Country land, or other area in Region 3.

Storm Water General Permit for Construction Activities

Cover Page

Permit No. [See Part I.A.]

Authorizatin To Discharge Under the National Pollutant Discharge Elimination System

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq.), except as provided in Part I.B.3 of this permit, operators of construction activities located in an area specified in Part I.A. and who submit a Notice of Intent in accordance with Part II, are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein.

This permit shall become effective on February 17, 1998.

This permit and the authorization to discharge shall expire at midnight, February 17, 2003.

Signed and issued this 16th day of January, 1998.

U. Gale Hutton,

Director, Water, Wetlands, and Pesticides Division, U.S. Environmental Protection Agency, Region 7.

This signature is for the permit conditions in Parts I through IX and for any additional conditions in Part X which apply to facilities located in the corresponding State, Indian Country land, or other area in Region 7.

Storm Water General Permit for Construction Activities

Cover Page

Permit No. [See Part I.A.]

Authorizatin To Discharge Under the National Pollutant Discharge Elimination System

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq.), except as provided in Part I.B.3 of this permit, operators of construction activities located in an area specified in Part I.A. and who submit a Notice of Intent in accordance with Part II, are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein.

This permit shall become effective on February 17, 1998.

This permit and the authorization to discharge shall expire at midnight, February 17, 2003.

Signed and issued this 15th day of January, 1998.

Kerrigan G. Clough,

Assistant Regional Administrator, Office of Pollution Prevention, State and Tribal Assistance.

This signature is for the permit conditions in Parts I through IX and for any additional conditions in Part X which apply to facilities located in the corresponding State, Indian Country land, or other area in Region 8.

Storm Water General Permit for Construction Activities

Cover Page

Permit No. [See Part I.A.]

Authorizatin To Discharge Under the National Pollutant Discharge Elimination System

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq.), except as provided in Part I.B.3 of this permit, operators of construction activities located in an area specified in Part I.A. and who submit a Notice of Intent in accordance with Part II, are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein.

This permit shall become effective on February 17, 1998.

This permit and the authorization to discharge shall expire at midnight, February 17, 2003.

Signed and issued this 29th day of January, 1998.

Alexis Strauss,

Acting Director, Water Division, Region 9.

This signature is for the permit conditions in Parts I through IX and for any additional conditions in Part X which apply to facilities located in the corresponding State, Indian Country land, or other area in Region 9.

Storm Water General Permit for Construction Activities

Cover Page

Permit No. [See part I.A.]

Authorization to Discharge Under the National Pollutant Discharge Elimination System

In accordance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et seq.), except as provided in Part I.B.3 of this permit, operators of construction activities located in an area specified in Part I.A. and who submit a Notice of Intent in accordance with Part II, are authorized to discharge pollutants to waters of the United States in accordance with the conditions and requirements set forth herein.

This permit shall become effective on February 17, 1998.

This permit and the authorization to discharge shall expire at midnight, February 17, 2003.

Signed and issued this 20th day of January, 1998.

Philip G. Millam,

Director, Office of Water, Region 10.

This signature is for the permit conditions in Parts I through IX and for any additional conditions in Part X which apply to facilities located in the corresponding State, Indian Country land, or other area in Region 10.

NPDES General Permits for Storm Water Discharges From Construction Activities

Table of Contents

Part I. Coverage Under This Permit

A. Permit Area

The permit language is structured as if it were a single permit, with State, Indian Country land, or other area-specific conditions specified in Part X. Permit coverage is actually provided by legally separate and distinctly numbered permits covering each of the following areas:

Region 1

CTR10*##I: Indian Country lands in the State of Connecticut.

MAR10*###: Commonwealth of Massachusetts, except Indian Country lands.

MAR10*##I: Indian Country lands in the Commonwealth of Massachusetts.

MER10*###: State of Maine, except Indian Country lands.

MER10*##I: Indian Country lands in the State Maine.

NHR10*###: State of New Hampshire.

RIR10*##I: Indian Country lands in the State of Rhode Island.

VTR10*##F: Federal Facilities in the State of Vermont.

Region 2

NYR10*##I: Indian Country lands in the State of New York.

PRR10*###: The Commonwealth of Puerto Rico.

Region 3

DCR10*###: The District of Columbia.

DER10*##F: Federal Facilities in the State of Delaware.

Region 4

Coverate Not Available. Construction activities in Region 4 must obtain permit coverage under an alternative general permit.

Region 5

Coverage Not Available.

Region 6

Coverage Not Available.

Region 7

IAR10*##I: Indian Country lands in the State of Iowa.

KSR10*##I: Indian Country lands in the State of Kansas.

NER10*##I: Indian Country lands in the State of Nebraska, except Pine Ridge Reservation lands (see Region 8).

Region 8

COR10*##F: Federal Facilities in the State of Colorado, except those located on Indian Country lands.

COR10*##I: Indian Country lands in the State of Colorado, including the portion of the Ute Mountain Reservation located in New Mexico.

MTR10*##I: Indian Country lands in the State of Montana.

NDR10*##I: Indian Country lands in the State of North Dakota, including that portion of the Standing Rock Reservation located in South Dakota (except for the Lake Traverse Reservation which is covered under South Dakota permit SDR10*##I listed below).

SDR10*##I: Indian Country lands in the State of South Dakota, including the portion of the Pine Ridge Reservation located in Nebraska and the portion of the Lake Traverse Reservation located in North Dakota (except for the Standing Rock Reservation which is covered under North Dakota permit NDR10*##I listed above).

UTR10*##I: Indian Country lands in the State of Utah, except Goshute and Navajo Reservation lands (see Region 9).

WYR10*##I: Indian Country lands in the State of Wyoming.

Region 9

ASR10*###: The Island of American Samoa.

AZR10*###: The State of Arizona, except Indian Country lands.

AZR10*##I: Indian Country lands in the State of Arizona, including Navajo Reservation lands in New Mexico and Utah.

CAR10*##I: Indian Country lands in the State of California.

GUR10*###: The Island of Guam.

JAR10*###: Johnston Atoll.

MWR10*###: Midway Island and Wake Island.

NIR10*###: Commonwealth of the Northern Mariana Islands.

NVR10*##I: Indian Country lands in the State of Nevada, including the Duck Valley Reservation in Idaho, the Fort McDermitt Reservation in Oregon and the Goshute Reservation in Utah.

Region 10

AKR10*###: The State of Alaska, except Indian Country lands.

AKR10*##I: Indian Country lands in Alaska.

IDR10*###: The State of Idaho, except Indian Country lands.

IDR10*##I: Indian Country lands in the State of Idaho, except Duck Valley Reservation lands (see Region 9).

ORR10*##I: Indian Country lands in the State of Oregon except Fort McDermitt Reservation lands (see Region 9).

WAR10*##F: Federal Facilities in the State of Washington, except those located on Indian Country lands.

WAR10*##I: Indian Country lands in the State of Washington.

B. Eligibility

1. Permittees are authorized to discharge pollutants in storm water runoff associated with construction activities as defined in 40 CFR 122.26(b)(14)(x) and those construction site discharges designated by the Director as needing a storm water permit under 122.26(a)(1)(v) or under 122.26(a)(9) and 122.26(g)(1)(i). Discharges identified under Part I.B.3 are excluded from coverage. Any discharge authorized by a different NPDES permit may be commingled with discharges authorized by this permit.

2. This permit also authorizes storm water discharges from support activities (*e.g.*, concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided:

a. The support activity is directly related to a construction site that is required to have NPDES permit coverage for discharges of storm water associated with construction activity;

b. The support activity is not a commercial operation serving multiple unrelated construction projects by different operators, and does not operate beyond the completion of the

construction activity at the last construction project it supports; and

c. Appropriate controls and measures are identified in a storm water pollution prevention plan covering the discharges from the support activity areas.

3. Limitations on Coverage. A. *Post Construction Discharges.* This permit does not authorize storm water discharges that originate from the site after construction activities have been completed and the site, including any temporary support activity site, has undergone final stabilization. Industrial post-construction storm water discharges may need to be covered by a separate NPDES permit.

B. *Discharges Mixed With Non-Storm Water.* This permit does not authorize discharges that are mixed with sources of non-storm water, other than those discharges which are identified in Part II.A.2. or 3. (exceptions to prohibition on non-storm water discharges) and are in compliance with Part IV.D.5 (non-storm water discharges).

C. *Discharges Covered by Another Permit.* This permit does not authorize storm water discharges associated with construction activity that have been covered under an individual permit or required to obtain coverage under an alternative general permit in accordance with Part VI.L.

d. *Discharges Threatening Water Quality.* This permit does not authorize storm water discharges from construction sites that the Director (EPA) determines will cause, or have reasonable potential to cause or contribute to, violations of water quality standards. Where such determinations have been made, the Director may notify the operator(s) that an individual permit application is necessary in accordance with Part VI.L. However, the Director may authorize coverage under this permit after appropriate controls and implementation procedures designed to bring the discharges into compliance with water quality standards has been included in the storm water pollution prevention plan;

e. *Storm water discharges and storm water discharge-related activities that are not protective of Federally listed endangered and threatened ("listed") species or designated critical habitat ("critical habitat").*

(1) For the purposes of complying with the Part I.B.3.e. eligibility requirements, "storm water discharge-related activities" include:

(a) Activities which cause, contribute to, or result in point source storm water pollutant discharges, including but not limited to: excavation, site development, grading and other surface disturbance activities; and

(b) Measures to control storm water including the siting, construction and operation of best management practices (BMPs) to control, reduce or prevent storm water pollution.

(2) Coverage under this permit is available only if the applicant certifies that it meets at least one of the criteria in paragraphs (a)–(d) below. Failure to continue to meet one of these criteria during the term of the permit will render a permittee ineligible for coverage under this permit.

(a) The storm water discharges and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat; or

(b) Formal or informal consultation with the Fish and Wildlife Service and/or the National Marine Fisheries Service (the "Services") under section 7 of the Endangered Species Act (ESA) has been concluded which addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat and the consultation results in either a no jeopardy opinion or a written concurrence by the Service(s) on a finding that the applicant's storm water discharges and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat. A section 7 consultation may occur in the context of another Federal action (*e.g.*, a ESA section 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project, or as part of a National Environmental Policy Act (NEPA) review); or

(c) The applicant's construction activities are authorized under section 10 of the ESA and that authorization addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat; or

(d) The applicant's storm water discharges and storm water discharge-related activities were already addressed in another operator's certification of eligibility under Part I.B.3.e.(2)(a), (b), or (c) which included the applicant's project area. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based.

(3) All applicants must follow the procedures provided at Addendum A of this permit when applying for permit coverage.

(4) The applicant must comply with any applicable terms, conditions or other requirements developed in the process of meeting eligibility requirements of Part I.B.3.e.(2)(a), (b), (c), or (d) above to remain eligible for coverage under this permit. Such terms and conditions must be incorporated in the applicant's storm water pollution prevention plan.

(5) Applicants who choose to conduct informal consultation to meet the eligibility requirements of Part I.B.3.e.(2)(b) are automatically designated as non-Federal representatives under this permit. *See* 50 CFR 402.08. Applicants who choose to conduct informal consultation as a non-Federal representatives must notify EPA and the appropriate Service office in writing of that decision.

(6) This permit does not authorize any storm water discharges where the discharges or storm water discharge-related activities cause prohibited "take" (as defined under section 3 of the Endangered Species Act and 50 CFR 17.3) of endangered or threatened species unless such takes are authorized under section 7 or 10 of the Endangered Species Act.

(7) This permit does not authorize any storm water discharges where the discharges or storm water discharge-related activities are likely to jeopardize the continued existence of any species that are listed or proposed to be listed as endangered or threatened under the ESA or result in the adverse modification or destruction of habitat that is designated or proposed to be designated as critical under the ESA.

f. *Storm Water Discharges and Storm Water Discharge-Related Activities with Unconsidered Adverse Effects on Historic Properties.* (Reserved)

C. Obtaining Authorization

1. In order for storm water discharges from construction activities to be authorized under this general permit, an operator must:

a. Meet the Part I.B. eligibility requirements;

b. Except as provided in Parts II.A.5 and II.A.6, develop a storm water pollution prevention plan (SWPPP) covering either the entire site or all portions of the site for which they are operators (see definition in Part IX.N) according to the requirements in Part IV. A "joint" SWPPP may be developed and implemented as a cooperative effort where there is more than one operator at a site; and

c. Submit a Notice of Intent (NOI) in accordance with the requirements of Part II, using an NOI form provided by the Director (or a photocopy thereof). Only one NOI need be submitted to cover all of the permittee's activities on the common plan of development or sale (*e.g.*, you do not need to submit a separate NOI for each separate lot in a

residential subdivision or for two separate buildings being constructed at a manufacturing facility, provided your SWPPP covers each area for which you are an operator). The SWPPP must be implemented upon commencement of construction activities.

2. Any new operator on site, including those who replace an operator who has previously obtained permit coverage, must submit an NOI to obtain permit coverage.

3. Unless notified by the Director to the contrary, operators who submit a correctly completed NOI in accordance with the requirements of this permit are authorized to discharge storm water from construction activities under the terms and conditions of this permit two (2) days after the date that the NOI is postmarked. The Director may deny coverage under this permit and require submittal of an application for an individual NPDES permit based on a review of the NOI or other information (see Part VI.L).

D. Terminating Coverage

1. Permittees wishing to terminate coverage under this permit must submit a Notice of Termination (NOT) in accordance with part VIII of this permit. Compliance with this permit is required until an NOT is submitted. The permittee's authorization to discharge under this permit terminates at midnight of the day the NOT is signed.

2. All permittees must submit an NOT within thirty (30) days after one or more of the following conditions have been met:

a. Final stabilization (see definition Part IX.I) has been achieved on all portions of the site for which the permittee is responsible (including if applicable, returning agricultural land to its pre-construction agricultural use);

b. Another operator/permittee has assumed control according to Part VI.G.2.c. over all areas of the site that have not been finally stabilized; or

c. For residential construction only, temporary stabilization has been completed and the residence has been transferred to the homeowner.

Enforcement actions may be taken if a permittee submits an NOT without meeting one or more of these conditions.

Part II. Notice of Intent Requirements

A. Deadlines for Notification

1. Except as provided in Part II.A.3, II.A.4, II.A.5 or II.A.6 below, parties defined as operators (see definition in Part IX.N) due to their operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications, must submit a Notice of Intent (NOI) in accordance with the requirements of this Part at least two (2) days prior to the commencement of construction activities (*i.e.*, the initial disturbance of soils associated with clearing, grading, excavation activities, or other construction activities).

2. Except as provided in parts II.A.3, II.A.4, II.A.5 of II.A.6 below, parties defined as operators (see definition in Part IX.N) due to their day-to-day operational control over activities at a project which are necessary to ensure compliance with a storm water pollution prevention plan or other permit conditions (*e.g.*, general contractor, erosion control contractor) must submit an NOI at least two (2) days prior to commencing work on-site.

3. For storm water discharges from construction projects where the operator changes, including instances where an operator is added after an NOI has been submitted under Parts II.A.1 or II. A.2, the new operator must submit an NOI at least two (2) days before assuming operational control over site specifications or commencing work on-site.

4. Operators are not prohibited from submitting late NOIs. When a late NOI is submitted, authorization is only for discharges that occur after permit coverage is granted. The Agency reserves the right to take appropriate enforcement for any unpermitted activities that may have occurred between the time construction commenced and authorization of future discharges is granted (typically 2 days after a complete NOI is submitted).

5. Operators of on-going construction projects as of the effective date of this permit which received authorization to discharge for these projects under the 1992 baseline construction general permit must:

a. Submit a NOI according to Part II.B. within 90 days of the effective date of this permit. If the permittee is eligible to submit a Notice of Termination (*e.g.*, construction is finished and final stabilization has been achieved) before the 90th day, a new NOI is not required to be submitted;

b. For the first 90 days from the effective date of this permit, comply with the terms and conditions of the 1992 baseline construction general permit they were previously authorized under; and

c. Update their storm water pollution prevention plan to comply with the requirements of Part IV within 90 days after the effective date of this permit.

6. Operators of on-going construction projects as of the effective date of this permit which did *not* receive authorization to discharge for these projects under the 1992 baseline construction general permit must:

a. Prepare and comply with an interim storm water pollution prevention plan in accordance with the 1992 baseline construction general permit prior to submitting an NOI;

b. Submit a NOI according to Part II.B; and

c. Update their storm water pollution prevention plan to comply with the requirements of Part IV within 90 days after the effective date of this permit.

B. Contents of Notice of Intent (NOI)

1. Interim Use of Existing NOI Form

Until the revised NOI form is published as final in the **Federal Register**, operators must use EPA's existing NOI form [EPA Form 3510–6 (8–98)] to apply for permit coverage.

Note: The revised NOI form is pending approval by the U.S. Office of Management and Budget as of the effective date of this permit.

When using the existing NOI form, operators should only submit information that was required for parties under the baseline construction general permit. However, by completing and signing the existing NOI form to obtain permit coverage, operators are certifying that they meet all applicable eligibility requirements of Part I.B of today's permit and an informing the Director of their intent to be covered by, and comply with, the terms and conditions of this permit. When the revised NOI form is available (through final publication in the **Federal Register**), the existing NOI form will no longer be accepted for permit coverage.

2. Use of Revised NOI Form

The revised NOI form shall be signed in accordance with Part VI.G of this permit and shall include the following information:

a. The name, address, and telephone number of the operator filing the NOI for permit coverage;

b. An indication of whether the operator is a Federal, State, Tribal, private, or other public entity;

c. The name (or other identifier), address, county, and latitude/longitude of the construction project or site;

d. An indication of whether the project or site is located on Indian Country lands;

e. Confirmation that a storm water pollution prevention plan (SWPPP) has been developed or will be developed prior to commencing construction activities, and that the SWPPP will be compliant with any applicable local

sediment and erosion control plans. Copies of SWPPPs or permits should *not* be included with the NOI submission;

f. Optional information: the location where the SWPPP may be viewed and the name and telephone number of a contact person for scheduling viewing times;

g. The name of the receiving water(s);

h. Estimates of project start and completion dates, and estimates of the number of acres of the site on which soil will be distributed (if less than 1 acre, enter "1");

i. Based on the instructions in Addendum A, whether any listed or proposed threatened or endangered species, or designated critical habitat, are in proximity to the storm water discharges or storm water discharge-related activities to be covered by this permit;

j. Under which section(s) of Part I.B.3.e (Endangered Species) the applicant is certifying eligibility; and

Note that as of the effective date of this permit, reporting of information relating to the preservation of historic properties has been reserved and is not required at this time. Such reservation in no way relieves applicants or permittees from any otherwise applicable obligations or liabilities related to historic preservation under State, Tribal or local law. After further discussions between EPA and the Advisory Council on Historic Preservation, the Agency may modify the permit. Any such modification may affect future Notice of Intent reporting requirements.

C. Where To Submit

1. NOIs must be signed in accordance with Part VI.G. and sent to the following address: Storm Water Notice of Intent (4203), US EPA, 401 M. Street, SW, Washington, D.C. 20460.

Part III. Special Conditions, Management Practices, and Other Non-Numeric Limitations

A. Prohibition Non-Storm Water Discharges

1. Except as provided in Parts I.B.2 or 3 and III.A.2 or 3, all discharges covered by this permit shall be composed entirely of storm water associated with construction activity.

2. Discharges of material other than storm water that are in compliance with an NPDES permit (other than this permit) issued for that discharge may be discharged or mixed with discharges authorized by this permit.

3. The following non-storm water discharges from active construction sites are authorized by this permit provided the non-storm water component of the discharge is in compliance with Part IV.D.5 (non-storm water discharges): discharges from fire fighting activities; fire hydrant flushings; waters used to wash vehicles where detergents are not used; water used to control dust in accordance with Part IV.D.2.c.(2); potable water sources including waterline flushings; routine external building wash down which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; air conditioning concentrate; uncontaminated ground water or spring water; and foundation or footing drains where flows are not contaminated with process materials such as solvents.

B. Releases in Excess of Reportable Quantities

The discharge of hazardous substances or oil in the storm water discharge(s) from a facility shall be prevented or minimized in accordance with the applicable storm water pollution prevention plan for the facility. This permit does not relieve the permittee of the reporting requirements of 40 CFR 110, 40 CFR 117 and 40 CFR 302. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quality established under either 40 CFR 110, 40 CFR 117 or 40 CFR 302, occurs during a 24 hour period.

1. The permittee is required to notify the National Response Center (NRC) (800–424–8802; in the Washington, DC, metropolitan area call 202–426–2675) in accordance with the requirements of 40 CFR 110, 40 CFR 117 and 40 CFR 302 as soon as he or she has knowledge of the discharge;

2. The storm water pollution prevention plan required under Part IV of this permit must be modified within 14 calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

C. Spills

This permit does not authorize the discharge of hazardous substances or oil resulting from an on-site spill.

D. Discharge Compliance With Water Quality Standards

Operators seeking coverage under this permit shall not be causing or have the reasonable potential to cause or contribute to a violation of a water quality standard. Where a discharge is already authorized under this permit and is later determined to cause or have the reasonable potential to cause or contribute to the violation of an applicable water quality standard, the Director will notify the operator of such violation(s). The permittee shall take all necessary actions to ensure future discharges do not cause or contribute to the violation of a water quality standard and document these actions in the storm water pollution prevention plan. If violations remain or re-occur, then coverage under this permit may be terminated by the Director, and an alternative general permit or individual permit may be issued. Compliance with this requirement does not preclude any enforcement activity as provided by the Clean Water Act for the underlying violation.

E. Responsibilities of Operators

Permittees may meet one or both of the operational control components in the definition of "operator" found in Part IX.N. Either Parts III.E.1 or III.E.2 or both will apply depending on the type of operational control exerted by an individual permittee. Part III.E.3 applies to all permittees.

1. Permittees with operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications (*e.g.*, developer or owner), must:

a. Ensure the project specifications that they develop meet the minimum requirements of Part IV (Storm Water Pollution Prevention Plans (SWPPP)) and all other applicable conditions;

b. Ensure that the SWPPP indicates the areas of the project where they have operational control over project specifications (including the ability to make modifications in specifications), and ensure all other permittees implementing portions of the SWPPP impacted by any changes they make to the plan are notified of such modifications in a timely manner; and

c. Ensure that the SWPPP for portions of the project where they are operators indicates the name and NPDES permit number for parties with day-to-day operational control of those activities necessary to ensure compliance with the SWPPP or other permit conditions. If these parties have not been identified at the time the SWPPP is initially developed, the permittee with operational control over project specifications shall be considered to be the responsible party until such time as the authority is transferred to another party (*e.g.*, general contractor) and the plan updated.

2. Permittee(s) with day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions (*e.g.* general contractor) must:

a. Ensure that the SWPPP for portions of the project where they are operators meets the minimum requirements of Part IV (Storm Water Pollution Plan) and identifies the parties responsible for implementation of control measures identified in the plan;

b. Ensure that the SWPPP indicates areas of the project where they have operational control over day-to-day activities;

c. Ensure that the SWPPP for portions of the project where they are operators indicates the name and NPDES permit number of the party(ies) with operational control over project specifications (including the ability to make modifications in specifications).

3. Permittees with operational control over only a portion of a larger construction project (*e.g.*, one of four homebuilders in a subdivision) are responsible for compliance with all applicable terms and conditions of this permit as it relates to their activities on their portion of the construction site, including protection of endangered species and implementation of BMPs and other controls required by the SWPPP. Permittees shall ensure either directly or through coordination with other permittees, that their activities do not render another party's pollution control ineffective. Permittees must either implement their portions of a common SWPPP or develop and implement their own SWPPP.

Part IV. Storm Water Pollution Prevention Plans

At least one storm water pollution prevention plan (SWPPP) shall be developed for each construction project or site covered by this permit. For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site to prepare and participate in a comprehensive SWPPP is encouraged. Individual operators at a site may, but are not required, to develop separate SWPPPs that cover only their portion of the project provided reference is made to other operators at the site. In instances where there is more than one SWPPP for a site, coordination must be conducted between the permittees to ensure the storm water discharge controls and other measures are consistent with one another (*e.g.*, provisions to protect listed species and critical habitat).

Storm water pollution prevention plans shall be prepared in accordance with good engineering practices. The SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from the construction site. The SWPPP shall describe and ensure the implementation of practices which will be used to reduce the pollutants in storm water discharges associated with construction activity at the construction site and assure compliance with the terms and conditions of this permit.

When developing SWPPPs, applicants must follow the procedures in Addendum A of this permit to determine whether listed endangered or threatened species or critical habitat would be affected by the applicant's storm water discharges or storm water discharge-related activities. Any information on whether listed species or critical habitat are found in proximity to the construction site must be included in the SWPPP. Any terms or conditions that are imposed under the eligibility requirements of Part I.B.3.e and Addendum A of this permit to protect listed species or critical habitat from storm water discharges or storm water discharge-related activity must be incorporated into the SWPPP. Permittees must implement the applicable provisions of the SWPPP required under this part as a condition of this permit.

A. Deadlines for Pan Preparation and Compliance

The storm water pollution prevention plan shall:

1. Be completed prior to the submittal of an NOI to be covered under this permit (except as provided in Parts II.A.5 and II.A.6) updated as appropriate; and

2. Provide for compliance with the terms and schedule of the SWPPP beginning with the initiation of construction activities.

B. Signature, Plan Review and Making Plans Available

1. The SWPPP shall be signed in accordance with Part VI.G, and be retained on-site at the facility which generates the storm water discharge in accordance with Part V (Retention of Records) or this permit.

2. The permittee shall post a notice near the main entrance of the construction site with the following information:

a. The NPDES permit number for the project or a copy of the NOI if a permit number has not yet been assigned;

b. The name and telephone number of a local contact person;

c. A brief description of the project; and

d. The location of the SWPPP if the site is inactive or does not have an on-site location to store the plan.

If posting this information near a main entrance is infeasible due to safety concerns, the notice shall be posted in a local public building. If the construction project is a linear construction project (*e.g.*, pipeline, highway, etc.), the notice must be placed in a publicly accessible location near where construction is actively underway and moved as necessary. This permit does not provide the public with any right to trespass on a construction site for any reason, including inspection of a site; not does this permit require that permittees allow members of the public access to a construction site.

3. The permittee shall make SWPPPs available upon request to the Director, a State, Tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans, local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site. The copy of the SWPPP that is required to be kept on-site or locally available must be made available to the Director for review at the time of an on-site inspection. Also, in the interest of public involvement, EPA encourages permittees to make their SWPPPs available to the public for viewing during normal business hours.

4. The Director may notify the permittee at any time that the SWPPP does not meet one or more of the minimum requirements of this Part. Such notification shall identify those provision of this permit which are not being met by the SWPPP as well as those requiring modification in order to meet the minimum requirements of this Part. Within seven (7) calendar days of receipt of such notification from the Director (or as otherwise provided by the Director), the permittee shall make the required changes to the SWPPP and shall submit to the Director a written certification that the requested changes have been made. The Director may take appropriate enforcement action for the period of time the permittee was operating under a plan that did not meet the minimum requirements of this permit.

C. Keeping Plans Current

The permittee must amend the storm water pollution prevention plan whenever:

1. There is a change in design, construction, operation, or maintenance

which has a significant effect on the discharge of pollutants to the waters of the United States which has not been addressed in the SWPPP; or

2. Inspections or investigations by site operators, local, State, Tribal or Federal officials indicate the SWPPP is proving ineffective in eliminating or significantly minimizing pollutants from sources identified under Part IV.D.1 of this permit, or is otherwise not achieving the general objectives of controlling pollutants in storm water discharges associated with construction activity.

D. Contents of Plan

The storm water pollution prevention plan (SWPPP) shall include the following items:

1. Site Description

Each SWPPP shall provide a description of potential pollutant sources and other information as indicated below:

a. A description of the nature of the construction activity;

b. A description of the intended sequence of major activities which disturb soils for major portions of the site (*e.g.*, grubbing, excavation, grading, utilities and infrastructure installation);

c. Estimates of the total area of the site and the total area of the site that is expected to be disturbed by excavation, grading, or other activities including off-site borrow and fill areas;

d. An estimate of the runoff coefficient of the site for both the pre-construction and post-construction conditions and data describing the soil or the quality of any discharge from the site;

e. A general location map (*e.g.*, a portion of a city or county map) and a site map indicating the following: Drainage patterns and approximate slopes anticipated after major grading activities; areas of soil disturbance; areas which will not be disturbed; locations of major structural and nonstructural controls identified in the SWPPP; locations where stabilization practices are expected to occur; locations of off-site material, waste, borrow or equipment storage areas; surface waters (including wetlands); and locations where storm water discharges to a surface water;

f. Location and description of any discharge associated with industrial activity other than construction, including storm water discharges from dedicated asphalt plants and dedicated concrete plants, which is covered by this permit;

g. The name of the receiving water(s) and the areal extent and description of wetlands or other special aquatic sites (as described under 40 CFR 230.3(q-1)) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project;

h. A copy of the permit requirements (attaching a copy of this permit is acceptable); and

i. Information on whether listed endangered or threatened species, or critical habitat, are found in proximity to the construction activity and whether such species may be affected by the applicant's storm water discharges or storm water discharge-related activities.

2. Controls

Each SWPPP shall include a description of appropriate control measures (*i.e.*, BMPs) that will be implemented as part of the construction activity to control pollutants in storm water discharges. The SWPPP must clearly describe for each major activity identified in Part IV.D.1.b: (a) Appropriate control measures and the general timing (or sequence) during the construction process that the measures will be implemented; and (b) which permittee is responsible for implementation (*e.g.*, perimeter controls for one portion of the site will be installed by Contractor A after the clearing and grubbing necessary for installation of the measure, but before the clearing and grubbing for the remaining portions of the site; and perimeter controls will be actively maintained by Contractor B until final stabilization of those portions of the site up-gradient of the perimeter control; and temporary perimeter controls will be removed by the owner after final stabilization). The description and implementation of control measures shall address the following minimum components;

a. *Erosion and Sediment Controls.* (1) *Short and Long Term Goals and Criteria.* (a) The construction-phase erosion and sediment controls should be designed to retain sediment on site to the extent practicable.

(b) All control measures must be properly selected, installed, and maintained in accordance with the manufacturers specifications and good engineering practices. If periodic inspections or other information indicates a control has been used inappropriately, or incorrectly, the permittee must replace or modify the control for site situations.

(c) If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite (*e.g.*, fugitive sediment in street could be washed into storm sewers by the next rain and/or pose a safety hazard to users of public streets).

(d) Sediment must be removed from sediment traps or sedimentation ponds when design capacity has been reduced by 50%.

(e) Litter, construction debris, and construction chemicals exposed to storm water shall be prevented from becoming a pollutant source for storm water discharges (*e.g.*, screening outfalls, picked up daily).

(f) Offsite material storage areas (also including overburden and stockpiles of dirt, borrow areas, etc.) used solely by the permitted project are considered a part of the project and shall be addressed in the SWPPP.

(2) *Stabilization Practices.* The SWPPP must include a description of interim and permanent stabilization practices for the site, including a schedule of when the practices will be implemented. Site plans should ensure that existing vegetation is preserved where attainable and that disturbed portions of the site are stabilized. Stabilization practices may include but are not limited to: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Use of impervious surfaces for stabilization should be avoided.

The following records shall be maintained and attached to the SWPPP: the dates when major grading activities occur; the dates when construction activities temporarily or permanently cease on a portion of the site; and the dates when stabilization measures are initiated.

Except as provided in Parts IV.D.2.a.(2)(a), (b), and (c) below, stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased.

(a) Where the initiation of stabilization measures by the 14th day after construction activity temporary or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable.

(b) Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 21 days, temporary stabilization measures do not have to be initiated on that portion of site.

(c) In arid areas (areas with an average rainfall of 0 to 10 inches), semiarid areas (areas with an average annual rainfall of 10 to 20 inches), and areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is precluded by seasonably arid conditions, stabilization measures shall be initiated as soon as practicable.

(3) *Structural Practices.* The SWPPP must include a description of structural practices to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable. Structural practices may include but are not limited to: silt fences, earth dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. Placement of structural practices in floodplains should be avoided to the degree attainable. The installation of these devices may be subject to section 404 of the CWA.

(a) For common drainage locations that serve an area with ten (10) or more acres disturbed at one time, a temporary (or permanent) sediment basin that provides storage for a calculated volume of runoff from a 2 year, 24 hour storm from each disturbed acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location it is not necessary to include flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin.

In determining whether installing a sediment basin is attainable, the permittee may consider factors such as site soils, slope, available area on site, etc. In any event, the permittee must consider public safety, especially as it relates to children, as a design factor for the sediment basin and alternative sediment controls shall be used where site limitations would preclude a safe design. For drainage locations which serve ten (10) or more disturbed acres at one time and where a temporary sediment basin or equivalent controls is not attainable, smaller sediment basins and/or sediment traps should be used. Where neither the sediment basin nor equivalent controls are attainable due to site limitations, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries of the construction area and for those side slope boundaries deemed appropriate as dictated by individual site conditions. EPA encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.

(b) For drainage locations serving less than 10 acres, smaller sediment basins and/or sediment traps should be used. At a minimum, silt fences, vegetative buffer strips, or equivalent sediment controls are required for all down slope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of the construction area unless a sediment basin providing storage for a calculated volume of runoff from a 2 year, 24 hour storm or 3,600 cubic feet of storage per acre drained is provided. EPA encourages the use of a combination of sediment and erosion control measures in order to achieve maximum pollutant removal.

b. *Storm Water Management.* A description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed must be included in the SWPPP. Structural measures should be placed on upland soils to the degree attainable. The installation of these devices may also require a separate permit under section 404 of the CWA. Permittees are only responsible for the installation and maintenance of storm water management measures prior to final stabilization of the site, and are not responsible for maintenance after storm water discharges associated with construction activity have been eliminated from the site. However, post-construction storm water BMPs that discharge pollutants from point sources once construction is completed, may in themselves, need authorization under a separate NPDES permit.

(1) Such practices may include but are not limited to: storm water detention structures (including wet ponds); storm water retention structures; flow attenuation by use of open vegetated swales and natural depressions; infiltration of runoff onsite; and sequential systems (which combine several practices). The SWPPP shall include an explanation of the technical basis used to select the practices to control pollution where flows exceed predevelopment levels.

(2) Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel to provide a non-erosive flow velocity from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (*e.g.* no significant changes in the hydrological regime of the receiving water).

c. *Other Controls.* (1) No solid materials, including building materials, shall be discharged to waters of the United States, except as authorized by a permit issued under section 404 of the CWA.

(2) Off-site vehicle tracking of sediments and the generation of dust shall be minimized.

(3) The SWPPP shall be consistent with applicable State, Tribal and/or local waste disposal, sanitary sewer or septic system regulations to the extent these are located within the permitted area.

(4) The SWAPPP shall include a description of construction and waste materials expected to be stored on-site with updates as appropriate. The SWPPP shall also include a description of controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to storm water, and spill prevention and response.

(5) The SWPPP shall include a description of pollutant sources from areas other than construction (including storm water discharges from dedicated asphalt plants and dedicated concrete plants), and a description of controls and measures that will be implemented at those sites to minimize pollutant discharges.

(6) The SWPPP shall include a description of measures necessary to protect listed endangered or threatened species, or critical habitat, including any terms or conditions that are imposed under the eligibility requirements of Part I.B.3.e.(4) of this permit. Failure to describe and implement such measures will result in storm water discharges from construction activities that are ineligible for coverage under this permit.

d. *Approved State, Tribal or Local Plans.* (1) Permittees which discharge storm water associated with construction activities must ensure their storm water pollution prevention plan is consistent with requirements specified in applicable sediment and erosion site plans or site permits, or storm water management site plans or site permits approved by State, Tribal, or local officials.

(2) Storm water pollution prevention plans must be updated as necessary to remain consistent with any changes applicable to protecting surface water resources in sediment erosion site plans or site permits, or storm water management site plans or site permits approved by State, Tribal or local officials for which the permittee receives written notice.

3. Maintenance

All erosion and sediment control measures and other protective measures identified in the SWPPP must be maintained in effective operating condition. If site inspections required by Part IV.D.4. identify BMPs that are not operating effectively, maintenance shall be performed before the next anticipated storm event, or as necessary to maintain the continued effectiveness of storm water controls. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable.

4. Inspections

Qualified personnel (provided by the permittee or cooperatively by multiple permittees) shall inspect disturbed areas of the construction site that have not been finally stabilized, areas used for storage of materials that are exposed to precipitation, structural control measures, and locations where vehicles enter or exit the site, at least once every fourteen (14) calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater.

Where sites have been finally or temporarily stabilized, runoff is unlikely due to winter conditions (*e.g.*, site is covered with snow, ice, or frozen ground exists), or during seasonal arid periods in arid areas (areas with an average annual rainfall of 0 to 10 inches) and semi-arid areas (areas with an average annual rainfall of 10 to 20 inches) such inspections shall be conducted at least once every month.

Permittees are eligible for a waiver of monthly inspection requirements until one month before thawing conditions are expected to result in a discharge if all of the following requirements are met: (1) The project is located in an area where frozen conditions are anticipated to continue for extended periods of time (*i.e.*, more than one month); (2) land disturbance activities have been suspended; and (3) the beginning and ending dates of the waiver period are documented in the SWPPP.

a. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Sediment and erosion control measures identified in the SWPPP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Where discharge locations are inaccessible, nearby downstream locations shall be inspected to the extent that such inspections are practicable. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.

b. Based on the results of the inspection, the SWPPP shall be modified as necessary (*e.g.*, show additional controls on map required by Part IV.D.1; revise description of controls required by Part IV.D.2) to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within 7 calendar days following the inspection. If existing BMPs need to be modified or if additional BMPs are necessary, implementation shall be completed before the next anticipated storm event. If implementation before the next anticipated storm event is impracticable, they shall be implemented as soon as practicable.

c. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, and major observations relating to the implementation of the SWPPP shall be made and retained as part of the SWPPP for at least three years from the date that the site is finally stabilized. Major observations should include: the location(s) of discharges of sediment or other pollutants from the site; location(s) of BMPs that need to be maintained; location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location; and location(s) where additional BMPs are needed that did not exist at the time of inspection. Actions taken in accordance with Part IV.D.4.b of this permit shall be made and retained as part of the storm water pollution prevention plan for at least three years from the date that the site is finally stabilized. Such reports shall identify any incidents of non-compliance. Where a report does not identify any incidents of non-compliance, the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with Part VI.G of this permit.

5. Non-Storm Water Discharges

Except for flows from fire fighting activities, sources of non-storm water listed in Part III.A.2 or 3 of this permit that are combined with storm water discharges associated with construction activity must be identified in the SWPPP. The SWPPP shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

Part V. Retention of Records

A. Documents

The permittee shall retain copies of storm water pollution prevention plans and all reports required by this permit, and records of all data used to complete the Notice of Intent to be covered by this permit, for a period of at least three years from the date that the site is finally stabilized. This period may be extended by request of the Director at any time.

B. Accessibility

The permittee shall retain a copy of the storm water pollution prevention plan required by this permit (including a copy of the permit language) at the construction site (or other local location accessible to the Director, a State, Tribal or local agency approving sediment and erosion plans, grading plans, or storm water management plans; local government officials; or the operator of a municipal separate storm sewer receiving discharges from the site) from the date of project initiation to the date of final stabilization. Permittees with day-to-day operational control over SWPPP implementation shall have a copy of the SWPPP available at a central location on-site for the use of all operators and those identified as having responsibilities under the SWPPP whenever they are on the construction site.

C. Addresses

Except for the submittal of NOIs and NOTs (see Parts II.C and VIII.B, respectively), all written correspondence concerning discharges in any State, Indian Country land or from any Federal facility covered under this permit and directed to the EPA, including the submittal of individual permit applications, shall be sent to the address of the appropriate EPA Regional Office listed below:

Region 1: CT, MA, ME, NH, RI, VT
United States EPA, Region 1, Office of Ecosystem Protection, Municipal

Assistance Unit, John F. Kennedy Federal Building-CMU, Boston, MA 02203

Region 2: NJ, NY, PR, VI
United States EPA, Region 2, Division of Environmental Planning and Protection, (2DEPP-WPB), Water Programs Branch, 290 Broadway, New York, NY 10007-1866

Region 3: DE, DC, MD, PA, VA, WV
United States EPA, Region 3, Water Management Division, (3WM55), Storm Water Staff, 841 Chestnut Building, Philadelphia, PA 19107

Region 7: IA, KS, MO, NE (except see Region 8 for Pine Ridge Reservation Lands)
United States EPA, Region 7, Water, Wetlands, and Pesticides Division, NPDES and Facilities Management Branch, Storm Water Staff, 726 Minnesota Avenue, Kansas City, KS 66101

Region 8: CO, MT, ND, SD, WY, UT (except see Region 9 for Goshute Reservation and Navajo Reservation lands), the Ute Mountain Reservation in NM, and the Pine Ridge Reservation in NE
United States EPA, Region 8, Ecosystems Protection Program (8EPR-EP), Storm Water Staff, 999 18th Street, Suite 500, Denver, CO 80202-2466

Region 9: AZ, CA, HI, NV, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, the Goshute Reservation in UT and NV, the Navajo Reservation in UT, NM, and AZ, the Duck Valley Reservation in ID, Fort McDermitt Reservation in OR
United States EPA, Region 9, Water Management Division, WTR-5, Storm Water Staff, 75 Hawthorne Street, San Francisco, CA 94105

Region 10: AK, WA, ID (except see Region 9 for Duck Valley Reservation lands), OR (except see Region 9 for Fort McDermitt Reservation)
United States EPA Region 10, Office of Water OW-130, Storm Water Staff, 1200 6th Avenue, Seattle, WA 98101

Part VI. Standard Permit Conditions

A. Duty to Comply

1. The Permittee Must Comply With All Conditions of This Permit

Any permit noncompliance constitutes a violation of CWA and is grounds for reinforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

2. Penalties for Violations of Permit Conditions

The Director will adjust the civil and administrative penalties listed below in accordance with the Civil Monetary Penalty Inflation Adjustment Rule **Federal Register**: December 31, 1996, Volume 61, Number 252, pages 69359-69366, as corrected, March 20, 1997, Volume 62, Number 54, pages 13514-13517) as mandated by the Debt Collection Improvement Act of 1996 for inflation on a periodic basis. This rule allows EPA's penalties to keep pace with inflation. The Agency is required to review its penalties at least once every four years thereafter and to adjust them as necessary for inflation according to a specified formula. The civil and administrative penalties listed below were adjusted for inflation starting in 1996.

a. *Criminal.* (1) *Negligent Violations.* The CWA provides that any person who negligently violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both.

(2) *Knowing Violations.* The CWA provides that any person who knowingly violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both.

(3) *Knowing Endangerment.* The CWA provides that any person who knowingly violates permit conditions implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act and who knows at that time he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than $250,000, or by imprisonment for not more than 15 years, or both.

(4) *False Statement.* The CWA provides that nay person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than $10,000 or by imprisonment for not more than two years, or by both. If a conviction is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than four years, or by both. (*See* section 309(c)(4) of the Clean Water Act).

b. *Civil Penalties.* The CWA provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed $27,500 per day for each violation.

c. *Administrative Penalties.* The CWA provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:

(1) *Class I Penalty.* Not to exceed $11,000 violation nor shall the maximum amount exceed $27,500.

(2) *Class II Penalty.* Not to exceed $11,000 per day for each day during which the violation continues nor shall the maximum amount exceed $137,500.

B. Continuation of the Expired General Permit

If this permit is not reissued or replaced prior to the expiration date, it will be administratively continued in accordance with the Administrative Procedures Act and remain in force and effect. Any permittee who was granted permit coverage prior to the expiration date will automatically remain covered by the continued permit until the earlier of:

1. Reissuance or replacement of this permit, at which time the permittee must comply with the Notice of Intent conditions of the new permit to maintain authorization to discharge; or

2. The permittee's submittal of a Notice of Termination; or

3. Issuance of an individual permit for the permittee's discharges; or

4. A formal permit decision by the Director not to reissue this general permit, at which time the permittee must seek coverage under an alternative general permit or an individual permit.

C. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of

adversely affecting human health or the environment.

E. Duty to Provide Information

The permittee shall furnish to the Director or an authorized representative of the Director any information which is requested to determine compliance with this permit or other information.

F. Other Information

When the permittee becomes aware that he or she failed to submit any relevant facts or submitted incorrect information in the Notice of Intent or in any other report to the Director, he or she shall promptly submit such facts or information.

G. Signatory Requirements

All Notices of Intent, Notices of Termination, storm water pollution prevention plans, reports, certifications or information either submitted to the Director or the operator of a large or medium municipal separate storm sewer system, or that this permit requires be maintained by the permittee, shall be signed as follows:

1. All Notices of Intent and Notices of Termination shall be signed as follows:

a. For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means: a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25,000,000 (in second-quarter 1980 dollars) if authority to sign documents has been assigned to delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes (1) the chief executive officer of the agency, or (2) senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (*e.g.*, Regional Administrator of EPA).

2. All reports required by this permit and other information requested by the Director or authorized representative of the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described above and submitted to the Director.

b. The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

c. *Changes to Authorization.* If an authorization under Part II.B is no longer accurate because a different operator has responsibility for the overall operation of the construction site, a new Notice of Intent satisfying the requirements of Part II.B must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative. The change in authorization must be submitted within the time frame specified in Part II.A.3, and sent to the address specified in Part II.C.

d. *Certification.* Any person signing documents under Part VI.G shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports

Section 309(c)(4) of the Clean Water Act provides that any person who knowingly makes any false material statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than two years, or by both.

I. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the CWA or section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

J. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

K. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

L. Requiring an Individual Permit or an Alternative General Permit

1. The Director may require any person authorized by this permit to apply for and/or obtain either an individual NPDES permit or an alternative NPDES general permit. Any interested person may petition the Director to take action under this paragraph. Where the Director requires a permittee authorized to discharge under this permit to apply for an individual NPDES permit, the Director shall notify the permittee in writing that a permit application is required. This notification shall include a brief statement of the reasons for this decision, an application form, a statement setting a deadline for the permittee to file the application, and a statement that on the effective date of issuance or denial of the individual NPDES permit or the alternative general permit as it applies to the individual permittee, coverage under this general permit shall automatically terminate. Applications shall be submitted to the appropriate Regional Office indicated in Part V.C of this permit. The Director may grant additional time to submit the application upon request of the applicant. If a permittee fails to submit in a timely manner an individual NPDES permit application as required by the Director under this paragraph, then the applicability of this permit to the individual NPDES permittee is automatically terminated at the end of the day specified by the Director for application submittal.

2. Any permittee authorized by this permit may request to be excluded from the coverage of this permit by applying for an individual permit. In such cases, the permittee shall submit an individual application in accordance with the requirements of 40 CFR 122.26(c)(1)(ii), with reasons supporting the request, to the Director at the address for the appropriate Regional Office indicated in Part V.C of this permit. The request may be granted by issuance of any individual permit or an alternative general permit if the reasons cited by the permittee are adequate to support the request.

3. When an individual NPDES permit is issued to a permittee otherwise subject to this permit, or the permittee is authorized to discharge under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the effective date of the individual permit or the date of authorization of coverage under the alternative general permit, whichever the case may be. When an individual NPDES permit is denied to an owner or operator otherwise subject to this permit, or the owner or operator is denied for coverage under an alternative NPDES general permit, the applicability of this permit to the individual NPDES permittee is automatically terminated on the date of such denial, unless otherwise specified by the Director.

M. State/Tribal Environmental Laws

1. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State/Tribal law or regulation under authority preserved by section 510 of the Act.

2. No condition of this permit shall release the permittee from any responsibility or requirements under other environmental statutes or regulations.

N. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee only when necessary to achieve compliance with the conditions of this permit.

O. Inspection and Entry

The permittee shall allow the Director or an authorized representative of EPA, the State/Tribe, or, in the case of a construction site which discharges through a municipal separate storm sewer, an authorized representative of the municipal owner/operator or the separate storm sewer receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment).

P. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Part VII. Reopener Clause

A. If there is evidence indicating that the storm water discharges authorized by this permit cause, have the reasonable potential to cause or contribute to, a violation of a water quality standard, the permittee may be required to obtain an individual permit or an alternative general permit in accordance with Part I.C of this permit, or the permit may be modified to include different limitations and/or requirements.

B. Permit modification or revocation will be conducted according to 40 CFR 122.62, 122.63, 122.64 and 124.5.

C. EPA may propose a modification to this permit after further discussions between the Agency and the Advisory Council on Historic Preservation for the protection of historic properties.

Part VIII. Termination of Coverage

A. Notice of Termination

Permittees must submit a completed Notice of Termination (NOT) that is signed in accordance with Part VI.G of this permit when one or more of the conditions contained in Part I.D.2. (Terminating Coverage) have been met at a construction project. The NOT form found in Addendum D will be used unless it has been replaced by a revised version by the Director. The Notice of Termination shall include the following information:

1. The NPDES permit number for the storm water discharge identified by the Notice of Termination;

2. An indication of whether the storm water discharges associated with construction activity have been eliminated (*i.e.*, regulated discharges of storm water are being terminated) or the permittee is no longer an operator at the site;

3. The name, address and telephone number of the permittee submitting the Notice of Termination;

4. The name of the project and street address (or a description of location if no street address is available) of the construction site for which the notification is submitted;

5. The latitude and longitude of the construction site; and

6. The following certification,signed in accordance with Part VI.G (signatory requirements) of this permit. For construction projects with more than one permittee and/or operator, the permittee need only make this certification for those portions of the construction site where the permittee was authorized under this permit and not for areas where the permittee was not an operator:

"I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that authorized by a general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Clean Water Act."

For the purposes of this certification, elimination of storm water discharges associated with construction activity means that all disturbed soils at the portion of the construction site where the operator had control have been finally stabilized (as defined in Part IX.I) and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time to ensure final stabilization is maintained, or that all storm water discharges associated with construction activities from the identified site that

are authorized by a NPDES general permit have otherwise been eliminated from the portion of the construction site where the operator had control.

B. Addresses

1. All Notices of termination, signed in accordance with Part VI.G of this permit, are to be submitted using the form provided by the Director (or a photocopy thereof), to the address specified on the NOT form.

Part IX. Definitions

A. *Best Management Practices (BMPs)* means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to waters of the United States. BMPs also include treatment requirements, operating procedures, and practice to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

B. *Control Measure* as used in this permit, refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the United States.

C. *Commencement of Construction* the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

D. *CWA* means the Clean Water Act or the Federal Water Pollution Control Act, 33 U.S.C. section 1251 *et seq.*

E. *Director* means the Regional Administrator of the Environmental Protection Agency or an authorized representative.

F. *Discharge* when used without qualification means the "discharge of a pollutant."

G. *Discharge of Storm Water Associated with Construction Activity* as used in this permit, refers to a discharge of pollutants in storm water runoff from areas where soil disturbing activities (*e.g.*, clearing, grading, or excavation), construction materials or equipment storage or maintenance (*e.g.*, fill piles, borrow area, concrete truck washout, fueling), or other industrial storm water directly related to the construction process (*e.g.*, concrete or asphalt batch plants) are located.

H. *Facility or Activity* means any NPDES "point source" or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

I. *Final Stabilization* means that either:

1. All soil disturbing activities at the site have been completed and a uniform (*e.g.*, evenly distributed, without large bare areas) perennial vegetative cover with a density of 70% of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or goetextiles) have been employed. In such parts of the country, background native vegetation will cover less than 100% of the ground (*e.g.*, arid areas, beaches). Establishing at least 70% of the natural cover of the native vegetation meets the vegetative cover criteria for final stabilization (*e.g.*, if the native vegetation covers 50% of the ground, 70% of 50% would require 35% total cover for final stabilization; on a beach with no natural vegetation, no stabilization is required); or

2. For individual lots in residential construction by either: (a) The homebuilder completing final stabilization as specified above, or (b) the homebuilder establishing temporary stabilization including perimeter controls for an individual lot prior to occupation of the home by the homeowner and informing the homeowner of the need for, and benefits of, final stabilization. (Homeowners typically have an incentive to put in the landscaping functionally equivalent to final stabilization as quick as possible to keep mud out of their homes and off sidewalks and driveways.); or

3. For construction projects on land used for agricultural purposes (*e.g.*, pipelines across crop or range land), final stabilization may be accomplished by returning the disturbed land to its preconstruction agricultural use. Areas disturb that were not previously used for agricultural activities, such as buffer strips immediately adjacent to "water of the United States," and area which are not being returned to their preconstruction agricultural use must meet the final stabilization criteria (1) or (2) above.

J. *Flow-Weighted Composite Sample* means a composite sample consisting of a mixture of aliquots collected at a constant time interval, where the volume of each aliquot is proportional to the flow rate of the discharge.

K. *Large and Medium Municipal Separate Storm Sewer System* means all municipal separate storm sewers that are either:

1. Located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and G of 40 CFR 122); or

2. Located in the countries with unincorporated urbanized populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships or towns within such counties (these counties are listed in Appendices H and I of 40 CFR 122); or

3. Owned or operated by a municipality other than those described in paragraph (i) and (ii) and that are designated by the Director as part of the large or medium municipal separate storm sewer system.

L. *NOI* means Notice of Intent to be covered by this permit (see Part II of this permit.)

M. *NOT* means Notice of Termination (see Part VIII of this permit).

N. *Operator* for the purpose of this permit and in the context of storm water associated with construction activity, means any party associated with a construction project that meets either of the following two criteria:

1. The party has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications; or

2. The party has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a storm water pollution prevention plan for the site or other permit conditions (*e.g.*, they are authorized to direct workers at a site to carry out activities required by the SWPPP or comply with other permit conditions).

This definition is provided to inform permittees of EPA's interpretation of how the regulatory definitions of "owner or operator" and "facility or activity" are applied to discharges of storm water associated with construction activity.

O. *Owner or operator* means the owner or operator of any "facility or activity" subject to regulation under the NPDES program.

P. *Point Source* means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Q. *Pollutant* is defined at 40 CFR 122.2. A partial listing from this definition includes: dredged spoil, solid waste, sweage, garbage, sewage sludge, chemical wastes, biological materials,

heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial or municipal waste.

R. *Runoff coefficient* means the fraction of total rainfall that will appear at the conveyance as runoff.

S. *Storm Water* means storm water runoff, snow melt runoff, and surface runoff and drainage.

T. *Storm Water Associated with Industrial Activity* is defined at 40 CFR 122.26(b)(14) and incorporated here by reference. Most relevant to this permit is 40 CFR 122.26(b)(14)(x), which relates to construction activity including clearing, grading and excavation activities that result in the disturbance of five (5) or more acres of total land area, or are part of a larger common plan of development or sale.

U. *Waters of the United States* means:

1. All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

2. All interstate waters, including interstate "wetland";

3. All other waters such as interstate lakes, rivers, streams (including intermittent streams), mudflat, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

a. Which are or could be used by interstate or foreign travelers for recreational or other purposes;

b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

c. Which are used or could be used for industrial purposes by industries in interstate, commerce;

4. All impoundments of waters otherwise defined as waters of the United States under this definition;

5. Tributaries of waters identified in paragraphs (a) through (d) of this definition;

6. The territorial sea; and

7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraph 1. through 6. of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirement of the CWA (other than cooling ponds for steam electric generation stations per 40 CFR 423) which also meet the criteria of this definition) are not waters of the United States. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

Part X. Permit Conditions Applicable to Specific States, Indian Country Lands, or Territories

The provisions of this Part provide modifications or additions to the applicable conditions of Parts I through IX of this permit to reflect specific additional conditions required as part of the State or Tribal CWA Section 401 certification process, or Coastal Zone Management Act certification process, or as otherwise established by the permitting authority. The additional revisions and requirements listed below are set forth in connection with, and only apply to, the following States, Indian Country lands and Federal facilities.

A. Region 1

1. CTR10*##I: Indian Country Lands in the State of Connecticut

No additional requirements.

2. MAR10*###: Commonwealth of Massachusetts, Except Indian Country Lands

a. Part I.B.4 is added to the permit as follows:

Special Requirements for the State of Massachusetts

a. Discharges covered by the general permit must comply with the provisions of 314 CMR 3.00, 314 CMR 4.00, 314 CMR 9.00 and 310 CMR 10.00 and any related policies promulgated under the authority of the Massachusetts Clean Waters Act, M.G.L. c.21, ss.23–56, and Wetlands Protection Act, M.G.L. c.131 s.40. Specifically, construction activities subject to this permit must comply with applicable storm water performance standards prescribed by State regulation or policy. Construction activities subject to jurisdiction under 310 CMR 10.00 must comply with an Order or Superseding Order of Conditions. An application for a permit under 314 CMR 3.00 is required only when required by 314 CMR 3.04(2)(b) or is otherwise identified in 314 CMR 3.00 or Massachusetts Department of Environmental Protection policy as a discharge requiring a permit application.

b. The Massachusetts Department of Environmental Protection may request a copy of the storm water pollution prevention plan or conduct an inspection of any facility covered by this permit to ensure compliance with State law requirements. The Department may enforce its certification conditions.

3. MAR10*##I: Indian Country Lands in the Commonwealth of Massachusetts

No additional requirements.

4. MER10*###: State of Maine, Except Indian Country Lands

a. The following is added to the introductory section of Part IV:

The applicant for a project that does not require a permit pursuant to Maine's Storm Water Management Law, 38 MRSA 420–D due to the exemption at 38 MRSA 490–D(7)(D), must demonstrate to the satisfaction of the Maine Department of Environmental Protections (MDEP) prior to starting construction that the project meets the standards adopted pursuant to Maine's Storm Water Management Law, 38 MRSA 420–D.

b. The following is added to the introduction to Part IV. D:

For a project not requiring a permit pursuant to Maine's Storm Water Management Law, 38 MRSA 420–D, due to the exemption at 38 MRSA–D(7)(D),* the following information is provided: Maine's storm water permit application, as approved by MDEP, is considered to meet the requirements of the storm water pollution prevention plan as described in Part IV D.1, 2a, 2b, and 2c(1–5). Maine's storm water permit application is not considered to meet the requirements of Part IV D.2c(6) (threatened and endangered species and/or critical habitat), Part IV.D.3 (maintenance), Part IV.D.4. (inspection), or Part IV D.5. (non-storm water discharges).

For a project requiring a permit pursuant to Maine's Storm Water Management Law, 38 MRSA 420–D, or otherwise required to meet Maine's storm water standards adopted pursuant to 38 MRSA 420–D, the following information is provided: a permit or variance application addressing Storm water, as approved by MDEP, is considered to meet the requirements of the storm water pollution prevention plan as described in Part IV.D.1, 2a, 2b, 2c(1–5), 3 and 4. Maine's permit or variance application addressing storm water, as approved by MDEP, is not considered to meet the requirements in Part IV.D.2c(6) and (7) which address threatened and endangered species and/or critical habitat and historic sites, or Part IV.D.5 (non storm water discharges).

*A project that is exempt form the Storm Water Management Law, due to the exemption at 38 MRSA 490–D(7)(D) and some other exemptions listed at 38 MRSA 490–D(7), is not required to complete a Maine storm water permit application.

5. MER10*##I: Indian Country Lands in the State of Maine.

No additional requirements.

6. NHR10*###: State of New Hampshire, Except Indian County Lands

No additional requirements.

7. RIR10*##I: Indian Country Lands in the State of Rhode Island

No additional requirements.

8. VTR10*##F: Federal Facilities in the State of Vermont, Except Those Located on Indian Country Lands

No additional requirements.

B. Region 2

1. NYR10*##I: Indian Country Lands in the State of New York

No additional requirements.

2. PRR10*###: The Commonwealth of Puerto Rico

No additional requirements.

C. Region 3

1. DCR10*###: The District of Columbia

No additional requirements.

2. DER10*##F: Federal Facilities in the State of Delaware

No additional requirements.

D. Region 7

1. IAR10*##I: Indian Country Lands in the State of Iowa

No additional requirements.

2. KSR10*##I: Indian Country Lands in the State of Kansas

No additional requirements.

3. NER10*##I: Indian Country Lands in the State of Nebraska, Except Pine Ridge Reservation Lands (see Region 8)

No additional requirements.

E. Region 8

1. COR10*##F: Federal Facilities in the State of Colorado, Except Those Located on Indian Country Lands

No additional requirements.

2. COR10*##I: Indian Country Lands in the State of Colorado, Including the Portion of the Ute Mountain Reservation Located in New Mexico

No additional requirements.

3. MTR10*##I: Indian Country Lands in the State of Montana

a. Confederated Salish & Kootenai Tribes of the Flathead Reservation. Copies of Notices of Intent (NOI), Notices of Termination (NOT), and Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Confederated Salish and Kootenai Tribes' Natural Resources Department.

(1) Part II.C.2 is added to the permit as follows:

Special NOI Requirements for the Flathead Indian Reservation. NOIs shall also be submitted to the Confederated Salish and Kootenai Tribes at the same time they are submitted to EPA at the following address: Confederated Salish and Kootenai Tribes, Natural Resources Department, Department Head, P.O. Box 278, Pablo, MT 59855.

(2) Part VIII.B.2 is added to the permit as follows:

Special NOT Requirements for the Flathead Indian Reservation. NOTs shall also be submitted to the Confederated Salish and Kootenai Tribes at the same time they are submitted to EPA. NOTs are to be sent to the address given in Part II.C.2.

(3) Part IV.A.3 is added to the permit as follows:

Special Storm Water Pollution Prevention Plan Requirements for the Flathead Indian Reservation. Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Confederated Salish and Kootenai Tribes' Natural Resources Department before a project on the Flathead Indian Reservation begins. SWPPPs are to be sent to the address given in Part II.C.2.

b. All Other Indian Country lands in Montana. No additional requirements.

