### **INSTALLATION RESTORATION PROGRAM**

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This report has been prepared for the National Guard Bureau, Andrews Air Force Base, Maryland by the Hazardous Materials Technical Center for the purpose of aiding in the implementation of the Air Force Installation Restoration Program.

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### INSTALLATION RESTORATION PROGRAM PRELIMINARY ASSESSMENT

FOR

144th FIGHTER INTERCEPTOR WING CALIFORNIA AIR NATIONAL GUARD FRESNO AIR TERMINAL FRESNO, CALIFORNIA

April 1988

Prepared for

National Guard Bureau Andrews Air Force Base, Maryland 20331

Prepared by

The Hazardous Materials Technical Center The Dynamac Building 11140 Rockville Pike Rockville, Maryland 20852

Contract No. DLA 900-82-C-4426

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### EXECUTIVE SUMMARY

### A. INTRODUCTION

The Hazardous Materials Technical Center (HMTC) was retained in October 1987 to conduct the Installation Restoration Program (IRP) Preliminary Assessment (PA) of the 144th Fighter Interceptor Wing (FIW), California Air National Guard, Fresno Air Terminal, Fresno, California (hereinafter referred to as the Base), under Contract No. DLA 900-82-C-4426. The Preliminary Assessment included:

- o an onsite Base visit, including interviews with 16 past and present Base personnel conducted by HMTC personnel during 20-22 October 1987;
- o the acquisition and analysis of pertinent information and records on hazardous material use and hazardous waste generation and disposal at the Base;
- o the acquisition and analysis of available geologic, hydrologic, meteorologic, and environmental data from pertinent Federal, State, and local agencies; and
- o the identification of sites on the Base that are potentially contaminated with hazardous material/hazardous waste (HM/HW).

### B. MAJOR FINDINGS

Past Base operations involved the use and disposal of material and waste that subsequently were categorized as hazardous. The major operations of the Base that have used and disposed of these materials and wastes include aircraft maintenance; aerospace ground equipment maintenance; ground vehicle maintenance; and petroleum, oil, and lubricant (POL) management and distribution. The operations involve such activities as corrosion control, nondestructive inspection, fuel cell maintenance, and engine maintenance. Waste oils, recovered fuels, spent cleaners, paint removers, thinners, strippers, and cleaning solvents were generated by these activities. Interviews with 16 past and present Base personnel and a field survey resulted in the identification of three potential disposal and/or spill sites at the Base. The three sites are potentially contaminated with HM/HW and were assigned a Hazard Assessment Score (HAS) according to the U.S. Air Force Hazard Assessment Rating Methodology (HARM). The three potentially contaminated sites are as follows:

### Site No. 1 - Old Fire Training Area (HAS-60)

From the late 1950s to early 1970s, the Base used this fire training area (FTA), which is located south of Runway 29R in the eastern portion of the airport. Substances, including JP-4, AVGAS, and used oils from several Base shops were used in periodic fire training exercises. It is estimated that approximately 500 to 1,000 gallons of flammable material was used per month throughout the FTA's history. The FTA was used primarily by the Base.

### Site No. 2 - Base POL Area (HAS-50)

Since 1958, this site has been used as a Base POL area. Although there was no visual evidence of contamination, in the past, there has been periodic JP-4 spills during tank refueling. It was also mentioned, that in 1978, a 500 gallon JP-4 spill had occurred during refueling.

### Site No. 3 - Storage Area at Marine Corps Sub-Leased Area (HAS-50)

During the site survey, a noticeable stain was visible adjacent to a fenceline surrounding a Marine Corps Storage Area. The stain was thought to be waste POL product which had leaked from stored 55-gallon drums. It is estimated that less than 100 gallons of material had discharged onto the surrounding ground. This area is currently being occupied by the U.S. Marine Corps and is a tenant of the ANG unit.

### C. CONCLUSIONS

Information obtained through interviews with past and present Base personnel resulted in the identification of three areas on the Base that are potentially contamianted with HM/HW. Evidence from the three identified sites suggests that they may be contaminated, and that the potential for contaminant migration exists. All three of the sites were assigned a HAS according to HARM.

### D. RECOMMENDATIONS

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Because of the potential for contamination of soils, groundwater and surface water at the Base, and migration of contaminants, further IRP investigation at each of the scored sites is recommended in accordance with applicable regulations.

### I. INTRODUCTION

### A. Background

The California Air National Guard (ANG) at Fresno Air Terminal, Fresno County, Fresno, California (hereinafter referred to as the Base), supports the 144th Fighter Interceptor Wing (FIW). The unit was established in 1955. Past operations at the Base involved the use and disposal of materials and wastes that subsequently were categorized as hazardous. Consequently, the National Guard Bureau (NGB) has implemented an Installation Restoration Program (IRP), which consists of the following:

- Preliminary Assessment (PA) to identify past spill or disposal sites posing a potential and/or actual hazard to public health or the environment.
- o Site Investigation/Remedial Investigation/Feasibility Study (SI/RI/FS) to acquire data via field studies for the confirmation and quantification of environmental contamination that may have an adverse impact on public health or the environment, and to select a remedial action through preparation of a feasibility study.
- o Research, Development, and Demonstration (RD & D) if needed, to develop new technology for accomplishment of remediation.
- o Remedial Design/Remedial Action (RD/RA) to prepare designs and specifications and to implement remedial action.

B. Purpose

The purpose of this IRP Preliminary Assessment is to identify and evaluate suspected problems associated with past hazardous waste handling procedures, disposal sites, and spill sites on the Base. Personnel from the Hazardous Materials Technical Center (HMTC) visited the Base, reviewed existing environmental information, analyzed the Base records concerning the use and generation of hazardous material/hazardous waste (HM/HW), and conducted interviews with past and present personnel of the Base who are familiar with past HM/HW management activities. A physical inspection was made of the suspected sites. Relevant information collected and analyzed included the Base

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history, with special emphasis on the history of the shop operations and their past HM/HW management procedures; local geological, hydrological, and meteorological conditions that could affect migration of contaminants; local land use, public utilities, and zoning requirements that affect the potential for exposure to contaminants; and the ecological settings that indicate environmentally sensitive habitats or evidence of environmental stress.

### C. Scope

The scope of this Preliminary Assessment is limited to the Base and includes

- o An onsite visit;
- The acquisition of pertinent information and records on hazardous material use and hazardous waste generation and disposal practices at the Base;
- The acquisition of available geologic, hydrologic, meteorologic, landuse and zoning, critical habitat, and utility data from various Federal, California State, and local agencies;
- o A review and analysis of all information obtained; and
- o The preparation of a report to include recommendations for further actions.

The onsite visit, and interviews with past and present personnel were conducted during the period 20-22 October 1987. The HMTC Preliminary Assessment was conducted by Mr. Raymond G. Clark, Jr., Department Manager/P.E.; Mr. Mark Johnson, Program Manager; Mr. Jeffrey D. Fletcher, Geologist; Ms. Janet Emry, Hydrogeologist; and Ms. Jacqueline Crenca, Environmental Engineer (Resumes are included as Appendix A). Individuals who assisted in the Preliminary Assessment were SMSgt. James L. Craig, Jr. (ANGSC/SG) and selected members of the 144th FIW. The Base Point of Contact (POC) was 2nd Lieutenant Bjorn A. Brinkman, Environmental Engineer (144th FIW/DEE).

### D. Methodology

A flow chart of the Preliminary Assessment Methodology is presented in Figure 1. This methodology ensures a comprehensive collection and review of pertinent site-specific information and is used in the identification and assessment of potentially contaminated hazardous waste spill/disposal sites.

The Preliminary Assessment began with a site visit to the Base to identify all shop operations or activities on the Base that may have used hazardous material or generated hazardous waste. Next, an evaluation of past and present HM/HW handling procedures at the identified locations was made to determine whether environmental contamination may have occurred. The evaluation of past HM/HW handling practices was facilitated by extensive interviews with 16 past and present employees familiar with the various operating procedures at the Base. These interviews also defined the areas on the Base where waste materials, either intentionally or inadvertently, may have been used, spilled, stored, disposed of, or released into the environment.

Historical records contained in the Base files were collected and reviewed to supplement the information obtained from interviews. Using this information, a list of past waste spill/disposal sites on the Base is identified for further evaluation. A general survey tour of the identified spill/disposal sites, the Base, and the surrounding area is conducted to determine the presence of visible contamination and to help assess the potential for contaminant migration. Particular attention is given to locating nearby drainage ditches, surface water bodies, residences, and wells.

Detailed geological, hydrological, meteorological, development (land use and zoning), and environmental data for the area of study was also obtained from the POC, or from appropriate Federal, State, and local agencies. A list of outside agencies contacted is in Appendix B. Following a detailed analysis of all the information obtained, areas are identified as suspect areas where HM/HW



disposal may have occurred. Where sufficient information is available sites are assigned a Hazard Assessment Score (HAS) using the U.S. Air Force Hazard Assessment Rating Methodology (HARM) (Appendix C). However, the absence of a HAS does not negate a recommendation for further IRP investigation, but rather indicates a lack of data. The HAS is computed from the data included in the Factor Rating Criteria (Appendix D).

### II. INSTALLATION DESCRIPTION

### A. Location

The 144th FIW is based at the Fresno Air Terminal, Fresno County, Fresno, California. The 144th FIW provides air defense protection to central California.

The Base occupies a total of approximately 140 acres on three separate land parcels at the Fresno Air Terminal. One of these land parcels, located in the northern portion of the airport is currently being occupied by the U.S. Marine Corps and is a tenant of the ANG unit. Figure 2 shows the current boundaries of the Base covered by this Preliminary Assessment.

