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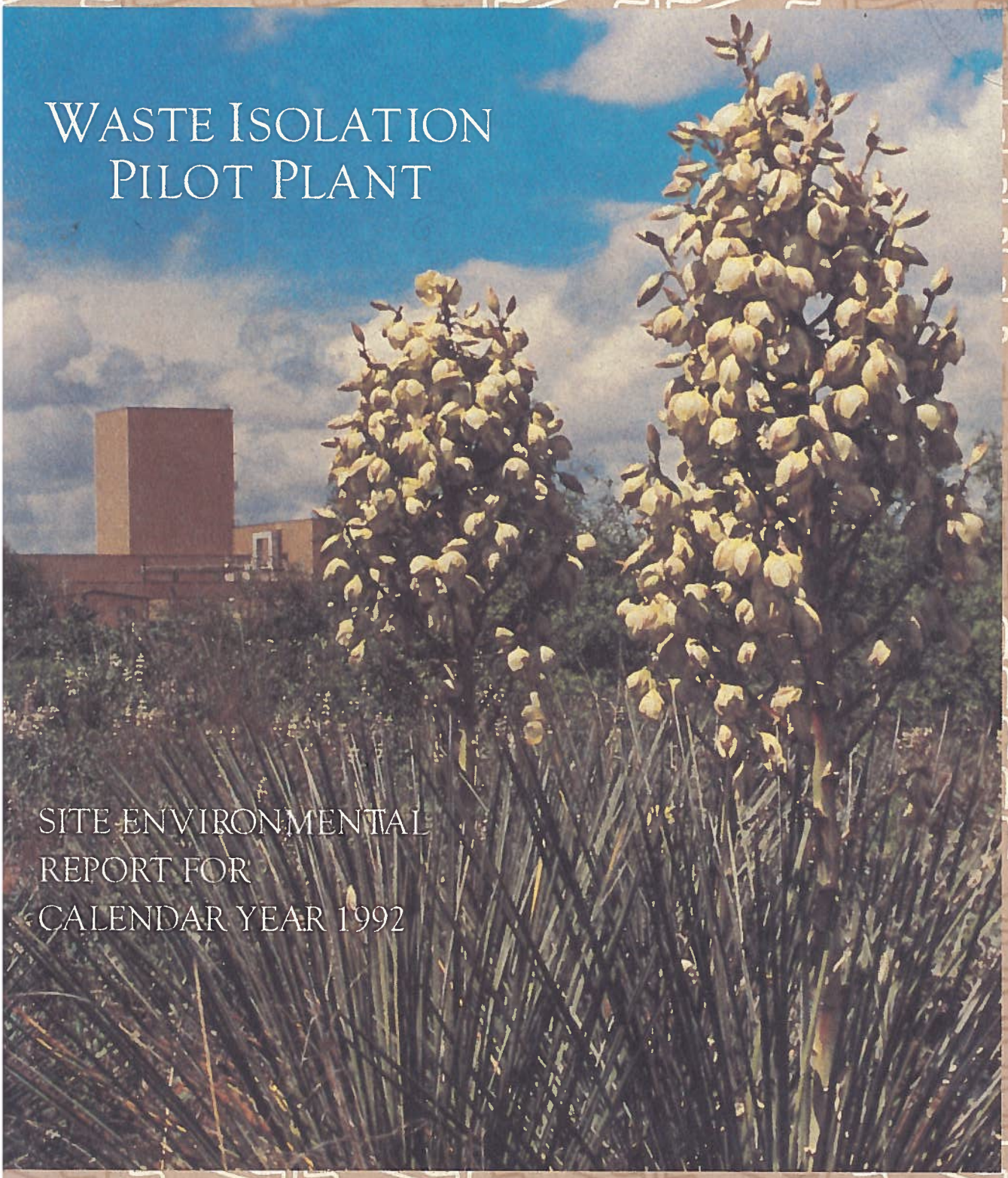
WASTE ISOLATION PILOT PLANT



SITE ENVIRONMENTAL REPORT FOR CALENDAR YEAR 1992

DOE/WIPP 93-017

931203

WIPP ANNUAL SITE ENVIRONMENTAL REPORT

FOR

CALENDAR

YEAR

1992

MASTER

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ACRONYMS AND ABBREVIATIONS

AEA	Atomic Energy Act
AIS	Air Intake Shaft
AMR	Annual Mitigation Report
AMS	Atmospheric Monitoring Station
ASER	Annual Site Environmental Report
BLM	U.S. Bureau of Land Management
BMP	Best Management Practices
Bq	Becquerel
CAA	Clean Air Act
C&C	Consultation and Cooperation
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (also known as Superfund)
CFR	Code of Federal Regulation
CH-TRU	Contact Handled Transuranic Waste
CT-1	Control 1
CT-2	Control 2
CWA	Clean Water Act
CX's	Categorical Exclusions
CY	Calendar Year
DOE	U.S. Department of Energy
DOE-EML	U.S. Department of Energy, Environmental Measurements Laboratory
DOL	U.S. Department of Labor
EA	Environmental Assessment
EC	Electrical Conductivity
EDF	Environmental Defense Fund

ACRONYMS AND ABBREVIATIONS
(Continued)

EEG	Environmental Evaluation Group
Eh	Oxidation-Reduction Potential
EIS	Environmental Impact Statement
EML	Environmental Measurement Laboratory
EMP	Ecological Monitoring Program
EO	Executive Order
EPA	U. S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
FDA	Fluorescardiacetate Hydrolysis Assay
FEIS	Final Environmental Impact Statement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FLPMA	Federal Land Policy Management Act
FR	Federal Register
FSAR	Final Safety Analysis Report
FT	Feet
FWPCA	Federal Water Pollution Control Act
GSP	Groundwater Surveillance Program
HEPA	High Efficiency Particulate Air (filter)
HMTA	Hazardous Material Transportation Act
HSWA	Hazardous and Solid Waste Amendments
HW	Hazardous Waste
INEL	Idaho National Engineering Laboratory
LLCL	Low Level Counting Laboratory
LWA	Land Withdrawal Act
MOU	Memorandum of Understanding
MPS	Meters Per Second

ACRONYMS AND ABBREVIATIONS
(Continued)

MSHA	Mine Safety and Health Administration
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NES	Nonradiological Environmental Surveillance
NESHAPs	National Emissions Standard for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NM	New Mexico
NMD	No-Migration Determination
NMED	New Mexico Environment Department
NMGF	New Mexico Department of Game and Fish
NMIMT	New Mexico Institute of Mining and Technology
NOD	Notice of Deficiency
NPDES	National Pollution Discharge Elimination System
NRC	Nuclear Regulatory Commission
NW 2	Northwest 2
NWPA	National Waste Policy Act
OEMP	Operational Environmental Monitoring Plan
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyls
pH	Hydrogen-Ion Activity of a System
PRS	Project Records Services
QA	Quality Assurance
QC	Quality Control
RBP	Radiological Baseline Program
RCRA	Resource Conservation and Recovery Act
RES	Radiological Environmental Surveillance

ACRONYMS AND ABBREVIATIONS
(Continued)

ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SE-1	Southeast 1
SE-2	Southeast 2
SEIS	Supplement Environmental Impact Statement
SEN	Secretary of Energy Notice
SERC	State Emergency Response Commission
SHPO	State Historic Preservation Officer
SIC	Standard Industrial Code
SNL	Sandia National Laboratories
SPDV	Site Preliminary Design Validation
SWPPP	Storm Water Pollution Prevention Plan
TDS	Total Dissolved Solids
TRU	Transuranic
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, and Disposal Facility
TSP	Total Suspended Particles
UIC	Underground Injection Control
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds
WIPP	Waste Isolation Pilot Plant
WPSO	WIPP Project Site Office
WQSP	Water Quality Sampling Program

CHAPTER 1

EXECUTIVE SUMMARY

CHAPTER 1

EXECUTIVE SUMMARY

The U. S. Department of Energy (DOE) Waste Isolation Pilot Plant (WIPP) Operational Environmental Monitoring Plan (OEMP) defines a comprehensive set of parameters which are monitored to detect potential environmental impacts and establish baselines for future environmental evaluations. Surface water and groundwater, air, soil, and biotics are monitored for radioactivity levels. Nonradiological environmental monitoring activities include air, water quality, soil properties, meteorological measurements and determination of the status of the local biological community. Ecological studies focus on the immediate area surrounding the WIPP site with emphasis on the salt storage pile. The baseline radiological surveillance covers a broader geographic area including nearby ranches, villages, and cities.

Since the WIPP is still in its preoperational phase (i.e., no waste has been received) certain operational requirements of DOE Orders 5400.1, 5400.5, and the Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance (DOE/EH-0173T) are not relevant. Therefore, this report does not discuss items such as radionuclide emissions and effluents and subsequent doses to the public.

1.1 COMPLIANCE SUMMARY

A summary of significant compliance-related issues and actions at the WIPP between January 1992 through March 1993 is described below. The major environmental statutes and Executive Orders applicable to the WIPP with the compliance status of both and significant issues, actions, and accomplishments at the WIPP facility in the Calendar Year (CY) 1992 (and the first quarter of CY 93) are related to each statute and described in Chapter 3 of this report.

Revision 2 to the Part B application was delivered to the New Mexico Environment Department (NMED) on March 4, 1992. The NMED ruled that the Part A permit application was complete in June 1992. Technical review of the Part B resulted in Revision 3 of the Part B being submitted to the NMED in January 1993. The NMED is currently preparing a draft permit for the WIPP site.

A report titled, "No-Migration Determination Annual Report for the Period of October 1991 through August 1992," was submitted to the Environmental Protection Agency (EPA) Region VI and EPA Headquarters on November 14, 1992, to satisfy the annual reporting requirement of the NMED.

The WIPP validated the bin-case reports for the second through if the bins of waste planned for shipment to the WIPP facility. These reports contain the results of the waste analysis efforts conducted at the Idaho National Engineering Laboratory (INEL) for shipment to the WIPP site. After review of these reports, the WIPP concluded that the bins may be emplaced in the WIPP repository in compliance with the NMED.

Two Underground Storage Tanks (USTs) were removed on December 19, 1991, and the two new tank systems were installed on January 11, 1992. The exhumed tanks have been cleaned and certified as meeting the specifications in the subcontract.

In February 1992 the WIPP submitted the Emergency and Hazardous Chemical Inventory Report for CY 1991 to the New Mexico State Emergency Response Commission, the Eddy County Local Emergency Planning Committee, and the local fire department with jurisdiction over the WIPP site, as required by Section 312 of the Superfund Amendments and Reauthorization Act (SARA) Title III. In March 1993 the WIPP submitted the Emergency and Hazardous Chemical Inventory Report for CY 92 to all the appropriate organizations.

An Environmental Assessment (EA) for expansion of the sewage lagoon was transmitted to the DOE and evaluated. The DOE/AL Compliance Officer has determined that this project is categorically excluded from further National Environmental Policy Act (NEPA) requirements.

The WIPP initiated a training program aimed at educating all WIPP personnel of their responsibilities under RCRA. The level of training provided under the program is equivalent with the employee's current job and duties. All employees now receive RCRA training and General Employee Training (GET) at the WIPP.

On February 3, 1992, a U.S. District Judge ruled on two important cases which have impacted the WIPP site. In the first case, Environmental Defense Fund (EDF) vs. Watkins, the EDF argued that the DOE was stopped from proceeding with the temporary storage of Transuranic (TRU) mixed wastes at the WIPP site, because they had failed to obtain "interim status" to operate a Treatment, Storage, and Disposal (TSD) facility under RCRA. The judge granted the EDF's motion for a summary judgement. This ruling requires that the DOE obtain a RCRA permit from the NMED prior to accepting any TRU mixed waste regulated under RCRA.

In the second case, New Mexico vs. Watkins, the judge ruled to permanently enjoin the DOE from proceeding with Public Land Order 6826 issued on January 22, 1991. This ruling mandated that the DOE either successfully appeal this court decision or obtain a legislative land withdrawal prior to commencement of the test phase.

On July 10, 1992, both cases were ruled upon in the U.S. Court of Appeals for the District of Columbia. The Appeals Court ruling reversed the prior ruling regarding "interim status" on the EDF vs. Watkins. The second case, NM vs. Watkins ruling was upheld regarding administrative land withdrawal, stating that "...the Secretary of the Interior exceeded his authority..." in the administrative transfer of public lands.

On October 30, 1992, President Bush signed the Waste Isolation Pilot Plant Land Withdrawal Act (LWA) transferring land from the public domain for use by the Department of Energy (DOE) for construction, experimentation, operation, maintenance, disposal, shutdown, monitoring, and decommissioning activities at the WIPP. The LWA establishes an extensive regulatory framework with specific requirements to begin and conduct the WIPP Test Phase with radioactive waste and, if all requirements are successfully met, the Disposal Phase.

1.2 ENVIRONMENTAL PROGRAM INFORMATION

The effort to establish environmental baseline conditions at the WIPP site before arrival of waste started in 1975. These studies are continuing to characterize the local environment both radiologically and nonradiologically until the WIPP site is operational. Once this happens, these programs will transition into the operational phase and pertinent data collection will continue throughout the life of the project.

1.2.1 Operational Environmental Monitoring Plan

The WIPP OEMP provides schedules and guidelines for monitoring a comprehensive set of parameters in order to detect and quantify any present or potential environmental impacts. Nonradiological portions of the program focus on the immediate area surrounding the WIPP site. The radiological surveillance generally covers a broader geographic area including nearby ranches, villages, and cities. Environmental Monitoring will continue at the WIPP site during project operations and through decommissioning activities. The sampling activities will continue to be performed at the monitoring location established by the OEMP. Monitoring parameters may be modified to remain a thorough and technically sound program, with revision and approval of the OEMP.

- **Raptor Research Program**

  In CY 92 the WIPP Raptor Management and Research Program sustained a significant reorganization with the boundaries of the research area expanding to approximately 176,000 acres. This expansion incorporated the DOE/BLM Memorandum of Understanding (MOU) concerning raptor management of the Los Medanos. Within this area, 74 distinctly different groups of Harris Hawks were identified. Additionally, 53 active nest sites were discovered and routinely monitored. Reproductive success was high with an average fledgling rate of greater than 2 per nest. This success rate correlates with an increase in precipitation that occurred during CY 92.

- **Reclamation of Disturbed Lands**

  In CY 92 reclamation activities focused on a decommissioned caliche pit one mile north of the WIPP site. This project represented an improved wildlife habitat and was seeded with species endemic to southeastern New Mexico and the Los Medanos. A water absorbing polymer was used to provide a ready water source to young seedlings. As of August 1993 seed germination has been marginal, however, the germination success is typical for the arid climate for southeastern New Mexico.

1.3 ENVIRONMENTAL RADIOLOGICAL PROGRAM INFORMATION

The following subsections present monitoring topics for the subprograms of the OEMP. These programs are consistent with the Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance, (DOE/EH-0173T).

During a pre-operational phase, compliance with DOE Order 5400.1 is required. Once a radiological baseline has been established, many of the radiological sampling programs can continue with the samples collected being archived for possible future analysis. As specifically outlined in the OEMP, five subprograms are being conducted to document the background levels of possible radionuclide pathways leading from the WIPP to the environment and the public.

These five subprograms are presented in the Statistical Summary of the Radiological Baseline Program for the Waste Isolation Pilot Plant (DOE/WIPP 92-037).

1.3.1 Airborne Particulate and Effluent Monitoring

Sampling airborne aerosol particulates was initiated in 1985 and is an important subprogram of the OEMP. The Final Safety Analysis Report (FSAR) (DOE, 1990) identifies the atmosphere pathway as the only credible release pathway which could result in a potential dose to the public. Continuous particulate aerosol samplers operate at eight locations: Three within 1000 meters of the facility boundary, four at local ranches and communities, and one at a sample control site.

The continuous aerosol samplers presently being used maintain a regulated flow rate of approximately 56.6 liters per minute (i.e., two cubic feet per minute) of air through a 47-millimeter (1.9 inch) fiber filter for particulate collection. Particulate filters were collected weekly at all locations and counted at the Low-Level Counting Laboratory at the WIPP site. Gross alpha and beta activities of each filter are counted and a weekly average of the previous 13 weeks (quarterly) is calculated. Table 5-1 of Chapter 5 of this document lists the quarterly alpha and beta concentrations for each sampling location.

1.3.2 Soil Sampling

Soil samples were not collected in CY 92. However, two years of baseline soil analyses were previously documented in DOE/WIPP 92-037.

1.3.3 Groundwater

Groundwater surveillance continued routinely throughout CY 92 with 10 wells sampled. Discussions pertaining to groundwater surveillance are contained in Chapter 7 of this document. The samples were processed and sent to a subcontracted laboratory for analysis.

1.3.4 Surface Water and Sediment Sampling

Surface water and sediment samples were not collected in CY 92. However, two years of baseline analyses were previously documented in DOE/WIPP 92-037.

1.3.5 Game Animals, and Fish Samples

In CY 92 fish, deer, quail, and rabbits were collected (beef was not collected), as required in the OEMP. The samples collected were processed and sent to a subcontracted laboratory for radiological analysis.

1.4 NONRADIOLOGICAL MONITORING INFORMATION

Nonradiological environmental surveillance was conducted in accordance with the OEMP. This program was preceded by the WIPP Biology Program (1975-1982). The program involved six universities and developed an extensive baseline of information describing the major components of the Los Medanos ecosystem prior to the initiation of the WIPP site construction activities.

A significant portion of the nonradiological surveillance was to document fugitive salt dust generated by the surface stockpiling activities on the surrounding ecosystem see (Reith et al., 1985). This study is documented in the Summary of the Salt Impact Studies at the Waste Isolation Pilot Plant 1984 to 1990 (DOE/WIPP 92-038).

1.4.1 Meteorology

A meteorological station provides support for various programs at the WIPP site. The primary function of this station is to generate data to aid in modeling atmospheric conditions for environmental surveillance. The meteorological station records standard meteorological measurements of wind speed, wind direction, and temperature at 3, 10, and 40 meters (10, 32, and 130 ft respectively), with dew point and precipitation monitored at ground level. These parameters are continuously measured and the data is stored as real time data.

The annual precipitation at the WIPP site for CY 92 was 48 cm (18.90 in), which is above the average for this area by 17 cm (6.69 in). The precipitation for CY 92 was 17 percent greater than that recorded for 1991.

In CY 92 the winds in the WIPP site area were consistent with previous data, with prevailing winds from the southeast 25.5% of the time.

1.4.2 Environmental Photography

Surface photographs document disturbance, development, and reclamation activities at the WIPP site and surrounding areas of the U.S. Bureau of Land Management (BLM). In September 1992 the aerial photographs were taken to document changes in the WIPP site area.

Since 1984 surface photography has been conducted semiannually at seven ecological study plots to document surface impacts. Photographs were again taken of the seven sites in September 1992. To date there has been virtually no surface impact.

1.4.3 Air Quality Monitoring

Seven pollutant gases are monitored at the WIPP site on a continuous basis. These gases are: sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), hydrogen sulfide (H_2S), nitrous oxide (NO), nitrous dioxide (NO_2), and oxides of nitrogen (NO_x). In addition, weekly measurements of Total Suspended Particulates (TSP) are collected by the low-volume continuous air sampler at the far-field air sampling location.

1.4.4 Surface Water Quality and Sediment Monitoring

During CY 92 no surface water or sediment sampling was conducted. Preoperational monitoring began in 1985 and continued through 1988 with samples collected annually.

1.4.5 Groundwater

Groundwater surveillance continued routinely throughout CY 92 with 10 wells sampled for water quality. Groundwater Level Surveillance took place utilizing 58 separate well bores, six of which were equipped with production inflatable packers to allow surveillance of more than one production zone through the same well bore. Groundwater level measurements were taken both at the Culebra dolomite in 46 locations and the Magenta dolomite in 11 locations.

1.4.6 Wildlife Population Monitoring

Population density measurements of birds and small nocturnal mammals are performed annually to assess the effects of WIPP activities on wildlife populations.

BIRD DENSITIES

Overall, species distribution patterns between WIPP transits and Control transits remain constant with the most significant species diversity occurring near the facility. More abundant food (i.e., insects drawn to the facility lights) and greater habitat diversity probably account for the increase in numbers of the WIPP transits compared to those of the controls. Insect dependant species (i.e., barn swallows, ash-throated flycatchers and king birds) are prominently increasing predominantly in the immediate vicinity of the WIPP facility.

SMALL NOCTURNAL MAMMAL POPULATION DENSITIES

In CY 92 Ord's kangaroo rats remained the most common species encountered. Plains wood rats were the next most common species encountered. Other species encountered in this area were grasshopper mice, white-footed mice, deer mice, and silky pocket mice.
A greater number of mammals were captured in the control plots than in the WIPP plots. The reason for this is unknown at this time, however, future density measurements may indicate a reason for this difference.

1.4.7 Surface and Subsurface Soil

During CY 92 the quarterly sampling of the surface soil and annual deep series was not conducted. When conducted the subsurface soil is collected at two depths, 30 to 45 centimeters (i.e., 11.8 to 17.7 inches) and 60 to 75 centimeters (i.e., 23.6 to 29.5 inches). With an adequate baseline established and the WIPP being in a pre-operational phase, no samples were collected in CY 92.

1.4.8 Vegetation Monitoring

A pattern observed from the 1989-1992 indicated an increase in shrub cover in the proximity of the salt piles. Although densities of annuals and species richness were greater in the near field plots. The responses of these plots to higher rainfall in later years will reveal whether this pattern is reflecting the start of significant changes or short-term effects (e.g., weather conditions) in the structure of the plant community. Weather conditions have a uniform effect on vegetation in all plots. A differential effect resulting from salt-induced physiological stress near the salt tailings was not observed.

1.5 QUALITY ASSURANCE

This document adheres to policies set forth by federal Quality Assurance (QA) regulations including: ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities, (ASME, 1989) and EPA, QAMS-005/80, Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, (EPA, 1980), and fulfills the requirements of the QA plan specified in DOE Orders 5400.1 (DOE, 1988d), 5400.3 (DOE, 1988e), 5700.6C (8/21/91) and the Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance (DOE/EH-0173T).

CHAPTER 2

INTRODUCTION

CHAPTER 2

INTRODUCTION

This is the WIPP Annual Site Environmental Report (ASER) for CY 92. The purpose of the WIPP as mandated by Public Law 96-164 is to provide a research and development facility to demonstrate the safe disposal of TRU wastes generated by the defense activities of the U.S. Government.
This document is prepared in accordance with the guidance contained in DOE Order 5400.1, General Environmental Protection Program Requirements (DOE, 1990); DOE Order 5400.5, Radiation Protection of the Public and the Environment (DOE, 1990); DOE/WIPP 91-054, Environmental Protection Implementation Plan, and DOE/EH-0173T, Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance. The above orders require DOE facilities to submit an ASER to the office of EH-1.

This report provides a comprehensive description of environmental activities at the WIPP during CY 92. These activities are described in the Operational Environmental Monitoring Plan for the Waste Isolation Pilot Plant (i.e., DOE/WIPP 88-025). This plan defines the scope and extent of the WIPP effluent and Environmental Monitoring programs during the pre-operational life of the site.

It also discusses the QA and Quality Control (QC) programs which ensure that samples collected and the analytical data obtained are representative of actual conditions at the WIPP site.
The OEMP is the guidance document that all environmental monitoring programs follow, with the purpose of ensuring that all appropriate sampling efforts are in place to establish the amount and type of naturally occurring radioactivity in the WIPP area before the WIPP site is operational and provide a database for comparisons between pre-operational and operational environmental conditions once the WIPP site is operating as a waste repository for TRU waste.

The OEMP was prepared in accordance with the guidance contained in DOE Order 5400.1 and DOE Order 5400.5, Radiation Protection of the Public and the Environment (DOE, 1988b), that was subsequently issued as DOE Order 5400.5 in February 1990 (DOE, 1990). Since waste has not been received, certain elements of DOE Order 5400.1 are not yet relevant to the WIPP environmental monitoring program (i.e., no discussion is included of radionuclide emissions with subsequent calculation of doses to the public).

The OEMP is reviewed and updated, as required by DOE Order 5400.1, to address enhancements and general changes to be implemented due to experience gained from these monitoring programs.

2.1 DESCRIPTION OF THE WIPP PROJECT

The WIPP is a project that was authorized by the DOE, National Security, and Military Applications of Nuclear Energy Authorization Act of 1980 (i.e., Public Law 96-164). Its legislative mandate, is to provide a research and development facility to demonstrate the safe disposal of radioactive waste resulting from national defense activities and programs. To fulfill this mandate, the WIPP has been designed to perform scientific investigations of the behavior of bedded salt and the interactions between the salt and radioactive wastes and demonstrate safe and efficient handling, transport, and emplacement of TRU (mixed) waste in a fully operational disposal site.

It is expected that operations involving radioactive waste will begin upon receipt of test phase wastes shipped to the WIPP site from the INEL and the Rocky Flats Plant in Colorado. This TRU waste material is contaminated with alpha emitting radionuclides greater than 100 nCi/g. General criteria defining the various categories of radioactive waste including TRU waste appear predominant as radionuclides contamination.

Following the initial receipt of TRU waste, the WIPP is expected to begin a five to seven year test phase. Although designated to receive wastes over a 25 year period, permanent disposal of wastes at the WIPP site will not begin until data obtained during this test phase indicates that the disposal of radioactive mixed waste is protective of human health and the environment.

Subsequent to a successful completion of the test phase, the WIPP site will be designated as an operational facility and TRU wastes will be transported from generator/storage sites around the United States to the WIPP site.

The TRU waste to be received from the generator sites will be transported to the WIPP site via tractor-trailer trucks. Each truck can haul up to three TRU Package Transporters (TRUPACT IIs), and each transporter will contain 14, 55 gallon drums or two standard waste boxes. The TRUPACT II is a durable, reusable container that has been approved by the Nuclear Regulatory Commission (NRC) to transport contact-handled transuranic waste to the WIPP.

Once the TRUPACT IIs have arrived at the WIPP and are transported into the Waste Handling Building, the waste containers will be removed from the TRUPACT II configured to support scientific analysis during the test phase, placed on the waste handling hoist, and lowered to the repository level of 655 m (2150 feet) below the surface. During the disposal phase, waste containers will be removed from the hoist and emplaced in excavated storage rooms in the Salado formation, (i.e., a thick sequence of salt beds deposited approximately 250 million years ago in the Permian Age). After filling the storage areas, specially designed seals and plugs will be placed in the excavated storage rooms and in the shafts. The plastic self-healing nature of the salt formation will result in a gradual creep closure, causing encapsulation and isolation of the waste within the Salado formation.

During site operations, the underground area will be ventilated with ambient air that enters the Air Intake Shaft, the Salt Handling Shaft, the Waste Handling Shaft, and exits through the Exhaust Shaft. In the event of an underground accident involving radioactivity, exhaust air can be circulated at a reduced flow rate through the Exhaust Filter Building. This building contains banks of High Efficiency Particulate Air (HEPA) filters that remove potentially contaminated particulates.

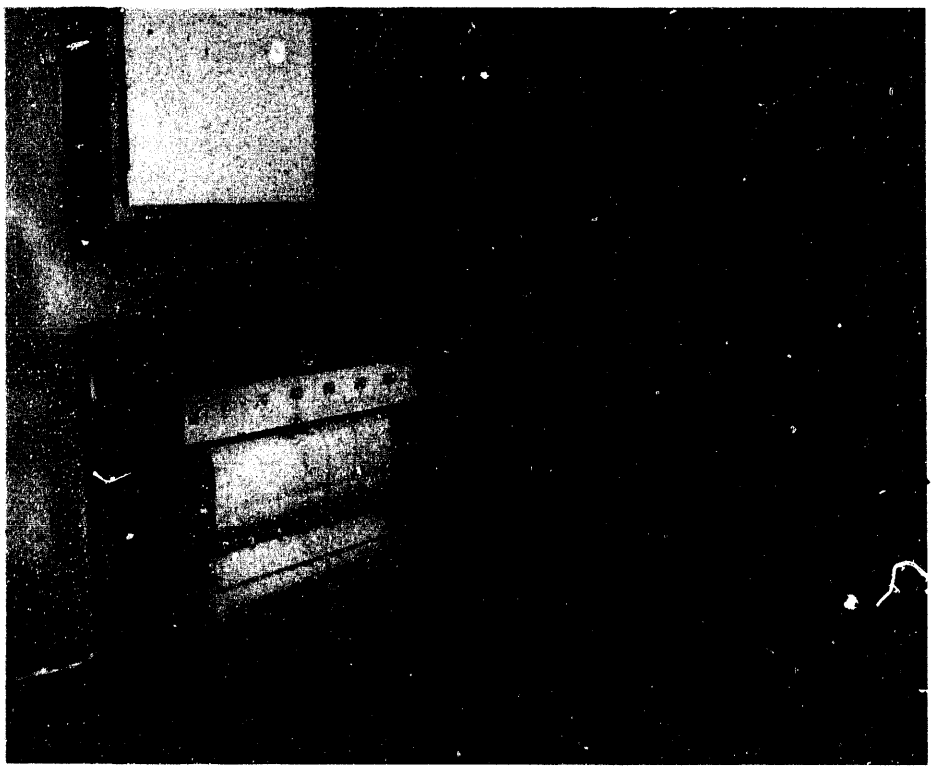
2.2 DESCRIPTION OF THE ENVIRONMENT & LANDS

The WIPP site is located in Eddy County in southeastern New Mexico (Figure 2-1). The WIPP site is approximately 40 kilometers (26 miles) east-southeast of Carlsbad, New Mexico in an area known as Los Medanos (i.e., the dunes). This area is a sparsely inhabited plateau with little water and limited land uses. The WIPP site boundary extends at least one mile or 1.6 kilometers beyond any underground development and is defined on the surface by the 16 section (4,146 ha) Land Withdrawal Area. On October 30, 1992, the WIPP Land Withdrawal Act, Public Law 102-579 was signed by President Bush transferring the land from DOI to DOE. A draft WIPP land management plan, DOE/WIPP 93-004, is being prepared and submitted to Congress by October 30, 1993. Other land uses in the surrounding areas include potash mining, exploring for and/or extracting oil and natural gas, recreational uses (i.e., hunting, trapping, and birdwatching) and other permitted uses by the BLM.

The WIPP site consists of 16 sections (4,146 ha) of federal land in Township 22 South, Range 31 East. Except for the one square mile (2.59 square kilometers) encompassing the facility known as the DOE Exclusive use area, the surface land uses remain largely unchanged. Mining and drilling for purposes other than support of the WIPP project are restricted within the 16 section (4,146 ha) area.

The WIPP site is divided into zones as represented in Figure 2-1. Zone I is surrounded by a chain-link fence which includes all major surface facilities. Zone II indicates the maximum extent of underground development. The WIPP site boundary extends at least 1.6 kilometers (one mile) beyond any underground development and is defined on the surface by the 16 section (4,146 ha) Land Withdrawal Area. This boundary provides a functional barrier of intact salt between the underground region defined by Zone II and the accessible environment.

The nearest residents to the WIPP site include eight individuals living at the Mills Ranch, 5.3 kilometers (3.5 miles) south-southwest of Zone 1 of the site, and two individuals living at the Smith Ranch, 11.3 kilometers (seven miles) west-northwest of Zone 1 of the site. Both ranches are continuously monitored as part of the environmental monitoring program. Also included in the monitoring program is the headquarters for the International Minerals and Chemical Corporation Potash Mine, located 14.5 kilometers (nine miles) west-northwest of Zone 1 of the site. Detailed demographic summaries and projections are listed in the WIPP Final Environmental Impact Statement (FEIS) (DOE, 1980), Final Supplement Environmental Impact Statement (SEIS) (DOE, 1990), and the WIPP Final Safety Analysis Report (FSAR) (DOE, 1990).



Proper preventative maintenance practices are an important factor in maintaining equipment reliability.

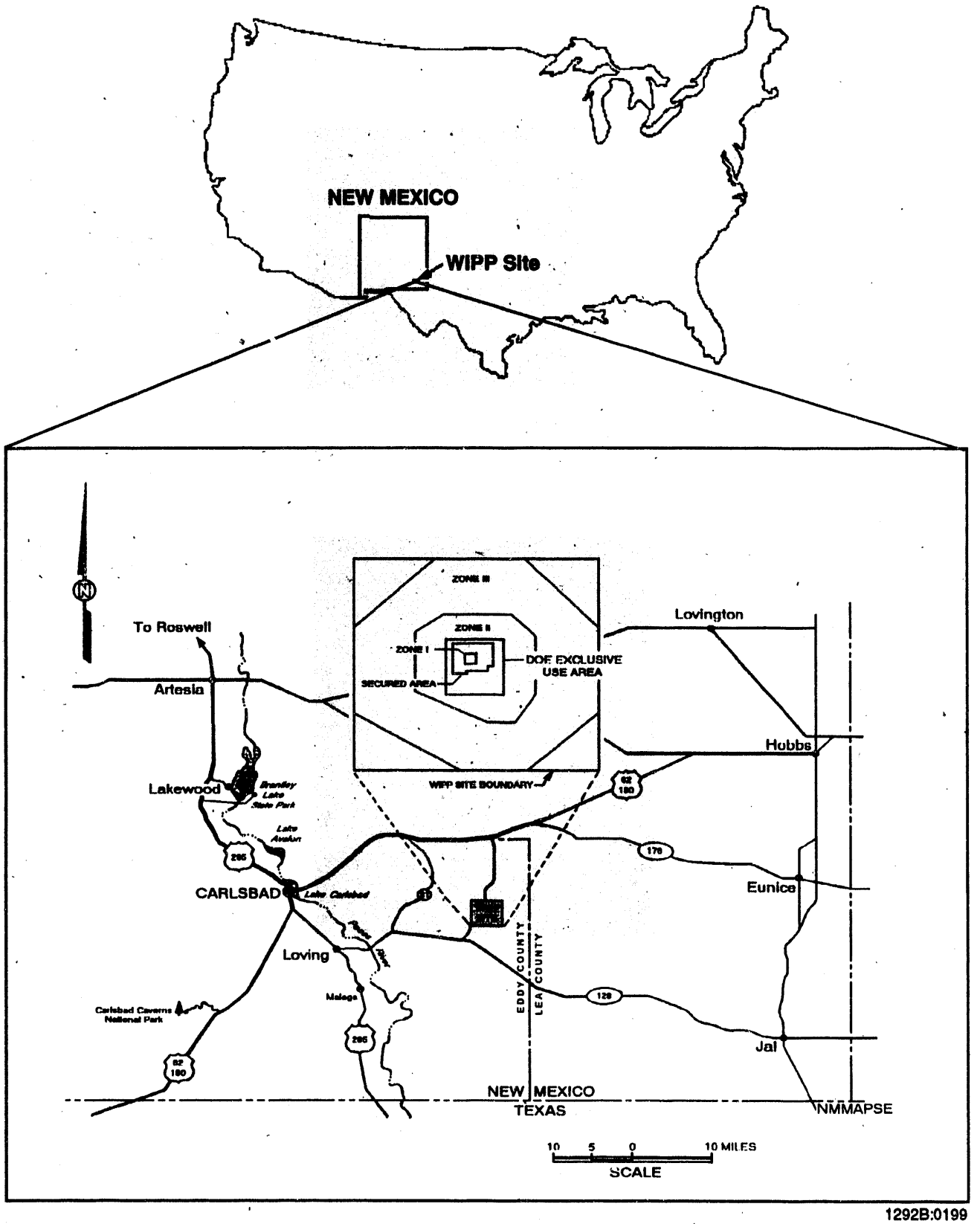


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Figure 2-1
Location Of The WIPP Site

CHAPTER 3

COMPLIANCE SUMMARY

CHAPTER 3

COMPLIANCE SUMMARY

The WIPP is required to comply with all applicable federal and state laws and regulations. Documentation of required federal and state permits, notifications, and approvals is maintained by the Environment, Safety and Health Department of the Management and Operating Contractor (MOC). Regulatory requirements are implemented by incorporating them into facility plans and procedures.