4. NDR10*##I: Indian Country Lands in the State of North Dakota, Including That Portion of the Standing Rock Reservation Located in South Dakota (Except for the Lake Traverse Reservation Which is Covered Under South Dakota Permit SDR10*##I Listed Below)

No additional requirements.

5. SDR10*##I: Indian Country Lands in the State of South Dakota, Including the Portion of the Pine Ridge Reservation Located in Nebraska and the Portion of the Lake Traverse Reservation Located in North Dakota (Except for the Standing Rock Reservation Which is Covered Under North Dakota Permit NDR10*##I Listed Above)

No additional requirements.

6. UTR10*##I: Indian Country Lands in the State of Utah, Except Goshute and Navajo Reservation Lands (see Region 9)

No additional requirements.

7. WYR10*##I: Indian Country Lands in the State of Wyoming

No additional requirements.

F. Region 9

1. ASR10*###: The Island of American Samoa

No additional requirements.

2. AZR10*###: The State of Arizona, Except Indian Country Lands

a. Part II.C.2 is added to the permit as follows:

Special NOI Requirements for the State of Arizona. NOIs shall also be submitted to the State of Arizona Department of Environmental Quality at the following address: Storm Water Coordinator, Arizona Department of Environmental Quality, 3033 North Central Avenue, Phoenix, Arizona 85012.

NOIs submitted to the State of Arizona shall include the well registration number if storm water associated with industrial activity is discharged to a dry well or an injection well.

b. Part VIII.B.2 is added to the permit as follows:

Special Not Requirement for the State of Arizona. NOTs shall also be submitted to the State of Arizona Department of Environmental Quality at the following address: Storm Water Coordinator, Arizona Department of Environmental Quality, 3033 North Central Avenue, Phoenix, Arizona 85012.

3. AZR10*##I: Indian Country Lands in the State of Arizona, Including Navajo Reservation Lands in New Mexico and Utah

No additional requirements.

4. CAR10*##I: Indian Country Lands in the State of California

No additional requirements.

5. GUR10*###I: The Island of Guam

a. Part II.C.2 of the permit is added as follows:

Special NOI Requirement for Guam. NOIs shall also be submitted to the following address: Guam Environmental Protection Agency, P.O. Box 22439 GMF, Barrigada, Guam 96921.

b. Part VI.L.4 is added to the permit as follows: Special Requirement for Guam. Individual permit applications required under this section shall also be submitted to the following address: Guam Environmental Protection Agency, P.O. Box 22439 GMF, Barrigada, Guam 96921.

6. JAR10*###: Johnston Atoll

No additional requirements.

7. MWR10*###: Midway Island and Wake Island

No additional requirements.

8. NIR10*###: Commonwealth of the Northern Mariana Islands

a. Part II.A.8 of the permit is added as follows:

NOI Deadline for CNMI. The NOI submitted to the CNMI Department of Environmental Quality (DEQ) shall be postponed seven (7) calendar days prior to any storm water discharges.

b. Part II.B.4 of the permit is added as follows:

Additional Requirements for CNMI. The NOI submitted to CNMI and EPA Region 9 shall be accompanied by a letter from the CNMI DEQ approving the storm water pollution prevention plan required by Part IV of this permit.

c. Part II.C.2 of the permit is added as follows:

Special NOI Requirements for CNMI. NOIs shall also be submitted to the following addresses:

Commonwealth of the Northern Mariana Islands, Division of Environmental Quality, P.O. Box 1304, Saipan, MP 96950

EPA, Region 9, Section WTR-5, 75 Hawthorne Street, San Francisco, CA 94105

d. Part IV.A.3 of the permit is added as follows:

Special Requirements for CNMI. Storm water pollution prevention plans (SWPPPs) required by this permit shall be submitted to the CNMI DEQ for review and approval along with applicable fees associated with a 401 Water Quality Certification prior to submittal of an NOI to EPA and the CNMI DEQ. SWPPPs are to be sent to the address given in Part II.C.2.

9. NVR10*##: Indian Country Lands in the State of Nevada, including the Duck Valley Reservation in Idaho, the Fort McDermitt Reservation in Oregon and the Goshute Reservation in Utah

No additional requirements.

G. Region 10

1. AKR10*###: The State of Alaska, Except Indian Country Lands

a. Part II.C.2 is added to the permit as follows:

Special NOI Requirements for the State of Alaska. A copy of the Notice of Intent must be sent to the Department of Environmental Conservation offices as listed below:

For projects nearest to Anchorage or Fairbanks: Alaska Department of Environmental Conservation, Water Quality Permitting Section/Storm Water, 555 Cordova Street, Anchorage, AK 99501, (907) 563-6529, FAX (907) 562-4026.

For projects in southeast Alaska, nearest to Juneau: Alaska Department of Environmental Conservation, Water Quality Permitting Section/Storm Water, 410 Willoughby Avenue, Juneau, AK 99801.

b. Part IV.A.3 is added to the permit as follows:

Special Storm Water Pollution Prevention Plan Requirements for the State of Alaska. Permittees shall obtain DEC approval of the Storm Water Pollution Prevention Plan for the construction site pursuant to 18 AAC 72.600(a). Plans are to be approved and sealed by a Professional Engineer registered in the State of Alaska, shall be submitted to the same DEC office that the Notice of Intent is sent to, and shall be accompanied by any State-required fee. A failure to secure approval as provided in this paragraph shall be deemed a violation of this general permit, but shall not prevent storm water discharges from being authorized by this general permit. (18 AAC 72.600(a), 18 AAC 72.610(a)(8), and 18 AAC 72.990(32)).

c. Part IV. D.2.b.(3) is added to the permit as follows:

Special Storm Water Management Requirements for the State of Alaska. The permittee is responsible for any post-stabilization requirements, such as the removal of pollution control devices and the control of pollutant discharges at that time, if these devices are not a permanent part of the pollution prevention controls after final stabilization.

d. Part VIII.B.2 is added to the permit as follows:

Special NOT Requirements for the State of Alaska. NOTs shall also be submitted to the State of Alaska at the same time they are submitted to EPA. NOTs are to be sent to the address given in Part II.C.2.

s. AKR10*##I: Indian Country Lands in Alaska

No additional requirements.

3. IDR10*###: The State of Idaho, Except Indian Country lands

a. Part III.F is added to the permit as follows:

Special Water Quality Standard Requirements for the State of Idaho. In addition to the requirements for coverage identified in the subject permit, the Storm Water Pollution Prevention Plan (SWPPP) design and associated storm water discharge quality shall demonstrate compliance with applicable Idaho Water Quality Standards.

4. IDR10*##I: Indian Country Lands in the State of Idaho, Except Duck Valley Reservation Lands (see Region 9)

No additional requirements.

5. ORR10*##I: Indian Country Lands in the State of Oregon Except Fort McDermitt Reservation Lands (see Region 9)

No additional requirements.

6. WAR*##F: Federal Facilities in the State of Washington, Except Those Located on Indian Country Lands

The Washington Department of Ecology includes these conditions to ensure compliance with R.W. 90.48.080 and rules referenced in the conditions above established in accordance with R.W. 90.48.035.

a. Part III.F.1 is added to the permit as follows:

Special Requirements for Federal Facilities in the State of Washington. The permittee is responsible for achieving compliance with State of Washington surface water quality standards (Chapter 173-201A WAC), sediment management standards (Chapter 173-204 WAC), ground water quality standards (Chapter 173-200 WAC), and human health based criteria in the National Toxics Rule (**Federal Register**, Vol. 57, No. 246, Dec. 22, 1992, pages 60848-609233).

b. Part III.F.2 is added to the permit as follows:

Special Ground Water Protection Requirements for Federal Facilities in the State of Washington. Diversion of storm water discharges to ground water from existing discharges to surface water shall not be authorized by this permit if this causes a violation or the potential for violation of ground water standards (Chapter 173-200 WAC). Such discharges below the surface of the ground are also regulated by the Underground Injection Control Program (Chapter 173-218 WAC).

c. Part III.F.3 is added to the permit as follows:

Special Numeric Limitations for Federal Facilities in the State of Washington.

Discharges of storm water to surface water from concrete batch or hot mix asphalt plants covered by this permit shall have an average monthly or daily maximum pH between 6.0-9.0 and a turbidity of less than 50 NTUs.

Discharges of storm water to the ground from concrete batch or hot mix asphalt plants covered by this permit shall have an average monthly or daily maximum pH between 6.5-8.5.

It needs to be reiterated that this permit does not authorize the discharge

of process water from concrete batch or hot mix asphalt plants.

d. Part III.F.4 is added to the permit as follows:

Special Requirement for Federal Facilities in the State of Washington. "Comeback Asphalt" must be contained within a lined area so that no leaching to ground or surface water can occur.

7. WAR10*##I: Indian Country Lands in the State of Washington

a. Confederated Tribes of the Chehalis Reservation. Copies of Notices of Intent (NOI) and Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Chehalis Tribal Department of Natural Resources.

(1) Part II.C.2 is added to the permit as follows:

Special NOI Requirements for the Confederated Tribes of the Chehalis Reservation.

NOI shall also be submitted to the Confederated Tribes of the Chehalis Reservation at the same time they are submitted to EPA at the following address: Confederated Tribes of Chehalis Reservation, Department of Natural Resources, 420 Howanut Road, Oakville, WA 98568.

(2) Part IV.A.3 is added to the permit as follows:

Special Storm Water Pollution Prevention Plan Requirements for the Confederated Tribes of the Chehalis Reservation. Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Chehalis Tribal Department of Natural Resources for review and approval prior to the beginning of any discharge activities taking place. SWPPPs are to be sent to the address given in Part II.C.2.

(3) Part III.I is added to the permit as follows:

Special Water Quality Standard Requirements for the Confederated Tribes of the Chehalis Reservation. The permittee shall be responsible for achieving compliance with Confederated Tribes of Chehalis Reservation's Water Quality Standards.

b. Puyallup Tribe of Indians. Copies of Notices of Intent (NOI) and Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Puyallup Tribe Environmental Department.

(1) Part II.C.2 of the permit is added as follows:

Special NOI Requirements for the Puyallup Tribe of Indians. NOIs shall also be submitted to the Puyallup Tribe Environmental Department at the same time they are submitted to EPA at the following address: Puyallup Tribe Environmental Department, 2002 E. 28th St., Tacoma, WA 98404.

(2) Part IV.A.3 is added to the permit as follows:

Special Storm Water Pollution Prevention Plan Requirements for the Puyallup Tribe of Indians. Storm Water Pollution Prevention Plans (SWPPPs) must be submitted to the Puyallup Tribe Environmental Department for review and approval prior to the beginning of any discharge activities taking place. SWPPPs are to be sent to the address given in Part II.C.2.

(3) Part III.F. is added to the permit as follows:

Special Water Quality Standard Requirements for the Puyallup Tribe of Indians. Each permittee shall be responsible for achieving compliance with the Puyallup Tribe's Water Quality Standards.

c. All Other Indian Country lands in Washington. No additional requirements.

Addendum A—Endangered Species

I. Instructions for Applicants

A. Background

To meet its obligations under the Clean Water Act and the Endangered Species Act (ESA) and to promote these Acts' goals, the Environmental Protection Agency (EPA) is seeking to ensure the activities regulated by the Construction General Permit (CGP) are protective of endangered and threatened species and critical habitat. To ensure that those goals are met, applicants for CGP coverage are required under Part I.B.3.e. to assess the impacts of their storm water discharges and storm water discharge-related activities on Federally listed endangered and threatened species ("listed species") and designated critical habitat ("critical habitat") by following Steps One through Six listed below. EPA strongly recommends that applicants follow these steps at the earliest possible stage to ensure that measures to protect listed species and critical habitat are incorporate early in the planning process. At minimum, the procedures should be followed when developing the storm water pollution prevention plan.

Permittees and applicants also have an independent ESA obligation to ensure that their activities do not result in any prohibited "takes" of listed species.[1] Many of the measures required in the CGP and in these instructions to protect species may also assist permittees in ensuring that their construction activities do not result in a prohibited take of species in violation of section 9 of the ESA. Applicants who plan construction activities in areas that harbor endangered and threatened species are advised to ensure that they are protected from potential takings liability under ESA section 9 by obtaining either an ESA section 10 permit or by requesting formal consultation under ESA section 7 (as described in more detail in Step Seven below). Applicants who seek protection from takings liability should be aware that it is possible that some specific construction activities may be too unrelated to storm water discharges to be afforded incidental take coverage through an ESA section 7 consultation that is performed to meet the eligibility requirements for CGP coverage. In such instances, applicants should apply for an ESA section 10 permit. Where applicants are not sure whether to pursue a section 10 permit or a section 7 consultation for takings protection, they should confer with the appropriate Fish and Wildlife Service (FWS) or National Marine Fisheries Service (NMFS) office.

This permit provides for the Possibility of multiple permittees at a construction site. Applicants should be aware that in many cases they can meet the permit eligibility requirements by relying on another operator's certification of eligibility under Part 1.B.3.e.(2)(a), (b), or (c), this is allowed under Part I.B.3.e.(2)(d) of the permit. However, the other operator's certification must apply to the applicant's project area and must address the effects from the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based. This situation will typically occur where a developer or primary contractor, such as one for construction of a subdivision or industrial part, conducts a comprehensive assessment of effects on listed species and critical habitat for the entire construction project, certifies eligibility under Part I.B.3.e.(2)(a), (b) or (c), and that certification is relied upon by other operators (*i.e.*, contractors) at

[1] Section 9 of the ESA prohibits any person from "taking" a listed species (*e.g.*, harassing or harming it) unless: (1) The taking is authorized through a "incidental take statement" as part of undergoing ESA § 7 formal consultation; (2) where an incidental take permit is obtained under ESA § 10 (which requires the development of a habitat conservation plan); or (3) where otherwise authorized or exempted under the ESA. This prohibition applies to all entities including private individuals, businesses, and governments.

the site. However, applicants that consider relying on another operator's certification should carefully review that certification along with any supporting information. If an applicant does not believe that the operator's certification provides adequate coverage for the applicant's storm water discharges and storm water discharge-related activities or for the applicant's particular project area, the applicant should provide its own independent certification under Part I.B.3.e.(2)(a), (b), or (c).

B. Procedures

To receive coverage under the Construction General Permit, applicants must assess the potential effects of their storm water discharges and storm water discharge-related activities on listed species and their critical habitat. To make this assessment, applicants must follow the steps outlined below prior to completing and submitting Notice of Intent (NOI) form. Applicants who are able to certify eligibility under Parts I.B.3.e.(2)(b), (c) or (d) because of a previously issued ESA section 10 permit, a previously completed ESA section 7 consultation, or because the applicant's activities were already addressed in another operator's certification of eligibility may proceed directly to Step Six.

Note—The revised NOI form which was included in the CGP (see 62 FR 29822–29823, June 2, 1997) requires that applicants provide detailed certification information on listed species. That form is still under development and is not expected to be finalized before this permit is issued. Until the revised NOI form is finalized, applicants must use the existing NOI form which does not contain the specific certification provisions relating to listed species and critical habitats at construction projects. However, use of the existing NOI form does not relieve applicants of their obligation to follow the procedures listed below to determine if their construction storm water discharges or storm water discharge-related activities meet permit eligibility requirements for the protection of listed species and critical habitat. By following these instructions, applicants will have sufficient information on listed species and critical habitat in order to complete either the existing or revised NOI form and sign the certification statement.

Step One: Determine if the Construction Site is Found Within Designated Critical Habitat for Listed Species

Some, but not all, listed species have designated critical habitat. Exact locations of such habitat is provided in the Service regulations at 50 CFR Parts 17 and 226. To determine if their construction site occurs within designated critical habitat, applicants should either:

- Contact the nearest Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) Office. A list of FWS and NMFS offices is found in Section II of this Addendum; or
- Contact the State or Tribal Natural Heritage Centers. These centers compile and disseminate information on Federally listed and other protected species. They frequently have the most current information on listed species and critical habitat. A list of these centers is provided in Section III of this Addendum; or
- Review those regulations (which can be found in many larger libraries).

If the construction site is not located in designated critical habitat, then the applicant does not need to consider impacts to critical habitat when following Steps Two through Six below. If the site is located within critical habitat, then the applicant must look at impacts to critical habitat when following Steps Two through Six. Note that many but not all measures imposed to protect listed species under these steps will also protect critical habitat. Thus, meeting the eligibility requirements of this permit may require measures to protect critical habitat that are separate from those to protect listed species.

Step Two: Determine if Listed Species are Located in the County(ies) Where the Construction Activity Will Occur

Section IV of the Addendum contains a county-by-county list of listed endangered and threatened species ("listed species"), and proposed endangered and threatened species ("proposed species"). Since the list was current as of September 1, 1997, applicants must also check with other sources for updated species and county information. These sources include: Sections II and III of this Addendum; EPA's Office of Wastewater Management's web page at "http://www.epa.gov/owm" where updates of the county-by-county list will be posted on a periodic basis; **Federal Register** Notices; State wildlife protection offices; a biologist or similar professional in the environmental field; or any other method which can be reasonably expected to provide this information. Applicants with construction projects located in EPA Region 2 can call the Storm Water General Permits Hotline at (800) 245–6510 for further assistance, while applicants with projects located in EPA Regions 1, 3, 7, 8, 9 and 10 may contact the appropriate EPA Regional Office.

Where a facility is located in more than one county, the lists for all counties should be reviewed. Where a facility discharges into a water body which serves as a border between counties or which crosses a county line which is in the immediate vicinity of the point of discharge, applicants should also review the species list for the county which lies immediately downstream or is across the water body from the point of discharge.

After a review of the available information from the sources mentioned above, if no listed species are located in a facility's county or if a facility's county is not listed, and the construction site is not located in critical habitat as described under Step One, an applicant is eligible for CGP coverage without further inquiry into the presence of, or effect to, listed species. The applicant must check the appropriate certification item on the revised NOI form (Part I.B.3.e.(2)(a)).

Once the applicant has determined which listed species are located in his or her facility's county, the applicant must follow Step Three.

Step Three: Determine if Any Federally Listed Endangered and Threatened Species May Be Present in the Project Area

The project area consists of:

- The areas on the construction site where storm water discharges originate and flow toward the point of discharge into the receiving waters (including areas where excavation, site development, or other ground disturbance activities occur) and the immediate vicinity.

Example(s)

1. Where bald eagles nest in a tree that is on or bordering a construction site and could be disturbed by the construction activity.

2. Where grading causes storm water to flow into a small wetland or other habitat that is on the site which contains listed species.

- The areas where storm water discharges flow from the construction site to the point of discharge into receiving waters.

Example(s)

1. Where storm water flows into a ditch, swale, or gully which leads to receiving waters and where listed species (such as amphibians) are found in the ditch, swale, or gully.

- The areas where storm water from construction activities discharge into receiving waters and the areas in the immediate vicinity of the point of discharge.

Example(s)

1. Where storm water from construction activities discharges into a

stream segment that is known to harbor listed aquatic species.

• The areas where storm water BMPs will be constructed and operated, including any areas where storm water flows to and from BMPs.

Example(s)

1. Where a storm water retention pond would be built.

The protect area will vary with the size and structure of the construction activity, the nature and quantity of the storm water discharges, the storm water discharge-related activities and the type of receiving water. Given the number of construction activities potentially covered by the CGP, no specific method to determine whether listed species may be located in the project area is required for coverage under the CGP. Instead, applicants should use the method which allows them to determine, to the best of their knowledge, whether listed species are located in their project area. These methods may include:

• Conducting visual inspections: This method may be particularly suitable for construction sites that are smaller in size or located in non-natural settings such as highly urbanized areas or industrial parks where there is little or no natural habitat, or for construction activities that discharge directly into municipal storm water collection systems.

• Contacting the nearest State or Tribal wildlife agency, the Fish and Wildlife Service (FWS), or the National Marine Fisheries Service (NMFS). Many endangered and threatened species are found in well-defined areas or habitats. Such information is frequently known to State, Tribal, or Federal wildlife agencies. A list of FWS and NMFS offices is provided in section II of this Addendum below.

• Contacting local/regional conservation groups or the State or Tribal Natural Heritage Centers (see section III of this Addendum). State and local conservation groups may have location specific listed species information. The Natural Heritage Centers inventory species and their locations and maintain lists of sightings and habitats.

• Submitting a data request to a Natural Heritage Center. Many of these centers will provide site specific information on the presence of listed species in a project area. Some of these centers will charge a fee for researching data requests.

• Conducting a formal biological survey. Larger construction sites with extensive storm water discharges may choose to conduct biological surveys as the most effective way to assess whether species are located in the project area and whether there are likely adverse effects. Biological surveys are frequently performed by environmental consulting firms. A biological survey can be used to follow Steps Four through Six of these instructions.

• Conducting an environmental assessment under the National Environmental Policy Act (NEPA). Some construction activities may require environmental assessments under NEPA. Such assessments may indicate if listed species are in the project area. Coverage under the CGP does not trigger such an assessment because the permit does not regulate any dischargers subject to New Source Performance Standards under section 306 of the Clean Water Act, and is thus statutorily exempted from NEPA. *See* CWA section 511(c). However, some construction activities might require review under NEPA because of Federal funding or other Federal involvement in the project.

If no species are found in the project area, an applicant is eligible for CGP coverage. Applicants must provide the necessary certification on the revised NOI form. If listed species are found in the project area, applicants must indicate the location and nature of this presence in the storm water pollution prevention plan and follow Step Four.

Step Four: Determine if Listed Species or Critical Habitat Are Likely To Be Adversely Affected by the Construction Activity's Storm Water Discharges or Storm Water Discharge-Related Activities

To receive CGP coverage, applicants must assess whether their storm water discharges or storm water discharge-related activities are likely to adversely affect listed species or critical habitat. "Storm water discharge-related activities" include:

• Activities which cause, contribute to, or result in point source storm water pollutant discharges, including but not limited to excavation, site development, grading, and other surface disturbance activities; and

• Measures to control storm water discharges including the siting, construction, operation of best management practices (BMPs) to control, reduce or prevent storm water pollution.

Potential adverse effects from storm water discharges and storm water discharge-related activities include:

• *Hydrological.* Storm water discharges may cause siltation, sedimentation or induce other changes in receiving waters such as temperature, salinity or pH. These effects will vary with the amount of storm water discharged and the volume and condition of the receiving water. Where a storm water discharge constitutes a minute portion of the total volume of the receiving water, adverse hydrological effects are less likely. Construction activity itself may also alter drainage patterns on a site where construction occurs which can impact listed species or critical habitat.

• *Habitat.* Excavation, site development, grading, and other surface disturbance activities from construction activities, including the installation or placement of storm water BMPs, may adversely affect listed species or their habitat. Storm water may drain or inundate listed species habitat.

• *Toxicity.* In some cases, pollutants in storm water may have toxic effects on listed species.

The scope of effects to consider will vary with each site. If the applicant is having difficulty in determining whether his or her project is likely to adversely affect a listed specie or critical habitat, then the appropriate office of the FWS, NMFS or Natural Heritage Center listed in sections II and III of this Addendum should be contacted for assistance. If adverse effects are not likely, then the applicant should make the appropriate certification on the revised NOI form and apply for coverage under the permit. If adverse effects are likely, applicants must follow Step Five.

Step Five: Determine if Measures Can Be Implemented to Avoid Any Adverse Effects

If an applicant makes a preliminary determination that adverse effects are likely, it can still receive coverage under Part I.B.3.e.(2)(a) of the CGP if appropriate measures are undertaken to avoid or eliminate the likelihood of adverse effects prior to applying for permit coverage. These measures may involve relatively simple changes to construction activities such as re-routing a storm water discharge to bypass an area where species are located, relocating BMPs, or by changing the "footprint" of the construction activity. Applicants may wish to contact the FWS and/or NMFS to see what appropriate measures might be suitable to avoid or eliminate the likelihood of adverse impacts to listed species and/or critical habitat. (See 50 CFR 402.13(b)). This can entail the initiation of informal consultation with the FWS and/or NMFS which is described in more detail in Step Six.

If applicants adopt measures to avoid or eliminate adverse affects, they must continue to abide by those measures during the course of permit coverage. These measures must be described in

the storm water pollution prevention plan and may be enforceable as permit conditions. If appropriate measures to avoid the likelihood of adverse effects are not available to the applicant, the applicant must follow Step Six.

Step Six: Determine if the Eligibility Requirements of Part I.B.3.e.(2)(b)–(d) Can Be Met

Where adverse effects are likely, the applicant must contact the EPA and FWS/NMFS. Applicants may still be eligible for CGP coverage if any likely adverse effects can be addressed through meeting the criteria of Part I.B.3.e.(2)(b)–(d) of the permit. These criteria are as follows:

1. *An ESA Section 7 Consultation Is Performed for the Applicant's Activity (See Part I.B.3.e.(2)(b).*

Formal or informal ESA section 7 consultation is performed with the FWS and/or NMFS which addresses the effects of the applicant's storm water discharges and storm water discharge-related activities on listed species and critical habitat. The formal consultation must result in either a "no jeopardy opinion" or a "jeopardy opinion" that identifies reasonable and prudent alternatives to avoid jeopardy which are to be implemented by the applicant. The informal consultation must result in a written concurrence by the Service(s) on a finding that the applicant's storm water discharge(s) and storm water discharge-related activities are not likely to adversely affect listed species or critical habitat (for informal consultation, *see* 50 CFR 402.13).

Most consultations are accomplished through informal consultation. By the terms of this permit, EPA has automatically designated applicants as non-Federal representatives for the purpose of conducting informal consultations. *See* Part I.B.3.e.(5) and 50 CFR 402.08 and 402.13. When conducting informal ESA section 7 consultation as a non-Federal representative, applicants must follow the procedures found in 50 CFR 402 of the ESA regulations.

Applicants must also notify EPA and the Services of their intention and agreement to conduct consultation as a non-Federal representative. Consultation may occur in the context of another Federal action at the construction site (*e.g.*, where ESA section 7 consultation was performed for issuance of a wetlands dredge and fill permit for the project or where a NEPA review is performed for the project which incorporates a section 7 consultation). Any terms and conditions developed through consultations to protect listed species and critical habitat must be incorporated into the SWPPP. As noted above, applicants may, if they wish, initiate consultation with the Services at Step Five.

Whether ESA section 7 consultation must be performed with either the FWS, NMFS or both Services depends on the listed species which may be affected by the applicant's activity. In general, NMFS has jurisdiction over marine, estuarine, and anadromous species. Applicants should also be aware that while formal section 7 consultation provides protection from incidental takings liability, informal consultation does not.

2. *An Incidental Taking Permit Under Section 10 of the ESA is Issued for the Applicants Activity (See Part I.B.3.e.(2)(c)).*

The applicant's construction activities are authorized through the issuance of a permit under section 10 of the ESA and that authorization addresses the effects of the applicant's storm water discharge(s) and storm water discharge-related activities on listed species and critical habitat. Applicants must follow FWS and/or NMFS procedures when applying for an ESA Section 10 permit (see 50 CFR section 17.22(b)(1)(FWS) and section 222.22(NMFS)). Application instructions for section 10 permits for NMFS species can be obtained by (1) accessing the "Office of Protected Resources" sector of the NMFS Home Page at "http://www.nmfs.gov" or (2) by contacting the National Marine Fisheries Service, Office of Protected Resources, Endangered Species Division, F/PR3,1315 East-West Highway, Silver Spring, Maryland 20910, telephone (301) 713–1401, fax (301) 713–0376.

3. *The Applicant is Covered Under the Eligibility Certification of Another Operator for the Project Area (See Part I.B.3.e.(2)(d)).*

The applicant's storm water discharges and storm water discharge-related activities were already addressed in another operator's certification of eligibility under Part I.B.3.e.(2)(b), or (c) which also included the applicant's project area. By certifying eligibility under Part I.B.3.e.(2)(d), the applicant agrees to comply with any measures or controls upon which the other operator's certification under Part I.B.3.e.(2)(a), (b) or (c) was based. Certification under Part I.B.3.e.(2)(d) is discussed in more detail in section I.A. of this addendum.

The applicant must comply with any terms and conditions imposed under the eligibility requirements of paragraphs I.B.3.e(2)(a), (b), (c), (d) to ensure that its storm waters discharges and storm water discharge-related activities are protective of listed species and/or critical habitat. Such terms and conditions must be incorporated in the project's SWPPP. If the eligibility requirements of Part I.B.3.e.(2)(a)–(d) cannot be met, then the applicant may not receive coverage under the CGP. Applicants should then consider applying to EPA for an individual permit.

II. List of Fish and Wildlife Service and National Marine Fisheries Service Offices

A. U.S. Fish and Wildlife Service Offices

National Website for Endangered Species Information

Endangered Species Home page: http://www.fws.gov/~r9endspp/endspp.html.

Regional, State, Field and Project Offices

Region 1

Regional Office

Division Chief, Endangered Species, U.S. Fish and Wildlife Service, ARD Ecological Services, 911 NE 11 Avenue, Portland, OR 97232–4181, (503) 231–6121

State, Field and Project Offices

Field Supervisor, U.S. Fish and Wildlife Service, P.O. Box 50088, 300 Ala Moana Blvd., Rm 3108, Honolulu, HI 96850

Field Supervisor, U.S. Fish and Wildlife Service, Upper Columbia R. Basin F&W Office, 11103 East Montgomery Drive, Ste 2, Spokane, WA 99306

State Supervisor, U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, 2600 S.E 98th Avenue, Suite 100, Portland, OR 97266

Field Supervisor, U.S. Fish and Wildlife Service, Snake River Basin F&W Office, 1387 South Vinnell Way, Room 368, Boise, ID 83709

State Supervisor, U.S. Fish and Wildlife Service, Nevada State Office, 4600 Kietzke Lane, Building C, Rm. 125, Reno, NV 89502–5093

State Supervisor, U.S. Fish and Wildlife Service, Western Washington F&W Office, 510 Desmond Dr., Suite 102, Lacey, WA 98503–1273

Field Supervisor, U.S. Fish and Wildlife Service, Klamath Falls F&W Office, 6600 Washburn Way, Klamath Falls, OR 97603

Field Supervisor, U.S. Fish and Wildlife Service, Klamath River F&W Office, 1215 South Main, Suite 212, Yreka, CA 96097–1006

Field Supervisor, U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, 2730 Loker Avenue West, Carlsbad, CA 92008

Field Supervisor, U.S. Fish and Wildlife Service, Ventura Field Office, 2493 Portola Road, Suite B, Ventura, CA 93003

Project Leader, U.S. Fish and Wildlife Service, Coastal California Fish and

Appendix B

Construction Quality Control Plan
Amchitka Island Mud Pit Closure

B.1.0 Use and Application of Plan

This Construction Quality Control (CQC) Plan (Plan) has been prepared to address construction materials and quality assurance/quality control procedures to be implemented during mud pit closures, hot mix plant closure, and monitoring well abandonment activities at the U.S. Department of Energy (DOE) sites located on Amchitka Island, Alaska. This Plan has been developed using the design drawings and the technical specifications, and is to be used in conjunction with these documents. If any discrepancies between the Plan and the above-referenced documents arise, the contract documents shall supersede this Plan.

B.1.1 Selection and Testing of Soils and Aggregates

The Plan shall be used to confirm soil and aggregate material quality and installation. The selection of soils and aggregates shall be based on the contract documents. Design requirement tables summarizing the testing requirements of soils and aggregates are located in Attachment B-2.

B.1.2 Selection and Testing of Geosynthetics

The Plan shall be used to confirm geosynthetic material quality and installation. The geosynthetic materials shall be selected to satisfy the specified requirements. Design requirement tables were prepared for all permitted geosynthetic components. These design requirement tables are included in Attachment B-2 of this Plan and shall be used to verify that the proposed material satisfies the specified requirements.

B.2.0 General

This Plan presents the QC requirements associated with the construction of the mud pit caps, surface water management systems, as well as the treatment of potentially contaminated water within the mud pits. It also presents QC activities associated with the hot mix plant closure and monitoring well abandonment. This Plan addresses the inspection and documentation procedures that shall be utilized before, during, and after construction to provide assurance, with a reasonable degree of certainty, that the remedial action meets the specifications.

This Plan describes the following:

- Sampling and testing procedures (both geotechnical and chemical) to be used in the field and in the laboratory
- Testing frequency
- Sampling parameters and sample locations
- Material specifications
- Procedures to be followed if a test fails
- The management structure, experience, and training of the testing personnel
- Contingency plan for anticipated construction difficulties

B.3.0 Responsible Parties and Lines of Communication

The general responsibilities and authorities of each of these parties, as well as the lines of communication, are described in the following paragraphs.

B.3.1 Responsibility and Authority

The principal parties involved in the Construction Quality Control (CQC) process include the Regulatory Agency, the DOE, the DOE's Project Engineer (DOE PE), the Contractor, the Geosynthetics CQC Laboratory, the Geosynthetics Manufacturer(s), the Geomembrane Installer, the Surveyor, and the Analytical Laboratory. The responsibility and/or authority of a given party may be modified or expanded, as dictated by specific project needs prior to commencement of work.

B.3.1.1 Regulatory Agency

The ADEC Contaminated Sites Group provides acceptance of the remedial activities after review of the as-built data.

B.3.1.2 Department of Energy

The DOE has responsibility for all aspects of the project and has final authority.

B.3.1.3 Department of Energy's Project Engineer

The DOE PE shall be a representative of a qualified firm contractor to the DOE with experience in construction quality assurance and quality control, particularly on projects involving similar facets as the project to be completed. The DOE PE reports directly to the DOE Task Manager, and is responsible to confirm that the contract documents are followed for all aspects of the closure activities. The DOE PE will be on site and supported by CQC monitoring personnel, the specific number of which are determined by the workload. The DOE PE shall designate a Certifying Engineer, who shall be a Professional Engineer registered in the State of Alaska. The Certifying Engineer shall be responsible for the CQC personnel and their activities, as well as the preparation of a report to certify that the project has been constructed in substantial compliance with the Plan. The DOE PE shall be capable of assigning technically qualified personnel to the project, including an

on-site Lead CQC Monitor and additional CQC Monitors, as needed. The DOE PE may utilize multiple Lead CQC Monitors such that each Lead CQC Monitor may be brought on site when project tasks are being performed for which the Lead CQC Monitor is experienced or specifically trained. The person designated as the Lead CQC Monitor shall possess a thorough knowledge of all aspects of earthwork and geosynthetic construction. CQC Monitors shall be specifically trained in quality assurance of geosynthetics, earthwork, and other construction materials and techniques related to the project.

In general, the responsibilities and authorities of the DOE PE shall include:

- Possessing a complete understanding of the contract documents
- Scheduling, coordinating, and performing CQC activities
- Performing independent on-site observation of the work in progress to assess compliance with the Plan and contract documents
- Recognizing and reporting deviations from the Plan and/or contract documents to the Contractor and DOE
- Verifying that testing equipment meets testing and calibration requirements, and that tests are conducted according to standardized procedures defined in the Plan
- Recording and maintaining test data accurately
- Identifying CQC-tested work that should be accepted, rejected, or further evaluated
- Verifying that corrective measures are implemented
- Documenting and reporting CQC activities
- Collecting data needed for record documentation
- Maintaining open lines of communication with other parties involved in the construction
- Providing final authority for acceptance of construction

B.3.1.4 Contractor

The Contractor is responsible for all activities as defined by the contract documents. These activities may include: planning activities, construction of sedimentation and erosion control facilities,

treatment of potentially contaminated water, solidification of drilling mud, placement of cover soils, installation of a geomembrane cover, and other related work items. It is the responsibility of the Contractor to supply labor, material, and equipment necessary to perform the work in accordance with the contract documents and this Plan.

B.3.1.5 Geosynthetics CQC Laboratory

The Geosynthetics CQC Laboratory staff shall be experienced in performing laboratory tests to determine geosynthetics characteristics as required by this Plan. The Geosynthetics CQC Laboratory shall demonstrate that it follows the standard test methods listed in the Plan and maintains the appropriate, calibrated equipment to perform the tests. The Geosynthetics CQC Laboratory is responsible for performing the laboratory testing required by the Plan to determine specific characteristics of the geosynthetics. The Geosynthetics CQC Laboratory is also responsible for providing adequate documentation of analytical results, test methods followed, and testing equipment used. The Geosynthetics CQC Laboratory will provide conformance data on the geosynthetics for DOE PE review prior to delivery. The laboratory may be owned by the Geosynthetics Manufacturer or the Geomembrane Installer.

B.3.1.6 Geosynthetics Manufacturer

The Geosynthetics Manufacturer(s) shall be able to provide sufficient production capacity and experience to meet the requirements of the contract documents. The Geosynthetics Manufacturer(s) is responsible for the production of geosynthetics that meet the requirements of the Plan. The Geosynthetics Manufacturer is also responsible for providing adequate documentation regarding the characteristics of the resin, the characteristics of the finished product, the testing performed to determine the characteristics, and the quality control measures taken during manufacturing. The Geosynthetics Manufacturer is also responsible for providing the manufacturer's warranty on all geosynthetics.

B.3.1.7 Geomembrane Installer

The Geomembrane Installer(s) shall be trained and qualified as required in the contract documents. Prior to mobilization, the Geomembrane Installer shall provide the DOE PE with information demonstrating qualifications as required by this Plan. The Geomembrane Installer shall provide the

DOE PE with a list of proposed seaming personnel and their professional resumes. The DOE PE shall review these certificates for adequacy. Proposed seaming personnel which do not meet the requirements of the contract documents shall not be accepted by the DOE PE. The Geomembrane Installer may designate one representative as a Superintendent, who will represent the Installer on site and at site meetings. The Superintendent shall be qualified by experience and must also exhibit good management skills. The Superintendent or designee shall be on site at all times during all geomembrane deployment and seaming activities. In addition, the Geomembrane Installer shall have at least one Seamer, who shall not be the Superintendent, that shall have a minimum of 1,000,000 square feet (ft^2) of field-seaming experience, and be experienced with extrusion welding, fusion welding, and welding in both hot and cold weather. If qualified, the Contractor may also act as the Geomembrane Installer.

Prior to installation, the Geomembrane Installer is responsible for the preparation of the panel layout drawing identifying fabricated and field seams including dimensions and details. The Geomembrane Installer is responsible for performing the quality control testing and providing quality control documentation of all installation activities. The DOE PE will oversee and approve all testing performed by the Geomembrane Installer. Upon completion of the installation, the Geomembrane Installer shall provide the geomembrane installation certification and the installation warranty to the DOE.

B.3.1.8 Surveyor

The Surveyor is a firm or person, retained by the Contractor, responsible for delineating and documenting all lines and grades associated with construction of the mud pit caps. All survey work shall be overseen by a Surveyor licensed in the State of Alaska. Surveying activities include surveying of all construction grades including, but not limited to, the top of stabilized mud, intermediate cover, geomembrane cover components (i.e., field seams, test locations), protective cover, soil cover, and vegetative layer. Additionally, the Surveyor will provide original ground surveys and final surveys at all the borrow areas. The Surveyor is also responsible for preparation of the construction as-built drawings, sealed by a Surveyor licensed in the State of Alaska, which include plan views of constructed components and cross sections necessary to estimate quantities of construction materials for payment.

B.3.2 Project Communication

To achieve a high degree of quality during installation, clear, open channels of communication are essential. The following meetings should be held, when appropriate.

B.3.2.1 Preinstallation Meeting

A Preinstallation Meeting shall be held one day prior to commencing a new definable feature of work. Preinstallation Meetings should be held for the following features:

- Erosion and sediment control installation
- Earthwork activities
- Water treatment plant start up
- Drilling mud solidification
- Geomembrane deployment
- Intermediate cover, protective cover, soil cover, and vegetative layer placement
- Site restoration activities

Additional features may be added, as required.

At a minimum, these meetings shall be attended by the DOE PE, the Contractor, and the Subcontractor (if any) performing the work. The purpose of this meeting is to:

- Define responsibilities of each party
- Establish lines of authority
- Establish CQC procedures
- Define the method of acceptance of the completed product
- Review schedules
- Review safety procedures

The DOE PE shall take records of the meeting and minutes will be distributed within 48 hours of the completion of the meeting.

B.3.2.2 Daily Meetings

A daily meeting may be held between the DOE PE, the Contractor, and other involved parties on an as-needed basis. Those attending will discuss, plan, and coordinate the work and CQC activities to be completed that day. These meetings may be held informally, and meeting minutes summarizing these meetings are not necessary.

B.3.2.3 Progress Meetings

Progress meetings may be held between the DOE, the DOE PE, and the Contractor approximately one per week or on an as-needed basis. Those attending will discuss current progress, planned activities for the next week, and new business or revisions to the work. The DOE PE will log problems, decisions, or questions arising at this meeting. Minutes of the meeting shall be taken by the DOE PE and shall be transmitted to all parties within 48 hours of the meeting.

B.3.2.4 Problem or Work Deficiency Meetings

A special meeting shall be held in the event that a problem or deficiency, which would impact the construction quality and/or schedule, is present or likely to occur. At a minimum, the meeting shall be attended by the Contractor, the DOE PE, and the Geomembrane Installer. Other entities shall be included, as appropriate. The DOE shall be notified prior to the meeting and will be invited to attend. The purpose of the meeting is to define and resolve the problem or work deficiency as follows:

- Define and discuss the problem or deficiency
- Review alternative solutions
- Implement an action plan to resolve the problem or deficiency

The DOE PE shall take records of the meeting, and minutes shall be transmitted to all parties within 48 hours of the completion of the meeting.

B.4.0 Mud Pit Closures

This section of the Plan addresses the activities related to the closure of each mud pit. These activities will include the following:

- Fill placement
- Compacted fill placement
- Drilling mud solidification
- Intermediate cover placement
- Geomembrane cover installation
- Protective cover placement
- Soil cover placement
- Vegetative layer placement

B.4.1 Fill

The soils for fill shall meet requirements for material characteristics and construction quality listed in Table B.2-1 of Attachment B-2**.** Laboratory testing of the borrow areas was previously completed during the field investigation to verify that the proposed borrow area soils meet the specifications for fill. On-site visual inspections and classifications of the borrow area soils will be performed by the DOE PE. These visual inspections are extremely important to verify that the material property requirements of the fill are met, and to monitor the consistency of these materials. Throughout construction, on-site QC testing shall be performed at specified intervals to ensure that the fill meets the requirements of this Plan and to verify the visual inspections/classifications.

B.4.1.1 Test Methods and Sampling Requirements

Table B.2-1 (Attachment B-2) presents the QC test methods and minimum test frequencies that shall be used to characterize and evaluate the construction quality of the soils for fill. The tests shall be conducted in accordance with the current versions of the corresponding standard methods referenced.

B.4.1.2 Fill - General Requirements

Fill shall consist of relatively homogeneous, cohesive or cohesionless soils, free of rock particles greater than four inches in size, frozen material, organic material, and other foreign debris. Samples shall be obtained from within the identified soil borrow area and tested as indicated in Table B.2-1 of

Attachment B-2. This table contains information regarding the tests to be performed, frequencies, sample size, and acceptance criteria, and locations of where samples for the fill will be collected.

B.4.1.3 Construction Testing

Testing of fill material will be performed by the DOE PE during construction to determine if fill is being installed in accordance with the tests, test frequencies, and acceptance criteria established in Table B.2-1 of Attachment B-2. Testing to be performed during construction shall include visual inspections of the soil placement and compaction and lift thickness verification.

B.4.2 Compacted Fill

The soils for compacted fill shall meet requirements for material characteristics and construction quality listed in Table B.2-1 of Attachment B-2. Laboratory testing of the borrow areas was previously completed during the field investigation to verify that the proposed borrow area soils meet the specifications for compacted fill. On-site visual inspections and classifications of the borrow area soils will be performed by the DOE PE. These visual inspections are extremely important to verify that the material property requirements of the compacted fill are met and to monitor the consistency of these materials. Throughout construction, on-site compaction testing shall be performed at specified intervals by the Contractor and approved by the DOE PE to ensure that the compacted fill meets the requirements of this Plan and to verify the visual inspections/classifications.

B.4.2.1 Test Methods and Sampling Requirements

Table B.2-1 (Attachment B-2) presents the test methods and minimum test frequencies that shall be used to characterize and evaluate the construction quality of the soils for compacted fill. The tests shall be conducted in accordance with the current versions of the corresponding standard methods referenced by the contractor and approved by the DOE PE.

B.4.2.2 Compacted Fill - General Requirements

The compacted fill shall consist of relatively homogeneous, cohesive or cohesionless, soils free of rock particles greater than four inches in size, frozen material, organic material, and other foreign debris. Samples shall be obtained from within the identified soil borrow area and tested as indicated

in Table B.2-1 of Attachment B-2**.** This table contains information regarding the tests to be performed, frequencies, sample size, acceptance criteria, and locations of where samples for the intermediate cover will be collected.

B.4.2.3 Construction Testing

Testing will be performed by the DOE PE during construction to determine if the compacted fill is being installed in accordance with the tests, test frequencies, and acceptance criteria established in Table B.2-1 of Attachment B-2. Testing to be performed during construction shall include visual inspections of the soil placement, and compaction and lift thickness verification.

B.4.3 Solidified Drilling Mud

The drilling mud will be solidified with on-site material excavated from the borrow areas at a ratio of four parts solidification soils to one part drilling mud by weight by mixing with conventional construction equipment.

B.4.3.1 Solidification Soils - General Requirements

The solidification soils shall consist of relatively homogeneous, cohesionless soils free of rock particles greater than six inches in size, frozen material, organic material, and other foreign debris.

B.4.3.2 Solidification Testing

A visual inspection will be done to confirm that a homogenous mixture is obtained. To ensure that the mixture is of proper consistency, in-place density testing by ASTM D2922 and ASTM D3017 will be done at an approximate frequency of 1 test per 1,000 cubic yards of solidification soils delivered to the site. This testing will be used to monitor the progression of the solidification process and the consistency of the solidified mud. The testing requirements and methodology are presented in Table B.2-1 of Attachment B-2.

B.4.4 Intermediate Cover

Intermediate cover will consist of a 12-inch thick layer of compacted soil. The soils for the intermediate cover shall meet requirements for material characteristics and construction quality listed

in Table B.2-1 of Attachment B-2. On-site visual inspections and classifications of the borrow area soils will be performed by the DOE PE. These visual inspections are extremely important to verify that the material property requirements of the intermediate cover are met, and to monitor the consistency of these materials. Throughout construction, on-site QC testing shall be performed at specified intervals to ensure that the intermediate cover meets the requirements of this Plan and to verify the visual inspections/classifications.

B.4.4.1 Test Methods and Sampling Requirements

Table B.2-1 within Attachment B-2 presents the laboratory and field test methods and minimum test frequencies that shall be used to characterize and evaluate the construction quality of the soils for intermediate cover. The tests shall be conducted in accordance with the current versions of the corresponding standard methods referenced.

B.4.4.2 Intermediate Cover - General Requirements

The intermediate cover shall consist of relatively homogeneous, cohesive or cohesionless soils, free of rock particles greater than one inch in size, frozen material, organic material, and other foreign debris. Samples shall be obtained from within the identified soil borrow area and tested as indicated in Table B.2-1 of Attachment B-2. This table contains information regarding the tests to be performed, frequencies, and acceptance criteria.

B.4.4.3 Construction Testing

Testing will be performed by the DOE PE during construction to determine if intermediate cover is being installed in accordance with the tests, test frequencies, and acceptance criteria established in Table B.2-1 of Attachment B-2. Testing to be performed during construction shall include visual inspections of the soil placement, and compaction and lift thickness verification.

B.4.5 Geomembrane

Following selection of the Geosynthetics Manufacturer, the manufacture, shipment, and installation of geosynthetics shall be conducted in accordance with the conformance test tables included in Attachment B-2. Throughout this section, laboratory and field tests will be referred to by name.

Table B.2-2 and Table B.2-3 in Attachment B-2 outline each proposed geosynthetics test, corresponding methodology, and lists the corresponding required testing values for each test. The DOE PE shall document the inventory, testing, and placement of all geosynthetics. The flexible membrane liner shall be comprised of a 30-mil liner for the composite cap system.

B.4.5.1 Manufacture, Shipment and Handling, and Storage

The following text addresses the activities associated with the manufacture, shipment, handling, and delivery of the geomembrane to the site, conformance testing of the delivered geomembrane, and the storage of the geomembrane prior to installation.

B.4.5.1.1 Manufacture of Geomembrane

Prior to shipping any material, the Geomembrane Manufacturer shall provide documentation that the material meets the requirements of the specifications, and that adequate quality control measures have been implemented during the manufacturing process.

Resin Quality. The raw material shall be first quality, with no reclaimed polymers or other materials. Documentation of resins shall be provided for material traceability.

Certification of Property Values. In addition to information regarding the raw material, the Geomembrane Manufacturer shall provide the DOE PE with the following prior to shipment of the geomembrane:

- Manufacturer certification values for all test properties presented in Table B.2-2 of Attachment B-2 for the 30-mil geomembrane
- A list of quantities and description of material other than the base polymer which comprises the geomembrane

The DOE PE shall compare the property values provided by and certified by the Geomembrane Manufacturer with those listed in Table B.2-2 to verify the material meets the specifications.

Quality Control Certificates. Prior to shipment, the Geomembrane Manufacturer shall provide the DOE PE with quality control certificates for the geomembrane. A responsible party employed by the

Geomembrane Manufacturer will sign the quality control certificates. The quality control certificate will include:

- Roll or pallet numbers and identification
- Sampling procedures and results of quality control tests

The Geomembrane Manufacturer shall be required to perform and document, at a minimum, the testing scope presented in Table B.2-2 included in Attachment B-2.

The DOE PE shall:

- Verify that quality control certificates have been provided at the frequency defined by the Manufacturer QC Test Frequency specified within the conformance tables included in Attachment B-2.
- Review the quality control certificates to document that the testing methodology and resulting values comply with the requirements specified within the conformance tables included in Attachment B-2.
- Approve rolls or pallets of geomembrance meeting the requirements.
- Disapprove rolls or pallets of geomembrane failing to meet the requirements.

B.4.5.1.2 Shipment and Handling

Shipment of the geomembrane to the dock is the responsibility of the Geomembrane Manufacturer or Contractor. Handling the geomembrane on site is the responsibility of the Geomembrane Installer and/or Contractor. All labels identifying rolls/pallets shall be weatherproof and securely attached.

The DOE PE shall observe that:

- Handling equipment used on site pose minimal risk of damage to the geomembrane
- Personnel handle the geomembrane with care

Upon delivery to the island, the Installer and the DOE PE shall conduct a surface inspection of the exposed geomembrane rolls/pallets for defects, damage, and labeling. This examination shall be

conducted without unrolling rolls, unless defects or damages are found or suspected. The DOE PE will indicate to the Contractor:

- Rolls/pallets, or portions thereof, that should be rejected and removed from the site because they have severe flaws
- Rolls/pallets that have minor repairable flaws
- Rolls/pallets that do not have proper identification

Rolls/pallets without proper identification shall be noted by the DOE PE and shall be rejected unless proper identification is obtained.

B.4.5.1.3 Storage

The Contractor shall be responsible for the on-site storage of the geomembrane. Storage space should protect the geomembrane from passage of vehicles, water, and weather.

The DOE PE shall document that storage of the geomembrane provides adequate protection against dirt, shock, and other sources of damage.

B.4.5.2 Geomembrane Installation

The installation of the geomembrane involves three primary tasks: earthwork, placement of geomembrane field panels, and seaming of the field panels.

B.4.5.2.1 Underlying Earthwork

The earthwork immediately beneath the geomembrane and proper anchoring are crucial to the performance of the geomembrane. Earthwork construction activities shall be performed by the Contractor and closely monitored for acceptance by the DOE PE.

The DOE PE shall document for acceptance that:

- A qualified Surveyor has verified lines and grades
- The requirements of the Plan are satisfied

The Geomembrane Installer shall certify in writing that the surface on which the geomembrane will be installed (intermediate cover) is acceptable. The certification shall be given by the Geomembrane Installer to the DOE PE prior to commencement of geomembrane installation in the area under construction. The Contractor will be given a copy of this certificate by the DOE PE.

B.4.5.2.2 Geomembrane Placement

The placement of geomembrane field panels is the responsibility of the Geomembrane Installer and shall be performed in accordance with the following.

Panel Layout. On or before a Preinstallation Meeting, the Geomembrane Installer shall provide the Contractor and the DOE PE with a drawing of the mud pit to be capped, showing expected seams (panel layout drawing). The DOE PE shall review the panel layout drawing and verify that it is consistent with the accepted state of practice and the Plan. It is beneficial to "shingle" panel overlaps in the downward direction to facilitate drainage in the event of precipitation. It is also beneficial to proceed in the direction of prevailing winds.

To the extent possible, geomembrane panel seams should be oriented parallel to the line of maximum slope (i.e., placed along the length of the slope, not perpendicular to it). In corners and odd-shaped geometric locations, the number of seams should be minimized. If it will be necessary to have horizontal seams, these seems shall be a minimum of five feet from the toe of the slope, crest of berms or benches, or areas of potential stress concentrations. When a full panel does not extend five feet past the toe of slope, a cross seam may be welded provided the panel end is cut at an angle greater than forty-five degrees.

Field Panel Identification. The DOE PE shall document that the Geomembrane Installer labels each field panel with a panel number consistent with the layout plan. This panel number shall be agreed upon by the Contractor, Geomembrane Installer, and DOE PE. It is the responsibility of the Geomembrane Installer and the DOE PE to document that each installed field panel can be traced back to the original roll number. The panel number will be marked at a location agreed upon by the Geomembrane Installer and DOE PE at the Preinstallation Meeting.

The DOE PE shall establish a table or chart showing correspondence between geomembrane roll numbers and installed field panel numbers. The field panel number will be used for all quality assurance records.

Location. The DOE PE shall document that field panels are installed at the location indicated on the Geomembrane Installer's panel layout drawing, as approved or modified.

Installation Schedule. Field panels shall be placed one at a time, unless otherwise approved by the DOE PE. If practical, each field panel shall be seamed after its placement in order to minimize the number of unseamed field panels exposed to weather.

Scheduling decisions will be made during installation, depending upon varying weather and other construction conditions. In any event, the Geomembrane Installer shall be fully responsible for the decision made regarding placement procedures.

The DOE PE shall record the panel number, original roll number, location, date of installation, time of installation and ambient temperature of each field panel.

The DOE PE shall evaluate field changes by the Geomembrane Installer that may affect the original schedule proposed by the Geomembrane Installer, and advise the Contractor on the acceptability of that change.

Weather Conditions. Geomembrane panel installation shall not proceed when measured temperature exceeds the constraints, as specified in Section B.4.5.2.3. Deviations from this temperature criteria shall only occur when authorized by the DOE PE, based on passing test welds at temperatures identical or in excess of the anticipated temperature. Geomembrane placement shall not be performed during rain, snow, fog conditions, in areas of ponded water, or in the presence of excessive winds.

The DOE PE shall document that the above conditions are fulfilled and shall inform the Contractor of any deviations from the accepted installation procedures.

Geomembrane Anchor Trench. Anchor trenches shall be excavated to the lines and widths shown on the contract drawings prior to geomembrane installation. The DOE PE shall document that anchor trenches have been constructed according to the contract drawings.

Slightly rounded corners shall be provided along the trench length where the geomembrane enters the trench to avoid sharp bends that could increase geomembrane stress concentrations and, hence, damage the geomembrane. Loose soil shall not underlie the geomembrane within the trench. Panel seaming shall continue through the anchor trench. Following the placement of each geosynthetic layer within the anchor trench, the Geomembrane Installer is responsible for temporary anchorage within the anchor trench. Temporary anchorage shall be achieved with sandbags, rolls of geosynthetic material or other material that allows for removal from the trench for the placement of additional geosynthetic layers. The Contractor is responsible for the placement and compaction of soil within the anchor trench as the permanent anchorage.

Method of Placement. The following is the responsibility of the Geomembrane Installer, and the DOE PE shall document that these conditions are satisfied and acceptable:

- The geomembrane is not damaged by equipment through handling, traffic, excessive heat, leakage of liquids, or other means
- The prepared soil surface underlying the geomembrane has not deteriorated since previous acceptance and is still acceptable immediately prior to geomembrane installation
- Geosynthetic material immediately underlying a proposed geomembrane layer to be installed is clean and free of debris
- Personnel working on the geomembrane do not smoke, wear damaging shoes, or engage in other activities that could damage the geomembrane
- The method and equipment utilized to deploy panels does not cause scratches or crimps in the geomembrane and does not damage the subbase soil layer
- The method used to place the panels minimizes wrinkles (especially differential wrinkles between adjacent panels)
- Adequate temporary loading and/or anchoring (e.g., sand bags, geosynthetic rolls), not likely to damage the geomembrane, has been placed to prevent uplift by wind (in case of high winds, continuous loading [e.g., by adjacent sand bags] is recommended along the edges of panels to minimize the risk of wind flow under the panels)

- Adequate temporary loading along the back of all benches to minimize "trampolining" of the geomembrane due to thermal contraction

- Direct contact with the geomembrane is minimized (i.e., the geomembrane should be protected by a sacrificial layer of geomembrane or other suitable material in areas where excessive traffic may be expected)

The DOE PE shall inform the Contractor if the above conditions are not fulfilled.

Damage. The DOE PE shall visually inspect each panel after placement and prior to, during, or following seaming for damage. The DOE PE shall advise the Contractor if any panels, or portions of panels, should be rejected, repaired, or accepted. Damaged panels or portions of damaged panels that have been rejected shall be marked and their removal from the work area recorded by the DOE PE. Repairs shall be made according to procedures described in Section B.4.5.3.

At a minimum, the DOE PE shall document that:

- The panel is placed in such a manner that it is unlikely to be further damaged

- Any tears, punctures, holes, thin spots, or similar defects are either marked for repair or the panel is rejected

B.4.5.2.3 Field Seaming

Field seaming is the responsibility of the Geomembrane Installer and shall be performed in accordance with the following:

Requirements of Personnel. At the Preinstallation Meeting, the Geomembrane Installer will provide the DOE PE with a list of proposed seaming personnel and their professional resumes. This documentation will be reviewed and approved by the DOE PE.

Seaming Equipment and Products. The approved processes for geomembrane field seaming are extrusion seaming and hot-air seaming (patches only). The Geomembrane Installer shall submit seaming equipment documentation to the DOE PE during the Preinstallation Meeting for approval.

The following conditions shall apply to the Geomembrane Installer. The DOE PE shall document that these conditions are met:

- The Geomembrane Installer maintains a number of spare operable seaming devices that are approved for seaming by the DOE PE on site.
- Equipment used for seaming is not likely to damage the geomembrane.
- The electric generator is placed upon a smooth base and a rub sheet such that no damage occurs to the geomembrane.
- A smooth insulating plate or fabric is placed beneath the hot seaming apparatus after usage, if placed on the geomembrane.

Fusion Process. The fusion-seaming apparatus must be an automated mechanical device, equipped with gauges giving the applicable temperatures. Pressure settings shall be verified by the Geomembrane Installer prior to each seaming period.

The Geomembrane Installer shall log ambient temperatures, air temperatures, and seaming apparatus temperatures, speeds, and pressures.

The Geomembrane Installer shall maintain at least one spare, operable seaming unit on site at all times.

Seam Preparation. The following is the responsibility of the Installer; the DOE PE shall document that these conditions are met:

- Prior to seaming, the area to be seamed shall be clean and free of moisture, dust, dirt, oils, greases, foreign material, and debris of any kind. The geomembrane panels to be welded together must be wiped with a clean cloth, brush, or other cleaning equipment just prior to seaming.
- A rub sheet must be used to protect the liner while cutting any materials.
- Seams are aligned with the fewest possible number of wrinkles and “fishmouths.”

Weather Conditions for Seaming. The required weather conditions for seaming are as follows:

- Unless authorized in writing by the DOE PE, no seaming shall be attempted at a temperature above 104°F or below 32°F.
- The geomembrane shall be dry and protected from the wind.

The DOE PE shall document that these weather conditions are complied with, and will advise the Contractor accordingly.

Overlapping and Temporary Bonding. The following shall be the responsibility of the Geomembrane Installer and verified by the DOE PE:

- In general, geomembrane panels shall have a finished overlap of a minimum of 4 inches for both fusion seaming and hot air seaming (or otherwise specified by the manufacturer); sufficient overlap will be provided to perform peel tests on the seam.
- The procedure used to temporarily bond adjacent panels together shall not damage the geomembrane (in particular, the temperature of hot air at the nozzle of any spot-seaming apparatus will be controlled such that the geomembrane is not damaged).

Test Seam, Geomembrane Seaming. Test seams shall be made on scrap pieces of geomembrane liner under the same weather and field conditions to be encountered during the seaming period to document that seaming conditions and procedures are adequate and in accordance with the specifications in Attachment B-1. Such test seams shall be made at least 2 times each day (at the beginning of the day and at least 4 hours thereafter). A test seam which passes QC testing shall be made for each seaming device and technician. For fusion welding with a self-propelled machine, retest welding shall be required if any setting on the machine is varied from those used for the preparation of the previous passing test seam. With fusion welding, once a machine has a passing test weld, any qualified Welding Technician may utilize that machine. A test seam shall also be made in the event that the air temperature varies more than 20°F since the last passing test seam. Test seams shall be made under the same conditions as actual seams. If the seaming apparatus is turned off for any reason, a new passing test seam must be completed for that specific seaming apparatus.

The Geomembrane Installer shall provide the calibrated tensiometer required for field test seam shear and peel testing. The tensiometer shall be automatic and shall have a direct digital readout. The

tensiometer shall be calibrated at the site prior to use. The Geomembrane Installer shall provide the DOE PE with the calibration certification.

Ten coupons, 1-inch (25-mm) wide each, shall be cut from the test seam sample by the Geomembrane Installer. Five coupons shall be tested in shear and five in peel using a calibrated field tensiometer. A passing welded seam is achieved in peel or shear when all five coupons meet the criteria presented in Table B.2-2 of Attachment B-2.