Fresno Air Terminal is located in the San Joaquin Valley within the corporate boundaries of Fresno, in Fresno County, California. Property north, west, and south of the airport is predominately residential and industrial. East of the airport is primarily agricultural land. Further to the north is the city of Clovis and more agricultural land.

### B. History

In 1955, the 144th FIW moved to the Fresno Air Terminal from Hayward, California. Prior to this move, the airport was used as an air base by the Army Air Corps. The mission of the 144th was, and still is, to recruit, administer, and train personnel and maintain combat-ready equipment for short notice mobilization.

The first mission aircraft used by the 144th was the F-51D and F-51H. Later, conversion were made to the F-86A, the F-86L, the F-102, the F-106, and currently, the F-4D Phantom. The 144th currently maintains 24 F-4Ds, 4 T-33s, and a C-131D.

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### III. ENVIRONMENTAL SETTING

### A. Meteorology

The meteorological information presented below is from local climatological data for the Fresno, California area compiled by the National Oceanic and At-mospheric Administration (NOAA). The climate of Fresno is dry and mild in winter and hot in summer. Nearly nine-tenths of the annual precipitation falls in the 6 months from November to April.

Due to clear skies during the summer and the protection of the San Joaquin Valley from marine effect, the normal daily maximum temperature reaches the high 90s during the latter part of July. The daily maximum temperature during the warmest month has ranged from 76 to 115 degrees. Low relative humidities and some wind movement substantially lower the sensible temperature during periods of high readings. Winds flow with the major axis of the San Joaquin Valley, generally from the northwest.

Although the heaviest rains recorded at Fresno for short periods have occurred in June, usually any rainfall during the summer is very light. Snow is a rare occurrence in Fresno.

The Fresno area has an average annual precipitation of 9.87 inches, based on the period from 1957 to 1986 (NOAA, 1987). By calculating net precipitation according to the method outlined in the <u>Federal Register</u> (47 FR 31224, 16 July 1982), a net precipitation value of -41.13 inches per year is obtained. Rainfall intensity based on 1-year frequency, 24-hour duration rainfall is .75 inches (calculated according to 47 FR 31235, 16 July 1982, Figure 8).

### B. Geology

The Fresno Air Terminal is located within the Great Valley of California geomorphic province, approximately 25 miles west of the Sierra Nevada Mountain Range. The Great Valley consists of predominately alluvial plains and fans. Area sediments were deposited by intermittent streams which overflowed their banks and moved back and forth across the region.

Surficial sediments at the Base are part of a compound alluvial fan complex, characterized by predominately poorly sorted, fine-grained silt, sand, and gravel, with local clay lenses. These unconsolidated deposits, which extended to depths of 1,000 feet or more, were deposited during the Tertiary and Cretaceous Periods. Underlying the unconsolidated surficial deposits are continental and marine sedimentary rocks deposited during the Cretaceous and Tertiary Periods. These consolidated deposits consist primarily of sandstone, siltstone, and shale.

Below the consolidated marine sedimentary rocks is the basement complex which consists of granitic Igneous rocks and compact, highly cemented Metamorphic and Sedimentary rocks (California Regional Water Control Board, 1986).

### C. Hydrology

### Surface Water

All surface drainage from the Fresno Air Terminal is currently collected by a system of ditches and culverts. This drainage system ultimately empties into Mill Ditch, which flows parallel to McKinley Avenue, south of the airport.

Besides Mill Ditch, there are no major surface water bodies located within the vicinity of the Fresno Air Terminal. The city of Fresno derives the majority of its municipal water from the underlying groundwater system.

### Groundwater

Groundwater in the Fresno area occurs in the sand dunes, flood-basin deposits, alluvium, terrace deposits, and continental deposits. The main part of the aquifer is the alluvium and continental deposits and extends from the foothills of Sierra Nevada, westward beyond the Fresno area.

III-2

The Base receives drinking water from a well installed into an unconfined groundwater zone at a depth of 285 feet. However, a groundwater zone is also located at approximately 70 feet in depth.

Groundwater generally flows from high to low areas; at Fresno Air Terminal, the groundwater flows to the southwest.

D. Critical Habitats/Endangered or Threatened Species

According to the Sacramento Endangered Species Office of the U.S. Fish and Wildlife Service, there are no endangered or threatened species of flora or fauna within a 1-mile radius of the Base. Furthermore, there are no critical habitats, wetlands, or wilderness areas within a 1-mile radius of the Base.

### IV. SITE EVALUATION

### A. Activity Review

A review of Base records and interviews with past and present personnel at the Base resulted in the identification of specific operations within each activity in which the majority of industrial chemicals are handled and hazardous wastes are generated. Table 1 summarizes the major operations associated with each activity, provides estimates of the quantities of waste currently being generated by these operations, and describes the past and present disposal practices for the wastes. Based on information gathered, any operation that is not listed in Table 1 has been determined to produce negligible (less than 5 gallons/year) quantities of wastes requiring disposal.

B. Disposal/Spill Site Identification, Evaluation, and Hazard Assessment

Interviews with 16 Base personnel (Appendix B) and subsequent site inspections resulted in the identification of three waste disposal/spill sites. It was determined that all three sites are potentially contaminated with HM/HW, and have a potential for migration; therefore, they should be further evaluated. The three sites were scored using HARM (Appendix D). Figure 3 illustrates the locations of the scored sites. A copy of the completed Hazardous Assessment Rating Form is found in Appendix E. Table 2 summarizes the HAS of each scored site.

### <u>Site No. 1 - Old Fire Training Area</u> (HAS-60)

An old Fire Training Area (FTA) is located in the eastern portion of the Base, just east of the aircraft parking apron. This FTA was used primarily by the Base from the late 1950s to the early 1970s. Used oils and JP-4 were the predominant substances used for fire training exercises, although it is likely that solvent products were also dumped at the site. The old FTA consists of an

SHOP NAME	BUILDING NO.	WASTE MATERIAL	WASTE QUANTITY (GALLONS/YEAR)	1945	METHODS OF TREATMENT, STORAGE AND DISPOSAL 1950 1960 1960 1970 1980 1987
Aircraft Maintenance		Acetone Engine Oil (Recip) Trichloroethane PD-680 Strippers Hydraulic Oil 7808 Oil JP-4 AVGAS	288888888 28888888 -		·
Aerospace Ground Equipment Maintenance (AGE)		Engine Oil Hydraulic Oil Strippers/Thinners JP-4 PD-680 Turbine Oil 7808 Oil Sulfuric Acid	88~88~85		'DRMO/CONTR'DRMO'         'DRMO/CONTR'DRMO'
Vehicle Maintenánce		Engine Oil PD-680 Sulfuric Acid JP-4 Hydraulic Oil Thinners Ethylene Glycol	8885858		·
Hangar Space		JP-4 PD-680 Hydraulic Oil	280		'FTA' '-DRMO-' '-D
Non-Destructive Inspection		Emulsifier Penetrant Trichloroethane	50 25 25		'NEUTR SAN' 'DRMO'-''' 'CONTR'-DRMO-'
Photo Lab		Developer Fixer	83		

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Table 1. Hazardous Material/Hazardous Waste Disposal Summary: Californic Air National Guard, Fresno Air Terminal, Fresno, California

·----NEUTR SAN--------- DRMO---- -------NEUTR SAN----Table I. Hazardous Material/Hazardous Waste Disposal Summary: California Air National Guard, Fresno Air Terminal, Fresno, California (Continued) 1987 --DRMO---- OWNG--DRMO-1 ----. -METHODS OF TREATMENT, STORAGE AND DISPOSAL 1950 1960 1960 1970 1980 MARINE CORPS LEASED LAND 1945 WASTE QUANTITY (GALLONS/YEAR) 9 2,300 28 2 **Transmission Fluid** Lubricating 0il Hydraulic 0il Ethylene Glycol Engine Oi) Sulfuric Acid Sulfuric Acid Brake Fluid Diesel Fuel WASTE MATERIAL Motor Oil Thinner BUILDING ġ Aerospace Ground Equipment Maintenance (AGE) Vehicle Maintenance Battery Shop SHOP NME

CONTR - Disposed of through Hazardous Waste Contractor
Disposed of through the Defense Reutilization and Marketing Office
DRMD - Disposed of through the Defense Reutilization and Marketing Office
FTA - Burned at Fire Training Area
NEUTR SAN - Neutralized and disposed of through sanitary sewer
SNN - Disposed of in drains leading to sanitary sewer
SIL REC - Sent for silver recovery offbase
STORM - Disposed of in drains leading to storm sewer
STORM - Disposed of in drains leading to storm sewer
SPLY - Turned into base supply for recovery



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Table 2.	Site Hazard Assessment Scores (as Derived from HARM):
	California Air National Guard, Fresno Air Terminal,
	Fresno, California

Site Priority	Site No.	Site Description	Receptors	Waste Characteristics	Pathway	Waste Mgmt. Practices	Overall Score
1	I	Old Fire Training Area	58	80	42	1.0	60
2	2	Base POL Area	58	50	42	1.0	50
3	3	Storage Area at Marine Corps Sub-Leased Area	58	50	42	1.0	50

open earth area, approximately 60 feet in diameter, with no containment structures or lining. According to Base personnel, after fire training exercises were discontinued, the site was covered with 3 to 4 feet of fill; thus, no visible contamination was seen during the site survey. It is estimated that approximately 500 to 1,000 gallons per month of flammable substances were used in the exercises. Also, it is assumed that the majority (at least 70 percent) of the flammable materials were destroyed during fire training exercises, leaving approximately 25,500 to 50,900 gallons to either evaporate, run off, or seep into the ground at the site. It should be noted that 70 percent is considered a conservative estimate of the amount of flammables destroyed. Given the large quantities of wastes released at the old FTA, this site was scored using HAS.