Table 3-1, provides a summary of the major Federal and New Mexico statutes applicable to the WIPP Project; Table 3-2, presents DOE Orders and Agreements Affecting the WIPP environmental program; Table 3-3, is a Summary Of Agreements Between the DOE and the State of New Mexico that affect the environmental program; Table 3-4, details active environmental permits for the WIPP in CY 92 and the first quarter of CY 93.

3.1 COMPLIANCE ASSESSMENT FOR CALENDAR YEAR 1992

In 1992 the WIPP remained in compliance with applicable federal and state environmental regulations. Section 3.2 lists the major environmental statutes and executive orders applicable to the WIPP followed by its compliance status with each significant issue, action, and accomplishment. Section 3.3 describes other significant environmental issues, actions, and accomplishments at the WIPP facility in CY 92.

3.2 COMPLIANCE STATUS

This section states the WIPP's status of compliance with the following regulatory requirements as required for the facility.

3.2.1 Atomic Energy Act of 1954 (AEA) (42 U.S.C. sec. 2011 et seq.)

The AEA establishes a national program for research, development, and utilization of atomic energy for both national defense and domestic civilian purposes. Section 161 of the AEA provides that the Atomic Energy Commission (succeeded by the DOE for national defense purposes) is authorized to prescribe regulations and orders to:

> Govern any activity authorized pursuant to [the AEA], including standards, and reference restrictions governing the design, location, and operation of facilities used in the conduct of such activity, in order to protect health and to minimize danger to life or property.

The authority of the DOE to develop policies, issue orders, promulgate regulations (i.e., addressing environment, safety and health protection aspects) regarding radioactive waste and nuclear materials is derived directly from the AEA. The EPA has also derived its authority to establish generally applicable standards for the protection of the public and the environment from ionizing radiation from the AEA.

The DOE under the authority of the AEA and in accordance with various Executive Orders (EOs) uses a system of Orders, Notices, and Directives to carry out the mandate to implement effective and consistent programs to protect the public, the environment, and employees from adverse consequences resulting from the DOE operations. Implementation of those Orders dealing with environmental monitoring and surveillance is addressed in the Operational Environmental Monitoring Plan (OEMP) for the WIPP.

Most of the waste to be managed at the WIPP site is considered radioactive mixed waste because it contains both radioactive components regulated by the AEA and hazardous components regulated by RCRA. RCRA contains qualified provisions making the act inapplicable to activities or substances authorized by or regulated under the AEA. Two different sections of RCRA address these exclusions:

- The Solid Waste Exclusion. RCRA sec. 1004(27) defines a solid waste as a solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, agricultural operations, and community activities. This definition specifically excludes "source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended."

- The Inconsistency Exclusion. RCRA sec. 1006(a) provides the following: "Nothing in this Act shall be construed to apply to (or to authorize any state, interstate, or local authority to regulate) any activity or substance which is subject to [listed acts] or the Atomic Energy Act of 1954 . . except to the extent that such application (or regulation) . . . is not inconsistent with the requirements of such Acts." [Emphasis added.]

Radioactive mixed waste to be emplaced at the WIPP site is subject to dual regulation under both the AEA and RCRA. The radioactive constituents of the waste are regulated under the AEA and the hazardous constituents are regulated under RCRA.

3.2.2 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. sec. 9601 et seq.), including the Superfund Amendments and Reauthorization Act of 1986 (SARA)

The CERCLA, or "Superfund," and the SARA establish a comprehensive federal strategy for responding and establishing liability for releases of hazardous substances from a facility to the environment. Hazardous substance cleanup procedures are specified in the National Contingency Plan (NCP) in Title 40 CFR Part 300. No release sites have been identified at the WIPP facility that would require cleanup under the provisions of the CERCLA. Any spills of hazardous substances of reportable quantities will be reported to the National Response Center under the provisions of the CERCLA sec. 103 and Title 40 CFR Part 302.

The WIPP facility is required to report under Sections 311 and 312 of SARA Title III, also known, as the Emergency Planning and Community Right-to-Know Act (EPCRA). Required reports under these two sections are submitted to the State Emergency Response Commission (SERC), the Local Emergency Planning Committee (LEPC), and the local fire department. All reports issued by the WIPP under EPCRA have been submitted in advance of the stipulated reporting deadlines. The WIPP also submits Section 311 data and Section 312 Annual Reports to the Hobbs Fire Department and the Otis Fire Department. The DOE maintains Memoranda of Understanding (MOUs) with each of these agencies for emergency response purposes.

The WIPP facility is not required to report under Section 313 of the EPCRA. The WIPP is a Research and Development (R&D) facility and does not fall under any of the applicable Standard Industrial Codes (SICs) identifying facilities that are regulated under Section 313.

3.2.3 Resource Conservation and Recovery Act (RCRA)(42 U.S.C. sec. 3251 et seq.)

The RCRA was enacted in 1976 and implementing regulations were promulgated in May 1980. This body of regulations is intended to ensure that hazardous wastes are disposed of in an environmentally safe manner. Facilities that store, treat, or dispose of hazardous waste also must protect human health and the environment. The Hazardous and Solid Waste Amendments (HSWA) of 1984 created a set of restrictions on the land disposal of hazardous wastes unless certain treatment standards are satisfied. HSWA also places increased emphasis on waste minimization activities and serves as a mechanism to enforce cleanup.

WIPP has not received any Notices of Noncompliance. In June 1992 the New Mexico Environment Department (NMED) ruled that the Part A was complete. A revision to Part B of the permit application was submitted to the NMED in March 1992. This revision was prepared after discussions with the NMED over the level of detail on waste characterization and on facility design information to be included in the application. In July 1992 the NMED ruled that the Part B was administratively complete. The NMED initiated the technical review process from August through December 1992. The DOE responded to three requests for additional information and to a Notice of Deficiency (NOD). The NOD was sent to the DOE on December 18, 1992; and resulted in the issuance of Revision 3 of the permit application in January 1993. The NMED's major concerns dealt with waste characterization, waste acceptance, waste retrieval, facility closure, and the scope of the testing. The NMED is now in the process of preparing the draft permit for the WIPP site. This draft permit was issued for comment in August 1993.

Hazardous-Waste Generator Compliance

In CY 92 the WIPP remained in compliance with the RCRA hazardous waste generator requirements as codified in Title 40 CFR Part 262. The Hazardous Waste (HW) section purchased an additional storage connex to augment the existing 90-day staging capacity for hazardous waste. The hazardous waste satellite accumulation areas and the Hazardous Waste Staging Area at the WIPP are operated by written procedure and are inspected routinely in accordance with RCRA requirements. All hazardous waste generated at the WIPP facility in 1992 was transported off-site for disposal at an approved Temporary Storage and Disposal Facility within the 90-day accumulation time required by RCRA.

No-Migration Determination Compliance

On November 14, 1990, the EPA published the Conditional No-Migration Determination (NMD) for the WIPP in the *Federal Register* (55 FR 47700). Three of the conditions stipulated in the NMD are listed below:

- Implementation of an air monitoring plan as described in Section IV.K of the proposed variance (55 FR 13068, April 6, 1990).
- Submission of annual written NMD reports.
- Notification to EPA of any changes in the unit and/or environment that significantly depart from the conditions described in the variance and affect the potential for migration of hazardous constituents from the unit.

The WIPP has developed and implemented a volatile organic compound (VOC) monitoring program at the WIPP to satisfy the air monitoring requirement of the NMD. Air samplers have been installed at five locations (three underground and two on the surface), and samples are collected and analyzed on a routine basis. One of these samplers is considered a source monitor, it is designed to collect gases vented from the test bins containing experimental waste. The gases are diverted via a manifold system through a carbon sorption device which is designed to achieve a control efficiency of greater than 95%, prior to collection.

A report entitled, "Waste Isolation Pilot Plant No-Migration Determination Annual Report" for the Period October 1991 through August 1992 (DOE/WIPP 92-057), was submitted to EPA Region VI and EPA Office of Solid Waste and Emergency Response on November 11, 1992, to satisfy the annual reporting requirement of the NMD. This report contains the following information regarding WIPP activities in CY 1992:

- A description of the tests to date and their results [described in "WIPP Test Phase Plan: Performance Assessment" (DOE, 1990e)]
- Modifications to the test plan
- A summary of DOE's understanding of the repository's performance
- Waste characterization data from pretest waste characterization
- An annual data summary of air monitoring data

The DOE-WPSO received comments on this report from the EPA Region VI in January 1993 and revision 1 of the report was addressed and submitted to the EPA in February 1993.

Any changes in conditions that depart significantly from the conditions described in the *No-Migration Variance Petition* (DOE, 1990d) and that affect the potential for hazardous constituents to migrate from the unit must be reported in writing to the EPA. In addition the detection of any migration of hazardous constituents will trigger the suspension of receipt of mixed waste at the WIPP and must be reported to the EPA. A WIPP procedure has been issued to ensure that these conditions are met. The procedure requires that a No-Migration Determination Review Task Force reviews proposed and unplanned changes in conditions at the WIPP and/or the surrounding environment, evaluate the significance of those changes with respect to the conditions set forth in the NMD and recommend that appropriate action be taken. No such changes have been implemented at the WIPP facility.

During 1992 the DOE-WPSO validated the bin-case reports for the second through fifth bins of waste planned for shipment to the WIPP site. These reports contain the results of waste characterization efforts conducted at the sites generating and/or storing waste planned for shipment to the WIPP site. After a review of these reports the DOE-WPSO concluded that these bins could be emplaced and safely managed at the WIPP site in compliance with the NMD and other applicable regulatory criteria.

Mixed-Waste Management Test Phase

On July 25, 1990, the state of New Mexico received final EPA authorization to regulate radioactive mixed waste. In a letter dated August 27, 1990, the state of New Mexico notified the WIPP that Parts A and B of the RCRA permit application for the WIPP were due by January 22 and February 28, 1991, respectively. On January 22, 1991, the Part A permit application was delivered to the State and the EPA Region VI Office in Dallas, Texas (DOE, 1991b). The Part B permit application was delivered to the State on February 26 and to EPA Region VI on February 27, 1991. The DOE-WPSO submitted Revision 1 and Revision 3 of the Part B permit application in March 1992 and January 1993 respectively.

Underground Storage Tanks

During 1991 the DOE-WPSO removed and replaced two 8000-gallon Underground Storage Tanks (USTs) used for storage of petroleum fuel products at the WIPP site. As reported in the 1990 Site Environmental Report (DOE, 1991c), these tanks were tested for tightness on September 28, 1990. A leak was detected in the associated piping above the tanks. The NMED granted the DOE-WPSO two 180-day extensions in March and September of 1991 to remove the tanks. They were removed on December 19, 1991, and the two new tank systems were installed on January 11, 1992, and put into service in October 1992. After contract negotiations the former tanks were cleaned on February 5, 1993, by Cline Pump, Inc. Written certification from Cline Pump, Inc., has been received stating that the two petroleum tanks have been cleaned to the standards disclosed in the original contract. All tank closure records have been maintained according to New Mexico UST Bureau regulations.

Training

The DOE-WPSO initiated a graded training program aimed at educating all WIPP personnel to their responsibilities under the RCRA. The level of training provided under this program is equal with the employee's job and duties. A training matrix has been developed which delineates each hazardous waste management employee's title, RCRA course requirements, and position starting date. This matrix is reviewed quarterly by WIPP managers to ensure that employees receive training relevant to their assigned job duties in order to perform them in a safe and healthful manner. As a RCRA-regulated facility, all WIPP employees must understand the basic regulatory requirements under which the WIPP facility must operate. All WIPP facility employees receive introductory RCRA training.

3.2.4 National Environmental Policy Act (NEPA) (42 U.S.C. sec. 4321 et seq.)

The NEPA was enacted to require the Federal government to use all practicable means to consider potential environmental impacts as part of the decision making process regarding the implementation of new projects and activities. NEPA dictates that the public be allowed to review and comment on proposed projects that might have the potential to significantly affect the environment. The NEPA directs the federal government to use all practicable means to improve and coordinate federal plans, functions, programs and resources. NEPA contains several "action-forcing" provisions like:

> Utilizing an interdisciplinary approach in planning and decision making, ensuring appropriate consideration of unquantified environmental values, developing alternatives to proposals involving conflicts over use of resources, making environmental information generally available, and including a "detailed statement" on environmental impacts of "major federal actions significantly affecting the quality of the human environment".

NEPA procedural objectives and extensive public involvement requirements are detailed in the Council on Environmental Quality regulations implementing NEPA in Title 40 CFR Parts 1500-1508.

To satisfy NEPA requirements, the Final Environmental Impact Statement (FEIS) was issued in October 1980 (DOE, 1980), followed by the Record of Decision (ROD) to the FEIS (DOE, 1981), which was published in the *Federal Register* on January 28, 1981.

The ROD concluded that the Los Medanos (WIPP) site in southeastern New Mexico would be acceptable for the long-term disposal of Transuranic (TRU) waste with "minimal risk of any release of radioactivity to the environment." The ROD noted:

> If significant new environmental data results from the Site Preliminary and Design Validation (SPDV) program or other WIPP project activities, the FEIS will be supplemented as appropriate to reflect such data, and this decision to proceed with phased construction and operation of the WIPP facility will be reexamined in the light of that supplemental NEPA review.

Consistent with this commitment and to further the purposes of NEPA, the DOE issued the Final Supplement Environmental Impact Statement (SEIS) in January 1990 (DOE, 1990a) to address changes in the proposed action and the development of new geologic and hydrologic information. Theses changes included altering the composition of the waste inventory, transporting waste to the WIPP site, conducting a Test Phase, and managing TRU waste mixed with hazardous constituents. The DOE's ROD to proceed with the Test Phase was published on June 22, 1990 (DOE, 1990c).

In accordance with the commitments made in the ROD for the WIPP SEIS, the DOE will issue another SEIS prior to deciding whether to proceed with the Disposal Phase at the WIPP site.

The DOE released DOE Order 5440.1D, National Environmental Policy Act Compliance Program, on February 2, 1991. This revision incorporates a conservative interpretation of NEPA with a number of new requirements to support direction provided in Secretary of Energy Notice SEN-15-90. One new requirement was a Mitigation Action Plan (MAP) to be prepared "for implementation of any commitments made in an EIS/ROD for mitigation of environmental impacts associated with an action" [DOE, 1991d, 7(a)(23)]. A MAP was prepared based on both RODs and the final was submitted to DOE on July 10, 1991. The commitments described in the MAP will be tracked and reported annually as required by DOE Order 5440.1E [7(a)(24)], in the WIPP Annual Mitigation Action Plan Report (AMR).

DOE Order 5440.1E updates the National Environmental Policy Act Compliance Program to meet the final DOE NEPA Rule codified at 10 CFR 1021. This rule revises provisions of DOE's Guidelines for Implementing the Procedural Provisions of NEPA and consolidates changes required by certain policy initiatives instituted by the Secretary of Energy for participation of the public and affected states. The Rule also includes a revised and expanded list of Categorical Exclusions (CXs). CXs are classes of actions that normally do not require the preparation of either an environmental assessment or impact statement.

A WIPP NEPA compliance program has been developed to ensure the requirements of the NEPA are fulfilled at the WIPP site. This includes those responsible for the planning, coordination, and performance of work follow the provisions of NEPA and is applied appropriately for all work and locations performed at the WIPP Project. Furthermore, the NEPA Compliance Program details the actions taken in the evaluation of work documents for NEPA Compliance in accordance with DOE Order 5440.1E and SEN 15-90.

A draft WIPP NEPA Compliance Program was developed and issued for review and comment. Due to the newly codified DOE NEPA Rule, the issuance of DOE Order 5440.1E and other DOE NEPA information, the WIPP NEPA compliance program is being revised to reflect current changes. These changes include, but are not limited to, evaluation of cumulative impacts, timing of NEPA documents, and incorporating waste minimization and pollution prevention into the NEPA process.

The WID NEPA Coordinator tracks and monitors related work for compliance to the NEPA requirements. A NEPA training module was implemented to train those responsible for the planning, coordination, and performance of work at the WIPP in the requirements of NEPA.

3.2.5 Clean Air Act (CAA) (42 U.S.C. sec. 7401 et seq.)

The CAA provides for the preservation, protection, and enhancement of air quality, principally in areas of special interest (i.e., natural, recreational, scenic, or historic value).

Hazardous air pollutant emissions are regulated under Title 40 CFR Part 61 of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) of the CAA. Title 40 CFR Part 61, Subpart H, applies to the WIPP facility with respect to future emissions of radionuclides from a DOE facility. A revised standard for Subpart H radionuclide emissions was declared by the EPA in a final rule published in the *Federal Register* on December 15, 1989, (EPA, 1989). The DOE will ensure compliance with this standard after receipt of TRU waste at the WIPP site.

The DOE-WPSO conducted a hazardous air pollutants inventory for the WIPP in 1992. The results of this inventory indicated that the DOE-WPSO is not required to obtain an operating permit under the Clean Air Act. The Hazardous Air Pollutant emission levels are below quantities which would require a permit.

3.2.6 Clean Water Act (CWA) (or Federal Water Pollution Control Act of 1972) (33 U.S.C. sec. 1251 et seq.)

Section 402 of the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) program establishes the requirements for regulating industrial storm water discharges that have the potential to discharge into waters of the United States. The WIPP will demonstrate that the WIPP site does not have a discharge of regulated storm waters through the use of Best Management Practices (BMP's). This includes engineering controls, storm water retention basins, the covering of materials storage areas, and the reclamation of disturbed zones.

The WIPP submitted a Notice of Intent to the EPA to obtain a National Pollutant Discharge Elimination System (NPDES) Storm Water General Permit. On December 31, 1992, the EPA issued the New Mexico NPDES Storm Water General Permit (NMR00A021). As part of the Nationwide General Permit Program, the WIPP is included in the New Mexico General Permit.

The WIPP is currently developing the WIPP NPDES Storm Water Pollution Prevention Plan (PPP). The NPDES Storm Water Permit Rules require that a PPP be developed for each facility covered under the permit by April 1, 1993. The PPP will identify and assess potential pollutant sources, and describe all BMPs which will be implemented to ensure that storm water discharges do not contact regulated pollutants. Additionally, the WIPP will outline a schedule for the implementation of all BMPs required to demonstrate compliance with all permit requirements.

Approximately 40,000 gallons of non-hazardous brine are generated at the WIPP site each month. These waters are generated by seepage between stratigraphic formations in the ungrouted Air Intake Shaft, and from the pumping of observation wells at the WIPP. In January 1992 an emergency discharge permit was applied for and received from the NMED to accommodate the 40,000 gallons of brines generated monthly. Mine water is now collected in portable tanks and is hoisted to the surface where it is pumped to the WIPP site salt pile evaporation basin. The brines were sampled and analyzed to demonstrate that they were non-hazardous prior to disposal. Successive analytical studies have demonstrated that site-generated brines are non-hazardous and can be pumped to the main salt pile evaporation basin for disposal.

The permanent disposal/prevention of site-generated brines will be accomplished by the expansion of the WIPP sewage treatment facility and by the grouting of the Air Intake Shaft (AIS). The grouting of the AIS began in May of 1993 and will reduce the volume of site-generated brine by approximately 90 percent.

The WIPP has applied for and received an approved Discharge Plan (DP-831) for the WIPP sewage facility. The approved Discharge Plan supersedes the emergency discharge permit of January 1992. The Discharge Plan approves the construction, sampling, and, management requirements for the facility. The expansion of the sewage system involves the construction of a lined evaporation pond which is divided into two "cells".

The new evaporation pond will be located down-gradient of the existing evaporation pond. The south cell of the new pond shall be used to evaporate sewage effluent only. The north cell shall be used to evaporate brine waters from mine de-watering and for evaporation well water that has been mixed with sewage effluent. Brine waters shall be hauled to the north cell by water truck, and then pumped from the water truck into the north cell. After the two new cells are brought into operation the existing evaporation basin shall be lined with a 30 mil synthetic liner. The expansion of the system is scheduled to be completed in June 1993.

3.2.7 Safe Drinking Water Act (SDWA) (42 U.S.C. sec. 300f et seq.)

The SDWA of 1974 as amended, provides the regulatory strategy for protecting public water supply systems and underground sources of drinking water. As defined in implementing regulations in Title 40 CFR Part 141.2, these are systems that provide water for human consumption and that have at least 15 connections or regularly serve at least 25 people.

The SDWA also protects underground sources of drinking water from underground injections of contaminated fluids. Underground injection defined as, "subsurface emplacement of fluids by well injection" in sec. 1421(d) of the SDWA is governed by the Underground Injection Control (UIC) program under the Part C regulations in Title 40 CFR Part 144.

Because the WIPP site receives water from an off-site supplier it has neither developed or maintained a public water supply system as defined by the SDWA and its implementing regulations. The nearest underground source of drinking water to the WIPP site is the Dewey Lake Redbeds, a perched water table located approximately 3.5 miles to the south with no hydrogeologic connection to the WIPP site. Therefore, the SDWA and its implementing regulations do not apply to the WIPP site.

> In Natural Resources Defense Council NRDC v. EPA [824 F.2d 1258 (1987)], the court linked deep geologic disposal of nuclear wastes to the UIC concept in the SDWA. The individual protection requirements of the EPA radiation protection standards in Title 40 CFR Part 191.15 were remanded because the 25 mrem and 75 mrem to any organ dose limits were deemed inconsistent with the SDWA standard of 4 mrem for public drinking water supplies. These regulations have not yet been repromulgated. (*Reference section 3.2.14*).

3.2.8 Toxic Substances Control Act (TSCA) (15 U.S.C. sec. 2601 et seq.)

The TSCA applies primarily to manufacturers, importers, and processors of toxic chemicals for commercial purposes. The WIPP site is not considered a manufacturer or processor of chemical products, and most of the provisions of TSCA do not apply. The TSCA regulates the use of Polychlorinated Biphenyls (PCBs), asbestos, and materials containing PCBs and asbestos. DOE policy prohibits the use of PCB-containing materials in DOE-installed equipment at facilities like the WIPP site. Therefore, TSCA would not apply to DOE-installed equipment. At the present, TSCA does not apply to the WIPP repository because there are no plans to ship PCB-contaminated wastes to the WIPP site. The WIPP site will comply with TSCA regulations contained in Title 40 CFR Parts 761.60 and 761.65, with respect to any possible future storage or disposal of PCB-contaminated materials. Procurement of asbestos containing materials is also prohibited at the WIPP site.

3.2.9 Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 U.S.C. sec. 136 et seq).

The FIFRA authorizes the EPA to regulate the registration, certification, use, storage, disposal, transportation, and recall of pesticides. The EPA at its discretion may exempt federal agencies from any FIFRA provisions if emergency conditions exist (Title 40 CFR Part 166). Recommended procedures for storage and disposal of pesticides and pesticide containers are contained in Title 40 CFR Part 165. FIFRA standards are considered mandatory for DOE facilities. DOE will continue to comply with the standards of FIFRA at the WIPP site.

3.2.10 Endangered Species Act (ESA) (16 U.S.C. sec. 1531 et seq).

The ESA provides protection for threatened or endangered species of flora and fauna. Under Section 7 of the Act and implementing regulations in Title 50 CFR Part 402, the EPA is prohibited from authorizing activities likely to jeopardize the continued existence of any threatened or endangered species or its critical habitat. The Section 7 process may involve a biological assessment and "formal consultation" followed by the issuance of a "...nor biological opinion" by the U.S. Fish and Wildlife Service for any species that is determined to be in potential jeopardy. According to the WIPP FEIS (DOE, 1980) and the SEIS (DOE, 1990a) the U.S. Fish and Wildlife Service lists four threatened or endangered species of plants or animals that could occur at the WIPP site. The U.S. Fish and Wildlife Service has determined that WIPP facility activities will have no adverse impacts on these species (Stigman, 1979).

The New Mexico Department of Game and Fish, and the U.S. Fish and Wildlife Service also lists 52 possible threatened and endangered species to be encountered in southeastern New Mexico. No critical habitat for terrestrial endangered species has been identified at the WIPP site (Stigman, 1979). Neither has a formal consultation nor biological opinion processes been required for the WIPP project by the U.S. Fish and Wildlife Service under Section 7.

3.2.11 National Historic Preservation Act (NHPA) (16 U.S.C. sec. 470 et seq.)

The NHPA was enacted to protect the nation's cultural resources and established the National Register of Historic Places. Since 1976, cultural resources investigations have recorded 98 archeological sites and numerous isolated artifacts within the 16-square-mile area enclosed by the WIPP site boundary. Thirty-three sites are recorded within the central 4-square-mile area, including all of Zones I and II were determined eligible for inclusion in the National Register as an archeological district. Investigations since 1980 have recorded an additional 14 individual sites outside the central 4-square-mile area that are considered eligible for inclusion in the National Register (DOE, 1990a). The average site density on WIPP facility lands, according to the WIPP FEIS (DOE, 1980), is 7.5 sites per square mile. A mitigation plan describing the avoidance and/or excavation of sites was submitted to the New Mexico State Historic Preservation Officer (SHPO) (Hart and Brausch, 1980; DOE and BLM, 1983). A determination of "no adverse effect from WIPP facility activities" on cultural resources was made by the SHPO in May 1980 (Merlan, 1980). A similar plan was submitted to the National Advisory Council on Historic Preservation. The Council concurred that the WIPP Mitigation Plan is appropriate to protect cultural resources (National Advisory Council on Historic Preservation, 1981).

The NHPA has been amended by the Archeological and Historic Preservation Act (16 U.S.C. sec. 469a et seq.), which directs federal agencies to recover and preserve historic and archeological data that would otherwise be lost as a result of federal construction or activities. It has also been amended by the Archeological Resources Protection Act (16 U.S.C. sec. 470aa et seq.), which requires a permit from the U.S. Department of the Interior for excavation or removal of archeological resources from public or Indian lands. Both of these statutes apply to known cultural resources or resources recorded in the future on WIPP facility lands. In accordance with the WIPP Mitigation Plan, four archeological sites that could have been or that were actually disturbed by construction activities have been excavated. Avoidance of other archeological sites is carried out by DOE so there will be no adverse effects on known cultural resources from WIPP facility activities. No additional sites have been slated for excavation.

Under the WIPP Land Withdrawal Act, the jurisdiction for managing the cultural resources within the WIPP Site Boundary have been transferred to the DOE. A Land Management Plan and a memorandum of understanding with the Bureau of Land Management are being prepared to provide equitable and consistent administration of these resources within the WIPP withdrawal area.

3.2.12 Floodplain Management (Executive Order 11988)

EO 11988 directs federal agencies to avoid adverse impacts associated with the modification of floodplains, to consider alternatives to a proposed action, to provide early public review of proposed actions, and to propose mitigation measures for proposed actions within floodplains. Because the WIPP site is not located within a floodplain zone, EO 11988 does not apply to the WIPP facility.

3.2.13 Protection of Wetlands (Executive Order 11990)

EO 11990 requires that federal agencies consider the effects of proposed actions in wetlands, determine whether wetlands are present, assess the impacts, consider alternatives to a proposed action, provide for early public review, and propose mitigation measures for proposed actions that could affect wetlands. The WIPP facility is neither located within nor will impact a wetlands area, EO 11990 does not apply to the WIPP facility.

3.2.14 Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes (Title 40 CFR Part 191)

The authority of the EPA to establish radiation protection standards for nuclear wastes is derived from the Atomic Energy Act (AEA), as amended; the Reorganization Plan No. 3 of 1970; and the Nuclear Waste Policy Act (NWPA) (Pub. L. 97-425). The standards apply to spent nuclear fuel, high-level radioactive waste as defined by the NWPA, and TRU waste (i.e., containing more than 100 nanocuries per gram of waste of alpha-emitting TRU radionuclides with half-lives greater than 20 years). The standards are divided into two subparts A and B and are described below.

Subpart A, Standards for Management and Storage, sets the operational term requirements limiting annual doses to members of the public from management and storage operations at disposal facilities. These facilities are operated by DOE and are not regulated by the U.S. Nuclear Regulatory Commission (NRC). The annual dose allowed by the public in the general environment can exceed 25 mrem to the whole body and 75 mrem to any critical organ. The WIPP facility does not qualify as a disposal facility defined by Title 40 CFR Part 191 during the Test Phase. Subpart A also does not apply to management and storage operations during that period. In accordance with DOE policy as delineated in DOE Order 5400.5, the WIPP facility maintains compliance with 40 CFR 191, Subpart A requirements. In the Second Modification to the Agreement for Consultation and Cooperation dated August 4, 1987, DOE agreed with the State of New Mexico that the WIPP facility will comply with the standards of Subpart A upon the initial and future receipt of waste.

Subpart B, Standards for Disposal, establishes several sets of long-term requirements for containment, individual protection, and groundwater protection, and guidance for their implementation. The containment provisions of Title 40 CFR Part 191.14 require that radioactive waste disposal systems be designed to provide a reasonable expectation that cumulative releases of radionuclides from the repository over 10,000 years will not exceed levels specified in the standards. This degree of assurance is to be provided by a performance assessment conducted by DOE.

As the result of a challenge to the EPA standards by the NRDC and others, the U.S. Court of Appeals for the First Circuit vacated and remanded Subpart B of the regulation (NRDC v. EPA, see Section K-8). The Second Modification to the Agreement for Consultation and Cooperation between the DOE and the State of New Mexico dated August 4, 1987, specifies that, although the standards are on remand, the DOE will continue to guide its performance assessment planning efforts as though the vacated regulations are still in effect.

In the WIPP Land Withdrawal Act of 1992 (P.L. 102-579), Congress reinstated all of the 40 CFR 191, Subpart B regulations with the exception of those that were specifically questioned by the court (i.e., Sections 191.15, Individual Protection Requirements, and 191.16, Ground Water Protection Requirements). Congress also required the EPA to issue final disposal regulations by April 30, 1993. On February 10, 1993, the EPA proposed revised disposal regulations under 40 CFR 191, Subpart B (58 FR 7924). In this proposed rulemaking, the EPA revised only the portions of the regulations which were remanded by the court (i.e., 40 CFR 191.15 and 191.16).

3.2.15 Hazardous Materials Transportation Act (HMTA) (49 App. U.S.C. sec. 1801 et seq.; Title 49 CFR Parts 106-179)

The HMTA provides for safe intra- and inter-state transportation of hazardous/nuclear materials. The HMTA allows states to regulate the transport of hazardous/nuclear materials if regulations are consistent with the HMTA or U.S. Department of Transportation (DOT) regulations. The DOT regulations for hazardous/radioactive materials are contained in Title 49 CFR Parts 171-177. Specifications for the kinds and design of packages to be used for the transport of various types of radionuclides are contained in Title 49 CFR Part 173, Subpart I (and parallel NRC regulations in Title 10 CFR Part 71). DOT regulations in Title 49 CFR Part 177 provide a routing and quantity rule for highway shipments of radioactive material; Title 49 CFR Part 174 contains segregation rules for shipment by rail. In the Second Modification to the Agreement for Consultation and Cooperation dated August 4, 1987, the DOE agreed to comply with all applicable DOT regulations and the corresponding regulations of the NRC.

3.2.16 Packaging and Transportation of Radioactive Materials (Title 10 CFR Part 71)

Regulations for shipping containers and the safe packaging and transportation of radioactive materials are under the authority of the NRC and DOT. In the Second Modification to the Agreement for Consultation and Cooperation dated August 4, 1987, DOE agreed to comply with the applicable transportation regulations of the NRC. Packaging requirements for radioactive materials including Type B packages to be used to transport waste to the WIPP facility are detailed in DOT regulations (Title 49 CFR Part 173, Subpart I). This references the NRC regulations. The NRC regulations in Title 10 CFR Part 71 reference the DOT regulations in Title 49 CFR Part 173.

The NRC requirements for shipping containers apply to the certification of the TRUPACT-II shipping container by the NRC. The container will be used to transport radioactive waste to the WIPP facility. The TRUPACT-II container was certified by the NRC on August 30, 1989 after compliance with Title 10 CFR Part 71 requirement for Type B packaging was demonstrated (NRC, 1990).

A Container Supplier Inspection was conducted by NRC on the dates of January 12-14, 1993. The scope of the audit was to determine whether procedures have been established, documented and executed at DOE's WIPP facility that meet the quality assurance requirements of 10 CFR Part 71. The audit also determined whether packages were fabricated and maintained in accordance with the design approved by the Commission. The NRC had no findings and stated that all quality assurance requirements of 10 CFR Part 71 were being followed.

3.2.17 Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980 (Public Law 96-164)

This Act, which authorized the WIPP Project, provides as follows:

> Not withstanding any other provision of law, the Waste Isolation Pilot Plant is authorized as a defense activity of the Department of Energy . . . for the express purpose of providing a research and development facility to demonstrate the safe disposal of radioactive wastes resulting from the defense activities and programs of the United States. . . .

The statute provides for DOE consultation and cooperation with appropriate officials of the state of New Mexico with respect to public health and safety concerns. It also provides for a written agreement between DOE and the appropriate officials of the state of New Mexico setting forth the procedures under which to carry out consultation and cooperation. In compliance, the DOE has entered into two agreements with the state of New Mexico: the Consultation and Cooperation (C&C) Agreement and the Working Agreement for the C&C Agreement. Both agreements have been modified several times (see Table 3-3). The most recent modification of the C&C Agreement is the Second Modification to the Consultation and Cooperation Agreement dated August 4, 1987. The Working Agreement for the C&C Agreement was last modified in March 1988. The agreements are implemented through the DOE and the New Mexico Radioactive Waste Consultation Task Force. In addition, the DOE interfaces regularly with the NMED and the New Mexico Legislature's Radioactive and Hazardous Waste Committee.