If a coupon fails, the entire operation shall be repeated. If the additional coupon fails, the seaming apparatus and seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and a successful, full test seam is achieved.

The DOE PE shall observe test seam procedures. The remainder of the successful test seam sample shall be assigned a number and marked accordingly by the DOE PE, who will also log the date, hour, ambient temperature, number of seaming unit, name of seamer, and pass or fail description. The remainder of the successful test seam sample shall be archived at the site.

General Seaming Procedure. Unless otherwise specified, the general seaming procedure used by the Installer shall be as follows:

- While fusion seaming, a movable protective layer of plastic may be required to be placed directly below each overlap of geomembrane that is to be seamed. This is to help prevent any moisture buildup between the panels to be seamed.
- If required, a firm substrate will be provided by using a flat board or similar hard surface directly under the seam overlap to achieve proper support.
- Wrinkles at the seam overlaps will be cut along the ridge of the wrinkle in order to achieve a flat overlap. Cut wrinkles will be seamed and any portion where the overlap is inadequate will then be patched with an oval or round patch of the same geomembrane, extending a minimum of 6 inches beyond the cut in all directions.
- The direction of seaming on slopes will be such that the flow of water over the geomembrane is not hindered.

- With respect to the anchor trench, seaming will extend to the outside edge of panels installed within the anchor trench.

- All horizontal seams will be welded using fusion devices.

The DOE PE shall document that the above seaming procedures are followed and shall inform the Contractor if they are not. It is the Contractor's responsibility to assure that the procedures are revised to meet the procedures listed.

Nondestructive Seam Continuity Testing. The Geomembrane Installer shall nondestructively test all field seams over their full length. All welds shall be tested by the vacuum box method. The purpose of nondestructive tests is to inspect the continuity of geomembrane panels seams. The Geomembrane Installer shall complete any required repairs in accordance with Section B.4.5.3.

Vacuum Box Testing. Unless otherwise specified, the general vacuum testing procedure used by the Installer shall be as follows:

- Turn on vacuum pump to reduce pressure within the vacuum box to approximately 5 pounds per square inch gauge (psig).

- Apply a generous amount of a solution composed of liquid soap and water to the area to be tested.

- Place the vacuum box over the area to be tested and apply sufficient downward pressure to "seat" the seal strip against the liner.

- Close the bleed valve and open the vacuum valve.

- Ensure that a leak-tight seal is created.

- For a period of not less than 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.

- If no bubbles appear after 10 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3-inch overlap and repeat the process.

Noncomplying Vacuum Test. In the event of a noncomplying vacuum test, the following procedure shall be followed:

- Mark all areas where soap bubbles appear and repair the marked areas, as specified in Section B.4.5.3.
- Retest repaired areas.

QC Responsibilities. The DOE PE shall:

- Document all testing.
- Record location, date, test unit number, name of tester, and outcome of all testing.
- Inform the Geomembrane Installer and Contractor of any required repairs.

When defects are located, the DOE PE shall:

- Observe the repair and retesting of the repairs.
- Mark on the geomembrane that the repair has been made.
- Document the results.

Nontestable Areas. The Geomembrane Installer shall use the following procedures at locations where seams cannot be nondestructively tested:

- Spark testing or other method approved by the DOE PE shall be employed, if possible.
- All such seams shall be cap-stripped with the same geomembrane material.
- If the seam is accessible to testing equipment prior to final installation, the seam shall be nondestructively tested prior to final installation.
- If the seam cannot be tested prior to final installation, the seaming and cap-stripping operations shall be observed by the DOE PE for uniformity and completeness.

The seam number, date of observation, name of tester, and outcome of the test or observation shall be recorded by the DOE PE.

Destructive Testing, Geomembrane Seaming. Destructive seam tests shall be performed at selected locations. The purpose of these tests is to evaluate seam strength. Seam strength testing shall be done as the seaming work progresses, not at the completion of all field seaming, unless otherwise approved by the DOE PE. Table B.2-2 of Attachment B-2 summarizes required seam strengths.

Location and Frequency. The DOE PE shall select locations where the geomembrane panel seam samples will be cut out for laboratory testing. Those locations shall be established as follows:

- A minimum frequency of 500-linear feet of seam.
- Test locations will be determined during seaming at the DOE PE's discretion. Selection of such locations may be prompted by suspicion of contamination, offset seams, or any other potential cause of defective seaming.

The Geomembrane Installer will not be informed in advance of destructive seam test locations.

Sampling Procedure. Samples shall be cut by the Installer as the seaming progresses in order to have passing on-site tensiometer laboratory test results before the geomembrane is covered by another liner system material. The DOE PE shall:

- Observe sample cutting.
- Assign a number to each sample and mark it accordingly.
- Record the destructive sample location on the appropriate geomembrane panel layout drawing.
- Record the reason for taking the sample at this location (e.g., statistical routine or suspicious feature of the geomembrane).

All holes in the geomembrane resulting from destructive seam sampling shall be immediately repaired in accordance with repair procedures described in Section B.4.5.3 of the Plan. The continuity of the new seams in the repaired area will be tested according to "Nondestructive Seam Continuity Testing," as shown above in this section.

Size of Samples. At a given sampling location, three types of samples shall be taken by the Installer. At a given destructive sample location, the test sample shall be 12 inches wide, centered on the seam, and 54 inches long. The sample shall be cut into two parts and distributed as follows:

- One portion to the Geomembrane Installer for on-site testing, 12 x 18 inches
- One portion to the DOE PE for archive storage, 12 x 18 inches

Final determination of the sample sizes shall be made at the Preinstallation Meeting. The DOE PE shall witness destructive sample collection and mark all samples and portions with their number. The DOE PE shall also log the date and time, seam identification, and sample location.

Field Testing. Ten 1-inch (25 mm) wide coupons will be tested in the field with a calibrated tensiometer, five for peel and five for shear, respectively, and shall meet the minimum requirements presented in Table B.2-2 of Attachment B-2. If any field test sample fails to pass, then the procedures outlined in the Destructive Test Failure section will be followed. The DOE PE shall observe and document the results of the field tests.

Destructive Test Failure. The following procedures shall apply whenever a sample fails a destructive test conducted by the Installer's testing personnel:

- The Geomembrane Installer can reconstruct the seam between any two passed destructive seam test locations.
- The Geomembrane Installer can trace the seaming path to an intermediate location (at least 10 feet from the point of the failed test in each direction) and take a small sample for an additional field test at each location. If these destructive samples pass the tests, then the seam is repaired between these locations by capping. If the test sample fails, then the process is repeated to establish the zone in which the seam should be repaired.

The DOE PE shall document all actions taken in conjunction with destructive test failures.

B.4.5.3 Defects and Repairs

All seams and non-seam areas of the geomembrane shall be examined by the DOE PE for identification of defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. Because light reflected by the geomembrane helps to detect defects, the surface of the geomembrane will be clean at the time of examination. The geomembrane surface shall be swept or washed by the Geomembrane Installer if the amount of dust or mud inhibits examination.

B.4.5.3.1 Evaluation

Each suspected defect location, both in seam and non-seam areas, shall be nondestructively tested, as necessary, using the methods described in Section B.4.5.2.3. Each location that fails the non-

destructive testing shall be marked by the DOE PE and repaired by the Geomembrane Installer. Work shall not proceed with any subsequent materials that will cover locations that have been repaired until field test results with passing values are available.

B.4.5.3.2 Repair Procedures

Any portion of the geomembrane exhibiting a flaw, failing a destructive or failing a nondestructive test, shall be repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure shall be approved by the Contractor and the DOE PE. The procedures available include:

- Patching – Apply a new piece of geomembrane sheet over, and at least 6 inches (150 mm) beyond the limits of a defect. The patch shall be extrusion seamed to the underlying geomembrane. This method should be used to repair holes, tears, destructive test locations, undispersed raw materials, contamination by foreign matter, dents, pinholes, and pressure-test holes.

- Capping – Apply a new strip of geomembrane along the length of a delineated faulty seam. The cap strip shall extend at least 6 inches (150 mm) beyond the limit of the seam, and the edges will be extrusion seamed to the underlying geomembrane.

- Replacement – The faulty seam is removed and replaced.

In addition, the following provisions shall be satisfied:

- Surfaces of the geomembrane which are to be repaired will be abraded no more than one hour prior to the repair.

- All surfaces must be clean and dry at the time of the repair.

- All seaming equipment used in repairing procedures must be approved.

- The repair procedures, materials, and techniques will be approved in advance of the specific repair by the DOE PE and Installer.

- Patches or caps will extend at least 6 inches (150 mm) beyond the edge of the defect, and all patch corners will be rounded.

- Seam repairs over 150 feet (45 m) long will require a destructive test to be taken from the repair.

B.4.5.3.3 Verification of Repairs

Each repair shall be numbered and logged by the DOE PE and the Geomembrane Installer. Each repair shall be nondestructively tested, as necessary, using the methods described in Section B.4.5.2.3. Repairs that pass the nondestructive test will be taken as an indication of an adequate repair. However, if the DOE PE suspects a repair to be questionable, although it passes nondestructive testing, a destructive test can be requested. Failed tests will require the repair to be redone and retested until a passing test is obtained. The DOE PE shall observe nondestructive testing of repairs and shall record the repair test date, location, and test outcome. The DOE PE shall have final verification authority.

B.4.5.3.4 Large Wrinkles

When seaming of the geomembrane panels is completed (or when seaming of a large area of the geomembrane is completed), and prior to placing overlying liner materials, the DOE PE shall inspect the geomembrane for the presence of wrinkles. The DOE PE will indicate to the Contractor which wrinkles should be cut and reseamed by the Geomembrane Installer. The resulting seam produced by removing the wrinkle will be tested like any other repair.

B.4.5.4 Installed Geomembrane Certification/Acceptance

The Geomembrane Installer and the geomembrane manufacturer shall retain ownership and responsibility for the geosynthetics installed until acceptance by the DOE.

The liner system shall be accepted by the DOE when:

- The installation is finished
- Verification of the adequacy of seams and repairs, including associated testing, is complete
- Geomembrane Installer's representative furnishes the DOE PE with certification that the geomembrane was installed in accordance with the geomembrane manufacturer's recommendations as well as the contract drawings and specifications

- All documentation of installation is completed including the DOE PE's final report
- Certification, including record drawings, sealed by a Professional Engineer has been received by the DOE

The DOE PE shall provide certification that installation has proceeded in accordance with this Plan for the project, except as noted.

B.4.5.5 Materials in Contact with the Geomembranes

The quality assurance procedures indicated in this subsection are only intended to document that the installation of these materials does not damage the geomembrane. Additional quality assurance procedures provided in subsequent sections of this Plan are necessary to document that the systems built with these materials are constructed to perform as designed.

B.4.6 Protective Cover

Protective cover will consist of a 12-inch thick layer of compacted soil. The soils for the protective cover shall meet requirements for material characteristics and construction quality listed in Table B.2-1 of Attachment B-2. On-site visual inspections and classifications of the borrow area soils will be performed by the DOE PE. These visual inspections are extremely important to verify that the material property requirements of the protective cover are met and to monitor the consistency of these materials. Throughout construction, on-site QC testing shall be performed at specified intervals to ensure that the protective cover meets the requirements of this Plan and to verify the visual inspections/classifications.

The protective cover layer will be placed on top of the geomembrane. Protective cover shall be placed by end dumping at an edge of the area on which the cap system is being constructed, and spreading outward onto the geomembrane using low ground-pressure equipment. One 12-inch lift will be placed and compacted, as specified. Heavy compaction or compacting to a specified moisture content and maximum dry density shall be avoided to prevent damage to the underlying geomembrane.

B.4.6.1 Test Methods and Sampling Requirements

Table B.2-1 (Attachment B-2) presents the field test methods and minimum test frequencies that shall be used to characterize and evaluate the construction quality of the soils for protective cover. The tests shall be conducted in accordance with the current versions of the corresponding standard methods referenced.

B.4.6.2 Protective Cover - General Requirements

The protective cover shall consist of relatively homogeneous, cohesive of cohesionless soils, free of rock particles greater than one inch in size, frozen material, organic material, and other foreign debris. Samples shall be obtained from within the identified soil borrow area and tested as indicated in Table B.2-1 of Attachment B-2. This table contains information regarding the tests to be performed, frequencies, sample size, and acceptance criteria, and locations of where samples for the protective cover will be collected.

B.4.6.3 Construction Testing

Testing will be performed by the DOE PE during construction to determine if the protective cover is being installed in accordance with the tests, test frequencies, and acceptance criteria established in Table B.2-1 of Attachment B-2. Testing to be performed during construction shall include visual inspections of the soil placement and compaction and lift thickness verification.

B.4.7 Soil Cover Layer

The soil cover layer will be placed on top of the protective cover. It shall be comprised of a minimum of 18 inches of clean soil, having no rock particles greater than 2 inches in size. The cover soil shall not contain any debris, sharp, or protruding objects. Table B.2-1 (Attachment B-2) contains requirements for the types of tests, frequency, sample size, and acceptance criteria for the soil cover layer.

Soil cover shall be placed in one 18-inch lift. Soil cover shall be placed by end dumping at an edge of the area on which the protective cover was placed, and spreading outward onto the protective cover using low ground-pressure equipment. Heavy compaction or compacting to a specified moisture

content and maximum dry density shall be avoided to prevent damage to the underlying geomembrane. The thickness of the soil cover layer shall be verified following placement through field survey.

B.4.8 Vegetated Layer

The vegetated layer will be placed on top of the soil cover layer. It shall be comprised of a minimum of 6 inches of clean soil, having no rock particles greater than 3 inches in size and shall not contain any debris, sharp, or protruding objects. Vegetated layer soil shall possess sufficient fertility to support vegetative growth, and the type of vegetation used shall be such that the soil cover layer, protective cover, and geomembrane are protected from damage due to root penetration.

Vegetated layer soil shall be placed by end dumping at an edge of the area on which the soil cover was placed and spreading outward onto the soil cover using low ground-pressure equipment. Final thickness of the vegetative layer shall be not less than 6 inches. No compaction effort shall be imparted on the vegetative layer soil as it is being placed.

B.4.9 Restoration

The vegetated layer shall be properly prepared by broadcast spreading fertilizer and lime, and disking into place using appropriate machinery. After the seedbed is properly prepared, seed and fertilizer shall be applied in accordance with the specifications.

An erosion control mat shall be placed over all areas being restored. This mat shall be stored, handled, and installed in accordance with the manufacturer's recommendations and as shown on the drawings.

B.5.0 Storm Water Management System

Storm water runon and runoff at the DOE sites shall be controlled by a series of perimeter ditches and berms. These ditches and berms will divert flow around the caps and transfer flow to the surrounding, undisturbed areas. Riprap-lined energy dissipaters shall be provided where concentrated flows from ditches are to be discharged to surfaces with established vegetation.

Stabilized construction exits shall be constructed at the entrance/exit of each site to remove soil from the tires of construction vehicles. Silt fence, straw bale check dams, and/or sediment traps shall be installed downgradient of all disturbed areas prior to earthmoving activities to control sediment-laden runoff which may discharge from the DOE sites.

B.5.1 Geotextiles

Geotextiles which are to be used in the construction of the silt fence, construction exits, energy dissipaters, and sediment trap shall meet the requirements listed in Table B.2-3 of Attachment B-2. The delivery, storage, handling, and installation of the geotextiles shall be in strict accordance with the manufacturer's recommendations.

B.5.2 Aggregates

Aggregates such as rock, stone, and riprap, which are to be used in the construction of the construction exits, energy dissipaters, and sediment trap, shall meet the requirements in Table B.2-4 of Attachment B-2. All storm water management controls shall be constructed to meet the lines and grades shown on the design drawings.

B.6.0 Monitoring Well Abandonment

A total of 24 monitoring wells will be abandoned at the Milrow and Long Shot sites. Prior to well abandonment, each well shall be examined and the depth of each well and the depth to groundwater shall be determined. Any debris or other substance in the well which may interfere with the proper plugging shall be identified.

Any debris or other substances which may exist within the well shall be removed**,** the existing well casing shall then be removed to a depth of 5 feet or to one foot above the groundwater table, whichever is less. The well shall then be filled from bottom to top, in one continuous operation, using a bentonite slurry-grout. After the grout has set up, a cap consisting of a one-foot thick layer of bentonite pellets shall be placed over the bottom of the excavation and hydrated; the remaining excavation shall then be backfilled to existing grading.

Upon the completion of the abandonment of each well, the well abandonment log is to include:

- Project name
- Date of well abandonment
- Coordinates of well
- Well identification number
- Description of use of well
- Description of the method of abandonment
- Type and amount of sealant used to abandon the well

B.7.0 Hot Mix Plant Closure

Two abandoned rail tank cars are buried adjacent to the Charlie Runway and contain approximately 15,000 gallons of a black, viscous asphalt-like liquid. The two rail cars supported asphalt production activities at a hot mix plant on the island during the underground nuclear testing. In order to close the tanks, the contents shall be sampled, removed, and transported off-island for disposal. Once the contents are removed, the tanks shall be filled with native soils to prevent collapse. The following paragraphs detail the activities.

B.7.1 Characterization Sampling

A representative sample of the tank contents shall be taken and analyzed as described in Section B.9.0 for hazard characterization.

If the contents of the tank are in multiple phases, then a sample representative of each phase will be taken. Samples will be taken using disposable sampling equipment; liquid samples will be obtained with a bailer, while semisolid phase material samples will be taken with a “sludge judge” glass sampling tube, coliwasa, or similar device. The samples will be immediately placed on ice and shipped via chartered air service to a State of Alaska-certified laboratory for analysis. Sample handling, preservation, packaging, and shipping procedures are detailed in Section C.6.0 of the Quality Assurance Project Plan.

B.7.2 Tank Content Removal

After laboratory data have been reviewed and the liquid in the tanks characterized, the liquid will be pumped from the tanks and placed into DOT-certified containers, as appropriate. If there are several phases of waste which demonstrate different hazard characteristics, these phases will be segregated into separate waste streams and handled accordingly. Once all of the liquid has been removed from the tank, high-pressure sprayers will be utilized to clean the interior of the tank and remove as much of the remaining material as practical. At no time will anyone enter the tank. If necessary, several access ports will be cut into the top of the tanks to adequately rinse the interior. This rinse water will be containerized and handled as a separate waste stream. All waste generated will be handled as described in Section B.7.4 below.

B.7.3 Tank Closure

Once the material has been removed from the tanks, the tanks will be filled through the access ports with a combination of native soils and, if necessary, a lean portland cement grout. If necessary, the top of the tank will be removed to assure that the tank is completely filled.

B.7.4 Waste Handling, Transport, and Disposal

The sample results of the tank contents shall be compared to RCRA hazardous waste criteria in order to determine if the contents constitute a hazardous waste. If the tank contents are determined to be nonhazardous waste, the material will be placed in a DOT-certified container(s) and staged in the on-site waste accumulation area prior to transport off the island. Nonhazardous waste shall be disposed of at an appropriate facility in accordance with all applicable regulations. Should the tank contents be determined hazardous waste, the waste will be containerized in a DOT-certified container(s), marked and labeled as hazardous waste, and placed in the on-site waste accumulation area pending off-site disposal. All relevant RCRA regulations regarding the proper characterization, handling, transport, and disposal of hazardous waste shall be followed. Hazardous waste must be removed from the island within 90 days of the date of generation, unless an extension is granted by the EPA Region X administrator.

Any hazardous waste generated on Amchitka must be disposed of off-island at a RCRA-permitted facility approved by DOE. The DOE will approve disposal facilities for use by the Contractor prior to the initiation of work on the island. At a minimum, the following information will be reviewed for each proposed disposal facility:

1. Available audits/assessments performed of the facility in the past three years
2. Records of imposed fines or violations within the past three years
3. Current permits held

The DOE PE shall review all documentation relating to hazardous waste management, such as the waste characterization records, waste tracking logbook or similar, waste profiles, and waste manifest(s), prior to shipment of waste off the island. In addition, the DOE or DOE PE may observe/inspect the waste containers for proper markings/labels and may observe the loading and securing of waste containers on the vessel(s) that will transport waste off the island.

B.8.0 Water Treatment

Water shall be pumped off of the mud pits prior to solidification activities. As long as the diesel-contaminated drilling mud in the pits is not disturbed, the water can be discharged without treatment. The suction line to the pumps shall be fastened to a float in order to prevent disturbance to the underlying drilling mud. The water shall be pumped to a rock apron to minimize any erosion to the land. In accordance with ADEC regulations, this pumping shall continue until a sheen is observed at the suction entry. A technician shall man the pump on a full-time basis whenever the pump is operating and oversee the pumping operations. At the time the sheen is discovered, the water shall be diverted into the treatment system prior to discharge. Potentially contaminated water on the mud pits and any Contractor-generated rinsate as a result of equipment and/or personnel decontamination activities shall be treated prior to discharge to the ground. The chosen treatment methods, flocculation, and carbon adsorption will be done using a modular tank and a portable treatment unit that consists of a series of bag filters and two activated-carbon vessels in series. The water requiring treatment shall be pumped to the modular tank, where ferric chloride shall be added. The pH of the water shall then be adjusted to the appropriate range by introducing powdered alum to the tank. An anionic polymer shall be added to cause suspended solids to flocculate and sink to the bottom of the tank. The water shall then be pumped from the modular tank via a submersible pump placed inside the tank to the influent bag filters. The filtered water shall then pass through two activated-carbon adsorbers. Each carbon adsorber contains activated carbon and will be arranged to operate in series. The carbon will remove the diesel-range organics (as well as PCBs) from the water. The first adsorber will remove the majority of the organics, and the second adsorber will act as a polishing unit. The discharge side of the second carbon adsorber will be equipped with a sampling port where samples will be taken at 10,000-gallon intervals, as described in Section B.9.0. At the completion of the project, even though the adsorbers will have additional capacity, the spent carbon will be disposed of off site or recycled through the manufacturer.

B.9.0 Sampling and Analysis

The scope of this remedial action requires the sampling and analysis of several media: the confirmatory sampling and analysis of the *in situ* soils at the Cannikin South Post Shot Drill Back Hole Mud Pit, the characteristic sampling and analysis of the liquid within the hot mix plant tanks, and the sampling and analysis of the water treatment plant discharge. This section details the analytical parameters for each media. The quality assurance requirements dealing with sample collection, handling, and shipping are contained in the QAPP, which is contained as Appendix C of the Amchitka Island Removal Action Work Plan. Analytical requirements are included in Table C.2-1 of the QAPP.

B.9.1 Confirmatory Soil Sampling at Cannikin

After the drilling mud at the South Post Shot Drill Back Hole Mud Pit has been removed, confirmatory sampling shall be done on a 20-foot grid to verify that the *in situ* soils are below the ADEC Contaminated Sites Group cleanup levels. The *in situ* soils will be analyzed for diesel-range organics by Alaska (AK) Method 102. If the laboratory analysis shows that the *in situ* soils are still above cleanup levels, then an additional 1-foot of material in a 10-foot radius around the sample location shall be removed and the area retested. This shall continue until all sample locations are below the cleanup levels.

B.9.2 Characteristic Waste Sampling at the Hot Mix Plant

Each phase of the liquid within the tanks at the hot mix plant will be sampled and analyzed for the following parameters for waste characterization and disposal:

- Ignitability
- Corrosivity
- Reactivity
- Semivolatile Organics
- PCBs
- Volatile Organics
- RCRA Metals

If any sludges or solids are present in the tank, the following parameters will be analyzed for:

- Ignitability
- Corrosivity
- Reactivity
- Toxicity Characteristic Leaching Procedure
  - Semivolatile Organics
  - Metals
  - Volatile Organics
- PCBs

B.9.3 Water Sampling of the Treatment Plant Discharge

Sampling of the treatment plant discharge shall be conducted at a frequency determined by the ADEC. Samples will be collected from the port located on the discharge line of the system. The following parameters shall be analyzed:

- Flow
- Benzene
- Total Aromatic Hydrocarbons
- Total Aqueous Hydrocarbons
- Total Petroleum Hydrocarbons
- PCBs

B.9.4 Sampling of Treatment System Sludges

Representative samples of sludges or other residual buildup within treatment system components shall be sampled for waste characterization purposes prior to disposal. The following parameters shall be analyzed:

- Ignitability
- Corrosivity
- Reactivity
- Toxicity Characteristic Leaching Procedure
  - Semivolatile Organics
  - Metals
  - Volatile Organics
- PCBs

B.9.5 Quality Control Samples

Analytical methods are presented in Appendix C. In order to determine if the laboratory data are of acceptable quality, quality control samples will be taken. Field duplicate samples and matrix spike/matrix spike duplicates will be taken at a frequency of at least 5 percent of the field samples, or one per event. Rinsate banks will be collected if certificates of cleanliness are not available for the disposable sampling equipment. Equipment rinsate blanks shall also be collected of the last decontamination rinsate for each decontamination method used for sampling equipment. Trip blanks will accompany any shipping container containing samples for VOC analysis. Field blanks will be taken.

B.10.0 Surveying

B.10.1 Introduction

Surveying of lines and grades shall be conducted during the placement of fill, compacted fill, solidified drilling mud, intermediate cover, geomembrane cover, protective cover, soil cover, and vegetated layer. Surveying shall be performed to provide documentation for record drawings, document quantities of soils and geosynthetics, and to assist the Contractor in complying with the required grades.

B.10.2 Survey Control

Benchmarks have previously been established at the DOE sites and are shown on the drawings. The vertical and horizontal controls for these benchmarks have been established within normal land surveying standards.

B.10.3 Surveying Personnel

Surveying will be performed under the direct supervision of the Surveyor. Surveying personnel will be experienced in the provision of these services, in addition to preparing detailed and accurate documentation.

B.10.4 Precision and Accuracy

The survey instruments used for this work shall be precise and accurate to meet the needs of the project. Survey instruments shall be capable of reading to a precision of one-one hundredth (0.01) of a foot (3.1 mm), with a setting accuracy of 10 seconds. Calibration certificates for survey instruments shall be submitted to the DOE PE prior to initiation of surveying activities.

B.10.5 Lines and Grades

When required, the following surfaces shall be surveyed to determine the lines and grades achieved during construction:

- Original ground surface

- Surface of excavation/structural fill
- Surface and limits of geosynthetics
- Anchor trench
- Profiles, cross sections, inverts for ditches, roads, etc.

Additional surveying will be required, as necessary.

B.10.6 Frequency

Surveying shall be performed as soon as possible after completion of a given component installation to facilitate progress and avoid delaying the installation of subsequent components. When surveying is utilized to confirm grades and thickness of various cap components, sufficient density of survey points shall be provided to determine that the constructed configuration is consistent with the design. This shall be achieved with a minimum survey of spot elevations on a frequency of one per acre, with additional shots at grade breaks, the limit of the area, trenches, and other breaks in grade or configuration of the cell.

B.10.7 Tolerances

Acceptable tolerances on survey coordinates within the waste containment areas shall be +/-0.20 feet on elevations and +/-0.20 feet on coordinates, provided state regulations are adhered to (e.g., thickness, grades).

B.10.8 Documentation

The Surveyor shall retain the original field survey notes. A copy of these notes will be given to the DOE PE prior to the covering of the surveyed component. The results from the field surveys will be used as the basis for the preparation of the record drawings. At a minimum, these drawings shall show the final elevations of the surfaces listed in this section of the Plan at a scale of 1-inch equals 100 feet, with contour intervals no greater than 1 foot.

B.10.9 Certification

Survey results will be certified by the Surveyor and submitted to the DOE PE for review.

B.11.0 References

API, see American Society of Testing and Materials.

American Petroleum Institute. 1997. *Standard Procedure for Testing Water Based Drilling Fluids*, 2nd Edition, RP 13B-1. Washington, DC.

ASTM, see American Society of Testing and Materials.

American Society of Testing and Materials. 2000. *2000 Annual Book of ASTM Standards*. Philadelphia, PA.

Attachment B-1

Technical Specifications

(To be submitted prior to field work)

Attachment B-2

Design Requirement Summary Tables

(3 Pages)

Table B.2-1
Soil Type and Testing Requirements

	Source Quality Control			Field Quality Control
Material Type	**Soil Type**[1]	**Maximum Particle Size**	**Sample Frequency**[2]	**Frequency of Compaction Testing**[3]
Fill	GC, SW, SP, SM, SC, CL, CH	4 Inches	1 test per 2,000 y^3	1 per acre per lift
Solidification Soils	GC, SW, SP, SM, SC, CL, CH	6 Inches	N/A	N/A
Solidified Drilling Mud	N/A	N/	N/A	1 per 1,000 y^3 of Solidification Soils Mixed
Compacted Fill	GC, SW, SP, SM, SC, CL, CH	4 Inches	1 test per 2,000 y^3	1 per 200 y^3 or 1 per lift (whichever is more frequent)
Intermediate Cover	GC, SW, SP, SM, SC, CL, CH	1 Inch	1 test per 2,000 y^3	1 per acre per lift
Protective Cover	GC, SW, SP, SM, SC, CL, CH	1 Inch	1 test per 2,000 y^3	1 per acre per lift
Soil Cover	GC, SW, SP, SM, SC, CL, CH	2 Inches	1 test per 2,000 y^3	1 per acre per lift
Vegetated Layer	N/A	3 Inches	N/A	N/A

[1]Visual Classification
[2]Standard Proctor (ASTM D698) and Moisture Content (ASTM D2216) at same frequency
[3]In-Place Nuclear Field Density Testing (ASTM D2922 and ASTMD 3017)
(ASTM, 2000)

N/A - Not Applicable
y^3 - Cubic yards
SC - Clayey Sand
GC - Clayey Gravel
SP - Poorly Graded Sand
CL - Low Plasticity Clay
SW - Well-Graded Sand
SM - Silty Sand
CH - High Plasticity Clay

Table B.2-2
Geomembrane Material and Testing Requirements

Material Requirements			
Property	**Sample Frequency**	**Test Method**	**Minimum Result**
Thickness	1 per roll or blanket	ASTM D5199	30-mil (nominal)
Weight	1 per roll or blanket	ASTM D751	28 oz/y^2
Tensile Strength (Yield)	1 per roll or blanket	ASTM D751, Grab Method	550/550 lbs
Elongation (Yield)	1 per roll or blanket	ASTM D751	20%
Puncture Resistance	1 per roll or blanket	ASTM D4833	250 lbs
Tear Resistance	1 per roll or blanket	ASTM D4533	35/35 lbs
Destructive Seam Testing Results			
Peel[1]	1 per 500 LF	ASTM D751	15 lbs/in.^{2}
Shear[1]	1 per 500 LF	ASTM D751	35 lbs/in.^{2}

[1]Five of five coupons must pass to constitute a passing sample.
[2]A film tear bond is required in addition to the minimum value stated.

(ASTM, 2000)

lbs - Pounds
in. - Inch
oz - Ounce
y^2 - Square yard

Table B.2-3
Geotextile Material Requirements

Application	Property	Sample Frequency	Test Method	Minimum Average Roll Value
Silt Fence	Tensile Strength	1 per lot	ASTM D4632	120 lbs
	Trapezoidal Tear	1 per lot	ASTM D4533	65 lbs
	Mullen Burst	1 per lot	ASTM D3786	300 psi
	Puncture	1 per lot	ASTM D4833	65 lbs
	Permittivity	1 per lot	ASTM D4491	0.10 sec.(-1)
	AOS (Seive Size)	1 per lot	ASTM D4751	No. 30
	Flow Rate	1 per lot	ASTM D4491	10 gal/min/ft^2
	UV Resistance (at 500 hours)	1 per lot	ASTM D4355	70%
Construction Exits, Energy Dissipaters, and Sediment Trap D-1	Weight	1 per lot	ASTM D5261	8 oz/y$^{2\,(1)}$
	Tensile Strength	1 per lot	ASTM D4632	200 lbs
	Mullen Burst	1 per lot	ASTM D3786	300 psi
	AOS (Seive Size)	1 per lot	ASTM D4751	No. 80$^{(1)}$

$^{(1)}$Typical Values
(ASTM, 2000)

AOS - Apparent opening size
UV - Ultraviolet
lbs - Pounds
gal/min/ft^2 - Gallons per minute per square foot
oz/y^2 - Ounce per square yard
sec - Second
psi - Pounds per square inch

Table B.2-4
Aggregate Material Requirements

Application	Material Type	Size
Construction Exits	Riprap	4- to 6-inch
Energy Dissipaters	Riprap	4- to 6-inch
Sediment Trap D-1	Stone	1- to 2-inch
	Rock	2- to 4-inch
	Riprap	4- to 6-inch

Appendix C

Quality Assurance Project Plan

C.1.0 Introduction

This Quality Assurance Project Plan (QAPP) is a planning document used for the Amchitka Island Project by the Nevada Environmental Restoration Program (NV ERP). The NV ERP conducts environmental investigation and remediation activities at sites under the oversight of the DOE/NV. It is the policy of the NV ERP to conduct all environmental restoration activities in a manner that produces data of a known quality. Safety is integrated into management and work practices at all levels so that missions are accomplished while protecting the public, the worker, and the environment.

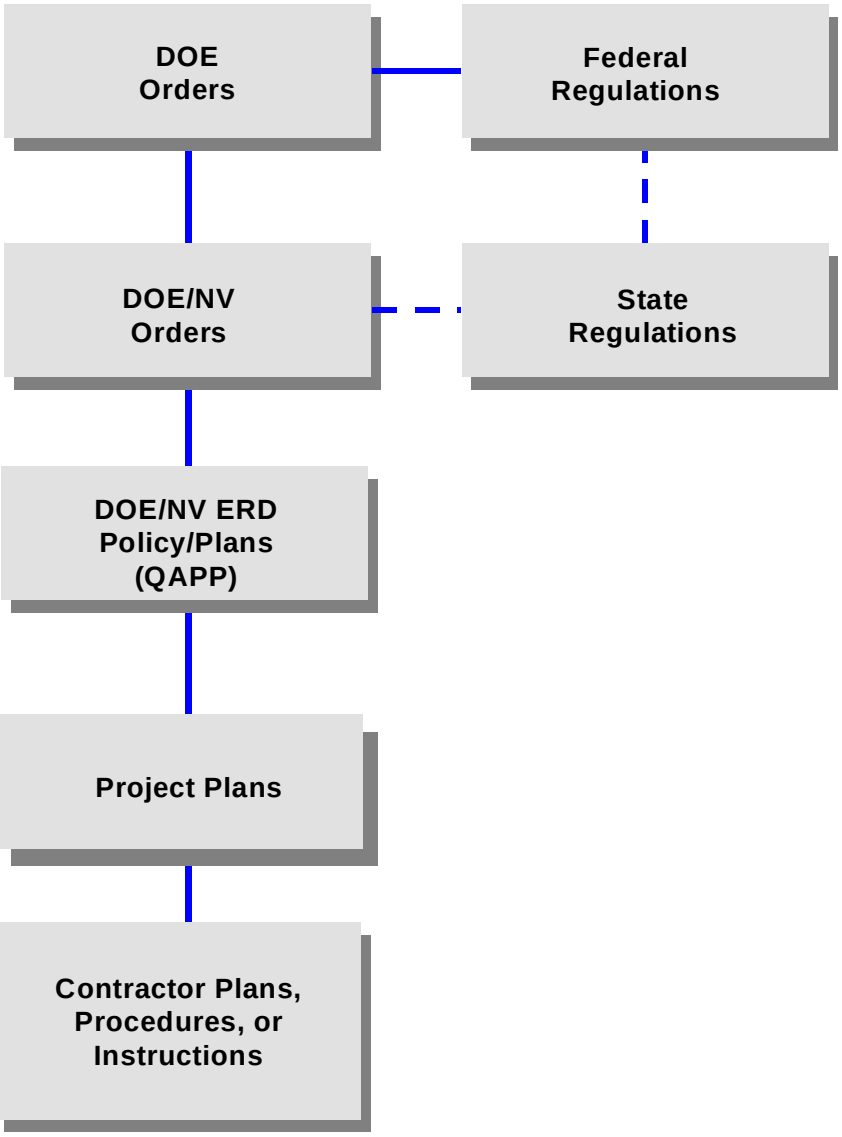
The information provided in this QAPP describes policies, organization, responsibilities, and objectives of the Amchitka Island Project and is intended to provide a consistent framework for the collection, evaluation, analysis, and use of data. This QAPP provides for the evaluation of risks associated with the activities to be performed and uses the graded approach to determine the required level of quality assurance. This document supplements, and is to be used in conjunction with, the Amchitka Island Field Instruction which will contain QA/QC requirements appropriate for the site and activities being performed. Attachment C-1 of this QAPP delineates the quality criteria that should be addressed in site-specific planning documents. In the event that project objectives or regulatory jurisdiction changes, this document will be reevaluated for adequacy.

The requirements of this QAPP are consistent with those provided in DOE Order 414.1A, *Quality Assurance* (DOE, 1999). Environmental Restoration Project activities shall also be in compliance with DOE Order 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees* (DOE, 1998), and DOE Order 450.4, *Safety Management System Policy* (DOE, 1996b). Work at hazardous waste sites shall be conducted in accordance with the applicable sections of 29 *Code of Federal Regulations* (CFR) 1910.120, *Hazardous Waste Operations and Emergency Response* (CFR, 1998b). Should radioactive waste be generated, it shall be handled and disposed of in accordance with 10 CFR Part 71, Subpart H, *Packaging and Transportation of Radioactive Materials - Quality Assurance* (CFR, 1998a), and *The Nevada Test Site Waste Acceptance Criteria* (NTSWAC) (DOE/NV; 1999b). Sites where nuclear activities have taken place shall also comply with the relevant parts of 10 CFR 830.120, *Quality Assurance* (CFR, 1996a).

Figure C.1-1 delineates the hierarchy of documents for NV ERP activities.

QAPP Organization

The organization of this plan reflects the criteria of DOE Order 414.1A, *Quality Assurance* (DOE, 1999). The ten criteria therein cover three major areas: management, performance, and assessments. Management entails the planning and preparation required for the successful completion of the Project mission. Additionally, this section incorporates quality improvement processes to enable personnel to detect and prevent quality problems. The performance section establishes the requirements and procedures to be implemented to ensure that newly collected environmental data are valid, that uses of existing data are appropriate, and that methods of environmental modeling are reliable. Assessments provide a feedback loop to Project management whereby the feedback information can be used to evaluate and, if necessary, modify a system or process to ensure the quality of the product.



Key
ERD = Environmental Restoration Division

Figure C.1-1
Hierarchy of Documents

C.2.0 Criteria 1 - Quality Program

Amchitka Island Project management systems encompass the planning and preparation necessary to ensure the successful completion of identified objectives. This QAPP has been prepared to provide the planning and control necessary for effective and efficient work processes. This document provides the overall quality assurance (QA) Program requirements and the general quality practices to be applied to Amchitka Island activities. Policy is established, roles and responsibilities are defined, lines of communication are identified, the needs and objectives of the Project are confirmed, and reviews are conducted to ensure (to the extent possible) that all necessary planning and preparation activities have taken place. Low-level radioactive and mixed waste managed under the NV ERP must also meet the requirements of the applicable waste acceptance criteria and the associated waste certification program plan. The following sections describe the quality management systems to be employed for the effective management of the Amchitka Island Project.

C.2.1 Quality Management Policy

It is the policy of the NV ERP to provide environmental management that incorporates applicable regulatory requirements. The Quality Management Program described in this document should be implemented for all Amchitka Island environmental activities to ensure that work is performed in an efficient, controlled manner, and is appropriately documented. Project requirements should be applied on a graded approach, commensurate with the risk of failure of the items or processes and the potential harm those risks pose for human health and the environment. Activities shall conform with applicable federal, state, and local regulations, and contract requirements. Quality will be part of the normal course of work and incorporated from the earliest planning stages to completion of the work.

C.2.2 Project Organization

The DOE/NV Environmental Restoration Division (ERD) is responsible for the administration of the NV ERP. Personnel from the ERD are assigned project management and technical support responsibilities. All NV ERP Project Managers are responsible for achieving quality within the specific projects they manage. The DOE/NV ERD organization chart is provided in Figure C.2-1.

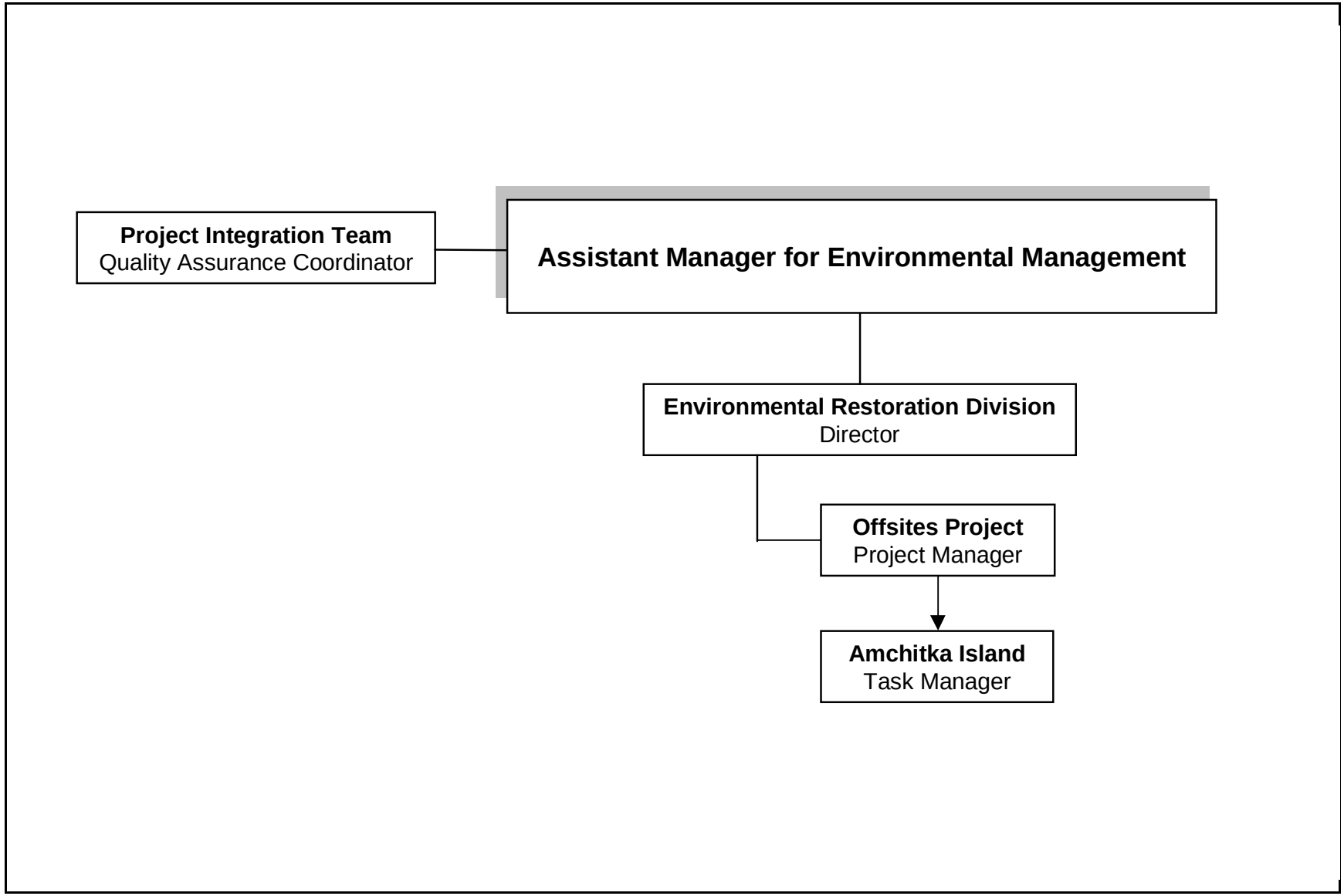


Figure C.2-1
DOE/NV ERD Organizational Chart

Roles and responsibilities for NV ERP personnel and supporting contractors and organizations (referred to as Project participants) are described in the following sections.

C.2.3 DOE/NV ERD Director

The DOE/NV ERD Director has oversight and management responsibilities for all projects under the NV ERP and is responsible for the scope and implementation of the QA Program defined in this document. The Director is the senior management official responsible for ensuring that this QAPP is established, that quality requirements are implemented, and that opportunities for improvement are identified and incorporated.

C.2.3.1 NV ERP Project Manager

The NV ERP Project Managers report directly to and are the prime point-of-contact with the DOE/NV ERD Director. The NV ERP Project Manager, or designee, has day-to-day management responsibilities for technical, financial, and scheduling aspects of his/her assigned project and shall monitor contractor performance of project activities. At a minimum, the DOE/NV Project Manager is responsible for the following duties:

- Review, approve, and direct the implementation of NV ERP project-specific plans.
- Disseminate pertinent information from DOE/NV to NV ERP participants.
- Review and approve changes to NV ERP project-specific documents.
- Monitor the activities of participating organizations and provide direction and guidance for improvement.
- Verify Project participants are adequately executing the responsibilities as delineated in Section C.2.3.1.
- Notify and apprise the DOE/NV ERD Director and NV ERP Quality Assurance Coordinator (QAC) of significant conditions adverse to quality.
- Act as the point-of-contact for state regulator, or designee, for all aspects of the project.

C.2.3.1.1 NV ERP Task Manager

The NV ERP Task Managers report directly to their respective NV ERP Project Managers. The Task Managers have day-to-day management responsibilities for technical and scheduling aspects of the assigned project task and shall monitor contractor performance of task activities. At a minimum, the Task Managers are responsible for the following duties:

- Ensure effective communication among contractors performing work for their assigned tasks.
- Participate in the organization and planning of activities.
- Perform periodic assessments (such as surveillances) of activities under their purview.
- Monitor the activities of participating organizations and provide direction and guidance for improvement.
- Notify the responsible NV ERP Project Manager and other involved personnel of significant conditions adverse to quality.
- Act as the point-of-contact for state regulator for all aspects of the project as designated by NV ERP Project Manager.

C.2.3.1.2 NV ERP Quality Assurance Coordinator

The NV ERP QAC has a direct line of communication with the DOE/NV ERD Director and the NV ERP Project Managers. The NV ERP QAC will provide the overall direction of the QA function. At a minimum, the NV ERP QAC shall have the following duties:

- Identify and respond to QA/QC needs of the NV ERP and provide QA/QC guidance or assistance to individual Project Managers and Task Managers.
- Verify that systems are in place to evaluate data against analytical quality criteria.
- Verify that appropriate corrective actions are taken for nonconforming conditions.
- Notify the DOE/NV ERD Director, the individual NV ERP Project Managers, and other involved personnel, of significant conditions adverse to quality or any adverse trends.

C.2.3.2 Amchitka Island Project Participants

Project participants, such as supporting contractors and organizations, are responsible for developing the necessary procedures for their assigned scope of work and ensuring that work is performed in accordance with applicable federal, state, and local regulations; and approved NV ERP project plans and procedures consistent with individual contracts and agency agreements. To fulfill responsibilities specific to QA, participants shall, at a minimum, be responsible for the following:

- Report to the NV ERP Project Managers or NV ERP Task Managers concerning scope, schedules, costs, technical execution, and quality achievement of task order activities.
- Ensure the proper resources are provided for QA activities and that QA activities are integrated into project activities.
- Evaluate activities to ensure that planning document requirements are implemented.
- Implement applicable procedures and instructions that govern NV ERP activities.
- Verify that work is technically sound, of acceptable quality, and is consistent with project objectives.
- Ensure personnel are trained and qualified to achieve initial proficiency, maintain proficiency, and adapt to changes in technology, methods, or job responsibilities.
- Perform assessments, as applicable, to verify compliance with applicable requirements.
- Identify deficient areas and implement effective corrective action for quality problems.
- Notify the NV ERP Project Managers, the NV ERP Task Managers, and other involved personnel of significant conditions adverse to quality or any adverse trends.
- Verify that appropriate corrective actions are taken for nonconformances.

C.2.3.3 Analytical Laboratories

Analytical laboratories used to support the NV ERP are responsible for ensuring that samples are received, handled, stored, and analyzed according to the analytical laboratory's QA program and contract requirements. Analytical laboratories performing data analysis shall participate in Performance Evaluation Sample Programs appropriate for analyses performed and be subject to

periodic audits. Subcontracted analytical services are subject to the same requirements. Verification of subcontractor conformance is the responsibility of the contracting organization.

C.2.4 Planning

The NV ERP and participant personnel responsible for oversight of data collection operations should verify that the data-collection system design is defined, controlled, verified, and documented. All planning shall incorporate the principle of Integrated Safety Management to mitigate hazards to workers, the public, and the environment. A graded approach to data quality requirements shall be used to meet the sampling objectives and data needs of a given site and the dynamic nature of the program. Work assignments should be clearly communicated with lines of communication established among all participants. Organizations assigned lead responsibilities shall coordinate project planning with decision makers and participating organizations.

C.2.4.1 Task Initiation

A project kickoff meeting should be conducted at the beginning of each task. This meeting should brief key personnel assigned to the task on the purpose of the task, the expected outcome, the schedule for the task, and personnel responsibilities for completion of the effort. The planning process should be monitored by responsible managers to ensure communication of status, to assess progress, and to implement any corrective action needed to achieve timely completion.

C.2.4.2 Data Quality Objectives

When appropriate, planning and scoping for environmental data/information needs will include the use of the DQO process to determine the type, quantity, and quality of the data to be collected and the appropriate use of such data. Participants in the DQO process for each operation should include representatives of all data users and decision makers involved with that operation. The DQO process provides a systematic procedure for defining the criteria that a data collection design should satisfy. The appropriate DOE/NV ERD personnel, NV ERP participants, and state regulators will jointly establish DQOs for each site, or group of similar sites, to allow the work to be planned in a manner that will ensure data will meet the needs of the end users. Representatives from these organizations should include data users and decision makers.

The DQO process should:

- Clarify the study objective.
- Define the most appropriate type of data to collect.
- Determine the most appropriate conditions from which to collect the data.
- Specify tolerable limits on decision errors which will be used as the basis for establishing the quantity and quality of data needed to support the decision.

Results of the DQO process shall be documented and project participants shall use the DQOs to develop a scientific and resource-effective data collection design.

C.2.5 Quality Indicators

Data quality indicator goals are qualitative and quantitative statements that specify the data requirements for the project. Sampling analytical data goals are based on the intended use of the data, current field procedures, instrumentation, and available resources. Quality indicator goals are established during the site-specific DQO process to properly support the overall project or sampling task objectives. An evaluation of the quality indicators shall be performed during the assessment of data to determine if the goals set during the DQO process have been accomplished. Indicators of data quality as they relate to data collection and laboratory analysis include precision, accuracy, representativeness, completeness, and comparability.

C.2.5.1 Precision

Precision measures the reproducibility of data under a given set of conditions. Specifically, precision is a quantitative measurement of the variability of a population of measurements compared to their average value. Precision shall be assessed by collecting, preparing, and analyzing duplicate field samples and by creating, preparing, and analyzing laboratory duplicates from one or more field samples. Precision will be reported as relative percent difference (RPD). The RPD is calculated as the difference between the measured concentrations of Sample 1 and Sample 2, divided by the average of the two concentrations, and multiplied by 100. If the RPD exceeds predetermined limits for a given parameter, the data shall be evaluated for usability based on the purpose for the data and reasons for the increased RPD. This evaluation must be documented.

C.2.5.2 Accuracy

Analytical accuracy is defined as the nearness of a measurement to the true or accepted reference value. It is the composite of the random and systematic components of the measurement system and measures bias in a measurement system. Accuracy measurements for spike samples and laboratory control samples shall be calculated as percent recovery, which is calculated by dividing the measured sample concentration by the true concentration and multiplying the quotient by 100. The percent recovery shall be within the limits defined in site-specific plans. Values exceeding the acceptance criteria, established during the site-specific DQO process, must be evaluated for corrective actions.

C.2.5.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent a characteristic of a sample population, a parameter variation at a sampling point, a process condition, or an environmental condition (EPA, 1998). Representativeness depends on the proper design and execution of a sampling program, and it will be achieved through careful selection of sampling intervals and locations as well as analytical parameters and the correct collection methods.

The number of samples collected must be sufficient to demonstrate that the data represents the population of interest to the statistical certainty required by the DQOs. Collection, storage, handling, and transport of samples should be performed in a manner that preserves the *in situ* characteristics of the samples and maintains the representativeness of the sample to the site.

C.2.5.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct, normal conditions (EPA, 1998). Completeness is affected by unexpected conditions that may occur during the data collection process. The number of samples prescribed for an activity must be sufficient to meet data requirements identified in the DQO process and must consider typical loss of data caused by handling, shipping, and analytical processes.

C.2.5.5 Comparability

Comparability is a measure of the confidence with which one dataset or method can be compared with another (EPA, 1998). Comparability is achieved by using standard techniques and procedures (e.g., standard operating procedures) to collect and analyze representative samples and by reporting analytical results in appropriate units. Comparability is limited by the other quality indicators because only when precision and accuracy are known can datasets be compared with confidence.

C.2.6 Reports to Management

Contractor management and NV ERP Project Managers shall be made aware of project activities and shall participate in the development, review, and operation of these activities. The construction management shall be informed of quality-related activities through the receipt, review, and/or approval of:

- Project-specific plans and procedures
- Assessment reports
- Corrective action requests, corrective actions, and schedules
- Nonconformance reports (NCR)

Individuals identifying nonconforming conditions or deficiencies are responsible for documenting and reporting said conditions. All nonconformances and findings related to quality shall be corrected as required, documented, and properly reported. In addition, periodic assessment of QA/QC activities and data quality parameters shall be evaluated and reported to the participating project field and laboratory management.

C.2.7 Readiness Reviews

Readiness reviews verify that all planning documents and systems are in place for the successful and efficient accomplishment of the mission. The readiness review includes verification that personnel are qualified and knowledgeable in the activities they are assigned to perform.

Readiness reviews shall be performed by participating organizations prior to the start of any major scheduled activity and prior to restarting work (following stop work orders) to verify and document

that project planning and prerequisites have been satisfactorily completed. At a minimum, readiness reviews shall verify that the following issues have been addressed:

- The scope of work is compatible with project objectives.
- The planned work is appropriate to meet objectives.
- Work instructions have been reviewed for adequacy and appropriateness, formally approved, and issued to personnel who will be performing the work.
- Hazards have been identified, analyzed, categorized, and controls implemented.
- Proper resources (e.g., personnel, equipment, and materials) have been identified and are available.
- Assigned personnel have read the applicable work instructions and have been trained and qualified.
- Internal and external interfaces have been defined.
- Proper work authorizations and permits have been obtained.
- The calibration of all material and test equipment is current.
- A feedback mechanism has been established to facilitate process improvement.

C.3.0 Criteria 2 - Personnel Training and Qualifications

The NV ERP and Project participant management shall ensure that personnel are qualified and knowledgeable in the activities they perform. Training should emphasize correct performance of assigned work and provide an understanding of why quality requirements exist. Personnel qualification and training records shall be maintained as quality documents in accordance with DOE Order 414.1A, *Quality Assurance* (DOE, 1999).

C.3.1 Project Personnel

Personnel shall be trained and qualified to perform the tasks to which they are assigned. Objective evidence of qualifications may include academic credentials, personal resumes, registrations and/or certifications, licenses, and training records. The qualifications of personnel shall be evaluated against assigned responsibilities and any identified training needs must be addressed.

Training should be provided to achieve and maintain proficiency; adapt to changes in technology, methods, or job description; and allow for feedback and effectiveness of job performance. Training may take the form of orientation and/or indoctrination, formal classroom training, or on-the-job training. This training should include regulatory requirements, scopes of work, QA/QC requirements, and applicable work instructions.

On-the-job training should be conducted and documented by personnel experienced in the task being performed in accordance with each organization's requirements. Any work performed by a trainee should be under the supervision of an experienced individual. Trainees should demonstrate capability prior to performing work independently.

C.3.2 Subcontractor Personnel

Subcontractor personnel shall be qualified and trained to perform the duties for which they were contracted. The contracting organization shall be responsible for verifying the qualifications of their subcontractors.

C.4.0 Criteria 3 - Quality Improvement

The objective of the Amchitka Island Project is to produce quality products and to continuously seek methods to improve both processes and products. Processes shall be established with the objective of preventing problems and improving quality. Peer reviews of various work products should be built into the work processes to ensure the quality of the products prior to release. All personnel are encouraged to identify and suggest improvements in all areas of Amchitka Island activities.

Management shall seek to cultivate an atmosphere which fosters the belief that improvement is always possible, and accountability and excellence must be established at all levels. It is equally important to identify and implement process improvements and efficiencies. Successful techniques should be evaluated to determine the potential for performance improvements in other areas or projects. The following sections identify processes that, at a minimum, shall be implemented.

C.4.1 Internal Quality Control Checks

Quality control checks shall be performed for data collected in the field and data obtained through on-site and/or off-site analysis. Information shall be reviewed by someone other than the initiator to ensure correct collection, transcription, and manipulation. Transcribed data shall be verified to ensure the correctness of the transcription. Data that has been manipulated shall be checked to ensure the manipulation process was performed as the originator intended.

Proprietary computer applications used for the evaluation of historical data maintained or transferred via electronic media shall have QC checks performed that are appropriate to the application being used. These checks must be documented and maintained in accessible files.

Field sampling and laboratory analytical activities shall incorporate QC procedures. All field and laboratory operations and systems shall be evaluated for their potential to impact the quality of generated data. System quality controls that meet the requirements of this QAPP shall be established and documented through the use of approved procedures, plans, or instructions.

The QC samples shall be incorporated into the analytical stream to assess the overall data quality produced by the program. The QC samples consist of field- and laboratory-generated samples which

are used to evaluate sampling and analytical precision and accuracy as well as the levels of potential contamination introduced by the sampling and analytical effort. The following paragraphs describe the QC samples that will be generated.

C.4.1.1 Field Quality Control

The field data collection QC program is designed to provide confidence that data collected during field activities adequately represents the area of interest. For sampling activities, field QC samples provide a mechanism for assessing and documenting that the collection process meets the QA objectives of the project. The number and type of field QC samples required shall be determined during the DQO process for each site. Field QC samples include, as applicable, trip blanks, equipment rinsate blanks, source blanks, field blanks, and field duplicates. Field QC samples shall be submitted to the laboratory in such a manner that the laboratory is not aware that the sample is for QC purposes. Collection and documentation of field QC samples shall be in accordance with approved procedures and site-specific plans. Other types of data collected, such as observational data and measurements, shall have the appropriate quality control checks applied to ensure the information collected is of a quality that meets the objectives of the activity.

C.4.1.1.1 Equipment Rinsate Blank Samples

An equipment rinsate blank is collected from the final rinse solution from the equipment decontamination process to determine the effectiveness of the decontamination process. The blanks shall be prepared by pouring deionized water through or over a sampling device after it has been decontaminated and prior to using the device for environmental sample collection. If equipment rinsate blank analytical results indicate possible contamination of samples, environmental sample results shall be reviewed to determine whether qualifiers should be assigned to the data or whether the source should be resampled. Results of rinsate blank analyses shall be maintained with the corresponding sample analytical data in the laboratory records file and reported in the laboratory data package.

C.4.1.1.2 Field Blank Samples

Field blanks are collected and analyzed by the laboratory to determine if contamination in the air during sample collection and packaging may have contaminated the samples. The field blanks are

prepared by pouring deionized water into clean sample containers in the field near the sampling locations, or by exposing a clean swipe to the same ambient conditions as those present during sampling. Field blanks should be collected as closely in time and space to the environmental sample as possible. If field blank analytical results indicate possible contamination of associated samples, environmental sample results shall be reviewed to determine whether qualifiers should be assigned to the data or whether the source should be resampled.

C.4.1.1.3 Trip Blank Samples

A trip blank is a 40-milliliter volatile organic analysis (VOA) container of organic-free water that is shipped to the field along with the other VOA sample containers. The blank is not opened, but is otherwise maintained, handled, stored, packaged, and shipped as if it were collected in the field. The purpose of the trip blank is to determine if contaminants have entered the sample through diffusion across the Teflon™-faced, silicone rubber septum of the sample vial during the performance of laboratory, field, or shipping procedures. The trip blank is only analyzed for volatile organic constituents. Trip blanks shall be submitted for analysis at a frequency of one sample per shipping container that contains field VOA samples.

Following the analyses, if the trip blanks indicate possible contamination of the samples, the appropriate project personnel shall be notified. Results of trip blank analyses shall be maintained with the corresponding sample analytical data in the laboratory records file and reported in the laboratory data package.

C.4.1.1.4 Duplicate Samples

Field duplicates are QC samples that are collected as closely in time and space to the environmental sample as possible to assess sample variability and to measure sampling and analytical variability. Collection of the required number of duplicates shall be evenly distributed throughout the sampling activity. The field duplicates shall mirror the sampling and analytical profile of the original sample and be assigned a unique sample number. The duplicate sample number shall not indicate that it is a QC sample to minimize handling, analysis, and data-evaluation bias. Parameters to be analyzed shall be the same as those analyzed for the corresponding environmental samples. Sample management

and documentation procedures for duplicates shall be the same as those used for environmental samples.

C.4.1.2 Laboratory Quality Control

All on-site and off-site laboratories performing analyses for the Amchitka Island Project shall conduct their activities in accordance with a written and approved QA plan. Laboratory quality control (LQC) samples shall be analyzed using the same analytical procedures used to analyze environmental samples. Each analytical laboratory shall generate QC samples during each analytical run to assess and document accuracy and precision associated with each analytical measurement in accordance with the laboratory QA plan. All data from concurrently analyzed LQC samples and other quality controls which are used to demonstrate analytical control shall be included in the laboratory's analytical report. The requirements for the types and number of LQC samples will depend on the analytical procedure or method and the laboratory's QA objective for each test. Laboratory quality control samples (LCS) include method blanks, surrogate-spike, and matrix spike/matrix spike duplicate samples.