### <u>Site No. 2 - Base POL Area</u> (HAS-50)

The Base POL area is located in the western portion of the Base, adjacent Building 117 (POL and refueling vehicle). Since 1958, the Base has maintained POL storage tanks for aircraft refueling. Of the six existing underground tanks at the site, four are 25,000 gallon JP-4 jet fuel tanks which were installed in 1958. The two remaining tanks are 30,000 gallon JP-4 tanks which were installed in 1978. According to Base personnel, in the past, there have been occasional minor spills (less than 100 gallons) of JP-4 during tank refueling. It was also mentioned that in 1978 during a scheduled tank refueling, there was a 500 gallon JP-4 spill. Given the history of small JP-4 spills, the site was scored using HAS to quantify the potential hazard presented by the site.

### <u>Site No. 3 - Storage Area at Marine Corps Sub-Leased Area</u> (HAS-50)

This site is located at the northern edge of the Fresmo Air Terminal within a parcel of land sub-leased by the U.S. Marine Corps. During the site investigations, the HMTC team discovered a POL stain adjacent to a fenceline surrounding a POL storage area. The stained area, which was approximately 12 feet by 1 foot, was apparently the result of dripping 55-gallon POL drums, located within the fenced storage area. It is assumed that less than 100 gallons of POL product was released from the drums. Because visual oil stains provided evidence that hazardous material had been spilled, a HAS was applied to quantify the relative potential hazard posed by this site. An updated hazardous waste storage area is currently under construction by the Marine Corps adjacent to the current storage area.

### V. CONCLUSIONS

Information obtained through interviews with 16 past and present Base personnel, review of Base records, and field observations have resulted in the identification of three potentially contaminated disposal and/or spill sites on Base property. These sites consist of the following:

- o Site No. 1 Old Fire Training Area (HAS-60)
- o Site No. 2 Base POL Area (HAS-50)
- o Site No. 3 Storage Area at Marine Corps Sub-Leased Area (HAS-50)

Each of these sites is potentially contaminated with HM/HW and each exhibit the potential for contaminant migration to groundwater and surface water. Therefore, these sites were assigned as HAS according to HARM.

### VI. RECOMMENDATIONS

Because of the potential for soils, groundwater, and surface water contamination at the Base, initial investigative stages of the IRP are recommended for all of the scored sites identified at the Base. The following recommendations are made to ascertain if soil or groundwater at the three scored sites have been contaminated, and to confirm or refute that contaminants are migrating.

### <u>Site No. 1 - Old Fire Training Area</u>

Further IRP investigation at this site is recommended in accordance with applicable regulations.

### <u>Site No. 2 - Base POL Area</u>

Further IRP investigation at this site is recommended in accordance with applicable regulations.

### <u>Site No. 3 - Storage Area at Marine Corps Sub-Leased Area</u>

Further IRP investigation at this site is recommended in accordance with applicable regulations.

### GLOSSARY OF TERMS

AQUIFER - A geologic formation, or group of formations, that contains sufficient saturated permeable material to conduct groundwater and to yield economically significant quantities of groundwater to wells and springs.

CONTAMINANT - As defined by Section 101(f)(33) of SARA shall include, but not be limited to, any element, substance, compound, or mixture, including diseasecausing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction), or physical deformation in such organisms or their offspring; except that the term "contaminant" shall not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under:

- (a) any substance designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act,
- (b) any element, compound, mixture, solution, or substance designated pursuant to Section 102 of this Act,
- (c) any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress),
- (d) any toxic pollutant listed under Section 307(a) of the Federal Water Pollution Control Act,
- (e) any hazardous air pollutant listed under Section 112 of the Clean Air Act, and
- (f) any imminently hazardous chemical substance or mixture with respect to which the administrator has taken action pursuant to Section 7 of the Toxic Substance Control Act;

and shall not include natural gas, liquified natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas).

CRETACEOUS - The final period of the Mesozoic era (after the Jurassic and before the the Tertiary period of the Cenozoic era) thought to have covered the span of time between 135 and 65 million years ago; also the corresponding system of the rocks.

CRITICAL HABITAT - The native environment of an animal or plant which, due either to the uniqueness of the organism or the sensitivity of the environment, is susceptible to adverse reactions to environmental changes such as may be induced by chemical contaminants.

DOWNGRADIENT - A direction that is hydraulically downslope; the direction in which groundwater flows.

ENDANGERED SPECIES - Any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the secretary to constitute a pest whose protection would present an overwhelming and overriding risk to man.

GROUNDWATER - Refers to the subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated.

HARM - Hazard Assessment Rating Methodology - A system adopted and used by the United States Air Force to develop and maintain a priority listing of potentially contaminated sites on installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts. (Reference: DEQPPM 81-5, 11 December 1981).

HAS - Hazard Assessment Score - The score developed by utilizing the Hazardous Assessment Rating Methodology (HARM).

HAZARDOUS MATERIAL - Any substance or mixture of substances having properties capable of producing adverse effects on the health and safety of the human being. Specific regulatory definitions also found in OSHA and DOT rules.

GL-2

HAZARDOUS WASTE - A solid or liquid waste that, because of its quantity, concentration, or physical, chemical, or infectious characteristics may:

- a. Cause, or significantly contribute to, an increase in mortality or an increase in serious or incapacitating reversible illness; or
- b. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.

MIGRATION (Contaminant) - The movement of contaminants through pathways (groundwater, surface water, soil and air).

PERMEABILITY - The capacity of a porous rock, sediment, or soil for transmitting a fluid without impairment of the structure of the medium; it is a measure of the relative ease of fluid flow under unequal pressure.

SOIL PERMEABILITY - The characteristic of the soil that enables water to move downward through the profile. Permeability is measured as to the number of inches per hour that water moves downward through the saturated soil.

Terms describing permeability are:

Very Slow	- less than 0.06 inches per hour (less than 4.2 x $10^{-5}$ cm/sec)
Slow	- 0.06 to 0.20 inches per hour (4.2 x $10^{-5}$ to 1.4 x $10^{-4}$ cm/sec)
Moderately Slow	- 0.2 to 0.6 inches per hour (1.4 x $10^{-4}$ cm/sec)
Moderate	- 0.6 to 2.0 inches per hour (4.2 x $10^{-4}$ x $10^{-3}$ cm/sec)
Moderately Rapid	- 2.0 to 6.0 inches per hour (1.4 x $10^{-3}$ to 4.2 x $10^{-3}$ cm/sec)
Rapid	- 6.0 to 20 inches per hour (4.2 x $10^{-3}$ to 1.4 x $10^{-2}$ cm/sec)
Very Rapid	<pre>- more than 20 inches per hour (more than 1.4 x 10<sup>-2</sup> cm/sec)</pre>
	(Reference: U.S.D.A. Soil Survey)

GL-3

SURFACE WATER - All water exposed at the ground surfaces including streams, rivers, ponds, and lakes.

TERTIARY - The first period of the Cenozoic era (after the Cretaceous of the Mesozoic era and before the Quaternary), thought to have covered the span of time between 65 and two to three million years ago.

THREATENED SPECIES - Any species which is likely to become an endangered species within the forseeable future throughout all or a significant portion of its range.

TOPOGRAPHY - The general conformation of a land surface, including its relief and the position of its natural and manmade features.

UPGRADIENT - A direction that is hydraulically upslope.

WATER TABLE - As used in this report, the water table is the surface below which all the openings or voids in the ground are filled with water. It is the surface at which water stands in shallow wells, or would stand if a well were drilled.

WETLANDS - An area subject to permanent or prolonged inundation or saturation that exhibits plant communities adapted to this environment.

WILDERNESS AREA - An area unaffected by anthropogenic activities and deemed worthy of special attention to maintain its natural condition.

GL-4

### BIBLIOGRAPHY

- 1. <u>Aquifer Determination Pursuant to G 1424(e) of the Safe Drinking Water Act</u>, Fresno County, California, EPA Region IX, January 1977.
- 2. California Air National Guard, <u>On Base Disaster Preparedness Map</u>, Fresno California, November, 1986.
- 3. California Regional Water Quality Control Board, Fresno, California, <u>Hydrological and Geological Reports of the Fresno, California Area.</u>
- 4. National Oil and Hazardous Substances Contingency Plan, <u>Federal Register</u> (47 FR 31235), July 16, 1982.
- 5. National Oil and Hazardous Substances Contingency Plan, <u>Federal Register</u> (47 FR 31235), July 16, 1982.
- 6. United States Geological Survey, Clovis Quadrangle, California, 7.5 Minute Series (Topographic), 1981.