3.2.18 Waste Isolation Pilot Plant Land Withdrawal Act PL (102-579)

On October 30, 1992, President Bush signed the Waste Isolation Pilot Plant Land Withdrawal Act (LWA) transferring land from the public domain for use by the Department of Energy (DOE) for the construction, experimentation, operation, maintenance, disposal, shutdown, monitoring, and decommissioning activities at the WIPP. The LWA establishes an extensive regulatory framework and specific requirements to begin and conduct the WIPP Test Phase with radioactive waste and if all requirements are successfully met, the Disposal Phase.

As a result of the LWA, the Secretary of Energy is required to develop a management plan to provide for grazing, hunting and trapping, wildlife habitat, the disposal of salt tailings, and mining. The WIPP Land Management Plan is currently being developed and will be followed throughout the life of the facility including decommissioning.

Compliance with the following statutes or regulations is required under the Act:

- Taylor Grazing Act
- Subchapter IV of the Federal Land Policy and Management Act
- Public Rangelands Improvement Act
- Materials Act of 1947
- Federal Mine Safety and Health Act of 1977
- Solid Waste Disposal Act
- 40 CFR 191 Disposal Act
- 29 CFR 1910.120
- Clean Air Act
- Safe Drinking Water Act
- Toxic Substance Control Act
- Comprehensive Environmental Response, Compensation and Liability Act
- All other applicable Federal Laws pertaining to public health and safety of the environment.

The law also provides prerequisites for the DOE and the EPA prior to initiating both the Test Phase and Disposal Phase including EPA review and approval of key WIPP programmatic documents. Roles and responsibilities for the Department of Interior, Department of Labor, Environmental Eval[illegible]n Group, National Academy of Sciences, and the State of New Mexico are defined in the la[illegible] A summary of the provisions of the act are as follows:

- The EPA must publish final radioactive waste disposal standards (40 CFR 191).

- The EPA must determine that the DOE has complied with the terms and conditions of the NMD issued on November 14, 1990 (55FR47700).

- The EPA must review and approve DOE's Test Phase Plan and Retrieval Plan. Approval of the Test Phase Plan will be contingent on the EPA determining that the data collected in the proposed tests will be directly relevant to (as specific in LWA) certifying compliance with EPA's radioactive waste disposal standards or with the RCRA.

- The federal Occupational Safety and Health Administration must certify that it has reviewed the DOE emergency response training programs and has concurred that such programs are in compliance with 20 CFR 1910.120.

- The DOE must certify, through issuance of safety analysis documentation that the safety of the Test Phase activities can be ensured through procedures which would not compromise the type, quantity, or quality of data collected from such activities.

- The DOE must issue a plan to ensure that the mined rooms in the repository at the WIPP facility will remain sufficiently stable and safe to permit uninterrupted testing for the duration of such activities. The federal Mine Safety and Health Administration (MSHA) must review the plan and concur in its adequacy.

In addition, the LWA places requirements on the DOE, the EPA, the MSHA, the Bureau of Mines, and the State of New Mexico (NM) during the Test Phase. Specifically these are:

- The DOE must issue a PA report every two years. This report is to be submitted to the EPA, NM, the NAS, and the Environmental Evaluation Group (EEG) for review. Reviewers are required by the statute to provide comments within 120 days. The DOE then has another 120 days to respond to comments.

- The DOE must comply with all applicable federal environmental laws and regulations.

- By October 30, 1994, and every two years, the DOE must submit documentation of compliance to these laws and regulations to the EPA and NM. Timetables are established in the statute for resolving noncompliances.

- All waste must remain fully retrievable during the Test Phase. The DOE must publish a determination in the Federal Register annually that the wastes are fully retrievable.

- The DOE must physically demonstrate retrieval of a sample of transuranic waste on an annual basis after emplacement during the test phase.

- Allows NM to invoke the "Conflict Resolution" clause in the Consultation and Cooperation (C&C) Agreement with the DOE, if NM believes there is an insufficient basis for the DOE's determination or demonstration of retrievability.

- The DOE must take corrective action or implement the Retrieval Plan if it determines the waste is not or will not remain retrievable.

- Authorizes EPA and NM to take actions necessary to ensure the retrieval or removal of all TRU waste emplaced in the WIPP facility, if the DOE determines this waste cannot remain retrievable and that corrective action is not possible.

- In the event the EPA fails to certify that the WIPP facility will comply with the final disposal standards, the DOE must remove all waste from the state within one year of implementation of the Retrieval Plan.

- The MSHA is required to inspect the WIPP facility at least four times per year.

- The U.S. Bureau of Mines is required to prepare an annual evaluation of the safety of WIPP.

- The DOE is required to provide NM, the NAS, and the EEG free and timely access to data relating to health, safety, and environmental issues at the WIPP facility.

- The DOE is required to consult and cooperate with the EEG in the performance of its responsibility to conduct independent technical review and evaluation of the WIPP Project.

- The statute does not affect either the C&C Agreement or the Supplemental Stipulated Agreement between the DOE and NM.

In addition, the statute contains requirements related to the transportation of radioactive waste to the WIPP facility, prerequisites for the disposal phase, EPA issuance of final disposal standards, economic assistance to the State of New Mexico, waste limitations, decommissioning.

NOTE: *Pending the completion of the WIPP Land Management Plan, the DOE will continue current land management practices and maintain all applicable permits with external organizations.*

3.2.18.1 Federal Land Policy and Management Act (43 U.S.C. secs. 1701-1782)

The Federal Land Policy and Management Act was enacted to ensure, among other things, that:

"...public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for aquatic fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use...."

Under S. 1671, the Secretary of Energy is required to comply with Subchapter IV of the Federal Land Policy and Management Act. Subchapter IV establishes the authority for grazing fees, range betterment funds, grazing permits, and grazing advisory boards. Under LWA, the Secretary of Energy is empowered to administer these programs.

3.2.18.2 Taylor Grazing Act (43 U.S.C. sec. 315 et seq.)

This act is intended to prohibit injury to public grazing lands by preventing overgrazing and soil deterioration. The Act promotes the orderly use and/or improvement to public grazing lands by establishing grazing districts and a grazing permit system. As required by the LWA, the DOE must allow grazing to continue on WIPP facility land where grazing districts had been established prior to the date of enactment of the withdrawal act. The Secretary of Energy is empowered to issue grazing permits on WIPP facility land.

3.2.18.3 Public Rangelands Improvement Act (43 U.S.C. sec. 1901 et seq.)

The Public Rangelands Improvement Act establishes a national policy and commitment to:

- Inventory and identify current public rangeland conditions and trends.
- Manage, maintain, and improve the condition of public rangelands to become as productive as is feasible.
- Continue the policy of protecting wild free-roaming horses and burros. and remove and dispose of these excess animals that pose a threat to themselves, their habitat, and other rangeland values.

As specified by the LWA, the DOE must inventory and administer WIPP facility lands as public rangelands.

3.2.18.4 Executive Order 12548 – Grazing Fees

EO 12548 orders the establishment of fees for grazing of domestic livestock on public rangelands. The LWA empowers the Secretary of Energy establish grazing fees.

3.2.18.5 Materials Act of 1947 (30 U.S.C. 601 et seq.)

The Materials Act of 1947 pertains to the disposal of mineral materials (i.e., sand, stone, gravel, pumice, cinders, clay and etc.) on public lands. The disposal of vegetative materials (e.g., yucca, manzanita, mesquite, cactus, and timber or forest products) is also addressed. Under the LWA, the WIPP facility must dispose of salt tailings in accordance with the bidding, advertising, contract negotiation, and disposition of monies provisions (secs. 602-603) of the Materials Act.

3.2.18.6 Federal Mine Safety and Health Act of 1977 (30 U.S.C. sec. 801 et seq.)

Under the Federal Mine Safety and Health Act of 1977, the U.S. Department of Labor (DOL) is responsible for developing and enforcing regulations and standards to protect mine workers. Under a memorandum of understanding (MOU) between DOE and DOL effective July 9, 1987, the Mine Safety and Health Administration (MSHA) conducts periodic health and safety compliance inspections of WIPP facility underground operations. Because the MSHA does not have formal regulatory jurisdiction over the WIPP facility it advises DOE of appropriate actions to be taken to ensure the timely correction of any deficiencies noted during these inspections. MSHA, at the request of DOE, participate in investigations in the event of an accident or fatality at the WIPP facility.

MSHA conducted four inspections during 1992 in the months of February, June, September, and November. The last three of these inspections resulted in no findings. These inspections focus on both above-ground and below-ground mining operations.

3.2.19 Bald and Golden Eagle Protection Act (16 U.S.C. secs. 668-668d)

The Bald and Golden Eagle Protection Act makes it unlawful to capture, kill, molest, or disturb these eagles, their nests, or eggs anywhere in the United States. A permit must be obtained from the U.S. Department of the Interior to relocate a nest that interferes with resource development or recovery operations. The Act potentially applies to the WIPP facility because there is a possibility that these birds could be present on WIPP facility lands.

Surveys to identify raptor nests on WIPP facility lands since 1985 have not recorded any bald or golden eagle nests near operational activities. Through the Cooperative Raptor Research and Management Program at the WIPP facility the DOE will continue to monitor for raptor nests on WIPP lands and near operational buildings.

3.2.20 Migratory Bird Treaty Act (16 U.S.C. sec. 703 et seq.)

The Migratory Bird Treaty Act is intended to protect birds that have common migration patterns between the United States and Canada, Mexico, Japan, and Russia. The Act stipulates that it is unlawful to indiscriminately "kill . . . any migratory bird." It regulates the harvest of migratory birds by specifying the mode of harvest, hunting seasons, bag limits, etc. Although the WIPP facility is not located within a major migration corridor there are migratory birds present on WIPP facility lands. As required by the Migratory Bird Treaty Act, the DOE will consult annually with the U.S. Fish and Wildlife Service with respect to impacts on migratory birds from the hunting activities permitted on WIPP facility lands.

3.2.21 Noise Control Act of 1972 (42 U.S.C. sec. 4901 et seq.)

According to the Act's policy clause in sec. 2(a)(3), the primary responsibility for noise control is vested in state and local governments. Federal regulation is deemed essential only for commercial noise sources requiring national uniformity of treatment (e.g., aircraft noise). However, federal agencies are required to comply with federal, state, interstate, and local requirements respecting control and abatement of environmental noise "to the fullest extent consistent with their authority" [sec. 4(a) and (b)(1), (2)].

The DOE facilities are required to comply with the Occupational Safety and Health Administration (OSHA) standards in 29 CFR Part 1910, which include the Occupational Noise Exposure standards in 29 CFR 1910.95. Any WIPP facility noise sources that exceed these standards will be mitigated (i.e., noise dampers have been installed in the WIPP facility underground air exhaust fans). There are no noise sources at the WIPP facility that would affect the general public.

3.2.22 Occupational Safety and Health Administration (OSHA) Regulations (29 CFR Parts 1900-1999)

Section 6(a) of the Williams-Steiger Occupational Safety and Health Act of 1970 provides that the Department of Labor (DOL) establish employee safety and health standards with which industries are generally familiar and that have been found to be national consensus standards or established federal standards. DOE voluntarily complies with OSHA standards for all WIPP facility activities. The WIPP facility has established safety procedures in accordance with DOE policy.

3.2.23 National Defense Authorization Act – Fiscal Year 1989

The DOE has entered into a contract with the New Mexico Institute of Mining and Technology to conduct independent reviews of the health and safety aspects of the design, construction, and operations of the WIPP facility, as required by the National Defense Authorization Act of 1989. The Environmental Evaluation Group (EEG) performs the reviews for the Institute. The DOE will cooperate, as appropriate, with the EEG reviews of health and safety practices at the WIPP facility.

3.2.24 Protection and Enhancement of Environmental Quality (EO 11514, as amended by EO 11991)

EO 11514 directs federal agencies to:

- Monitor, evaluate, and control their agency's activities so as to protect and enhance the quality of the environment.
- Develop procedures to ensure public information and understanding of federal programs with environmental impact.
- Ensure that information regarding existing or potential environmental problems as a result of research, development, demonstration, test, or evaluation activities is made available to federal agencies, states, counties, municipalities, institutions, and other appropriate entities.
- Review their agency's statutory authority, regulations, policies, and procedures in order to identify any deficiencies or inconsistencies that limit compliance with NEPA.

- Comply with Council on Environmental Quality (CEQ) regulations except where such compliance would be inconsistent with statutory requirements.

The DOE complies with CEQ regulations and public disclosure requirements by preparing NEPA documentation on WIPP Project activities as necessary. The DOE also conducts continuing comprehensive environmental monitoring programs at the WIPP site, such as the Operational Environmental Monitoring Plan and the Cooperative Raptor Research and Management Program.

3.2.25 Federal Compliance with Pollution Control Standards (EO 12088)

The EO 12088 directs the head of each federal agency to ensure that all necessary actions are taken for the prevention, control, and abatement of environmental pollution. Each agency is responsible for compliance with applicable pollution control standards established by such statutes as the Clean Water Act, the Clean Air Act, radiation guidance under the AEA of 1954, and others. Each agency must submit an annual plan for the control of environmental pollution at its facilities. This EO applies to the DOE in controlling pollution at the WIPP facility. The Waste Minimization and Pollution Prevention Awareness Plan for the WIPP facility is being reviewed by DOE-WPSO.

3.3 OTHER SIGNIFICANT ENVIRONMENTAL ISSUES, ACTIONS, AND ACCOMPLISHMENTS

On January 31, 1992, U.S. District Judge J. G. Penn ruled on two cases that impact the WIPP. In the case of Environmental Defense Fund v. Watkins (Civ. Action No. 91-2929), the plaintiff (EDF) argued that the DOE was precluded from proceeding with the temporary storage of TRU mixed wastes at the WIPP, because the department failed to obtain interim status to operate a Treatment Storage and Disposal Facility (TSDF) under RCRA. In this case, the Judge granted the EDF's motion for summary judgement. This ruling would require the DOE to obtain a RCRA permit from the NMED prior to accepting any TRU mixed waste regulated under RCRA.

In the second case, New Mexico v. Watkins (Civ. Action No. 91-2527), the judge ruled to permanently enjoin the defendants (DOE) from proceeding with Public Land Order 6826 issued on January 22, 1991. This ruling invalidates the administrative land withdrawal action which permitted the DOE to proceed with the WIPP Test Phase using TRU waste. In this ruling, the DOE would have to either obtain a legislative land withdrawal or successfully appeal this decision prior to commencement of the Test Phase.

Both cases were consolidated on appeal to the U. S. Court of Appeals for the District of Columbia. The ruling on these cases was issued July 10, 1992, and resulted in the reversal of the district court's decision regarding interim status but upheld the ruling in the second case, stating that "...the Secretary of the Interior exceeded his authority..." in the administrative transfer of public land.

Unrelated to the court cases above, but noteworthy nonetheless, is that the report entitled, "Final Safety Analysis Report Addendum, Dry Bin-Scale Test" (DOE, 1991a) was approved by the DOE in June 1992.

3.4 COMPLIANCE STATUS FOR JANUARY - APRIL 1, 1993

This section addresses compliance issues and actions at or affecting the WIPP in the first quarter of 1993.

3.4.1 Current Issues

3.4.1.1 Resource Conservation and Recovery Act (RCRA)(42 U.S.C. sec. 3251 et seq.)

The DOE submitted revision 3 of the Part B permit application in January 1993. The NMED's major concerns resulting in this revision dealt with waste characterization, waste acceptance, waste retrieval, facility closure, and the scope of the testing. The NMED is now in the process of preparing the draft permit for the WIPP facility. This draft permit is expected to be issued for public comment in May 1993.

3.4.1.2 Underground Storage Tanks (USTs)

The two USTs exhumed in CY 1991 were cleaned on February 5, 1993, and subsequently certified as cleaned to specifications listed in the contract with Cline Pump, Inc., of Hobbs, NM. These tanks are awaiting a transfer to the BLM to be used as fire slurries.

3.4.1.3 Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes (Title 40 CFR Part 191)

On February 10, 1993, the EPA proposed revised disposal regulations under 40 CFR 191, Subpart B (58 FR 7924). In this proposed rulemaking, the EPA revised only the portions of the regulations which were remanded by the court (i.e., 40 CFR 191.15 and 191.16).

3.4.1.4 Waste Isolation Pilot Plant Land Withdrawal Act PL (102-579)

Enacted in October 1992 the WIPP LWA mandates certain prerequisites that must be completed prior to the initiation of the Test Phase and requires the ongoing participation of several federal and state agencies in the review, inspection, and approval of the WIPP facility. These issues are worthy of mention due to their importance to future activities at the WIPP. (Reference section 3.2.18)

3.4.1.5 No-Migration Determination

Revision 1 of the No-Migration Determination Annual Report was submitted to the EPA on February 24, 1993.

3.4.1.6 Toxic Substance Control Act (TSCA) (15 U.S.U. Sec. 2601 et. seq.)

In November 1992 Environmental Monitoring (EM) personnel were preparing to convert an excessed mobile laboratory trailer into a raptor research trailer. At this time EM personnel discovered two sheets approximately 4ft. by 4ft. each of suspected asbestos heat shielding. Laboratory analyses were completed, and confirmed that the heat shielding contained non-friable asbestos.

Because no specific asbestos removal procedure existed at the WIPP, the Environmental Safety and Health (ES&H) Department has developed a one-time asbestos removal directive for this removal action. ES&H Industrial Hygiene and Safety professionals worked with Hazardous Waste and Self Assessment (HWSA) personnel to oversee removal activities and to ensure that all HWSA personnel were adequately trained, and were equipped with the appropriate equipment, protective clothing, and respiratory protection for this project.

All asbestos material was stabilized with latex paint and packaged in a single 55 gallon DOT shipping drum. On February 2, 1993, HWSA and ES&H Industrial Hygiene personnel completed the asbestos removal in accordance with the applicable requirements of the TSCA and the OSHA regulations. All asbestos wastes were packaged, manifested, and shipped to an off-site hazardous waste disposal facility per WIPP procedure WP 06-101, shipping of Non-Radioactive Hazardous Materials.

3.4.2 Current Actions

During January-March 1993 compliance with the applicable environmental regulations was maintained at the WIPP. Significant environmental compliance actions that were accomplished during the first quarter of CY 1993 are described below.

3.4.2.1 Resource Conservation and Recovery Act (RCRA)

The DOE submitted for review Revision 3 of the Part B Permit Application to the state in January 1993. With this revisions submitted, the NMED is currently preparing a draft permit for public comment.

3.4.2.2 Superfund Amendments and Reauthorization Act (SARA)

In February 1993 the DOE-WPSO submitted the Emergency and Hazardous Chemical Inventory Report to the New Mexico State Emergency Response Commission, the Eddy County Local Emergency Planning Committee, and the local fire department with jurisdiction over the WIPP facility, as required by Section 312 of the Superfund Amendments and Reauthorization Act (SARA) Title III. This report provides information to various emergency groups regarding quantities and locations of hazardous and extremely hazardous chemicals at threshold planning amounts for emergency planning purposes. This report listed a new hazardous chemical, Ethylene Glycol, not present in previous SARA Title III reports, as present in threshold planning amounts.

3.5 SUMMARY OF PERMITS, APPROVALS, AND NOTIFICATIONS

The permits received, permit applications in preparation, and notifications and approvals required are described below. More specific information is provided in the permit matrix presented as Table 3.2.

In June 1992 the New Mexico Environment Department (NMED) ruled that the RCRA Part A Permit Application was complete. In July 1992 the NMED ruled that Part B was administratively complete and assessed a $600,000 permitting fee. The DOE paid this fee in August 1992. The DOE has recently submitted Revision 3 of the Part B Permit Application and expects the NMED to issue a draft permit for public comment in May 1993.

An annual registration fee was paid to the Underground Storage Tank (UST) Bureau of the NMED. This registration and careful maintenance of inventory control records for WIPP USTs are necessary to comply with provisions contained in the New Mexico Groundwater Protection Act.

An Open Burning Permit was obtained on February 4, 1992, from the NMED for the purpose of fire-fighter training at the WIPP. This permit expired February 4, 1993. No open burning has taken place since the lapse of the permit.

Two permits are obtained annually from the New Mexico Department of Game and Fish (NMGF). One permit allows for the collection of biological samples which was granted on January 25, 1991. The other permit was granted on February 27, 1991, allows the banding of non-threatened and non-endangered migratory birds excluding waterfowl and eagles. Both permits require the submittal of an annual report to the NMGF describing the species captured and banded. A federal migratory bird banding permit is maintained with the U.S. Fish and Wildlife Service (USFWS) of the U.S. Department of the Interior. This permit operates concurrently with the New Mexico State Migratory Bird Banding Permit. The federal banding permit requires that an annual permit report be submitted to the National Banding Lab. This federal permit will expire June 30, 1993, and will automatically be renewed pending review and approval of banding records. All three of these permits provide data to support raptor population and raptor prey-base studies. These permits are required for compliance with the Endangered Species Act and the Migratory Bird Treaty Act. Concurrence was obtained in 1980 from the NMGF that the construction activities of the WIPP would have no significant adverse impacts upon threatened or endangered species.

Compliance with the Federal Land Policy and Management Act (FLPMA) has been maintained through cooperative efforts with the BLM. Currently, the WIPP has nine active BLM Right-of-Way permits. These permits allow WIPP employees access across federal lands to air sampling stations, subsidence monuments, the WIPP north access road, the WIPP railroad spur, and the water supply pipeline. The future of these permits will remain unchanged pending the completion of the Land Management Plan.

The DOE-WPSO submitted an Environmental Assessment (EA) for the proposed sewage lagoon expansion to the DOE WIPP Project Integration Office (WPIO) on February 14, 1992. The DOE/AL NEPA Compliance Officer has subsequently determined that this project was categorically excluded. The NEPA requires that the state and local permit requirements associated with proposed projects be addressed in conjunction with the NEPA documentation process. To expand the sewage lagoon, an approved Discharge Plan is required to comply with the New Mexico Water Quality Commission's Regulations. The DOE submitted a discharge plan application to the NMED on January 7, 1992. The NMED issued an approved discharge plan for the expansion of the WIPP sewage lagoon on January 16, 1992. In order to assure compliance with the discharge plan, effluent sampling must be completed and the effluent sampling results must be submitted quarterly to the NMED. The first quarterly report will be due to the NMED on April 16, 1993. The DOE is currently preparing a comprehensive NEPA Compliance Program for the WIPP. This program is already in use at the WIPP. The NEPA Compliance Program contains a compliance plan, two compliance procedures, and a NEPA training module. Adherence to the NEPA compliance procedures will ensure that decisions to proceed with proposed WIPP projects (i.e., those not "categorically excluded" from NEPA by the DOE) are made only after the proper level of NEPA documentation has been prepared and approved by the appropriate DOE office.

Table 3-1

COMPLIANCE STATUS WITH MAJOR ENVIRONMENTAL REGULATIONS APPLICABLE TO THE WIPP PROJECT

STATUTE/REGULATION	STATUS
Atomic Energy Act	No radioactive waste was received during the CY 92.
Clean Air Act	NESHAPs data package and letter of notification submitted. No monitoring/reporting required until after receipt of waste.
Clean Water Act	See "New Mexico Water Quality Act."
Comprehensive Environmental Response, Compensation, and Liability Act/Superfund Amendments and Reauthorization Act	No Land Disposal Units (LDUs) on site requiring cleanup under CERCLA. Reports filed as required under SARA for hazardous substances maintained on site.
Endangered Species Act	Permit to collect biological samples and to band non-endangered species of raptors obtained.
Federal Land Policy and Management Act	The WIPP Land Withdrawal Act was signed into law October 30, 1992. The Act requires compliance with numerous regulations, as well as the development of a WIPP Land Management Plan.
Federal Insecticide, Fungicide, and Rodenticide Act	All use of pesticides is approved by Industrial Safety and is performed by subcontractors.
Hazardous Materials Transportation Act	Hazardous wastes to be sent off site are reviewed to ensure compliance with HMTA.
National Environmental Policy Act (as supplemented by DOE Order 5440.1E, National Environmental Policy Act Compliance Program)	Mitigation Action Plan was prepared based on the RODs to the two WIPP EISs. All WIPP activities subject to NEPA under DOE Order 5440.1E are reviewed, and the appropriate NEPA documentation is filed with the DOE-WPSO.
National Historic Preservation Act	See "New Mexico Cultural Properties Act."
New Mexico Air Quality Control Act	New Mexico does not yet have primacy for NESHAP for radionuclide emissions from DOE facilities.
New Mexico Cultural Properties Act	Land within the fenced area of the site has been surveyed as required. Activities such as excavation outside the fence are examined on a case-by-case basis to ensure that the area has been properly surveyed prior to initiating said activities.

STATUTE/REGULATION	STATUS
New Mexico Emergency Management Act	See "Comprehensive Environmental Response, Compensation, and Liability Act."
New Mexico Hazardous Waste Management Regulations	See "Resource Conservation and Recovery Act." NMED does not yet have primacy for all areas of RCRA.
New Mexico Radioactive Materials Act	No radioactive wastes had been received at the WIPP by the end of CY 92.
New Mexico Water Quality Act	Expansion of the sewage lagoon required to accommodate the disposal of site generated non-hazardous brine waters. A Discharge Plan (DP-831) has been approved for this expansion. A New Mexico NPDES storm water Discharge Permit was issued 12/31/92 by the EPA.
New Mexico Wildlife Conservation Act	See "Endangered Species Act."
Resource Conservation and Recovery Act	*Hazardous-waste generator compliance:* All site generated hazardous wastes were transported off site within the 90-day accumulation period. *No-Migration Determination compliance:* Second annual report submitted to EPA on November 11, 1992. Procedure has been issued to examine planned and unplanned changes and any migration of hazardous constituents to ensure proper reporting to EPA. *Mixed-waste management, Test Phase:* Revision 2 of the Part B permit application submitted to NMED on March 4, 1992 (DOE, 1992). Revision 3 of the Part B submitted to the NMED January 1993. *Underground Storage Tanks:* Two USTs removed on December 19, 1991, and replaced with two new tanks on January 11, 1992. Exhumed tanks have been certified as clean and await an interagency transfer of property to the BLM.
Toxic Substances Control Act	Procurement of asbestos-/PCB-containing materials not allowed. Other portions of TSCA not applicable.

Table 3-2

DOE ORDERS AND AGREEMENTS AFFECTING THE WIPP ENVIRONMENTAL PROGRAM

ORDER NO.	DATE	TITLE	ANNOTATION
DOE 5400.1	11/09/88	General Environmental Protection Program	Establishes environmental protection program requirements, authorities, and responsibilities for DOE operations for ensuring compliance with Federal and State environmental protection laws and regulations, Federal executive orders, and internal department policies.
DOE 5400.2A	01/31/89	Environmental Compliance Issue Coordination	Establishes DOE requirements for coordination of significant environmental compliance issues.
DOE 5400.3	02/22/89	Hazardous and Radioactive Mixed Waste Program	Establishes DOE hazardous and radioactive mixed waste policies and requirements for RCRA compliance.
DOE 5400.4	10/06/89	Comprehensive Environmental Response, Compensation, and Liability Act Requirements	Establishes basic requirements for implementation of the superfund at DOE facilities
DOE 5400.5	06/05/90	Radiation Protection of the Public and the Environment	Establishes standards and requirements for operations of the DOE and DOE contractors with respect to protection of the public and the environment against undue risk from radiation.
DOE 5440.1E	11/10/92	National Environmental Policy Act	Establishes DOE policy for implementation of the National Environmental Policy Act of 1969 (PL 91-190).
DOE 5480.1B	03/27/90	Environmental Protection, Safety, and Health Protection Program for DOE Operations	Establishes an overall framework of program requirements for safety, environmental, and health protection.
DOE 5480.3	07/09/85	Safety Requirements for the Packaging of Fissile and Other Radioactive Materials	Establishes requirements for packaging and transportation of radioactive materials for DOE facilities.
DOE 5484.1	10/17/90	Environmental Protection, Safety, Health Protection Information Reporting Requirements	Establishes requirements and procedures for reporting information having environmental protection, safety, or health significance for DOE operations.
AL 5484.1	10/24/86	Environmental Protection, Safety and Health Protection Information Reporting Requirements	Albuquerque Operations Office implementation of 5484.1.

Table 3-2

DOE ORDERS AND AGREEMENTS AFFECTING THE WIPP ENVIRONMENTAL PROGRAM (Continued)

ORDER NO.	DATE	TITLE	ANNOTATION
DOE 5480.23	04/30/92	Nuclear Safety Analyses Reports	To establish uniform requirements for the preparation and review of safety analyses of DOE operations which include: identification of hazards, their elimination or control, assessment of the risk, and documented management authorization of the operation.
DOE 5482.1B	11/18/91	Environmental, Safety and Health Appraisal Program	To establish the Environmental Protection, Safety, and Health (ES&H) appraisal program for the DOE.
DOE 5500.3A	02/27/92	Planning, and Preparedness, for Operational Emergencies	To establish requirements for the development of DOE site-specific emergency plans and procedures for radiological emergencies occurring in existing or planned DOE reactors and nonreactor nuclear facilities. It also requires that comprehensive emergency actions are planned, coordinated, and implemented to respond effectively to the on-site and off-site consequences of a radiological emergency at these facilities and it provides for appropriate coordination between DOE and off-site officials to ensure the protection of on-site personnel, public health and safety, and the environment.
DOE 5700.6C	08/21/91	Quality Assurance	To provide DOE policy, set forth principles, and assign responsibilities for establishing, implementing, and maintaining programs of plans and actions to ensure quality achievement in DOE programs.
DOE 5820.2A	09/26/88	Radioactive Waste Management	Establishes policies and guidelines by which DOE manages radioactive waste, waste byproducts, and radioactively contaminated surplus facilities.
DOE 6430.1A	04/06/89	General Design Criteria	To provide general design criteria for use in the acquisition of DOE facilities and to establish responsibilities and authorities for the development and maintenance of these criteria.

Table 3-3

SUMMARY OF AGREEMENTS BETWEEN DOE AND THE STATE OF NEW MEXICO THAT AFFECT THE WIPP ENVIRONMENTAL PROGRAM

Stipulated Agreement on Civil Action No. 81-0363 JB -- This agreement, approved by the U.S. District Court proceedings held in abeyance in the lawsuit against DOE by the State of New Mexico, was executed on July 1, 1981. The eight-page agreement assures that a binding, enforceable "consultation and cooperation" agreement will be entered into by DOE and the state and that DOE will make a "good faith effort" to resolve certain state off-site concerns (which are covered in the Supplemental Stipulated Agreement). The Stipulated Agreement also addresses a number of additional studies and experiments to be conducted by DOE for the Site Preliminary and Design Validation phase of the WIPP facility. It was signed by Jeff Bingaman, (Attorney General, State of New Mexico), and Myles Flint, (Attorney, U.S. Department of Justice), and issued July 1, 1981, by Juan G. Burciaga (U.S. District Judge, District of New Mexico).

Agreement for Consultation and Cooperation -- Usually referred to as the "C&C Agreement," this agreement is contained in Appendix A to the Stipulated Agreement. It affirms the intent of the Secretary of Energy to consult and cooperate with New Mexico with respect to state public health and safety concerns. It was signed in July 1981 by Bruce King, (Governor, State of New Mexico), and James B. Edwards, (Secretary, U.S. Department of Energy).

Working Agreement for Consultation and Cooperation, Appendix B, Article IV, Revision I -- This agreement, Appendix B to the Stipulated Agreement, identifies in Article IV over 60 "key events" and "milestones" in the construction and operation of the WIPP facility that must be reviewed by the state before they are commenced. Many environmental items are included. It was signed in March 1983 by Robert McNeill, (Chairman, Radioactive Waste Task Force), and R. G. Romotowski, (Manager, Albuquerque Operations Office, U.S. Department of Energy). (Article IV of the Working Agreement was revised on April 8, 1983.

Supplemental Stipulated Agreement Resolving Certain State Off-Site Concerns Over WIPP -- This agreement dated December 27, 1982, addresses five state concerns including the need for state "verification" of the WIPP Environmental Monitoring Program. The concerns addressed are: state liability for a nuclear incident, emergency response preparedness, transportation monitoring of the WIPP facility waste, the WIPP facility environmental monitoring by the state, and upgrading of state highways. It was signed in December 1982 by Bruce King, (Governor, State of New Mexico), et al., and R. G. Romotowski, (Manager, Albuquerque Operations Office, U.S. Department of Energy).

First Modification to the July 1, 1981, Agreement for Consultation and Cooperation on WIPP by the State of New Mexico and the U.S. Department of Energy -- This modification was signed November 30, 1984, wherein DOE and the state agree to address certain concerns of the state regarding: (1) the specific mission of the WIPP Project, (2) a demonstration of retrievability prior to waste emplacement, (3) post-closure control and responsibility, (4) completion of certain additional scientific testing and reports, (5) compliance with applicable federal regulatory standards for waste repositories, and (6) a program for encouraging and reporting on the hiring of New Mexico residents at the WIPP Project. It was signed in November 1984 by Joseph Goldberg, (Secretary, Health and Environment Department, State of New Mexico), and R. G. Romotowski, (Manager, Albuquerque Operations Office, U.S. Department of Energy).

Table 3-3

SUMMARY OF AGREEMENTS BETWEEN DOE AND THE STATE OF NEW MEXICO THAT AFFECT THE WIPP ENVIRONMENTAL PROGRAM (Continued)

Second Modification to the July 1, 1981, Agreement for Consultation and Cooperation on WIPP by the State of New Mexico and the U.S. Department of Energy -- Signed August 4, 1987, wherein DOE and the state agree to address certain concerns of the state regarding: (1) surface and subsurface mining and drilling after closure of the WIPP site; (2) the disposal of salt tailings at the WIPP site; and (3) compliance with U.S. Environmental Protection Agency, U.S. Department of Transportation, and U.S. Nuclear Regulatory Commission regulations. It was signed in August 1987 by Garrey Carruthers, (Governor, State of New Mexico), et al., and R. G. Romotowski, (Manager, Albuquerque Operations Office, U.S. Department of Energy).

1988 Modification to the Working Agreement of the Consultation and Cooperation Agreement Between the U.S. Department of Energy and the State of New Mexico on the Waste Isolation Pilot Plant -- This modification deleted the sorbing tracer test from the list of required reports and substituted additional tests. In addition, the state is allowed to operate a fixed-air sampler in the mine ventilation effluent air stream. It was signed in March 1988 by Kirkland Jones, (Deputy Director, New Mexico Environmental Improvement Division, State of New Mexico), et al., and R. G. Romotowski, (Manager, Albuquerque Operations Office, U.S. Department of Energy).