C.4.1.2.1 Laboratory Control Samples

One LCS shall be prepared and analyzed with each batch of samples per matrix. The LCS shall be carried throughout the sample preparation and analysis procedures to assess laboratory accuracy and precision. The LCS shall be analyzed concurrently with each analytical batch for each analyte of interest and shall be prepared from standards independent of the calibration standard. Control limits for recovery shall be established, and recovery data shall be plotted on internal control charts. The LCS data outside these recovery limits shall be considered "out of control," and the laboratory shall initiate corrective action(s) that shall be performed in accordance with the laboratory's QA plan. Results of duplicate LCS analyses shall be reported as RPD and percent recovery and included with the associated analytical report.

C.4.1.2.2 Method Blank Samples

Method blanks shall be analyzed by the laboratory to check for instrument contamination and contamination and interference from reagents used in the analytical method. A method blank shall be concurrently prepared and analyzed for each analyte of interest for each analytical batch. Method

blank data outside statistical control limits shall be considered "out of control," and corrective action(s) shall be performed in accordance with the laboratory's QA plan. Method blank data shall be reported in the same units as the corresponding environmental samples, and the results shall be included with each analytical report.

C.4.1.2.3 Surrogate-Spike Samples

Surrogate-spike sample analysis shall be performed for all samples analyzed by gas chromatography, (GC) gas chromatography/mass spectrometry (GC/MS), and High Performance Liquid Chromatography (HPLC) to monitor the percent recovery of the sample preparation and analytical procedures on a sample-by-sample basis. Surrogate standards are nontarget compounds added to GC, GC/MS, and HPLC standards, blanks, and samples prior to extraction or purging. Surrogate compounds and concentrations added shall be those specified in the applicable analytical method. Recovery values for surrogate compounds shall be within the control limits specified by the laboratory and in accordance with assessment procedures in the laboratory's QA plan, or the analysis shall be repeated. Results of surrogate-spike sample analyses shall be reported as percent recovery.

C.4.1.2.4 Matrix-Spike/Matrix-Spike Duplicate Samples

Project site-specific matrix-spike/matrix-spike duplicate samples shall be analyzed by the laboratory to determine interferences of the sample matrix on the analytical methods and subsample variance of the laboratory data. A separate sample aliquot shall be spiked with the analytes of interest and analyzed with every 20 samples per matrix or, if fewer than 20 samples were collected, at least one of the samples shall be spiked. Results of the matrix-spike/matrix-spike duplicate analyses shall be reported as percent recovery and RPD and included with the analytical report. Results that are outside the established recovery or reproducibility limits for the analytical method shall be considered "out of control," and the laboratory shall initiate corrective action(s) that shall be performed in accordance with the laboratory's QA plan.

C.4.1.2.5 Laboratory Duplicate Samples

Two aliquots of the same sample per matrix shall be prepared and analyzed for inorganic analysis, and the duplicate results will be used to calculate the precision as defined by the RPD. If the precision value exceeds the control limit, the appropriate laboratory personnel will identify the root

cause of the nonconformance and implement corrective actions. A laboratory duplicate analysis shall be performed for every 20 samples.

C.4.2 Data Precision, Accuracy, and Completeness

Quality control sample results are used to evaluate laboratory and field precision and accuracy. Precision shall be determined by comparing the concentrations of the various constituents between duplicate analyses. Accuracy shall be determined by comparing analytical results with the known (true) value of a reference standard (i.e., a laboratory control sample). The accuracy of the spiked samples must be within the accepted accuracy of the method of analysis for the analyte of interest. Sample results falling outside of acceptable ranges for precision and accuracy shall be brought to the attention of laboratory management for evaluation and corrective action(s) as needed. Completeness shall be determined by comparing the amount of valid data obtained from a measurement system to the amount that was expected to be obtained. Data precision, accuracy, and completeness requirements shall be dependant on the end use of the data and determined during the DQO process for each site.

Laboratory results shall be checked upon receipt. If there appears to be an error in the analysis, the laboratory shall be contacted immediately, and corrective action(s) must be taken. If investigation reveals that processes were not in control, corrective action(s) shall be taken and the resulting data evaluated to determine any impacts.

C.4.3 Corrective Action

This section establishes the methods and responsibilities for identifying, reporting, controlling, and resolving conditions of nonconformance and conditions adverse to quality for activities performed in support of the Amchitka Island Project.

C.4.3.1 Nonconformance

A nonconformance is a deficiency in characteristic, documentation, or procedure that renders the quality of an item or activity as estimated, unacceptable, or indeterminate. The NV ERP policy encourages all personnel to identify and document nonconforming items and processes. It is also NV ERP policy to identify nonconformances in a manner that focuses on solutions and discourages

fault-finding to encourage the open identification and resolution of problems. Individuals identifying nonconforming conditions or items are responsible for documenting and reporting the nonconformance. Responsible personnel should be notified at the time the nonconformance is identified so that, when possible, corrective measures may be taken immediately.

All NCRs shall be handled in accordance with each organization's internal processes. An NCR shall specify:

- Originator
- Date of the nonconformance
- NCR number (unique)
- Responsible organization
- Requirement(s)
- Nature of the nonconformance
- Disposition
- Technical justification for disposition

When an NCR affects cost, schedule, scope, or is a H&S issue, the applicable NV ERP Project Manager and the NV ERP QAC must be notified.

C.4.3.2 Root Cause

A root cause is the most basic element that, if corrected, will prevent recurrence of the same (or similar) problem. Root-cause analysis should be used where the understanding of the basic underlying cause is important to the prevention of similar or related problems. The root-cause analysis should be used to gain an understanding of the deficiency, its causes, and the necessary corrective actions to prevent recurrence. The level of effort expended should be based on the possible negative consequences of a repeat occurrence of a problem.

C.4.3.3 Trend Analysis

Trend analyses should be performed on nonconforming conditions, deficiencies, root causes, and the results of improvement initiatives to identify any possible trends. Adverse trends shall be brought to the attention of the appropriate management. Positive trends, such as improved performance or cost savings resulting from enhancements or the application of new technology, should be shared to

facilitate improvement in other areas or projects. As appropriate, information obtained from trend analyses should be included in a Lessons Learned system.

C.4.3.4 Lessons Learned

A Lessons Learned system has been established at DOE/NV as a focal point for reporting and retrieving important information concerning experiences gained through previous activities. Continuous improvement can be fostered through incorporation of applicable Lessons Learned into work processes and project planning activities, including work plan development, budget development, and strategic planning. The Lessons Learned program should be used interactively with other management tools such as critiques, assessments, readiness reviews, and evaluations of field activities.

C.5.0 Criteria 4 - Documents and Records

The Amchitka Island Project shall have planning documents and work plans, as deemed necessary, for the work to be performed. Contractors may determine that additional procedures are necessary to further define the responsibilities and activities of specific scopes of work. Figure C.1-1 is a flowchart of the guidance documents.

C.5.1 Documents and Records

Systems and controls shall be implemented by project participants for identifying, preparing, reviewing, approving, revising, collecting, indexing, filing, storing, maintaining, retrieving, distributing, and disposing of pertinent quality documentation and records. The format for documents pertaining to the Amchitka Island Project shall be established in cooperation with the State of Alaska.

C.5.1.1 Document Review and Control

Plans and reports shall be reviewed for quality requirements, technical adequacy, completeness, and accuracy prior to their approval and issuance. The NV ERP documents shall be reviewed in accordance with the DOE/NV procedure AMEM-02-002, *Document Review and Coordination* (DOE/NV, 1999a).

A system or process for identifying documents that require control and controlling those documents shall be implemented to ensure that the latest revision of a document is used. The Amchitka Island management is responsible for ensuring that personnel who perform work are in possession of the most current version of the documents applicable to the activities being conducted.

Revisions to controlled documents shall be approved by the same level of authority or organization as the original. Documents no longer in use should have their status clearly indicated, and record copies should be maintained in accordance with DOE Order 200.1, *Information Management Program* (DOE, 1996a).

C.5.1.2 Change Control

Changes or modifications to approved procedures or plans may be necessary to adjust an activity to actual field conditions or to revise programmatic methods of implementing project requirements. Amchitka Island participants shall ensure that changes are properly identified, documented, approved, and controlled in accordance with the individual procedures of each participant organization. Verbal authorization of changes must be documented and followed up with a written change notice in a timely manner. Changes shall be approved commensurate with the original document prior to implementation of the change. Changes to the SSHASP shall be in accordance with procedures. The NV ERP shall be notified of changes that impact the technical scope, cost, or schedule of the project.

C.5.1.3 Records Maintenance

Sufficient records of Amchitka Island activities shall be prepared, reviewed, and maintained. Project records shall be maintained in accordance with DOE Order 200.1 (DOE, 1996a), *Information Management Program.* Contractors and other agency participants shall have a system in place for the storage and retrieval of quality records that is consistent with environmental regulations and DOE Order 200.1 (DOE, 1996a).

C.6.0 Criteria 5 - Work Processes

The performance of activities shall be based upon the objectives of the project. Details of specific, environmental, data-collection activities will be discussed in the applicable site-specific planning documents. Appropriate technical methods or a scientific rationale shall be employed. Activities shall be performed in accordance with approved procedures and site-specific plans that comply with the applicable requirements of DOE Orders, procedures, and project planning documents. Upon request, contractors and participating organizations shall supply the NV ERP with copies of applicable procedures. Deviations from the applicable approved project plans and procedures shall be approved and documented.

C.6.1 Evaluation and Use of Existing and New Data

Existing and new data shall be evaluated against current requirements for their intended use. This analysis consists of editing, screening, checking, auditing, verification, and review. Methods shall be in place for the control and transfer of data, control of interpretive work products, and the control of data within a database. The process should provide guidance for gathering, manipulating, and distributing data. The quality of existing data shall be determined, based on the traceability of data and the level of QA/QC applied to the data during initial collection, prior to inclusion into a central database. Reports or interpretative works shall indicate the quality of the data being used. Prior to use, newly acquired analytical data will be evaluated against predetermined objectives and criteria.

C.6.2 Computer Hardware and Software

Computer hardware/software configurations are defined as the combination of computer program software version, operating software version, and model of computer hardware. Computer software and hardware/software configurations used in the acquisition, modeling or storage of environmental data shall be installed, tested, used, maintained, controlled, and documented to meet the requirements of the user and/or data management criteria. Compatibility between software and hardware systems must be achieved for long-term retrievability. To the extent possible, the contractor's and project participants' hardware and software should be compatible with the NV ERP.

C.6.2.1 Computer Systems

Computer hardware/software configurations for the storage and manipulation of environmental data should be tested by knowledgeable individuals prior to actual use and the results documented and maintained. Changes to hardware/software configurations should be assessed to determine the impact of the change on the technical and quality objectives of the environmental program. If any of the components are changed or modified and a new configuration results, or if program requirements change so that the capability of the hardware/software configurations to meet the new requirements is uncertain, then the configuration should be retested and redocumented.

Computer hardware/software configurations integral to measurement and test equipment (M&TE) that are calibrated for specific uses do not require further testing unless the software uses change or the configuration is modified.

The physical media on which software is stored shall be controlled and protected so that software and data are physically retrievable and protected from loss or compromise by catastrophic events. Back-up copies shall be maintained so that a single event will not cause a significant loss of software or data.

C.6.2.2 Software Design/Development

Project participants involved in the development or use of major-use software for modeling or technical computations will develop and implement processes for the development, modification, verification/validation, and control of computer software codes. Code criteria should be clearly defined prior to development or purchase and should be consistent with applicable national standards. Software will be qualified for use, based on its ability to provide acceptable results for its intended application. The configuration of software should be controlled and documented so traceability is maintained through the developmental history. Documentation of the development or modification of software codes must include the appropriate peer reviews and verification/validation.

C.6.2.2.1 Code Evaluation

Newly developed computer codes or modifications to existing software shall be reviewed and the reviews documented by individuals who are knowledgeable in the area of code development. Reviewers should consider the following aspects:

- Assumptions are reasonable and valid
- Correctness of the mathematical model
- Conformance of methods to accepted and published concepts (recognizing that alternative methods and interpretations other than those of the evaluators may be acceptable)
- Consistency of results with known data
- Reasonable and prudent use of data and analysis tools
- Appropriateness for intended purpose

C.6.2.2.2 Code Verification/Validation

Software should be qualified for use based on its ability to provide acceptable results for the intended application. Software verification and validation activities will include provisions for providing confidence that the software adequately and correctly performs all intended functions. The extent of verification/validation required shall depend on the complexity, risk, and uniqueness of the code. Computer software code modifications shall be verified and validated according to the same requirements as the original code. Verification of changes may be limited to the scope of the modification if the rest of the code is not affected. Acquired technical software used without modification must have operational checks performed through test cases to verify that the software is functioning as intended.

Computer applications, project participants, used for the evaluation of historical data maintained or transferred via electronic media shall have QC checks performed as appropriate to the application being used. These checks must be documented and maintained in project files.

C.6.2.2.3 Software Documentation

All developed or procured computer codes shall be uniquely identified. Computer software code documentation shall be maintained with associated calculations and reference material. Documentation will consist of software design and reference material, verification/validation records, operational test records, and user-oriented information.

C.6.2.3 Peer Review of Software and Code Applications

The peer review is an assessment of the assumptions, calculations, extrapolations, alternate interpretations, methodology, acceptance criteria, and conclusions pertaining to interpretive work products generated through use of computer software. Peer reviews shall be performed and documented to ensure that interpretive work products are technically adequate, properly documented, and satisfy established technical and quality requirements. Peer reviewers shall possess the appropriate subject matter/technical expertise and not have participated in preparing the original work. All review comments and the attendant comment responses shall be recorded on review sheets and maintained in the project files. The acceptable level of accuracy of each interpretive work product should be established by project management.

C.6.3 Field Investigation

Field activities generally involve the collection of data for the purpose of decision making. Field data acquisition shall be accomplished through the use of approved plans, procedures, and/or instructions, by qualified personnel using appropriate tools and calibrated equipment. Additionally, all work shall be performed safely within the controls established to prevent/mitigate hazards. Details of specific environmental data collection activities shall be delineated in the associated project plans and instructions. Data acquisition methods for which a procedure does not exist (those that are unique, experimental, or under development) shall be detailed in the project-specific plans or instructions.

C.6.3.1 Sample Custody

Chain of custody for each field sample collected must be documented to provide the traceability of possession from the time the samples are collected until disposal. A sample is considered to be in custody if it meets any of the following criteria:

- Is in a person's actual possession
- Is in a person's unobstructed view after being in the person's physical possession
- Is in a secured area to prevent tampering after having been in the person's physical possession
- Is in a designated secured area, restricted to authorized personnel only

Sampling events shall be monitored to ensure that custody procedures and records are being properly implemented. Without exception, sample custody shall be continuously maintained for all samples collected.

C.6.3.1.1 Chain of Custody Form

Each individual who possesses a sample is responsible for sample custody until the sample is relinquished to another individual or a secure storage area via the chain of custody form. Field teams shall initiate chain of custody forms for samples collected during field activities in accordance with written and approved procedures and/or instruction. Whenever samples are transferred to a new sample custodian, the new custodian shall sign his or her name, the company name, and note the time and date that the transfer occurred. There shall be no gaps on the record of custody. The chain of custody form shall accompany the samples during handling and shipment, and it shall chronicle the history of custody.

C.6.3.1.2 Custody Seals

To ensure that tampering is easily detectable, each sample container shall be individually sealed with a custody seal. The seal shall be placed over or around the lid of the sample container so that the container cannot be opened without breaking the seal. Each custody seal shall be initialed and dated by the sample custodian.

C.6.3.1.3 Sample Labels and Identification

Sample labels shall contain the unique sample numbers and other sampling information, using indelible ink, and be securely affixed to the container. All information and data for a sample are keyed to each sample's unique number. The sample label shall contain the following required information:

- Project name
- Unique sample number
- Sampling date and time (military)
- Sample location and depth interval (if applicable)
- Sample medium
- Requested analyses
- Name of the individual collecting the sample
- Preservation or conditioning of the sample

Each sample number shall be indicated on both the container and field data/sample collection forms. For samples requiring multiple containers, the same sample identification numbers shall be required on each container. Labels that are not plastic coated and have the potential to smear or deteriorate shall be covered with clear tape.

C.6.3.1.4 Sample Handling, Preservation, Packaging, and Shipping

Proper sample handling is achieved by selecting the appropriate sample containers, preservation procedures, and holding times for specific analyses. Where applicable, sample containers shall be certified clean per EPA protocol and shall remain sealed until ready for use. Certificates of container cleanliness shall be maintained in the project files. A table of parameters and analytical methods is provided in Attachment C-2. This table is a living document and as such is subject to review and update on a regular basis.

Upon completion of sampling, labeling, and custody sealing, each sample shall be placed in a separate, sealable plastic bag; transferred to an appropriate shipping container cooled with ice, if required; and protected from breakage by using shock-absorbent packing material. Approved procedures must comply with Title 49 CFR, Parts 170 to 177 (CFR, 1996b), for the packaging, labeling/placarding, and shipping of samples.

C.6.3.1.5 Decontamination

To prevent cross-contamination of samples, equipment coming in contact with samples shall be decontaminated prior to use, between sampling locations, and before leaving the site. Certification of cleanliness shall be obtained for disposable or precleaned sampling equipment. Decontamination activities shall be performed and documented in accordance with the participating organization's approved written procedures.

Equipment rinsate blanks shall be submitted to the analytical laboratory to assess the effectiveness of the decontamination process. If the rinsate blank results indicate possible contamination, corrective actions shall be implemented to preclude recurrence. Sample results obtained using the suspect sampling equipment shall be reviewed to determine whether analytical qualifiers should be assigned to the data.

C.6.3.1.6 Investigation-Derived Waste

Investigation-derived waste (IDW) shall be containerized pending the results of waste characterization. To ensure compliance with DOE requirements and federal and state regulations, IDW shall be characterized and disposed of in accordance with approved plans.

C.6.3.1.7 Field Documentation

Field documentation should be of sufficient detail to facilitate the reconstruction of field activities. Field personnel shall document activities on a daily activity report, a log book, or on the appropriate form as required by each contractor doing work for the NV ERP. Documentation should be made in indelible ink and include all information applicable to the activity being performed.

C.6.3.1.8 Photographic Documentation

With the approval of the DOE/NV, photographs may be taken during the corrective action investigation and/or corrective action activities. Photographs shall be documented on a photographic log in accordance with contractor procedures. The photographs and negatives shall be processed and stored in accordance with DOE/NV security procedures.

C.6.3.2 Identification and Control of Items

The NV ERP participants shall establish and document sufficient controls to ensure that quality-affecting items, such as equipment, components, and material can be readily identified. These controls shall be established to prevent incorrect use, to retain integrity of materials, and to preserve the desired operating characteristics of equipment. Controls shall be applied that are based on the risk to the project if control of the item is lost. Appropriate controls shall be applied prior to and subsequent to use. Specific requirements for preservation and packaging shall be identified in project documents.

Hazardous materials shall be properly controlled and transported in accordance with Title 49 CFR Part 173, *Shippers—General Requirements for Shipments and Packaging* (CFR, 1996b).

C.6.3.3 Calibration and Preventive Maintenance

The M&TE used in NV ERP projects shall be uniquely identified and controlled. A system of calibration and preventive maintenance shall be employed by project participants to ensure the proper operation of M&TE. Reference standards of the correct type, range, and acceptable uncertainty shall be used for collecting data consistent with the project objectives.

C.6.3.3.1 Calibration

Approved procedures or the manufacturer's recommendations shall be used to calibrate M&TE prior to use and at prescribed intervals thereafter. The frequency of calibrations (periodic or factory) shall be based on the manufacturer's recommendations, national standards of practice, equipment type and characteristics, and past experience. Operational, or in-house, calibrations and/or source-response checks shall be performed on the appropriate M&TE prior to the start of work and at prescribed intervals to verify the equipment's continued accuracy and operational function.

Equipment for which the periodic calibration period has expired, equipment that fails calibration, or equipment that becomes inoperable, shall be tagged "out-of-service" and, when possible, segregated to prevent inadvertent use. Results of activities performed using equipment that is out of calibration shall be evaluated for adverse affects and the appropriate personnel notified.

Physical and chemical standards shall have certifications traceable to the National Institute of Standards and Technology, U.S. Environmental Protection Agency (EPA), or other nationally recognized agencies. Supporting documentation on all reference standards and equipment shall be maintained.

C.6.3.3.2 Preventive Maintenance

Project participants shall perform periodic preventive maintenance on field and laboratory equipment. To avoid preventable breakdowns and work delays, preventive maintenance schedules, practices, and a list of necessary spare parts shall be developed in accordance with manufacturers' specifications and warranties. The frequency of preventive maintenance shall be based on the manufacturers' recommendations and the users' professional knowledge and experience.

C.6.3.4 Laboratory Operation

Laboratories performing analytical work for the Amchitka Island Project must operate in accordance with an acceptable written QA program. Plans and procedures relevant to the NV ERP must be made available upon request. Deviations from approved procedures shall be documented.

All Amchitka Island participants who subcontract analytical services must ensure quality of services through established procurement practices and oversight activities. Laboratories must participate in an Interlaboratory Performance Evaluation program appropriate to sample types and analyses. The laboratory must maintain participation in the DOE interlaboratory quality assurance programs appropriate for the samples analyzed and in the EPA programs most appropriate to sample types and analyses. The laboratory must provide the results of these performance evaluation studies along with the laboratory's response to any deficiencies which were identified upon request.

C.6.3.4.1 Preanalysis Storage

Samples received at the analytical laboratory that have been entered into the sample tracking system shall be placed into a storage refrigerator or secure storage area until analyzed. The methods of storage are generally intended to:

- Retard biological action

- Retard hydrolysis of chemical compounds and complexes
- Reduce volatility of constituents
- Reduce adsorption effects
- Reduce light exposure

Preservation methods are generally limited to pH control, preservative addition, and refrigeration. Radiological samples do not require preservation. Preanalysis sample storage procedures shall be documented and described in laboratory-specific procedures.

C.6.3.4.2 Postanalysis Storage

The possibility of reanalysis requires that proper environmental control for post-analysis samples be provided. These controls shall be described in laboratory-specific procedures. In general, samples shall not be kept longer than one year. The samples shall be properly disposed of by the laboratory unless other arrangements have been made to return them to the site.

C.6.4 Analytical Data Usability

Analytical data received for input into a project should be assessed for acceptability against the requirements stipulated in the applicable project document. Personnel should verify that analytical data reports have been reviewed by appropriate individuals other than those generating the analytical data or the report and that all forms of the report (printed or electronic) carry a notice of any limitations on the use of the data.

C.6.4.1 Data Management

Analytical data shall be controlled and managed to guarantee data integrity throughout acquisition and development. Systems must be established for directing analytical data results into a controlled data management system. Requirements shall be established for identification, collection, selection, control, and transfer of analytical data both within and external to the NV ERP data management system. Analytical data that are submitted shall be qualified and traceable to the original data records and procedures established for processing, storage, and control of data. Analytical data users are responsible for determining if the data are sufficient for their intended use.

Each participating organization responsible for generating environmental data for the NV ERP shall have a management plan for handling data that describes the flow of data from its generation through its final use and storage. The Data Management Plan shall include or reference the specific procedures to be used for data verification and validation to ensure that all data used to support decisions made under the NV ERP are of known and documented quality. Procedures shall be used to optimize the detection and correction of errors and prevent data loss during data reduction, reporting, and data entry into databases.

C.6.4.2 Evaluation and Use of Data

Participating organizations shall have a system in place for the control and transfer of data and interpretive work products to the Common Data Repository, which will provide guidance for gathering, manipulating, and distributing data. The quality of existing data shall be determined, based on the traceability of data and the level of QA/QC applied to the data during initial collection and current requirements for their intended use. This analysis consists of editing, screening, checking, auditing, verification, and review. Reports, models, or interpretative works shall indicate the quality of the data being used. Prior to use, newly acquired analytical data will be evaluated against predetermined objectives and criteria. Computer applications used for the evaluation of data maintained or transferred via electronic media shall have quality control checks performed as appropriate to the application being used.

C.6.4.3 Data Reduction, Verification, and Validation

Computations performed on raw data are considered data reductions. Numerical reduction of field and analytical data shall be formally checked in accordance with approved procedures, and this checking must be performed prior to the presentation of results. If unchecked results are to be presented, transmittals or subsequent calculations based on these results must be marked "preliminary" until the results are checked and determined to be correct.

Verification is the process of checking and reviewing the data reduction process. Data verification is a systematic review of data by qualified individuals to check data reduction and ensure that data meet specified guidelines.

Validation of analytical data is a comprehensive verification which includes complete review of raw data. The site-specific DQO process shall establish what percentage of analytical data packages shall be validated. Qualifiers may be attached to the data to indicate the results of the verification process. These qualifiers may restrict or limit certain uses of the data.

C.6.4.3.1 Data Completeness Review

A completeness review should be conducted to ensure that field and laboratory data and documentation are present and complete. During this review, problems should be identified and documented. Information from this review should accompany the data. The review should include the verification that:

- Overall deliverable objectives are met.
- Laboratory documentation is complete and accurate.
- Significant problems are identified in the laboratory documentation.
- Chain-of-custody documents are complete and contain required information.
- Analytical practices are consistent with chain-of-custody requirements.
- Analytical information presented is correct and complete.
- Analytical practices are within technical guidelines.
- All field forms are present and complete.

C.6.4.3.2 Data Review and Summary

Selected QC checks and procedures shall be evaluated for compliance or noncompliance with DQO standards. Deficiencies in the data package shall be communicated to the laboratory, and additions or corrections to the data package shall be controlled. Data review shall be conducted by personnel with training in, and a technical understanding of, laboratory methods and data quality, but extensive experience required of professionally trained data validators is not required. Data review shall include, but not be limited to, the examination of the following:

- Analytical requirements have been met.
- Critical items meet the project requirements.
- Analytical method QC compliance are evaluated and applied to results/qualifiers.
- Sample data quality indicator goals are evaluated.
- Surrogate data quality indicators are evaluated.
- Laboratory QC sample data quality indicators are evaluated.
- Calibration information is evaluated and applied to results/qualifiers.
- Internal standard is evaluated and applied to results/qualifiers.

- Serial dilution effects
- Holding time criteria is correct.
- Laboratory data qualifiers are correct and explained or a key is included.

C.6.4.3.3 Data Validation

Data validation encompasses a complete validation of the analytical results according to EPA functional guidelines or an equivalent industry-standard protocol. Data validation and review of CLP and CLP-like data packages shall be performed in accordance with the *USEPA Contract Laboratory Program, National Functional Guidelines for Inorganic Data Review* (EPA, 1994) and *Contract Laboratory Program, National Function Guidelines for Organic Data Review* (EPA, 1999). For non-CLP radiochemical parameters, the data validation shall be performed following the requirements outlined in DOE SOPs, which are based on the Hazardous Waste Remedial Action Program, *Requirements for Quality Control of Analytical Data* (DOE, 1988). This review is designed to be conducted by personnel with training in, and a technical understanding of, laboratory methods and data quality, and with the extensive experience required of professionally trained data validators. Calculations of results from raw data will be verified, and data validation qualifiers will be assigned. The results of this review and a summary of parameter detections shall be forwarded to the appropriate Project Manager for evaluation.

Data validation shall include a check of the calculation of all QC sample results and the third party confirmation of a minimum of five percent, based on direction from the Radioactive Waste Acceptance Program, of the sample result calculations from characterization samples or samples intended to demonstrate that the contaminant(s) of concern have been isolated, stabilized, and/or removed. Data validation shall also include a check of all the functional guideline parameters included in lower-level reviews.

The percentage of data packages to be validated for the Amchitka Island Project shall be dependent on the end use of the data and established during the site-specific DQO process. Sample results selected for validation shall be determined by use of a random number generator or may be selected by project management in cases where special criteria exist. The Amchitka Island Project Manager shall maintain the option of having additional data packages reviewed.

C.6.4.4 Laboratory Data Reporting

Analytical data reports must contain, at a minimum, the following information:

- Cover page with the reviewer's signature, data qualifiers, and a description of any technical difficulties encountered during the analyses
- Date the sample was received
- Date the sample was prepared
- Date the sample was analyzed
- Sample identification number
- Laboratory sample identification number
- Analytical method reference number
- Analytical results
- Tabulated QC sample results
- Instrument tuning and calibration results
- Final copy of the chain-of-custody form, with appropriate signatures
- Hard copy raw data of calibration, QC samples, and the analyses of field samples

Data packages shall be required for all analytical results unless sample results are excluded from data validation by NV ERP project management. Validated data shall be reviewed to determine whether they meet the DQOs of the investigation. The data shall be reviewed to ensure that the required number of samples were collected, critical samples were collected and analyzed, and the results passed data-validation criteria. The data shall also be reviewed to determine whether detection limits were met. Data-reporting techniques shall be in accordance with the project data-reporting requirements; data-reporting procedures shall be consistent with those found in the *User's Guide to the Contract Laboratory Program* (EPA, 2000).

C.6.4.4.1 Data Reporting

Data shall be reported in accordance with standardized formats. Electronic data transfers shall be delivered, along with the hard copy, on 3.5-inch diskettes or other methods agreed upon with the NV ERP Common Data Repository custodial organization. The laboratory will not be loaded into the common data repositories for general use until it has been verified/validated.

C.7.0 Criteria 6 - Design

Any quality-affecting items or processes designed in support of the Amchitka Island Project shall be in accordance with a documented design control process and based on sound engineering and scientific principles using the appropriate standards. The acceptability and adequacy of the design product shall be verified or validated by qualified individual(s) other than those who performed the original design. Verification and validation shall be completed prior to approval and implementation of the design. Design records shall include the design steps and sources of input that support the final output. The final design output shall be approved in accordance with the participants' internal procedures. Changes or modifications to the final design shall be subject to the same control measures and approvals as applied to the original design.

C.8.0 Criteria 7 - Procurement

Procurement of items and services for the Amchitka Island Project shall be consistent with standard commercial purchase order terms and conditions, and performed in cooperation with the DOE/NV Contracts Management Division. Project participants must have processes in place that meet the requirements of their contracts or agreements and applicable federal requirements.

C.8.1 Procurement Control

Items and services of a technical nature procured in support of the Amchitka Island Project shall be of a quality that meets the requirements of the project. Project participants shall establish controls to ensure that, as a minimum, procured items and services meet specifications delineated in the procurement documents. Each participating organization shall have systems in place to track items and confirm the delivery of procured items and services as specified. Project participants shall have a program in place, invoking the appropriate quality requirements of the contractor's QA program and specifying any project requirements for the procurement of items and services.

Subcontractors procured for Amchitka Island activities must be evaluated for prior experience, ability to perform specific tasks, and cost. The capabilities of subcontractor personnel shall be assessed by the procuring contractor to verify qualifications and determine the type and amount of training and supervision needed for environmental restoration activities.

C.8.1.1 Procurement Documents

Procurement documents for the Amchitka Island Project shall define the scope of work for the item or service being procured and provide specifications, acceptance criteria, shipping and handling requirements, health and safety requirements, and any documentation required as applicable. Technical specifications shall either be directly included in the procurement documents or included by reference to specific drawings, specifications, procedures, regulations, or codes that describe the items or services to be furnished. Procurement documents shall be reviewed for accuracy and completeness by qualified personnel prior to initial issue. Changes to a procurement document require the same level of review and approval as the original document.

C.8.1.2 Measurement and Testing Equipment

Procurement documents shall also require that all purchased and rented M&TE be calibrated to existing national standards prior to acceptance and that calibration documentation is provided. Calibration certification and instrument manufacturer's manuals should be available in project files for M&TE. Schedules for recalibration shall be established and implemented for M&TE requiring periodic calibration.

C.8.1.3 Verification of Quality Conformance

If applicable, procurement documents for Amchitka Island Project-related items or services, shall require access to the subcontractor's or vendor's facilities, including their subtier facilities, work areas, and records for assessments to verify acceptability. Upon delivery, procured items or services shall be inspected for conformance to procurement specifications and requirements prior to using items or placing them in service. Project personnel have the authority to stop work if significant quality problems are identified. Procured items should be evaluated for suspect/counterfeit parts. If there are indications that suppliers knowingly supplied substandard items or services, the DOE Office of Inspector General shall be notified.

C.9.0 Criteria 8 - Inspection and Acceptance Testing

Inspections and acceptance testing shall be accomplished in accordance with approved inspection documents and test procedures that reflect acceptance and performance criteria. Individuals performing inspections and acceptance testing shall be independent of those who performed the work. Quality-affecting materials used during characterization, corrective action, or sampling activities shall be inspected upon receipt for adequacy. The M&TE used in the performance of inspections or acceptance tests shall be calibrated and properly maintained. Any item or work determined to be defective shall be controlled to avoid inadvertent use.

C.10.0 Criteria 9 - Management Assessment

Planned and periodic assessments shall be conducted and shall involve the participation of management at all levels. The primary emphasis of management assessments is to evaluate the implementation of the integrated QA program and identify problems that hinder the achievement of objectives. Contractor management should conduct periodic assessments that focus on such issues as the:

- Adequacy of implementation of the integrated QA program, with particular emphasis on quality improvement
- Existence of any management biases or organizational barriers that impede the improvement process
- Adequacy of the appraised organization's structure, staffing, and physical facilities
- Existence of effective training programs

The results of the assessment shall be documented in a final report and issued to the appropriate managers. Senior management has the primary responsibility to ensure the timely follow-up of corrective actions, including an evaluation of the effectiveness of management's actions. Results of the management assessment should be entered into a tracking system for the purposes of identifying trends and lessons learned.

C.11.0 Criteria 10 - Independent Assessments

Independent management and technical assessments shall be performed to verify compliance with applicable quality requirements, DOE policies, and procedures. Assessments shall be conducted to measure item and service quality, the adequacy of work performance, and to promote improvement. The scheduling of the assessments and resource allocation for independent assessments should be based on the status, risk, and complexity of work being assessed.

The group performing the independent assessment shall be composed of individuals that are not directly involved in the work being assessed. Each group performing independent assessments shall have sufficient authority and freedom to carry out the activities necessary to effectively conduct the assessment. Assessments should focus on improving the quality of the processes that lead to the end product.

Results of each assessment should be tracked and resolved by responsible management with follow-up of deficient areas. Assessment responses should include: corrective action, identification of the root cause, actions to prevent recurrence, lessons learned, and actions for improvement.

C.12.0 References

American Society of Quality Control. 1994. American National Standards Institute, *Specifications and Guidelines for Quality Systems for Environmental Technology Programs,* ANSI/ASQ E-4. Milwaukee, WI.

ASQC, see American Society of Quality Control.

CFR, see *Code of Federal Regulations*.

Code of Federal Regulations. 1996a. Title 10, Part 830.120, "Energy - Nuclear Safety Management." Washington, DC.

Code of Federal Regulations. 1996b. Title 49, Parts 170 through 177, "Transportation - Hazardous Materials Shipping Regulations." Washington, DC.

Code of Federal Regulations. 1998a. Title 10 Part 71, "Energy - Packaging and Transportation of Radioactive Material," Subpart H. Washington, DC.

Code of Federal Regulations. 1998b. Title 29 Part 1910.120, "Hazardous Waste Operations and Emergency Response." Washington, DC.

DOE, see U.S. Department of Energy.

DOE/NV, see U.S. Department of Energy, Nevada Operations Office.

EPA, see U.S. Environmental Protection Agency.

U.S. Department of Energy. 1988. *Requirements for Quality Control of Analytical Data.* Washington, DC.

U.S. Department of Energy. 1996a. *Information Management Program,* DOE Order 200.1. Washington, DC.

U.S. Department of Energy. 1996b. *Safety Management System Policy,* DOE Order 450.4. Washington, DC.

U.S. Department of Energy. 1998. *Worker Protection Management for DOE Federal and Contractor Employees,* DOE Order 440.1A. Washington, DC.

U.S. Department of Energy. 1999. *Quality Assurance,* DOE Order 414.1A. Washington, DC.

U.S. Department of Energy, Nevada Operations Office. 1993. *DOE/NV Quality Glossary.* Las Vegas, NV.

U.S. Department of Energy, Nevada Operations Office. 1999a. *Document Review and Coordination,* Rev. 0, AMEM-02-002. Contained in Policies, Plans, Procedures, and Guidance Manual. Las Vegas, NV: Office of Assistant Manager, Environmental Management.

U.S. Department of Energy, Nevada Operations Office. 1999b. *Nevada Test Site Waste Acceptance Criteria, NTSWAC,* Rev. 2, DOE/NV-325. Las Vegas, NV.

U.S. Environmental Protection Agency. 1994. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,* EPA-540/R-94/013. Washington, DC.

U.S. Environmental Protection Agency. 1998. *Guidance for Quality Assurance Project Plans,* EPA QA-G-5, EPA/600/R-98/018. Washington, DC.

U.S. Environmental Protection Agency. 1999. *Contract Laboratory Program National Functional Guidelines for Organic Data Review,* EPA-540/R-99/008. Washington, DC.

U.S. Environmental Protection Agency. 2000. *User's Guide to the Contract Laboratory Program,* EPA 540-R-99-004. Washington, DC.

C.13.0 Glossary

Acceptance Criteria

Specific characteristics of an item, process, or service defined in codes, standards, or other requirement documents. (DOE/NV, 1993)

Accuracy

A measure of the closeness of an individual measurement or the average of a number of measurements to the true value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations; the EPA recommends using the terms "*precision*" and *bias*," rather than "*accuracy,"* to convey the information usually associated with accuracy. (EPA, 1998)

Activity

An all-inclusive term describing a specific set of operations or related tasks to be performed, either serially or in parallel (e.g., research and development, field sampling, analytical operations, equipment fabrication), that in total result in a product or service. (ASQC, 1994)

Assessment

The evaluation process used to measure the performance or effectiveness of a system and its elements. Assessment is an all-inclusive term used to denote any of the following: audit, performance evaluation, management systems review, peer review, inspection, or surveillance. (ASQC, 1994)

Audit (Quality)

A systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives. (ASQC, 1994)

Bias

The systematic or persistent distortion of a measurement process which causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value). (ASQC, 1994)

Calibration

Comparison of a measurement standard, instrument, or item with a standard or instrument of higher accuracy to detect and quantify inaccuracies and to report or eliminate those inaccuracies by adjustments. (ASQC, 1994)

Certification

The act of determining, verifying, and attesting in writing to the qualifications of personnel, processes, procedures, or items in accordance with acceptance criteria. (DOE/NV, 1993)

Characteristic

Any property or attribute of a datum, item, process, or service that is distinct, describable, and/or measurable. (ASQC, 1994)

Comparability

A measure of the confidence with which one data set can be compared to another. (ASQC, 1994)

Completeness

A measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct, normal conditions. (ASQC, 1994)

Condition Adverse to Quality

An all-inclusive term used in reference to any of the following: failures, malfunctions, deficiencies, defective items or nonconformance. (DOE/NV, 1993)

Corrective Action

An action taken to eliminate the causes of an existing nonconformance, deficiency, or other undesirable situation in order to prevent recurrence. (ASQC, 1994)

Criteria

Rules or tests against which the quality of performance can be measured. They are most effective when expressed quantitatively. Fundamental criteria are contained in policies and objectives, as well as codes, standards, regulations, and recognized professional practices that DOE and DOE contractors are required to observe. (DOE/NV, 1993)

Data Quality Objectives (DQOs)

Qualitative and quantitative statements derived from the DQO process that clarify study technical and quality objectives, define the appropriate types of data, and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity of data needed to support decisions. (ASQC, 1994)

Data Quality Objectives Process

A systematic strategic planning tool based on the scientific method that identifies and defines the type, quality, and quantity of data needed to satisfy a specific use. The key elements of the process include:

- Concisely defining the problem
- Identifying the decision to be made
- Identifying the key inputs to the decision
- Defining the boundaries of the study
- Developing the decision rule
- Specifying tolerable limits on potential decision errors
- Selecting the most resource efficient data collection design

Data quality objectives are the qualitative and quantitative outputs from the DQO process. The DQO process was developed originally by the EPA, but has been adapted for use by other organizations to meet their specific planning requirements. (ASQC, 1994)

Data Usability

The process of ensuring or determining whether the quality of the data produced meets the intended use of the data. (ASQC, 1994)

Deficiency

An unauthorized deviation from acceptable procedures or practices, or a defect in an item. (ASQC, 1994)

Design

Specifications, drawings, design criteria, and performance requirements. Also the result of deliberate planning, analysis, mathematical manipulations, and design processes. (ASQC, 1994)

Document

Any written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results. (ASQC, 1994)

Environmental Data

Any measurements or information that describe environmental processes or conditions, or the performance of environmental technology. (ASQC, 1994)

Environmental Data Operations

Work performed to obtain, use, or report information pertaining to environmental processes and conditions. (ASQC, 1994)

Graded Approach

The process of basing the level of application of managerial controls applied to an item or work according to the intended use of the results and the degree of confidence needed in the quality of the results. (See data quality objectives process.) (ASQC, 1994)

Independent Assessment

An assessment performed by a qualified individual, group, or organization that is not a part of the organization directly performing and accountable for the work being assessed. (ASQC, 1994)

Inspection

An activity such as measuring, examining, testing, or gauging one or more characteristics of an entity and comparing the results with specified requirements in order to establish whether conformance is achieved for each characteristic. (ASQC, 1994)

Item

An all-inclusive term used in place of any of the following: appurtenance, facility, sample, assembly, component, equipment, material, module, part, product, structure, subassembly, subsystem, system, unit, documented concepts, or data. (ASQC, 1994)

Management Assessment

The determination of the appropriateness, thoroughness, and effectiveness of management processes. (DOE/NV, 1993)

Measurement and Testing Equipment (M&TE)

Tools, gauges, instruments, sampling devices or systems used to calibrate, measure, test, or inspect in order to control or acquire data to verify conformance to specified requirements. (ASQC, 1994)

Method

A body of procedures and techniques for performing an activity (e.g., sampling, chemical analysis, quantification) systematically presented in the order in which they are to be executed. (ASQC, 1994)

Nonconformance

A deficiency in characteristic, documentation, or procedure that renders the quality of an item or activity unacceptable or indeterminate; nonfulfillment of a specified requirement. (ASQC, 1994)

Precision

A measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions, expressed generally in terms of the standard deviations. (ASQC, 1994)

Procedure

A specified way to perform an activity. (ASQC, 1994)

Process

Any activity or group of activities that takes an input, adds value to it, and provides an output to a customer. The logical organization or people, materials, energy, equipment, and procedures into work activities designed to produce a specified end result (work product). (DOE/NV, 1993)

Quality

The totality of features and characteristics of a product or service that bear on its ability to meet the stated or implied needs and expectations of the user. (ASQC, 1994)

Quality Assurance (QA)

An integrated system of management activities involving planning, implementation assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed and expected by the customer. (ASQC, 1994)

Quality Assurance Program

The overall program (management system) established to assign responsibilities and authorities, define policies and requirements for the performance and assessment of work. (DOE, 1999)

Quality Control (QC)

The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality. (ASQC, 1994)

Quality Improvement

A management program for improving the quality of operations. Such management programs generally entail a formal mechanism for encouraging work recommendations with timely management evaluation and feedback or implementation. (ASQC, 1994)

Quality Indicators

Measurable attributes of the attainment of the necessary quality for a particular environmental decision. Indicators of quality include precision, bias, completeness, representativeness, reproducibility, comparability, and statistical confidence. (ASQC, 1994)

Quality Management Plan (QMP)

A formal document or manual, usually prepared once for an organization, that describes the quality system in terms of the organizational structure, functional responsibilities of management and staff, lines of authority, and required interfaces for those planning, implementing, and assessing all activities conducted. (ASQC, 1994)

Quality System

A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC. (ASQC, 1994)

Readiness Review

A systematic, documented review of the readiness for startup or continued use of a facility, process, or activity. Readiness reviews are typically conducted before proceeding beyond project milestones and prior to institution of a major phase of work. (ASQC, 1994)

Record

A completed document that furnishes evidence relating to items or activities. (DOE/NV, 1993)

Remediation

The process of reducing the concentration of a contaminant (or contaminants) in air, water, or soil media to a level that poses an acceptable risk to human health. (ASQC, 1994)

Representativeness

A measure of the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. (ASQC, 1994)

Risk

A quantitative or qualitative expression of possible loss which considers both the probability that an event occurrence will cause harm or loss and the consequences of that event. (DOE/NV, 1993)

Root Cause

The most basic reason for conditions adverse to quality that, if corrected, will prevent occurrence or recurrence. (DOE/NV, 1993)

Self Assessment

Assessments of work conducted by individuals, groups, or organizations directly responsible for overseeing and/or performing the work. (ASQC, 1994)

Service

The result generated by activities at the interface between the supplier and the customer, and by supplier internal activities to meet customer needs. Such activities in environmental programs include design, inspection, laboratory and/or field analysis, repair, and installation. (ASQC, 1994)

Specification

A document stating requirements and which refers to or includes drawings or other relevant documents. Specifications should indicate the means and the criteria for determining conformance. (ASQC, 1994)

Standard Operating Procedure

A written document that details the method for an operation, analysis, or action with thoroughly prescribed techniques and steps, and that is officially approved as the method for performing certain routine or repetitive tasks. (ASQC, 1994)

Surveillance (Quality)

Continual or frequent monitoring and verification of the status of an entity and the analysis of records to ensure that specified requirements are being fulfilled. (ASQC, 1994)

Technical Review

A documented critical review of work that has been performed within the state of the art. The review is accomplished by one or more qualified reviewers who are independent of those who performed the work, but are collectively equivalent in technical expertise to those who performed the original work. The review is an in-depth analysis and evaluation of documents, activities, material, data, or items that require technical verification or validation for applicability, correctness, adequacy, completeness, and assurance that established requirements are satisfied. (ASQC, 1994)

Traceability

The ability to trace the history, application, or location of an entity by means of recorded identifications. In a calibration sense, traceability relates measuring equipment to national or international standard, primary standards, basic physical constants or properties, or reference materials. In a data collection sense, it relates calculations and data generated throughout the project back to the requirements for quality for the project. (ASQC, 1994)

Training

The process of providing for and making available to an employee(s) and placing or enrolling an employee(s) in a planned, prepared, and coordinated program, course, curriculum, subject, system, or routine of instruction or education, in fiscal, administrative, management, individual development, or other fields which improve individual and organizational performance and assist in achieving the agency's mission and performance goals. (DOE/NV, 1993).

Validation

Confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled. In design and development, validation concerns the process of examining a product or result to determine conformance to user needs. (ASQC, 1994)

Verification

Confirmation by examination and provision of objective evidence that specified requirements have been fulfilled. In design and development, validation concerns the process of examining a result of a given activity to determine conformance to the stated requirements for that activity. (ASQC, 1994)

Attachment C-1

Quality Criteria for Site-Specific Documents

(2 Pages)

Site-Specific Quality Assurance Project Plans Requirements

Site-specific planning documents must contain QA/QC requirements appropriate for the site and activities being performed. This attachment delineates the quality criteria that should be either included in the site-specific planning document or addressed in an appendix to the appropriate document:

- Quality Objectives and Criteria for Measurement Data: Describe the project quality objectives and performance criteria.

- Special Training Requirements/Certification: Identify and describe any specialized training or certification requirements and discuss how such training will be provided and how the necessary skills will be assured and documented.

- Required Documentation and Records: Define the information that must be included in the data report package and the reporting format. Identify documents (e.g., interim progress reports, final reports) that will be produced. Specify the final disposition of records including retention period.

- Sampling Process Design: Describe any experimental design or data collection design for the project and classify all measurements as critical or non-critical.

- Sampling Methods Requirements: Describe specific performance requirements for the method. Address what to do when a failure in the sampling occurs, who is responsible for the corrective action, and how the effectiveness of the corrective action shall be determined and documented.

- Laboratory Requirements: Identify volume requirements, preservative requirements, and holding times.

- Analytical Methods Requirements: Identify the analytical methods, waste disposal requirements (if any), and specific performance requirements for the method.

- Quality Control Requirements: Identify required measurement QC check for both the field and laboratory. State the frequency of analysis for each type of QC check.

- Instrument/Equipment Testing, Inspection, and Maintenance Requirements: Describe how inspections and acceptance testing of environmental sampling and measurement systems and their components will be performed and documented.

- Reports to Management: Identify the frequency and distribution of reports issued to inform management of the status of the project.

- Analytical Data: Provide a summary sheet of data verification results, to include percent complete.

- Reconciliation with Data Quality Objectives: Describe how the results obtained from the project or task will be reconciled with the requirements defined by the data user or decision maker.

Attachment C-2

Analytical Table

(8 Pages)

Table C.2-1
Laboratory Chemical, Toxicity Characteristic Leaching Procedure, and Radiochemistry Analytical Requirements for Amchitka Island
(Page 1 of 6)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit	Regulatory Limit	Relative Percent Difference (RPD)[a]	Percent Recovery (%R)[b]
ORGANICS						
Total Volatile Organic Compounds (VOCs)	Water	8260B[c]	Analyte-specific estimated quantitation limits[d]	Not Applicable (NA)	14[e]	61-145[e]
	Soil				24[e]	59-172[e]
Toxicity Characteristic Leaching Procedure (TCLP) VOCs						
Benzene	Aqueous	1311/8260B[c]	0.050 mg/L[d]	0.5 mg/L[d]	14[e]	61-145[e]
Carbon Tetrachloride			0.050 mg/L[d]	0.5 mg/L[d]		
Chlorobenzene			0.050 mg/L[d]	100 mg/L[d]		
Chloroform			0.050 mg/L[d]	6 mg/L[d]		
1,2-Dichloroethane			0.050 mg/L[d]	0.5 mg/L[d]		
1,1-Dichloroethene			0.050 mg/L[d]	0.7 mg/L[d]		
Methyl Ethyl Ketone			0.050 mg/L[d]	200 mg/L[d]		
Tetrachloroethene			0.050 mg/L[d]	0.7 mg/L[d]		
Trichloroethene			0.050 mg/L[d]	0.5 mg/L[d]		
Vinyl Chloride			0.050 mg/L[d]	0.2 mg/L[d]		
Total Semivolatile Organic Compounds (SVOCs)	Water	8270C[c]	Analyte-specific estimated quantitation limits[d]	NA	50[e]	9-127[e]
	Soil				50[e]	11-142[e]
TCLP SVOCs						
o-Cresol	Aqueous	1311/8270C[c]	0.10 mg/L[d]	200 mg/L[d]	50[e]	9-127[e]
m-Cresol			0.10 mg/L[d]	200 mg/L[d]		
p-Cresol			0.10 mg/L[d]	200 mg/L[d]		
Cresol (total)			0.30 mg/L[d]	200 mg/L[d]		
1,4-Dichloro-benzene			0.10 mg/L[d]	7.5 mg/L[d]		
2,4-Dinitrotoluene			0.10 mg/L[d]	0.13 mg/L[d]		

Table C.2-1
Laboratory Chemical, Toxicity Characteristic Leaching Procedure, and Radiochemistry Analytical Requirements for Amchitka Island
(Page 2 of 6)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit	Regulatory Limit	Relative Percent Difference (RPD)[a]	Percent Recovery (%R)[b]
Hexachloro-benzene	Aqueous	1311/8270C[c]	0.10 mg/L[d]	0.13 mg/L[d]	50[e]	9-127[e]
Hexachloro-butadiene			0.10 mg/L[d]	0.5 mg/L[d]		
Hexachloro-ethane			0.10 mg/L[d]	3 mg/L[d]		
Nitrobenzene			0.10 mg/L[d]	2 mg/L[d]		
Pentachloro-phenol			0.50 mg/L[d]	100 mg/L[d]		
Pyridine			0.10 mg/L[d]	5 mg/L[d]		
2,4,5-Trichloro-phenol			0.10 mg/L[d]	400 mg/L[d]		
2,4,6-Trichloro-phenol			0.10 mg/L[d]	2 mg/L[d]		
Total Pesticides	Water	8081A[c]	Analyte-specific (CRQL)[e]	NA	27[e]	38-131[e]
	Soil				50[e]	23-139[e]
TCLP Pesticides						
Chlordane	Aqueous	1311/8081A[c]	0.0005 mg/L[e]	0.03 mg/L[d]	27[e]	38-131[e]
Endrin			0.001 mg/L[e]	0.02 mg/L[d]		
Heptachlor			0.0005 mg/L[e]	0.008 mg/L[d]		
Heptachlor Epoxide			0.0005 mg/L[e]	0.008 mg/L[d]		
gamma-BHC (Lindane)			0.0005 mg/L[e]	0.4 mg/L[d]		
Methoxychlor			0.005 mg/L[e]	10 mg/L[d]		
Toxaphene			0.05 mg/L[e]	0.5 mg/L[d]		
Polychlorinated Biphenyls (PCBs)	Water	8082[c]	Analyte-specific contract required quantitation limits (CRQL)[e]	NA	Lab-specific[f]	Lab-specific[f]
	Soil					
Total Herbicides	Water	8151A[c]	1.3 µg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil		66 µg/kg[c]			
TCLP Herbicides						
2,4-D	Aqueous	1311/8151A[c]	0.002 mg/L[d]	10 mg/L[d]	Lab-specific[f]	Lab-specific[f]
2,4,5-TP			0.00075 mg/L[d]	1 mg/L[d]		

Table C.2-1
Laboratory Chemical, Toxicity Characteristic Leaching Procedure, and Radiochemistry Analytical Requirements for Amchitka Island
(Page 3 of 6)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit	Regulatory Limit	Relative Percent Difference (RPD)[a]	Percent Recovery (%R)[b]
Total Petroleum Hydrocarbons (TPH) AK101 - Gas AK102 - Diesel AK103 - Residual	Water Gasoline	AK101 AK102 AK103[v]	0.1 mg/L[g]	AK101 AK102 AK103	Lab-specific[f]	Lab-specific[f]
	Soil Gasoline		0.5 mg/kg[g]			
	Water Diesel		0.5 mg/L[g]			
	Soil Diesel		25 mg/kg[g]			
Explosives	Water	8330[c]	14 µg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil		2.2 mg/kg[c]			
Polychlorinated Dioxins and Furans	Water	8280A/8290[c]	0.05 µg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil		5 µg/kg[c]			
INORGANICS						
Total *Resource Conservation and Recovery Act* (RCRA) Metals						
Arsenic	Water	6010B/7470A[c]	10 µg/L[g,h]	NA	20[h]	75-125[h]
	Soil	6010B/7471A[c]	1 mg/kg[g,h]			
Barium	Water	6010B/7470A[c]	200 µg/L[g,h]			
	Soil	6010B/7471A[c]	20 mg/kg[g,h]			
Cadmium	Water	6010B/7470A[c]	5 µg/L[g,h]			
	Soil	6010B/7471A[c]	0.5 mg/kg[g,h]			
Chromium	Water	6010B/7470A[c]	10 µg/L[g,h]			
	Soil	6010B/7471A[c]	1 mg/kg[g,h]			
Lead	Water	6010B/7470A[c]	3 µg/L[g,h]			
	Soil	6010B/7471A[c]	0.3 mg/kg[g,h]			
Mercury	Water	6010B/7470A[c]	0.2 µg/L[g,h]			
	Soil	6010B/7471A[c]	0.1 mg/kg[g,h]			
Selenium	Water	6010B/7470A[c]	5 µg/L[g,h]			
	Soil	6010B/7471A[c]	0.5 mg/kg[g,h]			
Silver	Water	6010B/7470A[c]	10 µg/L[g,h]			
	Soil	6010B/7471A[c]	1 mg/kg[g,h]			

Table C.2-1
Laboratory Chemical, Toxicity Characteristic Leaching Procedure, and Radiochemistry Analytical Requirements for Amchitka Island
(Page 4 of 6)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit	Regulatory Limit	Relative Percent Difference (RPD)[a]	Percent Recovery (%R)[b]
TCLP RCRA Metals						
Arsenic	Aqueous	1311/6010B[c] 1311/7470A[c]	0.10 mg/L[g,h]	5 mg/L[d]	20[h]	75-125[h]
Barium			2 mg/L[g,h]	100 mg/L[d]		
Cadmium			0.05 mg/L[g,h]	1 mg/L[d]		
Chromium			0.10 mg/L[g,h]	5 mg/L[d]		
Lead			0.03 mg/L[g,h]	5 mg/L[d]		
Mercury			0.002 mg/L[g,h]	0.2 mg/L[d]		
Selenium			0.05 mg/L[g,h]	1 mg/L[d]		
Silver			0.10 mg/L[g,h]	5 mg/L[d]		
Reactive Cyanide	Water	9010B[c]	0.01 mg/L[h]	NA	20[h]	75-125[h]
	Soil		1.0 mg/kg[h]			
Reactive Sulfide	Water	9030B/9034[c]	0.4 mg/L[c]	NA	Lab-specific[f]	Lab-specific[f]
	Soil or Sediment		10 mg/kg[g]			
pH/Corrosivity	Water	9040B[c]	NA	pH >2[i]	Lab-specific[f]	Lab-specific[f]
	Soil	9045C[c]		pH<12.5[i]		
Ignitability	Water	1010[c]	NA	Flash Point <140° F[d]	NA	NA
	Soil	1030[c]		Burn Rate[c] >2.2 mm/sec nonmetals; >0.17 mm/sec metals		
RADIOCHEMISTRY						
Gamma-emitting Radionuclides[j]	Water	EPA 901.1[k]	Isotope-specific[m]	NA	20	Tracer Yield 30-105 Laboratory Control Sample Yield 80-120
	Soil	HASL 300[l]			35	
Isotopic Plutonium[j]	Water	NAS-NS-3058[n,o]	1 pCi/L	NA	20	
	Soil		0.1 pCi/g Pu-238[p] 0.4 pCi/g Pu-239/240[p]		35	
Isotopic Uranium[j]	Water	NAS-NS-3050[q,r]	2 pCi/L	NA	20	
	Soil		1 pCi/g		35	
Strontium - 90[j]	Water	SM 7500-Sr[s]	5 pCi/L	NA	20	
	Soil	Martin 79[t]	1 pCi/g[u]		35	

Table C.2-1
Laboratory Chemical, Toxicity Characteristic Leaching Procedure, and Radiochemistry Analytical Requirements for Amchitka Island
(Page 5 of 6)

Parameter or Analyte	Medium or Matrix	Analytical Method	Minimum Reporting Limit	Regulatory Limit	Relative Percent Difference (RPD)[a]	Percent Recovery (%R)[b]
Gross Alpha	Water	EPA 900.0[k]	3 pCi/L	NA	20	Tracer Yield 30-105 Laboratory Control Sample Yield 80-120
	Soil	SM 7110[s]	1 pCi/g		35	
Gross Beta	Water	EPA 900.0[k]	4 pCi/L	NA	20	Tracer Yield 30-105 Laboratory Control Sample Yield 80-120
	Soil	SM 7110[s]	3 pCi/g		35	

Table C.2-1
Laboratory Chemical, Toxicity Characteristic Leaching Procedure, and Radiochemistry Analytical Requirements for Amchitka Island
(Page 6 of 6)

[a]RPD is used to Calculate Precision.
Precision is estimated from the relative percent difference of the concentrations measured for the matrix spike and matrix spike duplicate analyses of unspiked field samples, or field duplicates of unspiked samples. It is calculated by:
RPD = 100 x $\{(|C_1-C_2|)/[(C_1+C_2)/2]\}$, where C_1 = Concentration of the analyte in the first sample aliquot, C_2 = Concentration of the analyte in the second sample aliquot.

[b]%R is used to Calculate Accuracy.
Accuracy is assessed from the recovery of analytes spiked into a blank or sample matrix of interest, or from the recovery of surrogate compounds spiked into each sample. The recovery of each spiked analyte is calculated by: $\%R = 100 \times (C_s-C_u/C_n)$, where C_s = Concentration of the analyte in the spiked sample, C_u = Concentration of the analyte in the unspiked sample, C_n = Concentration increase that should result from spiking the sample

[c]U.S. Environmental Protection Agency's (EPAs) *Test Methods for Evaluating Solid Waste*, 3rd Edition, Parts 1-4, SW-846 (EPA, 1996)

[d]Estimated Quantitation Limit as given in SW-846 (EPA, 1996)

[e]EPA *Contract Laboratory Program Statement of Work for Organic Analysis* (EPA, 1988b; 1990; 1991; and 1994b)

[f] In-House Generated RPD and %R Performance Criteria
It is necessary for laboratories to develop in-house performance criteria and compare them to those in the methods. The laboratory begins by analyzing 15-20 samples of each matrix and calculating the mean %R for each analyte. The standard deviation (SD) of each %R is then calculated, and the warning and control limits for each analyte are established at ± 2 SD and ± 3 SD from the mean, respectively. If the warning limit is exceeded during the analysis of any sample delivery group (SDG), the laboratory institutes corrective action to bring the analytical system back into control. If the control limit is exceeded, the sample results for that SDG are considered unacceptable. These limits are reviewed after every 20-30 field samples of the same matrix and are updated at least semiannually. The laboratory tracks trends in both performance and control limits by the use of control charts. The laboratory's compliance with these requirements is confirmed as part of an annual laboratory audit. Similar procedures are followed in order to generate acceptance criteria for precision measurements.

[g]Minimum reporting level as directed to laboratory by contractor.

[h]EPA *Contract Laboratory Program Statement of Work for Inorganic Analysis* (EPA, 1988a; 1993; and 1994a)

[i]*RCRA Regulations and Keyword Index*, 1998 Edition

[j]Isotopic minimum detectable concentrations are defined during the DQO process and specified in the CAIP, as applicable.