APPENDIX A

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1

Resumes of Preliminary Assessment Team Members

### RAYMOND G. CLARK, JR.

### EDUCATION

Completed graduate engineering courses, George Washington University, 1957 B.S., mechanical engineering, University of Maryland, 1949

### SPECIALIZED TRAINING

Grad. European Command Military Assistance School, Stuttgart, 1969

Grad. Army Psychological Warfare School, Fort Bragg, 1963

Grad. Sanz School of Languages, D.C., 1963

Grad. DOD Military Assistance Institute, Arlington, 1963

Grad. Defense Procurement Management Course, Fort Lee, 1960

Grad. Engineer Officer's Advanced Course, Fort Belvoir, 1958

### CERTIFICATIONS

Registered Professional Engineer: Kentucky (#4341); Virginia (#8303); Florida (#36228)

### EXPERIENCE

Twenty-nine years of experience in engineering design, planning and management including construction and construction management, environmental, operations and maintenance, repair and utilities, research and development, electrical, mechanical, master planning and city management. Over six years' logistical experience including planning and programming of military assistance materiel and training for foreign countries, serving as liaison with American private industry, and directing materiel storage activities in an overseas area. Over two years' experience as an engineering instructor. Extensive experience in personnel management, cost reduction programs, and systems improvement.

### EMPLOYMENT

### Dynamac Corporation (1986-present): Program Manager

Responsible for activities relating to Phases I, II and IV of the U.S. Air Force Installation Restoration Program including records search, review and evaluation of previous studies; preparation of statements of work, feasibility studies; preparation of remedial action plans, designs and specifications; review of said studies/plans to ensure that they are in conformance with requirements; review of environmental studies and reports; and preparation of Air Force Installation Restoration Program Management Guidance.

### Howard Needles Tammen & Bergendoff (HNTB) (1981-1986): Manager

Responsible, as Project Manager, for: design of a new concourse complex at Miami International Airport to include terminal building, roadway system, aircraft apron, drainage channel relocation, satellite building with underground pedestrian tunnel, and associated underground utility corridors, to include subsurface aircraft fueling systems, with an estimated construction cost of \$163 million; a cargo vehicle tunnel under the crosswind runway with an estimated construction cost of \$15 million; design and construction of two large corporate jet aircraft hangars; and for the hydrocarbon recovery program to include investigation, analysis, design of recovery systems, monitoring of recovery systems, and planning and design of residual recovery systems utilizing biodegradation. Participated, as sub-consultant, in Air Force IRP seminar.

### HNTB (1979-1981): Airport Engineer

Responsibilities included development of master plan for Iowa Air National Guard base; project initiation assistance for a new regional airport in Florida; engineering assistance for new facilities design and construction for Maryland Air National Guard; master plan for city maintenance facilities, Orlando, Florida; in-country master plan and preliminary engineering project management for Madrid, Spain, International Airport; and project management of master plan for Whiting Naval Air Station and outlying fields in Florida.

### HNTB (1974-1979): Design Engineer

Responsibilities included development of feasibility and site selection studies for reliever airports in Cleveland and Atlanta; site selection and facilities requirements for the Office of Aeronautical Charting and Cartography, NOAA; and onsite mechanical and electrical engineering design for terminal improvements at Baltimore-Washington International Airport, Maryland.

### HNTB (1972-1974): Airport Engineer

Responsible for development of portions of the master plan and preliminary engineering for a new international airport for Lisbon, Portugal, estimated to cost \$250 million.

### Self-employed (1971-1972): Private Consultant

Responsible for engineering planning and installation of a production line for multimillion-dollar contract in Madrid, Spain, to fabricate transmissions and differentials for U.S. Army vehicles.

### U.S. Army, Corps of Engineers (1969-1971): Chief, Materiel & Programs

Directed materiel planning and military training programs of military assistance to the Spanish Army. Controlled arrival and acceptance of materiel by host government. Served as liaison/advisor to American industry interested

### R.G. CLARK Page 3

in conducting business with Spanish government. Was Engineer Advisor to Spanish Army Construction, Armament and Combat Engineers, also the Engineer Academy and Engineer School of Application.

### Corps of Engineers (1968-1969): Chief, R&D Branch, OCE

Directed office responsible to Chief of Engineers for research and development. Developed research studies in new concepts of bridging, new explosives, family of construction equipment, night vision equipment, expedient airfield surfacing, expedient aircraft fueling systems, water purification equipment and policies, prefabricated buildings, etc. Achieved Department of Army acceptance for development and testing of new floating bridge. Participated in high-level Department Committee charged with development of a Tactical Gap Crossing Capability Model.

### Corps of Engineers (1967-1968): Division Engineer

Facilities engineer in Korea. Was fully responsible for management and maintenance of 96 compounds within 245 square miles including 6,000+ buildings, 1 million linear feet of electrical distribution lines, 18 water purification and distribution systems, sanitary sewage disposal systems, roads, bridges, and fire protection facilities with real property value of more than \$256 million. Planned and developed the first five-year master plan for this area. Administered \$12 million budget and \$2 million engineer supply operation. Was in responsible charge of over 500 persons. Developed and obtained approval for additional projects worth \$9 million for essential maintenance and repair. Directed cost reduction programs that produced more than \$500,000 savings to the United States in the first year.

### Corps of Engineers (1963-1967): Engineer Advisor

Engineer and aviation advisor to the Spanish Army. Developed major modernization program for Spanish Army Engineers, including programming of modern engineer and mobile maintenance equipment. Directed U.S. portion of construction, testing and acceptance of six powder plants, one shell loading facility, an Engineer School of Application, and depot rebuild facilities for engineer, artillery, and armor equipment. Planned and developed organization of a helicopter battalion for the Spanish Army. Responsible for sales, delivery, assembly and testing of 12 new helicopters in country. Provided U.S. assistance to unit until self-sufficiency was achieved. Was U.S. advisor to Engineer Academy, School of Application and Polytechnic Institute.

### Corps of Engineers (1960-1963): Deputy District Engineer

Responsible for planning and development of extensive construction projects in the Ohio River Basin for flood control and canalization, including dam, lock, bridge, and building construction, highway relocation, watershed studies, real estate acquisitions and dispositions. Was contracting officer for more than \$75

### R.G. C'\_ARK Page 4

million of projects per year. Supervised approximately 1,300 personnel, including 300 engineers. Planned and directed cost reduction programs amounting to more than \$200,000 per year. Programmed and controlled development of a modern radio and control net in a four-state area.

Corps of Engineers (1959-1960): Area Engineer

Directed construction of a large airfield in Ohio as Contracting Officer's representative. Assured that all construction (runway, steam power plant, fuel transfer and loading facilities, utilities, buildings, etc.) complied with terms of plans and specifications. Was onsite liaison between Air Force and contractors.

Corps of Engineers (1958-1959): Chief, Supply Branch

Managed engineer supply yard containing over \$21 million construction supplies and engineer equipment. Directed in-storage maintenance, processing and deprocessing of equipment. Achieved complete survey of items on hand, a new locator system and complete rewarehousing, resulting in approximately \$159,000 savings in the first year.

Corps of Engineers (1957-1958): Student

U.S. Army Engineer School, Engineer Officer's Advanced Course.

Corps of Engineers (1954-1957): Engineer Manager

Managed engineer construction projects and was assigned to staff and faculty of the Engineer School. Was in charge of instruction on engineer equipment utilization, management and maintenance. Directed Electronic Section of the school. Coordinated preparation of five-year master plan for the Department of Mechanical and Technical Equipment.

Corps of Engineers (1949-1954): Engineer Commander

Positions of minor but increasing importance and responsibility in engineering management, communications, demolitions, construction administration and logistics.

### PROFESSIONAL AFFILIATIONS

Member, National Society of Professional Engineers Fellow, Society of American Military Engineers Member, American Society of Civil Engineers Member, Virginia Engineering Society Member, Project Management Institute R.G. CLARK Page 5

HARDWARE

18M PC

SOFIWARE

Lotus 1-2-3, D Base III Plus, Framework, Project Scheduler 5000, Harvard Project Manager, Volkswriter, Microsoft Project

### EDUCATION

### B.S., geology, James Madison University, 1980

### EXPERIENCE

Seven years' technical experience including geologic mapping, subsurface investigations, foundation inspections, groundwater monitoring, pumping and observation well installation, geotechnical instrumentation, groundwater assessment, preparation of Air Force Installation Restoration Program Guidance and preparation of statements of work for the Air Force and the Air National Guard.

### EMPLOYMENT

### Dynamac Corporation (1984-present): Staff Scientist/Geologist

Primarily responsible for preparing statements of work for Phase IV-A of the Air Force's Installation Restoration Program, statements of work for Phase II and Phase IV-A of the Air National Guard's Installation Restoration Program, and assessing groundwater of hazardous waste disposal/spill sites on military installations for the purpose of determining rates and extents of contaminant migration and for developing site investigations, remedial investigations and identifying remedial actions. Prepared management guidance document for the Air Force's Installation Restoration Program.

### Bechtel Associates Professional Corporation (1981-1984): Geologist

Performed the following duties in conjunction with major civil engineering projects including subways, nuclear power plants and buildings: prepared geologic maps of surface and subsurface facilities in rock and soil including tunnels, foundations and vaults; assessed groundwater conditions in connection with construction activities and groundwater control systems; monitored the installation of permanent and temporary dewatering systems and observation wells; monitored surface and subsurface settlement of tunnels; and participated in subsurface investigations.

Schnabel Engineering Associates (1981): Geologist

Inspected foundations and backfill placement.

### PROFESSIONAL AFFILIATIONS

Association of Engineering Geologists National Water Well Association/Association of Ground Water Scientists and Engineers British Tunneling Society

### JEFFREY D. FLETCHER

### EDUCATION

### B.S., geology, Millersville University, 1984

### EXPERIENCE

Technical and field experience includes geologic mapping, water well site location, and construction of water table maps. Expertise in hazardous waste management including site evaluations and preparation of records searches for the Phase I portion of the Installation Restoration Program for the Air Force and the Phase II Preliminary Assessment of the Hazardous Waste Site Investigation Program for the Federal Bureau of Prisons. Experience also includes principal investigator in charge of a Hazardous Waste Survey/Historical Records Search for the U.S. Coast Guard.