Environmental Oversight and Monitoring Agreement -- This agreement states that DOE will provide additional technical and financial support for state activities in environmental oversight, monitoring, access, and emergency response to ensure compliance with applicable federal, state, and local laws at several DOE facilities including the WIPP facility. It was signed in October 1990 by Garrey Carruthers, (Governor, State of New Mexico; Dennis Boyd, (Secretary, Health and Environment Department); and Bruce G. Twining, (Manager, Albuquerque Operations Office, U.S. Department of Energy).

Site Specific Protocol for Implementation of the Environmental Oversight and Monitoring Agreement -- Signed October 23, 1992, this protocol describes the site-specific protocol for day-to-day activities involving NMED and DOE contract personnel stationed at the WIPP. This protocol is a result of the "Environmental Oversight and Monitoring Agreement of 1990" between the State of New Mexico and the DOE. It is designed within the context of the unique nature and purpose of the WIPP.

Table 3-4

ACTIVE/PENDING PERMITS FOR THE WASTE ISOLATION PILOT PLANT DURING 1992 AND THE FIRST QUARTER OF 1993

Granting Agency	Type of Permit	Permit Number	Granted/ Submitted	Expiration	Permit Status
Department of the Interior, Bureau of Land Management	Right-of-Way for Water Pipeline	NM53809	8/17/83	None	Active
Department of the Interior, Bureau of Land Management	Right-of-Way for the North Access Road	NM55676	8/24/83	None	Active
Department of the Interior, Bureau of Land Management	Right-of-Way for Railroad	NM55699	9/27/83	None	Active
Department of the Interior, Bureau of Land Management	Right-of-Way for Dosimetry and Aerosol Sampling Sites	NM63136	7/31/86	None	Active
Department of the Interior, Bureau of Land Management	Right-of-Way for Seven Subsidence Monuments	NM65801	11/7/86	None	Active
Department of the Interior, Bureau of Land Management	Right-of-Way for Aerosol Sampling Site	NM77921	8/18/89	8/18/2019	Active
Department of the Interior, Bureau of Land Management	Right-of-Way for Ten Raptor Nesting Platforms	NM82212	9/12/89	12/13/2019	Active
Department of the Interior, Bureau of Land Management	Right-of-Way for Survey Monument Installation	NM82245	12/13/89	12/13/2019	Active
Department of the Interior, Bureau of Land Management	Approval to Drill 2 New Test Wells on Existing Pads at P-1 and P-2	None	9/18/86	None	Active
New Mexico Environment Department	Open Burning Permit to Train Fire Control Crews	None	2/4/92	2/4/93	Expired
New Mexico Environment Department	Temporary Permission for Disposal of Brine	None	9/18/91	1/16/92	Superseded by the issuance of Discharge Plan Approval
New Mexico Environment Department	Discharge Plan Approval	DP-831	1/16/92	1/16/97	Active

Granting Agency	Type of Permit	Permit Number	Granted/ Submitted	Expiration	Permit Status
New Mexico Environment Department	Submittal of Part A RCRA Permit Application		Submitted to NMED and EPA Region VI 1/22/91		Complete Subject of New Mexico Lawsuit requiring resolution in District Court
New Mexico Environment Department	Submittal of Part B RCRA Permit Application		Submitted to NMED and EPA Region VI on 2/26/92 and 2/27/92. Revisions were delivered to the NMED on 3/4/92 and 1/27/93		Awaiting Approval
New Mexico Environment Department	Acknowledgement of Notification of Hazardous Waste Activity	NM489013 9088	1/88 Latest report delivered on 2/28/92	None - Contingent upon delivery of biennial report	Active
New Mexico Department of Game and Fish	Master Banding	1608	2/27/91	12/31/91	Inactive
New Mexico Department of Game and Fish	Individual Banding	1961	10/22/91	12/31/91	Inactive
New Mexico Department of Game and Fish	Master Collecting	1894	1/25/91	12/31/91	Inactive
New Mexico Department of Game and Fish	Concurrence that WIPP construction activities will have no significant impact on State-listed threatened or endangered species	None	5/26/89	None	Active
U.S. Department of the Interior, Fish and Wildlife Service	Master Personal Banding	22478	1/28/91	6/30/93	Active
U.S. Department of the Interior, Fish and Wildlife Service	Concurrence that WIPP construction activities will have no significant impact on Federally-listed threatened or endangered species	None	5/29/80	None	Active

Granting Agency	Type of Permit	Permit	Granted/ Submitted	Expiration	Permit Status
New Mexico Department of Finance and Administrative Planning Division, Historic Preservation Bureau	Concurrence that the DOE Archaeological Resources Protection Plan is adequate to mitigate any adverse impacts upon cultural resources resulting from construction of the WIPP facility	None	7/25/83	None	Active
U.S. Environmental Protection Agency	Notification of the presence of 2 Underground Storage Tanks	None	4/15/86	None	Active
U.S. Environmental Protection Agency	New Mexico NPDES Storm Water General Permit	NMR00A0 21	12/31/92	12/31/97	Active
New Mexico Commissioner of Public Lands	Right-of-Way for High Volume Air Sampler	RW-22789	10/3/85	10/3/20	Active

CHAPTER 4

ENVIRONMENTAL PROGRAM INFORMATION

CHAPTER 4

ENVIRONMENTAL PROGRAM INFORMATION

It is the policy of the WIPP to conduct its operations to comply with all applicable environmental laws and regulations.

4.1 OPERATIONAL ENVIRONMENTAL MONITORING PLAN

The WIPP Operational Environmental Monitoring Plan (OEMP) outlines the monitoring of a comprehensive set of parameters in order to detect and quantify any present or potential future environmental impacts. Nonradiological portions of the plan focus on the immediate area surrounding the site. Radiological surveillance generally covers a broader geographic area including nearby ranches, villages, and cities. Environmental Monitoring will continue at the site during project operations and through decommissioning activities.

The goal of the OEMP is to determine whether there are impacts during the preoperational phase of WIPP on the local ecosystem. Evaluation of their severity, geographic extent and, environmental significance is important to future research. Additional samples will be collected and analyzed to investigate and explain trends or anomalies that may have a bearing on environmental impacts.

As recommended in DOE/EP-0023 (i.e., Corley et al. 1981) and DOE/EH-0173T, the OEMP monitors levels of naturally occurring radionuclides. This includes world-wide fallout, and those expected in the WIPP waste. The geographic scope of radiological sampling is based on projections of potential release pathways (see Figure 5-1, Primary Pathway Exposure) and those in WIPP waste. The surrounding population centers are also monitored as sampling devices.

As required by DOE Order 5400.1, the OEMP is under review and will be updated as necessary. This update will incorporate new modifications to accurately monitor environmental impacts at the WIPP.

4.2 ACCIDENTAL RELEASES

During CY 92 the WIPP site had no accidental releases into the environment. During future operations if a release occurs all required state and federal regulatory agencies will be promptly notified.

4.3 SIGNIFICANT ENVIRONMENTAL ACTIVITIES

This section addresses significant environmental activities that occurred during CY 92.

4.3.1 Waste Minimization and Pollution Prevention Awareness Plan

On March 2, 1993, the WIPP Waste Minimization and Pollution Prevention Awareness Program Plan was reviewed and accepted by the WPSO.

In 1992 the WIPP accomplished the following waste minimization activities:

- Off-site recycling of approximately 6,000 gallons of waste oil
- Reuse of cold-degreasing solvents at 6 solvent stations used for cleaning parts
- Off-site reclamation of 600 gallon cold-degreasing solvents
- Product substitution for hazardous materials
- Exclusive use of recycled janitorial paper products
- Off-site recycling of approximately 150 lead-acid batteries

On February 18, 1993, the annual waste reduction report required by DOE Order 5400.1 and SEN 37-92 was completed. This report delineates waste reduction activities conducted at the WIPP in CY 92.

4.3.2 Environmental Training

Environmental training was provided to those personnel associated with environmental operations at the WIPP. Various training courses were offered from specific topics (i.e., RCRA), to basic environmental training. These courses were conducted both on-site by WIPP personnel and off-site by various contractors. Four personnel attended a six-week in-depth study of environmental compliance issues relevant to the DOE at the Environmental School of Excellence.

Wildlife are very evident in the WIPP area. A young mule deer is on a reclamation site north of the WIPP.

4.3.3 Reclamation of Disturbed Lands

In CY 92 reclamation activities focused on a decommissioned caliche pit one mile north of the site. This project represented an improved wildlife habitat and was seeded with species endemic to southeastern New Mexico and the Los Medaños. A water absorbing polymer was utilized to provide a ready water source to young seedlings. A pulverized version of the polymer was used in the main basin of the borrow pit to act as a water barrier and to pool water during rainy periods.

After completion of the caliche pit reclamation activities, heavy summer rains did have some detrimental affects on the site due to erosion. As of August 1993 seed germination has been marginal, however, the germination success is typical for the arid climate for southeastern New Mexico.

4.3.4 Seismic Activity

An earthquake of 5.0 on the Richter scale occurred in Rattlesnake Canyon on January 2, 1992. It occurred above or within a large buried north-south oriented structure called the Central Basin Platform. The seismic history of this structure suggests events of a magnitude of 5.0 might be expected from time to time along its entire length. Prior to the January 2, 1992 most seismic events occurred 40 to 60 km. south of the Rattlesnake Canyon earthquake epicenter (i.e., located midway between Eunice and Jal, New Mexico and about 3 km. east of the highway connecting these communities). Other earthquakes along the Central Basin Platform have rarely occurred as single isolated events. Earthquakes at this location are observed in clusters lasting a few months to a few years. It is likely that seismic activity will continue in this region. The seismic information for the WIPP facility region before 1962 is based on historical chronicles of effects of those tremors on people, structures, and land forms (i.e., macroseismic evidence). Since 1962 virtually all seismic information is based on instrumental data recorded at various seismograph stations. Currently, seismicity is being monitored from the WIPP site to the New Mexico Institute of Mining and Technology (NMIMT). Data is being collected from four stations (Figure 4-1) telemetered to the NMIMT campus from coordinates around the site, other New Mexico stations and bordering states.

There is little indication that significant magnitude events are likely to occur in the WIPP facility zone. There is no Quaternary fault offset, and seismic activity is low. Analysis of risk for the WIPP facility source zone considers 4.5 magnitude the maximum historical event, and the maximum event recorded at 5.5. The areas of New Mexico and West Texas are geographically very stable with little indication of a potential seismic event capable of detrimental effects to the WIPP.

4.3.5 WIPP Land Management Plan

On October 30, 1992, WIPP Land Withdrawal Act (i.e., Public Law 102-579 or Act) was signed into law. The WIPP withdrawal, comprise of 10,240 acres, that has been transferred from the Department of Interior to the Department of Energy.

One requirement of the Act is the preparation of a land management plan by October 30, 1993. This WIPP site Land Management Plan fulfills this requirement. This plan has been drafted by the DOE and the BLM in consultation with the state of New Mexico. This land management plan and future management of the withdrawal will be consistent with the FLPMA, the WIPP Land Withdrawal Act, and other applicable laws. The term of this land management plan is through the decommissioning of the WIPP facility. A separate plan for the post-commissioning Land Management Plan is required by the Act and will be prepared at a later date.

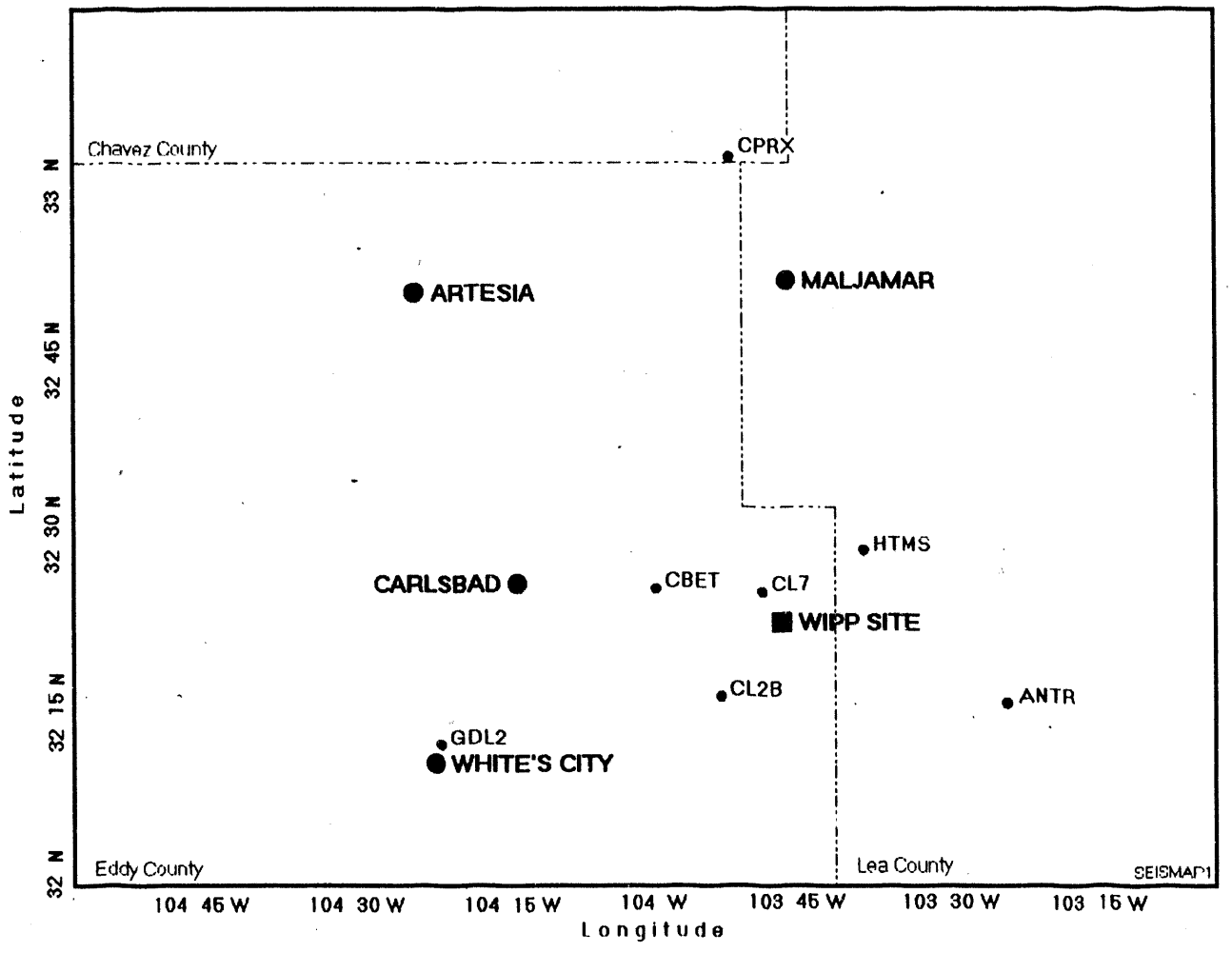


Figure 4-1
WIPP Seismograph Station Locations

Definitions of Aconyms

ANTR - Antelope Ridge
CBET - Carlsbad East Tower
CL2B - Carlsbad Station 2B
CL7 - Carlsbad Station 7
CPRX - Caprock
GDL2 - Guadalupe Mountains
HTMS - Hat Mesa

Management Goal

The goal of the Land Management Plan is to manage the withdrawal under the traditional multiple use concept to minimize possible land use restrictions. It is not the intent of the DOE to make the withdrawal an exclusive use area. However, some restrictions are needed to protect the long-term integrity of the WIPP repository. During operations the facility safety and security must be maintained. The DOE has the authority with the Act to restrict activities in the withdrawal area to whatever extent it deems necessary to ensure the protection of the facility, staff and public.

As a complement to this land use plan, an MOU shall be executed between the DOE and the BLM as required by the Act. This MOU will outline responsibilities of each agency with regard to land use requests for the withdrawn area. This MOU will also define the consultation role of other land management agencies adjacent to and in the vicinity of the withdrawal, (i.e., including the state of New Mexico and other federal agencies).

CHAPTER 5

ENVIRONMENTAL RADIOLOGICAL PROGRAM INFORMATION

CHAPTER 5

ENVIRONMENTAL RADIOLOGICAL PROGRAM INFORMATION

The following subsections provide a description of the various programs constituting the OEMP at the WIPP. Sample types analyzed radiologically are airborne particulates, soil, surface water, groundwater, and biotics. Parameters analyzed are in the primary pathway exposure model which could possibly influence the dose to man.

5.1 RADIOACTIVE EFFLUENT MONITORING

This program is described in the OEMP. This plan defines the scope and extent of the WIPP effluent and environmental monitoring programs during the operational life of the facility as indicated in Figure 5-1, Primary Pathways To Man For Radioactive Releases From The WIPP Site.

The Environmental Regulatory Guide for Effluent Monitoring and Environmental Surveillance (DOE/EH-0173T), (DOE, 1991), requires that monitoring of liquid waste effluent streams be adequate to demonstrate compliance with dose limits in DOE Order 5400.5, Radiation Protection of the Public and the Environment (DOE, 1990). This order also requires the monitoring of potential sources of contaminated airborne emissions. In CY 92 no radioactive waste was received at the WIPP site, so no effluent sampling or release data are reported in this document.

5.2 ENVIRONMENTAL RADIOACTIVITY MONITORING

The following subsections present the monitoring results of the OEMP for CY 92. These include aerosol monitoring, ambient radiation, terrestrial radioactivity, hydrologic radioactivity, and biotic radioactivity baseline subprograms. It should be noted in this report no offsite radiological analytical data with the exception of gross alpha and beta for aerosol monitoring is presented. The contract laboratory selected to perform radiological analysis has been delinquent in meeting the requirements of the contract and data from other radiological environmental programs is not available.
The "Statistical Summary of the Radiological Baseline Program for the WIPP" (DOE/WIPP 92-037) provides an indepth analysis of radiological data to meet the requirements of DOE Order 5400.1.

5.2.1 Atmospheric Radiation Baseline

Continuous particulate aerosol samplers operate at eight locations, three within 1000 meters of the facility, four at local ranches and communities, and one as a sample control site (Figure 5-2). The continuous aerosol samplers presently in use maintain a regulated flow rate of approximately 950 milliliters per second (i.e.,two cubic feet per minute) of air through a 47-millimeter (i.e., 1.9-inch) glass fiber filter for particulate collection. Table 5-1 lists the quarterly average concentrations of the alpha and beta activity on the low-volume aerosol filters from each location by quarter for 1992.

Airborne particulate sampling was initiated in July 1985 at a few locations. Routine weekly filter collections and subsequent radiochemical analysis began in early 1986 except for the Far Field location where data collection began in October 1986. Particulate filters were collected weekly at all locations in CY 92. These filters were analyzed at the Environmental Low-Level Counting Lab at the WIPP where a gross alpha and beta count of each weekly filter was completed.

The mean gross alpha concentrations in Figure 5-3 show limited fluctuation throughout the year and are consistently less than 0.70 E-9 Bq/ml. These fluctuations appeared to be consistent among all sampling locations.

The mean gross beta concentrations in Figure 5-4 fluctuate throughout the year within the ranges of 0.6-1.5 E-9 Bq/ml. The individual gross beta concentrations reported for each location are documented in Appendix 2.

Gross beta and alpha measurements provide an indication of total radionuclide concentration or changes in a specific radionuclide concentration. These measurements are screened to ensure that important radionuclides are not overlooked when performing a specific measurement. Gamma spectroscopy is performed in the WIPP Environmental Low-Level Counting Lab which identifies individual radionuclides and defines specific baseline environmental parameters.

Particulate air filters are weighed before and after their collection times to make accurate calculations of the amount of particulates collected at each sampling location.

5.2.2 Ambient Radiation Baseline

A Reuter-Stokes High Pressure Ionization Chamber designed to monitor low levels of gamma radiation in the environment was put into operation in May 1986. This unit is located at the WIPP far field location that is 1000 meters northwest of the site. The detector used to measure low levels of gamma radiation is a pressurized ion chamber and measures levels of radiation from 1 to 100 microroentgen per hour (μR/hr). Using the average rate of 7.4 μR/hr, the estimated annual dose is approximately 65 millirem. The fluctuations noted are primarily due to calibration of the system and meteorological events (e.g., the high intensity thunderstorms which frequent this area in late summer).

A seasonal rise in ambient radiation has been observed in the first and fourth quarters each year. As stated in previous reports, it is speculated that this fluctuation may be due to variations in the emission and dispersion of Radon-222 from the soil around the WIPP site. These variations can be caused by meteorological conditions, (i.e., inversions), which would slow the radon and its progeny from dispersing.

5.2.3 Radiological Soil Monitoring

In CY 92 there were no radiological soil samples collected. A substantial baseline of soil sample analyses that meets the requirements of DOE Order 5400.1 is available in the Statistical Summary of the Radiological Baseline Program for the WIPP, (DOE/WIPP 92-037).

5.2.4 Hydrologic Radioactivity

This subprogram is designed to establish characteristic radioactivity levels in surface water bodies, bottom sediments, and groundwater. The following discussion of the hydrologic program includes sampling locations, times and data collected during 1992. There is also refinements made to the program since the publication of the Radiological Baseline Program Sampling Plan (Reith and Daer, 1985).

- **Radiological Surface Water and Sediment Monitoring**

  There were no radiological surface water or sediment samples collected in 1992. A substantial baseline of surface water and sediment analyses which meets the requirements of DOE Order 5400.1 is available in the Statistical Summary of the Radiological Baseline Program for the WIPP, (DOE/WIPP 92-037).

- **Radiological Groundwater Characterization**

  Groundwater samples were collected in accordance with the Water Quality Sampling Program (WQSP). The primary objective of the WQSP is to obtain representative and repetitive groundwater quality data from selected wells under rigorous field and laboratory procedures and protocols. At each well site, the well is pumped and the groundwater serially analyzed for specific field parameters. Once the field parameters have stabilized denoting a chemical steady state with respect to those parameters analyzed, a final groundwater sample is collected to be analyzed for radionuclides. The controlling document for the WQSP is the WIPP Water Quality Sampling Plan and Procedures Manual, (WP 02-1, Rev 2).

  The primary water bearing units being evaluated by the WQSP are the Culebra and Magenta Dolomite members of the Rustler Formation. In 1992 groundwater data was gathered at 10 well locations. Data were collected at eight locations completed in the Culebra dolomite. Water quality data was also collected from two privately owned wells in the vicinity of the WIPP in the Dewey Lake Redbeds. The two private wells provide water for area livestock and Barn Well possibly provides water for human consumption. An in-depth discussion of groundwater hydrology including a figure with well locations is presented in Chapter 7.0 titled Groundwater Surveillance.

  Radiological groundwater samples collected in 1992 were transmitted to the analytical laboratory. Data results have not been received as of the issuance date of this report. If the data is received before the publication of this document it will be reviewed, verified and included in the report. If the data is not obtained it will be presented in the CY 93 ASER.

5.2.5 Biotic Radioactivity

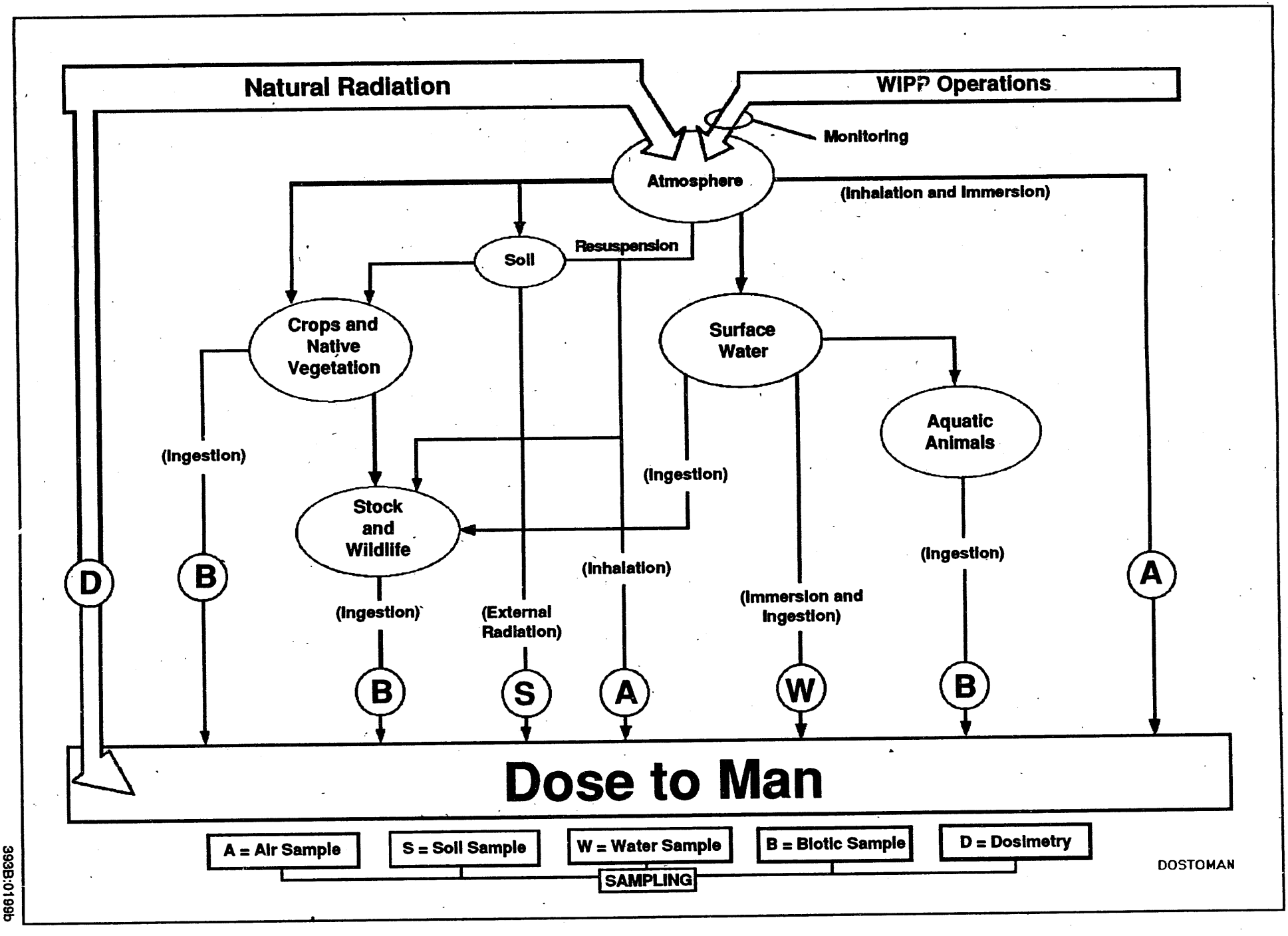
This system characterizes background radioactivity levels in key organisms along possible food chain pathways to man in vegetation, rabbits, quail, beef, and fish. During 1992 palatable tissues were collected and analyzed for concentrations of transuranics and common naturally occurring radionuclides. Data from these sampled media is not available as of the date of issuance of this draft report. This data will either be available in the issuance of this report in final form or in the 1993 ASER. There were no beef samples collected during CY 92. Representative biotic sample locations are shown in Figure 5-4.

5.3 ASSESSMENT OF POTENTIAL DOSE TO THE PUBLIC

In 1992 there was no waste received at the WIPP and no exposure to the public to radiation due to WIPP operations. Documentation of naturally occurring background radiation is discussed in Chapters 5 and 7 of this report.

FIGURE 5-1

PRIMARY PATHWAYS TO MAN FOR RADIOACTIVE RELEASES FROM THE WIPP SITE



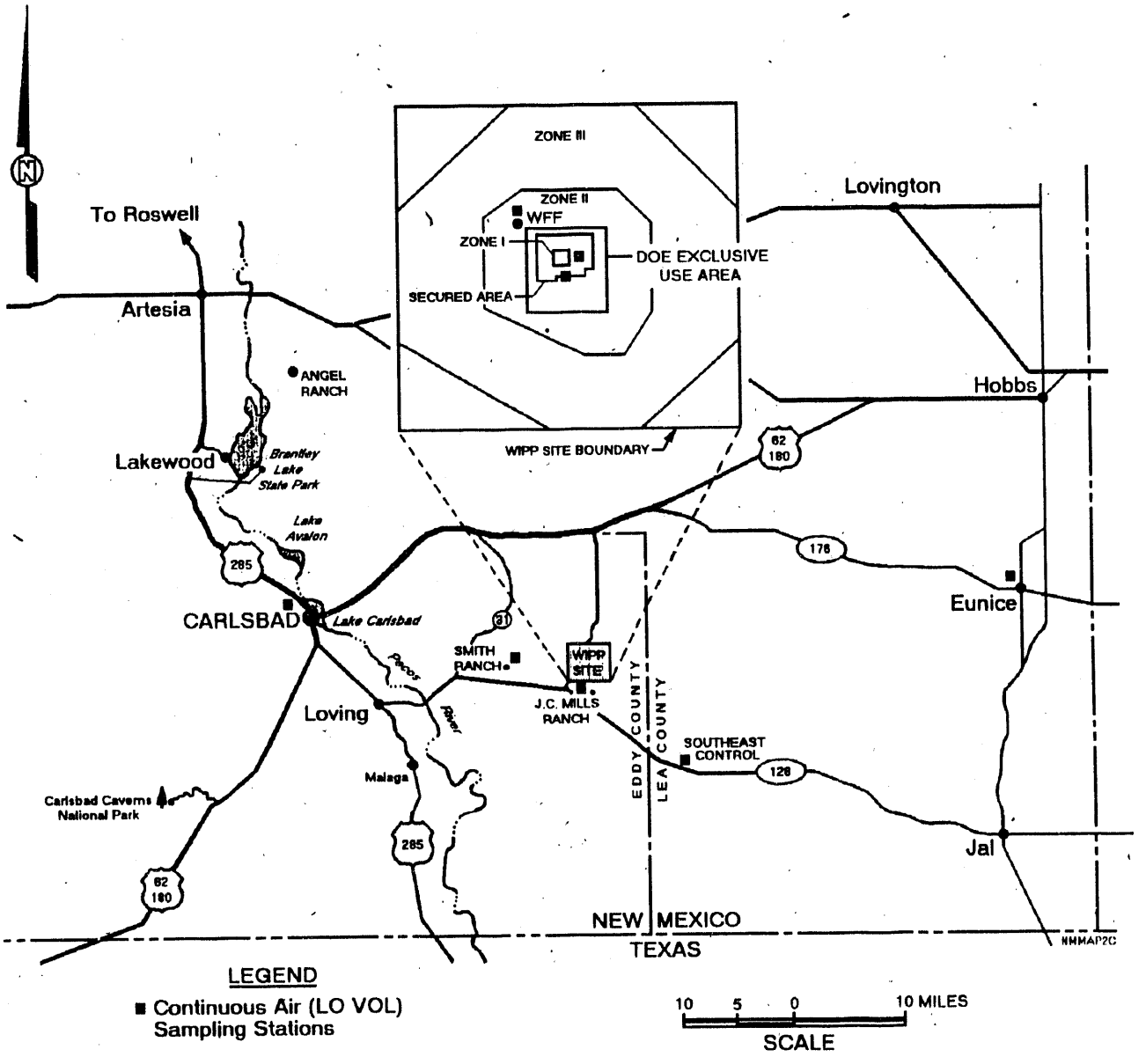


Figure 5-2
Continuous Air Sampling Stations

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TABLE 5-1

ACTIVITY CONCENTRATIONS IN QUARTERLY AVERAGES OF THE LOW VOLUME AEROSOL FILTERS (Bq/ml)

FIRST QUARTER 1992

LOCATION	ALPHA	BETA
Carlsbad	3.5 E-10	9.7 E-10
Smith Ranch	3.3 E-10	9.4 E-10
Mills Ranch	3.6 E-10	9.8 E-10
WIPP Far Field	3.7 E-10	9.1 E-10
WIPP South	3.9 E-10	9.5 E-10
WIPP East (1)	3.5 E-10	9.1 E-10
Eunice	3.2 E-10	9.4 E-10
South East Control	3.7 E-10	9.4 E-10

SECOND QUARTER 1992

LOCATION	ALPHA	BETA
Carlsbad	2.6 E-10	8.3 E-10
Smith Ranch	2.6 E-10	8.3 E-10
Mills Ranch	3.0 E-10	7.9 E-10
WIPP Far Field	2.5 E-10	7.6 E-10
WIPP South	2.6 E-10	7.9 E-10
WIPP East (1)	2.8 E-10	8.4 E-10
Eunice	2.6 E-10	8.3 E-10
South East Control	2.7 E-10	7.8 E-10

THIRD QUARTER 1992

LOCATION	ALPHA	BETA
Carlsbad	3.2 E-10	9.3 E-10
Smith Ranch	3.0 E-10	8.7 E-10
Mills Ranch	3.1 E-10	9.5 E-10
WIPP Far Field	2.8 E-10	8.4 E-10
WIPP South	3.0 E-10	9.1 E-10
WIPP East (1)	3.0 E-10	8.8 E-10
Eunice	2.7 E-10	8.4 E-10
South East Control	2.9 E-10	8.7 E-10

TABLE 5-1
CONTINUED

FOURTH QUARTER 1992

LOCATION	ALPHA	BETA
Carlsbad	4.7 E-10	1.3 E-09
Smith Ranch	4.9 E-10	1.3 E-09
Mills Ranch	4.3 E-10	1.2 E-09
WIPP Far Field	4.6 E-10	1.2 E-09
WIPP South	4.7 E-10	1.2 E-09
WIPP East (1)	4.4 E-10	1.5 E-09
Eunice	4 4 E-10	1.2 E-09
South East Control	4.6 E-10	1.2 E-09