[k]*Prescribed Procedures for Measurements of Radioactivity in Drinking Water* (EPA, 1980) or equivalent method

[l]*Environmental Measurements Laboratory Procedures Manual* (DOE, 1997) or equivalent method

[m]Isotope-Specific Minimum Reporting Limit to be specified in the work plan

[n]*The Radiochemistry of Plutonium* (Coleman, 1965) or equivalent method

[o]*Separation and Preconcentration of Actinides from Acidic Media by Extraction Chromatography* (Horwitz, et al., 1993) or equivalent method

[p]The *Nevada Test Site Performance Objective Criteria* requirement for certifying that hazardous waste has no added radioactivity requires that the total plutonium (the sum of the Pu-238, 239, 240 concentrations) not exceed 0.5 pCi/g (BN, 1995).

[q]*The Radiochemistry of Uranium* (Grindler, 1962) or equivalent method

[r]*Separation and Preconcentration of Uranium from Acidic Media by Extraction Chromatography* (Horwitz, et al., 1992) or equivalent method

[s]*Standard Methods for the Examination of Water and Waste Water* (APHA, 1995) or equivalent method

[t]Determination of Strontium-89 and -90 in soil with Total Sample Decomposition (Analytical Chemistry, 1979) or equivalent method

[u]The 1.0 pCi/g concentration is approximately twice the concentration of fallout Sr-90 in background surface soils reported in the *Environmental Monitoring Report for the Proposed Ward Valley, California, Low-Level Radioactive Waste Facility.* (Atlan-Tech, 1992)

[v]Alaska-Certified Laboratory Methods

Definitions:

µg/kg = Microgram(s) per kilogram
mg/kg = Milligram(s) per kilogram
pCi/L = Picocurie(s) per liter
mg/L = Milligram(s) per liter
pCi/g = Picocurie(s) per gram
µg/L = Microgram(s) per liter

References

APHA, see American Public Health Association.

American Public Health Association. 1995. *Standard Methods for the Examination of Water and Waste Water,* 19th Edition. Washington, D.C.

Analytical Chemistry. 1979. *Determination of Strontium-89 and -90 in Soil with Total Sample Decomposition,* October.

Atlan-Tech. 1992. *Environmental Monitoring Report for the Proposed Ward Valley, California, Low-Level Radioactive Waste Facility.* Roswell, GA.

BN, see Bechtel Nevada.

Bechtel Nevada. 1995. *Nevada Test Site Performance Objective for Certification of Nonradioactive Hazardous Waste,* Rev. 0, G-E11/96.01. Las Vegas, NV.

Coleman, G.H. 1965. *The Radiochemistry of Plutonium,* NAS-NS-3058. Washington, DC: National Academy of Sciences.

Grindler, J.E. 1962. *The Radiochemistry of Uranium,* NAS-NS3050. Washington, DC: National Academy of Sciences.

Horwitz, E.P., M.L. Dietz, R. Chiarizia, and H. Diamond. 1992. "Separation and Preconcentration of Uranium from Acidic Media by Extraction Chromatography." In *Analyticda Chimica Acta,* 266:25-37. Amsterdam, The Netherlands: Elsevier Publishers, B.V.

Horwitz, E.P., R. Chiarizia, M.L. Dietz, H. Diamond, and D.M. Nelson. 1993. "Separation and Preconcentration of Actinides from Acidic Media by Extraction Chromatography." In *Analyticda Chimica Acta,* 281:361-372. Amsterdam, The Netherlands: Elsevier Publishers, B.V.

RCRA Regulations and Keyword Index. 1998. ISSN 1074-1364. New York, NY: Elsevier Science, Inc.

U.S. Department of Energy. 1997. *Environmental Measurements Laboratory Procedures Manual,* HASL-300, 28th Edition, Vol. 1. New York, NY.

U.S. Department of Energy, Nevada Operations Office. 1996. *Industrial Sites Quality Assurance Project Plan, Nevada Test Site, Nevada,* DOE/NV--372. Las Vegas, NV.

U.S. Environmental Protection Agency. 1980. *Prescribed Procedures for Measurements of Radioactivity in Drinking Water,* EPA-600/4-80-032. Washington, DC.

U.S. Environmental Protection Agency. 1988a. *Contract Laboratory Program Statement of Work for Inorganic Analysis,* SOW No. 788, EPA/540/R-94/093. Washington, DC.

U.S. Environmental Protection Agency. 1988b. *Contract Laboratory Program Statement of Work for Organic Analysis*, SOW No. 2/88, EPA/540/R-94/096. Washington, DC.

U.S. Environmental Protection Agency. 1991. *Contract Laboratory Program Statement of Work for Organic Analysis*, OLMO 1.8, EPA/540/R-94/078. Washington, DC.

U.S. Environmental Protection Agency. 1994a. *Contract Laboratory Program Statement of Work for Inorganic Analysis*, ILMO 3.0, EPA/540/R-94/076. Washington, DC.

U.S. Environmental Protection Agency. 1994b. *Contract Laboratory Program Statement of Work for Organic Analysis*, OLM03.1, EPA/540/R-94/073. Washington, DC.

U.S. Environmental Protection Agency. 1994c. *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, EPA/540/R-94/013. Washington, DC.

U.S. Environmental Protection Agency. 1995. *Contract Laboratory Program Statement of Work for Inorganic Analysis*, ILMO 4.0, EPA/540/R-95/121. Washington, DC.

U.S. Environmental Protection Agency. 1996. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd Edition, CD-ROM PB97-501928GEI, which contains updates for 1986, 1992, 1994, and 1996. Washington, DC.

U.S. Environmental Protection Agency. 1999. *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review*, EPA/540/R-94/013. Washington, DC.

Appendix D

Site-Specific Health and Safety Plan

(To be inserted prior to mobilization)

Appendix E

Borrow Area Study

Samples were taken from the proposed borrow areas for geotechnical testing during the Engineering Field Investigation which took place in June of 2000. The purpose of the geotechnical testing program was to determine the existing conditions of the various drilling muds and site soils and to classify/characterize them. In order to accomplish this, the following geotechnical tests were performed:

- Natural Water Content - American Society of Testing and Materials (ASTM) D2216
- Particle Size Distribution - ASTM D422
- Atterberg Limits - ASTM D4318
- Unified Soil Classification System (USCS) - ASTM D2487
- Specific Gravity - ASTM D854
- Maximum Dry Density (Standard Proctor) - ASTM D698
- Viscosity - American Petroleum Institute (API) 13B-1 Section 2
- Unit Weight - Mud Balance

Samples of drilling mud and site soil were collected from the various mud pits, mud pit berms, and borrow areas. These samples were identified by the area from which they were obtained, followed by the type of sample and sample number. The area from which a sample was obtained was designated as follows:

- Long Shot Site - LSH
- Cannikin Sites - CAN
- Drill Site D - DSD
- Drill Site E - DSE
- Drill Site F - DSF
- Mile Marker 2 - MM2
- Mile Marker 8 - MILE8

The type of sample obtained was abbreviated as follows:

- Drilling Mud - DM
- Pit Berm Material - PB
- Borrow Area - BA

Table E.1-1 presents the testing matrix for the Phase 1 geotechnical testing program. Table E.1-2 summarizes the results of this phase. In general, the drilling muds were determined to have USCS classifications of MH, CH, and SC. The pit berms and borrow area soils were generally classified as GP-GM, GW-GM, GM, and SM. The laboratory data for this phase of testing is presented in Attachment E-1 of this Appendix.

Table E.1-1
Phase 1 Geotechnical Testing Program Matrix
Mud Pit Closure Plans, Amchitka Island, Alaska

Sample Type	Sample ID	Water Content ASTM D2216	Particle Size ASTM D422	Atterberg Limits ASTM D4318	Classification ASTM D2487	Specific Gravity ASTM D854	Max. Dry Density ASTM D698	Viscosity API 13B-1 Sec. 2	Unit Weight (Mud Balance)
DRILLING MUD	LSH-DM-01 (1OF2)	x	x COMPOSITE	x COMPOSITE	x COMPOSITE	x COMPOSITE		x	x
	LSH-DM-01 (2OF2)	x						COMPOSITE	x
	CAN-DM-01 (1OF2)	x	x COMPOSITE	x COMPOSITE	x COMPOSITE	x COMPOSITE		x	x
	CAN-DM-01 (2OF2)	x						COMPOSITE	x
	CAN-DM-02 (1OF2)	x	x COMPOSITE	x COMPOSITE	x COMPOSITE	x COMPOSITE		x	x
	CAN-DM-02 (2OF2)	x						COMPOSITE	x
	DSD-DM-01 (1OF2)	x	x COMPOSITE	x COMPOSITE	x COMPOSITE	x COMPOSITE		x	x
	DSD-DM-01 (2OF2)	x						COMPOSITE	x
	DSE-DM-01 (1OF2)	x	x COMPOSITE	x COMPOSITE	x COMPOSITE	x COMPOSITE		x	x
	DSE-DM-01 (2OF2)	x						COMPOSITE	x
	DSF-DM-01 (1OF2)	x	x COMPOSITE	x COMPOSITE	x COMPOSITE	x COMPOSITE		x	x
	DSF-DM-01 (2OF2)	x						COMPOSITE	x
PIT BERM	LSH-PB-01	x	x	x	x				
	LSH-PB-02	x	x	x	x				
	CAN-PB-01	x	x	x	x				
	CAN-PB-02	x	x	x	x				
	DSD-PB-01	x	x	x	x				
	DSD-PB-02	x	x	x	x				
	DSE-PB-01	x	x	x	x				
	DSF-PB-01	x	x	x	x				
BORROW AREA	MM2-BA-01	x	x	x	x	x	x		
	MM2-BA-02	x	x	x	x	x	x		
	MM2-BA-03	x	x	x	x	x	x		
	MILE8-BA-01	x	x	x	x	x	x		
	MILE8-BA-02	x	x	x	x	x	x		
	MILE8-BA-03	x	x	x	x	x	x		
	DSD-BA-01	x	x	x	x	x	x		
	DSD-BA-02	x	x	x	x	x	x		
	DSE-BA-01	x	x	x	x	x	x		

Table E.1-2
Phase 1 Geotechnical Testing Program Results
Mud Pit Closure Plans, Amchitka Island, Alaska
(Page 1 of 2)

Sample ID	Natural Water Content (%)	Particle Size			Atterberg Limits			Classification	Specific Gravity	Standard Proctor		Unit Weight (Mud Balance) (g/cc)	Viscosity API 13B-1 Sec. 2
		Gravel (%)	Sand (%)	Silt and Clay (%)	LL (%)	PL (%)	PI (%)			Max. Dry Density (PCF)	Opt. Moisture (%)		
LSH-DM-01 (1OF2)	224.3	1.0	22.7	76.3	83	28	55	CH	2.57			1.27	NR
LSH-DM-01 (2OF2)	178.8											1.36	
CAN-DM-01 (1OF2)	215.6	3.8	57.8	38.4	163	37	126	SC	2.49			1.29	NR
CAN-DM-01 (2OF2)	265.6											1.25	
CAN-DM-02 (1OF2)	202.7	17.6	37.2	45.2	147	48	99	SC	2.56			1.35	NR
CAN-DM-02 (2OF2)	153.0											1.31	
DSD-DM-01 (1OF2)	111.2	0.0	20.7	79.3	61	22	39	CH	2.59			1.45	5 minutes 700 cc, 24 oz
DSD-DM-01 (2OF2)	110.5											1.43	
DSE-DM-01 (1OF2)	98.0	14.8	29.7	55.5	76	34	42	CH	2.6			1.62	NR
DSE-DM-01 (2OF2)	96.1											1.45	
DSF-DM-01 (1OF2)	59.1	7.1	33.8	59.1	55	31	24	MH	2.64			1.72	NR
DSF-DM-01 (2OF2)	65.8											1.61	
LSH-PB-01	28.6	51.0	32.4	16.6	NONPLASTIC			GM					
LSH-PB-02	478.0	33.0	48.7	18.3	NONPLASTIC			SM					
CAN-PB-01	32.4	39.4	41.3	19.3	NONPLASTIC			SM					
CAN-PB-02	22.1	44.4	37.7	17.9	NONPLASTIC			GM					
DSD-PB-01	8.4	58.1	28.2	13.7	NONPLASTIC			GM					
DSD-PB-02	24.1	28.4	47.5	24.1	NONPLASTIC			SM					
DSE-PB-01	18.7	42.2	40.6	17.2	NONPLASTIC			GM					
DSF-PB-01	30.3	42.6	36.6	20.8	NONPLASTIC			GM					
MM2-BA-01	12.2	24.8	56.8	18.4	NONPLASTIC			SM	2.74	118.8	11.7		
MM2-BA-02	9.0	27.4	60.2	12.4	NONPLASTIC			SM	2.75	113.9	14.0		
MM2-BA-03	10.5	65.8	27.8	6.4	NONPLASTIC			GW-GM	2.69	109.4	16.5		
MILE8-BA-01	11.9	62.5	27.1	10.4	NONPLASTIC			GP-GM	2.80	105.8	20.0		
MILE8-BA-02	18.8	57.3	31.0	11.7	NONPLASTIC			GP-GM	2.80	103.7	20.7		

Table E.1-2
Phase 1 Geotechnical Testing Program Results
Mud Pit Closure Plans, Amchitka Island, Alaska
(Page 2 of 2)

Sample ID	Natural Water Content (%)	Particle Size			Atterberg Limits			Classification	Specific Gravity	Standard Proctor		Unit Weight (Mud Balance) (g/cc)	Viscosity API 13B-1 Sec. 2
		Gravel (%)	Sand (%)	Silt and Clay (%)	LL (%)	PL (%)	PI (%)			Max. Dry Density (PCF)	Opt. Moisture (%)		
MILE8-BA-03	14.7	48.8	44.3	6.9	NONPLASTIC			GW-GM	2.82	109.2	20.0		
DSD-BA-01	27.7	40.0	32.0	28.0	NONPLASTIC			GM	2.73	94.0	25.4		
DSD-BA-02	26.7	27.4	41.5	31.1	NONPLASTIC			SM	2.65	96.6	22.2		
DSE-BA-01	20.3	34.2	44.3	21.5	NONPLASTIC			SM	2.69	108.2	16.4		

LL = Liquid Limit
PL = Plastic Limit
PI = Plasticity Index
PCF = Pounds per cubic foot
g/cc = Grams per cubic centimeter
cc = Cubic centimeter
oz - Ounce

Attachment E-1

Geotechnical Data

(115 Pages)

Geotechnics

LABORATORY TEST REPORT

August 25, 2000

Project No. 00220-01

Mr. Paul Ingersol
The IT Group
2790 Mosside Blvd.
Monroeville, PA 15146

RE: Soils Testing - Amchitka Island 799419

Transmitted herein are the results of the soils testing performed for the above referenced project as verified on the Project Verification Form, submitted August 10, 2000.

The testing was performed in general accordance with the ASTM methods listed on the enclosed data sheets. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

Disclaimer

The test results are believed to be representative of the samples submitted but are indicative only of the specimens which were evaluated. Geotechnics has no direct knowledge of the origin of the samples, implies no position with regard to the disposition of the test results, i.e. pass/fail, and makes no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization of the Client and Geotechnics. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please do not hesitate to contact our office.

Respectively submitted,

David R. Backstrom
Laboratory Director

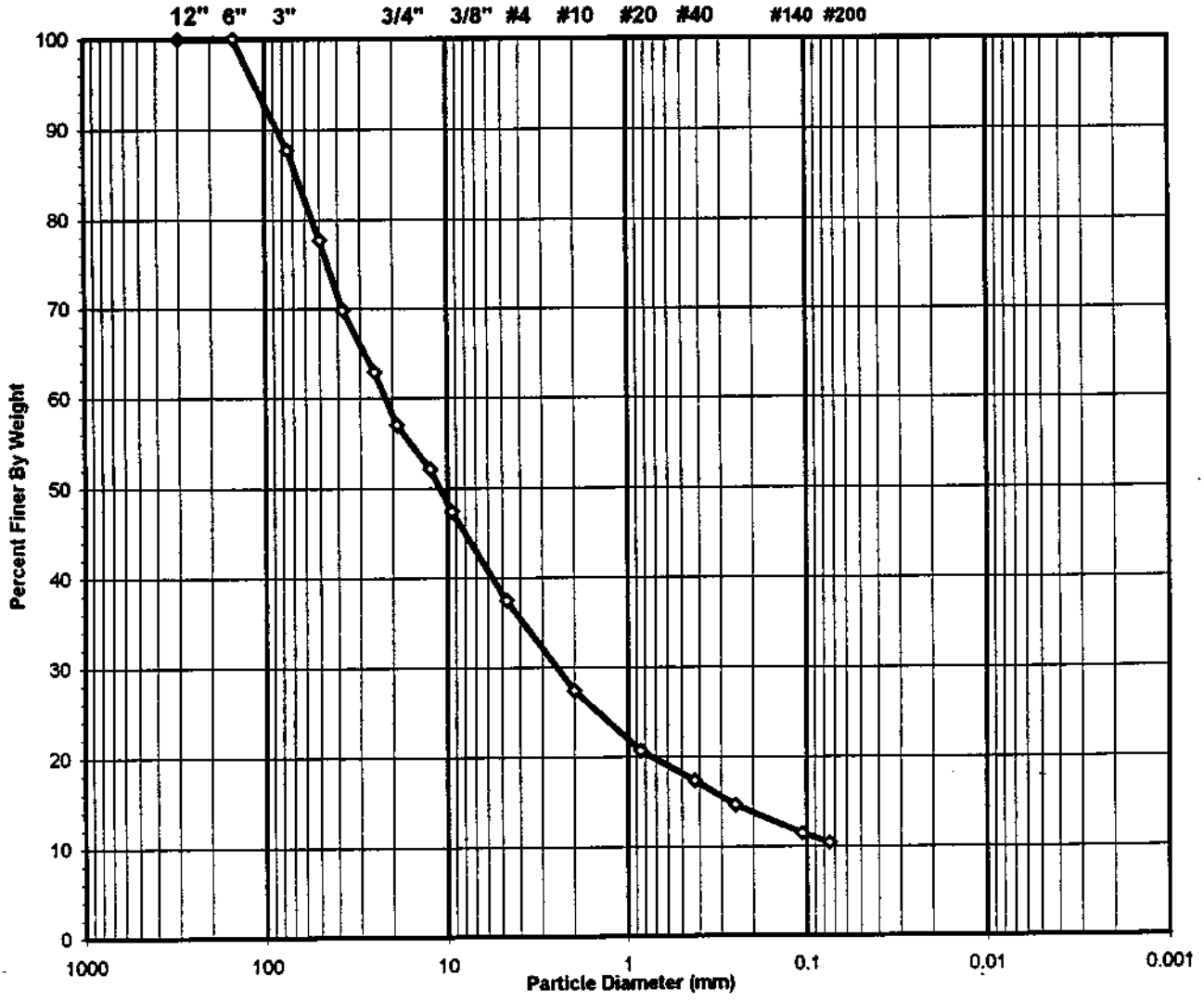
2

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-01
Lab ID	00220-01.027	Soil Color	**BROWN**

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***GP-GM, TESTED***

USCS Classification ***POORLY GRADED GRAVEL WITH SILT AND SAND (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By CB Date 8-16-00

DCN: CT-S3A DATE 6-25-96 REVISION 2

C:\MY DOCUMENTS\PrintQ\K104.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

3

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-01
Lab ID	00220-01.027	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2335	Tare No.	1719A
Wgt.Tare + Wet Specimen (gm)	1165.80	Wgt.Tare + Wet Specimen (gm)	943.80
Wgt.Tare + Dry Specimen (gm)	994.90	Wgt.Tare + Dry Specimen (gm)	896.70
Weight of Tare (gm)	101.43	Weight of Tare (gm)	84.84
Weight of Water (gm)	170.90	Weight of Water (gm)	47.10
Weight of Dry Soil (gm)	893.47	Weight of Dry Soil (gm)	811.86
Moisture Content (%)	**19.1**	**Moisture Content (%)**	**5.8**

Wet Weight -3/4" Sample (gm)	14726	Weight of the Dry Specimen (gm)	893.47
Dry Weight - 3/4" Sample (gm)	12361.5	Weight of minus #200 material (gm)	162.17
Wet Weight +3/4" Sample (gm)	9861.00	Weight of plus #200 material (gm)	731.30
Dry Weight + 3/4" Sample (gm)	9320.28		
Total Dry Weight Sample (gm)	21681.8	**J - Factor (Percent Finer than 3/4")**	**0.5701**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	2828.00		12.33	12.33	87.67	**87.67**
2"	50	2300.00	(*)	10.03	22.35	77.65	**77.65**
1 1/2"	37.5	1794.00		7.82	30.17	69.83	**69.83**
1"	25	1590.00		6.93	37.11	62.89	**62.89**
3/4"	19	1349.00		5.88	42.99	57.01	**57.01**
1/2"	12.5	77.04		8.62	8.62	91.38	**52.10**
3/8"	9.5	74.10		8.29	16.92	83.08	**47.37**
#4	4.75	154.97		17.34	34.26	65.74	**37.48**
#10	2	157.83		17.66	51.93	48.07	**27.41**
#20	0.85	105.65	(**)	11.82	63.75	36.25	**20.67**
#40	0.425	52.04		5.82	69.57	30.43	**17.35**
#60	0.25	42.52		4.76	74.33	25.67	**14.63**
#140	0.106	49.61		5.55	79.89	20.11	**11.47**
#200	0.075	17.54		1.96	81.85	18.15	**10.35**
Pan	-	162.17		18.15	100.00	-	-

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Specimen*

Tested By RO Date 8/15/00 Checked By LB Date 8-16-00

DCN: CT-S3A DATE 5-17-00 REVISION 3

C:\MY DOCUMENTS\PrintQ\[K164.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

4

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-01
Lab ID	00220-01.027	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/15/00 *Checked By* UB *Date* 8-16-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\[K158.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

5

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE 8-BA-01
Lab ID	00220-01.027	Visual Description	**BROWN CLAYEY SAND** (Minus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	739.9	732.4
Temperature, T (°Celsius)	25.7	26.4
Weight of Pycnometer + Water (gm)	679.96	672.05
Tare Number	1859	1621
Weight of Tare + Dry Soil (gm)	195.03	194.46
Weight of Tare (gm)	101.78	100.53
Weight of Dry Soil (gm)	93.25	93.93
Specific Gravity of Soil @ T	2.799	2.797
Specific Gravity of Water @ T	0.9969	0.9967
Conversion Factor for Temperature T	0.9987	0.9985
Specific Gravity @ 20° Celsius	2.803	2.801

Average Specific Gravity @ 20° Celsius	2.80

Tested By DA *Date* 8/22/00 *Checked By* JMO *Date* 8/23/00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

6

Geotechnics

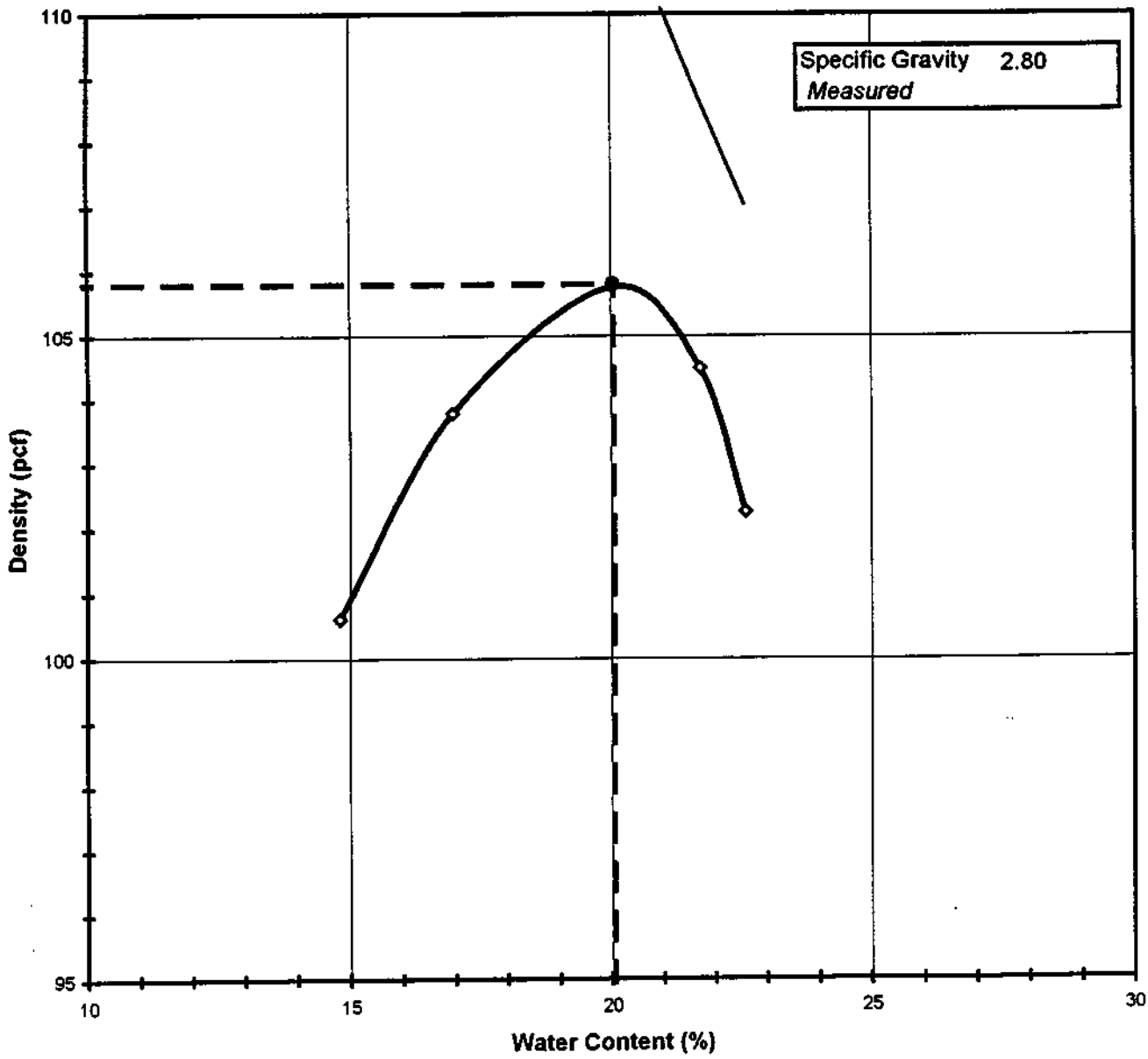
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-01
Lab ID	00220-01.027	Test Method	STANDARD

Visual Description: BROWN CLAY & SAND WITH ROCK FRAGMENTS

Optimum Water Content	**20.0**
Maximum Dry Density	**105.8**



Tested By MD Date 8/14/00 Checked By Jm Date 8.24.00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\My Documents\PrintQ\lk147.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-01
Lab ID	00220-01.027		

Visual Description: BROWN CLAY & SAND WITH ROCK FRAGMENTS

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Measured Specific Gravity	2.80
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	G774
Mold ID	G695
Mold diameter	6"
Weight of the Mold	5698
Volume of the Mold(cc)	2124

Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	9630	9830	10019	10027	9965
Wt.of Mold (gm)	5698	5698	5698	5698	5698
Wt. of WS	3932	4132	4321	4329	4267
Mold Volume (cc)	2124	2124	2124	2124	2124

Moisture Content / Density

Tare Number	592	1734	726	562	1693
Wt. of Tare & WS (gm)	659.30	748.50	552.60	641.20	785.80
Wt. of Tare & DS (gm)	584.80	652.00	474.70	541.90	656.40
Wt. of Tare (gm)	81.68	83.11	85.76	84.55	83.40
Wt. of Water (gm)	74.50	96.50	77.90	99.30	129.40
Wt. of DS (gm)	503.12	568.89	388.94	457.35	573.00
Wet Density (gm/cc)	1.85	1.95	2.03	2.04	2.01
Wet Density (pcf)	115.5	121.4	126.9	127.2	125.4
Moisture Content (%)	**14.8**	**17.0**	**20.0**	**21.7**	**22.6**
Dry Density (pcf)	**100.6**	**103.8**	**105.8**	**104.5**	**102.3**

Zero Air Voids

Moisture Content (%)		20.0	21.7	22.6
Dry Unit Weight (pcf)		111.9	108.7	107.0

Tested By MD *Date* 8/14/00 *Checked By* Jcm *Date* 8.24.00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\My Documents\Print Q\[k147.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

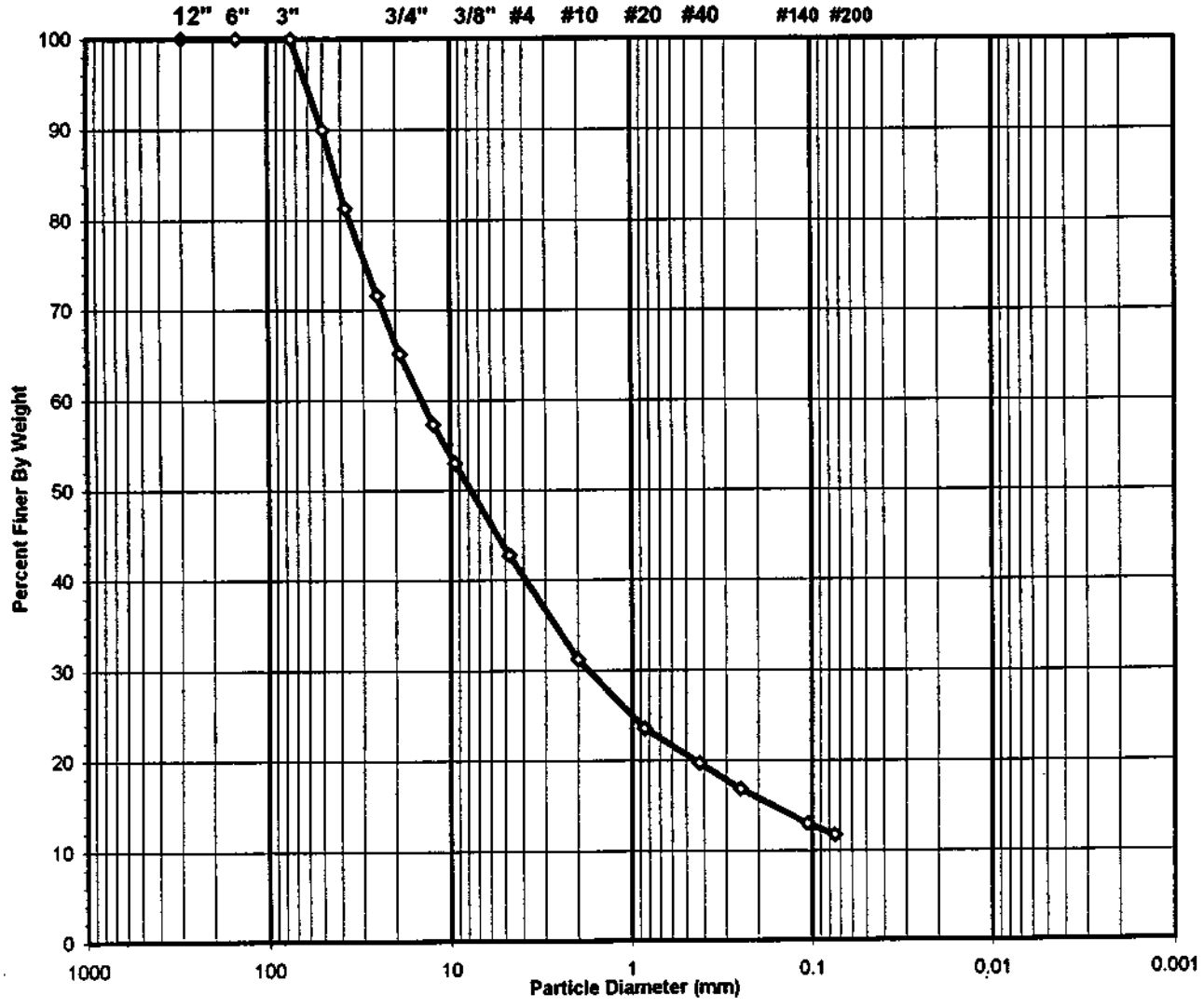
8

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-02
Lab ID	00220-01.028	Soil Color	**BROWN**

	SIEVE ANALYSIS		*HYDROMETER*
USCS	gravel	sand	silt and clay



USCS Symbol ***GP-GM, TESTED***

USCS Classification ***POORLY GRADED GRAVEL WITH SILT AND SAND (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By LB Date 8-16-00

DCN: CT-S3A DATE 6-25-98 REVISION 2

C:\MY DOCUMENTS\PrintQ\K165.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-02
Lab ID	00220-01.028	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2331	Tare No.	2477
Wgt.Tare + Wet Specimen (gm)	1301.40	Wgt.Tare + Wet Specimen (gm)	1023.90
Wgt.Tare + Dry Specimen (gm)	1109.50	Wgt.Tare + Dry Specimen (gm)	936.90
Weight of Tare (gm)	100.20	Weight of Tare (gm)	99.47
Weight of Water (gm)	191.90	Weight of Water (gm)	87.00
Weight of Dry Soil (gm)	1009.30	Weight of Dry Soil (gm)	837.43
Moisture Content (%)	**19.0**	**Moisture Content (%)**	**10.4**

Wet Weight -3/4" Sample (gm)	18508	Weight of the Dry Specimen (gm)	1009.30
Dry Weight - 3/4" Sample (gm)	15551.2	Weight of minus #200 material (gm)	181.08
Wet Weight +3/4" Sample (gm)	9167.20	Weight of plus #200 material (gm)	828.22
Dry Weight + 3/4" Sample (gm)	8304.46		
Total Dry Weight Sample (gm)	23855.7	**J - Factor (Percent Finer than 3/4")**	**0.6519**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	2650.10	(*)	10.06	10.06	89.94	**89.94**
1 1/2"	37.5	2273.40		8.63	18.70	81.30	**81.30**
1"	25	2557.60		9.71	28.41	71.59	**71.59**
3/4"	19	1686.10		6.40	34.81	65.19	**65.19**
1/2"	12.5	122.10		12.10	12.10	87.90	**57.30**
3/8"	9.5	66.23		6.56	18.66	81.34	**53.02**
#4	4.75	159.29		15.78	34.44	65.56	**42.74**
#10	2	178.74		17.71	52.15	47.85	**31.19**
#20	0.85	118.98	(**)	11.79	63.94	36.06	**23.51**
#40	0.425	59.35		5.88	69.82	30.18	**19.67**
#60	0.25	44.50		4.41	74.23	25.77	**16.80**
#140	0.106	58.91		5.84	80.07	19.93	**13.00**
#200	0.075	20.12		1.99	82.06	17.94	**11.70**
Pan	-	181.08		17.94	100.00	-	-

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Specimen*

Tested By RO Date 8/15/00 Checked By [illegible] Date 8-16-00

DCN: CT-S3A DATE 5-17-00 REVISION 3

C:\MY DOCUMENTS\PrintQ\K165.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

10

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-02
Lab ID	00220-01.028	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/15/00 *Checked By* VS *Date* 8-16-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\K159.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE 8-BA-02
Lab ID	00220-01.028	Visual Description	**BROWN CLAYEY SAND** (Minus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	741.7	734.4
Temperature, T (°Celsius)	27.3	27
Weight of Pycnometer + Water (gm)	679.75	671.97
Tare Number	2446	889
Weight of Tare + Dry Soil (gm)	190.11	201.12
Weight of Tare (gm)	93.6	103.95
Weight of Dry Soil (gm)	96.51	97.17
Specific Gravity of Soil @ T	2.793	2.797
Specific Gravity of Water @ T	0.9965	0.9965
Conversion Factor for Temperature T	0.9982	0.9983
Specific Gravity @ 20° Celsius	2.798	2.802

Average Specific Gravity @ 20° Celsius	2.80

Tested By DA *Date* 8/21/00 *Checked By* JHO *Date* 8/23/00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

12

Geotechnics

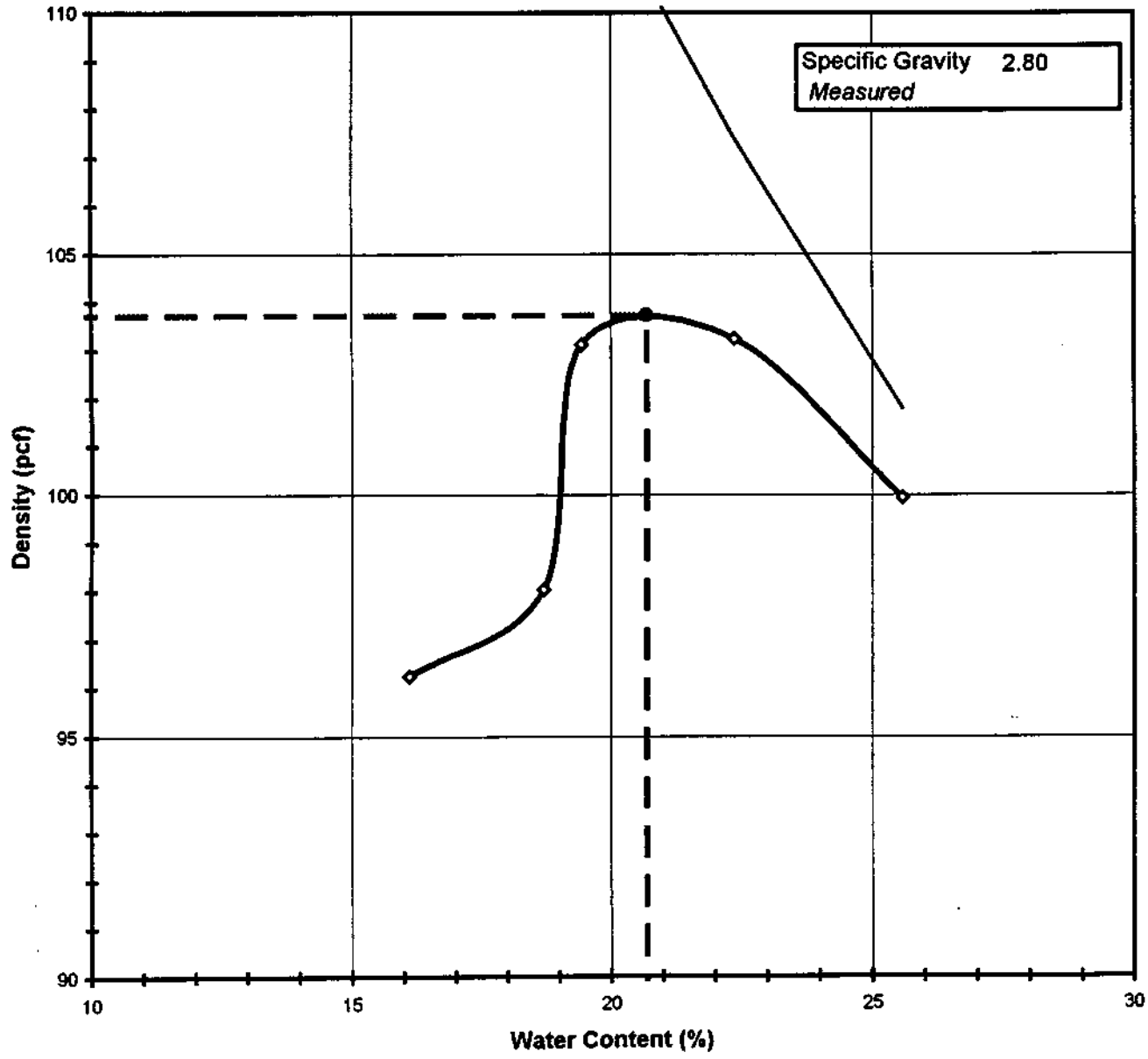
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-02
Lab ID	00220-01.028	Test Method	**STANDARD**

Visual Description BROWN CLAY & SAND WITH ROCK FRAGMENTS

Optimum Water Content **20.7**
Maximum Dry Density **103.7**



Tested By JP *Date* 8/15/00 *Checked By* Jm *Date* 8.24.00

DCN:CT-S12 DATE: 6-26-98 REVISION 3

C:\My Documents\Print Q\[K148.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

13

Geotechnics

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-02
Lab ID	00220-01.028		

Visual Description: BROWN CLAY & SAND WITH ROCK FRAGMENTS

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Measured Specific Gravity	2.80
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	G441
Mold ID	G778
Mold diameter	6"
Weight of the Mold	5534
Volume of the Mold(cc)	2124

Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	9338	9495	9726	9834	9806
Wt.of Mold (gm)	5534	5534	5534	5534	5534
Wt. of WS	3804	3961	4192	4300	4272
Mold Volume (cc)	2124	2124	2124	2124	2124

Moisture Content / Density

Tare Number	601	1712	1713	1716	626
Wt. of Tare & WS (gm)	454.30	395.50	492.60	512.40	1023.90
Wt. of Tare & DS (gm)	403.20	346.23	426.00	434.00	832.80
Wt. of Tare (gm)	86.11	82.69	83.34	83.50	85.82
Wt. of Water (gm)	51.10	49.27	66.60	78.40	191.10
Wt. of DS (gm)	317.09	263.54	342.66	350.50	746.98
Wet Density (gm/cc)	1.79	1.86	1.97	2.02	2.01
Wet Density (pcf)	111.8	116.4	123.2	126.3	125.5
Moisture Content (%)	**16.1**	**18.7**	**19.4**	**22.4**	**25.6**
Dry Density (pcf)	**96.2**	**98.0**	**103.1**	**103.2**	**99.9**

Zero Air Voids

Moisture Content (%)	19.4	22.4	25.6
Dry Unit Weight (pcf)	113.1	107.4	101.8

Tested By JP *Date* 8/15/00 *Checked By* JCM *Date* 8.24.00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\My Documents\PrintQ\[K148.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

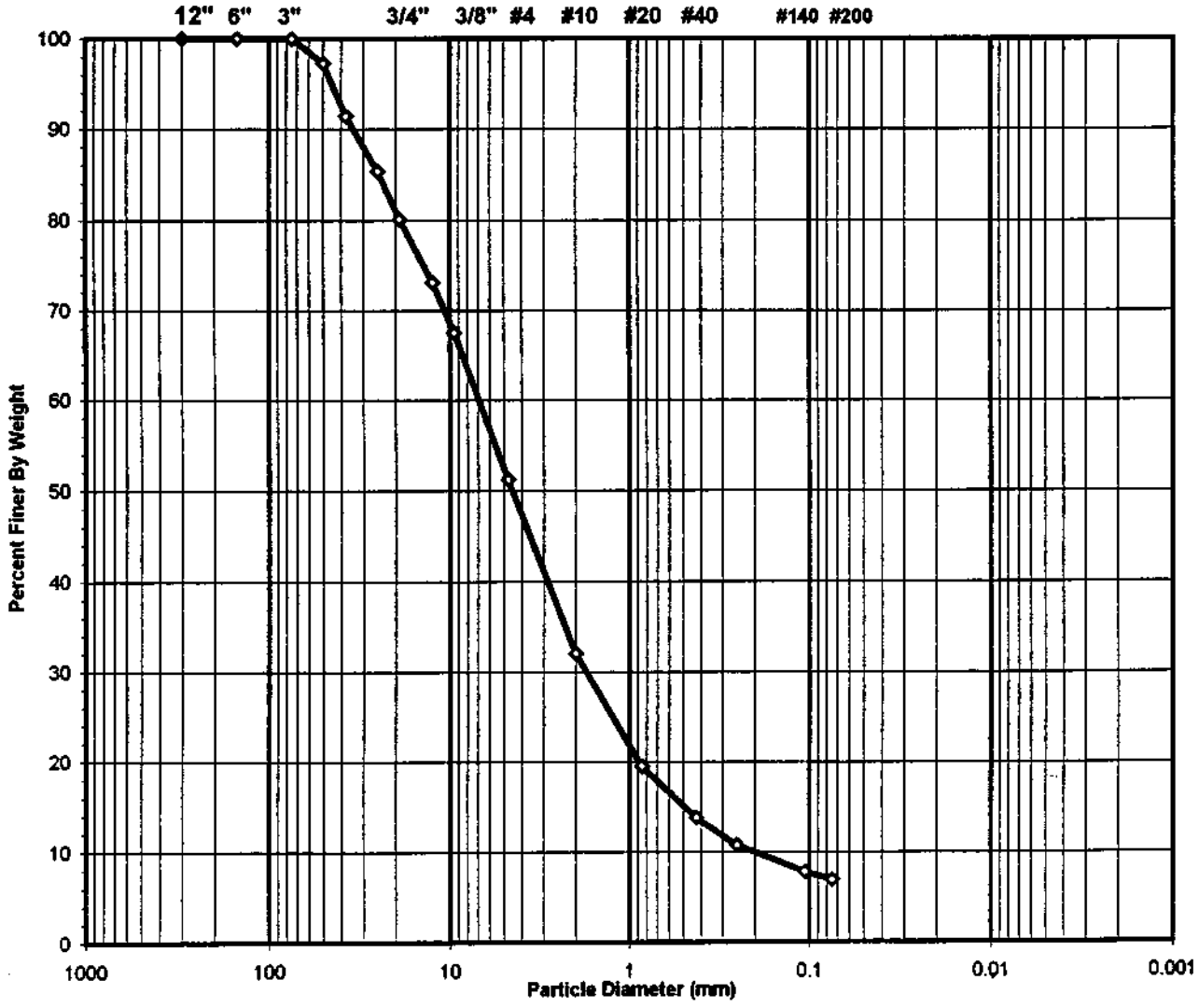
14

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-03
Lab ID	00220-01.029	Soil Color	BROWN

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol	GW-GM, TESTED	D60 =	6.9	CC =	2.2
USCS Classification	WELL-GRADED GRAVEL WITH SILT AND SAND (NON-PLASTIC FINES)	D30 =	1.7	CU =	33.8
		D10 =	0.2		

Tested By RO Date 8/15/00 Checked By LB Date 8-16-00

DCN: CT-S3A DATE 6-25-98 REVISION 2

C:\MY DOCUMENTS\Print\Q\K168.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

15

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-03
Lab ID	00220-01.029	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2492	Tare No.	2463
Wgt.Tare + Wet Specimen (gm)	1181.50	Wgt.Tare + Wet Specimen (gm)	975.10
Wgt.Tare + Dry Specimen (gm)	1030.70	Wgt.Tare + Dry Specimen (gm)	941.30
Weight of Tare (gm)	99.45	Weight of Tare (gm)	99.42
Weight of Water (gm)	150.80	Weight of Water (gm)	33.80
Weight of Dry Soil (gm)	931.25	Weight of Dry Soil (gm)	841.88
Moisture Content (%)	**16.2**	**Moisture Content (%)**	**4.0**

Wet Weight -3/4" Sample (gm)	20510	Weight of the Dry Specimen (gm)	931.25
Dry Weight - 3/4" Sample (gm)	17651.6	Weight of minus #200 material (gm)	80.57
Wet Weight +3/4" Sample (gm)	4551.10	Weight of plus #200 material (gm)	850.68
Dry Weight + 3/4" Sample (gm)	4375.43		
Total Dry Weight Sample (gm)	22027.1	**J - Factor (Percent Finer than 3/4")**	**0.8014**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	629.00	(*)	2.75	2.75	97.25	**97.25**
1 1/2"	37.5	1344.70		5.87	8.61	91.39	**91.39**
1"	25	1385.70		6.05	14.66	85.34	**85.34**
3/4"	19	1191.70		5.20	19.86	80.14	**80.14**
1/2"	12.5	81.42		8.74	8.74	91.26	**73.13**
3/8"	9.5	65.05		6.99	15.73	84.27	**67.53**
#4	4.75	190.21		20.43	36.15	63.85	**51.16**
#10	2	222.64		23.91	60.06	39.94	**32.01**
#20	0.85	145.62	(**)	15.64	75.70	24.30	**19.47**
#40	0.425	66.46		7.14	82.83	17.17	**13.76**
#60	0.25	35.70		3.83	86.67	13.33	**10.68**
#140	0.106	33.77		3.63	90.29	9.71	**7.78**
#200	0.075	9.81		1.05	91.35	8.65	**6.93**
Pan	-	80.57		8.65	100.00	-	-

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Specimen*

Tested By RO Date 8/15/00 Checked By LB Date 8-16-00

DCN: CT-S3A DATE 5-17-00 REVISION 3

C:\MY DOCUMENTS\PrintQ\K166.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

16

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-03
Lab ID	00220-01.029	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/15/00 *Checked By* VB *Date* 8-16-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\K160.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

17

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE 8-BA-03
Lab ID	00220-01.029	Visual Description	**BROWN CLAYEY SAND** (Minus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	739.9	732.5
Temperature, T (°Celsius)	27.5	27
Weight of Pycnometer + Water (gm)	679.72	671.97
Tare Number	1024	1679
Weight of Tare + Dry Soil (gm)	191.27	191.29
Weight of Tare (gm)	97.54	97.67
Weight of Dry Soil (gm)	93.73	93.62
Specific Gravity of Soil @ T	2.794	2.829
Specific Gravity of Water @ T	0.9964	0.9965
Conversion Factor for Temperature T	0.9982	0.9983
Specific Gravity @ 20° Celsius	2.799	2.834

Average Specific Gravity @ 20° Celsius	2.82

Tested By DA *Date* 8/21/00 *Checked By* JMO *Date* 8/23/00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

18

Geotechnics

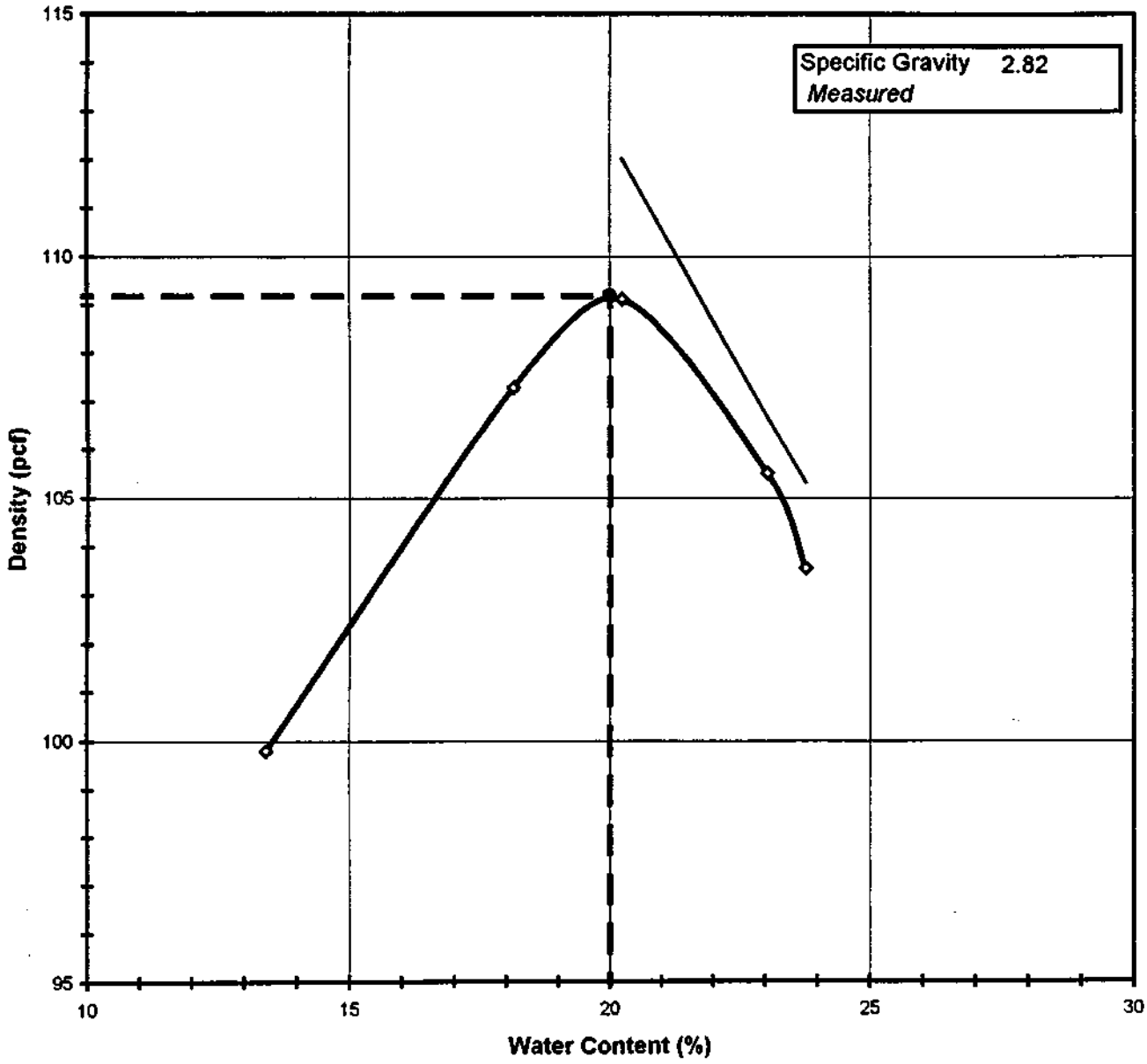
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-03
Lab ID	00220-01.029	Test Method	**STANDARD**

Visual Description: BROWN CLAY & SAND WITH ROCK FRAGMENTS

Optimum Water Content	**20.0**
Maximum Dry Density	**109.2**



Tested By MD *Date* 8/14/00 *Checked By* Jcm *Date* 8.24.00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\My Documents\Print Q\[K149.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MILE8-BA-03
Lab ID	00220-01.029		

Visual Description: BROWN CLAY & SAND WITH ROCK FRAGMENTS

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Measured Specific Gravity	2.82
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	G774
Mold ID	G695
Mold diameter	6"
Weight of the Mold	5698
Volume of the Mold(cc)	2124

Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	9551	10012	10164	10117	10061
Wt.of Mold (gm)	5698	5698	5698	5698	5698
Wt. of WS	3853	4314	4466	4419	4363
Mold Volume (cc)	2124	2124	2124	2124	2124

Moisture Content / Density

Tare Number	1131A	613	616	783	628
Wt. of Tare & WS (gm)	767.40	616.80	665.40	688.60	1090.00
Wt. of Tare & DS (gm)	686.60	535.10	567.70	575.20	897.00
Wt. of Tare (gm)	84.56	84.87	85.05	83.01	85.49
Wt. of Water (gm)	80.80	81.70	97.70	113.40	193.00
Wt. of DS (gm)	602.04	450.23	482.65	492.19	811.51
Wet Density (gm/cc)	1.81	2.03	2.10	2.08	2.05
Wet Density (pcf)	113.2	126.7	131.2	129.8	128.2
Moisture Content (%)	**13.4**	**18.1**	**20.2**	**23.0**	**23.8**
Dry Density (pcf)	**99.8**	**107.3**	**109.1**	**105.5**	**103.6**

Zero Air Voids

Moisture Content (%)	20.2	23.0	23.8
Dry Unit Weight (pcf)	112.0	106.7	105.3

Tested By MD *Date* 8/14/00 *Checked By* Jm *Date* 8.24.00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\My Documents\Print\Q\[K149.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-6999

20

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-01
Lab ID	00220-01.030	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay

USCS Symbol ***GM, TESTED***

USCS Classification ***SILTY GRAVEL WITH SAND (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By LB Date 8-18-00

DCN: CT-S3A DATE 6-25-98 REVISION 2

C:\MY DOCUMENTS\PrintQ\[M20.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

21

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-01
Lab ID	00220-01.030	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2355	Tare No.	1671
Wgt.Tare + Wet Specimen (gm)	944.20	Wgt.Tare + Wet Specimen (gm)	936.00
Wgt.Tare + Dry Specimen (gm)	757.20	Wgt.Tare + Dry Specimen (gm)	848.20
Weight of Tare (gm)	101.56	Weight of Tare (gm)	97.23
Weight of Water (gm)	187.00	Weight of Water (gm)	87.80
Weight of Dry Soil (gm)	655.64	Weight of Dry Soil (gm)	750.97
Moisture Content (%)	**28.5**	**Moisture Content (%)**	**11.7**

Wet Weight -3/4" Sample (gm)	15555	Weight of the Dry Specimen (gm)	655.64
Dry Weight - 3/4" Sample (gm)	12103.0	Weight of minus #200 material (gm)	290.07
Wet Weight +3/4" Sample (gm)	7846.70	Weight of plus #200 material (gm)	365.57
Dry Weight + 3/4" Sample (gm)	7025.33		
Total Dry Weight Sample (gm)	19128.3	**J - Factor (Percent Finer than 3/4")**	**0.6327**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	4369.00		20.45	20.45	79.55	**79.55**
3"	75	1169.50		5.47	25.92	74.08	**74.08**
2"	50	1821.80	(*)	8.53	34.45	65.55	**65.55**
1 1/2"	37.5	334.30		1.56	36.02	63.98	**63.98**
1"	25	120.70		0.56	36.58	63.42	**63.42**
3/4"	19	31.40		0.15	36.73	63.27	**63.27**
1/2"	12.5	8.17		1.25	1.25	98.75	**62.48**
3/8"	9.5	9.24		1.41	2.66	97.34	**61.59**
#4	4.75	15.99		2.44	5.09	94.91	**60.05**
#10	2	22.22		3.39	8.48	91.52	**57.91**
#20	0.85	26.91	(**)	4.10	12.59	87.41	**55.31**
#40	0.425	45.65		6.96	19.55	80.45	**50.90**
#60	0.25	79.77		12.17	31.72	68.28	**43.20**
#140	0.106	118.87		18.13	49.85	50.15	**31.73**
#200	0.075	38.75		5.91	55.76	44.24	**27.99**
Pan	-	290.07		44.24	100.00	-	-

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Specimen*

Tested By RO Date 8/15/00 Checked By LB Date 8-18-00

DCN: CT-S3A DATE 5-17-00 REVISION 3

C:\MY DOCUMENTS\PrintQ\M29.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

22

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-01
Lab ID	00220-01.030	Visual Description	**BROWN SILT**
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/17/00 *Checked By* LB *Date* 8-18-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\M19.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-6999

23

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-01
Lab ID	00220-01.030	Visual Description	**BROWN CLAY** (Minus No.4 sieve material, airdried)

Replicate Number	1	2
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	729.7	722.1
Temperature, T (°Celsius)	28.6	28.4
Weight of Pycnometer + Water (gm)	679.56	671.78
Tare Number	1081	1683
Weight of Tare + Dry Soil (gm)	182.34	177.25
Weight of Tare (gm)	103.06	97.75
Weight of Dry Soil (gm)	79.28	79.50
Specific Gravity of Soil @ T	2.721	2.725
Specific Gravity of Water @ T	0.9961	0.9961
Conversion Factor for Temperature T	0.9979	0.9979
Specific Gravity @ 20° Celsius	2.726	2.731

Average Specific Gravity @ 20° Celsius	2.73

Tested By TO *Date* 8/11/00 *Checked By* UB *Date* 8-14-00

DCN: CT-S5 Date 04-18-89 Revision: 6 *C:\MY DOCUMENTS\PrintQ\K119.xls]Sheet1*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

24

Geotechnics

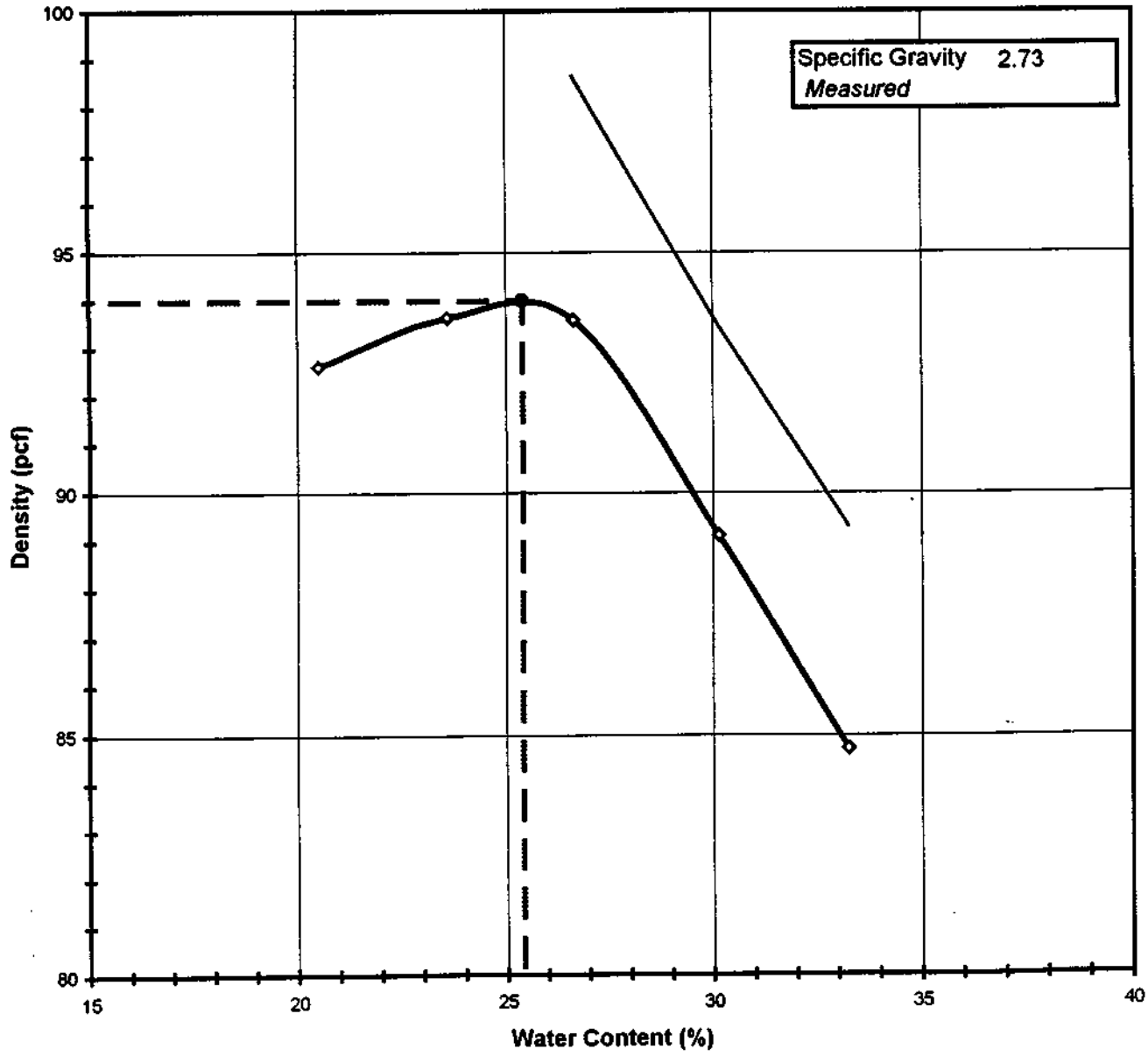
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-01
Lab ID	00220-01.030	Test Method	**STANDARD**