### EMPLOYMENT

### Dynamac Corporation (1986-present): Staff Scientist/Geologist

Responsibilities include site evaluations and preparation of records searches for Phase I of the Installation Restoration Program for the Air National Guard and Phase II – Preliminary Assessments of the Hazardous Waste Site Investigation Program for the Federal Bureau of Prisons. Efforts include assessment of hazardous waste disposal/spill sites for the purpose of determining rates and extents of contaminant migration and for identifying remedial actions.

Fletcher-Lowright and Assoc., Consulting Geologists (1984-1985): Geohydrology Assistant

Primary duties included site location of water wells, analysis of well yield data through the use of computers, and construction of water table maps.

### JACQUELINE A. CRENCA

### EDUCATION

B.S., environmental engineering, Pennsylvania State University, 1983

### SPECIALIZED TRAINING

Hazardous Waste Site Investigation Health and Safety Training Course

### CERTIFICATION

Engineer-in-Training, Pennsylvania, 1983

### EXPERIENCE

Four years of technical experience in hazardous and solid waste management, including CERCLA remedial investigations and feasibility studies, RCRA Part B permit application preparation, and solid and hazardous waste land disposal facility design. Performed hydrogeologic, environmental and regulatory analyses for several solid and hazardous waste facilities. Prepared cost estimates, designs and specifications, and operations and maintenance guidelines. Also familiar with site investigations, sampling, monitoring, and personal protective equipment usage.

### EMPLOYMENT

### Dynamac Corporation (1986-present): Environmental Engineer

Primarily responsible for preparing statements of work for Phases II and IV-A of the Air Force's Installation Restoration Program. Duties include site reconnaissance, background data evaluation, assessment of extent of contamination, and specification of activities required for site investigations and development of remedial actions. Also reviews remedial action plans and cleanup designs for technical and regulatory consistency.

### Black & Veatch, Engineers-Architects (1983-1986): Environmental Engineer

Served as environmental engineer for the performance of two Remedial Investigation/Feasibility Study (RI/FS) projects for the New Jersey Department of Environmental Protection. These RI/FS projects addressed the Florence Land Recontouring Landfill in Burlington County and the Sayreville Landfill in Middlesex County. Specific responsibilities included background data collection and assimilation, and preparation of site-specific quality assurance, field sampling, and health and safety plans. In addition, assisted in the preparation

### J.A. CRENCA Page 2

of a Background Investigation Study, a Focus Feasibility Study for initial remedial measures, a Remedial Investigation Report, and a Feasibility Study Report. Also served as a liaison during remedial investigation activities, and has evaluated chemical analysis results and institutional requirements for alternative evaluation.

Served as an environmental engineer on the Hawkins Point Hazardous Waste Landfill project for the Maryland Environmental Service and Allied Chemicals. Main responsibilities included RCRA Part B Permit Application and Design Documentation preparation and review, leachate collection system design and surface water runoff analysis. Prepared construction cost-estimates and specifications, responses to Notices-of-Deficiency, an Operations & Maintenance Manual, an NPDES Permit Application, a Continuing Releases Assessment, and an Exposure Information Report. Contributed to the preparation of an environmental assessment and a hydrogeologic assessment for the facility.

In addition, served as an environmental engineer for the County of Loudoun, Virginia Sanitary Landfill project. Duties on the project included development of intermediate and final site grading and waste cell configurations, design of the leachate collection system, preparation of the final design report, and interpretation of groundwater monitoring results. Contributed to the preparation of an RFP for a landfill gas recovery system for the City of Virginia Beach, Virginia Landfill No. 2, and the design of a remedial closure system for Virginia Beach, Virginia Landfill No. 1. Also contributed to a study of bentonite landfill liners prepared for the Exxon Minerals Company, and the design of a stormwater drainage and sewer system for the Turkey Branch project for Montgomery County, Maryland. Í

U.S. Environmental Protection Agency, Office of Solid Waste (1983): Environmental Engineer

Worked on several projects involving revision to the Resource Conservation and Recovery Act (RCRA); specifically, reviewed public comment and began revising the proposed amendment to the definition of solid waste. Initiated the revision of management standards for recycled hazardous waste. Also participated in the development and performance of the National Small Quantity Hazardous Waste Generator Study, and analyzed several state-initiated small quantity generator studies.

### PROFESSIONAL AFFILIATIONS

Hazardous Materials Control Research Institute Governmental Refuse Collection and Disposal Association

### EDUCATION

M.S., geology, Old Dominion University, 1987 B.S. (cum laude), geology, James Madison University, 1983

### EXPERIENCE

Three years' technical experience in the fields of hydrogeology and environmental science, including drilling and placement of wells, well monitoring, aquifer testing, determination of hydraulic properties, computer modeling of aquifer systems, and field and laboratory soils analysis.

### EMPLOYMENT

### Dynamac Corporation (1987-present): Staff Scientist/Hydrogeologist

Responsibilities include Preliminary Assessments, Site Investigations, Remedial Investigations, Feasibility Studies, and Emergency Responses to include providing geological and hydrological assessments of hazardous waste disposal/spill sites, determination of rates and extents of contaminant migration, and computer modeling of groundwater flow and contaminant transport. Projects are for the U.S. Air Force and Air National Guard Installation Restoration Program.

Froehling and Robertson, Inc. (1986-1987): Geologist/Engineering Technician

Performed both field and laboratory engineering soils tests.

The Nature Conservancy (1985–1986): Hydrogeologist

Investigated groundwater geology of the Nature Conservancy's Nags Head Woods Ecological Preserve in Dare County, North Carolina. Study included installing wells, monitoring water table levels, determination of hydraulic parameters through a pumping test, stratigraphic test borings, and computer modeling.

<u>Old Dominion University (1983-1985)</u>: Teaching Assistant, Department of Geological Sciences

Taught laboratory classes in Earth Science and Historical Geology.

### PROFESSIONAL AFFILIATIONS

Geological Society of America National Water Well Association/Association of Ground Water Scientists and Engineers J.S. EMRY Page 2

### PUBLICATION

Impact of Municipal Pumpage Upon a Barrier Island Water Table, Nags Head and Kill Devil Hills, North Carolina. In: Abstracts with Programs, Geological Society of America, Vol. 19, No. 2, February 1987. f

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APPENDIX B

Outside Agency Contact List

### OUTSIDE AGENCY CONTACT LIST

- National Oceanic and Atmospheric Administration 6001 Executive Boulevard Rockville, Maryland 21082
- 2. United States Geological Survey 12201 Sunrise Valley Drive Reston, Virginia 22092

- California Regional Water Quality Control Board Central Valley Region 3614 East Ashlan Avenue Fresno, California 93726
- United States Department of the Interior Fish and Wildlife Service 2800 Cottage Way, Room E-1823 Sacramento, California 95825

APPENDIX C

USAF Hazard Assessment Rating Methodology

### USAF HAZARD ASSESSMENT RATING METHODOLOGY

The Department of Defense (DoD) has established a comprehensive program to identify, evaluate, and control problems associated with past disposal practices at DoD facilities. One of the actions required under this program is to:

develop and maintain a priority listing of contaminated installations and facilities for remedial action based on potential hazard to public health, welfare, and environmental impacts (Reference: DEQPPM 81-5, 11 December 1981).

Accordingly, the United States Air Force (USAF) has sought to establish a system to set priorities for taking further actions at sites based upon information gathered during the Preliminary Assessment phase of its Installation Restoration Program (IRP).

### PURPOSE

The purpose of the site rating model is to provide a relative ranking of sites of suspected contamination from hazardous substances. This model will assist the Air National Guard in setting priorities for follow-on site investigations.

This rating system is used only after it has been determined that (1) potential for contamination exists (hazardous wastes present in sufficient quantity), and (2) potential for migration exists. A site can be deleted from consideration for rating on either basis.

### DESCRIPTION OF MODEL

Like the other hazardous waste site ranking models, the U.S. Air Force's site rating model uses a scoring system to rank sites for priority attention. However, in developing this model, the designers incorporated some special features to meet specific DoD program needs.

C-1

The model uses data readily obtained during the Preliminary Assessment portion of the IRP. Scoring judgment and computations are easily made. In assessing the hazards at a given site, the model develops a score based on the most likely routes of contamination and the worst hazards at the site. Sites are given low scores only if there are clearly no hazards. This approach meshes well with the policy for evaluating and setting restrictions on excess DoD properties.

Site scores are developed using the appropriate ranking factors according to the method presented in the flow chart (Figure 1 of this report). The site rating form and the rating factor guideline are provided at the end of this appendix.

As with the previous model, this model considers four aspects of the hazard posed by a specific site: possible receptors of the contamination, the waste and its characteristics, the potential pathways for contaminant migration, and any efforts that were made to contain the wastes resulting from a spill.

The receptors category rating is based on four rating factors: the potential for human exposure to the site, the potential for human ingestion of contaminants should underlying aquifers be polluted, the current and anticipated uses of the surrounding area, and the potential for adverse effects upon important biological resources and fragile natural settings. The potential for human exposure is evaluated on the basis of the total population within 1,000 feet of the site. and the distance between the site the the base boundary. The potential for human ingestion of contaminants is based on the distance between the site and the nearest well, the groundwater use of the uppermost aquifer, and population served by the groundwater supply within 3 miles of the site. The uses of the surrounding area are determined by the zoning within a 1-mile radius. Determination of whether or not critical environments exist within a 1-mile radius of the site predicts the potential for adverse effects from the site upon important biological resources and fragile natural settings. Each rating factor is numerically evaluated (0-3) and increased by a multiplier. The maximum possible score is also computed. The factor score and maximum possible scores are totaled, and the receptors subscore computed as follows: receptors subscore = (100 x factor score subtotal/maximum score subtotal).