Figure 5-3

ALPHA Concentration

All Locations

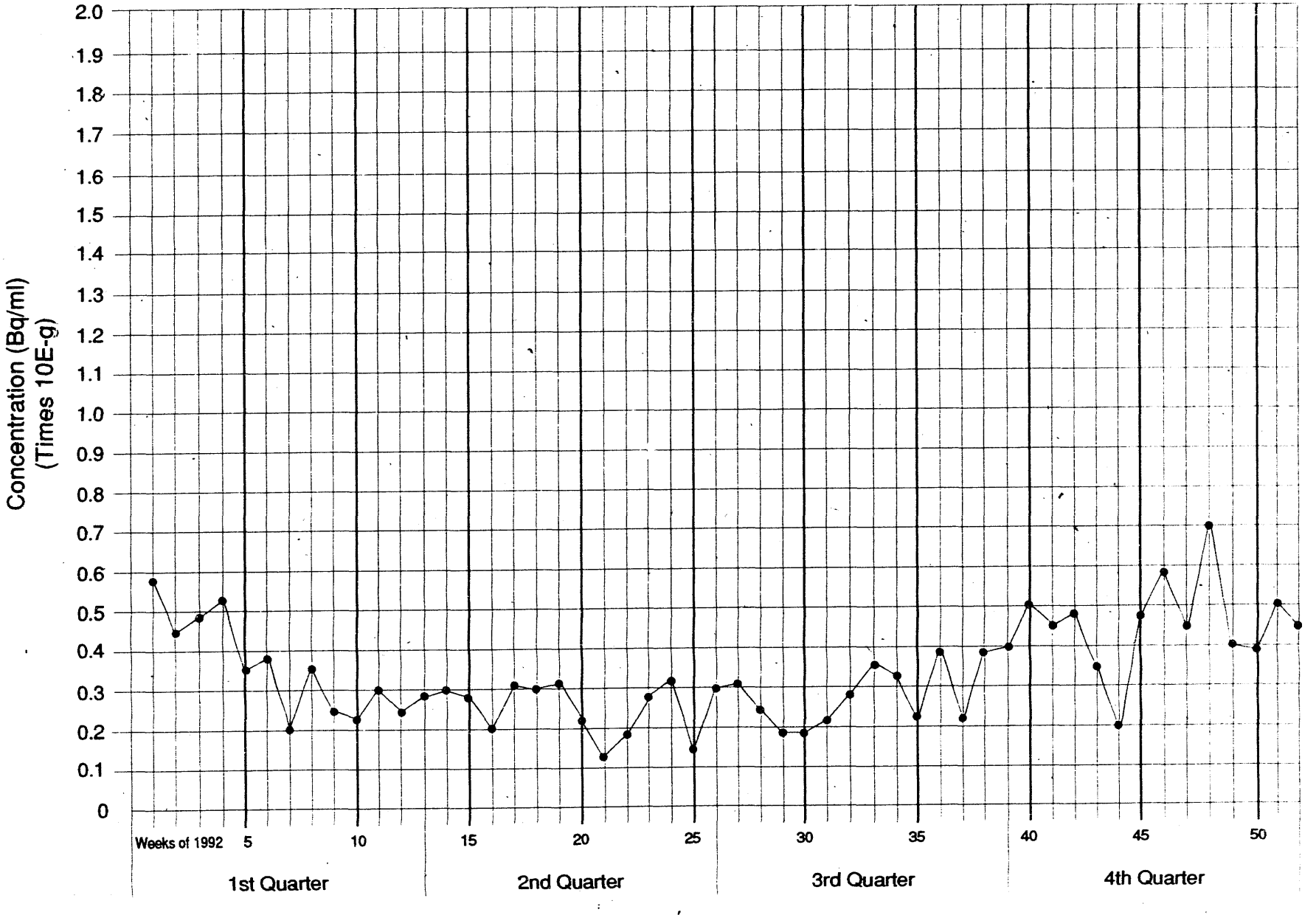

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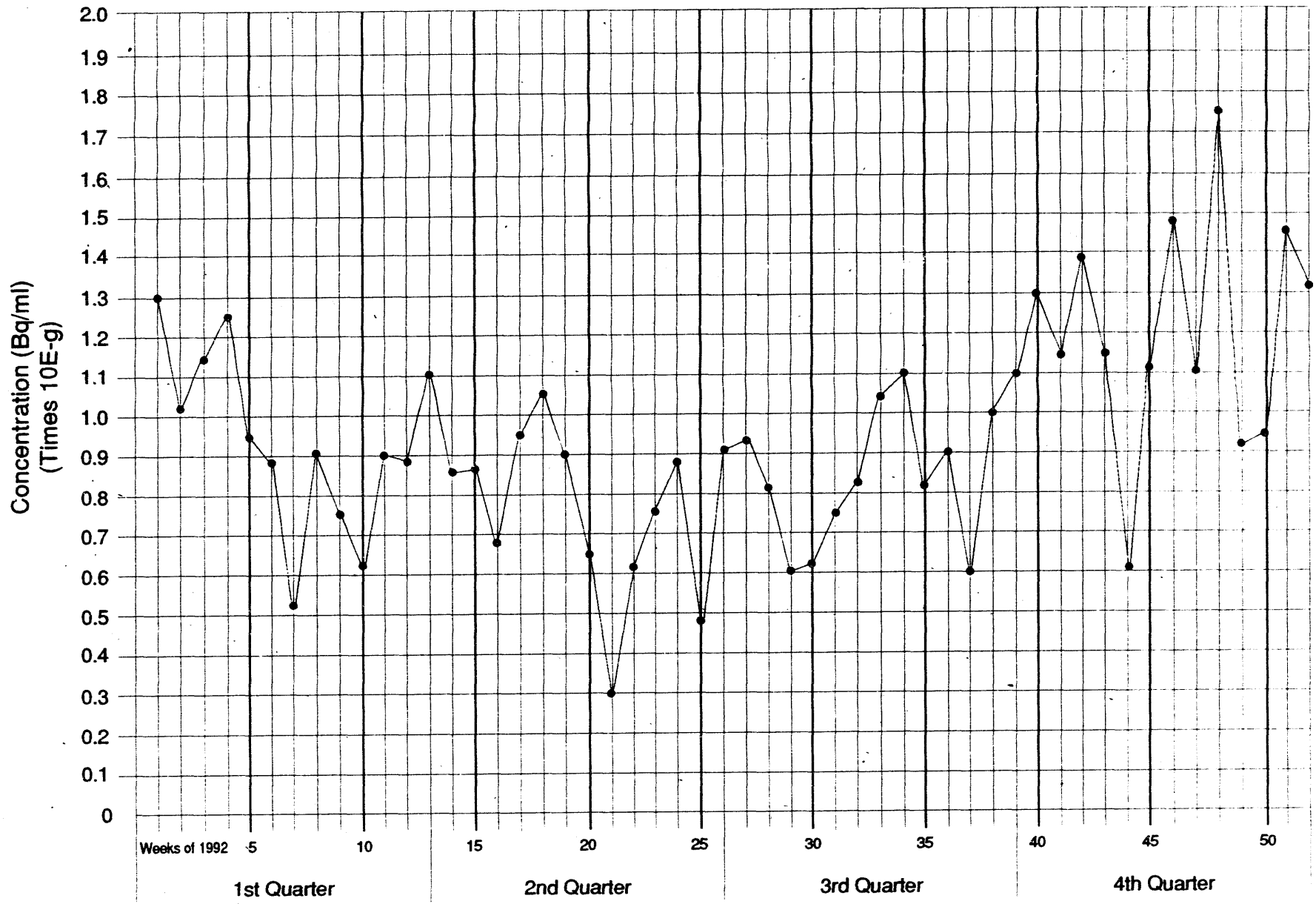
Figure 5-4

Beta Concentration

All Locations



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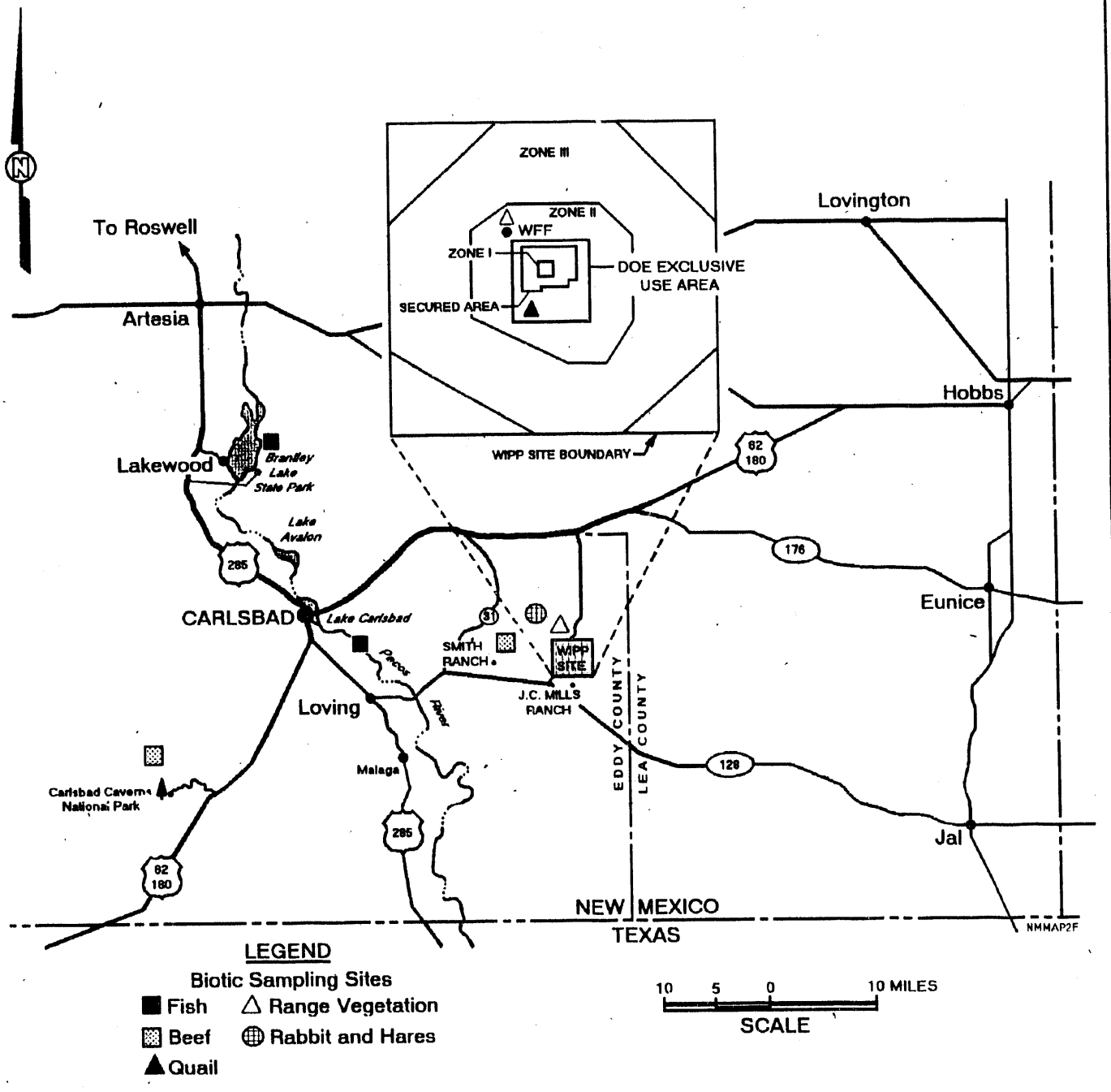

Figure 5-5
Biotic Sampling Sites

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CHAPTER 6

ENVIRONMENTAL NONRADIOLOGICAL PROGRAM INFORMATION

CHAPTER 6

ENVIRONMENTAL NONRADIOLOGICAL PROGRAM INFORMATION

This program is described in the OEMP (DOE/WIPP 88-025) for the WIPP. This plan defines the scope and extent of the WIPP effluent and environmental monitoring programs and quality assurance and quality control programs during the operational life of the facility. Nonradiological Environmental Surveillance (NES) is conducted by the Environmental Monitoring Section of the Environment, Safety and Health Department.

The principal functions of the NES are:

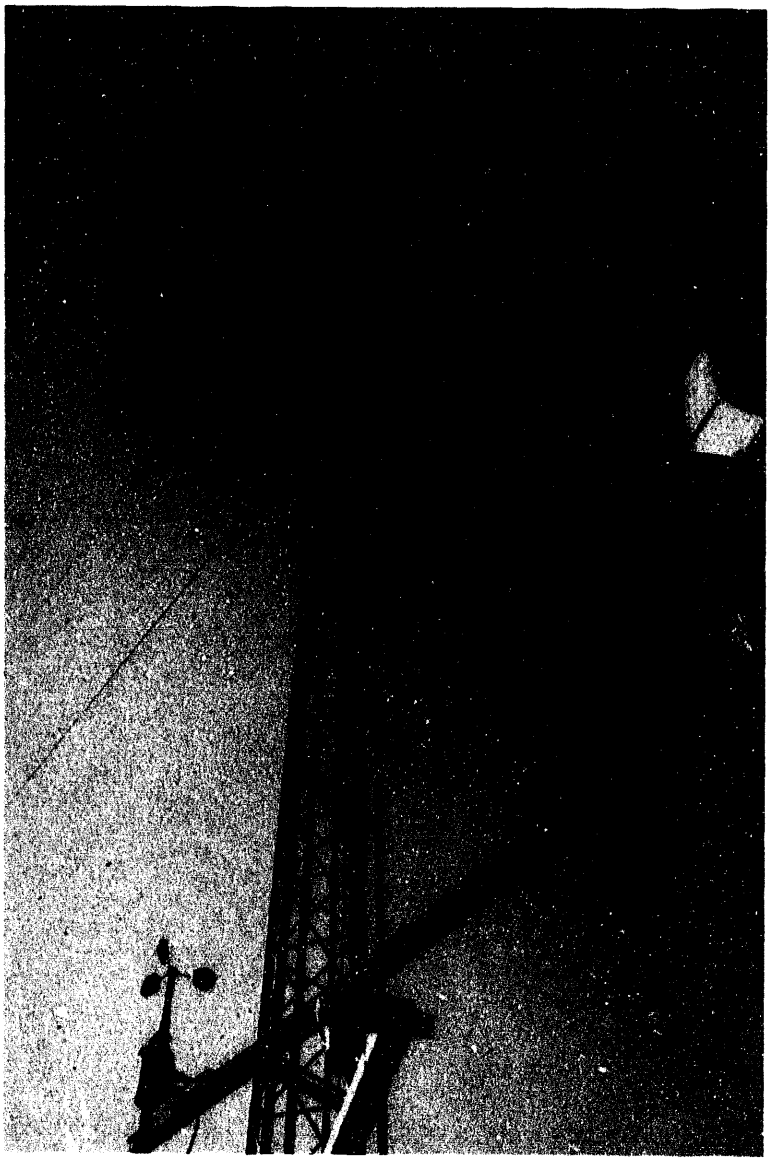
- To detect and quantify the impacts of construction and operational activities at the WIPP on the surrounding ecosystem
- To continue the development of the ecological data base for the Los Medanos Area which was initiated by the WIPP Biology Program
- To investigate unusual or unexpected elements in the ecological data bases
- To provide environmental data that are important to the mission of the WIPP project, but which have not or will not be acquired by other programs

This section of the ASER presents and discusses data collected between January 1, 1992, and December 31, 1992, as part of the NES of the OEMP. Ecological monitoring at the WIPP include the following five subprograms: meteorological monitoring, air quality monitoring, water quality monitoring, wildlife population monitoring, and surface disturbance monitoring through the analysis of aerial photographs. The salt impact studies include three subprograms soil chemistry, soil microbial activity, and vegetation. The results of the environmental monitoring activities and discussions of significant findings are presented in this report.

6.1 METEOROLOGY

The WIPP NES includes a primary meteorological station that provides support for various programs at the WIPP. Its primary function is to generate data to aid in modeling atmospheric conditions for the RES. The station documents standard meteorological measurements of wind speed, wind direction, and temperatures at 3, 10, and 40 meters (10, 30, 130, feet respectively), with dew point, and precipitation monitored at ground level. These parameters are continuously measured and the data is stored in the central monitoring system.

In addition to the primary meteorological station, the Atmospheric Monitoring Station (AMS) monitors pollutant gases. At the AMS a secondary meteorological station measures and records temperature, barometric pressure, wind speed, and wind direction at 10 meters (30 feet).



Meteorological data are used by many groups, this program is a very important part of the environmental monitoring programs at the WIPP.

6.1.1 Climatic Data Summary

The average annual temperature for the WIPP area in 1992 was 17°C (63°F). The range for monthly mean temperatures for the WIPP area was 5°to 30°C (41° to 86°F) for January and August. Average daily maximum, minimum, and average temperatures are presented in Figure 6-1 of this report. Generally maximum temperatures occur June through September while minimum temperatures occur December through February.

The last freezing day of the 1991-92 winter season was April 3, 1992, with a temperature of -2°C (28°F). The first freezing day of the 1992-93 winter season occurred October 8, 1992, with 0°C (32°F). The maximum temperature recorded was 43°C (109°F) on July 5, 1992. The minimum temperature was -10°C (14°F) on January 15, 1992.

The annual precipitation at the WIPP site for 1992 was 42 cm (16.58in), which is above the average for this area by 11cm (4.33in). The annual precipitation for CY 92 was 13 percent less than that recorded for CY 91. Figure 6-2 displays the monthly precipitation at the WIPP for CY 92.

6.1.2 Wind Direction and Wind Speed

In CY 92 the predominate wind direction in the WIPP area was from the southeast sector. This is illustrated in Figure 6-3, 1992 Annual Wind Rose. However, winds occurring in late spring are primarily from the west. Various storm systems move through this area which briefly interrupt the predominate southeasterly winds. Wind speed noted as calm [less than 0.5 meters per second (mps)] occurred less than seven percent of the time. Winds of 1.4 through 2.7 mps were the most prevalent during CY 92 accounting for 25.5% of the time.

6.2 ENVIRONMENTAL PHOTOGRAPHY

Aerial photographs were taken in August 1992 to document surface disturbance, development, and reclamation activities at the WIPP site and surrounding BLM/DOE lands. Spot photos, section photos, and aerial flight lines are archived for future reference and comparisons.

Surface photography has been conducted at seven ecological study plots since 1984. Photographs are used to document year to year surface impacts at the study plots and are archived for future reference. Although some paths are noticeable in some plots due to foot traffic, very little impact has been seen in CY 92 through comparative examination of the photographs. Photographs for CY 92 were made in October.

6.3 AIR QUALITY MONITORING

Seven classes of pollutant gases are monitored 1000 meters (0.6 mile) northwest of the exhaust shaft at the WIPP site on a continuous basis. These are sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), hydrogen sulfide (H_2S), and oxides of nitrogen (NO, NO_2, NO_x). The data generated by the analyzers was at the lower limit of detection, that is below the permissible concentrations for the State of New Mexico. The permissible New Mexico state standard for the gases monitored at the WIPP are listed below:

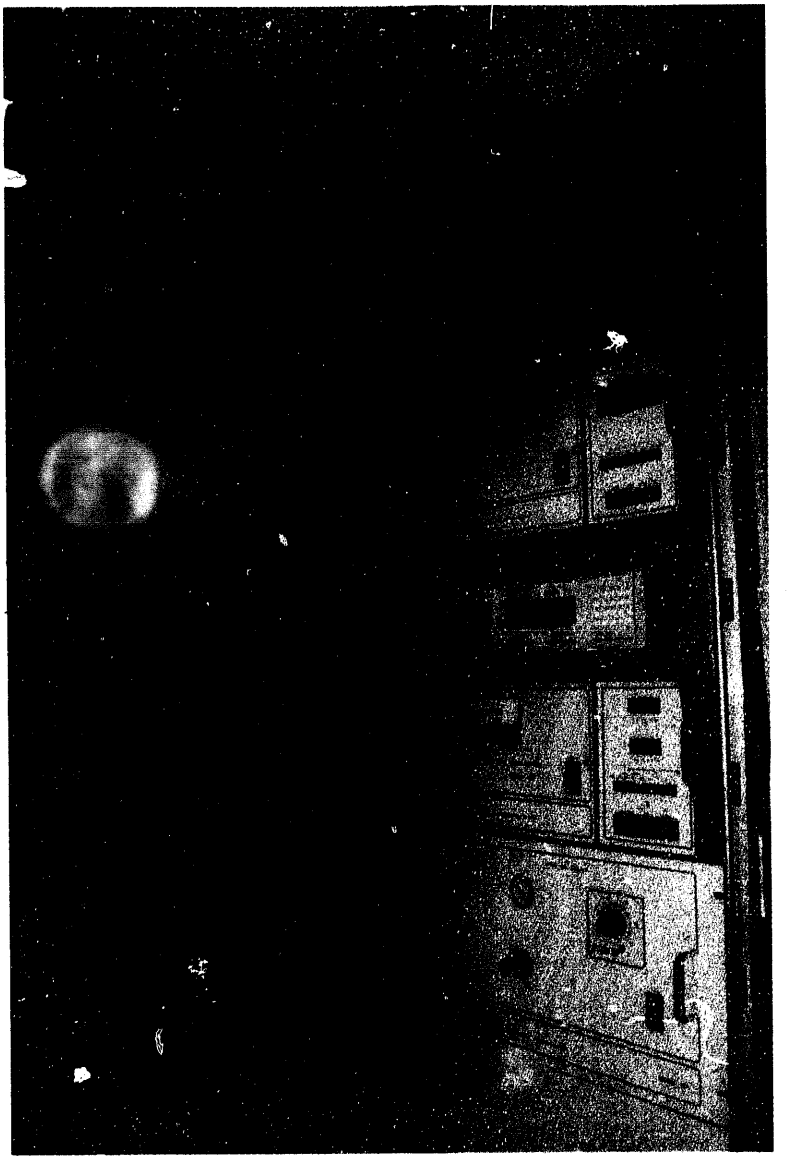
•	CO	8.70	per eight hour average
•	SO_2	0.02 ppm 0.10 ppm	annual average 24-hour average
•	O_3	0.06 ppm	per one hour average
•	NO_2	0.10 ppm	24-hour average
•	H_2S	0.10 ppm	per one half hour average

The ambient gas monitors are extremely sensitive instruments which require semiannual recertification by a factory engineer. During CY 92 the H_2S, SO_2 and NO_x analyzers were replaced with updated analyzers incorporating modern technology developed by the manufacturer. These instruments were installed late in CY 92 and a long term evaluation of the data generated by these instruments is unavailable at this time. However, initial indications show H_2S, SO_2 and NO_x data values at or below lower level of detection for these analyzers. This is consistent with data gathered by the previous analyzers.

In addition, weekly measurements of Total Suspended Particulates are made from the particulates collected by the low-volume continuous air sampler at the Far-Field air sampling location. These filters can load with dust particles due to the arid climate of this area; however, this poses no health concern.

6.4 WILDLIFE POPULATION MONITORING

Population density measurements of breeding birds and small nocturnal mammals are performed annually to assess the effects of the WIPP site activities on wildlife populations. Two permanent study plots adjacent to the WIPP site are used for each of these two classes of wildlife. The data are compared to two control sites for each class in order to assess the effects of WIPP activities on wildlife populations. Trap grids are used to measure small mammal populations, and 2,500 foot long Emlen transects are used to measure bird population densities.



Maintaining scheduled field adjustments to air quality monitoring instruments is one of the many required activities of the WIPP Environmental Monitoring Section.

6.4.1 Cooperative Raptor Research and Management Program

The Los Medanos of Southeast New Mexico is universally recognized as supporting one of the most diverse and dense populations of raptors (bird of prey) in recorded literature.
CY 92 marked a significant reorganization of the Cooperative Raptor Research and Management Program entered into jointly by the DOE and the U.S. Department of the Interiors' Bureau of Land Management.

In order to more accurately assess current population densities in the defined study areas, as well as to more precisely evaluate relative comparisons in historical densities, assays were conducted in an area encompassing approximately 176,000 acres outside the aforementioned study areas.

In 51 hours of searching, 74 distinct groups of Harris' Hawks' (Parabuteo unicinctus) were identified, 53 of which had confirmed nest sites. Nest site locations were identified with a hand - held Loran Navigator and logged for plotting on 7.5 minute topographic maps.

In the CY 92 program, nest locations were the first priority in the design for the interagency cooperative management strategies. The major goal was to decrease human intrusion and disturbance factors on the raptors in the area of WIPP.

6.4.2 Breeding Bird Densities

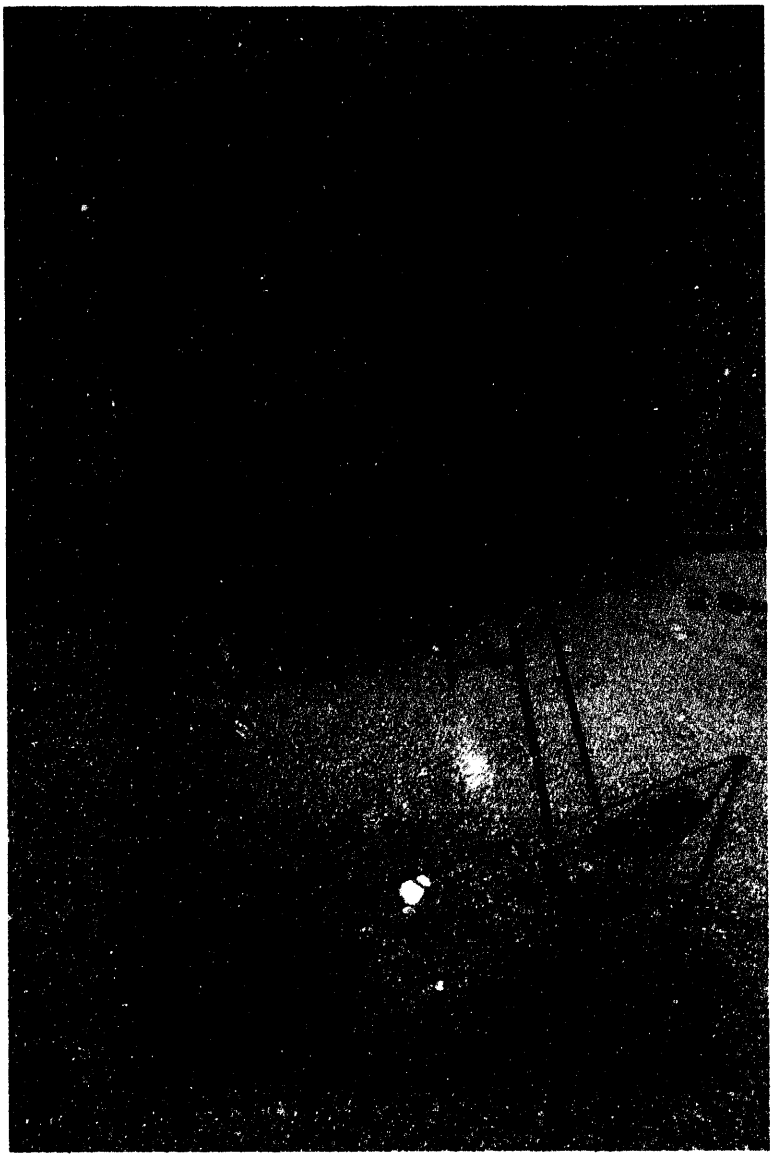
Breeding bird densities maintained similar pattern variations as previous years (Table 6-1). Overall, the patterns of species distribution between the WIPP transects and the control transects follow that of previous years. More species and a higher total density were found in the Southeast 1 (SE1), the Northwest 2 (NW2) and the Control 2 (CT2) transects than in previous years. Although the Control 1 (CT1) plot did not show similar increases, the CT2, SE1 and NW2 plots have substantial increases in varieties and densities, this is possibly due to major oil field activity east of the site. Noise levels are markedly higher and loss of habitat is apparent, possibly forcing the birds further west as home ranges becomes less and less appealing. New oil field activity is beginning southwest of the site, thus 1993 Emlen results may show a decline of bird activity in the CT2 transect as well. A new well is being drilled just yards north of the existing CT2 Emlen line.

Insect dependant species continue to be more abundant near the site as compared to the control plots. Favorable nesting locations and increased insect availability; due to facility structures, large equipment, food availability, and water; act as attractants to barn swallows, king birds, phoebes and others. The immediate area around the WIPP (1 km) boasts a greater concentration of these species. Current adverse effects of WIPP on birds is negligent as field species were displaced during site development and other species have filled, and continue to fill, their place. A new seed eater, pigeons, have been seen flying over the site but to date, no nests have been located.

Beginning September of 1991 a new 21.5 mile line transect was initiated on a monthly basis to assess the species that utilize this region year round or as a fly-way during migration (Table 6-2, Observed Avifauna of Los Medaños and Surrounding Ecotones). As most birds are migratory, the possibility of seeing rare, threatened or endangered species during the Emlen transects is minute.

The transect begins on pipeline road 31 on Hat Mesa and takes a southeasterly route through the 16 sections of WIPP, entering in Section 15 and exiting in Section 19, and ends on Tamarisk Flat at Laguna Grande de la Sal.

1992 observations on the 21.5 mile transect indicated no threatened or endangered species, however, sightings that are considered good for this area are the following: sandhill crane, golden eagle, rock wren, McGillivray's warbler, lazuli bunting, and grasshopper sparrow.



Monitoring levels of wildlife (i.e. deer/quail) are an important facet of the overall evaluation of the environment. Here a wildlife feeder is shown with the WIPP in the background.

6.4.3 Small Nocturnal Mammal Population Densities

Tables 6-3 and 6-4 summarize the results of the 1992 small mammal surveys in the Control 1 and 2 (Ct1 and Ct2) and WIPP Northwest 2 and Southeast 2 (NW2 and SE2) trap grids. Grids are composed of 100 traps set in a 150m x 150m grid with traps spaced 15m apart; the Y axis is noted as 1 through 10 and the X axis is noted as A through J. Trapping sessions began June 23, 1992, and ended July 23, 1992. Mammals were trapped using Sherman live traps baited with cracked grains.

During a two week period, mammals are trapped and released on three successive nights per week. Larger mammals such as kangaroo rats, wood and hispid cotton rats, deer mice, and grasshopper mice are tagged with numbered ear tags to identify individuals.
Silky pocket mice are marked with a stain on their side or head, sex and weight are logged on Small Mammal Data sheets. From this data, population densities, actual numbers of captures for each genus, and travel distances for recaptured individuals are calculated.

Population densities are calculated using the Schnabel Method (Tanner 1978) for mark and recapture mammal trapping. Kangaroo rats are the most common species encountered. Calculations determine the maximum likelihood estimation of population and variance estimation (Table 6-3). Table 6-4 lists the actual number of captures rather than statistical populations for each plot.

Within each grid all the rodents occupy a certain territory or range. By using the data collected and plotting all recaptured animals their unique numbers, grid locations, and total distances that each animal traveled within the grids during the two trapping sessions were determinable. Of the 110 kangaroo rats surveyed 19 were recaptured each night in the same trap location. Several Ord's kangaroo rats were recaptured 60-75 meters from their original capture location, while the average recapture ventured 26.98 meters from their original capture location. According to these calculations, the Ords were less active in CY 92 than in CY 91.

Females were dominant in all grids except in NW2, where the captured population was 50/50. These figures are a complete reversal from CY 91 data where males were dominant in all plots except NW2, however, the data are consistent with CY 90 data results.

Densities were generally higher in all species in CY 92 than the six year average. A total of 40 wood rats were trapped in all plots for CY 92. This is a sharp rise in total captures of wood rats from 1985 to 1992. The overall rise in nocturnal rodent population can be attributed to a mild winter and an unusually rainy spring that gave rise to an abundance of forage availability.

6.5 SURFACE AND SUBSURFACE SOIL MONITORING

Surface and subsurface soil monitoring was temporarily discontinued in CY 92. Substantial analysis of soil was performed from 1984 to 1990. A detailed discussion of the non-radiological soil monitoring program is available in the report entitled, Summary of the Salt Impact Studies at the WIPP, 1984 to 1990, (DOE/WIPP 92-038). This program could be reinstated if, in the future, elevated salt levels were suspected in the topsoil adjacent to the salt storage piles.

6.6 SOIL MICROBIOTA

Soil microbiota monitoring was discontinued in CY 92. Substantial analysis of the soil microbiota was performed from 1984 to 1990. A summary of this program is discussed in summary of the salt impact studies at the WIPP, 1984 to 1990 (DOE/WIPP 92-038).

6.7 VEGETATION MONITORING

Vegetation in each of the seven ecological monitoring plots was measured in the fall (September and October) to assess the effect of the salt tailings on the proximal plant community structures.
In each plot, foliage of each species and species diversity are measured using the methods described in Reith,et al, 1985.. The frequency of a species is defined as the percent a species is identified in the sample plot. Data summaries are presented in Table 6-5. Species listed in the table with zero data values were encountered in the 1992 survey, species with zero data values were not encountered, however, these species are known to be within the WIPP ecological monitoring plots.

The CY 92 precipitation of 42.11cm. (16.58in.) was a decrease over the CY 91 48cm (18.9in.). Drought conditions persisted from February through April, but dramatically changed as record precipitation (a total of 25.37cm., 9.98in) began in May and June. Relatively little precipitation fell the rest of the summer resulting in stressed plants and drought conditions.

The CY 92 vegetation monitoring data showed a continued decline of perennial grasses with increasing proximity to the salt tailings. The total coverage in all plots were relatively uniform over all distances from the tailings. Although densities of annuals and species richness were greater in the nearfield plots, overall, species remained relatively uniform across all plots. A pattern observed from the 1989 - 1991 data which was also seen in the CY 92 data is an increase in shrub cover with increasing proximity to the salt tailings and an approximately equal decrease in perennial grass cover. The responses of these plots to higher rainfall in later years will reveal whether this pattern is reflecting the start of significant changes in the structure of the plant community or whether it is only a short-term effect caused by short-term weather conditions. Rainfall effect conditions have a uniform effect on vegetation in all plots. There were no differential effects resulting from salt-induced physiological stress near the salt tailings was not observed.

The mine tailings do not appear to be having a negative effects on the surrounding plant communities in the form of eolian salt deposition. The nature of the salt is to become compacted and solidified by the heavy machinery and moisture. Any water run-off is collected in the catchment basin where it is evaporated. Interestingly, wildlife has been observed using the salt tailings as a source of salt, similar to livestock using salt blocks.

6.8 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM DATA

The WIPP is currently developing the WIPP NPDES Storm Water Pollution Prevention Plan (PPP). The NPDES Storm Water Permit Rules require that a PPP be developed for each facility covered under the permit by April 1, 1993. The PPP will identify and assess potential pollutant sources, and describe all Best Management Practices (BMPs) and how they will be implemented to ensure that storm water discharges do not contact regulated pollutants. Additionally, the WIPP will outline a schedule for the implementation of all BMPs required to demonstrate compliance with all permit requirements.

Section 402 of the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) program establishes the requirements for regulating industrial storm water discharges that have the potential to discharge into waters of the United States. The WIPP will demonstrate that the facility does not have a discharge of regulated storm waters through the use of BMPs such as engineering controls, storm water retention basins, the covering of materials storage areas, and the reclamation of disturbed zones.

The WIPP submitted a Notice of Intent to the EPA to obtain a National Pollutant Discharge Elimination System (NPDES) Storm Water General Permit. On December 31, 1992, the EPA issued the New Mexico NPDES Storm Water General Permit (NMR00A021). As part of the Nationwide General Permit Program the WIPP is included in the New Mexico General Permit.