Visual Description BROWN SANDY CLAY WITH ROCK FRAGMENTS

Optimum Water Content	**25.4**
Maximum Dry Density	**94.0**



Tested By MD *Date* 8/15/00 *Checked By* VB *Date* 8-17-00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\My Documents\PrintQ\[K150.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

25

Geotechnics

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-01
Lab ID	00220-01.030		

Visual Description: BROWN SANDY CLAY WITH ROCK FRAGMENTS

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Measured Specific Gravity	2.73
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	G774
Mold ID	G695
Mold diameter	6"
Weight of the Mold	5701
Volume of the Mold(cc)	2124

Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	9500	9640	9735	9648	9543
Wt.of Mold (gm)	5701	5701	5701	5701	5701
Wt. of WS	3799	3939	4034	3947	3842
Mold Volume (cc)	2124	2124	2124	2124	2124

Moisture Content / Density

Tare Number	785	1703	551	585	539
Wt. of Tare & WS (gm)	815.60	691.10	667.50	626.20	632.60
Wt. of Tare & DS (gm)	691.40	575.20	544.90	501.10	495.60
Wt. of Tare (gm)	85.62	83.79	84.52	85.87	83.44
Wt. of Water (gm)	124.20	115.90	122.60	125.10	137.00
Wt. of DS (gm)	605.78	491.41	460.38	415.23	412.16
Wet Density (gm/cc)	1.79	1.85	1.90	1.86	1.81
Wet Density (pcf)	111.6	115.7	118.5	116.0	112.9
Moisture Content (%)	**20.5**	**23.6**	**26.6**	**30.1**	**33.2**
Dry Density (pcf)	**92.6**	**93.6**	**93.6**	**89.1**	**84.7**

Zero Air Voids

Moisture Content (%)	26.6	30.1	33.2	
Dry Unit Weight (pcf)	98.6	93.5	89.3	

Tested By MD *Date* 8/15/00 *Checked By* VB *Date* 8-17-00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\My Documents\PrintQ\[K150.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

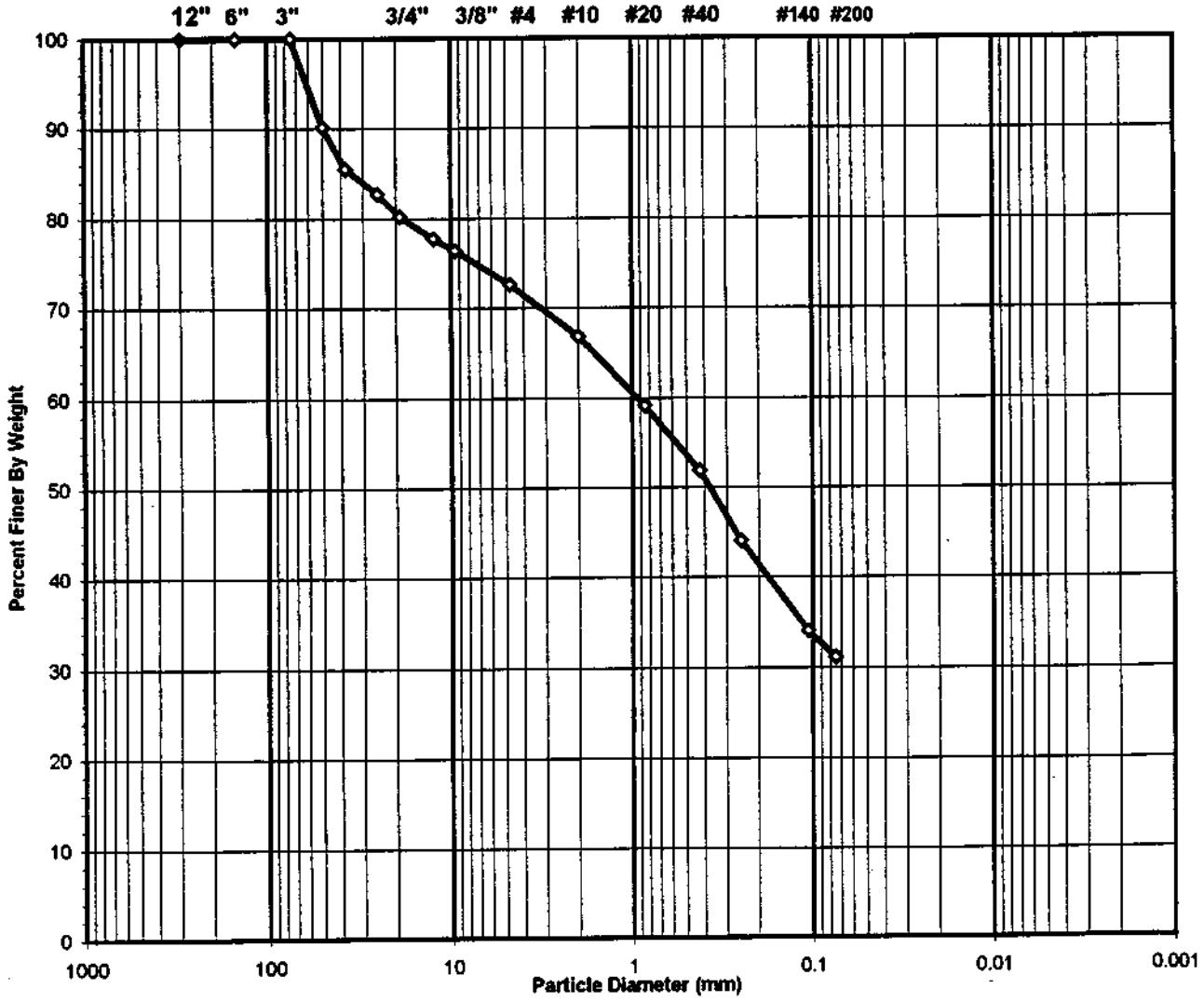
26

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-02
Lab ID	00220-01.031	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND WITH GRAVEL (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By CB Date 8-18-00

DCN: CT-S3A DATE 6-25-98 REVISION 2

C:\MY DOCUMENTS\PrintQ\[M30.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

27

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-02
Lab ID	00220-01.031	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2454	Tare No.	609
Wgt.Tare + Wet Specimen (gm)	1246.30	Wgt.Tare + Wet Specimen (gm)	814.90
Wgt.Tare + Dry Specimen (gm)	986.10	Wgt.Tare + Dry Specimen (gm)	776.10
Weight of Tare (gm)	100.24	Weight of Tare (gm)	82.26
Weight of Water (gm)	260.20	Weight of Water (gm)	38.80
Weight of Dry Soil (gm)	885.86	Weight of Dry Soil (gm)	693.84
Moisture Content (%)	**29.4**	**Moisture Content (%)**	**5.6**

Wet Weight -3/4" Sample (gm)	17887	Weight of the Dry Specimen (gm)	885.86
Dry Weight - 3/4" Sample (gm)	13826.0	Weight of minus #200 material (gm)	343.48
Wet Weight +3/4" Sample (gm)	3607.40	Weight of plus #200 material (gm)	542.38
Dry Weight + 3/4" Sample (gm)	3416.36		
Total Dry Weight Sample (gm)	17242.3	**J - Factor (Percent Finer than 3/4")**	**0.8019**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	1786.60	(*)	9.81	9.81	90.19	**90.19**
1 1/2"	37.5	856.00		4.70	14.51	85.49	**85.49**
1"	25	510.50		2.80	17.32	82.68	**82.68**
3/4"	19	454.30		2.50	19.81	80.19	**80.19**
1/2"	12.5	27.53		3.11	3.11	96.89	**77.69**
3/8"	9.5	14.57		1.64	4.75	95.25	**76.38**
#4	4.75	41.51		4.69	9.44	90.56	**72.62**
#10	2	63.81		7.20	16.64	83.36	**66.84**
#20	0.85	85.48	(**)	9.65	26.29	73.71	**59.10**
#40	0.425	79.96		9.03	35.32	64.68	**51.87**
#60	0.25	86.42		9.76	45.07	54.93	**44.04**
#140	0.106	110.39		12.46	57.53	42.47	**34.05**
#200	0.075	32.71		3.69	61.23	38.77	**31.09**
Pan	-	343.48		38.77	100.00	-	-

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Specimen*

Tested By RO Date 8/15/00 Checked By VB Date 8-18-00

DCN: CT-S3A DATE 5-17-00 REVISION 3

C:\MY DOCUMENTS\PrintQ\[M30.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

28

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-02
Lab ID	00220-01.031	Visual Description	**BROWN SILT** (Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/17/00 *Checked By* LB *Date* 8-18-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\M20.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

29

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-02
Lab ID	00220-01.031	Visual Description	**BROWN CLAY** (Minus No.4 sieve material, airdried)

Replicate Number	1	2
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	737.8	731
Temperature, T (°Celsius)	29.7	29.3
Weight of Pycnometer + Water (gm)	679.40	671.64
Tare Number	1084	2324
Weight of Tare + Dry Soil (gm)	194.7	196.78
Weight of Tare (gm)	100.74	101.49
Weight of Dry Soil (gm)	93.96	95.29
Specific Gravity of Soil @ T	2.642	2.652
Specific Gravity of Water @ T	0.9958	0.9959
Conversion Factor for Temperature T	0.9975	0.9977
Specific Gravity @ 20° Celsius	2.649	2.658

Average Specific Gravity @ 20° Celsius	2.65

Tested By TO *Date* 8/16/00 *Checked By* LB *Date* 8-17-00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

30

Geotechnics

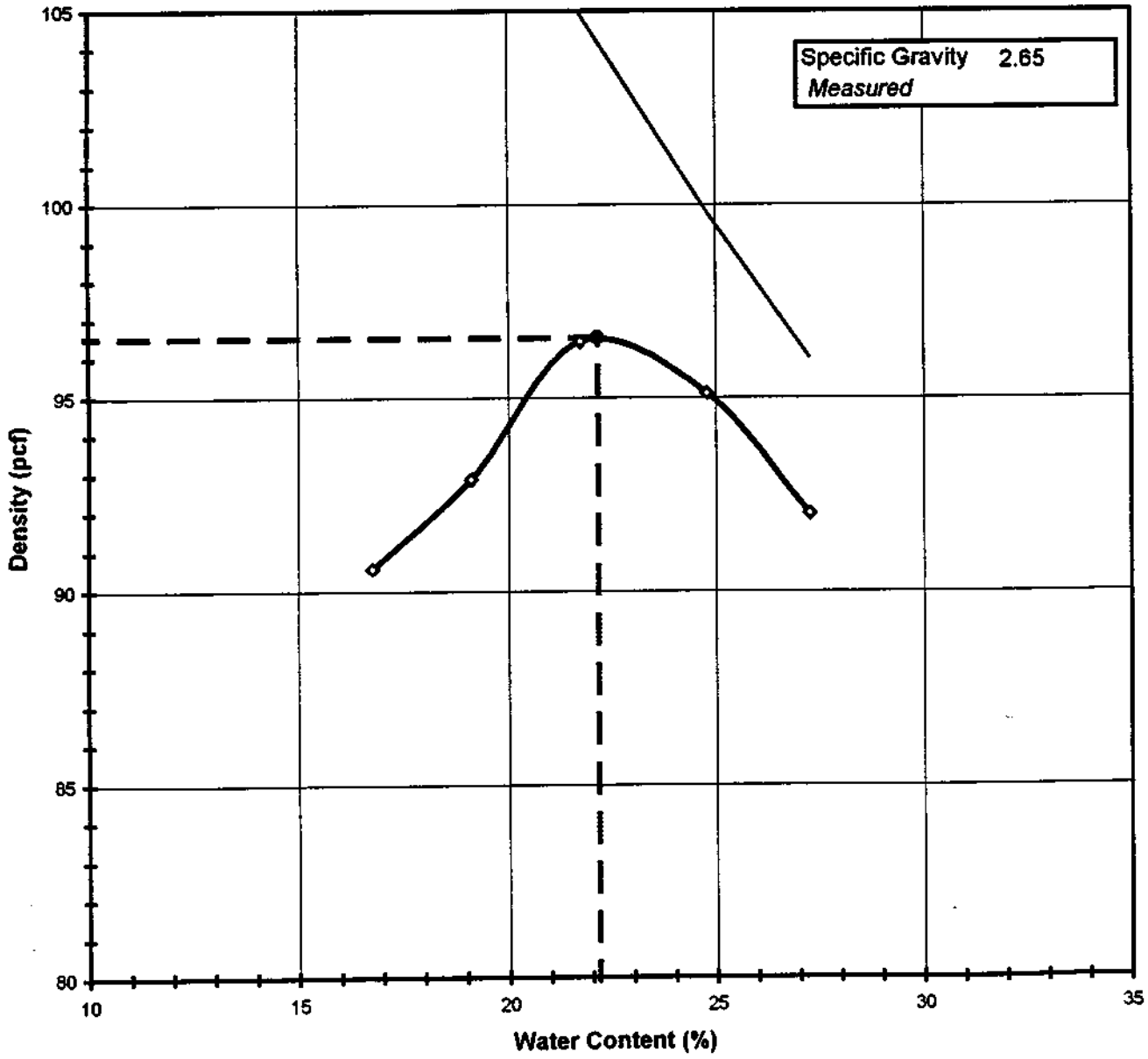
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-02
Lab ID	00220-01.031	Test Method	**STANDARD**

Visual Description: BROWN CLAY & SAND WITH ROCK FRAGMENTS

Optimum Water Content	**22.2**
Maximum Dry Density	**96.6**



Tested By MD *Date* 8/16/00 *Checked By* VB *Date* 8-17-00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\MY DOCUMENTS\PrintQ\[M5.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

31

Geotechnics

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-BA-02
Lab ID	00220-01.031		

Visual Description: BROWN CLAY & SAND WITH ROCK FRAGMENTS

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Measured Specific Gravity	2.65
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	G442
Mold ID	G778
Mold diameter	6"
Weight of the Mold	5535
Volume of the Mold(cc)	2124

Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	9135	9301	9531	9574	9520
Wt.of Mold (gm)	5535	5535	5535	5535	5535
Wt. of WS	3600	3766	3996	4039	3985
Mold Volume (cc)	2124	2124	2124	2124	2124

Moisture Content / Density

Tare Number	1712	673	601	785	1131
Wt. of Tare & WS (gm)	352.15	439.60	432.10	407.50	587.40
Wt. of Tare & DS (gm)	313.51	380.80	370.35	343.59	479.90
Wt. of Tare (gm)	82.74	73.07	86.08	85.62	85.34
Wt. of Water (gm)	38.64	58.80	61.75	63.91	107.50
Wt. of DS (gm)	230.77	307.73	284.27	257.97	394.56
Wet Density (gm/cc)	1.69	1.77	1.88	1.90	1.88
Wet Density (pcf)	105.8	110.6	117.4	118.7	117.1
Moisture Content (%)	**16.7**	**19.1**	**21.7**	**24.8**	**27.2**
Dry Density (pcf)	**90.6**	**92.9**	**96.4**	**95.1**	**92.0**

Zero Air Voids

Moisture Content (%)	21.7	24.8	27.2
Dry Unit Weight (pcf)	104.9	99.8	96.0

Tested By MD *Date* 8/16/00 *Checked By* LB *Date* 8-17-00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\MT DOCUMENTS\PrintQ\[M5.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

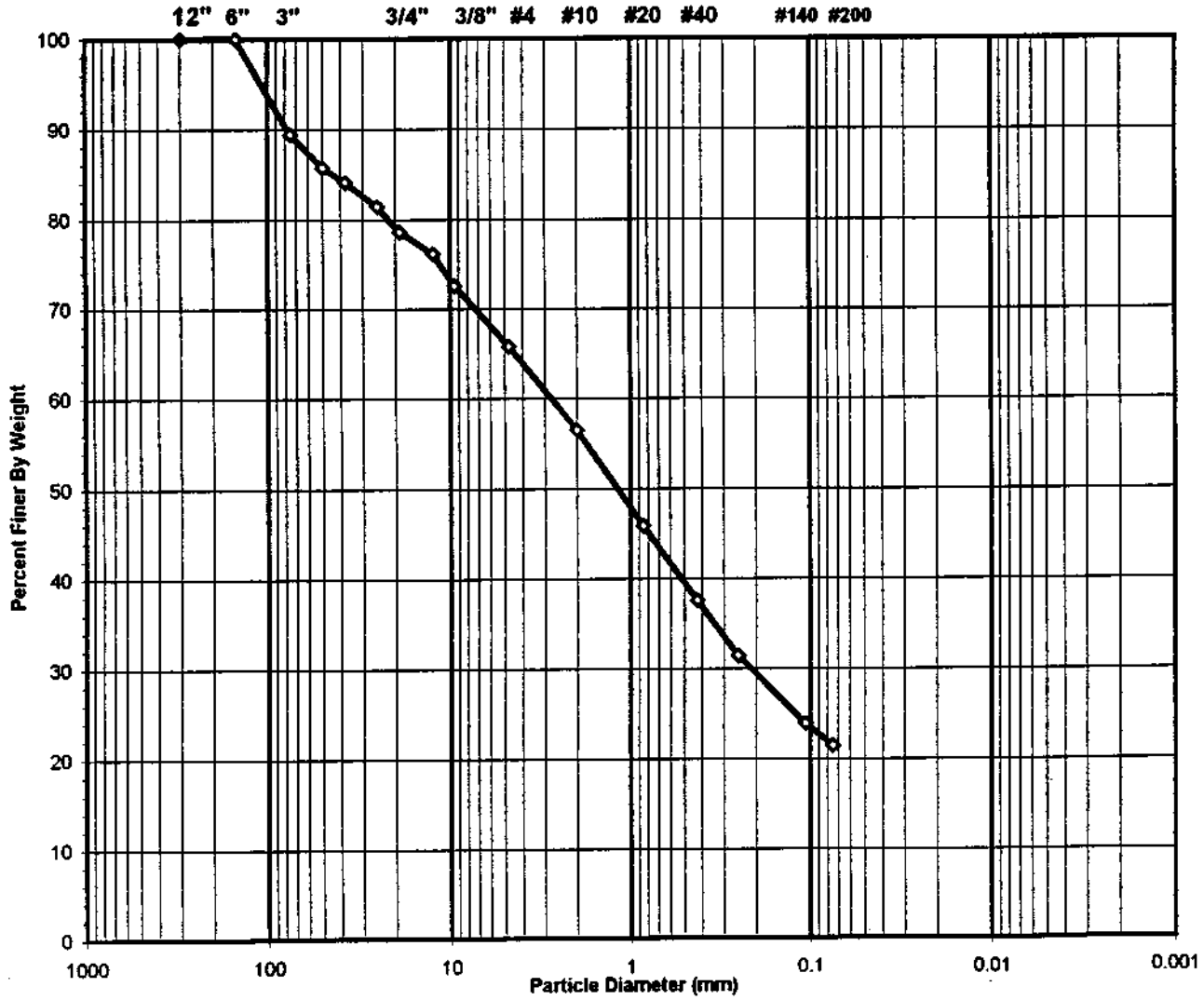
32

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-BA-01
Lab ID	00220-01.032	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND WITH GRAVEL (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By LB Date 8-18-00

DCN: CT-S3A DATE 6-25-98 REVISION 2

C:\MY DOCUMENTS\PrintQ\[M31.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

33

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-BA-01
Lab ID	00220-01.032	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1684	Tare No.	785
Wgt.Tare + Wet Specimen (gm)	1273.40	Wgt.Tare + Wet Specimen (gm)	581.00
Wgt.Tare + Dry Specimen (gm)	1042.60	Wgt.Tare + Dry Specimen (gm)	561.80
Weight of Tare (gm)	106.86	Weight of Tare (gm)	85.66
Weight of Water (gm)	230.80	Weight of Water (gm)	19.20
Weight of Dry Soil (gm)	935.74	Weight of Dry Soil (gm)	476.14
Moisture Content (%)	**24.7**	**Moisture Content (%)**	**4.0**

Wet Weight -3/4" Sample (gm)	20449	Weight of the Dry Specimen (gm)	935.74
Dry Weight - 3/4" Sample (gm)	16403.2	Weight of minus #200 material (gm)	256.17
Wet Weight +3/4" Sample (gm)	4643.50	Weight of plus #200 material (gm)	679.57
Dry Weight + 3/4" Sample (gm)	4463.51		
Total Dry Weight Sample (gm)	20866.7	**J - Factor (Percent Finer than 3/4")**	**0.7861**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	2300.80		10.60	10.60	89.40	**89.40**
2"	50	793.10	(*)	3.65	14.25	85.75	**85.75**
1 1/2"	37.5	364.80		1.68	15.93	84.07	**84.07**
1"	25	566.40		2.61	18.54	81.46	**81.46**
3/4"	19	618.40		2.85	21.39	78.61	**78.61**
1/2"	12.5	29.86		3.19	3.19	96.81	**76.10**
3/8"	9.5	41.48		4.43	7.62	92.38	**72.62**
#4	4.75	81.45		8.70	16.33	83.67	**65.77**
#10	2	110.94		11.86	28.18	71.82	**56.45**
#20	0.85	126.70	(**)	13.54	41.72	58.28	**45.81**
#40	0.425	98.67		10.54	52.27	47.73	**37.52**
#60	0.25	72.67		7.77	60.03	39.97	**31.42**
#140	0.106	88.93		9.50	69.54	30.46	**23.95**
#200	0.075	28.87		3.09	72.62	27.38	**21.52**
Pan	-	256.17		27.38	100.00	-	-

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Specimen*

Tested By RO Date 8/15/00 Checked By Date 8-18-00

DCN: CT-S3A DATE 5-17-00 REVISION 3

C:\MY DOCUMENTS\PrintQ\M31.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

34

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-BA-01
Lab ID	00220-01.032	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/17/00 *Checked By* LB *Date* 8-18-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\[M21.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

35

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-BA-01
Lab ID	00220-01.032	Visual Description	**BROWN CLAY** (Minus No.4 sieve material, airdried)

Replicate Number	1	2
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	740.5	731.7
Temperature, T (°Celsius)	29.9	29.8
Weight of Pycnometer + Water (gm)	679.37	671.57
Tare Number	1024	2446
Weight of Tare + Dry Soil (gm)	195.23	189.62
Weight of Tare (gm)	97.62	93.81
Weight of Dry Soil (gm)	97.61	95.81
Specific Gravity of Soil @ T	2.676	2.685
Specific Gravity of Water @ T	0.9957	0.9957
Conversion Factor for Temperature T	0.9975	0.9975
Specific Gravity @ 20° Celsius	2.683	2.692

Average Specific Gravity @ 20° Celsius	2.69

Tested By TO *Date* 8/16/00 *Checked By* IB *Date* 8-17-00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

36

Geotechnics

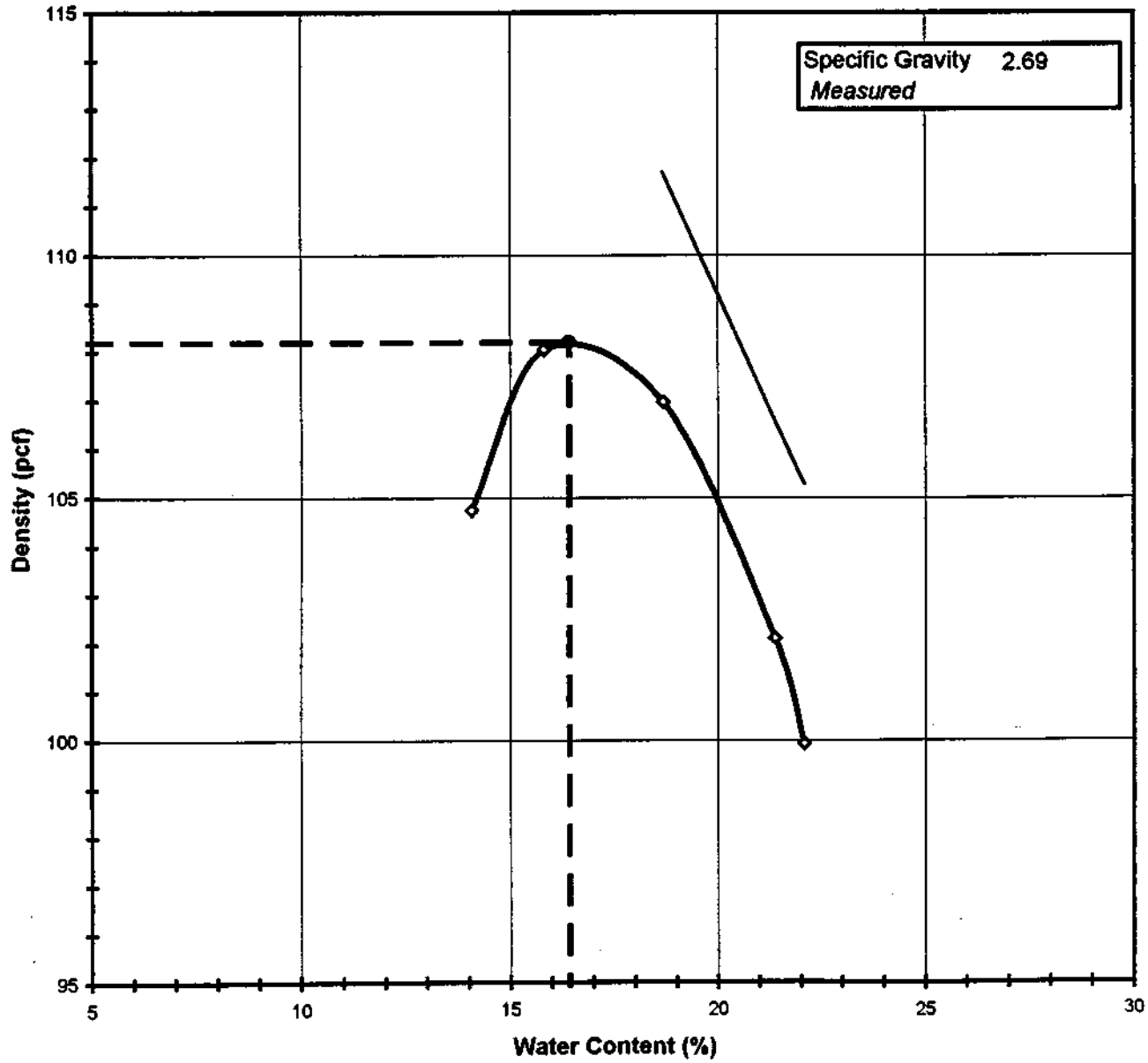
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-BA-01
Lab ID	00220-01.032	Test Method	**STANDARD**

Visual Description BROWN SANDY CLAY WITH ROCK FRAGMENTS

Optimum Water Content **16.4**
Maximum Dry Density **108.2**



Tested By MD *Date* 8/15/00 *Checked By* UB *Date* 8-17-00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\MY DOCUMENTS\PrintQ\[K151.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

37

Geotechnics

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-BA-01
Lab ID	00220-01.032		

Visual Description: BROWN SANDY CLAY WITH ROCK FRAGMENTS

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Measured Specific Gravity	2.69
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	G774
Mold ID	G695
Mold diameter	6"
Weight of the Mold	5701
Volume of the Mold(cc)	2124

Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	9768	9960	10022	9920	9854
Wt.of Mold (gm)	5701	5701	5701	5701	5701
Wt. of WS	4067	4259	4321	4219	4153
Mold Volume (cc)	2124	2124	2124	2124	2124

Moisture Content / Density

Tare Number	1705	1123	556	594	608
Wt. of Tare & WS (gm)	715.80	853.40	660.50	663.70	882.30
Wt. of Tare & DS (gm)	637.80	748.50	569.40	561.10	737.50
Wt. of Tare (gm)	83.44	85.39	81.86	81.12	82.10
Wt. of Water (gm)	78.00	104.90	91.10	102.60	144.80
Wt. of DS (gm)	554.36	663.11	487.54	479.98	655.40
Wet Density (gm/cc)	1.91	2.01	2.03	1.99	1.96
Wet Density (pcf)	119.5	125.1	126.9	123.9	122.0
Moisture Content (%)	**14.1**	**15.8**	**18.7**	**21.4**	**22.1**
Dry Density (pcf)	**104.7**	**108.0**	**107.0**	**102.1**	**99.9**

Zero Air Voids

Moisture Content (%)	18.7	21.4	22.1
Dry Unit Weight (pcf)	111.7	106.6	105.3

Tested By MD *Date* 8/15/00 *Checked By* LB *Date* 8-17-00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\MY DOCUMENTS\Print\Q\K151.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

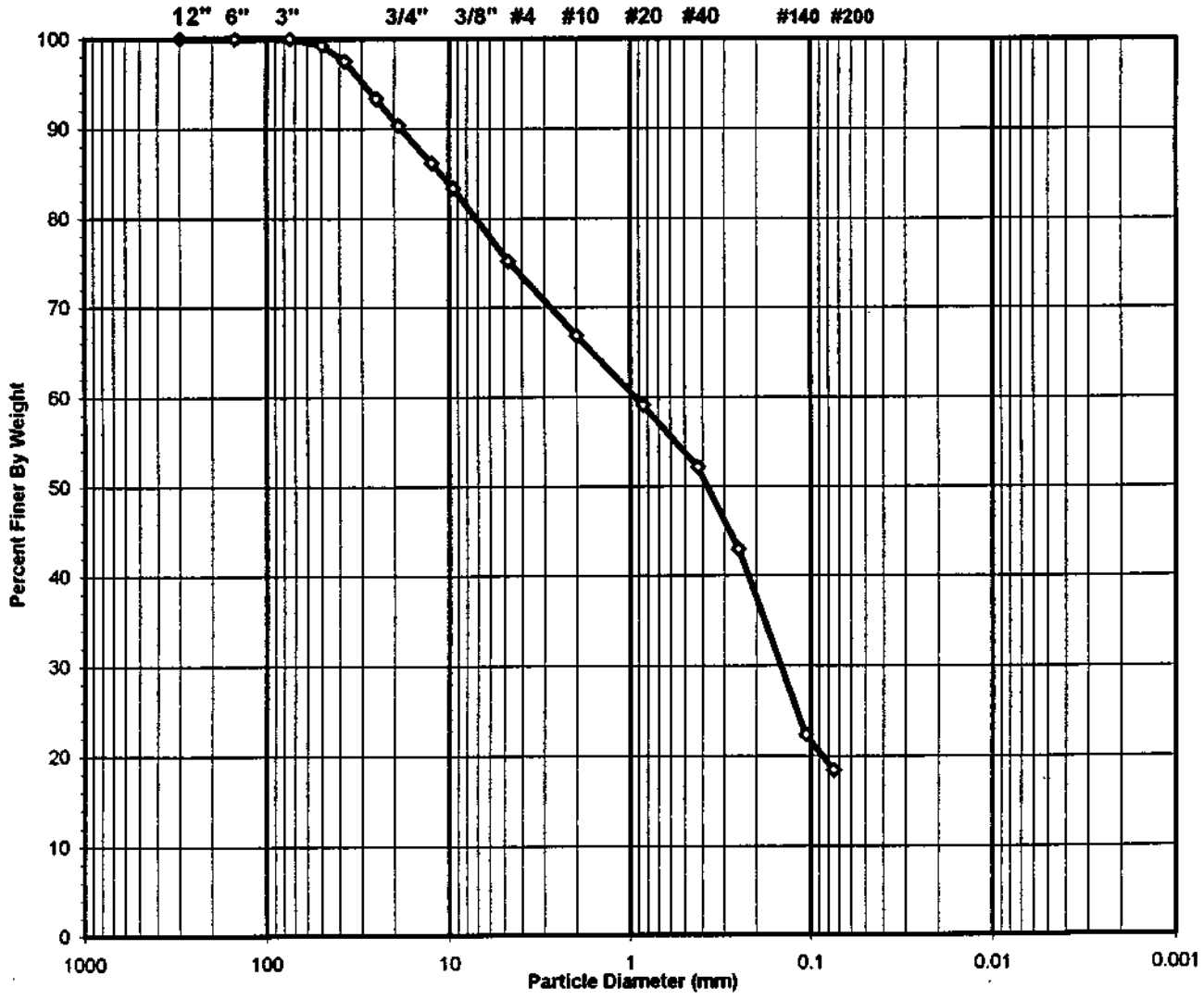
38

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-01
Lab ID	00220-01.033	Soil Color	BROWN

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND WITH GRAVEL (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By VB Date 8-18-00

DCN: GT-S3A DATE 6-25-98 REVISION 2

C:\MY DOCUMENTS\PrintQ\[M32.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-01
Lab ID	00220-01.033	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	684	Tare No.	1131
Wgt.Tare + Wet Specimen (gm)	1267.00	Wgt.Tare + Wet Specimen (gm)	666.20
Wgt.Tare + Dry Specimen (gm)	1122.30	Wgt.Tare + Dry Specimen (gm)	652.00
Weight of Tare (gm)	102.13	Weight of Tare (gm)	85.29
Weight of Water (gm)	144.70	Weight of Water (gm)	14.20
Weight of Dry Soil (gm)	1020.17	Weight of Dry Soil (gm)	566.71
Moisture Content (%)	**14.2**	**Moisture Content (%)**	**2.5**

Wet Weight -3/4" Sample (gm)	22260	Weight of the Dry Specimen (gm)	1020.17
Dry Weight - 3/4" Sample (gm)	19494.9	Weight of minus #200 material (gm)	207.86
Wet Weight +3/4" Sample (gm)	2132.59	Weight of plus #200 material (gm)	812.31
Dry Weight + 3/4" Sample (gm)	2080.46		
Total Dry Weight Sample (gm)	21575.3	**J - Factor (Percent Finer than 3/4")**	**0.9036**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	166.99	(*)	0.76	0.76	99.24	**99.24**
1 1/2"	37.5	376.80		1.70	2.46	97.54	**97.54**
1"	25	925.10		4.18	6.64	93.36	**93.36**
3/4"	19	663.70		3.00	9.64	90.36	**90.36**
1/2"	12.5	47.64		4.67	4.67	95.33	**86.14**
3/8"	9.5	31.47		3.08	7.75	92.25	**83.35**
#4	4.75	91.97		9.02	16.77	83.23	**75.20**
#10	2	94.94		9.31	26.08	73.92	**66.80**
#20	0.85	87.39	(**)	8.57	34.64	65.36	**59.06**
#40	0.425	78.30		7.68	42.32	57.68	**52.12**
#60	0.25	103.81		10.18	52.49	47.51	**42.93**
#140	0.106	232.48		22.79	75.28	24.72	**22.33**
#200	0.075	44.31		4.34	79.62	20.38	**18.41**
Pan	-	207.86		20.38	100.00	-	-

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Specimen*

Tested By RO Date 8/15/00 Checked By UB Date 8-18-00

DCN: CT-S3A DATE 5-17-00 REVISION 3

C:\MY DOCUMENTS\PrintQ\M32.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

40

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-01
Lab ID	00220-01.033	Visual Description	**BROWN SILT** (Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/17/00 *Checked By* VB *Date* 8-18-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

41

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-01
Lab ID	00220-01.033	Visual Description	**BROWN CLAY**
			(Minus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	736.1	727.3
Temperature, T (°Celsius)	29.6	28.7
Weight of Pycnometer + Water (gm)	679.41	671.73
Tare Number	503	1134
Weight of Tare + Dry Soil (gm)	190.25	189.4
Weight of Tare (gm)	100.62	101.95
Weight of Dry Soil (gm)	89.63	87.45
Specific Gravity of Soil @ T	2.721	2.743
Specific Gravity of Water @ T	0.9958	0.9961
Conversion Factor for Temperature T	0.9976	0.9978
Specific Gravity @ 20° Celsius	2.727	2.749

Average Specific Gravity @ 20° Celsius	2.74

Tested By TO *Date* 8/11/00 *Checked By* VB *Date* 8-14-00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

42

Geotechnics

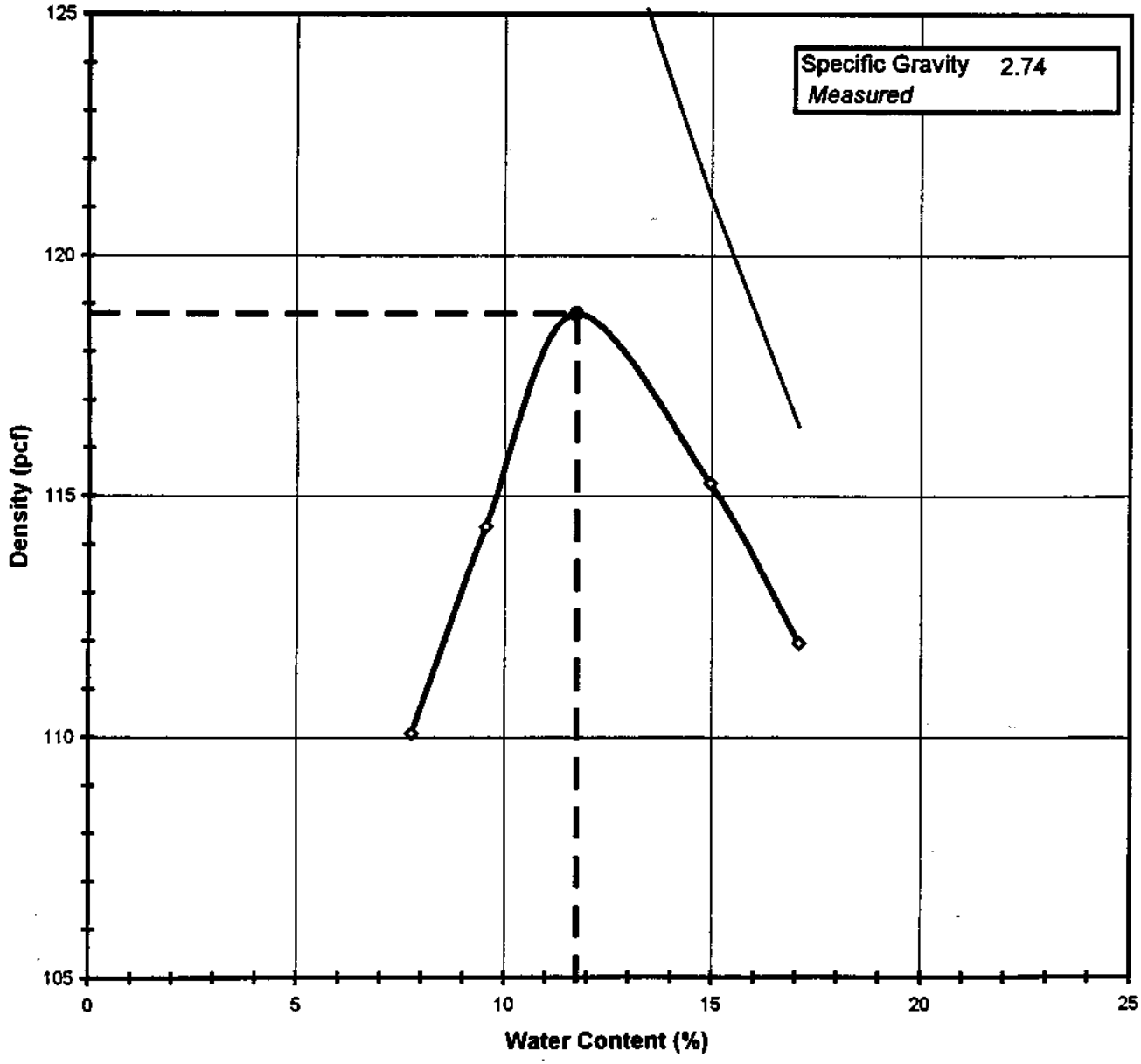
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-01
Lab ID	00220-01.033	Test Method	STANDARD

Visual Description: BROWN CLAYEY SAND WITH ROCK FRAGMENTS

Optimum Water Content	**11.7**
Maximum Dry Density	**118.8**



Tested By JP *Date* 8/14/00 *Checked By* LB *Date* 8-16-00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\MY DOCUMENTS\PrintQ\[K152.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

43

Geotechnics

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-01
Lab ID	00220-01.033		

Visual Description: BROWN CLAYEY SAND WITH ROCK FRAGMENTS

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Measured Specific Gravity	2.74
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	G441
Mold ID	G778
Mold diameter	6"
Weight of the Mold	5534
Volume of the Mold(cc)	2124

Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	9572	9798	10049	10044	9996
Wt.of Mold (gm)	5534	5534	5534	5534	5534
Wt. of WS	4038	4264	4515	4510	4462
Mold Volume (cc)	2124	2124	2124	2124	2124

Moisture Content / Density

Tare Number	1698	612	1696	617	1717
Wt. of Tare & WS (gm)	479.40	401.10	447.70	571.40	952.00
Wt. of Tare & DS (gm)	450.70	373.39	409.60	508.00	825.20
Wt. of Tare (gm)	81.33	83.08	83.31	84.05	83.34
Wt. of Water (gm)	28.70	27.71	38.10	63.40	126.80
Wt. of DS (gm)	369.37	290.31	326.29	423.95	741.86
Wet Density (gm/cc)	1.90	2.01	2.13	2.12	2.10
Wet Density (pcf)	118.6	125.3	132.6	132.5	131.1
Moisture Content (%)	**7.8**	**9.5**	**11.7**	**15.0**	**17.1**
Dry Density (pcf)	**110.1**	**114.4**	**118.8**	**115.3**	**112.0**

Zero Air Voids

Moisture Content (%)	11.7	15.0	17.1
Dry Unit Weight (pcf)	129.5	121.3	116.4

Tested By JP *Date* 8/14/00 *Checked By* UB *Date* 8/16/00

DCN:CT-S12 DATE: 6-25-96 REVISION 3

C:\MT DOCUMENTS\Print\[K152.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-02
Lab ID	00220-01.034	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND WITH GRAVEL (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By LB Date 8-18-00

DCN: CT-S3A DATE 6-25-96 REVISION 2

C:\MY DOCUMENTS\PrintQ\M33.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-02
Lab ID	00220-01.034	Soil Color	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2495	Tare No.	1703
Wgt.Tare + Wet Specimen (gm)	1100.80	Wgt.Tare + Wet Specimen (gm)	696.90
Wgt.Tare + Dry Specimen (gm)	989.90	Wgt.Tare + Dry Specimen (gm)	684.70
Weight of Tare (gm)	95.67	Weight of Tare (gm)	83.81
Weight of Water (gm)	110.90	Weight of Water (gm)	12.20
Weight of Dry Soil (gm)	894.23	Weight of Dry Soil (gm)	600.89
Moisture Content (%)	**12.4**	**Moisture Content (%)**	**2.0**

Wet Weight -3/4" Sample (gm)	21442	Weight of the Dry Specimen (gm)	894.23
Dry Weight - 3/4" Sample (gm)	19076.2	Weight of minus #200 material (gm)	138.52
Wet Weight +3/4" Sample (gm)	4945.70	Weight of plus #200 material (gm)	755.71
Dry Weight + 3/4" Sample (gm)	4847.28		
Total Dry Weight Sample (gm)	23923.5	**J - Factor (Percent Finer than 3/4")**	**0.7974**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00		0.00	0.00	100.00	100.00
6"	150	0.00		0.00	0.00	100.00	100.00
3"	75	2625.30		10.76	10.76	89.24	89.24
2"	50	417.70	(*)	1.71	12.47	87.53	87.53
1 1/2"	37.5	1014.40		4.16	16.62	83.38	83.38
1"	25	415.60		1.70	18.33	81.67	81.67
3/4"	19	472.70		1.94	20.26	79.74	79.74
1/2"	12.5	17.89		2.00	2.00	98.00	78.14
3/8"	9.5	18.14		2.03	4.03	95.97	76.53
#4	4.75	44.36		4.96	8.99	91.01	72.57
#10	2	70.17		7.85	16.84	83.16	66.31
#20	0.85	74.11	(**)	8.29	25.12	74.88	59.70
#40	0.425	68.86		7.70	32.82	67.18	53.56
#60	0.25	112.26		12.55	45.38	54.62	43.55
#140	0.106	302.97		33.88	79.26	20.74	16.54
#200	0.075	46.95		5.25	84.51	15.49	12.35
Pan	-	138.52		15.49	100.00	-	-

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Specimen*

Tested By RO Date 8/15/00 Checked By VB Date 8-18-00

DCN: CT-S3A DATE 5-17-00 REVISION 3

C:\MY DOCUMENTS\PrintQ\M33.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

46

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-02
Lab ID	00220-01.034	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/17/00 *Checked By* LB *Date* 8-18-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\M23.xls\Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-02
Lab ID	00220-01.034	Visual Description	**BROWN CLAY** (Minus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	741.7	734.4
Temperature, T (°Celsius)	27.8	27.5
Weight of Pycnometer + Water (gm)	679.68	671.90
Tare Number	1679	889
Weight of Tare + Dry Soil (gm)	195.47	202.39
Weight of Tare (gm)	97.79	104.03
Weight of Dry Soil (gm)	97.68	98.36
Specific Gravity of Soil @ T	2.739	2.743
Specific Gravity of Water @ T	0.9963	0.9964
Conversion Factor for Temperature T	0.9981	0.9982
Specific Gravity @ 20° Celsius	2.745	2.748

Average Specific Gravity @ 20° Celsius	2.75

Tested By TO *Date* 8/16/00 *Checked By* VB *Date* 8-17-00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

48

Geotechnics

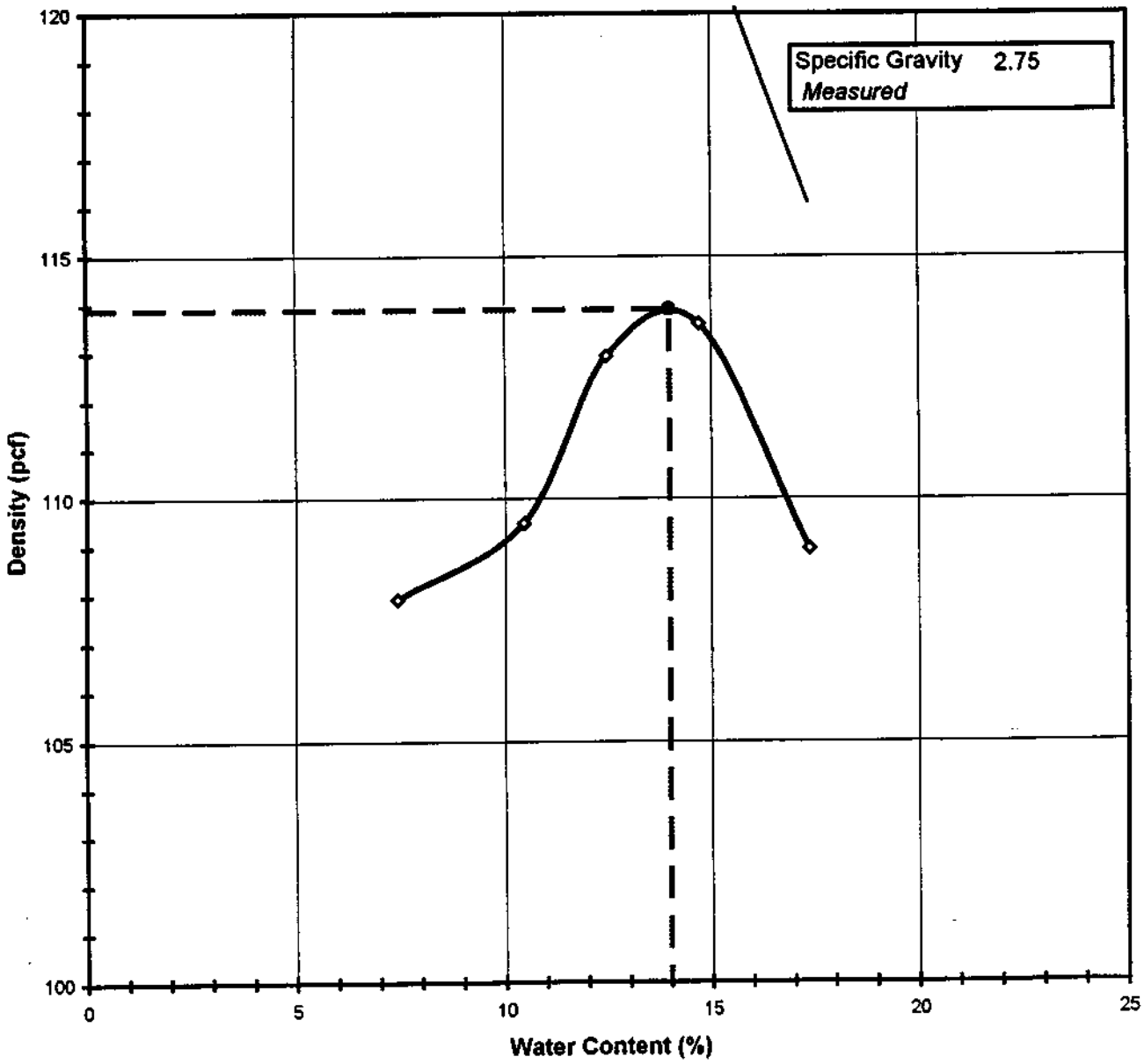
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-02
Lab ID	00220-01.034	Test Method	**STANDARD**

Visual Description: BROWN CLAYEY SAND WITH ROCK FRAGMENTS

Optimum Water Content 14.0
Maximum Dry Density 113.9



Tested By JP *Date* 8/14/00 *Checked By* UB *Date* 8-17-00

DCN:CT-S12 DATE: 6-25-96 REVISION 3

C:\MT DOCUMENTS\PrintQ\[K153.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-02
Lab ID	00220-01.034		

Visual Description: BROWN CLAYEY SAND WITH ROCK FRAGMENTS

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Measured Specific Gravity	2.75
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	G441
Mold ID	G778
Mold diameter	6"
Weight of the Mold	5534
Volume of the Mold(cc)	2124

Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	9480	9650	9857	9969	9887
Wt.of Mold (gm)	5534	5534	5534	5534	5534
Wt. of WS	3946	4116	4323	4435	4353
Mold Volume (cc)	2124	2124	2124	2124	2124

Moisture Content / Density

Tare Number	621	604	567	1714	1743
Wt. of Tare & WS (gm)	395.73	455.30	431.10	757.10	1001.60
Wt. of Tare & DS (gm)	374.40	420.50	392.72	670.80	865.70
Wt. of Tare (gm)	87.06	87.33	84.68	83.48	83.70
Wt. of Water (gm)	21.33	34.80	38.38	86.30	135.90
Wt. of DS (gm)	287.34	333.17	308.04	587.32	782.00
Wet Density (gm/cc)	1.86	1.94	2.04	2.09	2.05
Wet Density (pcf)	115.9	120.9	127.0	130.3	127.9
Moisture Content (%)	**7.4**	**10.4**	**12.5**	**14.7**	**17.4**
Dry Density (pcf)	**107.9**	**109.5**	**112.9**	**113.6**	**109.0**

Zero Air Voids

Moisture Content (%)	12.5	14.7	17.4
Dry Unit Weight (pcf)	127.8	122.2	116.1

Tested By JP *Date* 8/14/00 *Checked By* VB *Date* 8-17-00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\MY DOCUMENTS\PrintQ\[K153.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

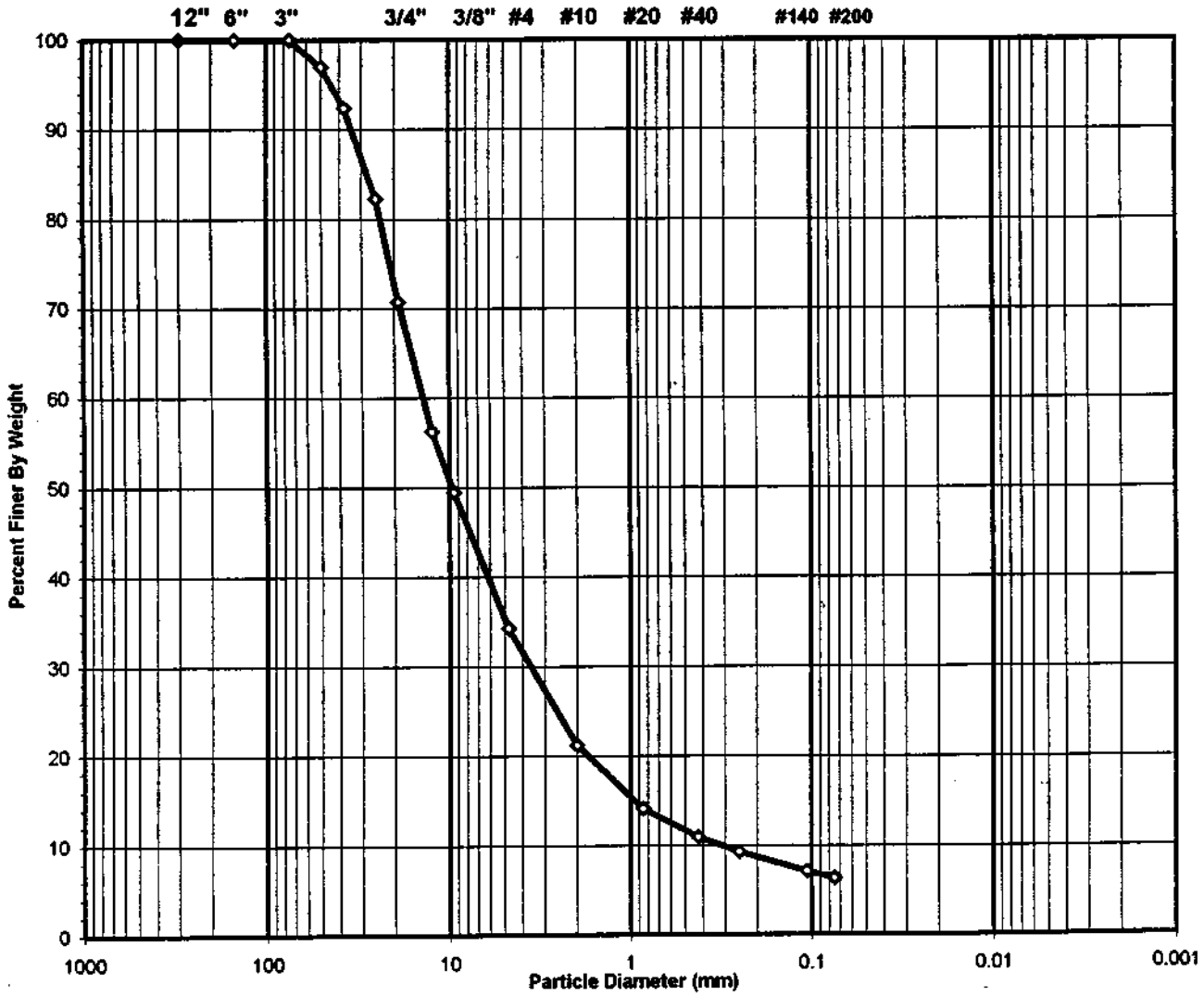
50

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-03
Lab ID	00220-01.035	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol *GW-GM, TESTED*

USCS Classification *WELL-GRADED GRAVEL WITH SILT AND SAND (NON-PLASTIC FINES)*

D60 = 13.9 CC = 2.9

D30 = 3.6 CU = 43.6

D10 = 0.3

Tested By RO Date 8/15/00 Checked By UB Date 8-18-00

DCN: CT-S3A DATE 6-25-98 REVISION 2

C:\MY DOCUMENTS\PrintQ\[M34.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

51

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-03
Lab ID	00220-01.035	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2342	Tare No.	1717
Wgt.Tare + Wet Specimen (gm)	1240.30	Wgt.Tare + Wet Specimen (gm)	674.10
Wgt.Tare + Dry Specimen (gm)	1109.20	Wgt.Tare + Dry Specimen (gm)	636.80
Weight of Tare (gm)	101.43	Weight of Tare (gm)	83.35
Weight of Water (gm)	131.10	Weight of Water (gm)	37.30
Weight of Dry Soil (gm)	1007.77	Weight of Dry Soil (gm)	553.45
Moisture Content (%)	**13.0**	**Moisture Content (%)**	**6.7**

Wet Weight -3/4" Sample (gm)	16562	Weight of the Dry Specimen (gm)	1007.77
Dry Weight - 3/4" Sample (gm)	14655.5	Weight of minus #200 material (gm)	90.49
Wet Weight +3/4" Sample (gm)	6471.30	Weight of plus #200 material (gm)	917.28
Dry Weight + 3/4" Sample (gm)	6062.70		
Total Dry Weight Sample (gm)	20718.2	**J - Factor (Percent Finer than 3/4")**	**0.7074**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)		Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00		0.00	0.00	100.00	**100.00**
6"	150	0.00		0.00	0.00	100.00	**100.00**
3"	75	0.00		0.00	0.00	100.00	**100.00**
2"	50	680.20	(*)	3.08	3.08	96.92	**96.92**
1 1/2"	37.5	1014.10		4.59	7.66	92.34	**92.34**
1"	25	2228.80		10.08	17.74	82.26	**82.26**
3/4"	19	2548.20		11.52	29.26	70.74	**70.74**
1/2"	12.5	206.51		20.49	20.49	79.51	**56.24**
3/8"	9.5	96.91		9.62	30.11	69.89	**49.44**
#4	4.75	216.65		21.50	51.61	48.39	**34.23**
#10	2	185.02		18.36	69.97	30.03	**21.25**
#20	0.85	101.54	(**)	10.08	80.04	19.96	**14.12**
#40	0.425	46.00		4.56	84.61	15.39	**10.89**
#60	0.25	23.53		2.33	86.94	13.06	**9.24**
#140	0.106	30.81		3.06	90.00	10.00	**7.08**
#200	0.075	10.31		1.02	91.02	8.98	**6.35**
Pan	-	90.49		8.98	100.00	-	-

Notes : *(*) The + 3/4" sieve analysis is based on the Total Dry Weight of the Sample*
*(**) The - 3/4" sieve analysis is based on the Weight of the Dry Specimen*

Tested By RO Date 8/15/00 Checked By LB Date 8-18-00

DCN: CT-S3A DATE 5-17-00 REVISION 3

C:\MY DOCUMENTS\PrintQ\[M34.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

52

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-03
Lab ID	00220-01.035	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/17/00 *Checked By* JB *Date* 8-18-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\M24.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-6999

53

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-03
Lab ID	00220-01.035	Visual Description	**BROWN CLAY**
			(Minus No.4 sieve material, airdried)

Replicate Number	1	2
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	741.5	731.7
Temperature, T (°Celsius)	28.8	28.6
Weight of Pycnometer + Water (gm)	679.53	671.75
Tare Number	2343	2445
Weight of Tare + Dry Soil (gm)	200	189.71
Weight of Tare (gm)	100.96	94.4
Weight of Dry Soil (gm)	99.04	95.31
Specific Gravity of Soil @ T	2.672	2.696
Specific Gravity of Water @ T	0.9960	0.9961
Conversion Factor for Temperature T	0.9978	0.9979
Specific Gravity @ 20° Celsius	2.677	2.701

Average Specific Gravity @ 20° Celsius	2.69

Tested By TO *Date* 8/16/00 *Checked By* LB *Date* 8-17-00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

54

Geotechnics

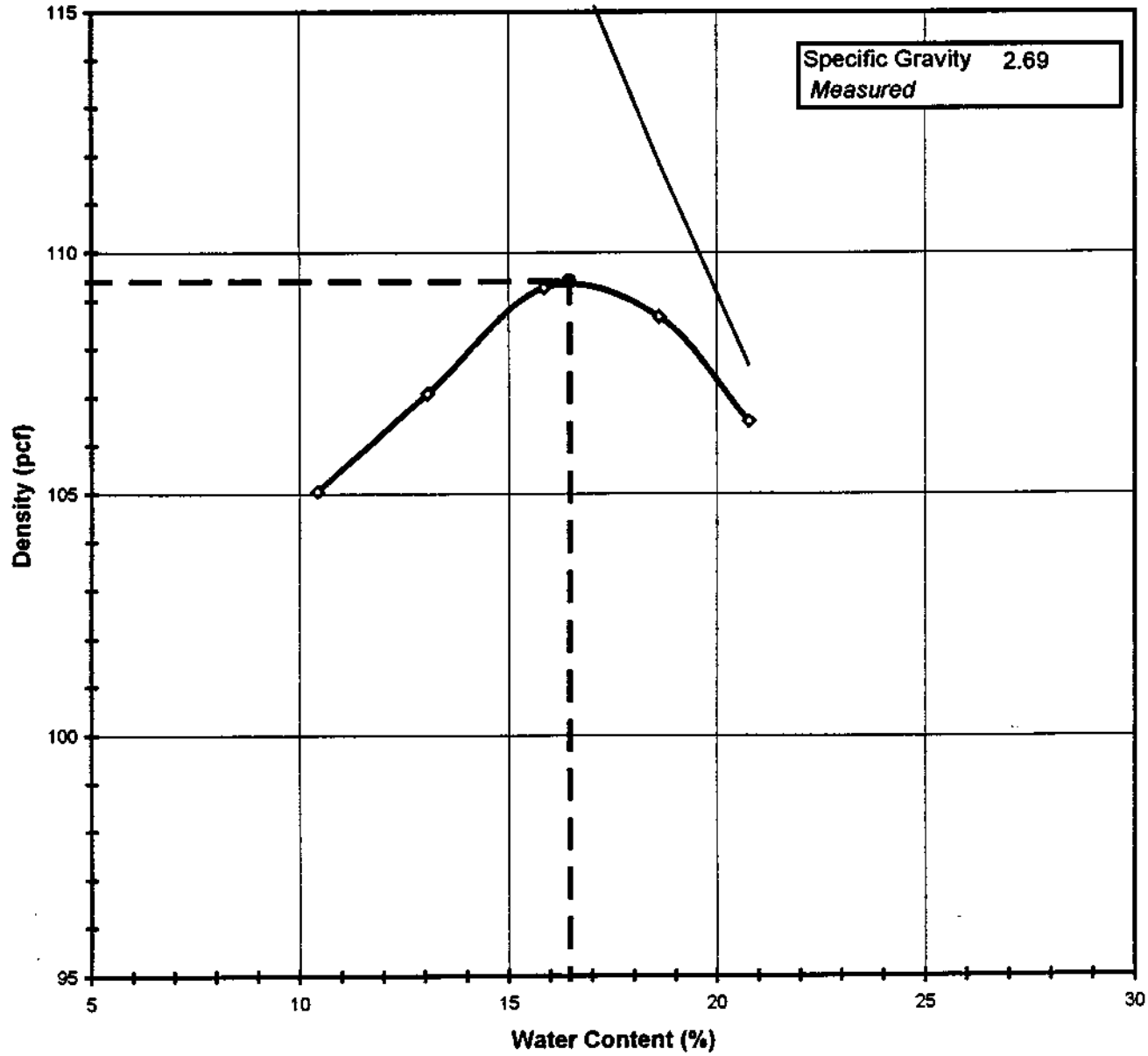
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-03
Lab ID	00220-01.035	Test Method	**STANDARD**