C-5

The waste characteristics category is scored in three stages. First, a point rating is assigned based on an assessment of the waste quantity and the hazard (worst case) associated with the site. The level of confidence in the information is also factored into the assessment. Next, the score is multiplied by a waste persistence factor, which acts to reduce the score if the waste is not very persistent. Finally, the score is further modified by the physical state of the waste. Liquid wastes receive the maximum score, while scores for sludges and solids are reduced.

The pathways category rating is based on evidence of contaminant migration or an evaluation of the highest potential (worst case) for contaminant migration along one of three pathways: surface-water migration, flooding, and groundwater migration. If evidence of contaminant migration exists, the category is given a subscore of 80 to 100 points. For indirect evidence, 80 points are assigned, and for direct evidence, 100 points are assigned. If no evidence is found, the highest score among the three possible routes is used. The three pathways are evaluated and the highest score among all four of the potential scores is used.

The scores for each of the three categories are added together and normalized to a maximum possible score of 100. Then the waste management practice category is scored. Scores for sites with no containment can be reduced by 5 percent. If a site is contained and well managed, its score can be reduced by 90 percent. The final site score is calculated by applying the waste management practices category factor to the sum of the scores for the other three categories.

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HAZARDOUS ASSESSMENT RATING NETHODOLOGY QUIDELINES

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### I. RECEPTORS CATEGORY

			Rating Scale Levels			
}	Rating Factors	0	-	2	~	Multiplier
÷.	Population within 1,000 feet (includes on-bese fecilities)	0	I-25	26-100	Greater then 100	•
ġ.	Distance to mearest weber well	Greater than 3 miles	l to 3 miles	5,001 feet to 1 mile	0 to 3,000 feet	9
ن	Land Usa/Zoning fuithin I- mile radius)	Campletely remote (zoning not appli- cable)	Agricultural	Commerciei or Indus- triei	Residential	•
ė	Distance to installation boundary	Greater than 2 miles	1 to 2 miles	1,001 feet to 1 mile	0 to 1,000 test	Ð
ن	Critical anvironments (eithin 1-mile radius)	Not a critical an- vironment	Natural areas	Pristime matural areas; minor watlands; pro- served areas; presence or econducally im- portant matural re- sources susceptible to contamination	Major habitat of an endengered or threat- ened species; presence of recharge area major watlands	2
L.	Mater quality/use designation of mearest surface water body	Agricultural or In- dustrial use	Recreation, propaga- gation and management of fish and wildlife	Shellfish propagation and harvesting	Potable water supplies	Ð
ů	Ground-weter use of upper- most equifer	Not used, other sources readily evailable	Commercial, indus- trial, or irrigation, very limited other weter sources	Drinking water, munic- ipal water available	Drinking water, no municipal water avall- able; commercial, in- dustrial, or irrige- tion, no other water source evallable	۵
ź	Population served by sur- face water supplies within 3 miles domistreem of site	o	1-50	000' i-15	Greater than 1,000	v
<u>-</u>	Papulation served by aquifer supplies within 3 miles of site	٥	1-50	51-1,000	Greater then 1,000	vð

### MASTE CHARACTERISTICS ÷

## A-I <u>Hezerdous Weste Quentity</u>

- S = Smeil quantity (5 tons or 20 drums of ilquid) M = Moderate quantity (5 to 20 tons or 21 to 85 drums of ilquid) L = Large quentity (20 tons or 85 drums of Ilquid)

# A-2 Confidence Level of Information

- C = Confirmed confidence level (minimum criteria below)
- o Verbal reports fram interviewer (at least 2) or written
  - information from the records
- o Knowledge of types and quantities of westes generated by shops and other areas on base

# S = Suspected confidence level

o No verbal reports or conflicting verbal reports and no written information from the records Logic based on the knowledge of the types and quantities of haz-ardous wastes generated at the base, and a history of past waste disposal practices indicate that these wastes were disposed of at a site

### A-3 Hezerd Reting

		Reting Sci	de Levels	
Rating Factors	0	-	2	5
Toxicity	Sax's Level 0	Sax's Level 1	Sax's Lavel 2	Sax's Level 3
lgnitability	Flash point greater than 2004 F	Flash point at 140° F to 200° F	Flash point at 80° F to 140° F	flesh point less then 80° F
Redioactivity	At or below beckground levels	l to 3 times beckground levels	5 to 5 times beckground levels	Over 5 times beckground levels

Use the highest individual rating based on toxicity, ignitability and radioactivity and datermine the hazard rating.

Points	•	2
<u>Hezerd Reting</u>	High (H)	Madium (N)

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# 11. MASTE CHARACTERISTICS -- Continued

## Meste Characteristics Natrix

# B. Persistence Multiplier for Point Rating

Muitiply Point Rating	
Persistence Criteria	<u>From Part A by the Following</u>
Metais, polycyclic compounds, and	0.4
halogenated hydrocarbons	
Substituted and other ring compounds	0.9
Straight chain hydrocarbons	0.0
Essily blodegradeble compounds	•••
Physical State Nuttiplier	
	Multiply Point Total from
Physical State	Perts A and 8 by the following
Liquid	-
Słudge	52.0
Solid	

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0.7 8.0 8.0

### Notes:

for a site with more then one hezerdous waste, the weste quentities may be added using the following rules:

### Confidence Level

Confirmed confidence levels (C) can be added.
 Suspected confidence levels (S) can be added.
 Confirmed confidence levels cannot be added with sus-

pected confidence levels.

### Weste Hezerd Reting

o Mestes with the same hazard rating can be added. O Mastes with different hazard ratings can only be added In a domgrade mode, e.g., WCM + SCM = LCM if the total quentity is greater than 20 tons.

Example: Several wates may be present at a site, each having an MCM designation (60 points). By adding the quantities of each waste, the designation may change to LCM (80 points). In this case, the correct point rating for the waste is 80.

## III. PATHMAYS CATEGORY

# A. Evidence of Contemination

Direct evidence is obtained from laboratory analyses of hazardous conteminants present above natural beckground levels in surface water, ground water, or air. Evidence should confirm that the source of contemination is the site being evaluated.

Indirect evidence might be from visuel observation (i.e., leechate), vegetation stress, sludge deposits, presence of teste and odors in drinking water, or reported discharges that cannot be confirmed as resulting from the site, but the site is greatly suspected of being a source of contamination.

# B-1 Potential for Surface Mater Contamination

		Rating Scale Levels			
Rating Factors	0	-	2		Nuitiplier
listance to meanest surface water including drainage ditches and torm sewers)	Greater than I mile	2,001 feet to I mile	501 feet to 2,000 fee:	0 to 500 feet	83
et precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater than +20 inches	Ŷ
urface erosion	None	St ight	Noderate	Severe	æ
urface parmaability	06 to 156 clay (>10 <sup>-2</sup> cm/sec)	15% to 30% clay (10- <sup>2</sup> to 10 <sup>-4</sup> cm/sec)	30% to 50% clay (10 <sup>-4</sup> to 10 <sup>-6</sup> cm/sec)	Greater than 50% clay (<10-6 cm/sec)	v
lainfall intensity based on	<1.0 inch	1.0 to 2.0 inches	2.1 to 3.0 inches	>3.0 inches	60
weeks of thunderstorms)	(0-5)	(6-35)	(36-49)	(05<)	
-2 <u>Potential for Flooding</u>					
loodplain	Beyond 100-year floodplain	In 100-year floodplain	In 10-year floodplain	floods ennueily	-
i-3 <u>Potential for Ground-Nater C</u>	ontaminstion				
epth to groundwater	Greater than 500 feet	50 to 500 feet	11 to 50 feet	0 to 10 feet	80
et precipitation	Less than -10 inches	-10 to +5 inches	+5 to +20 inches	Greater then +20 Inches	ø
oil permeebility	Greater then 50% clay (<10 <sup>-6</sup> cm/sec)	305 to 505 clay (10 <sup>-6</sup> to 10-6 cm/sec)	15% to 30% clay (10-2 to 10-4 cm/sec)	0% to 15% clay (>10 <sup>-2</sup> cm/sec)	
ubsurface flows	Bottom of site greater than 5 feet above high ground-water level	Bottom of site occasionally sub- margad	Bottom of site fre- quently submarged	Bottom of site located below meen ground-water level	æ

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urect eccess to groundwater (through faults, fractures, faulty well casings, subsidence, fissures, etc.)	No evidence of risk La	er risk	Noderate risk	High risk
IV. MASTE NAMAGENENT PRACTICES CAT	EGONY			
<ol> <li>This category adjusts the tota engineering controls designed subscores.</li> </ol>	l risk as determined from the recep to reduce this risk. The total ri	ptors, pathways, and isk is datarmined by	waste characteristics r first averaging the r	categories for wast receptors, pathways,
B. <u>Waste Menegement Practices Fac</u>				
The following multipliers are	then applied to the total risk poin	nts (from A):		
Kaste Nene	gement Practice		Multipli	
No conteinment			0.1	
Limited contained Fully contained	ent and in full compliance		0.9	<b>N C</b>
Guidelines for fully containe	Ť			
Landf111s:			<u>Surface</u>	Impoundments:
o Clay cap or o	ither impermedie cover		o Liner	rs in good condition
o Leechate coll	lection system		o Sound	d dikes and adequate
o Liners in goo o Adequete moni	d condition toring wells		o Adequ	uate monitoring well
Spi 1181			Fire Pro	ptection Treining Ar
o Quick spill c	leanup action taken		o Concr	rete surface and bei
o Conteminated o Soil and/or t	soil removed ater camiles confirm total clanamo		0110 o	water separator for
			o crrit plant	UNT TOTA OLIVINATOR

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APPENDIX D

USAF Hazard Assessment Rating Methodology Factor Rating Criteria

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### 144th Fighter Interceptor Wing California Air National Guard Fresno Air Terminal Fresno, California

### USAF HAZARD ASSESSMENT RATING METHODOLOGY FACTOR RATING CRITERIA

### 1. RECEPTORS

2.