6.9 VOLATILE ORGANIC COMPOUNDS MONITORING

As stated in Section 3.2.3, the WIPP has developed and implemented a VOC monitoring program to satisfy the air monitoring requirements of the NMD for the WIPP (55 FR 47700). The data resulting from this program are reported in the NMD annual reports submitted to the EPA. As stated in Section 3.2.3, the most recent report entitled, "Waste Isolation Pilot Plant No-Migration Determination Annual Report for the period of October 1991 through August 1992" (DOE/WIPP 92-057), was submitted to the EPA on November 11, 1992.

Unlike the other programs listed in this chapter, the WIPP VOC Monitoring Program is not included in the OEMP for the WIPP (DOE/WIPP 88-025) and is not implemented by the Environmental Monitoring Section. Rather, the WIPP VOC Monitoring Program is implemented by the Dosimetry and Analytical Technology Section of the Environment, Safety and Health Department, and the implementing documents are specific to the program. These include, "VOC Monitoring Plan for Bin-Room Tests (WP 12-6)" and "Volatile Organic Compounds Monitoring Quality Assurance Program Plan(WP 12-7)."

1992
Average Monthly Temperatures

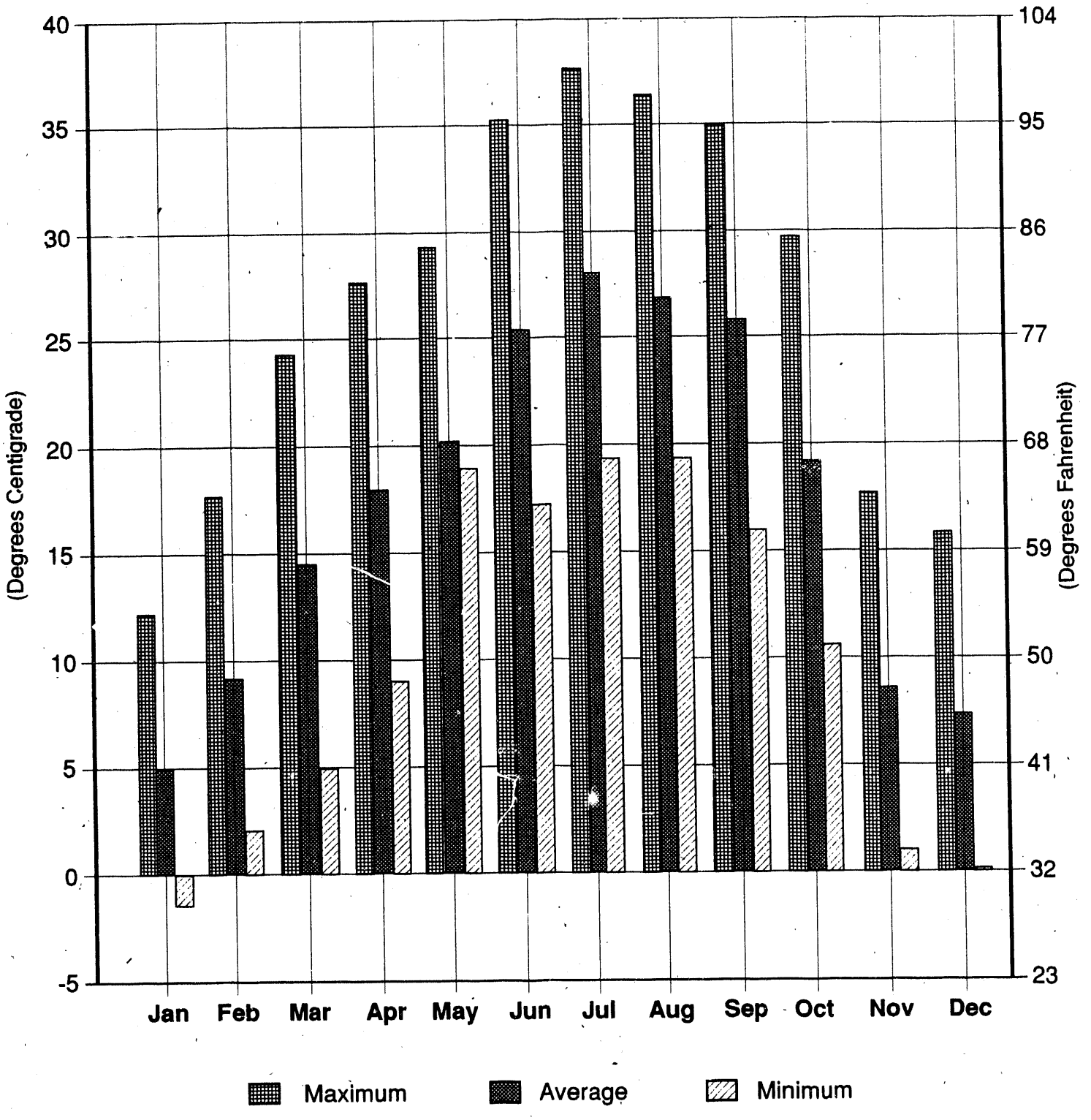


Figure 6-1

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1992
Precipitation

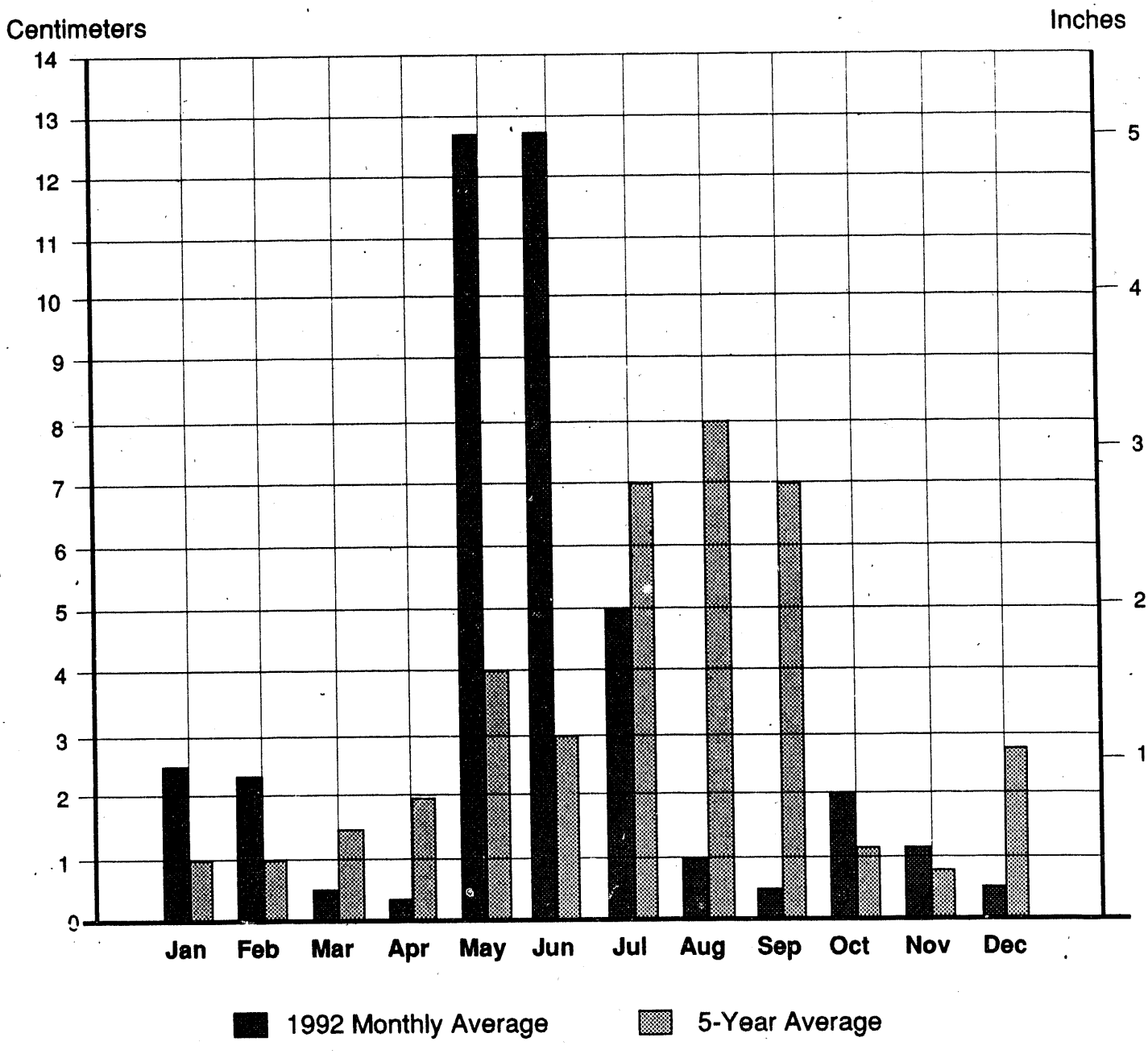

Figure 6-2

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1992 ANNUAL WINDROSE

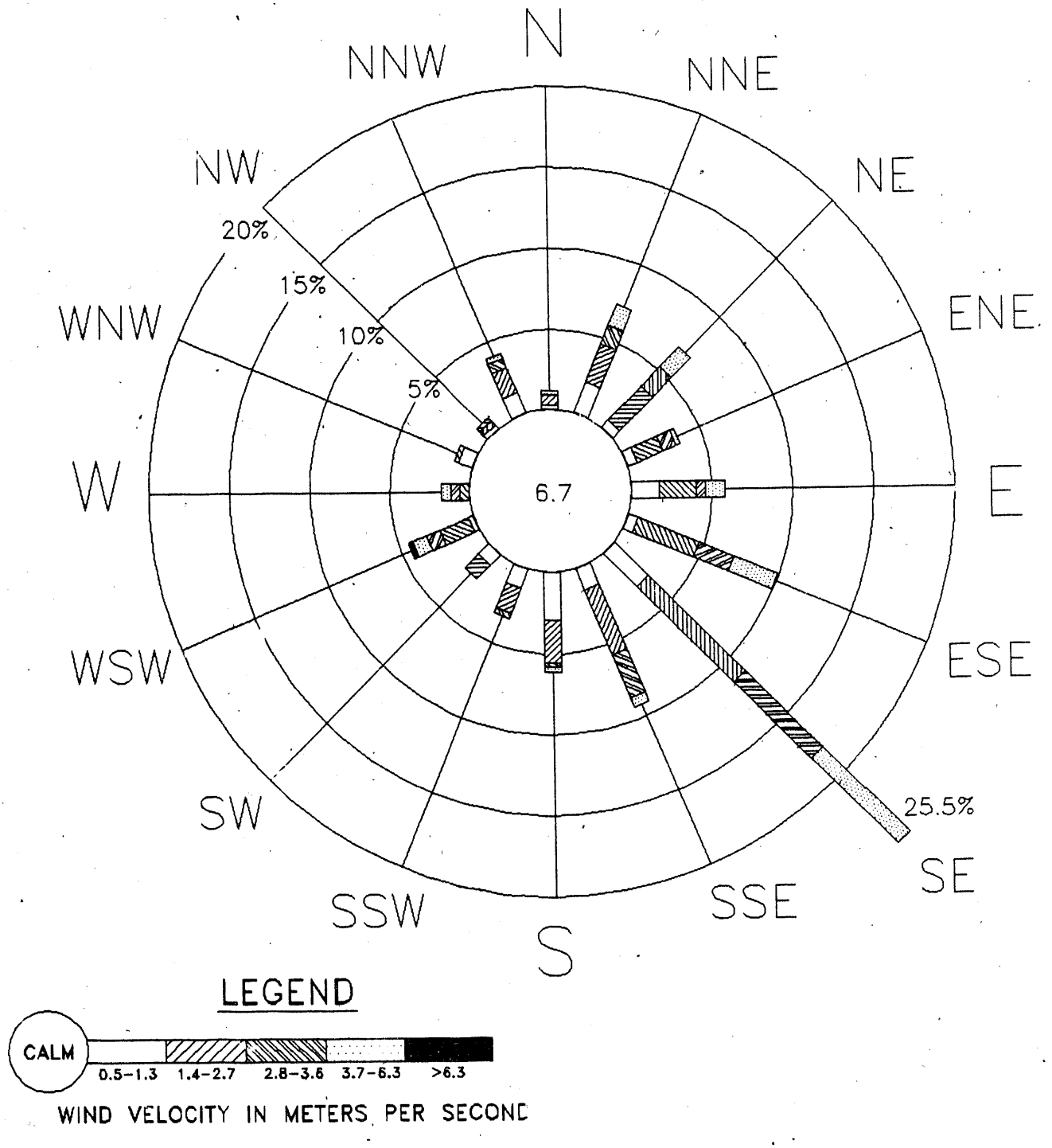

FIGURE 6-3

TABLE 6-1

SUMMARY OF THE 1992 EMLEN BREEDING BIRD DENSITY MEASUREMENTS IN BIRDS PER 40ha.

PLOTS:		CT1	CT2	1992	84-92		NW2	SE1	1992	84-92
				AVERAGES					AVERAGES	
BIRD SPECIES										
KILLDEER		0.0	0.0	0.0	0.0		0.0	7.3	3.7	2.0
NORTHERN HARRIER	0.0	4.3	2.2	1.2		0.0	17.2	8.6	4.3	
SWAINSON'S HAWK	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.1	
HARRIS' HAWK		0.0	2.8	1.4	0.7		0.0	0.0	0.0	0.0
NORTHERN BOBWHITE		15.0	8.9	12.0	6.5		12.0	8.6	10.3	7.6
SCALED QUAIL		20.7	7.9	14.3	8.3		12.9	4.3	8.6	4.6
MOURNING DOVE		18.0	20.3	19.2	13.2		12.9	7.0	10.0	7.2
GREATER ROADRUNNER		0.0	0.0	0.0	0.0		4.3	8.6	6.5	3.6
GREAT HORNED OWL	12.9	10.7	11.8	6.0		0.0	0.0	0.0	0.3	
COMMON POORWILL	0.0	0.0	0.0	0.4		0.0	0.0	0.0	0.2	
COMMON NIGHTHAWK	0.0	0.0	0.0	1.3		0.0	0.0	0.0	1.1	
LADDER-BACKED WOODPECKER		17.2	9.7	4.9		0.0	17.2	8.6	5.2	
WESTERN KINGBIRD	12.9	13.4	13.2	7.2		17.5	27.2	22.4	14.5	
SCISSOR-TAILED FLYCATCHER		0.0	0.0	0.0	0.4		0.0	17.2	8.6	4.6
ASH-THROATED FLYCATCHER		0.0	17.2	8.6	4.7		14.3	17.2	15.8	9.8
SAY'S PHOEBE		4.3	0.0	2.2	1.1		0.0	0.0	0.0	0.0
BARN SWALLOW		0.0	0.0	0.0	0.0		34.5	28.4	31.5	16.5
CHIHUAHUAN RAVEN	9.9	6.1	8.0	4.6		7.7	16.2	12.0	6.7	
CACTUS WREN		20.4	18.4	19.4	11.0		14.0	19.9	17.0	11.7
LOGGERHEAD SHRIKE		25.9	6.8	16.4	10.5		6.5	0.0	3.3	3.2
NORTHERN MOCKINGBIRD		8.6	10.3	9.5	10.1		8.3	8.6	8.5	11.1
CRISSAL THRASHER	2.1	4.3	3.2	2.0		10.8	10.0	10.4	5.2	
BELL'S VIREO		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.2
YELLOW WARBLER		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.2
PYRRHULOXIA		17.7	23.1	20.4	19.6		19.6	29.0	24.3	20.4
RUFOUS-SIDED TOWHEE		0.0	0.0	0.0	0.0		0.0	17.2	8.6	4.3
GRASSHOPPER SPARROW		0.0	8.6	4.3	2.2		0.0	0.0	0.0	0.0
LARK SPARROW		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.3
BLACK-THROATED SPARROW		15.0	49.5	32.3	29.1		38.8	46.3	42.6	32.3
CASSIN'S SPARROW		15.8	19.3	17.6	9.3		40.9	21.5	31.2	15.8
RUFOUS-CROWNED SPARROW		0.0	8.6	4.3	2.2		0.0	0.0	0.0	0.0
BREWER'S SPARROW		0.0	0.0	0.0	0.3		0.0	12.9	6.5	3.3
WHITE-CROWNED SPARROW		0.0	0.0	0.0	0.0		34.5	34.5	34.5	17.3
YELLOW-HEADED BLACKBIRD		0.0	2.1	1.1	0.7		0.0	FLOCK	FLOCK	0.3
RED-WINGED BLACKBIRD		0.0	0.0	0.0	0.0		0.0	17.2	8.6	4.3
BREWER'S BLACKBIRD		4.3	0.0	2.2	1.1		17.2	11.9	14.6	7.3
BROWN-HEADED COWBIRD			5.4	14.3	9.9	7.5		16.1	12.9	14.5 8.8
LARK BUNTING		17.2	12.9	15.1	7.7		34.5	17.2	25.9	13.1
MEADOWLARK		14.3	14.3	14.3	8.7		7.2	16.1	11.7	6.4
NORTHERN ORIOLE		8.6	0.0	4.3	2.2		11.5	0.0	5.8	4.0
HOUSE SPARROW		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.1
LESSER GOLDFINCH		0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.2
AMERICAN GOLDFINCH		0.0	0.0	0.0	0.0		0.0	17.2	8.6	4.3
HOUSE FINCH		0.0	0.0	0.0	0.2		0.0	17.2	8.6	5.2
TOTAL DENSITY		251.1	301.3	276.9	184.8		376.0	486.0	431.8	267.6
NUMBER OF SPECIES		20	23	26	31		21	29	31	40

TOTAL SPECIES OBSERVED 1984-92 44

Species in italics are considered threatened or endangered federally and/or by New Mexico.

TABLE 6-2

OBSERVED AVIFAUNA OF LOS MEDAÑOS AND SURROUNDING ECOTONES

MONTH OBSERVED		J	F	M	A	M	J	J	A	S	O	N	D	SPECIES TOTALS
BIRD SPECIES														
BLACK-CROWNED NIGHT-HERON		0	0	1	>200	171	86	30	0	0	0	0	0	>200
SNOWY EGRET		0	0	1	>100	111	119	30	6	0	0	0	0	>119
GREAT BLUE HERON	0	0	0	1	0	0	0	0	0	0	0	0	1	
SANDHILL CRANE		0	0	0	0	0	0	0	0	0	42	0	0	42
BLUE-WINGED TEAL	0	0	0	2	0	0	0	0	0	0	0	0	2	
AMERICAN COOT		0	0	0	1	0	0	0	0	0	0	0	0	1
SNOWY PLOVER		0	0	0	1	0	0	0	0	0	0	0	0	1
KILLDEER		0	0	0	1	3	0	0	0	0	0	0	1	5
SEMIPALMATED SANDPIPER	0	0	0	1	0	0	0	0	0	0	00	1		
LEAST SANDPIPER	0	0	0	0	0	0	0	0	0	0	0	1	1	
RING-BILLED GULL	0	0	0	1	0	0	0	0	0	0	0	0	1	
TURKEY VULTURE		0	0	0	0	3	2	12	10	18	0	0	0	45
GOLDEN EAGLE		0	0	0	0	0	0	0	0	0	0	0	1	1
NORTHERN HARRIER	3	5	7	2	1	0	0	0	1	20	17	21	77	
SHARP-SHINNED HAWK		0	0	1	0	0	0	0	0	0	0	0	1	2
RED-TAILED HAWK	7	1	3	2	0	1	2	4	4	7	10	3	44	
SWAINSON'S HAWK	0	0	0	7	1	2	7	12	12	0	0	0	41	
ROUGH-LEGGED HAWK		1	0	0	0	0	0	0	0	0	0	0	0	1
FERRUGINOUS HAWK	0	2	0	0	0	0	0	0	2	0	1	1	6	
HARRIS' HAWK		1	0	0	0	1	2	2	3	2	2	0	2	15
AMERICAN KESTREL	1	0	3	1	0	0	0	1	6	1	0	0	13	
MERLIN		1	0	0	0	0	0	0	0	0	0	0	0	1
PRAIRIE FALCON		1	0	0	0	0	0	0	0	0	1	1	1	4
NORTHERN BOBWHITE		0	0	1	3	3	13	3	0	4	0	15	0	42
SCALED QUAIL		0	38	4	7	14	20	13	15	67	54	18	16	266
MOURNING DOVE		53	20	39	23	25	39	191	225	51	3	6	3	678
GREATER ROADRUNNER		0	1	1	1	1	0	1	2	4	1	0	0	12
GREAT HORNED OWL	0	1	0	8	6	0	0	0	0	0	0	0	15	
BURROWING OWL		0	0	0	1	0	0	0	0	0	0	0	0	1
COMMON NIGHTHAWK	0	0	0	0	1	0	5	1	0	0	0	0	7	
LESSER NIGHTHAWK	0	0	0	0	0	1	0	0	0	0	0	0	1	
RED-SHAFTED NORTHERN FLICKER		0	0	0	0	0	0	0	0	0	0	0	1	1
LADDER-BACKED WOODPECKER		1	1	0	0	2	1	0	0	1	0	4	10	
WESTERN KINGBIRD	0	0	0	1	6	10	4	0	1	0	0	0	22	
SCISSOR-TAILED FLYCATCHER		0	0	0	2	1	2	7	0	3	0	0	0	15
HORNED LARK		0	0	0	0	0	1	2	0	0	0	0	0	3
ASH-THROATED FLYCATCHER		0	0	5	6	2	0	0	0	0	0	0	13	
SAY'S PHOEBE		0	0	0	0	1	0	0	0	0	0	1	0	2
BARN SWALLOW		0	0	0	2	1	0	0	10	4	0	0	0	17
OBSERVED MONTHLY SUBTOTALS		68	69	62	>373	356	302	310	289	179	132	69	56	
OBSERVED SPECIES SUBTOTALS		8	8	11	23	18	15	15	11	14	10	8	13	

TABLE 6-3

SUMMARY OF 1992 SMALL NOCTURNAL MAMMAL DENSITIES

MEASUREMENTS ARE INDIVIDUALS PER 150M X 150M TRAP GRID

	CONTROL GRIDS				WIPP GRIDS			
			AVE	AVE			AVE	AVE
	CT1	CT2	1992	85-92	NW	SE	1992	85-92
ORD'S KANGAROO RAT	28	40	34	25	25	17	21	19
SILKY POCKET MOUSE	9	7	8	11	2	4	3	4
NORTHERN GRASSHOPPER MOUSE	14	7	11	7	6	2	4	7
PLAINS WOODRAT	26	15	21	12	13	9	11	6
WHITE-FOOTED MOUSE AND DEER MOUSE	1	0	.5	.25	1	0	.5	2
TOTAL DENSITY	78	69	75	55	47	32	40	38

TABLE 6-4

ACTUAL CAPTURES OF NOCTURNAL MAMMALS IN 1992

		CT1	CT2	1992	91-92		NW2	SE2	1992	91-92
ORD'S KANGAROO RAT		29	41	35	34		25	18	22	27
WHITE FOOTED/DEER MOUSE		0	.5	.25		0	1	.5	3	
PLAINS POCKET MOUSE		4	5	5	6		4	3	4	3
GRASSHOPPER MOUSE		8	5	7	5		6	2	4	3
PLAINS WOOD RAT	17	14	16	9		10	8	9	6	
HISPID COTTON RAT		0	0	0	2		0	0	0	4

TABLE 6-5 WIPP 1992 FALL VEGETATION REPORT

		* CONTROL 1			* CONTROL 2		
TREE, SHRUB, CACTI, YUCCA	**ACRO**	**COVER**	**FREQ**	**DENS**	**COVER**	**FREQ**	**DENS**
WESTERN SOAPBERRY	SASA	0.05	0.12	0.00	0.00	0.00	0.00
HONEY MESQUITE	PRGL	0.00	0.00	0.00	0.35	1.24	0.00
SHINNERY OAK	QUHA	11.63	29.05	0.00	14.23	50.25	0.00
THREAD-LEAF SAGE WORT	ARFI	1.18	2.95	0.00	1.36	4.80	0.00
SOUTHWEST RABBITBRUSH	CHPU	0.13	0.32	0.00	0.00	0.00	0.00
YELLOW EVENING PRIMROSE	CASE	0.06	0.15	0.00	0.00	0.00	0.00
PINK PLAINS PENSTEMON	PEAM	0.00	0.00	0.00	0.00	0.00	0.00
PLAINS YUCCA	YUCA	1.05	2.62	0.00	1.63	5.76	0.00
PLAINS PRICKLYPEAR	OPPO	0.00	0.00	0.00	0.00	0.00	0.00
PERENNIAL FORBS							
DUNE FLATSEDGE	CYON	0.64	1.60	0.00	0.06	0.21	0.00
WIDOW'S TEARS, DAY-FLOWER	COER	0.00	0.00	0.00	0.00	0.00	0.00
CLIMBING MILKWEED	SAHE	0.00	0.00	0.00	0.00	0.00	0.00
LONGHORN MILKWEED	ASOE	0.00	0.00	0.00	0.00	0.00	0.00
KNOTWEED LEAFFLOWER	PHPO	0.39	0.97	0.00	0.00	0.00	0.00
LEATHER-WEED CROTON	CRPO	0.00	0.00	0.00	0.00	0.00	0.00
SMOOTH OXYBAPHUS	OXGL	0.46	1.15	0.00	0.10	0.35	0.00
ARIZONA SNAKECOTTON	FRAR	0.00	0.00	0.00	0.00	0.00	0.00
WOOLLY DALEA	DALA	0.71	1.77	0.00	1.18	4.17	0.00
INDIAN RUSHPEA	HOGL	0.16	0.40	0.00	0.00	0.00	0.00
WESTERN SENSITIVE BRIER	SCOC	0.00	0.00	0.00	0.00	0.00	0.00
SPECTACLE POD	DIWI	0.00	0.00	0.00	0.00	0.00	0.00
SILVER-LEAF NIGHTSHADE	SOEL	0.06	0.15	0.00	0.00	0.00	0.00
PLAINS BLACKFOOT	MELE	0.79	1.97	0.00	0.00	0.00	0.00
SLENDER GREENTHREAD	THSI	0.00	0.00	0.00	0.00	0.00	0.00
SENECIO, RIDDLE OR THREADLEAF	SENO	0.00	0.00	0.00	0.44	1.55	0.00
THREAD-LEAF BROOMWEED	XAMI	0.00	0.00	0.00	0.00	0.00	0.00
PERENNIAL GRASSES							
SANDBUR	CIEN	3.23	8.07	0.00	3.19	11.26	0.00
FALL WITCHGRASS	LECO	5.15	12.87	0.00	1.24	4.38	0.00
ALKALI SACATON	SPAI	0.00	0.00	0.00	0.00	0.00	0.00
SAND DROPSEED	SPCR	0.00	0.00	0.00	0.00	0.00	0.00
SPIKE DROPSEED	SPCO	0.00	0.00	0.00	0.13	0.46	0.00
MESA DROPSEED	SPFL	0.00	0.00	0.00	0.00	0.00	0.00
GIANT DROPSEED	SPGI	0.74	1.85	0.00	1.28	4.52	0.00
LITTLE BLUESTEM	ANSC	0.00	0.00	0.00	0.00	0.00	0.00
BIG BLUESTEM	ANGE	0.00	0.00	0.00	0.00	0.00	0.00
SAND PASPALUM	PAST	1.61	4.02	0.00	0.00	0.00	0.00
PURPLE THREE-AWN	ARPU	6.25	15.61	0.00	2.54	8.97	0.00
HAIRY GRAMA	BOHI	0.94	2.35	0.00	0.00	0.00	0.00
SIDEOATS GRAMA	BOCU	0.00	0.00	0.00	0.00	0.00	0.00
BLACK GRAMA	BOER	0.00	0.00	0.00	0.00	0.00	0.00
LOVEGRASS (SESSILISPICA)	ERSE	0.00	0.00	0.00	0.00	0.00	0.00
RED LOVEGRASS	EROX	0.00	0.00	0.00	0.00	0.00	0.00
PLAINS BRISTLEGRASS	SEMA	0.00	0.00	0.00	0.00	0.00	0.00
GRASS COTYLEDON	....	0.00	0.00	0.00	0.00	0.00	0.00
ANNUAL FORBS							
TEXAS CROTON	CRTE	0.89	2.22	0.75	0.18	0.64	0.15
PRAIRIE SPURGE	EUMI	1.64	4.10	1.65	0.18	0.64	0.15
RIDGE-SEED SPURGE	EUGL	0.39	0.97	0.45	0.00	0.00	0.00
SAND LEAF-FLOWER	PHAB	0.00	0.00	0.00	0.00	0.00	0.00
SPOTTED BEE-BALM	MOPU	0.20	0.50	0.10	0.10	0.35	0.10
MAT BLUETS	HEHU	0.95	2.37	1.75	0.00	0.00	0.00
ANNUAL WILD-BUCKWHEAT	ERAN	0.09	0.22	0.05	0.00	0.00	0.00
RUSSIAN THISTLE	SAKA	0.00	0.00	0.00	0.00	0.00	0.00
SHAGGY PORTULACA	POMU	0.00	0.00	0.00	0.00	0.00	0.00
ENGLEMANN EVENING-PRIMROSE	OEEN	0.00	0.00	0.00	0.00	0.00	0.00
NEALLEY BEE-BLOSSOM	GASU	0.00	0.00	0.00	0.00	0.00	0.00
PRAIRIE SUNFLOWER	HEPE	0.26	0.65	0.10	0.00	0.00	0.00
SAND PALAFOX	PASP	0.00	0.00	0.00	0.00	0.00	0.00
RAGWEED	AMCO	0.00	0.00	0.00	0.00	0.00	0.00
ANNUAL SUNFLOWER	HEAN	0.00	0.00	0.00	0.00	0.00	0.00
LIMONCILLO	PETE	0.38	0.95	0.85	0.00	0.00	0.00
GOLDEN CROWNBEARD	VEEN	0.00	0.00	0.00	0.13	0.46	0.02
GOLDEN ASTER	HETER	0.00	0.00	0.00	0.00	0.00	0.00
ANNUAL GRASS							
FALSE BUFFALO GRASS	MUSQ	0.00	0.00	0.00	0.00	0.00	0.00

* **ACRONYM:** 4 letter abbreviation of the scientific name **COVER:** Foliar cover in percent **FREQUENCY:** Percent of sample **DENSITY:** Annual plants per square meter

TABLE 6-5 (CONTINUED) WIPP 1992 FALL VEGETATION REPORT

		* NORTHWEST 1			* NORTHWEST 2		
TREE, SHRUB, CACTI, YUCCA	ACRO	COVER	FREQ	DENS	COVER	FREQ	DENS
WESTERN SOAPBERRY	SASA	0.23	0.58	0.00	0.00	0.00	0.00
HONEY MESQUITE	PRGL	2.25	5.66	0.00	0.38	0.91	0.00
SHINNERY OAK	QUHA	10.93	27.48	0.00	12.79	30.77	0.00
THREAD-LEAF SAGE WORT	ARFI	5.45	13.7	0.00	1.88	4.52	0.00
SOUTHWEST RABBITBRUSH	CHPU	0.00	0.00	0.00	0.00	0.00	0.00
YELLOW EVENING PRIMROSE	CASE	0.18	0.45	0.00	0.10	0.24	0.00
PINK PLAINS PENSTEMON	PEAM	0.00	0.00	0.00	0.06	0.14	0.00
PLAINS YUCCA	YUCA	0.00	0.00	0.00	0.47	1.13	0.00
PLAINS PRICKLYPEAR	OPPO	0.00	0.00	0.00	0.00	0.00	0.00
PERENNIAL FORBS							
DUNE FLATSEDGE	CYON	0.00	0.00	0.00	0.38	0.91	0.00
WIDOW'S TEARS, DAY-FLOWER	COER	0.00	0.00	0.00	0.00	0.00	0.00
CLIMBING MILKWEED	SAHE	0.00	0.00	0.00	0.00	0.00	0.00
LONGHORN MILKWEED	ASOE	0.00	0.00	0.00	0.00	0.00	0.00
KNOTWEED LEAFFOWER	PHPO	1.29	3.24	0.00	1.58	3.80	0.00
LEATHER-WEED CROTON	CRPO	0.00	0.00	0.00	0.00	0.00	0.00
SMOOTH OXYBAPHUS	OXGL	0.00	0.00	0.00	0.13	0.31	0.00
ARIZONA SNAKECOTTON	FRAR	0.00	0.00	0.00	0.00	0.00	0.00
WOOLLY DALEA	DALA	0.15	0.38	0.00	1.31	3.15	0.00
INDIAN RUSHPEA	HOGL	0.00	0.00	0.00	0.00	0.00	0.00
WESTERN SENSITIVE BRIER	SCOC	0.00	0.00	0.00	0.00	0.00	0.00
SPECTACLE POD	DIWI	0.00	0.00	0.00	0.00	0.00	0.00
SILVER-LEAF NIGHTSHADE	SOEL	0.00	0.00	0.00	0.00	0.00	0.00
PLAINS BLACKFOOT	MELE	0.00	0.00	0.00	0.00	0.00	0.00
SLENDER GREENTHREAD	THSI	0.00	0.00	0.00	0.00	0.00	0.00
SENECIO, RIDDLE OR THREADLEAF	SENO	0.84	2.11	0.00	0.35	0.84	0.00
THREAD-LEAF BROOMWEED	XAMI	0.00	0.00	0.00	0.00	0.00	0.00
PERENNIAL GRASSES							
SANDBUR	CIEN	3.73	9.38	0.00	4.76	11.45	0.00
FALL WITCHGRASS	LECO	3.76	9.45	0.00	3.16	7.60	0.00
ALKALI SACATON	SPAI	0.00	0.00	0.00	0.00	0.00	0.00
SAND DROPSEED	SPCR	0.00	0.00	0.00	0.00	0.00	0.00
SPIKE DROPSEED	SPCO	0.00	0.00	0.00	1.03	2.48	0.00
MESA DROPSEED	SPFL	0.00	0.00	0.00	0.00	0.00	0.00
GIANT DROPSEED	SPGI	2.96	7.44	0.00	0.96	2.31	0.00
LITTLE BLUESTEM	ANSC	0.00	0.00	0.00	2.25	5.41	0.00
BIG BLUESTEM	ANGE	0.00	0.00	0.00	0.00	0.00	0.00
SAND PASPALUM	PAST	0.58	1.46	0.00	0.26	0.00	0.63
PURPLE THREE-AWN	ARPU	1.06	2.66	0.00	3.44	8.28	0.00
HAIRY GRAMA	BOHI	0.00	0.00	0.00	0.00	0.00	0.00
SIDEOATS GRAMA	BOCU	0.00	0.00	0.00	0.00	0.00	0.00
BLACK GRAMA	BOER	0.00	0.00	0.00	0.00	0.00	0.00
LOVEGRASS (SESSILISPICA)	ERSE	0.00	0.00	0.00	0.00	0.00	0.00
RED LOVEGRASS	EROX	0.00	0.00	0.00	0.00	0.00	0.00
PLAINS BRISTLEGRASS	SEMA	0.00	0.00	0.00	0.00	0.00	0.00
GRASS COTYLEDON	----	0.00	0.00	0.00	0.00	0.00	0.00
ANNUAL FORBS							
TEXAS CROTON	CRTE	0.00	0.00	0.00	0.09	0.22	0.10
PRAIRIE SPURGE	EUMI	1.59	4.00	0.85	1.63	3.92	1.20
RIDGE-SEED SPURGE	EUGL	1.29	3.24	1.40	2.01	4.83	2.65
SAND LEAF-FLOWER	PHAB	0.00	0.00	0.00	0.00	0.00	0.00
SPOTTED BEE-BALM	MOPU	0.00	0.00	0.00	0.00	0.00	0.00
MAT BLUETS	HEHU	0.00	0.00	0.00	0.00	0.00	0.00
ANNUAL WILD-BUCKWHEAT	ERAN	0.00	0.00	0.00	0.13	0.31	0.10
RUSSIAN THISTLE	SAKA	1.30	3.27	0.10	0.00	0.00	0.00
SHAGGY PORTULACA	POMU	0.00	0.00	0.00	0.00	0.00	0.00
ENGLEMANN EVENING-PRIMROSE	OEEN	0.00	0.00	0.00	0.00	0.00	0.00
NEALLEY BEE-BLOSSOM	GASU	0.19	0.48	0.10	0.13	0.31	0.05
PRAIRIE SUNFLOWER	HEPE	0.25	0.63	0.10	0.00	0.00	0.00
SAND PALAFOX	PASP	0.00	0.00	0.00	0.13	0.31	0.05
RAGWEED	AMCO	0.00	0.00	0.00	0.00	0.00	0.00
ANNUAL SUNFLOWER	HEAN	0.00	0.00	0.00	0.00	0.00	0.00
LIMONCILLO	PETE	0.00	0.00	0.00	0.00	0.00	0.00
GOLDEN CROWNBEARD	VEEN	0.00	0.00	0.00	0.06	0.14	0.05
GOLDEN ASTER	HEPS	1.75	4.40	1.05	2.04	4.91	1.75
ANNUAL GRASS							
FALSE BUFFALO GRASS	MUSQ	0.00	0.00	0.00	0.06	0.14	0.10