Visual Description BROWN CLAYEY SAND WITH ROCK FRAGMENTS

Optimum Water Content **16.5**
Maximum Dry Density **109.4**



Tested By JP *Date* 8/15/00 *Checked By* VB *Date* 8-17-00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\MT DOCUMENTS\PrintQ\[K154.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

55

Geotechnics

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	MM2-BA-03
Lab ID	00220-01.035		

Visual Description: BROWN CLAYEY SAND WITH ROCK FRAGMENTS

Total Weight of the Sample (gm)	NA
As Received Water Content(%)	NA
Measured Specific Gravity	2.69
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	C

TestType	STANDARD
Rammer Weight (lbs)	5.5
Rammer Drop (in)	12
Rammer Type	MECHANICAL
Machine ID	G441
Mold ID	G778
Mold diameter	6"
Weight of the Mold	5534
Volume of the Mold(cc)	2124

Mold / Specimen

Point No.	1	2	3	4	5
Wt. of Mold & WS (gm)	9482	9655	9843	9921	9912
Wt.of Mold (gm)	5534	5534	5534	5534	5534
Wt. of WS	3948	4121	4309	4387	4378
Mold Volume (cc)	2124	2124	2124	2124	2124

Moisture Content / Density

Tare Number	552	630	610	611	595
Wt. of Tare & WS (gm)	433.90	424.50	523.30	712.30	1159.60
Wt. of Tare & DS (gm)	400.70	384.98	463.10	613.60	975.10
Wt. of Tare (gm)	81.89	82.57	83.47	83.15	87.02
Wt. of Water (gm)	33.20	39.52	60.20	98.70	184.50
Wt. of DS (gm)	318.81	302.41	379.63	530.45	888.08

Wet Density (gm/cc)	1.86	1.94	2.03	2.07	2.06
Wet Density (pcf)	116.0	121.1	126.6	128.9	128.6
Moisture Content (%)	**10.4**	**13.1**	**15.9**	**18.6**	**20.8**
Dry Density (pcf)	**105.0**	**107.1**	**109.3**	**108.7**	**106.5**

Zero Air Voids

Moisture Content (%)	15.9	18.6	20.8
Dry Unit Weight (pcf)	117.7	111.9	107.7

Tested By JP *Date* 8/15/00 *Checked By* JB *Date* 8-17-00

DCN:CT-S12 DATE: 6-25-98 REVISION 3

C:\MY DOCUMENTS\PrimQ\[K154.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

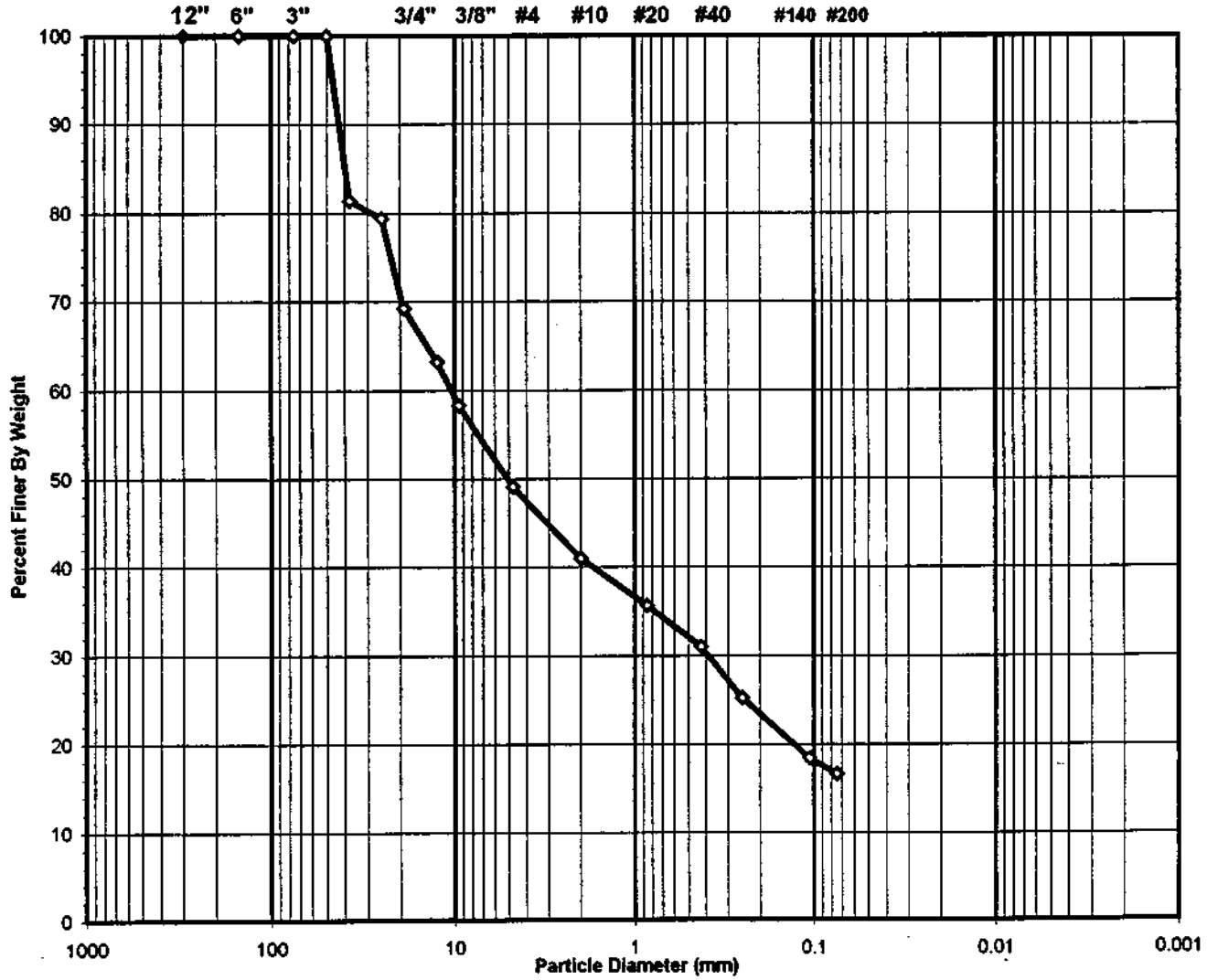
56

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	LSH-PB-01
Lab ID	00220-01.019	Soil Color	**BROWN**

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol ***GM, TESTED***

USCS Classification ***SILTY GRAVEL WITH SAND (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By UB Date 8-18-00

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\M25.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

57

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	LSH-PB-01
Lab ID	00220-01.019	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1339	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	1307.30	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	1046.20	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	99.69	Weight of Tare (gm)	NA
Weight of Water (gm)	261.10	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	946.51	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**27.6**	**Moisture Content (%)**	NA

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	946.51
Dry Weight - 3/4" Sample (gm)	497.9	Weight of minus #200 material (gm)	157.36
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	789.15
Dry Weight + 3/4" Sample (gm)	291.26		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	176.26	18.62	18.62	81.38	**81.38**
1"	25.0	18.53	1.96	20.58	79.42	**79.42**
3/4"	19.0	96.47	10.19	30.77	69.23	**69.23**
1/2"	12.50	57.22	6.05	36.82	63.18	**63.18**
3/8"	9.50	46.26	4.89	41.70	58.30	**58.30**
#4	4.75	87.63	9.26	50.96	49.04	**49.04**
#10	2.00	76.53	8.09	59.05	40.95	**40.95**
#20	0.850	50.48	5.33	64.38	35.62	**35.62**
#40	0.425	44.12	4.66	69.04	30.96	**30.96**
#60	0.250	54.23	5.73	74.77	25.23	**25.23**
#140	0.106	64.71	6.84	81.61	18.39	**18.39**
#200	0.075	16.71	1.77	83.37	16.63	**16.63**
Pan	-	157.36	16.63	100.00	-	-

Tested By RO Date 8/15/00 Checked By UB Date 8-18-00

DCN: CT-S3C DATE 6-25-96 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[M25.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

58

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	LSH-PB-01
Lab ID	00220-01.019	Visual Description	**BROWN SILT** (Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/17/00 *Checked By* LB *Date* 8-18-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\M15.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

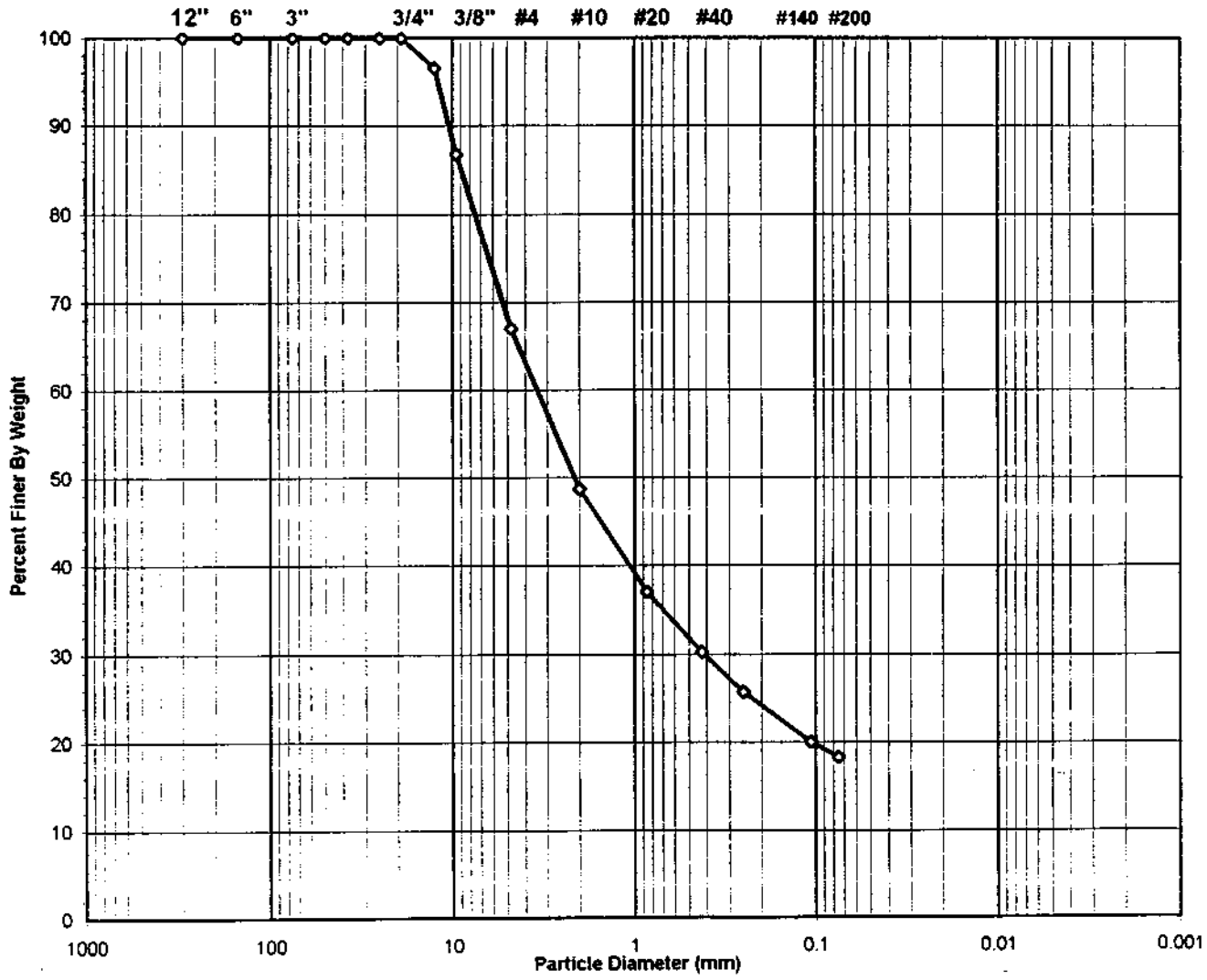
59

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	LSH-PB-02
Lab ID	00220-01.020	Soil Color	**BROWN**

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND WITH GRAVEL (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By Date 8/24/00

OCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\Print\[C88.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

60

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	LSH-PB-02
Lab ID	00220-01.020	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1646	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	840.40	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	235.49	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	97.30	Weight of Tare (gm)	NA
Weight of Water (gm)	604.91	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	138.19	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**437.7**	**Moisture Content (%)**	NA

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	138.19
Dry Weight - 3/4" Sample (gm)	112.9	Weight of minus #200 material (gm)	25.25
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	112.94
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated **Percent Finer** (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	4.78	3.46	3.46	96.54	**96.54**
3/8"	9.50	13.47	9.75	13.21	86.79	**86.79**
#4	4.75	27.31	19.76	32.97	67.03	**67.03**
#10	2.00	25.36	18.35	51.32	48.68	**48.68**
#20	0.850	16.11	11.66	62.98	37.02	**37.02**
#40	0.425	9.31	6.74	69.72	30.28	**30.28**
#60	0.250	6.26	4.53	74.25	25.75	**25.75**
#140	0.106	7.93	5.74	79.98	20.02	**20.02**
#200	0.075	2.41	1.74	81.73	18.27	**18.27**
Pan	-	25.25	18.27	100.00	-	-

Tested By RO Date 8/15/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\Print\QC88.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

61

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	LSH-PB-02
Lab ID	00220-01.020	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/23/00 *Checked By* JMO *Date* 8/23/00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MSOFFICE\EXCEL\PrintQ\[C72.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

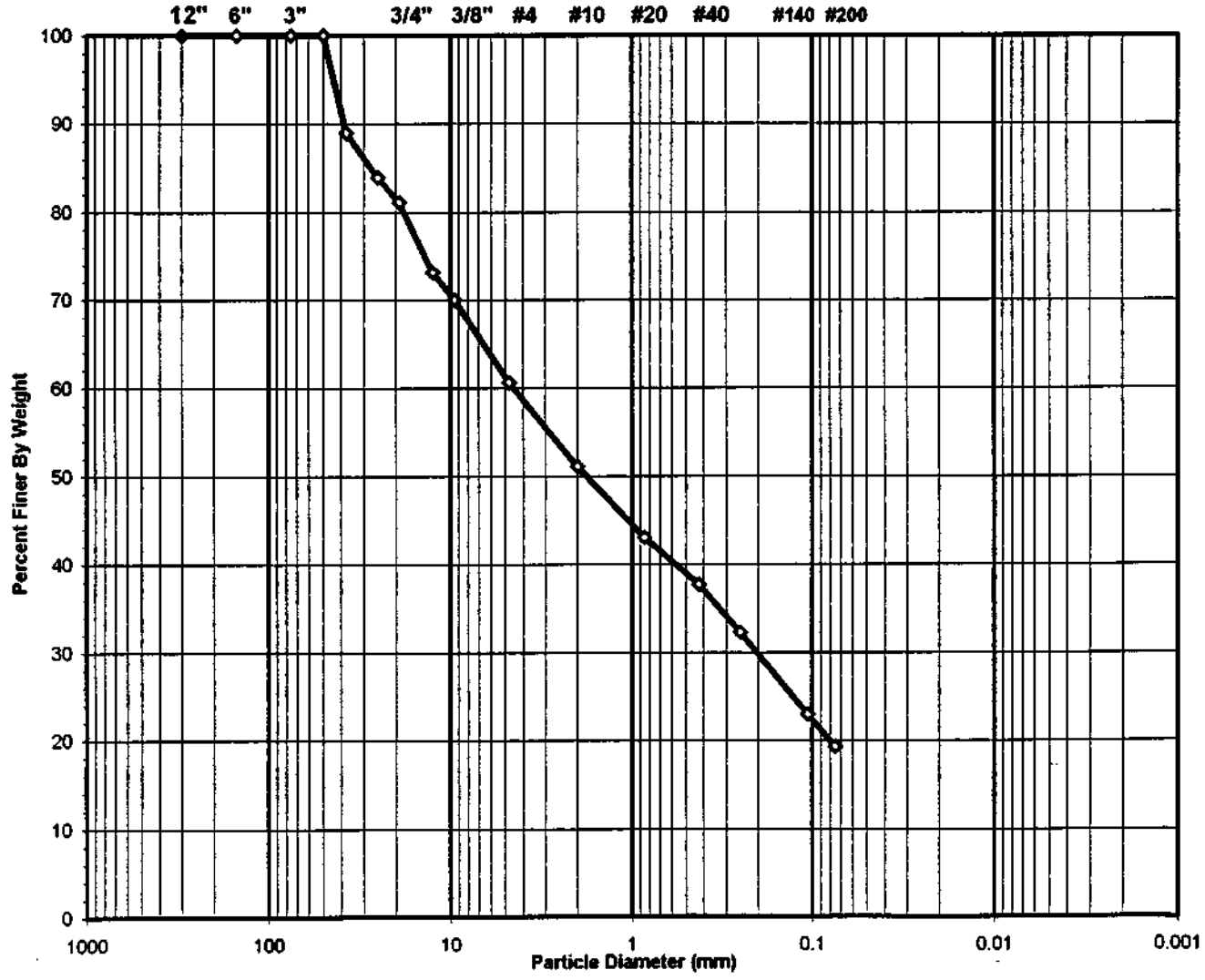
62

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-PB-01
Lab ID	00220-01.021	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol *SM, TESTED*

USCS Classification *SILTY SAND WITH GRAVEL (NON-PLASTIC FINES)*

Tested By RO Date 8/15/00 Checked By VB Date 8-18-00

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[M26.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

63

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-PB-01
Lab ID	00220-01.021	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2350	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	1235.60	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	1008.50	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	100.65	Weight of Tare (gm)	NA
Weight of Water (gm)	227.10	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	907.85	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**25.0**	**Moisture Content (%)**	NA

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	907.85
Dry Weight - 3/4" Sample (gm)	561.3	Weight of minus #200 material (gm)	175.16
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	732.69
Dry Weight + 3/4" Sample (gm)	171.43		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	99.95	11.01	11.01	88.99	**88.99**
1"	25.0	46.05	5.07	16.08	83.92	**83.92**
3/4"	19.0	25.43	2.80	18.88	81.12	**81.12**
1/2"	12.50	72.31	7.96	26.85	73.15	**73.15**
3/8"	9.50	28.33	3.12	29.97	70.03	**70.03**
#4	4.75	85.97	9.47	39.44	60.56	**60.56**
#10	2.00	85.98	9.47	48.91	51.09	**51.09**
#20	0.850	73.24	8.07	56.98	43.02	**43.02**
#40	0.425	48.28	5.32	62.29	37.71	**37.71**
#60	0.250	49.33	5.43	67.73	32.27	**32.27**
#140	0.106	85.00	9.36	77.09	22.91	**22.91**
#200	0.075	32.82	3.62	80.71	19.29	**19.29**
Pan	-	175.16	19.29	100.00	-	-

Tested By RO Date 8/15/00 Checked By UB Date 8-18-00

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[M26.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

64

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-PB-01
Lab ID	00220-01.021	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/17/00 *Checked By* LB *Date* 8-18-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\M16.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

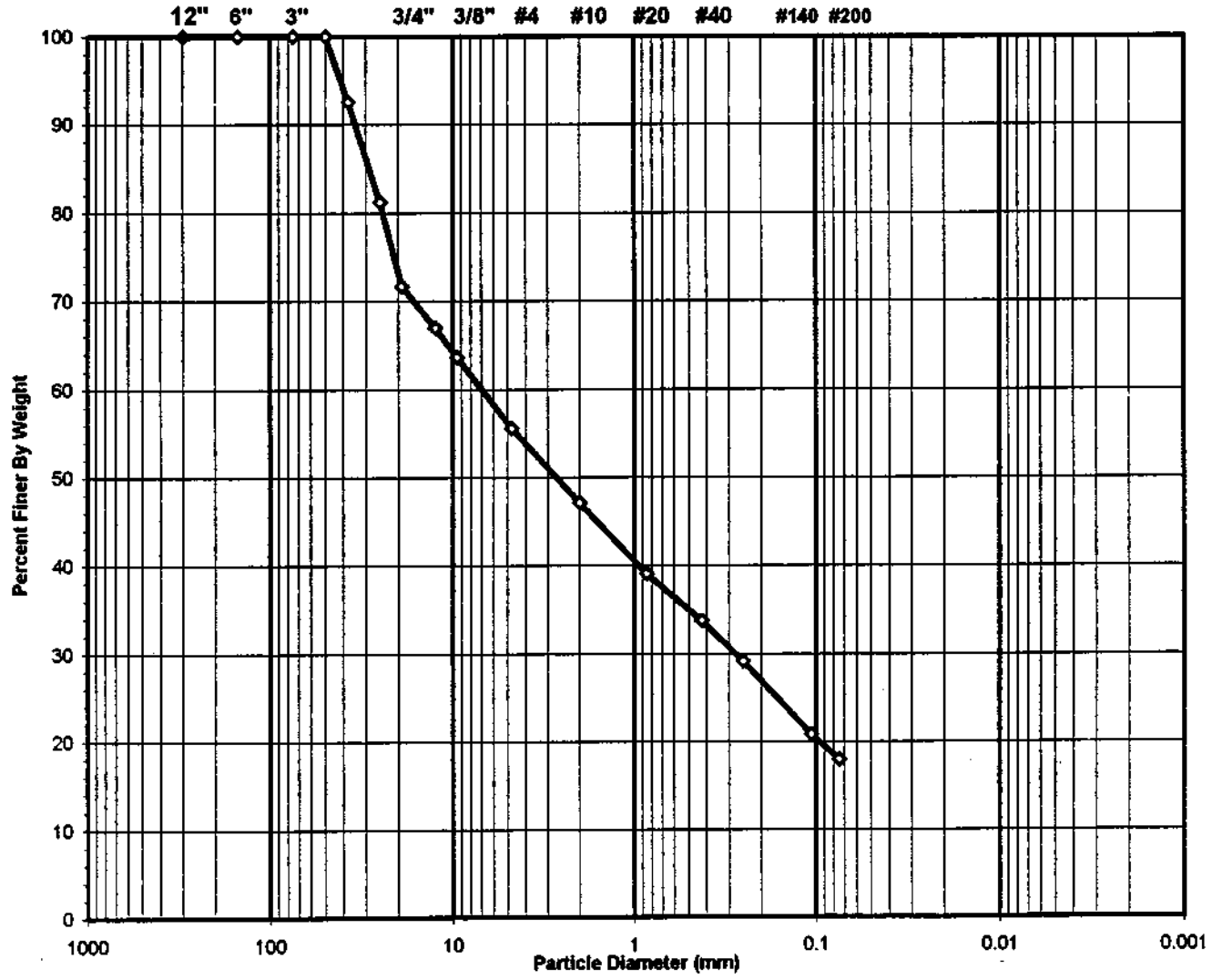
65

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-PB-02
Lab ID	00220-01.022	Soil Color	BROWN

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol *GM, TESTED*

USCS Classification *SILTY GRAVEL WITH SAND (NON-PLASTIC FINES)*

Tested By RO Date 8/15/00 Checked By LB Date 8-18-00

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[M27.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-PB-02
Lab ID	00220-01.022	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2472	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	1747.80	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	1427.00	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	99.34	Weight of Tare (gm)	NA
Weight of Water (gm)	320.80	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	1327.66	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**24.2**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	1327.66
Dry Weight - 3/4" Sample (gm)	713.2	Weight of minus #200 material (gm)	238.19
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	1089.47
Dry Weight + 3/4" Sample (gm)	376.27		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	99.24	7.47	7.47	92.53	**92.53**
1"	25.0	150.96	11.37	18.85	81.15	**81.15**
3/4"	19.0	126.07	9.50	28.34	71.66	**71.66**
1/2"	12.50	62.13	4.68	33.02	66.98	**66.98**
3/8"	9.50	44.43	3.35	36.37	63.63	**63.63**
#4	4.75	106.65	8.03	44.40	55.60	**55.60**
#10	2.00	113.13	8.52	52.92	47.08	**47.08**
#20	0.850	106.81	8.04	60.97	39.03	**39.03**
#40	0.425	70.36	5.30	66.27	33.73	**33.73**
#60	0.250	60.88	4.59	70.85	29.15	**29.15**
#140	0.106	110.33	8.31	79.16	20.84	**20.84**
#200	0.075	38.48	2.90	82.06	17.94	**17.94**
Pan	-	238.19	17.94	100.00	-	-

Tested By RO Date 8/15/00 Checked By LB Date 8-18-00

DCN: CT-SSC DATE 6-25-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[M27.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

67

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-PB-02
Lab ID	00220-01.022	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/17/00 *Checked By* VB *Date* 8-18-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\M17.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

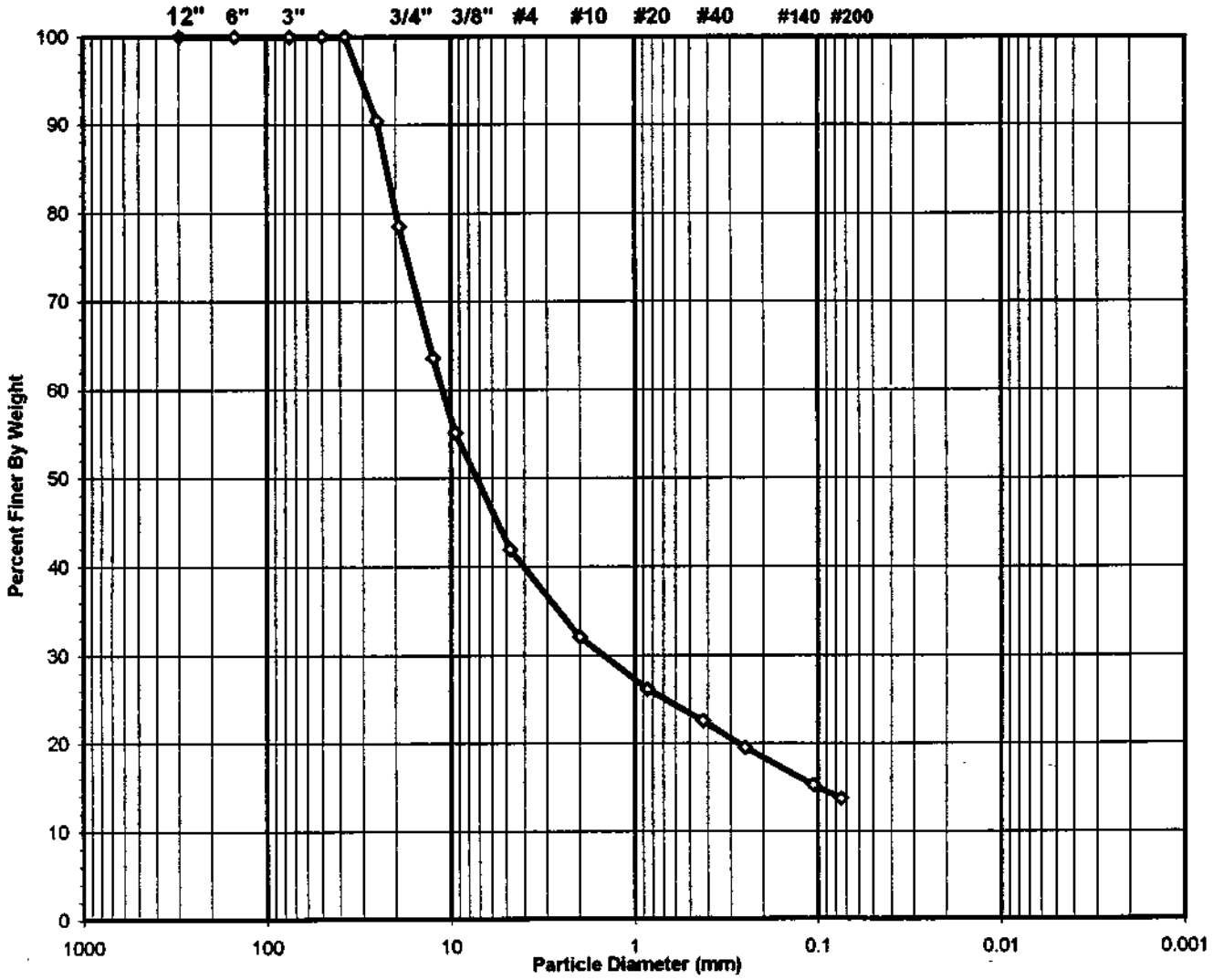
68

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-PB-01
Lab ID	00220-01.023	Soil Color	BROWN

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol *GM, TESTED*

USCS Classification *SILTY GRAVEL WITH SAND (NON-PLASTIC FINES)*

Tested By RO Date 8/15/00 Checked By VB Date 8-18-00

DCN: CT-S3C DATE 6-25-96 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[M28.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-PB-01
Lab ID	00220-01.023	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2347	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	1380.60	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	1237.00	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	99.00	Weight of Tare (gm)	NA
Weight of Water (gm)	143.60	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	1138.00	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**12.6**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	1138.00
Dry Weight - 3/4" Sample (gm)	737.3	Weight of minus #200 material (gm)	156.22
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	981.78
Dry Weight + 3/4" Sample (gm)	244.52		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	109.31	9.61	9.61	90.39	**90.39**
3/4"	19.0	135.21	11.88	21.49	78.51	**78.51**
1/2"	12.50	170.12	14.95	36.44	63.56	**63.56**
3/8"	9.50	96.42	8.47	44.91	55.09	**55.09**
#4	4.75	149.61	13.15	58.06	41.94	**41.94**
#10	2.00	112.43	9.88	67.93	32.07	**32.07**
#20	0.850	67.17	5.90	73.84	26.16	**26.16**
#40	0.425	41.52	3.65	77.49	22.51	**22.51**
#60	0.250	34.82	3.06	80.55	19.45	**19.45**
#140	0.106	47.99	4.22	84.76	15.24	**15.24**
#200	0.075	17.18	1.51	86.27	13.73	**13.73**
Pan	-	156.22	13.73	100.00	-	-

Tested By RO Date 8/15/00 Checked By CB Date 8-18-00

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\M28.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

70

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-PB-01
Lab ID	00220-01.023	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/17/00 *Checked By* LB *Date* 8-18-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\Print\QVM18.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

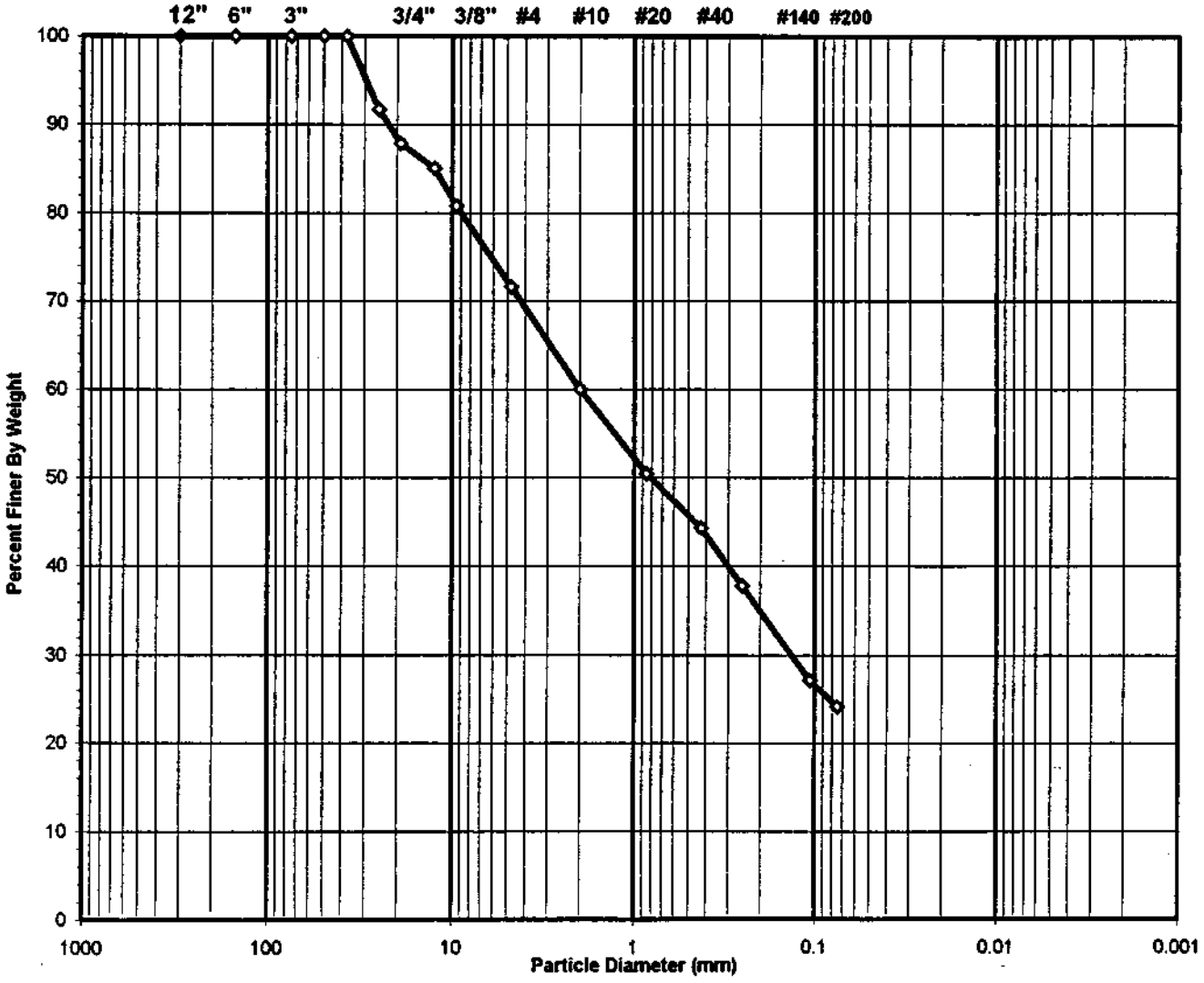
71

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-PB-02
Lab ID	00220-01.024	Soil Color	**BROWN**

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND WITH GRAVEL (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By VB Date 8-16-00

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\K161.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

72

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-PB-02
Lab ID	00220-01.024	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	523	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	1274.10	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	1050.90	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	100.11	Weight of Tare (gm)	NA
Weight of Water (gm)	223.20	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	950.79	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**23.5**	**Moisture Content (%)**	NA

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	950.79
Dry Weight - 3/4" Sample (gm)	605.8	Weight of minus #200 material (gm)	229.20
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	721.59
Dry Weight + 3/4" Sample (gm)	115.78		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	79.03	8.31	8.31	91.69	**91.69**
3/4"	19.0	36.75	3.87	12.18	87.82	**87.82**
1/2"	12.50	26.63	2.80	14.98	85.02	**85.02**
3/8"	9.50	40.26	4.23	19.21	80.79	**80.79**
#4	4.75	87.53	9.21	28.42	71.58	**71.58**
#10	2.00	110.46	11.62	40.04	59.96	**59.96**
#20	0.850	90.82	9.55	49.59	50.41	**50.41**
#40	0.425	58.03	6.10	55.69	44.31	**44.31**
#60	0.250	61.97	6.52	62.21	37.79	**37.79**
#140	0.106	101.48	10.67	72.88	27.12	**27.12**
#200	0.075	28.63	3.01	75.89	24.11	**24.11**
Pan	-	229.20	24.11	100.00	-	-

Tested By RO Date 8/15/00 Checked By JB Date 8-16-00

DCN: CT-S3C DATE 6-25-98 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

73

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-PB-02
Lab ID	00220-01.024	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/15/00 *Checked By* LB *Date* 8-16-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintOut\K155.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

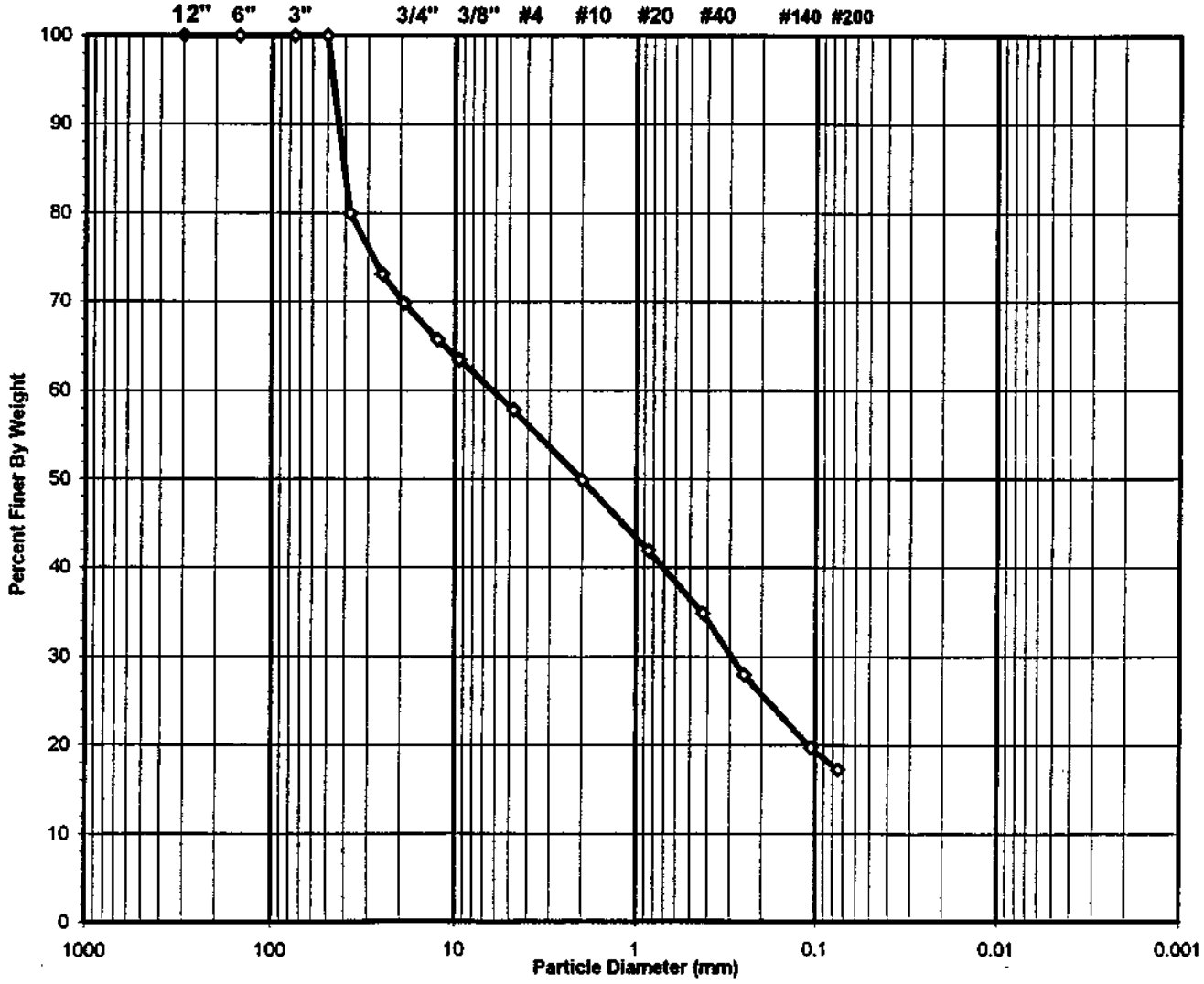
74

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-PB-01
Lab ID	00220-01.025	Soil Color	**BROWN**

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***GM, TESTED***

USCS Classification ***SILTY GRAVEL WITH SAND (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By [illegible] Date 8-16-00

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[K162.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

75

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-PB-01
Lab ID	00220-01.025	Soil Color	BROWN

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	501	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	1435.90	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	1252.60	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	104.19	Weight of Tare (gm)	NA
Weight of Water (gm)	183.30	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	1148.41	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**16.0**	**Moisture Content (%)**	NA

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	1148.41
Dry Weight - 3/4" Sample (gm)	604.4	Weight of minus #200 material (gm)	197.66
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	950.75
Dry Weight + 3/4" Sample (gm)	346.40		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	100.00
6"	150	0.00	0.00	0.00	100.00	100.00
3"	75	0.00	0.00	0.00	100.00	100.00
2"	50	0.00	0.00	0.00	100.00	100.00
1 1/2"	37.5	230.30	20.05	20.05	79.95	79.95
1"	25.0	79.03	6.88	26.94	73.06	73.06
3/4"	19.0	37.07	3.23	30.16	69.84	69.84
1/2"	12.50	47.91	4.17	34.34	65.66	65.66
3/8"	9.50	25.28	2.20	36.54	63.46	63.46
#4	4.75	65.60	5.71	42.25	57.75	57.75
#10	2.00	90.54	7.88	50.13	49.87	49.87
#20	0.850	91.33	7.95	58.09	41.91	41.91
#40	0.425	81.41	7.09	65.17	34.83	34.83
#60	0.250	78.91	6.87	72.05	27.95	27.95
#140	0.106	95.37	8.30	80.35	19.65	19.65
#200	0.075	28.00	2.44	82.79	17.21	17.21
Pan	-	197.66	17.21	100.00	-	-

Tested By RO Date 8/15/00 Checked By VB Date 8-16-00

DCN: CT-S3C DATE 5-25-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[K162.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

76

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-PB-01
Lab ID	00220-01.025	Visual Description	**BROWN SILT**
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/15/00 *Checked By* VB *Date* 8-16-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\K156.xls]Sheet1

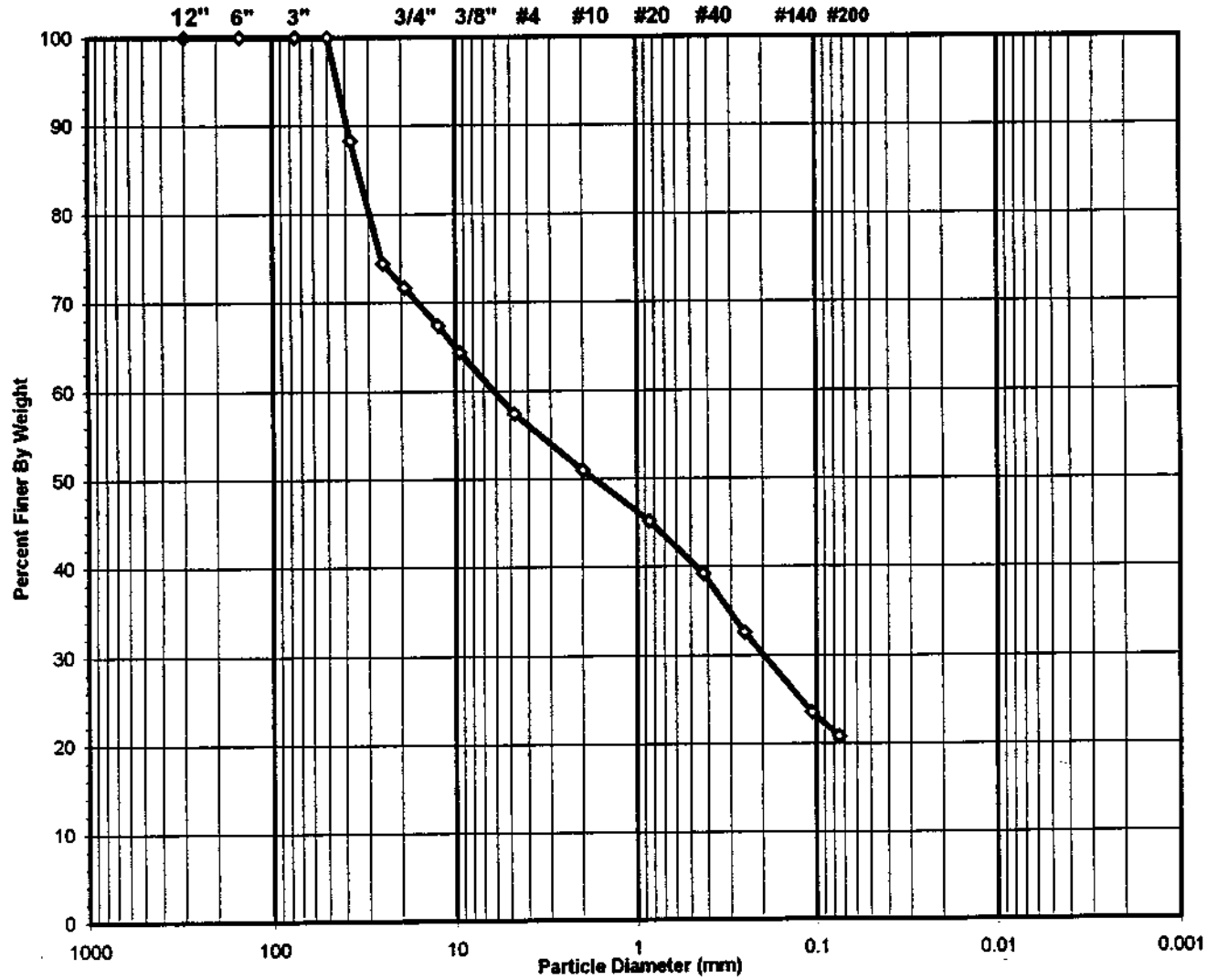
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSF-PB-01
Lab ID	00220-01.026	Soil Color	BROWN

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***GM, TESTED***

USCS Classification ***SILTY GRAVEL WITH SAND (NON-PLASTIC FINES)***

Tested By RO Date 8/15/00 Checked By VB Date 8-16-00

DCN: CT-S3C DATE 6-25-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[K163.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

78

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSF-PB-01
Lab ID	00220-01.026	Soil Color	**BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1675	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	1309.30	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	1087.40	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	97.23	Weight of Tare (gm)	NA
Weight of Water (gm)	221.90	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	990.17	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**22.4**	**Moisture Content (%)**	NA

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	990.17
Dry Weight - 3/4" Sample (gm)	503.7	Weight of minus #200 material (gm)	206.10
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	784.07
Dry Weight + 3/4" Sample (gm)	280.35		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated **Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	116.34	11.75	11.75	88.25	**88.25**
1"	25.0	137.04	13.84	25.59	74.41	**74.41**
3/4"	19.0	26.97	2.72	28.31	71.69	**71.69**
1/2"	12.50	42.81	4.32	32.64	67.36	**67.36**
3/8"	9.50	29.83	3.01	35.65	64.35	**64.35**
#4	4.75	69.31	7.00	42.65	57.35	**57.35**
#10	2.00	63.84	6.45	49.10	50.90	**50.90**
#20	0.850	57.28	5.78	54.88	45.12	**45.12**
#40	0.425	59.07	5.97	60.85	39.15	**39.15**
#60	0.250	64.85	6.55	67.40	32.60	**32.60**
#140	0.106	89.65	9.05	76.45	23.55	**23.55**
#200	0.075	27.08	2.73	79.19	20.81	**20.81**
Pan	-	206.10	20.81	100.00	-	-

Tested By RO Date 8/15/00 Checked By LB Date 8-16-00

DCN: CT-S3C DATE 6-25-96 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[K163.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-6999

79

Geotechnics

ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSF-PB-01
Lab ID	00220-01.026	Visual Description	**BROWN SILT**
			(Minus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By DA *Date* 8/15/00 *Checked By* VB *Date* 8-16-00

DCN: CT-S4C DATE: 7-11-97 REVISION : 2

C:\MY DOCUMENTS\PrintQ\K157.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

80

Geotechnics

MOISTURE CONTENT

ASTM D 2216 (SOP-S1)

Client: IT GROUP
Client Reference: AMCHITKA ISLAND
Project No.: 00220-01

Lab ID	.001	.002	.004	.005	.007
Boring No.	1 of 2	2 of 2	1 of 2	2 of 2	1 of 2
Depth (ft)	NA	NA	NA	NA	NA
Sample No.	LSH-DM-01	LSH-DM-01	CAN-DM-01	CAN-DM-01	CAN-DM-02
Tare Number	540	1122	1125	1691	1712
Wt. of Tare & WS (gm)	444	553.3	612.5	463.9	549.9
Wt. of Tare & DS (gm)	194.57	252.32	251.25	187.65	237.04
Wt. of Tare (gm)	83.37	83.94	83.69	83.64	82.68
Wt. of Water (gm)	249.43	300.98	361.25	276.25	312.86
Wt. of DS (gm)	111.2	168.38	167.56	104.01	154.36
Water Content (%)	**224.3**	**178.8**	**215.6**	**265.6**	**202.7**

Lab ID	.008	.010	.011	.013	.014
Boring No.	2 of 2	1 of 2	2 of 2	1 of 2	2 of 2
Depth (ft)	NA	NA	NA	NA	NA
Sample No.	CAN-DM-02	DSD-DM-01	DSD-DM-01	DSE-DM-01	DSE-DM-01
Tare Number	551	585	595	550	539
Wt. of Tare & WS (gm)	561.5	507.7	403.6	543	452.3
Wt. of Tare & DS (gm)	273.06	285.58	237.43	314.8	271.53
Wt. of Tare (gm)	84.52	85.78	87.03	81.92	83.44
Wt. of Water (gm)	288.44	222.12	166.17	228.2	180.77
Wt. of DS (gm)	188.54	199.8	150.4	232.88	188.09
Water Content (%)	**153.0**	**111.2**	**110.5**	**98.0**	**96.1**

Notes : *NA*

Tested By *DA/JP* *Date* *8/10/00* *Checked By* *VB* *Date* 8-21-00

DCN: CT-S1 DATE 6-30-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[k144.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

81

Geotechnics

MOISTURE CONTENT

ASTM D 2216 (SOP-S1)

Client	IT GROUP
Client Reference	AMCHITKA ISLAND
Project No.	00220-01

Lab ID	.016	.017	.019	.020	.021
Boring No.	1 of 2	2 of 2	NA	NA	NA
Depth (ft)	NA	NA	NA	NA	NA
Sample No.	DSF-DM-01	DSF-DM-01	LSH-PB-01	LSH-PB-02	CAD-PB-01
Tare Number	1692	1713	1123	594	611
Wt. of Tare & WS (gm)	492.6	505.5	293.3	264.72	301.57
Wt. of Tare & DS (gm)	340.38	337.89	247.05	112.86	248.17
Wt. of Tare (gm)	82.8	83.27	85.43	81.09	83.19
Wt. of Water (gm)	152.22	167.61	46.25	151.86	53.4
Wt. of DS (gm)	257.58	254.62	161.62	31.77	164.98
Water Content (%)	**59.1**	**65.8**	**28.6**	**478.0**	**32.4**

Lab ID	.022	.023	.024	.025	.026
Boring No.	NA	NA	NA	NA	NA
Depth (ft)	NA	NA	NA	NA	NA
Sample No.	CAN-PB-02	DSD-PB-01	DSD-PB-02	DSE-PB-01	DSE-PB-01
Tare Number	556	1705	626	1704	1716
Wt. of Tare & WS (gm)	296.65	427	305.11	295.52	261.5
Wt. of Tare & DS (gm)	257.78	400.29	262.54	262.31	220.12
Wt. of Tare (gm)	81.87	83.43	85.83	84.5	83.54
Wt. of Water (gm)	38.87	26.71	42.57	33.21	41.38
Wt. of DS (gm)	175.91	316.86	176.71	177.81	136.58
Water Content (%)	**22.1**	**8.4**	**24.1**	**18.7**	**30.3**

Notes : *NA*

Tested By *DA/JP* *Date* *8/10/00* *Checked By* LB *Date* 8-21-00

DCN: CT-S1 DATE 6-30-98 REVISION: 2

C:\MY DOCUMENTS\PrintQ\[k145.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

82

Geotechnics

MOISTURE CONTENT

ASTM D 2216 (SOP-S1)

Client	IT GROUP
Client Reference	AMCHITKA ISLAND
Project No.	00220-01

Lab ID	.027	.028	.029	.030	.031
Boring No.	NA	NA	NA	NA	NA
Depth (ft)	NA	NA	NA	NA	NA
Sample No.	MILE8-BA-01	MILE8-BA-02	MILE8-BA-03	DSD-BA-01	DSD-BA-02
Tare Number	582	700	601	579	608
Wt. of Tare & WS (gm)	444.4	372.6	481.6	437.4	412.3
Wt. of Tare & DS (gm)	406.1	325.71	431	360.69	342.72
Wt. of Tare (gm)	84.25	75.94	86.09	83.97	82.12
Wt. of Water (gm)	38.3	46.89	50.6	76.71	69.58
Wt. of DS (gm)	321.85	249.77	344.91	276.72	260.6
Water Content (%)	**11.9**	**18.8**	**14.7**	**27.7**	**26.7**

Lab ID	.032	.033	.034	.035	.036
Boring No.	NA	NA	NA	NA	NA
Depth (ft)	NA	NA	NA	NA	NA
Sample No.	DSE-BA-01	MM2-BA-01	MM2-BA-02	MM2-BA-03	LSH-DM
Tare Number	676	728	590	561	578
Wt. of Tare & WS (gm)	461.9	362.95	414.6	521.6	530.9
Wt. of Tare & DS (gm)	396.55	332.83	387.2	480.2	246.6
Wt. of Tare (gm)	74.48	86.61	82.1	86.46	84.49
Wt. of Water (gm)	65.35	30.12	27.4	41.4	284.3
Wt. of DS (gm)	322.07	246.22	305.1	393.74	162.11
Water Content (%)	**20.3**	**12.2**	**9.0**	**10.5**	**175.4**

Notes : *NA*

Tested By *DA/JP* *Date* *8/10/00* *Checked By* LB *Date* 8-21-00

DCN: CT-S1 DATE 6-30-98 REVISION: 2

C:\My Documents\PrintQ\lk146.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

83

Geotechnics

UNIT WEIGHT

(SOP - S37)

Client	IT GROUP
Client Reference	AMCHITKA ISLAND
Project No.	00220-01

MOISTURE CONTENT

Lab ID	.001	.002	.004	.005
Boring No.	1 of 2	2 of 2	1 of 2	2 of 2
Depth	NA	NA	NA	NA
Sample No.	LSH-DM-01	LSH-DM-01	CAN-DM-01	CAN-DM-01
Tare Number	573	1126	1710	1724
Wt. Tare & WS(gm.)	386.86	383.53	321.84	227.08
Wt. Tare & DS(gm.)	184.87	211.28	164.84	128.01
Wt. Tare(gm.)	82.66	85.09	82.63	83.06
Moisture Content(%)	197.62	136.50	190.97	220.40
Wet Unit Weight (gms./cc)	1.27	1.36	1.29	1.25

Tested By *DA* Date *8/15/00* Checked By UB Date 8-21-00

DCN: CT-S37A DATE:8-03-99 REVISION: Original

C:\MY DOCUMENTS\PrintQA\[M6.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

84

Geotechnics

UNIT WEIGHT

(SOP - S37)

Client	IT GROUP
Client Reference	AMCHITKA ISLAND
Project No.	00220-01

MOISTURE CONTENT

Lab ID	.007	.008	.010	.011
Boring No.	1 of 2	2 of 2	1 of 2	2 of 2
Depth	NA	NA	NA	NA
Sample No.	CAN-DM-02	CAN-DM-02	DSD-DM-01	DSD-DM-01
Tare Number	586	ZY	558	606
Wt. Tare & WS(gm.)	247.54	249.22	260.47	262.46
Wt. Tare & DS(gm.)	144.87	145.64	169.22	169.86
Wt. Tare(gm.)	82.58	85.54	81.56	85.65
Moisture Content(%)	164.83	172.35	104.10	109.96
Wet Unit Weight (gms./cc)	1.35	1.31	1.45	1.43

Tested By *DA/JP* Date *8/16/00* Checked By VB Date 8-21-00

DCN: CT-S37A DATE:8-03-99 REVISION: Original

C:\MY DOCUMENTS\PrintQ\[m7.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

85

Geotechnics

UNIT WEIGHT

(SOP - S37)

Client	IT GROUP
Client Reference	AMCHITKA ISLAND
Project No.	00220-01

MOISTURE CONTENT

Lab ID	.013	.014	.016	.017
Boring No.	1 of 2	2 of 2	1 of 2	2 of 2
Depth	NA	NA	NA	NA
Sample No.	DSE-DM-01	DSE-DM-01	DSF-DM-01	DSF-DM-01
Tare Number	555	1741	1722	1701
Wt. Tare & WS(gm.)	272.39	236.83	277.13	261.08
Wt. Tare & DS(gm.)	194.71	162.38	212.48	190.16
Wt. Tare(gm.)	82.17	83.50	81.67	81.26
Moisture Content(%)	69.02	94.38	49.42	65.12
Wet Unit Weight (gms./cc)	1.62	1.45	1.72	1.61

Tested By *DA* Date *8/16/00* Checked By UB Date 8-21-00

DCN: CT-S37A DATE:8-03-99 REVISION: Original

C:\MY DOCUMENTS\Print0\[m35.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

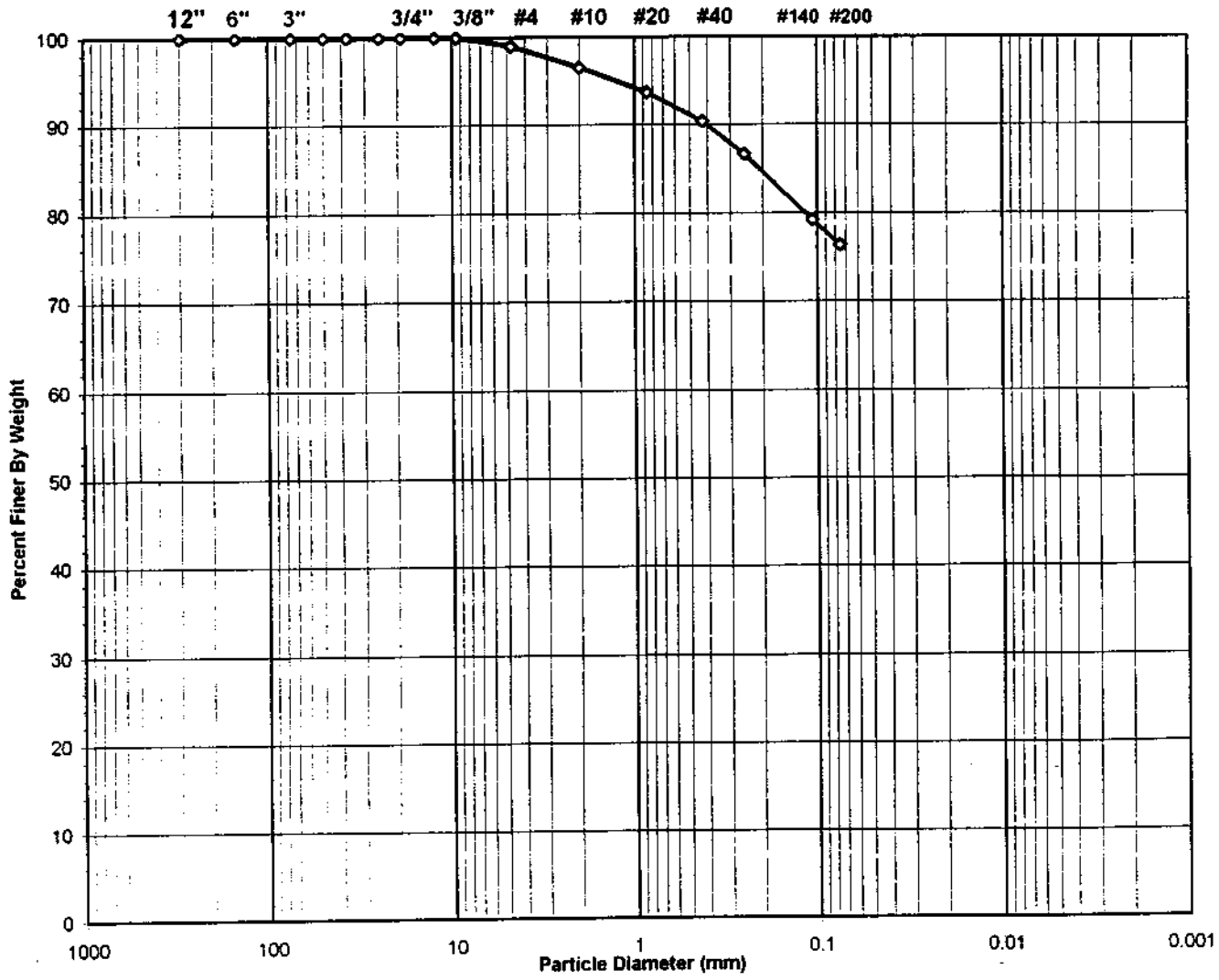
86

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	LSH-DM-01
Lab ID	00220-01.003	Soil Color	GRAY