Population within 1.000 feet of site: Over 100 Distance to nearest well: Site No. 1 1,200 feet Site No. 2 1,000 feet Site No. 3 2,800 feet Land use/zoning within 1-mile radius: **Residential** Distance to Base boundary: Site No. 1 Less than 100 feet Site No. 2 Less than 100 feet Site No. 3 Less than 100 feet Critical environments within 1 mile: Not a critical environment Water Quality of nearest surface water body: Agricultural or industrial use Groundwater use of uppermost aguifer: Limited use for drinking water Population served by surface water supply within 3 miles downstream of site: None Population served by groundwater supply within 3 miles of site: More than 1.000 WASTE CHARACTERISTICS Quantity Site No. 1 Over 5,000 gallons Site No. 2 Less than 1,000 gallons Site No. 3

Less than 500 gallons

### 144th Fighter Interceptor Wing California Air National Guard Fresno Air Terminal Fresno, California

### USAF HAZARD ASSESSMENT RATING METHODOLOGY FACTOR RATING CRITERIA (Continued)

### 2. WASTE CHARACTERISTICS (Continued)

Confidence Level

Site	No.	1	Confirmed
Site	No.	2	Confirmed
Site	No.	3	Confirmed

Hazard Rating

Site	No.	1	Medium
Site	No.	2	Medium
Site	No.	3	Medium

### 3. PATHWAYS

Surface Water Migration

Distance to nearest surface water:

Site No. 1	Approximately 500 feet
Site No. 2	Approximately 450 feet
Site No. 3	Approximately 500 feet
Net precipitation:	-^1.13 inches
Surface erosion	Slight
Surface permeability:	1 x 10 <sup>-2</sup> to 1 x 10 <sup>-4</sup> cm/sec
Rainfall intensity:	.75 inches
Flooding:	Beyond 100-year flood- plain
Groundwater Migration	
Depth to groundwater:	11 to 50 feet
Net precipitation:	-41.13 inches

144th Fighter Interceptor Wing California Air National Guard Fresno Air Terminal Fresno, California

### USAF HAZARD ASSESSMENT RATING METHODOLOGY FACTOR RATING CRITERIA (Continued)

3. PATHWAYS (Continued)

Groundwater Migration (Continued)

Soil permeability:

Subsurface flow:

Direct access to groundwater:

 $1 \times 10^{-2}$  to  $1 \times 10^{-4}$  cm/sec

Occasionally submerged

Low risk

### HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITESITE NO. 1 - OLD FIRE TRAINING AREALOCATIONFRESNO AIR TERMINAL, FRESNO, CALIFORNIADATE OF OPERATION/OCCURRENCELATE 1950'S TO EARLY 1970'SOWNER/OPERATORCALIFORNIA AIR NATIONAL SUARDCOMMENTS/DESCRIPTIONPREVIOUS SITE DESIGNATED FOR FIRE TRAINING EXERCISESRATED BYHMTC

				MAXIMUM	
FAC	TOR		FACTOR	POSSIBLE	
RAT	ING M	IULTIPLIER	SCORE	SCORE	
;	3	4	12	12	
:	3	10	30	30	
:	3	3	9	9	
:	3	6	18	18	
Е:	0	10	0	30	
:	0	6	0	18	
:	2	9	18	27	
:	0	6	0	18	
:	3	6	19	18	
SUB	TOTALS		105	180	
AXINUM	SCORE	SUBTOTAL )		58	
	FAC RAT	FACTOR RATING P : 3 : 3 : 3 : 3 E : 0 : 0 : 2 : 0 : 2 : 0 : 3 SUBTOTALS HAXIMUM SCORE	FACTOR RATING         MULTIPLIER           :         3         4           :         3         10           :         3         3           :         3         6           :         3         6           :         0         6           :         2         9           :         0         6           :         3         6	FACTOR RATING         MULTIPLIER         FACTOR SCORE           :         3         4         12           :         3         10         30           :         3         3         9           :         3         6         18           E         0         10         0           :         0         6         0           :         2         9         18           :         0         6         19           SUBTOTALS         105            HAXIMUM SCORE SUBTOTAL	FACTOR RATING         FACTOR MULTIPLIER         FACTOR SCORE         POSSIBLE SCORE           :         3         4         12         12           :         3         10         30         30           :         3         3         9         9           :         3         6         18         18           E         0         10         0         30           :         0         6         0         18           :         2         9         18         27           :         0         6         0         18           :         3         6         19         18           SUBTOTALS         105         180

A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

1.	WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE)	( L	)
2.	CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM)	( C	)
3.	HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH)	( 11	)

FACTOR SUBSCORE A ( 80 ) (FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX>

### B. APPLY PERSISTENCE FACTOR

(

FACTOR SUBSCORE A × PERSISTENCE FACTOR SUBSCORE B ( 80 )( 1 ) = ( 80 )

C. APPLY PHYSICAL STATE MULTIPLIER

PHI	YSICAL STATE			
SUBSCORE B x MUL	LTIPLIER =	: 1	WASTE	CHARACTERISTICS SUBSCORE
80)(	1) =	: (		80)

III. PATHWAY

	FACTOR		FACTOR	MAX. POSSIBLE
RATING FACTOR	RATING	MLTPLR	SCORE	SCORE

- A. IF THERE IS EVIDENCE OF MIGRATION OF HAZARDOUS CONTAMINANTS, ASSIGN MAXIMUM FACTOR SUBSCORE OF <100 POINTS FOR DIRECT EVIDENCE> OR <80 POINTS FOR INDIRECT EVIDENCE>. IF DIRECT EVIDENCE <100> EXISTS THEN PROCEED TO C. IF NO EVIDENCE OR INDIRECT EVIDENCE <LESS THEN 80> EXISTS, PROCEED TO B ( 0)
- B. RATE THE MIGRATION POTENTIAL FOR 3 POTENTIAL PATHWAYS: SURFACE WATER MIGRATION, FLOODING, AND GROUND-WATER MIGRATION. SELECT THE HIGHEST RATING, AND PROCEED TO C.

1. SURFACE WATER MIGRATION

	DISTANCE TO NEAREST SURFACE NET PRECIPITATION SURFACE EROSION SURFACE PERMEABILITY RAINFALL INTENSITY	WATER : : : :	3 0 1 1 0	8 8 6 8	24 0 8 6 0	24 18 24 18 24
	SUBTOTA SUBSCORE (100 x FACTOR SCORE	NLS : SUBTOTAL/MAXIMUM SCOR	E SUBTOTAL)		38	108 35
2.	FLOODING		0	1	0	3
	SUBSCORE (100 × FACTOR SCORE	: /3) :				0
3.	GROUND WATER MIGRATION					
	DEPTH TO GROUND WATER NET PRECIPITATION SOIL PERMEABILITY SUBSURFACE FLOWS DIRECT ACCESS TO GROUND WATE	: : : R :	2 0 2 1 1	8 6 8 8	16 0 16 8 8	24 18 24 24 24
	SUBTOTA SUBSCORE (100 × FACTOR SCORE	LS SUBTOTAL/MAXIMUM SCOR	E SUBTOTAL)		48	114 42

C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	(	58)
WASTE CHARACTERISTICS	l	80 )
PATHWAYS	l	42 )
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	(	60)

B. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

WASTE MANAGEMENT GROSS TOTAL SCORE × PRACTICES FACTOR × FINAL SCORE ( 60)( 1) D-5 60

### HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITESITE ND. 2 - BASE POL AREALOCATIONFRESNO AIR TERMINAL, FRESNO, CALIFORNIADATE OF OPERATION/OCCURRENCE1958 TO PRESENTOWNER/OPEPATORCALIFORNIA AIR NATIONAL GUARDCOMMENTS/DESCRIPTIONSTORAGE AND REFUELING AREA FOR JET FUELRATED BYHMTC

!.	RECEPTORS	FACTOR			FACTOR	MAXIMUM POSSIBLE
	RATING FACTOR	RATING		MULTIPLIER	SCORE	SCORE
Α.	POPULATION WITHIN 1000 FEET OF SITE	;	3	4	12	12
9.	DISTANCE TO NEAREST WELL	:	3	10	30	30
С.	LAND USE/ZONING WITHIN 1 MILE RADIUS	:	3	3	9	9
D.	DISTANCE TO INSTALLATION BOUNDARY	:	3	6	19	18
Ε.	CRITICAL ENVIRONMENTS MITHIN 1 MILE RADIUS OF SITE	:	0	10	0	30
F.	WATER QUALITY OF NEAREST SURFACE WATER	:	0	6	0	18
6.	GROUND WATER USE OF UPPERMOST AQUIFER	:	2	9	18	27
Н.	POPULATION (WITHIN 3 MILES) SERVED BY					
	DOWN STREAM SURFACE WATER	:	0	6	0	18
	GROUND WATER	:	3	6	18	18
		SUBTOT	ALS	 }	105	160
	RECEPTORS SUBSCORE (100 × FACTOR SCORE SUBTOTAL/MA	(INUM SCI	ORI	E SUBTOTAL)		58