* **ACRONYM:** 4 letter abbreviation of the scientific name **COVER:** FOLIAR COVER IN PERCENT **FREQUENCY:** PERCENT OF SAMPLE **DENSITY:** ANNUAL PLANTS PER SQUARE METER

TABLE 6-5 (CONTINUED) WIPP 1992 FALL VEGETATION REPORT

		* SOUTHEAST 1				* SOUTHEAST 2	
TREE, SHRUB, CACTI, YUCCA	ACRO	COVER	FREQ	DENS	COVER	FREQ	DENS
WESTERN SOAPBERRY	SASA	0.00	0.00	0.00	0.00	0.00	0.00
HONEY MESQUITE	PRGL	0.19	0.52	0.00	0.00	0.00	0.00
SHINNERY OAK	QUHA	16.15	44.22	0.00	8.84	29.48	0.00
THREAD-LEAF SAGE WORT	ARFI	3.98	10.90	0.00	4.85	16.17	0.00
SOUTHWEST RABBITBRUSH	CHPU	0.00	0.00	0.00	0.00	0.00	0.00
YELLOW EVENING PRIMROSE	CASE	0.00	0.00	0.00	0.00	0.00	0.00
PINK PLAINS PENSTEMON	PEAM	0.00	0.00	0.00	0.00	0.00	0.00
PLAINS YUCCA	YUCA	4.31	11.80	0.00	0.81	2.70	0.00
PLAINS PRICKLYPEAR	OPPO	0.00	0.00	0.00	0.00	0.00	0.00
PERENNIAL FORBS							
DUNE FLATSEDGE	CYON	0.00	0.00	0.00	0.00	0.00	0.00
WIDOW'S TEARS, DAY-FLOWER	COER	0.00	0.00	0.00	0.00	0.00	0.00
CLIMBING MILKWEED	SAHE	0.01	0.03	0.00	0.00	0.00	0.00
LONGHORN MILKWEED	ASMA	0.00	0.00	0.00	0.00	0.00	0.00
KNOTWEED LEAFFLOWER	PHPO	0.21	0.57	0.00	1.53	5.10	0.00
LEATHER-WEED CROTON	CRPO	0.00	0.00	0.00	0.00	0.00	0.00
SMOOTH OXYBAPHUS	OXGL	0.00	0.00	0.00	0.00	0.00	0.00
ARIZONA SNAKECOTTON	FRAR	0.00	0.00	0.00	0.00	0.00	0.00
WOOLLY DALEA	DALA	0.16	0.44	0.00	0.08	0.27	0.00
INDIAN RUSHPEA	HOGL	0.00	0.00	0.00	0.00	0.00	0.00
WESTERN SENSITIVE BRIER	SCOC	0.00	0.00	0.00	0.00	0.00	0.00
SPECTACLE POD	DIWI	0.00	0.00	0.00	0.00	0.00	0.00
SILVER-LEAF NIGHTSHADE	SOEL	0.13	0.36	0.00	0.00	0.00	0.00
PLAINS BLACKFOOT	MELE	0.00	0.00	0.00	0.00	0.00	0.00
SLENDER GREENTHREAD	THSI	0.00	0.00	0.00	0.00	0.00	0.00
SENECIO, RIDDLE OR THREADLEAF	SENO	0.00	0.00	0.00	0.13	0.43	0.00
THREAD-LEAF BROOMWEED	XAMI	0.00	0.00	0.00	0.00	0.00	0.00
PERENNIAL GRASSES							
SANDBUR	CIEN	1.15	3.15	0.00	3.65	12.17	0.00
FALL WITCHGRASS	LECO	0.36	0.99	0.00	1.94	6.47	0.00
ALKALI SACATON	SPAI	0.00	0.00	0.00	0.00	0.00	0.00
SAND DROPSEED	SPCR	0.31	0.85	0.00	0.25	0.83	0.00
SPIKE DROPSEED	SPCO	0.79	2.16	0.00	0.00	0.00	0.00
MESA DROPSEED	SPFL	0.00	0.00	0.00	0.00	0.00	0.00
GIANT DROPSEED	SPGI	0.58	1.59	0.00	0.05	0.17	0.00
LITTLE BLUESTEM	ANSC	0.00	0.00	0.00	0.06	0.20	0.00
BIG BLUESTEM	ANGE	0.00	0.00	0.00	0.00	0.00	0.00
SAND PASPALUM	PAST	0.19	0.52	0.00	1.13	3.77	0.00
PURPLE THREE-AWN	ARPU	3.83	10.49	0.00	2.66	8.87	0.00
HAIRY GRAMA	BOHI	0.00	0.00	0.00	0.00	0.00	0.00
SIDEOATS GRAMA	BOCU	0.00	0.00	0.00	0.00	0.00	0.00
BLACK GRAMA	BOER	0.00	0.00	0.00	0.00	0.00	0.00
LOVEGRASS (SESSILISPICA)	ERSE	0.34	0.93	0.00	0.00	0.00	0.00
RED LOVEGRASS	EROX	0.21	0.57	0.00	0.19	0.63	0.00
PLAINS BRISTLEGRASS	SEMA	0.10	0.27	0.00	0.00	0.00	0.00
GRASS COTYLEDON	----	0.09	0.25	0.00	0.13	0.43	0.00
ANNUAL FORBS							
TEXAS CROTON	CRTE	0.03	0.08	0.05	0.00	0.00	0.00
PRAIRIE SPURGE	EUMI	2.04	5.59	2.15	1.19	3.97	1.25
RIDGE-SEED SPURGE	EUGL	0.21	0.57	0.20	1.53	5.10	2.05
SAND LEAF-FLOWER	PHAB	0.00	0.00	0.00	0.00	0.00	0.00
SPOTTED BEE-BALM	MOPU	0.00	0.00	0.00	0.00	0.00	0.00
MAT BLUETS	HEHU	0.00	0.00	0.00	0.15	0.50	0.35
ANNUAL WILD-BUCKWHEAT	ERAN	0.00	0.00	0.00	0.29	0.97	0.15
RUSSIAN THISTLE	SAKA	0.00	0.00	0.00	0.00	0.00	0.00
SHAGGY PORTULACA	POMU	0.00	0.00	0.00	0.00	0.00	0.00
ENGLEMANN EVENING-PRIMROSE	OEEN	0.00	0.00	0.00	0.00	0.00	0.00
NEALLEY BEE-BLOSSOM	GASU	0.00	0.00	0.00	0.00	0.00	0.00
PRAIRIE SUNFLOWER	HEPE	0.00	0.00	0.00	0.00	0.00	0.00
SAND PALAFOX	PASP	0.00	0.00	0.00	0.00	0.00	0.00
RAGWEED	AMCO	0.00	0.00	0.00	0.00	0.00	0.00
ANNUAL SUNFLOWER	HEAN	0.00	0.00	0.00	0.00	0.00	0.00
LIMONCILLO	PETE	0.95	2.60	2.60	0.34	1.13	0.85
GOLDEN CROWNBEARD	VEEN	0.19	0.52	0.15	0.00	0.00	0.00
GOLDEN ASTER	HEPS	0.00	0.00	0.00	0.00	0.00	0.00
ANNUAL GRASS							
FALSE BUFFALO GRASS	MUSQ	0.01	0.03	0.05	0.19	0.63	0.35

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TABLE 6-5 (continued) WIPP 1992 FALL VEGETATION REPORT

		* EAST 1		
TREE, SHRUB, CACTI, YUCCA	ACRO	COVER	FREQ	DENS
WESTERN SOAPBERRY	SASA	0.00	0.00	0.00
HONEY MESQUITE	PRGL	1.31	3.15	0.00
SHINNERY OAK	QUHA	14.63	35.18	0.00
THREAD-LEAF SAGE WORT	ARFI	5.16	12.41	0.00
SOUTHWEST RABBITBRUSH	CHPU	0.00	0.00	0.00
YELLOW EVENING PRIMROSE	CASE	0.00	0.00	0.00
PINK PLAINS PENSTEMON	PEAM	0.00	0.00	0.00
PLAINS YUCCA	YUCA	3.45	8.3	0.00
PLAINS PRICKLYPEAR	OPPO	0.00	0.00	0.00
PERENNIAL FORBS				
DUNE FLATSEDGE	CYON	0.00	0.00	0.00
WIDOW'S TEARS, DAY-FLOWER	COER	0.01	0.24	0.00
CLIMBING MILKWEED	SAHE	0.00	0.00	0.00
LONGHORN MILKWEED	ASMA	0.00	0.00	0.00
KNOTWEED LEAFFLOWER	PHPO	0.00	0.00	0.00
LEATHER-WEED CROTON	CRPO	0.00	0.00	0.00
SMOOTH OXYBAPHUS	OXGL	0.51	1.23	0.00
ARIZONA SNAKECOTTON	FRAR	0.00	0.00	0.00
WOOLLY DALEA	DALA	1.84	4.42	0.00
INDIAN RUSHPEA	HOGL	0.06	0.14	0.00
WESTERN SENSITIVE BRIER	SCOC	0.00	0.00	0.00
SPECTACLE POD	DIWI	0.06	0.14	0.00
SILVER-LEAF NIGHTSHADE	SOEL	0.00	0.00	0.00
PLAINS BLACKFOOT	MELE	0.25	0.60	0.00
SLENDER GREENTHREAD	THSI	0.00	0.00	0.00
SENECIO, RIDDLE OR THREADLEAF	SELO/SESP	0.00	0.00	0.00
THREAD-LEAF BROOMWEED	XAMI	2.41	5.80	0.00
PERENNIAL GRASSES				
SANDBUR	CIEN	2.63	6.33	0.00
FALL WITCHGRASS	LECO	0.59	1.42	0.00
ALKALI SACATON	SPAI	0.46	1.11	0.00
SAND DROPSEED	SPCR	1.41	3.39	0.00
SPIKE DROPSEED	SPCO	0.00	0.00	0.00
MESA DROPSEED	SPFL	0.00	0.00	0.00
GIANT DROPSEED	SPGI	0.28	0.67	0.00
LITTLE BLUESTEM	ANSC	0.00	0.00	0.00
BIG BLUESTEM	ANGE	0.00	0.00	0.00
SAND PASPALUM	PAST	0.00	0.00	0.00
PURPLE THREE-AWN	ARPU	3.64	8.75	0.00
HAIRY GRAMA	BOHI	0.06	0.14	0.00
SIDEOATS GRAMA	BOCU	0.00	0.00	0.00
BLACK GRAMA	BOER	0.00	0.00	0.00
LOVEGRASS (SESSILISPICA)	ERSE	0.00	0.00	0.00
RED LOVEGRASS	EROX	0.00	0.00	0.00
PLAINS BRISTLEGRASS	SEMA	0.13	0.31	0.00
ANNUAL FORBS				
TEXAS CROTON	CRTE	0.13	0.31	0.10
PRAIRIE SPURGE	EUMI	0.53	1.27	0.45
RIDGE-SEED SPURGE	EUGL	0.00	0.00	0.00
SAND LEAF-FLOWER	PHAB	0.00	0.00	0.00
MAT BLUETS	HEHU	0.00	0.00	0.00
SPOTTED BEE-BALM	MOPU	0.06	0.14	0.05
MAT BLUETS	HEHU	0.00	0.00	0.00
ANNUAL WILD-BUCKWHEAT	ERAN	0.16	0.38	0.10
RUSSIAN THISTLE	SAKA	0.00	0.00	0.00
SHAGGY PORTULACA	POMU	0.00	0.00	0.00
ENGLEMANN EVENING-PRIMROSE	OEEN	0.00	0.00	0.00
NEALLEY BEE-BLOSSOM	GASU	0.00	0.00	0.00
PRAIRIE SUNFLOWER	HEPE	0.00	0.00	0.00
SAND PALAFOX	PASP	0.00	0.00	0.00
RAGWEED	AMCO	0.00	0.00	0.00
ANNUAL SUNFLOWER	HEAN	0.06	0.14	0.05
LIMONCILLO	PETE	1.65	3.97	6.75
GOLDEN CROWNBEARD	VEEN	0.00	0.00	0.00
GOLDEN ASTER	HEPS	0.00	0.00	0.00
ANNUAL GRASS				
FALSE BUFFALO GRASS	MUSQ	0.01	0.02	0.05

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CHAPTER 7

GROUNDWATER PROTECTION

CHAPTER 7

GROUNDWATER SURVEILLANCE

Current groundwater surveillance activities at the WIPP are outlined in the OEMP and the WIPP Groundwater Monitoring Program Plan and Procedure Manual (WP 02-1 Rev 2). This is a Quality Assurance document that contains program plans for each of the activities performed by groundwater surveillance personnel. Detailed procedures for performing specific activities (pumping system installations, field parameter analysis, document and QA records management) are also contained in this procedure.

The objective of the Groundwater Surveillance Program is to determine the physical and chemical characteristics and maintain surveillance of groundwater levels surrounding the WIPP facility. This includes both before and throughout the operational lifetime of the facility. The Groundwater Surveillance Program also fulfills the requirements set forth in DOE Order 5400.1.

Background water quality data were collected from 1985 through the 1990 sampling period. "Background Water Quality Characterization Report for the Waste Isolation Pilot Plant" (DOE/WIPP92-040) evaluates this sampling period. These data will be compared to water quality data collected throughout the operational life of the facility. Pre-operational data will be gathered in the interim period to strengthen the background data and to evaluate the need to make adjustments to comparison criteria. Data generated by groundwater surveillance programs are also useful in determining future regulatory needs, land use decisions, and updating information for site documents like the OEMP.

The data obtained by the Water Quality Sampling Program (WQSP) in 1992 supported three major programs at the WIPP: (1) Site Characterization; (2) Performance Assessment (in compliance with 40 CFR 191); and (3) the OEMP. Each of these programs requires a unique set of analyses and data, overlap of analytical date occur. Particular sample needs are defined by each program. In addition to the characterization of groundwater the WQSP supported radionuclide monitoring for the Environmental Analysis and Compliance section of WID. Results of radionuclide sampling are discussed in Chapter 5 of this report. The NMED participated in each sampling event, collecting samples for independent evaluation.

The WIPP is located within the Pecos Valley section of the Southern Great Plains physiographic province see (Powers et al., 1978). The primary Industries in the area which could contribute to pollution of the groundwater are local potash mining, gas and oil drilling activities, and cattle ranching. Geologic and lithologic descriptions of the area surrounding the WIPP site can be found in documents like the OEMP, Groundwater Protection Management Program Plan (DOE/WIPP 90-008), or USGS 83-4016 (Mercer, 1983).

The rock units which were sampled in 1992 in descending order are the Dewey Lake Redbeds and the Culebra dolomite. Fluids from these rock units have been collected either from wells at the WIPP or from privately owned windmills. Groundwater sampling at WIPP focuses on the Culebra dolomite Member of the Rustler Formation because it is the most significant water bearing unit within the vicinity of the WIPP. No known hydrologic connection exists between the repository horizon and the Culebra dolomite. Surveillance of the characteristics of the water contained in the Culebra dolomite is beneficial to the WIPP. It provides data which can be used to determine changing characteristics of the water in the Culebra and in hydrologic models designed to predict long term performance of the repository (i.e. Performance Assessment). Groundwater surveillance activities during 1992 consisted of two separate programs, the groundwater quality sampling and the groundwater level measurements. Ground water surveillance programs utilize 58 well bores to gather data. Six of these well bores are equipped with production inflated packers which allow groundwater level surveillance on more than one producing zone through the same well bore.

Groundwater Quality data were gathered from 10 well locations. Data were collected at 8 locations in the Culebra dolomite and two privately owned wells in the vicinity of the WIPP that are in the Dewey Lake Redbeds.

The water quality sampling process has been developed around the logistics of groundwater wells that were originally constructed for characterization and not groundwater monitering activities. The WIPP site has been given a conditional No-Migration determination and is not required to have a monitoring program in compliance with the RCRA. The original wells are being used for surveillance. Most of the wells are constructed with J-55 or K-55 iron casing. To decrease the sampling bias created by well construction deficiencies and combined with low transmissibilities of the formations. A labor intensive sampling process has been initiated. Due to the time and number of wells sampled each year they are only sampled once per year. Sampling episodes are referred to as a "sampling round", and consist of two types of samples, serial and final.

Serial samples are taken periodically as the well is being purged. Key physical and chemical field parameters are analyzed and compared to past serial sampling data until it is determined a chemical steady state has been reached. A chemical steady state is usually defined as +\- 5% of the average of the three to five preceding parameter measurements on the final day of serial sampling from previous rounds. Stabilization of these field parameters is a function of purging and is used as an indicator to determine if the groundwater is representative of the zone being sampled. A final sample is collected, once the pumped groundwater has achieved a representative state it is sent off site to a contract laboratory for analysis.

Scaling of the inside of the well casing was suspected to be the cause of incomplete packer sealing on some of the wells sampled as part of the WQSP. An outside contractor was hired to clean the well casings at the 8 Culebra locations to be sampled during 1992. This objective of obtaining complete packer seals was accomplished, as a result the well cleaning project affected some of the data. Iron concentrations were significantly increased as a result of the cleaning activity and also water level data for H-05b, WIPP-19, H-02c, H-14, H-04b and H-11b3 were affected. Vigorous well purging activities were initiated in October 1992 to correct the water level effects. However, elevated Iron concentrations may persist through 1993.

7.1 GROUNDWATER QUALITY

Sampling for groundwater quality was performed at 10 well locations including 2 privately owned well sites during 1992 (Figure 7-1). With the exception of the two privately owned wells, each well was purged a minimum of 24 hours prior to the commencement of the serial sampling phase of the purging process. Field analysis for Eh, pH, specific gravity, specific conductance, alkalinity, chloride, divalent cations, and total iron were performed on a periodic basis during serial sampling. These field parameters were used as an indicator during the purging process to better determine when the formation water being pumped had reached a representative state. This process requires seven to ten days to complete. Following the field analysis of the final serial sample, samples were collected and shipped to an independent, contracted, laboratory for analysis. Parameters of analysis by the contracted laboratory are listed in Table 7-1.

In CY 92 the total gallons of water removed from the Culebra dolomite member of the Rustler Formation due to groundwater surveillance activity was 95,824 gallons through out the year. The results of final sample analysis show relative consistency when compared to background data. Tables 7-1.2 through 7-1.9 contains average results of data collected during 1992 compared to background data for major constituents of the background matrix. The Volatile Organic Compounds for which analysis was ran showed any detectable concentrations.

Water quality of the Culebra in the vicinity of the WIPP is naturally poor and the waters are not usable for human consumption or for agricultural purposes. The waters contain naturally high concentrations of total dissolved solids and mineral constituents primarily of chloride, calcium, magnesium, sodium and potassium (Mercer, 1983). Although a number of wells within the vicinity of WIPP contain less than 10,000 mg/l of total dissolved solids, the chloride and sulfate concentrations in these wells are well above limits set by water quality standards. The generally poor quality of the waters has historically posed an analysis problem because it tends to interfere with standard laboratory equipment (i.e., atomic adsorption or inductively coupled argon plasma spectroscopy causing detection limits to be inconsistent). Other inconsistencies of general chemistry parameters are discussed in Section 7.1.1.

The only usable water in the area of the WIPP are from wells in the Dewey Lake Redbeds that produce water from discontinuous saturated zones of thin lenticular sands that are believed to be locally recharged (Mercer 1983). The water quality of the Dewey Lake Redbeds are generally considered to be fresh water, suitable for agricultural purposes and marginal for human consumption. Two wells were sampled in the Dewey Lake Redbeds the Ranch Well; located approximately 3 and 2 tenths miles south of the WIPP site and the Barn Well; located approximately 3 and 4 tenths miles south of the WIPP site. Each of these wells showed elevated levels of nitrate in the groundwater analysis. Ranch Well showed the highest average concentration with 19 mg/l and the Barn Well concentration was 10 mg/l. The most probable source of these nitrate concentrations are the large numbers of livestock that utilize these wells for drinking water. A comparison of 1992 analytical results with background data are presented in Tables 7-10 and 7-11.

7.1.1 SUSPECT DATA

- The average magnesium value of 9.92 mg/l from well WIPP-19 is suspect because the normal range for magnesium at WIPP-19 is 961-2239 mg/l. The probable causes of this anomaly may be a misplaced decimal point or over dilution of the sample during analysis.

  The average concentration of lead of 2.21 mg/l at H-03b3 well bore is cause for some concern. H-03b3 produces no potable water for domestic or agricultural uses and presents no immediate or longterm threat to the health and safety of the general public. The concentrations of lead at H-03b3 have not exceeded detectable limits during the previous 6 sampling rounds. Investigations have been initiated to verify the quality assurance of the lab analysis through interviews with laboratory personnel and independent analysis.

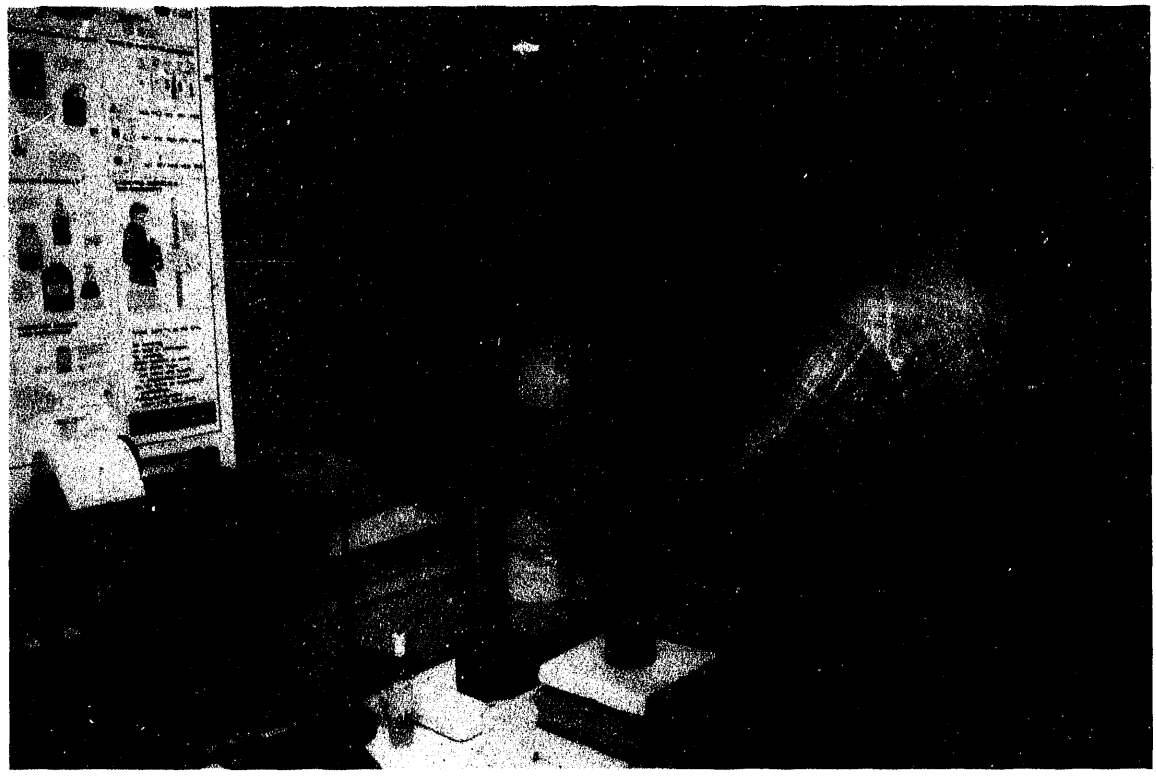
7.2 GROUNDWATER LEVEL SURVEILLANCE

In October 1988 the WID was tasked with conducting a groundwater level surveillance program in the area of the WIPP site, 58 well bores were used to perform surveillance of six water bearing zones in the WIPP area. The two zones of primary interest are the Culebra dolomite and Magenta dolomite members of the Rustler formation. There were 46 measurements taken in the Culebra dolomite and 11 measurements taken in the Magenta dolomite. Two separate measurements were each taken in the Rustler/Salado contact and Dewey Lake Formation. One separate measurement was taken in each the Bell Canyon, the Forty-niner, and the Unnamed Lower Member. Locations of the groundwater level surveillance sites are pictured in Figure 7-2.

Groundwater elevation measurements in the Culebra dolomite indicate that the generalized directional flow of ground water is north to south in the vicinity of WIPP (Figure 7-3). Caution should be used when making assumptions based on ground water level data alone. Recent studies in the Culebra dolomite have shown that fluid density variations in the Culebra dolomite can affect flow direction (Crawley, 1988); (Davies, 1989). The fractured media of the Culebra dolomite coupled with variable fluid densities can cause localized flow patterns with little or no relationship to general flow patterns (Mercer 1983; Crawley 1988).

Groundwater flow directions in the Magenta dolomite appear to be generally from an eastern to western direction across the WIPP site (Figure 7-4). Studies have not been performed in the Magenta dolomite to determine spacial variations in the fluid densities of the Magenta. It is very possible that density variations do occur in the Magenta dolomite. The flow patterns in the Magenta dolomite may be affected by variations in fluid density or dictate the behavior of localized flow patterns.

Groundwater elevations taken in 1992 were compared to potentiometric elevation maps. These maps were produced by Mercer in 1983 and the 1992 groundwater elevations appear to be below 1983 levels. The 1983 Mercer study was performed prior to the onset of the large scale hydrologic activities which took place in the vicinity of the WIPP to support site characterization and other hydrological oriented activities during the mid to late 1980's. Since the end of the 1980's only modest amounts of groundwater have been removed from these formations. The possibility exists that the trends toward increasing groundwater elevations observed in 1992 is a natural trend for the formations to recover to groundwater elevations near those of 1983 potentiometric elevations.



A water quality scientist prepares groundwater samples for serial sampling analysis in support of the WIPP groundwater surveillance programs.

A sampling pump lowered into the well, pumps groundwater up to the surface for analysis as part of the WIPP Water Quality Sampling Program.

TABLE 7-1

PARAMETERS ANALYZED DURING CALENDAR YEAR 1992

SPECIFIC CONDUCTANCE	BORON
SULFATE	CADMIUM
TOTAL DISSOLVED SOLIDS	CALCIUM
TOTAL SUSPENDED SOLIDS	CHROMIUM
DENSITY	IRON
pH	LEAD
ALKALINITY	LITHIUM
BROMIDE	MAGNESIUM
CHLORIDE	MERCURY
FLUORIDE	POTASSIUM
IODIDE	SELENIUM
NITROGEN, NO3 (AS N)	SILICA
TOTAL ORGANIC CARBON	SILVER
TOTAL ORGANIC HALOGENS	SODIUM
PHENOL, TOTAL	CARBON TETRACHLORIDE
ORTHOPHOSPHATE (AS P)	METHYLENE CHLORIDE
ARSENIC	TRICHLOROETHYLENE
BARIUM	1,1,1-TRICHLOROETHANE
BERYLLIUM	FREON-113

TABLE 7-2

H-06b, CULEBRA
ROUND 7 COMPARISON TO BACKGROUND CHARACTERIZATION

PARAMETER	1992 AVERAGE CONCENTRATION mg/l	BACKGROUND CONCENTRATION INTERVAL mg/l
BORON	4.7	7.7-10.7
CALCIUM	1,100	1,702-2,138
IRON	0.93	0.2-0.6
LITHIUM	0.88	0.3-0.7
MAGNESIUM	548	791-1,085
POTASSIUM	228	330-556
SODIUM	11,500	14,230-17,710
ALKALINITY	76	91-101
BROMIDE	36	12-62
CHLORIDE	32,600	28,816-34,462
FLUORIDE	<1.0	1.2-1.5
pH	6.9	6.18-7.37
SULFATE	3,520	3,093-3,527
TOTAL DISSOLVED SOLIDS	58,050	56,831-64,569
ARSENIC	<0.01	<0.5
BARIUM	0.112	<0.1
BERYLLIUM	0.76	0.05
CADMIUM	<0.001	<0.05
CHROMIUM	<0.002	0.22-0.45
LEAD	0.009	≤0.83
MERCURY	<0.002	≤0.0012
SELENIUM	<0.005	≤1.3
SILICA	16.5	8.3-25
SILVER	<0.002	≤0.1
IODIDE	0.41	<2.0
NITRATE AS (N)	0.31	≤0.2
PHENOLICS	<0.10	0.004-0.016
PHOSPHATE AS (P)	<0.02	≤0.02
TOTAL ORGANIC CARBON	0.97	≤7.0
TOTAL ORGANIC HALOGEN	78.2	0.16-3.0

TABLE 7-3

H-05b, CULEBRA
ROUND 7 COMPARISON TO BACKGROUND CHARACTERIZATION

PARAMETER	1992 AVERAGE CONCENTRATION mg/l	BACKGROUND CONCENTRATION INTERVAL mg/l
BORON	24.3	28-35
CALCIUM	1,770	1,205-1,875
IRON	<3.0	1.8-3.2
LITHIUM	<1.0	0.6-1.3
MAGNESIUM	2,085	1,586-2,094
POTASSIUM	1,130	1,014-1,362
SODIUM	53,500	44,526-55,955
ALKALINITY	43.6	39-47
BROMIDE	68.2	24-99
CHLORIDE	80,300	84,085-91,835
FLUORIDE	<2.0	0.7-1.2
pH	6.59	6.88-7.11
SULFATE	6,520	5,914-7,646
TOTAL DISSOLVED SOLIDS	151,500	142,508-164,093
ARSENIC	0.0074	<0.1
BARIUM	<0.35	<0.5
BERYLLIUM	<0.35	<0.05
CADMIUM	<0.001	≤0.11
CHROMIUM	<0.002	≤0.3
LEAD	<0.005	≤1.0
MERCURY	<0.0002	≤0.0005
SELENIUM	<0.005	≤7.3
SILICA	4.38	<21
SILVER	<0.002	≤0.1
IODIDE	1.76	<2.0
NITRATE AS (N)	0.10	≤0.4
PHENOLICS	<0.10	≤0.51
PHOSPHATE AS (P)	<0.02	<0.13
TOTAL ORGANIC CARBON	15.1	≤4.0
TOTAL ORGANIC HALOGEN	0.31	≤7.6

TABLE 7-4

WIPP-19, CULEBRA
ROUND 7 COMPARISON TO BACKGROUND CHARACTERIZATION

PARAMETER	1992 AVERAGE CONCENTRATION mg/l	BACKGROUND CONCENTRATION INTERVAL mg/l
BORON	17.8	27-34
CALCIUM	1,435	1,441-1,919
IRON	9.28	≤2.0
LITHIUM	0.80	0.3-1.1
MAGNESIUM	9.92	961-2,239
POTASSIUM	546	565-913
SODIUM	23,750	23,962-32,658
ALKALINITY	44.6	51-70
BROMIDE	42.7	22-126
CHLORIDE	39,700	33,201-54,520
FLUORIDE	<0.1	0.8-1.1
pH	7.2	6.75-7.33
SULFATE	5,700	5,097-5,763
TOTAL DISSOLVED SOLIDS	62,300	68,389-103,151
ARSENIC	<0.005	<0.5
BARIUM	<0.10	<0.50
BERYLLIUM	<0.10	<0.50
CADMIUM	<0.001	<0.50
CHROMIUM	<0.002	≤2.0
LEAD	<0.005	<5.0
MERCURY	<0.0002	<0.002
SELENIUM	<0.002	<0.50
SILICA	7.45	≤4.40
SILVER	0.0065	<1.0
IODIDE	2.22	<2.0
NITRATE AS (N)	<0.05	≤0.12
PHENOLICS	<0.02	≤0.019
PHOSPHATE AS (P)	<0.02	≤0.03
TOTAL ORGANIC CARBON	10.15	2-7
TOTAL ORGANIC HALOGEN	3.8	0.57-3.2