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***CH, TESTED***

USCS Classification ***FAT CLAY WITH SAND***

Tested By JP Date 8/18/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\PrintQ\C83.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

87

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	LSH-DM-01
Lab ID	00220-01.003	Soil Color	GRAY

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2353	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	613.40	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	296.67	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	100.53	Weight of Tare (gm)	NA
Weight of Water (gm)	316.73	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	196.14	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**161.5**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	196.14
Dry Weight - 3/4" Sample (gm)	46.4	Weight of minus #200 material (gm)	149.73
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	46.41
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	2.02	1.03	1.03	98.97	**98.97**
#10	2.00	4.74	2.42	3.45	96.55	**96.55**
#20	0.850	5.62	2.87	6.31	93.69	**93.69**
#40	0.425	6.55	3.34	9.65	90.35	**90.35**
#60	0.250	7.24	3.69	13.34	86.66	**86.66**
#140	0.106	14.63	7.46	20.80	79.20	**79.20**
#200	0.075	5.61	2.86	23.66	76.34	**76.34**
Pan	-	149.73	76.34	100.00	-	-

Tested By JP Date 8/18/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\Print\QC\C83.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

3 POINT ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	LSH-DM-01
Lab ID	00220-01.003	Soil Description	**GRAY FAT CLAY**

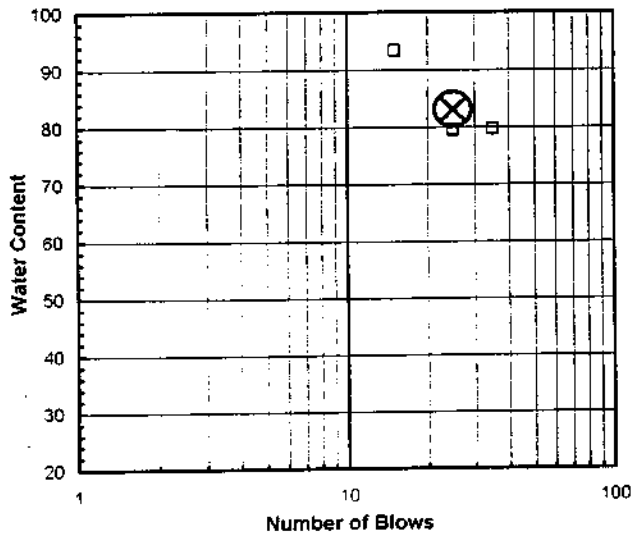
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

Liquid Limit Test	1	2	3	MULTIPOINT
Tare Number	69	87A	72	
Wt. of Tare & WS (gm)	40.00	37.37	41.07	
Wt. of Tare & DS (gm)	30.07	27.22	29.89	
Wt. of Tare (gm)	17.60	14.44	17.91	
Wt. of Water (gm)	9.9	10.2	11.2	
Wt. of DS (gm)	12.5	12.8	12.0	
Moisture Content (%)	**79.6**	**79.4**	**93.3**	
Number of Blows	**35**	**25**	**15**	

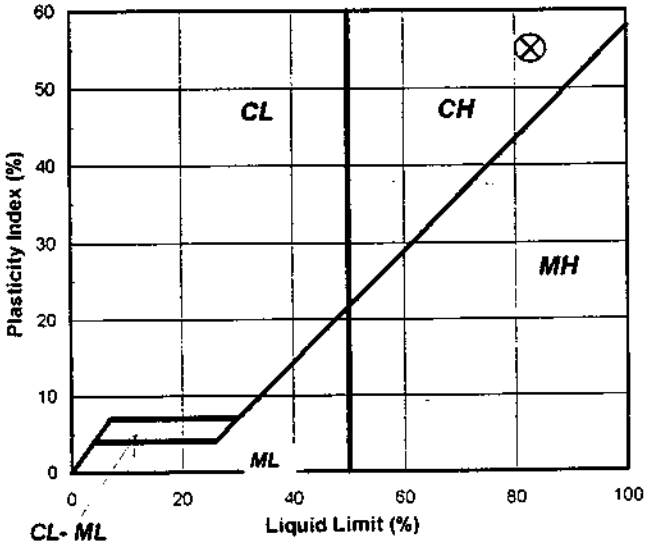
Plastic Limit Test	1	2	3
Tare Number	2052	163	166
Wt. of Tare & WS (gm)	22.38	21.37	24.90
Wt. of Tare & DS (gm)	21.04	20.04	23.43
Wt. of Tare (gm)	16.26	15.22	18.08
Wt. of Water (gm)	1.3	1.3	1.5
Wt. of DS (gm)	4.8	4.8	5.4
Moisture Content (%)	**28.0**	**27.6**	**27.5**

Test Results	
Liquid Limit (%)	**83**
Plastic Limit (%)	**28**
Plasticity Index (%)	**55**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



Tested By DA *Date* 8/22/00 *Checked By* JMO *Date* 8/23/00

C:\MSOFFICE\EXCEL\PrintQ\[C53.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

89

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	LSH-DM-01
Lab ID	00220-01.003	Visual Description	**GRAY CLAY**
			(Minus No.4 sieve material, airdried)

Replicate Number	1	2
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	714.7	707.2
Temperature, T (°Celsius)	28.3	28.5
Weight of Pycnometer + Water (gm)	679.61	671.76
Tare Number	2486	522
Weight of Tare + Dry Soil (gm)	158.22	155.44
Weight of Tare (gm)	100.46	97.54
Weight of Dry Soil (gm)	57.76	57.90
Specific Gravity of Soil @ T	2.548	2.578
Specific Gravity of Water @ T	0.9962	0.9961
Conversion Factor for Temperature T	0.9979	0.9979
Specific Gravity @ 20° Celsius	2.554	2.583

Average Specific Gravity @ 20° Celsius	2.57

Tested By DA *Date* 8/22/00 *Checked By* JMO *Date* 8/23/00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

90

Geotechnics

MARSH FUNNEL VISCOSITY

EPA SLP No. I-02

CLIENT	IT GROUP
CLIENT PROJECT	AMCHITKA ISLAND
PROJECT No.	00220-01
SAMPLE No.	LSH-DM-01
LAB I.D.	00220-01.003

ADMIXTURE	NA
WATER	NA
CONCENTRATION (gm/l):	NA
HYDRATION TIME	NA
MARSH CONE (sec):	Too thick, no reading after 5 minutes.
SLURRY DENSITY (pcf):	NA
pH:	NA
TEMPERATURE:	NA

NOTES:

Tested By DA DATE: 8/15/00 Checked By: LB Date: 8-21-00

DCN: MARSH Date: 8/17/00 Rev: 1

C:\MY DOCUMENTS\PrintQ\[K196.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

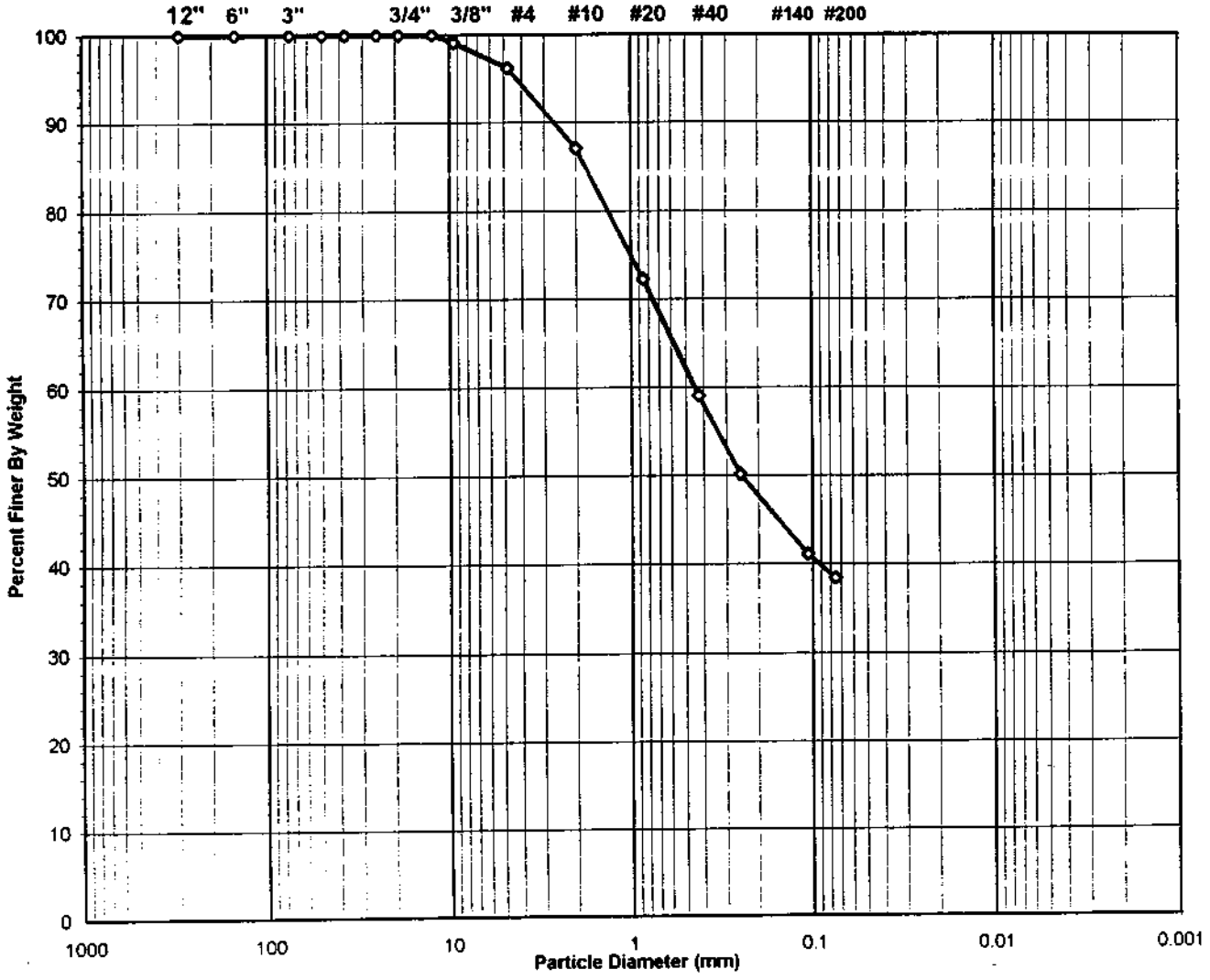
91

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-DM-01
Lab ID	00220-01.006	Soil Color	GRAY

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***SC, TESTED***

USCS Classification ***CLAYEY SAND***

Tested By JP Date 8/18/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\PrintQ\[C84.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

92

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-DM-01
Lab ID	00220-01.006	Soil Color	**GRAY**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	865	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	737.40	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	303.43	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	101.99	Weight of Tare (gm)	NA
Weight of Water (gm)	433.97	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	201.44	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**215.4**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	201.44
Dry Weight - 3/4" Sample (gm)	124.0	Weight of minus #200 material (gm)	77.42
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	124.02
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated **Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	1.80	0.89	0.89	99.11	**99.11**
#4	4.75	5.88	2.92	3.81	96.19	**96.19**
#10	2.00	18.50	9.18	13.00	87.00	**87.00**
#20	0.850	29.68	14.73	27.73	72.27	**72.27**
#40	0.425	26.60	13.20	40.94	59.06	**59.06**
#60	0.250	18.04	8.96	49.89	50.11	**50.11**
#140	0.106	18.13	9.00	58.89	41.11	**41.11**
#200	0.075	5.39	2.68	61.57	38.43	**38.43**
Pan	-	77.42	38.43	100.00	-	-

Tested By JP Date 8/18/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\Printout\C84.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

93

Geotechnics

3 POINT ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-DM-01
Lab ID	00220-01.006	Soil Description	**GRAY FAT CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

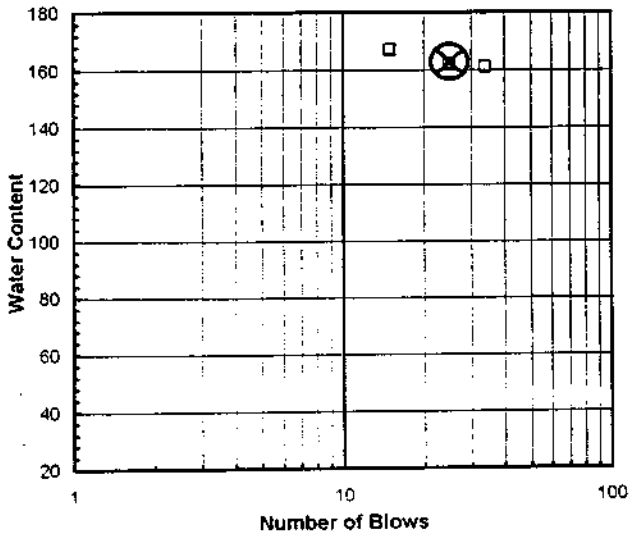
(Minus No. 40 sieve material, Airdried)

Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	2274	97	O	U
Wt. of Tare & WS (gm)	42.48	38.69	43.02	L
Wt. of Tare & DS (gm)	29.42	25.39	28.72	T
Wt. of Tare (gm)	21.31	17.19	20.15	I
Wt. of Water (gm)	13.1	13.3	14.3	P
Wt. of DS (gm)	8.1	8.2	8.6	O
				I
Moisture Content (%)	**161.0**	**162.2**	**166.9**	N
Number of Blows	**34**	**25**	**15**	T

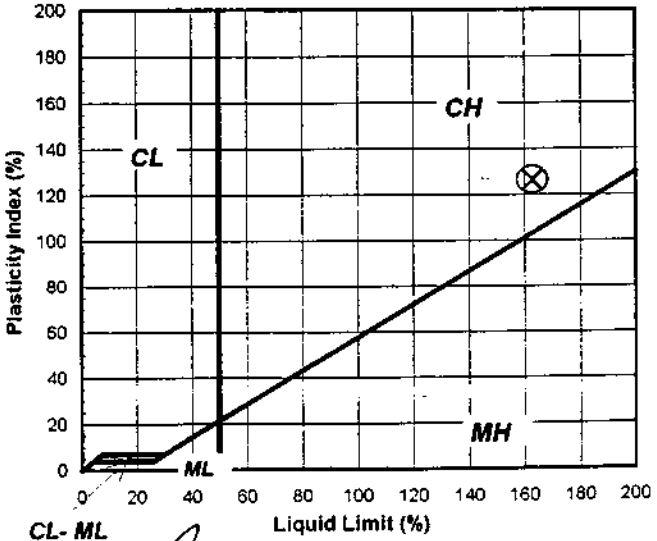
Plastic Limit Test	**1**	**2**	**3**
Tare Number	120	2295	2063
Wt. of Tare & WS (gm)	24.97	28.36	20.09
Wt. of Tare & DS (gm)	23.20	26.77	18.24
Wt. of Tare (gm)	18.46	22.45	13.36
Wt. of Water (gm)	1.8	1.6	1.9
Wt. of DS (gm)	4.7	4.3	4.9
Moisture Content (%)	**37.3**	**36.8**	**37.9**

Test Results	
Liquid Limit (%)	**163**
Plastic Limit (%)	**37**
Plasticity Index (%)	**126**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



Tested By DA *Date* 8/21/00 *Checked By* Jm *Date* 9-23-00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

94

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-DM-01
Lab ID	00220-01.006	Visual Description	**GRAY SLUDGE**
			(MInus No.4 sieve material, airdried)

Replicate Number	1	2
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	698.1	690
Temperature, T (°Celsius)	28.8	28.9
Weight of Pycnometer + Water (gm)	679.53	671.70
Tare Number	1684	2347
Weight of Tare + Dry Soil (gm)	137.86	129.67
Weight of Tare (gm)	106.79	98.98
Weight of Dry Soil (gm)	31.07	30.69
Specific Gravity of Soil @ T	2.485	2.476
Specific Gravity of Water @ T	0.9960	0.9960
Conversion Factor for Temperature T	0.9978	0.9978
Specific Gravity @ 20° Celsius	2.491	2.482

Average Specific Gravity @ 20° Celsius	2.49

Tested By DA *Date* 8/24/00 *Checked By* JMO *Date* 8/25/00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

95

Geotechnics

MARSH FUNNEL VISCOSITY

EPA SLP No. I-02

CLIENT	IT GROUP
CLIENT PROJECT	AMCHITKA ISLAND
PROJECT No.	00220-01
SAMPLE No.	CAN-DM-01
LAB I.D.	00220-01.006

ADMIXTURE	NA
WATER	NA
CONCENTRATION (gm/l):	NA
HYDRATION TIME	NA
MARSH CONE (sec):	Too thick to flow.
SLURRY DENSITY (pcf):	NA
pH:	NA
TEMPERATURE:	NA

NOTES:

Tested By DA DATE: 8/15/00 Checked By: LB Date: 8-21-00

DCN: MARSH Date: 8/17/00 Rev: 1

C:\MY DOCUMENTS\PrintQ\[k197.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

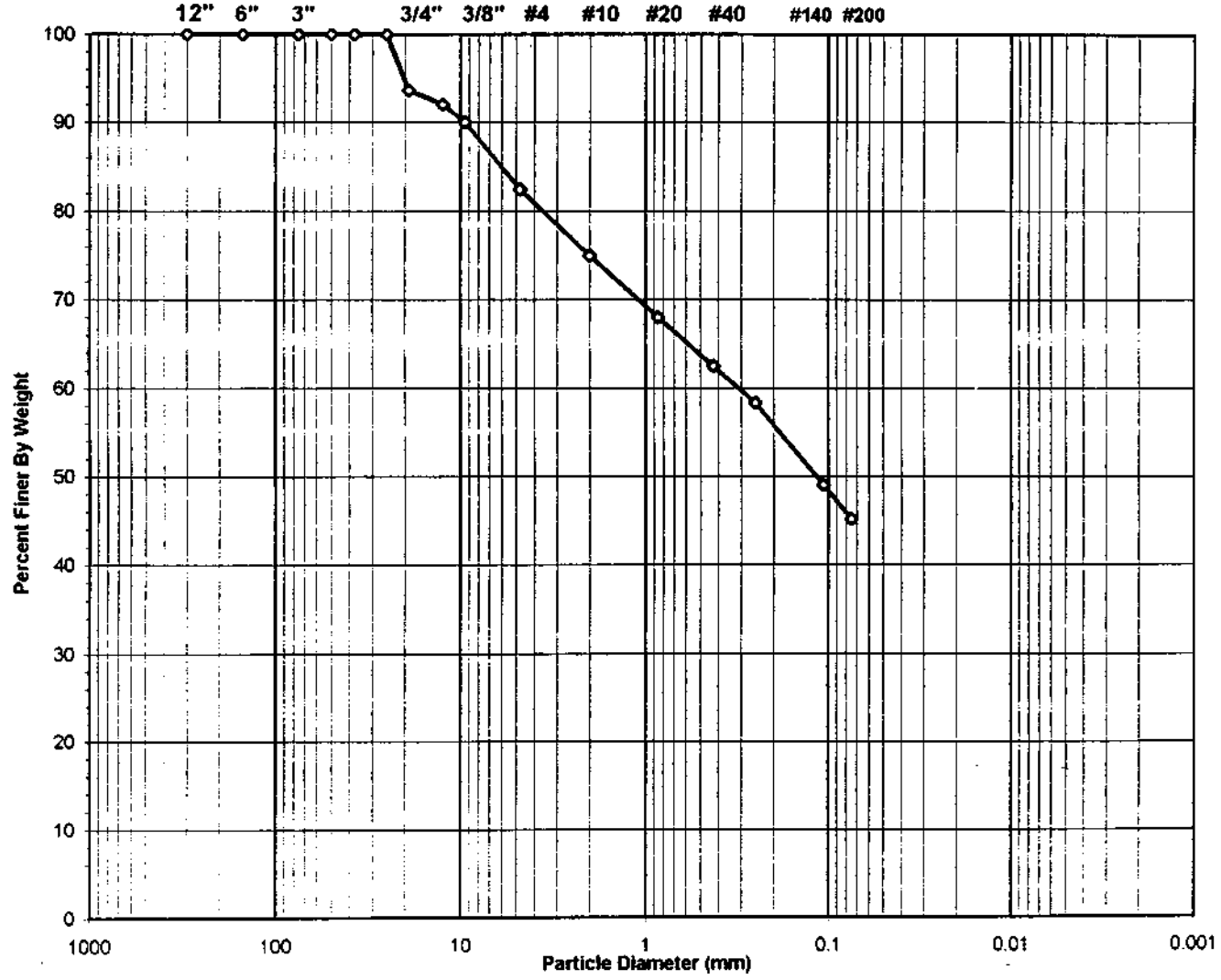
96

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-DM-02
Lab ID	00220-01.009	Soil Color	GRAY

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol *SC, TESTED*

USCS Classification *CLAYEY SAND WITH GRAVEL*

Tested By JP Date 8/18/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\Print\[C85.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

97

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-DM-02
Lab ID	00220-01.009	Soil Color	**GRAY**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2486	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	792.00	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	357.90	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	100.58	Weight of Tare (gm)	NA
Weight of Water (gm)	434.10	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	257.32	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**168.7**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	257.32
Dry Weight - 3/4" Sample (gm)	124.7	Weight of minus #200 material (gm)	116.19
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	141.13
Dry Weight + 3/4" Sample (gm)	16.45		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	16.45	6.39	6.39	93.61	**93.61**
1/2"	12.50	4.10	1.59	7.99	92.01	**92.01**
3/8"	9.50	5.16	2.01	9.99	90.01	**90.01**
#4	4.75	19.52	7.59	17.58	82.42	**82.42**
#10	2.00	19.16	7.45	25.02	74.98	**74.98**
#20	0.850	17.96	6.98	32.00	68.00	**68.00**
#40	0.425	14.07	5.47	37.47	62.53	**62.53**
#60	0.250	10.91	4.24	41.71	58.29	**58.29**
#140	0.106	23.93	9.30	51.01	48.99	**48.99**
#200	0.075	9.87	3.84	54.85	45.15	**45.15**
Pan	-	116.19	45.15	100.00	-	-

Tested By JP Date 8/18/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\PrintQ\[C85.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

98

Geotechnics

3 POINT ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-DM-02
Lab ID	00220-01.009	Soil Description	**GRAY FAT CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

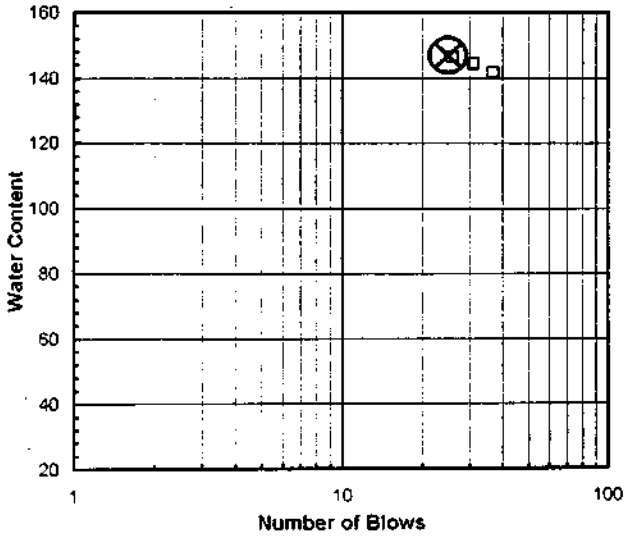
Liquid Limit Test	**1**	**2**	**3**
Tare Number	2322	209	80
Wt. of Tare & WS (gm)	37.30	39.74	41.10
Wt. of Tare & DS (gm)	24.94	26.56	26.56
Wt. of Tare (gm)	16.22	17.43	16.63
Wt. of Water (gm)	12.4	13.2	14.5
Wt. of DS (gm)	8.7	9.1	9.9
Moisture Content (%)	**141.7**	**144.4**	**146.4**
Number of Blows	**37**	**31**	**26**

MULTIPOINT

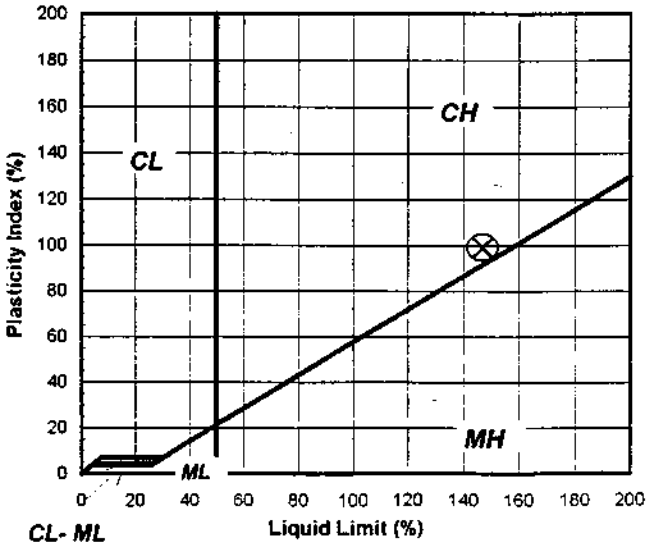
Plastic Limit Test	**1**	**2**	**3**
Tare Number	114	106	31
Wt. of Tare & WS (gm)	21.12	21.67	23.40
Wt. of Tare & DS (gm)	19.07	19.50	21.35
Wt. of Tare (gm)	14.85	15.15	16.99
Wt. of Water (gm)	2.1	2.2	2.1
Wt. of DS (gm)	4.2	4.4	4.4
Moisture Content (%)	**48.6**	**49.9**	**47.0**

Test Results	
Liquid Limit (%)	**147**
Plastic Limit (%)	**48**
Plasticity Index (%)	**99**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



CL- ML

Tested By LB *Date* 8/21/00 *Checked By* JMO *Date* 8/23/00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

99

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	CAN-DM-02
Lab ID	00220-01.009	Visual Description	**GRAY SLUDGE**
			(Minus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	705.5	698.5
Temperature, T (°Celsius)	25.2	25.2
Weight of Pycnometer + Water (gm)	680.03	672.21
Tare Number	865	1624
Weight of Tare + Dry Soil (gm)	144.28	142.63
Weight of Tare (gm)	102.16	99.79
Weight of Dry Soil (gm)	42.12	42.84
Specific Gravity of Soil @ T	2.530	2.588
Specific Gravity of Water @ T	0.9970	0.9970
Conversion Factor for Temperature T	0.9988	0.9988
Specific Gravity @ 20° Celsius	2.533	2.591

Average Specific Gravity @ 20° Celsius	2.56

Tested By DA *Date* 8/22/00 *Checked By* JMO *Date* 8/23/00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

100

Geotechnics

MARSH FUNNEL VISCOSITY

EPA SLP No. I-02

CLIENT	IT GROUP
CLIENT PROJECT	AMCHITKA ISLAND
PROJECT No.	00220-01
SAMPLE No.	CAN-DM-02
LAB I.D.	00220-01.009

ADMIXTURE	NA
WATER	NA
CONCENTRATION (gm/l):	NA
HYDRATION TIME	NA
MARSH CONE (sec):	Too thick to flow.
SLURRY DENSITY (pcf):	NA
pH:	NA
TEMPERATURE:	NA

NOTES:

Tested By JP DATE: 8/17/00 Checked By: VB Date: 8-21-00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

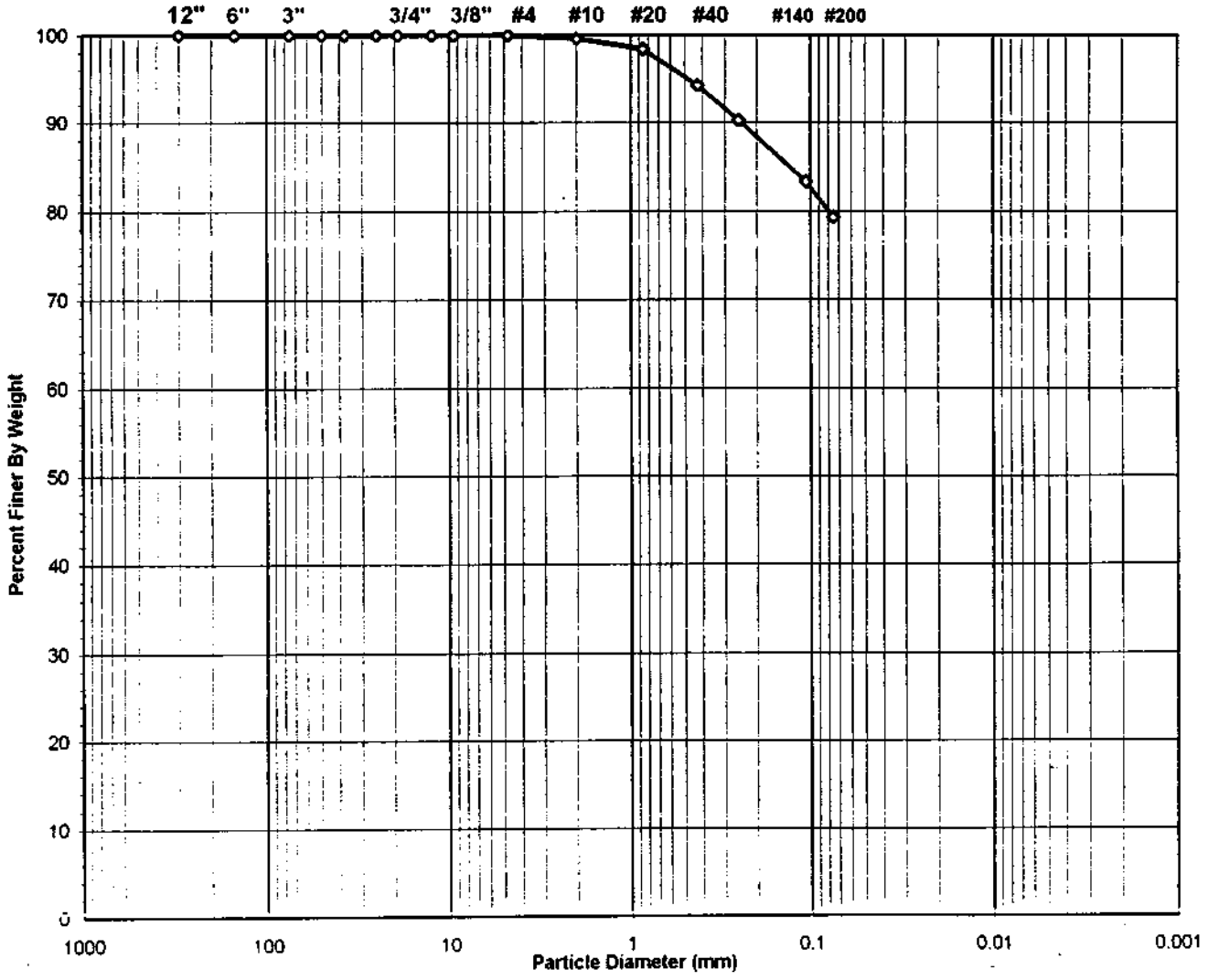
101

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-DM-01
Lab ID	00220-01.012	Soil Color	**GRAY**

	SIEVE ANALYSIS		*HYDROMETER*
USCS	gravel	sand	silt and clay



USCS Symbol ***CH, TESTED***

USCS Classification ***FAT CLAY WITH SAND***

Tested By JP Date 8/18/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\PrintQ\[C86.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

102

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-DM-01
Lab ID	00220-01.012	Soil Color	**GRAY**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1221	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	746.00	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	415.90	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	101.41	Weight of Tare (gm)	NA
Weight of Water (gm)	330.10	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	314.49	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**105.0**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	314.49
Dry Weight - 3/4" Sample (gm)	65.0	Weight of minus #200 material (gm)	249.47
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	65.02
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated **Percent Finer** (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	1.29	0.41	0.41	99.59	**99.59**
#20	0.850	3.82	1.21	1.62	98.38	**98.38**
#40	0.425	12.95	4.12	5.74	94.26	**94.26**
#60	0.250	12.47	3.97	9.71	90.29	**90.29**
#140	0.106	21.82	6.94	16.65	83.35	**83.35**
#200	0.075	12.67	4.03	20.67	79.33	**79.33**
Pan	-	249.47	79.33	100.00	-	-

Tested By JP Date 8/18/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\PrintQ\C86.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

103

Geotechnics

3 POINT ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-DM-01
Lab ID	00220-01.012	Soil Description	**GRAY FAT CLAY**

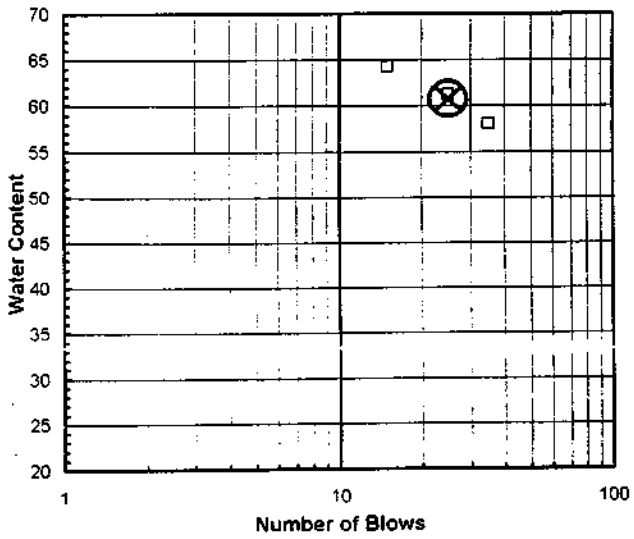
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	2232	190	165	**U**
Wt. of Tare & WS (gm)	43.38	41.66	37.76	**L**
Wt. of Tare & DS (gm)	33.85	31.96	28.32	**T**
Wt. of Tare (gm)	17.44	16.12	13.63	**I**
Wt. of Water (gm)	9.5	9.7	9.4	**P**
Wt. of DS (gm)	16.4	15.8	14.7	**O**
				I
Moisture Content (%)	**58.1**	**61.2**	**64.3**	**N**
Number of Blows	**35**	**25**	**15**	**T**

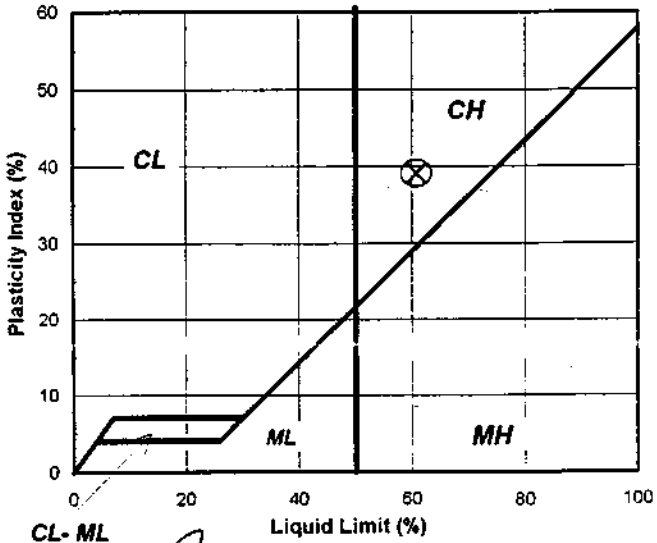
Plastic Limit Test	**1**	**2**	**3**
Tare Number	122	197	2306
Wt. of Tare & WS (gm)	23.63	24.20	22.64
Wt. of Tare & DS (gm)	22.53	23.11	21.38
Wt. of Tare (gm)	17.59	18.14	15.84
Wt. of Water (gm)	1.1	1.1	1.3
Wt. of DS (gm)	4.9	5.0	5.5
Moisture Content (%)	**22.3**	**21.9**	**22.7**

Test Results	
Liquid Limit (%)	**61**
Plastic Limit (%)	**22**
Plasticity Index (%)	**39**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



CL- ML

Tested By DA *Date* 8/21/00 *Checked By* Jm *Date* 8·23·00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

104

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSD-DM-01
Lab ID	00220-01.012	Visual Description	**GRAY CLAY**
			(Minus No.4 sieve material, airdried)

Replicate Number	1	2
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	710.7	704.5
Temperature, T (°Celsius)	27.8	27.9
Weight of Pycnometer + Water (gm)	679.68	671.85
Tare Number	2353	1667
Weight of Tare + Dry Soil (gm)	151.5	148.23
Weight of Tare (gm)	100.57	95.41
Weight of Dry Soil (gm)	50.93	52.82
Specific Gravity of Soil @ T	2.558	2.619
Specific Gravity of Water @ T	0.9963	0.9963
Conversion Factor for Temperature T	0.9981	0.9981
Specific Gravity @ 20° Celsius	2.563	2.624

Average Specific Gravity @ 20° Celsius	2.59

Tested By DA *Date* 8/22/00 *Checked By* JMO *Date* 8/23/00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

105

Geotechnics

MARSH FUNNEL VISCOSITY

EPA SLP No. I-02

CLIENT	IT GROUP
CLIENT PROJECT	AMCHITKA ISLAND
PROJECT No.	00220-01
SAMPLE No.	DSD-DM-01
LAB I.D.	00220-01.012

ADMIXTURE	NA
WATER	NA
CONCENTRATION (gm/l):	NA
HYDRATION TIME	NA
MARSH CONE (sec):	5 Min. 700 cc, 24 oz.
SLURRY DENSITY (pcf):	NA
pH:	NA
TEMPERATURE:	NA

NOTES:

Tested By JP/DA DATE: 8/16/00 Checked By: VB Date: 8-21-00

DCN: MARSH Date: 8/17/00 Rev: 1

C:\MY DOCUMENTS\PrintQ\[M51.xls]Sheet1

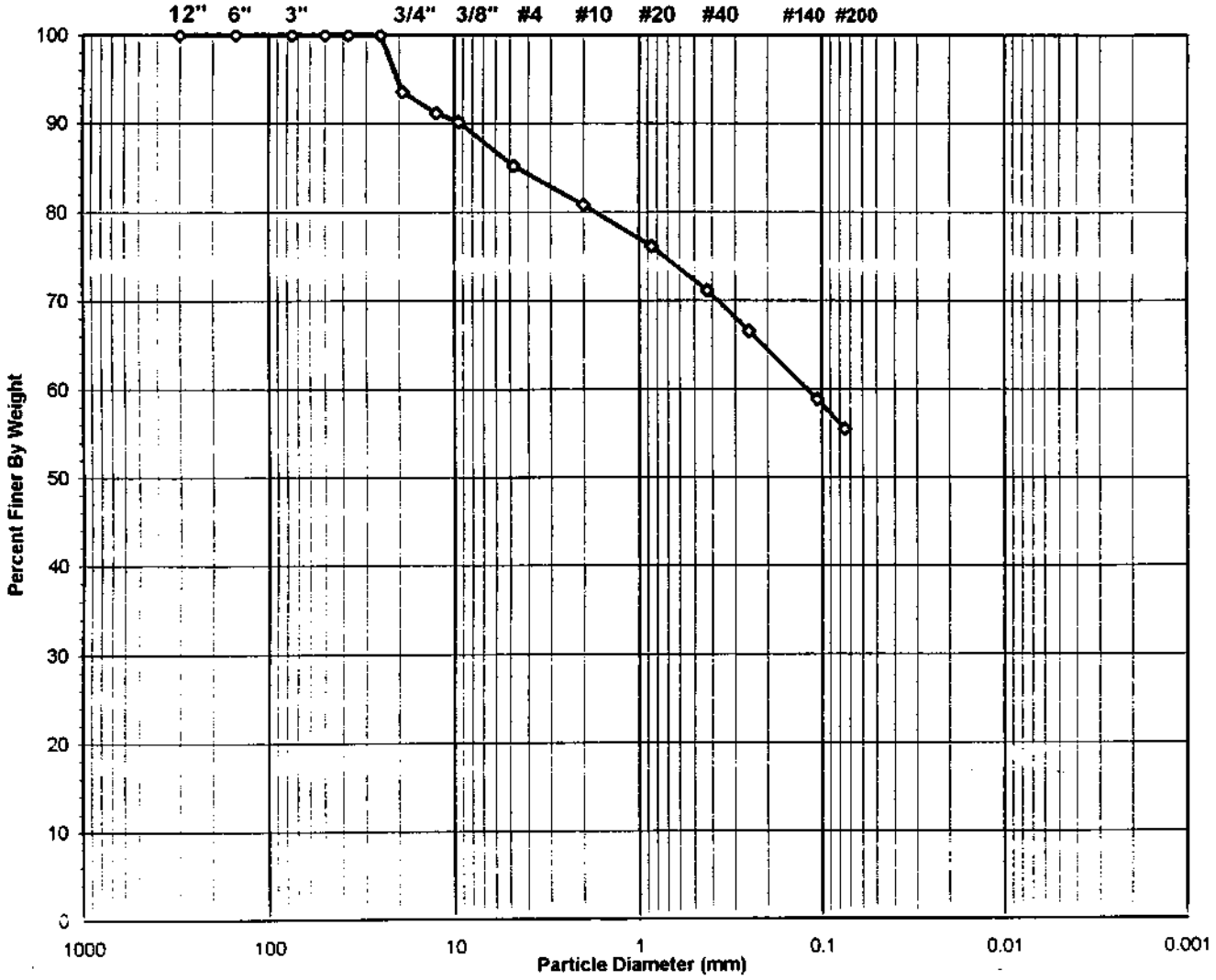
106

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-DM-01
Lab ID	00220-01.015	Soil Color	GRAY

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol ***CH, TESTED***

USCS Classification ***SANDY FAT CLAY***

Tested By JP Date 8/18/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

\MSOFFICE\EXCEL\PrintQ\[C87.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-DM-01
Lab ID	00220-01.015	Soil Color	GRAY

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	1667	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	831.10	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	494.20	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	95.09	Weight of Tare (gm)	NA
Weight of Water (gm)	336.90	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	399.11	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**84.4**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	399.11
Dry Weight - 3/4" Sample (gm)	151.6	Weight of minus #200 material (gm)	221.68
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	177.43
Dry Weight + 3/4" Sample (gm)	25.86		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	25.86	6.48	6.48	93.52	**93.52**
1/2"	12.50	9.33	2.34	8.82	91.18	**91.18**
3/8"	9.50	4.14	1.04	9.85	90.15	**90.15**
#4	4.75	19.89	4.98	14.84	85.16	**85.16**
#10	2.00	17.34	4.34	19.18	80.82	**80.82**
#20	0.850	18.75	4.70	23.88	76.12	**76.12**
#40	0.425	19.92	4.99	28.87	71.13	**71.13**
#60	0.250	18.13	4.54	33.41	66.59	**66.59**
#140	0.106	30.81	7.72	41.13	58.87	**58.87**
#200	0.075	13.26	3.32	44.46	55.54	**55.54**
Pan	-	221.68	55.54	100.00	-	-

Tested By JP Date 8/18/00 Checked By Date 8/24/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\Print\0\C87.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

108

Geotechnics

3 POINT ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-DM-01
Lab ID	00220-01.015	Soil Description	**GRAY FAT CLAY**

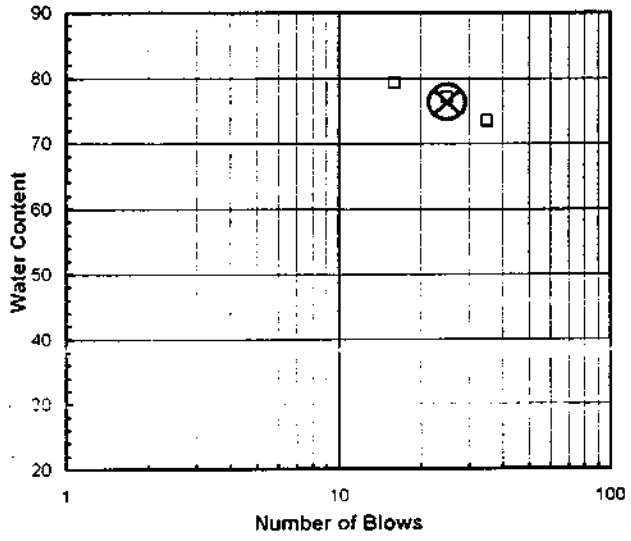
Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number	54	207	187	**U**
Wt. of Tare & WS (gm)	38.61	39.11	41.78	**L**
Wt. of Tare & DS (gm)	29.25	29.63	32.02	**T**
Wt. of Tare (gm)	16.52	17.34	19.71	**I**
Wt. of Water (gm)	9.4	9.5	9.8	**P**
Wt. of DS (gm)	12.7	12.3	12.3	**O**
				I
Moisture Content (%)	**73.5**	**77.1**	**79.3**	**N**
Number of Blows	**35**	**25**	**16**	**T**

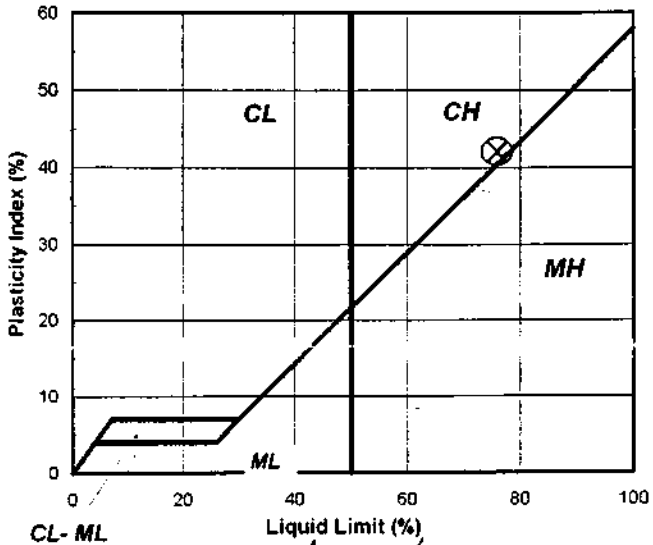
Plastic Limit Test	**1**	**2**	**3**
Tare Number	2314	157	2288
Wt. of Tare & WS (gm)	24.57	22.91	26.10
Wt. of Tare & DS (gm)	22.96	21.23	24.41
Wt. of Tare (gm)	18.24	16.26	19.36
Wt. of Water (gm)	1.6	1.7	1.7
Wt. of DS (gm)	4.7	5.0	5.1
Moisture Content (%)	**34.1**	**33.8**	**33.5**

Test Results	
Liquid Limit (%)	**76**
Plastic Limit (%)	**34**
Plasticity Index (%)	**42**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



Tested By DA *Date* 8/23/00 *Checked By* *Date* 8/24/00

page 1 of 1 DCN: CT-S4B DATE: 10/20/98 REVISION: ORIGINAL

C:\MSOFFICE\EXCEL\PrintQ\[C73.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

109

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSE-DM-01
Lab ID	00220-01.015	Visual Description	**GRAY SLUDGE**
			(Minus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	721.3	712.9
Temperature, T (°Celsius)	28.4	28.7
Weight of Pycnometer + Water (gm)	679.59	671.73
Tare Number	2455	2351
Weight of Tare + Dry Soil (gm)	164.82	165.18
Weight of Tare (gm)	96.72	98.38
Weight of Dry Soil (gm)	68.10	66.80
Specific Gravity of Soil @ T	2.580	2.606
Specific Gravity of Water @ T	0.9961	0.9961
Conversion Factor for Temperature T	0.9979	0.9978
Specific Gravity @ 20° Celsius	2.586	2.612

Average Specific Gravity @ 20° Celsius	2.60

Tested By DA *Date* 8/22/00 *Checked By* JMO *Date* 8/23/00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

110

Geotechnics

MARSH FUNNEL VISCOSITY

EPA SLP No. I-02

CLIENT	IT GROUP
CLIENT PROJECT	AMCHITKA ISLAND
PROJECT No.	00220-01
SAMPLE No.	DSE-DM-01
LAB I.D.	00220-01.015

ADMIXTURE	NA
WATER	NA
CONCENTRATION (gm/l):	NA
HYDRATION TIME	NA
MARSH CONE (sec):	Too thick to flow.
SLURRY DENSITY (pcf):	NA
pH:	NA
TEMPERATURE:	NA

NOTES:

Tested By DA DATE: 8/16/00 Checked By: LB Date: 8-21-00

DCN: MARSH Date: 8/17/00 Rev: 1

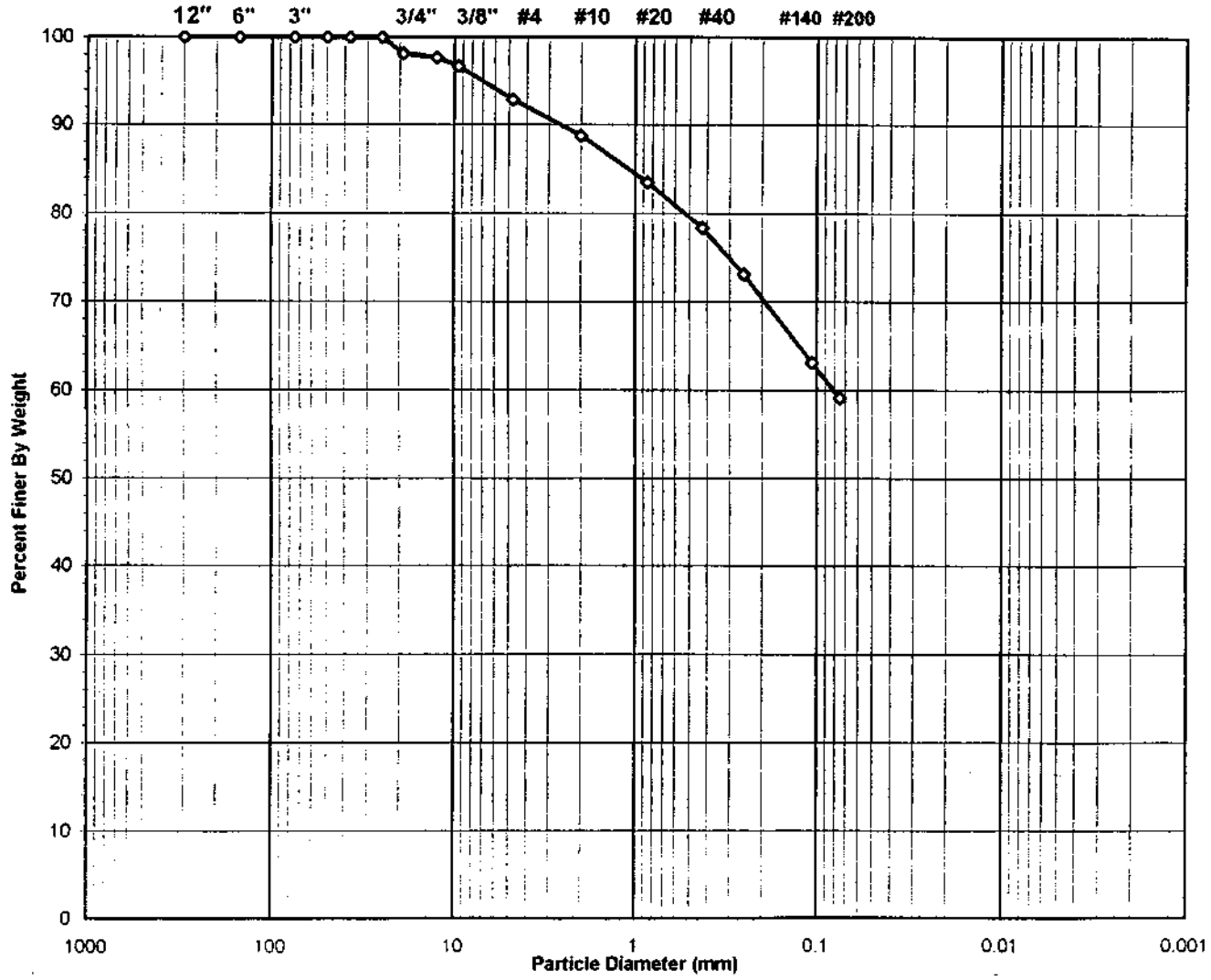
C:\MY DOCUMENTS\PrintQ\[M50.xls]Sheet1

Geotechnics

SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSF-DM-01
Lab ID	00220-01.018	Soil Color	GRAY

USCS	SIEVE ANALYSIS		HYDROMETER
	gravel	sand	silt and clay



USCS Symbol *MH, TESTED*

USCS Classification *SANDY ELASTIC SILT*

Tested By DA Date 8/24/00 Checked By JMO Date 8/25/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\PrintQ\C95.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

112

Geotechnics

WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSF-DM-01
Lab ID	00220-01.018	Soil Color	**GRAY**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	2450	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	797.60	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	542.00	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	100.54	Weight of Tare (gm)	NA
Weight of Water (gm)	255.60	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	441.46	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**57.9**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	441.46
Dry Weight - 3/4" Sample (gm)	172.3	Weight of minus #200 material (gm)	260.96
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	180.50
Dry Weight + 3/4" Sample (gm)	8.21		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	8.21	1.86	1.86	98.14	**98.14**
1/2"	12.50	1.93	0.44	2.30	97.70	**97.70**
3/8"	9.50	4.66	1.06	3.35	96.65	**96.65**
#4	4.75	16.47	3.73	7.08	92.92	**92.92**
#10	2.00	18.33	4.15	11.24	88.76	**88.76**
#20	0.850	23.13	5.24	16.47	83.53	**83.53**
#40	0.425	22.77	5.16	21.63	78.37	**78.37**
#60	0.250	23.21	5.26	26.89	73.11	**73.11**
#140	0.106	44.25	10.02	36.91	63.09	**63.09**
#200	0.075	17.54	3.97	40.89	59.11	**59.11**
Pan	-	260.96	59.11	100.00	-	-

Tested By DA Date 8/24/00 Checked By JHO Date 8/25/00

DCN: CT-S3A DATE 6-25-98 REVISION: 2

C:\MSOFFICE\EXCEL\PrintQ\C95.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

113

Geotechnics

3 POINT ATTERBERG LIMIT

ASTM D 4318-96 (SOP - S4)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSF-DM-01
Lab ID	00220-01.018	Soil Description	**GRAY ELASTIC SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

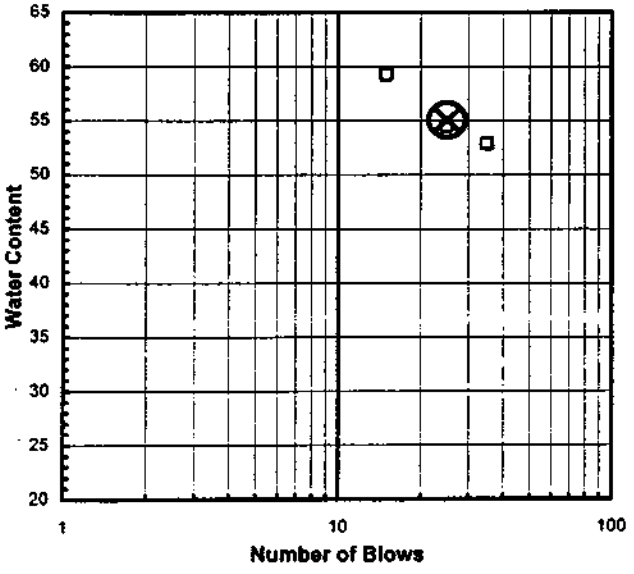
Liquid Limit Test	**1**	**2**	**3**
Tare Number	131	179	87
Wt. of Tare & WS (gm)	43.58	44.33	38.30
Wt. of Tare & DS (gm)	35.03	35.26	29.43
Wt. of Tare (gm)	18.86	18.62	14.46
Wt. of Water (gm)	8.6	9.1	8.9
Wt. of DS (gm)	16.2	16.6	15.0
Moisture Content (%)	**52.9**	**54.5**	**59.3**
Number of Blows	**35**	**25**	**15**

MOISTURE

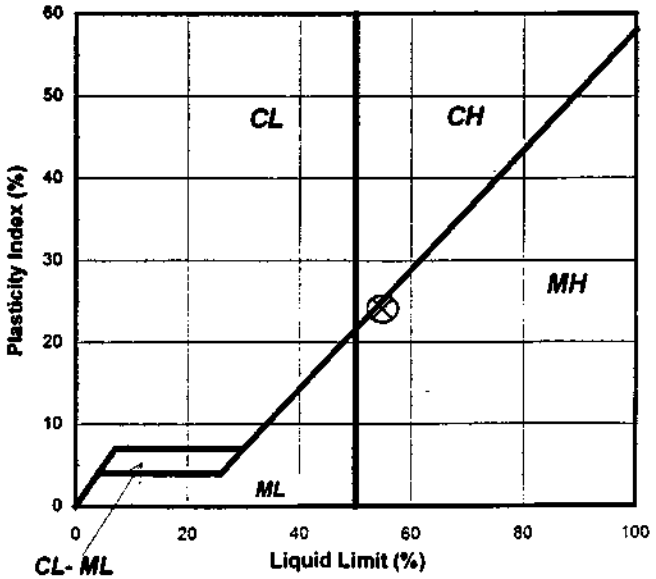
Plastic Limit Test	**1**	**2**	**3**
Tare Number	177	1882	194
Wt. of Tare & WS (gm)	22.07	25.84	23.00
Wt. of Tare & DS (gm)	20.56	24.27	21.50
Wt. of Tare (gm)	15.83	19.25	16.68
Wt. of Water (gm)	1.5	1.6	1.5
Wt. of DS (gm)	4.7	5.0	4.8
Moisture Content (%)	**31.9**	**31.3**	**31.1**

Test Results	
Liquid Limit (%)	**55**
Plastic Limit (%)	**31**
Plasticity Index (%)	**24**
USCS Symbol	**MH**

Flow Curve



Plasticity Chart



Tested By DA *Date* 8/17/00 *Checked By* VB *Date* 8-18-00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

114

Geotechnics

SPECIFIC GRAVITY

ASTM D 854-92 (SOP - S5)

Client	IT GROUP	Boring No.	NA
Client Reference	AMCHITKA ISLAND	Depth (ft)	NA
Project No.	00220-01	Sample No.	DSF-DM-01
Lab ID	00220-01.018	Visual Description	**GRAY SLUDGE**
			(Minus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	G 673	G 674
Weight of Pycnometer + Soil + Water (gm)	725.7	718.3
Temperature, T (°Celsius)	27.8	27.7
Weight of Pycnometer + Water (gm)	679.68	671.88
Tare Number	2325	1663
Weight of Tare + Dry Soil (gm)	176.1	173.38
Weight of Tare (gm)	101.65	98.7
Weight of Dry Soil (gm)	74.45	74.68
Specific Gravity of Soil @ T	2.619	2.643
Specific Gravity of Water @ T	0.9963	0.9963
Conversion Factor for Temperature T	0.9981	0.9981
Specific Gravity @ 20° Celsius	2.624	2.648

Average Specific Gravity @ 20° Celsius	2.64

Tested By DA *Date* 8/21/00 *Checked By* JMO *Date* 8/23/00

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999

Geotechnics

MARSH FUNNEL VISCOSITY

EPA SLP No. I-02

CLIENT	IT GROUP
CLIENT PROJECT	AMCHITKA ISLAND
PROJECT No.	00220-01
SAMPLE No.	DSF-DM-01
LAB I.D.	00220-01.018

ADMIXTURE	NA
WATER	NA
CONCENTRATION (gm/l):	NA
HYDRATION TIME	NA
MARSH CONE (sec):	Too thick to flow.
SLURRY DENSITY (pcf):	NA
pH:	NA
TEMPERATURE:	NA

NOTES:

Tested By DA DATE: 8/17/00 Checked By: IB Date: 8-21-00

DCN: MARSH Date: 8/17/00 Rev: 1 C:\MY DOCUMENTS\PrintO\[M48.xls]Sheet1

Distribution

	Copies
Monica Sanchez Environmental Restoration Division DOE/Nevada Operations Office P.O. Box 98518, M/S 505 Las Vegas, NV 89193-8518	1 (Controlled)
Michael Giblin Environmental Restoration Division DOE/Nevada Operations Office P.O. Box 98518, M/S 505 Las Vegas, NV 89193-8518	1 (Controlled)
David Stahl, P.E. IT Corporation P.O. Box 93838 Las Vegas, NV 89193-3838	1 (Controlled)
Sabrina D. Lawrence Environmental Restoration Division DOE/Nevada Operations Office P.O. Box 98518, M/S 505 Las Vegas, NV 89193-8518	1 (Controlled)
Paul J. Gretsky IT Corporation P.O. Box 93838 Las Vegas, NV 89193-3838	1 (Controlled)
Bryan Cherry IT Corporation P.O. Box 93838 Las Vegas, NV 89193-3838	1 (Controlled)
Gary Matthews 4701 Business Pk. Blvd., Suite 36 Anchorage, AK 99503-7166	1 (Controlled)

U.S. Department of Energy — 1 (Uncontrolled)
Technical Information Resource Center
DOE/Nevada Operations Office
P.O. Box 98518, M/S 505
Las Vegas, NV 89193-8518

U.S. Department of Energy — 1 (Uncontrolled)
Office of Scientific and Technical Information
175 Oak Ridge Turnpike
P.O. Box 62
Oak Ridge, TN 37831

Mark Ader — 1 (Uncontrolled)
EPA Region X
Office of Environmental Cleanup
1200 Sixth Avenue
Seattle, WA 98101

Claire Caldes — 1 (Uncontrolled)
U.S. Fish and Wildlife Service
Alaska Maritime National Wildlife Refuge
2355 Kachemak Bay Drive, Suite 101
Homer, AK 99603

Jeff Brownlee — 1 (Uncontrolled)
Alaska Department of Environmental Conservation
555 Cordova Street, 2nd Floor
Anchorage, AK 99501

U.S. Department of Energy — 1 (Uncontrolled)
Nevada Operations Office
Public Reading Facility
P.O. Box 98521
Las Vegas, NV 89193-8521

IT Corporation — 1 (Uncontrolled)
Central Files