### II. WASTE CHARACTERISTICS

A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

 1. WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE) (S)

 2. CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM) (C)

 3. HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH) (M)

FACTOR SUBSCORE A (50) (FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX)

### B. APPLY PERSISTENCE FACTOR

t

FACTOR SUBSCORE A x PERSISTENCE FACTOR SUBSCORE B ( 50 )( 1 ) = ( 50 )

C. APPLY PHYSICAL STATE MULTIPLIER

	PHYSICAL STATE						
SUBSCORE B ×	MULTIPLIER			=	WASTE	CHARACTERISTICS	SUBSCORE
50)(		1	}	=	(	50)	

III. PATHWAY

IH	. PA(HWAT						-
	RATING FACTOR		RATING MLTP	PLR SC	DRE	SCORE	.t
Ā.	IF THERE IS EVIDENCE OF MIGRATION	OF HAZARDOUS CONT	AMINANTS, ASS	IGN MAXIM	JM FACT	OR SUBSCORE	OF
	<100 PDINTS FOR DIRECT EVIDENCE>	OR <80 POINTS FOR	INDIRECT EVID	DENCE>. I	F DIREC	T EVIDENCE <	(100)
	EXISTS THEN PROCEED TO C. IF NO	EVIDENCE OR INDIRE	ECT EVIDENCE <	LESS THEN	80> EX	ISTS, PROCEE	ED TO
	( );						
8.	RATE THE MIGRATION POTENTIAL FOR	3 POTENTIAL PATHWA	YS: SURFACE	WATER MIG	RATION,	FLOODING, A	AND
	GROUND-WATER MIGRATION. SELECT 1	HE HIGHEST RATING	, AND PROCEED	TO S.			
	1. SURFACE WATER MIGRATION						
	DISTANCE TO NEAREST SURFACE	IATER :	3	8	24	24	
	NET PRECIPITATION	:	0	6	0	18	
	SURFACE EROSION	:	1	8	8	24	
	SURFACE PERMEABILITY	:	1	6	6	18	
	RAINFALL INTENSITY	:	0	8	0	24	
	SUBTOTAL	.5			38	109	
	SUBSCORE (100 x FACTOR SCORE	SUBTOTAL/MAXIMUM S	SCORE SUBTOTAL	.)		35	
	2. FLOODING		0	1	0	3	
	CURCODE (100 EACTOR CODE	/7)				0	
	SUBSLUME (IVU X FHLIUM SLUME	/3) :				U	
	3. GROUND WATER MIGRATION						
	DEPTH TO GROUND WATER	:	2	8	16	24	
	NET PRECIPITATION	:	0	6	0	18	
	SOIL PERMEABILITY	:	2	8	16	24	
	SUBSURFACE FLOWS	:	1	8	8	24	
	DIRECT ACCESS TO GROUND WATER	:	1	8	8	24	
	SUBTOTAL	.5			48	114	
	SUBSCORE (100 x FACTOR SCORE	SUBTOTAL/MAXIMUM S	SCORE SUBTOTAL	)		42	

B

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C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	ł	58)
WASTE CHARACTERISTICS	t	50 )
PATHWAYS	(	42)
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	(	50)

B. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

WASTE MANAGEMENT GROSS TOTAL SCORE x PRACTICES FACTOR x FINAL SCORE ( 50)( 1) = 50 D-7 ========

### HAZARDOUS ASSESSMENT RATING FORM

NAME OF SITE	SITE NO. 3 - STORAGE AREA AT MARINE CORPS SUB-LEASED AREA
LOCATION	FRESNO AIR TERMINAL, FRESNO, CALIFORNIA
DATE OF OPERATION/OCCURRENCE	
OWNER/OPERATOR	CALIFORNIA AIR NATIONAL GUARD
COMMENTS/DESCRIPTION	STORAGE AREA FOR MARINE CORPS ON ANG PROPERTY
RATED BY	HNTC

I. RECEPTORS					MAXIMUM
	FACTOR			FACTOR	POSSIBLE
RATING FACTOR	RATING	MULTIPLI	IER	SCORE	SCORE
A. POPULATION WITHIN 1000 FEET OF SITE	;	3	4	12	12
B. DISTANCE TO NEAREST WELL	;	3	10	30	30
C. LAND USE/ZONING WITHIN 1 MILE RADIUS	:	3	3	9	9
D. DISTANCE TO INSTALLATION BOUNDARY	:	3	6	18	18
E. CRITICAL ENVIRONMENTS WITHIN 1 MILE RADIUS OF SITE	:	0	10	0	30
F. WATER QUALITY OF NEAREST SURFACE WATER	:	0	6	0	18
G. GROUND WATER USE OF UPPERMOST AQUIFER	:	2	9	18	27
H. POPULATION (WITHIN 3 MILES) SERVED BY					
DOWN STREAM SURFACE WATER	;	0	6	0	18
GROUND WATER	:	3	6	18	18
	SUBTOT	ALS		105	180
RECEPTORS SUBSCORE (100 × FACTOR SCORE SUBTOTAL/MA	XIMUM SC	ORE SUBTOTI	AL)		58

### II. WASTE CHARACTERISTICS

8

### A. SELECT THE FACTOR SCORE BASED ON THE ESTIMATED QUANTITY, THE DEGREE OF HAZARD, AND THE CONFIDENCE LEVEL OF THE INFORMATION.

1.	WASTE QUANTITY (S=SMALL, M=MEDIUM, L=LARGE)	( S	)
2.	CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM)	( C	}

2. CONFIDENCE LEVEL (S=SUSPECT, C=CONFIRM) ( C ) 3. HAZARD RATING (L=LOW, M=MEDIUM, H=HIGH) ( M )

FACTOR SUBSCORE A (50) (FROM 20 TO 100 BASED ON FACTOR SCORE MATRIX>

### B. APPLY PERSISTENCE FACTOR

t

	FACTOR SUBSCORE A	x PERSISTENCE	FACTOR		SUBSCORE	9
l	50	) (	1 }	=	ί 50	)

C. APPLY PHYSICAL STATE MULTIPLIER

	PHYSICAL STATE						
SUBSCORE B x	MULTIPLIER			=	WASTE	CHARACTERISTICS	SUBSCORE
50)(		1	)	=	(	50 )	

III. PATHWAY

	FACTOR		FACTOR	MAX. POSSIBLE
RATING FACTOR	RATING	MLTPLR	SCORE	SCORE

- A. IF THERE IS EVIDENCE OF MIGRATION OF HAZARDOUS CONTAMINANTS, ASSIGN MAXIMUM FACTOR SUBSCORE OF <100 POINTS FOR DIRECT EVIDENCE> OR (80 POINTS FOR INDIRECT EVIDENCE). IF DIRECT EVIDENCE <100> EXISTS THEN PROCEED TO C. IF NO EVIDENCE OR INDIRECT EVIDENCE <LESS THEN 60> EXISTS, PROCEED TO B ( 0)
- B. RATE THE MIGRATION POTENTIAL FOR 3 POTENTIAL PATHWAYS: SURFACE WATER MIGRATION, FLOODING, AND GROUND-WATER MIGRATION. SELECT THE HISHEST RATING, AND PROCEED TO C.
  - 1. SURFACE WATER MIGRATION

	DISTANCE TO NEAREST SURFACE	WATER :		3	8	24	24
	NET PRECIPITATION	:		0	6	0	18
	SURFACE EROSION	:		1	8	8	24
	SURFACE PERMEABILITY	:		1	6	6	18
	RAINFALL INTENSITY	:		0	8	С	24
	SUBTOTA	LS				38	108
	SUBSCORE (100 x FACTOR SCORE	SUBTOTAL/M	AXIMUM SCORE	SUBTOTAL)			35
2.	FLOODING			0	1	0	3
	SUBSCORE (100 × FACTOR SCORE	:/3) :					0
3.	GROUND WATER MIGRATION						
	DEPTH TO GROUND WATER	:		2	8	16	24
	NET PRECIPITATION	:		0	6	0	18
	SOIL PERMEABILITY	:		2	8	16	24
	SUBSURFACE FLOWS	:		1	8	8	24
	DIRECT ACCESS TO GROUND WATE	R :		1	8	8	24
	SUBTOTA	LS				48	114
	SUBSCORE (100 x FACTOR SCORE	SUBTOTAL/M	AXIMUM SCORE	SUBTOTAL)			42

)

C. HIGHEST PATHWAY SUBSCORE

ENTER THE HIGHEST SUBSCORE VALUE FROM A, B-1, B-2 OR B-3 ABOVE.

IV. WASTE MANAGEMENT PRACTICES

A. AVERAGE THE THREE SUBSCORES FOR RECEPTORS, WASTE CHARACTERISTICS, AND PATHWAYS.

RECEPTORS	(	58)
WASTE CHARACTERISTICS	i	50)
PATHNAYS	(	42)
TOTAL DIVIDED BY 3 = GROSS TOTAL SCORE	{	50)

8. APPLY FACTOR FOR WASTE CONTAINMENT FROM WASTE MANAGEMENT PRACTICES

					WASTE MANAGEMENT		
	GROSS	TOTAL	SCORE	x	PRACTICES FACTOR		FINAL SCORE
(			50	)(	1	D-9	- 50