TABLE 7-5

H-02c, CULEBRA
ROUND 4 COMPARISON TO BACKGROUND CHARACTERIZATION

PARAMETER	1992 AVERAGE CONCENTRATION mg/l	BACKGROUND CONCENTRATION INTERVAL mg/l
BORON	6.92	9-12
CALCIUM	588	589-841
IRON	1.96	0-1.9
LITHIUM	0.3	0.26-0.72
MAGNESIUM	159	152-181
POTASSIUM	88	86-119
SODIUM	2,110	0-5,270
ALKALINITY	46.3	52-60
BROMIDE	4.3	0-5
CHLORIDE	3,435	2,396-6,737
FLUORIDE	1.6	2.1-2.2
pH	7.64	7.38-8.04
SULFATE	2,935	2,061-3,806
TOTAL DISSOLVED SOLIDS	9,960	7,612-15,689
ARSENIC	0.0007	≤0.014
BARIUM	<0.007	<0.05
BERYLLIUM	<0.007	<0.05
CADMIUM	<0.001	≤0.08
CHROMIUM	<0.001	≤0.4
LEAD	<0.03	≤0.5
MERCURY	0.0007	<0.0002
SELENIUM	<0.002	<0.05
SILICA	12	6.1-14
SILVER	0.008	≤0.20
IODIDE	3.8	1-9
NITRATE AS (N)	<0.50	≤0.30
PHENOLICS	<0.08	≤0.097
PHOSPHATE AS (P)	<0.02	≤0.03
TOTAL ORGANIC CARBON	3.82	5-7
TOTAL ORGANIC HALOGEN	16.9	≤0.14

TABLE 7-6

H-03b3, CULEBRA
ROUND 7 COMPARISON TO BACKGROUND CHARACTERIZATION

PARAMETER	1992 AVERAGE CONCENTRATION mg/l	BACKGROUND CONCENTRATION INTERVAL mg/l
BORON	30.25	19-32
CALCIUM	1,360	1,193-1,527
IRON	<0.29	0.14-0.47
LITHIUM	0.698	0.15-0.82
MAGNESIUM	736	710-826
POTASSIUM	421	372-534
SODIUM	17,200	16,140-17,900
ALKALINITY	39	46-54
BROMIDE	26.2	7-41
CHLORIDE	30,350	26,742-30,838
FLUORIDE	0.68	1.5-1.6
pH	7.21	6.85-7.66
SULFATE	13,700	4,537-4,823
TOTAL DISSOLVED SOLIDS	53,053	53,130-55,170
ARSENIC	<0.0002	<0.10
BARIUM	<0.035	≤0.06
BERYLLIUM	<0.035	≤0.15
CADMIUM	0.002	≤0.07
CHROMIUM	<0.001	0.007-0.4
LEAD	2.21	≤0.50
MERCURY	<0.0002	<0.001
SELENIUM	<0.002	<0.50
SILICA	9.17	4.5-13
SILVER	<0.002	≤0.10
IODIDE	<2.0	<2.0
NITRATE AS (N)	<0.50	<0.20
PHENOLICS	<0.10	≤0.033
PHOSPHATE AS (P)	<0.02	≤0.06
TOTAL ORGANIC CARBON	2.08	≤2.0
TOTAL ORGANIC HALOGEN	0.039	0.14-0.42

TABLE 7-7

H-14, CULEBRA
ROUND 5 COMPARISON TO BACKGROUND CHARACTERIZATION

PARAMETER	1992 AVERAGE CONCENTRATION mg/l	BACKGROUND CONCENTRATION INTERVAL mg/l
BORON	13.2	11
CALCIUM	1,595	1,504-2,129
IRON	1.82	0.1-0.8
LITHIUM	0.60	.039-0.56
MAGNESIUM	524	451-613
POTASSIUM	237	233-257
SODIUM	3,750	2,750-4,184
ALKALINITY	29	35-43
BROMIDE	13.4	9-18
CHLORIDE	9,875	6,954-9,779
FLUORIDE	1.88	0.1-2.6
pH	7.59	5.89-8.50
SULFATE	1,645	1,209-2,291
TOTAL DISSOLVED SOLIDS	19,150	14,066-19,867
ARSENIC	<0.002	<0.05
BARIUM	0.021	<0.05
BERYLLIUM	<0.0035	<0.05
CADMIUM	<0.001	≤0.06
CHROMIUM	<0.001	0.2-0.4
LEAD	0.013	≤0.5
MERCURY	<0.0002	≤0.0004
SELENIUM	<0.0002	<0.05
SILICA	10.2	5.5-14
SILVER	<0.002	≤0.1
IODIDE	<2.0	<2.0
NITRATE AS (N)	<1.00	≤0.40
PHENOLICS	<0.10	0.068-0.14
PHOSPHATE AS (P)	<0.02	≤0.05
TOTAL ORGANIC CARBON	0.6	≤2.0
TOTAL ORGANIC HALOGEN	32	0.08-1.1

TABLE 7-8

H-04b, CULEBRA
ROUND 7 COMPARISON TO BACKGROUND CHARACTERIZATION

PARAMETER	1992 AVERAGE CONCENTRATION mg/l	BACKGROUND CONCENTRATION INTERVAL mg/l
BORON	15.1	14-21
CALCIUM	671	604-741
IRON	1.53	0.40-0.55
LITHIUM	0.467	0.25-0.58
MAGNESIUM	428	385-468
POTASSIUM	193	179-261
SODIUM	5,805	5,625-6,255
ALKALINITY	52.8	51-72
BROMIDE	43.5	31-83
CHLORIDE	8,345	1,968-12,099
FLUORIDE	2.39	1.7-2.2
pH	7.56	6.30-7.82
SULFATE	5,805	4,447-6,513
TOTAL DISSOLVED SOLIDS	21,400	17,010-23,050
ARSENIC	<0.0002	<0.10
BARIUM	<0.025	<0.10
BERYLLIUM	<0.014	<0.05
CADMIUM	<0.003	<0.005
CHROMIUM	<0.004	≤0.30
LEAD	<0.013	<0.05
MERCURY	<0.0002	≤0.0017
SELENIUM	<0.005	<0.05
SILICA	11.6	5.6-14
SILVER	<0.003	<0.10
IODIDE	<2.0	≤2.0
NITRATE AS (N)	<0.20	<0.10
PHENOLICS	<0.10	<0.026
PHOSPHATE AS (P)	<0.02	≤0.03
TOTAL ORGANIC CARBON	1.14	3.0-5.0
TOTAL ORGANIC HALOGEN	0.0292	0.06-0.64

TABLE 7-9

H-11b3, CULEBRA
ROUND 6 COMPARISON TO BACKGROUND CHARACTERIZATION

PARAMETER	1992 AVERAGE CONCENTRATION mg/l	BACKGROUND CONCENTRATION INTERVAL mg/l
BORON	30.7	29-31
CALCIUM	1,490	1,329-1,655
IRON	0.95	<1.0
LITHIUM	0.602	0.5-0.6
MAGNESIUM	1,170	1,038-1,272
POTASSIUM	745	654-990
SODIUM	35,300	35,169-45,432
ALKALINITY	46	44-58
BROMIDE	46.6	18-90
CHLORIDE	61,300	57,063-72,497
FLUORIDE	1.21	1.0-1.2
pH	7.40	6.95-7.22
SULFATE	6,910	5,843-7,397
TOTAL DISSOLVED SOLIDS	114,000	113,705-123,095
ARSENIC	<0.002	≤0.15
BARIUM	<0.025	<0.10
BERYLLIUM	<0.014	<0.05
CADMIUM	<0.0038	0.06-0.09
CHROMIUM	<0.0054	0.32-.40
LEAD	0.045	≤0.60
MERCURY	<0.0002	<0.0004
SELENIUM	<0.005	<0.50
SILICA	6.21	4.1-15
SILVER	<0.0045	0.1-0.2
IODIDE	<2.0	<2.0
NITRATE AS (N)	0.65	<0.30
PHENOLICS	<0.10	≤0.02
PHOSPHATE AS (P)	<0.02	≤0.04
TOTAL ORGANIC CARBON	4.9	≤3.0
TOTAL ORGANIC HALOGEN	0.417	≤1.5

TABLE 7-10

BARN WELL, DEWEY LAKE
ROUND 6 COMPARISON TO BACKGROUND CHARACTERIZATION

PARAMETER	1992 AVERAGE CONCENTRATION mg/l	BACKGROUND CONCENTRATION INTERVAL mg/l
CALCIUM	12	47-85
MANGANESE	<0.18	<0.015
SODIUM	100.2	74-142
ALKALINITY	225	262-291
CHLORIDE	47.9	32-49
FLUORIDE	<0.1	2.5-2.7
pH	7.71	6.37-8.17
SULFATE	163	167-246
TOTAL DISSOLVED SOLIDS	779	606-729
ARSENIC	0.0065	<0.05
BARIUM	0.136	<0.2
CADMIUM	<0.001	<0.005
CHROMIUM	<0.002	≤0.02
COPPER	0.95	≤0.03
LEAD	<0.005	<0.05
MERCURY	<0.0002	<0.0002
SELENIUM	0.02	<0.05
SILVER	<0.002	<0.01
ZINC	14.22	≤0.03
NITRATE AS (N)	10.04	7.1-9.6
PHENLOICS	<0.02	<0.008
TOTAL ORGANIC CARBON	0.74	≤4.0
TOTAL ORGANIC HALOGEN	0.255	≤0.15

TABLE 7-11

RANCH WELL, DEWEY LAKE
ROUND 7 COMPARISON TO BACKGROUND CHARACTERIZATION

PARAMETER	1992 AVERAGE CONCENTRATION mg/l	BACKGROUND CONCENTRATION INTERVAL mg/l
CALCIUM	597	283-397
MANGANESE	0.0022	<0.015
SODIUM	184	115-270
ALKALINITY	151	215-256
CHLORIDE	290	318-470
FLUORIDE	1.16	0.7-1.5
pH	7.40	6.75-7.58
SULFATE	1784	700-1299
TOTAL DISSOLVED SOLIDS	3945	2818-3302
ARSENIC	<0.005	<0.01
BARIUM	0.0077	<0.20
CADMIUM	<0.002	≤0.01
CHROMIUM	<0.002	≤0.07
COPPER	<0.0032	<0.025
LEAD	<0.01	≤0.08
MERCURY	<0.0002	≤0.0008
SELENIUM	0.023	≤0.079
SILVER	<0.004	≤0.02
ZINC	0.219	0.02-0.16
NITRATE AS (N)	19.4	110-120
PHENLOICS	<0.02	≤0.022
TOTAL ORGANIC CARBON	0.8	3-4
TOTAL ORGANIC HALOGEN	2.37	≤0.4

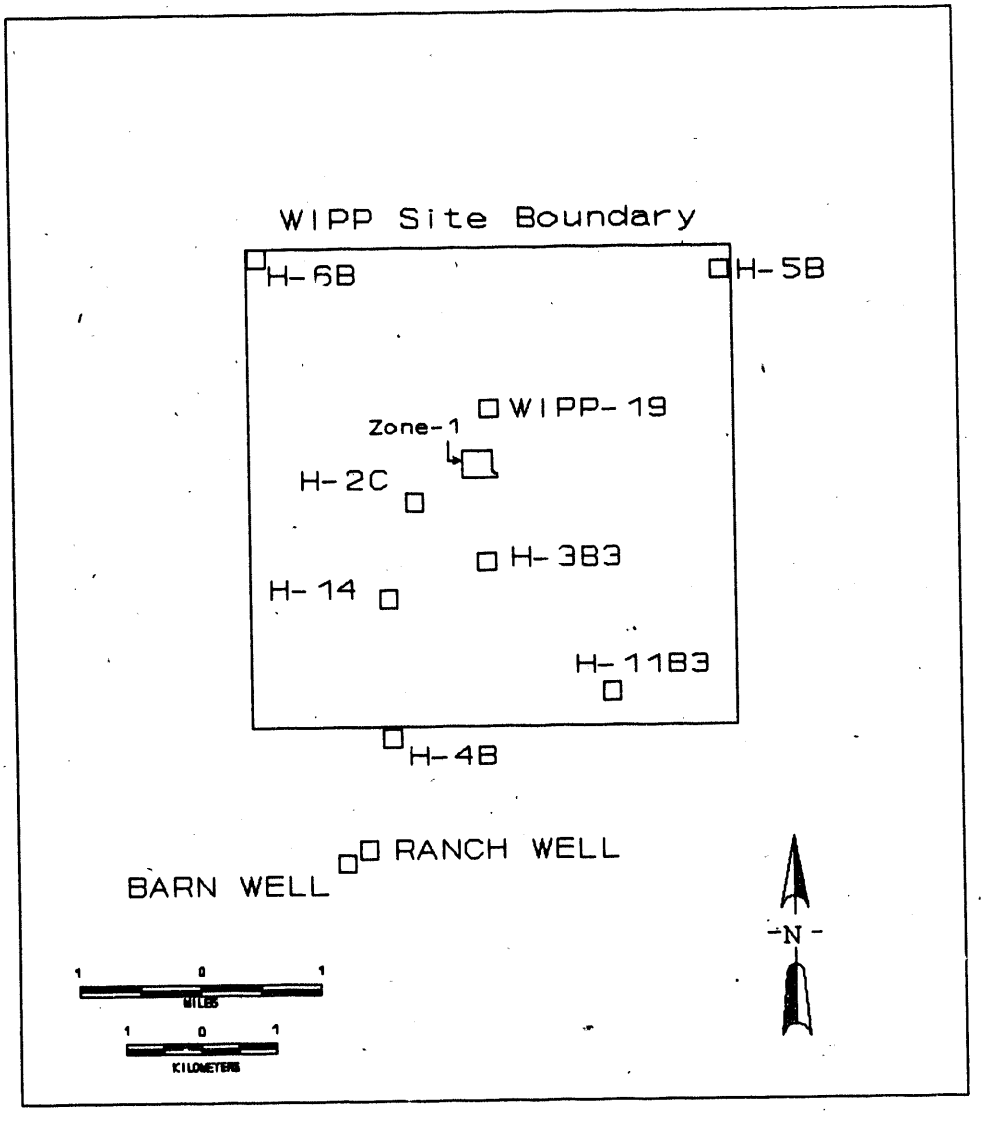


FIGURE 7-1 WATER QUALITY SAMPLING PROGRAM SAMPLE WELLS 1992

Figure 1

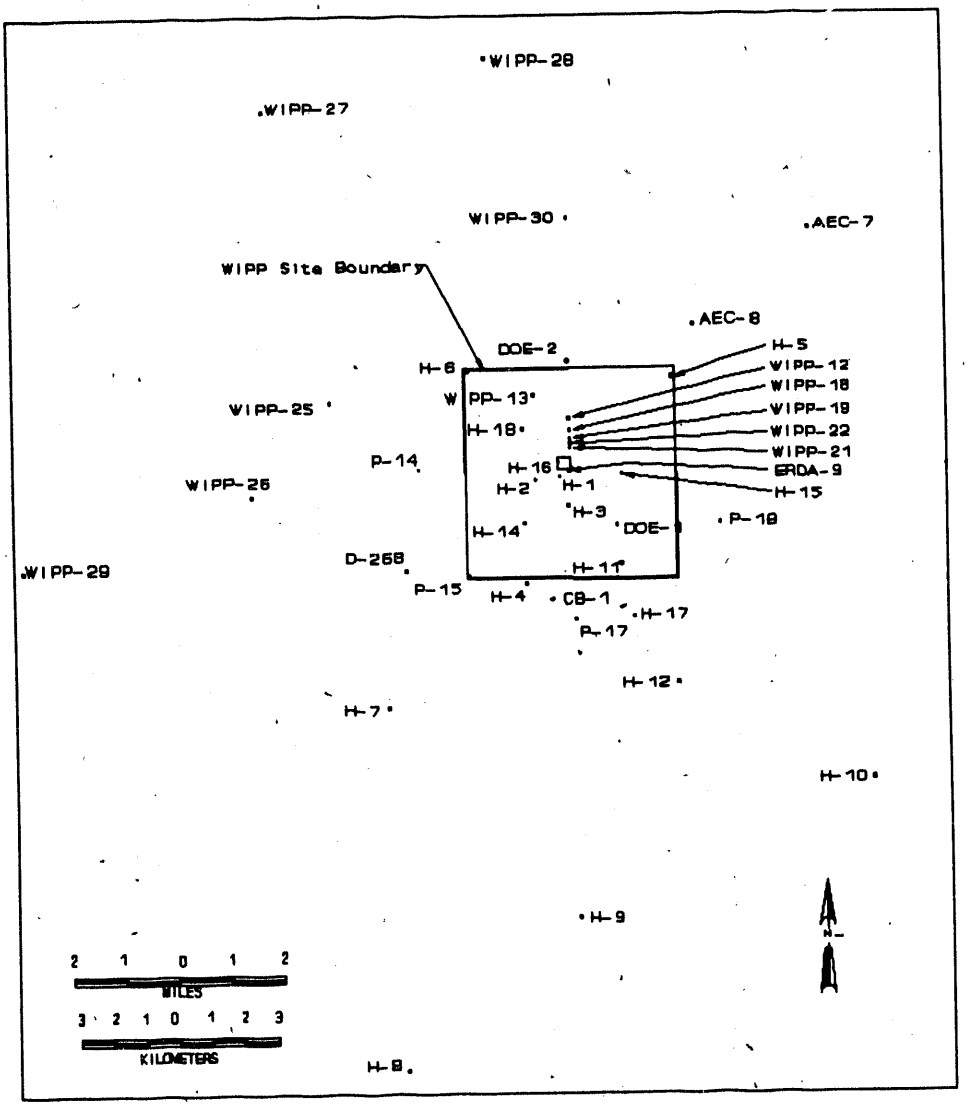
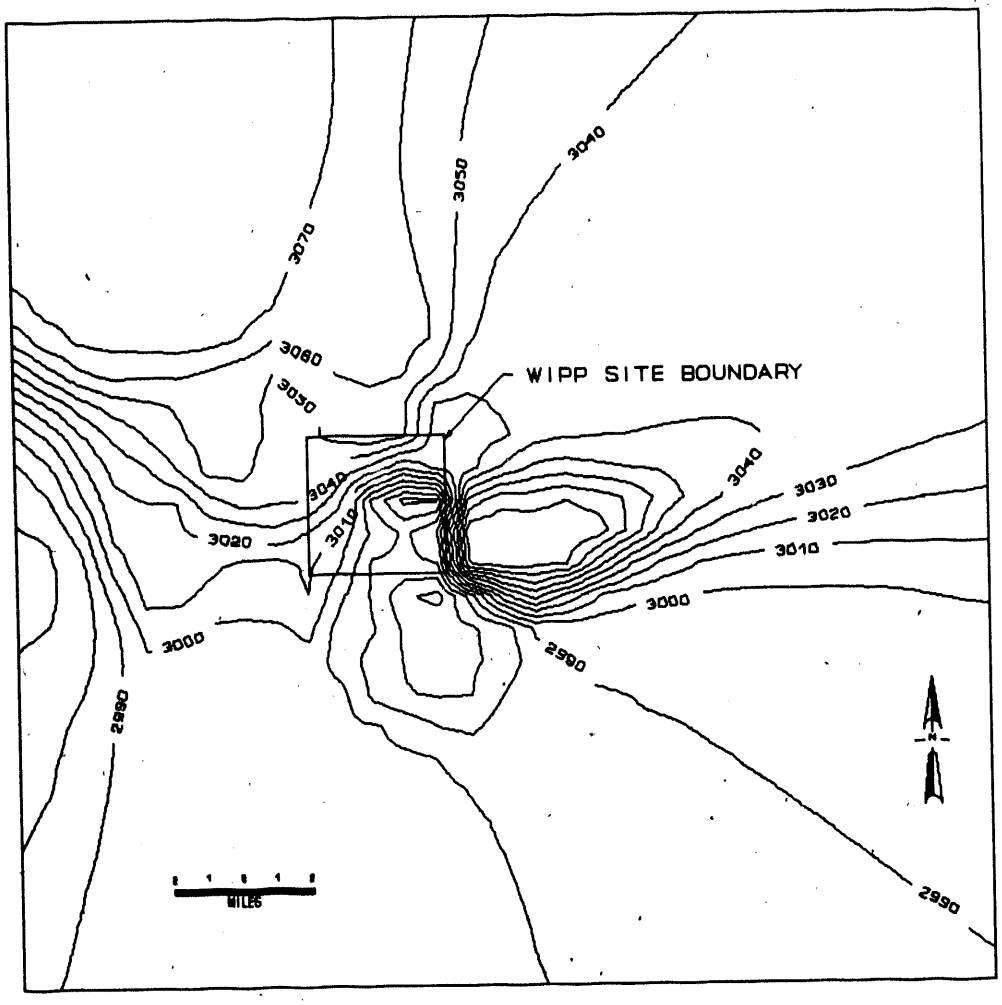
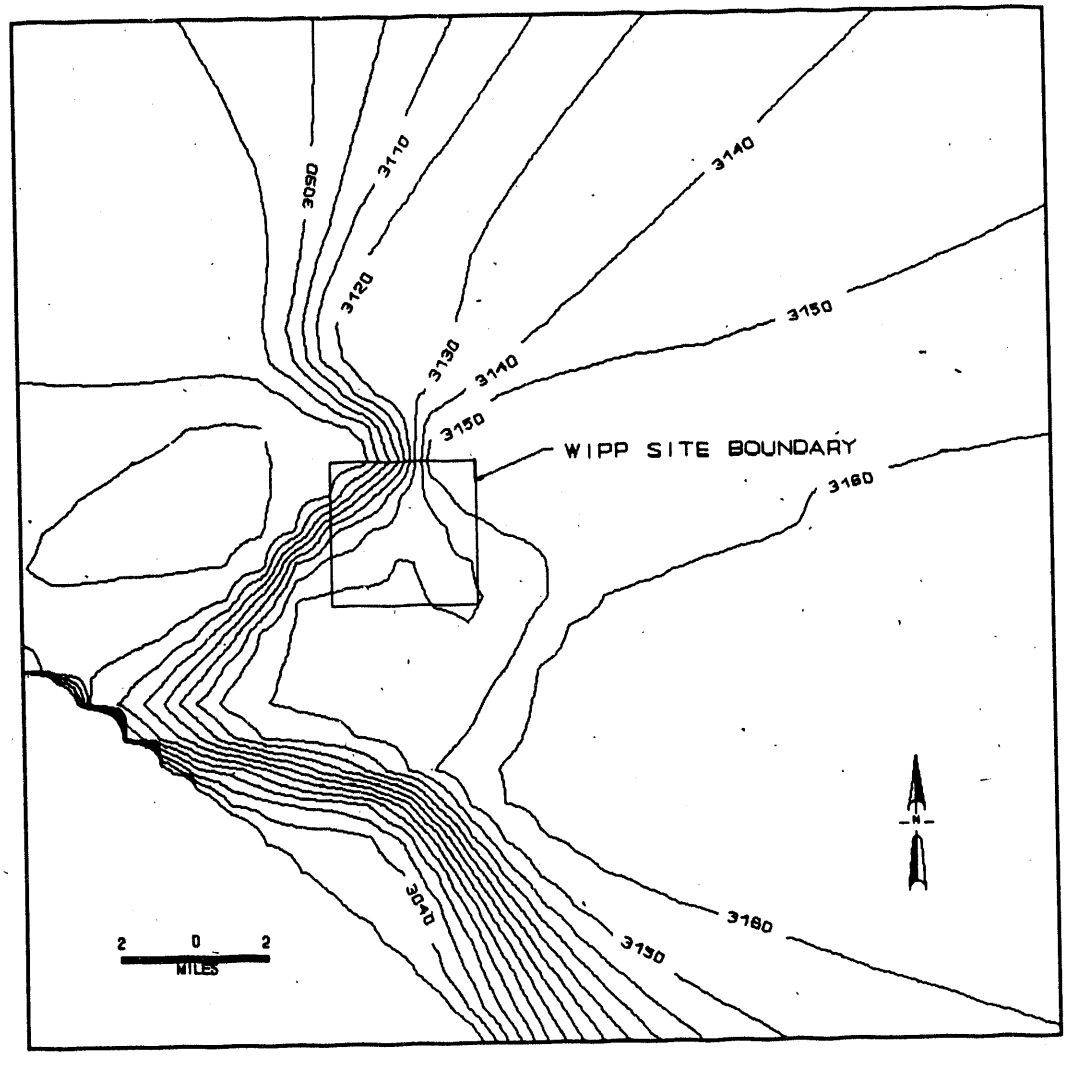


FIGURE 7-2 GROUND WATER LEVEL SURVEILLLANCE WELLS



POTENTIOMETRIC SURFACE OF THE CULEBRA DOLOMITE MEMBER OF THE RUSTLER FORMATION NEAR THE WIPP SITE AS OF 12-92

FIGURE 7-3



POTENTIOMETRIC SURFACE OF THE MAGENTA DOLOMITE MEMBER OF THE RUSTLER FORMATION NEAR THE WIPP SITE AS OF 12-92

FIGURE 7-4

CHAPTER 8

QUALITY ASSURANCE

CHAPTER 8

QUALITY ASSURANCE

This chapter outlines the Quality Assurance/Quality Control (QA/QC) goals and procedures for the radiological and nonradiological monitoring programs at the WID and offsite subcontractor laboratories. The purpose of the program is to monitor the reliability, accuracy, and precision of all data, and to detect and correct problems in the sample collection, preparation, analysis, and data evaluation phases.

QA comprises of all planned and programmed events undertaken to ensure the validity of the results of the monitoring program. Included in the QA Program is the QC task specific and provides a context for assessing the performance of equipment, instruments, and procedures. The QA/QC program for the WIPP environmental programs is established within the framework of the overall Quality Assurance Program Manual of the Westinghouse Electric Corporation, Waste Isolation Division.

A comprehensive QA program has been implemented to ensure that the data collected reflects actual concentrations in the environment and has been obtained prior to commencement of operations in order to provide sound baseline data for comparison with potential impacts of the WIPP. The focus of this program includes:

- Sample collection at all locations, according to procedures based on accepted practices and widely recognized methodologies and criteria
- Procedure review and revision as appropriate to minimize uncertainty due to sampling error while maintaining comparability and continuity between past and future data
- Data verification through a continuing program of analytical laboratory quality control, including participation in inter-laboratory cross-checks; duplicate sample analysis, radiological samples, splits provided to the EEG, and NMED for analysis

Adherence to policies set forth by federal QA regulations include the following: ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities, (ASME, 1989) and EPA; QAMS-005/80, Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, (EPA, 1980); fulfills the requirements of the QA plan specified in DOE Orders 5400.1 (DOE, 1990d), 5400.3 (DOE, 1989), 5700.6C (DOE, 1991); and the Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance (DOE/EH-0173T, Jan. 1991).

8.1 BASELINE DATA

Within the WIPP Environmental Monitoring section there are four programs currently in place, the NES, the RES, the Cooperative Raptor Research Program, and the WIPP Groundwater Surveillance Program. Their purpose is to collect the data needed to detect and quantify any impacts that construction and operational activities that the WIPP site may have on the surrounding ecosystem.

Preliminary studies are useful when considering the WIPP environmental monitoring efforts because they contribute to the baseline data during the construction phase, and are the predecessors to the long-term monitoring programs. These studies include:

- WIPP Site Characterization Program - instituted in 1976 by Sandia National Laboratories (SNL) to monitor air quality, background radiation levels, and groundwater quality. (Pocalujka et al., 1979; 1980a, b, c; 1981a, b; Powers et al., 1978; Lappin, 1989)

- WIPP Biology Program - began in 1975 with baseline studies of climate, soils, vegetation, arthropods, and vertebrates. (Best, 1980)

- Investigations of the site geohydrology - conducted by the U.S. Geological Survey (USGS) at the request of the DOE. In addition, the NRC issued a contract to Columbia University to perform a study of radionuclide mobility in the highly saline groundwaters of the Delaware Basin. (U.S.G.S., 1983)

- Radiological monitoring of air, water, and biological media - conducted by the Atomic Energy Commission (AEC) before and after the Project Gnome nuclear detonation. (USAEC, 1962a,b,c,d)

8.2 SAMPLE COLLECTION METHODOLOGIES

Written procedures provide guidance to field personnel for samples collected in the field and form the basis of an auditable program. The QA Department periodically conducts surveillance, inspection, and internal audits to ensure compliance with established procedures: An inspection report surveys personnel performance in one activity. A surveillance assesses a procedure from data collection through data management. Surveillances are conducted according to WP 13-011. An internal audit which is a more comprehensive investigation evaluates the adequacy and effectiveness of the QA programs implementation, related procedures and practices. An audit may include procedure review, file management, and test equipment. Audits are conducted according to WP 13-005. In 1992 there were a total of four QA inspection reports performed on the Environmental Monitoring Section with no deficiencies noted. There was one QA integrated oversight performed with one program deficiency report noted. This deficiency was expeditiously resolved with QA concurrence.

Sampling procedures are contained in the following documents:

- WIPP Groundwater Monitoring Program Plan and Procedure Manual (WP 02-1)

- WIPP Environmental Procedures Manual (WP 02-3)

- WID Quality Assurance Program Description (WP 13-1, Rev. 14)

The sampling procedures describe the methods for sample location determination; timing of collection, equipment calibration, specific steps for sample collection, analysis, shipment preparation, and the shipment method. The sampling procedures also provide program requirements for data entry, sample tracking, and record-keeping. This ensures data collected and entered becomes a quality record. Standard sample location codes are used for reporting results for all environmental programs.
The current guiding document provides details on the sampling procedures and cites the document containing those procedures. Chapter 11 of the OEMP defines the policies and practices to provide confidence in the quality of the data.

The data collected in the NES monitoring programs are analyzed as stated in guidance documents, DOE/EH-0023 (Corley et al., 1981). Section 8.0 of the OEMP discusses at length the procedures used to analyze the data statistically.

8.3 REVISION OF PROCEDURES

One of the responsibilities of data collection personnel is to assess the performance of collection and analysis methodologies. Sample collection field procedures, analysis preparation, and the laboratory analysis methodology are periodically reviewed and updated and continually scrutinized for adequacy. The method for modifying procedures is set forth in WP 15-101. Additionally cooperative sampling efforts and radiological samples are split with the EEG and the NMED to act as a check that procedures are adequate and that data results are comparable between the WIPP, EEG, and the NMED samples. All procedure manuals are reviewed regularly, updated and expanded as necessary.

8.4 INTERLABORATORY COMPARISONS

In October 1990 the WIPP was notified that it was accepted by the DOE-Environmental Measurements Laboratory (EML) to be included in the DOE-EML cross check intercomparison program. This program is where the DOE periodically ships samples of soil, water, vegetation, animal tissues, and air filters to a laboratory for analysis. An isotopic analysis is performed on the samples and the results are reported to DOE-EML. The WIPP Low Level Counting Laboratory (LLCL) began participation in the DOE-EML in March of 1991.

The EML program is also an excellent method for monitoring the improvements to the WIPP's in house sample analysis capabilities. Currently, the LLCL is in the process of upgrading its hardware and software used for low level isotopic analysis. Calibration sources required to perform efficiency calibrations for the counting geometries of EML samples have been ordered. The WIPP LLCL is anticipating the next round of samples to demonstrate the effectiveness of the upgrades to its program.

8.5 LABORATORY QUALITY CONTROL

During CY 92 the WIPP established contracts with the following analytical laboratories, Ross Analytical Services Inc., Atlan-Tech, and Accu-Labs.

The contracts with the laboratories stated above are performing analysis on WIPP sample media. These laboratories must adhere to and provide evidence of the following compliance with the ASME NQA-1:

- Routine calibration of instruments
- Frequent source and background counts (as appropriate)
- Routine yield determinations of radiochemical procedures
- Replicate/duplicate, and blank analyses to check precision

- Analyses of reagents to ensure chemical purity that could affect the results of the analytical process

- Each laboratory will have a written and implemented QA program that utilizes standard analysis methods for each parameter studied.

- Participation in interlaboratory cross-checks can reveal outdated, previously acceptable lab procedures that are currently unsuitable or inadequate. Steps are then taken to find updated methodologies. The laboratories providing chemical analytical services for the WIPP are required to participate in interlaboratory cross-checks conducted by the EPA.

8.6 RECORD KEEPING

Records generated in support of the OEMP are controlled and maintained in accordance with DOE Order 1324.2A, Records Description (DOE, 1992), and WIPP Records Management Procedures (WP 15-030). All original records are maintained in fire resistant file cabinets until they are transmitted to the WIPP Project Records Services (PRS), for permanent filing (WP 15-030). All records including raw data, calculations, computer programs or other data manipulation are subject to review and verification under the WIPP Quality Assurance Program. The Environmental Monitoring Section is responsible for validation of these records prior to transmittal to the PRS center in accordance with the Records Inventory Disposition Schedule.

Records (i.e., reports of analyses and sample receipt forms transmitted by contract analytical laboratories) are dated upon receipt and a copy made for QC review as specified in NES/RES QA/QC Implementation Procedures (WP 02-302). Specific record and data management procedures including the recording and referencing of data manipulations are implemented according to the WIPP Groundwater Monitoring Program Plan and Procedures Manual, RES Data Management Procedure (WP 02-305), and NES Data Management Procedure (WP 02-334).

The WIPP complies with record-keeping requirements issued under 40 CFR Part 61, Subpart H (EPA, 1985B), which pertain to atmospheric radionuclide emissions (WP 02-301). In addition unless regulations are amended in the future, records development pursuant to these criteria will be maintained at least 30 years as specified in DOE 1324.2A (DOE, 1992), Chapter V, Attachment 1, Schedule 25 (i.e., Medical, Health and Safety Records).

Consistent record keeping in all aspects of the Environmental Monitoring Programs are a part of QA requirements. Section 10 of the OEMP includes a listing of the required records and reports and the laws, regulations, or DOE Orders that contain the requirements. Records are maintained in accordance with WP 15-030, Records Management.

CHAPTER 9

REFERENCES

CHAPTER 9

REFERENCES

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CHAPTER 10

DISTRIBUTION LIST

CHAPTER 10

REQUIRED DISTRIBUTION LIST

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1000 Independence Avenue, S.W.
Washington, D.C. 20585

U. S. EPA
Region VI
Suite 1200
1445 Ross Avenue
Dallas, TX 75202-2733

U.S. Department of Energy
WIPP Project Inter. Office
One Park Square
Suite 903
6501 Americas Parkway, NE
Albuquerque, NM 87110

Judith M. Espinosa, Sec.
Harold Runnels Building
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

Carlsbad Environmental
Monitoring & Research Center
Attention: Director
800 W. Pierce St.
Carlsbad, NM 88220

U. S. Department of Energy
EM-34
323 Trevion
12800 Middlebrook Rd
Germantown, MD 20874

U. S. Department of Energy
Albuquerque Field Operations Office
P.O. Box 5400
Pennsylvania and H Street
Albuquerque, NM 87185-5400

New Mexico Environment Department
WIPP Site
P.O. Box 3090
Carlsbad, NM 88221-3090

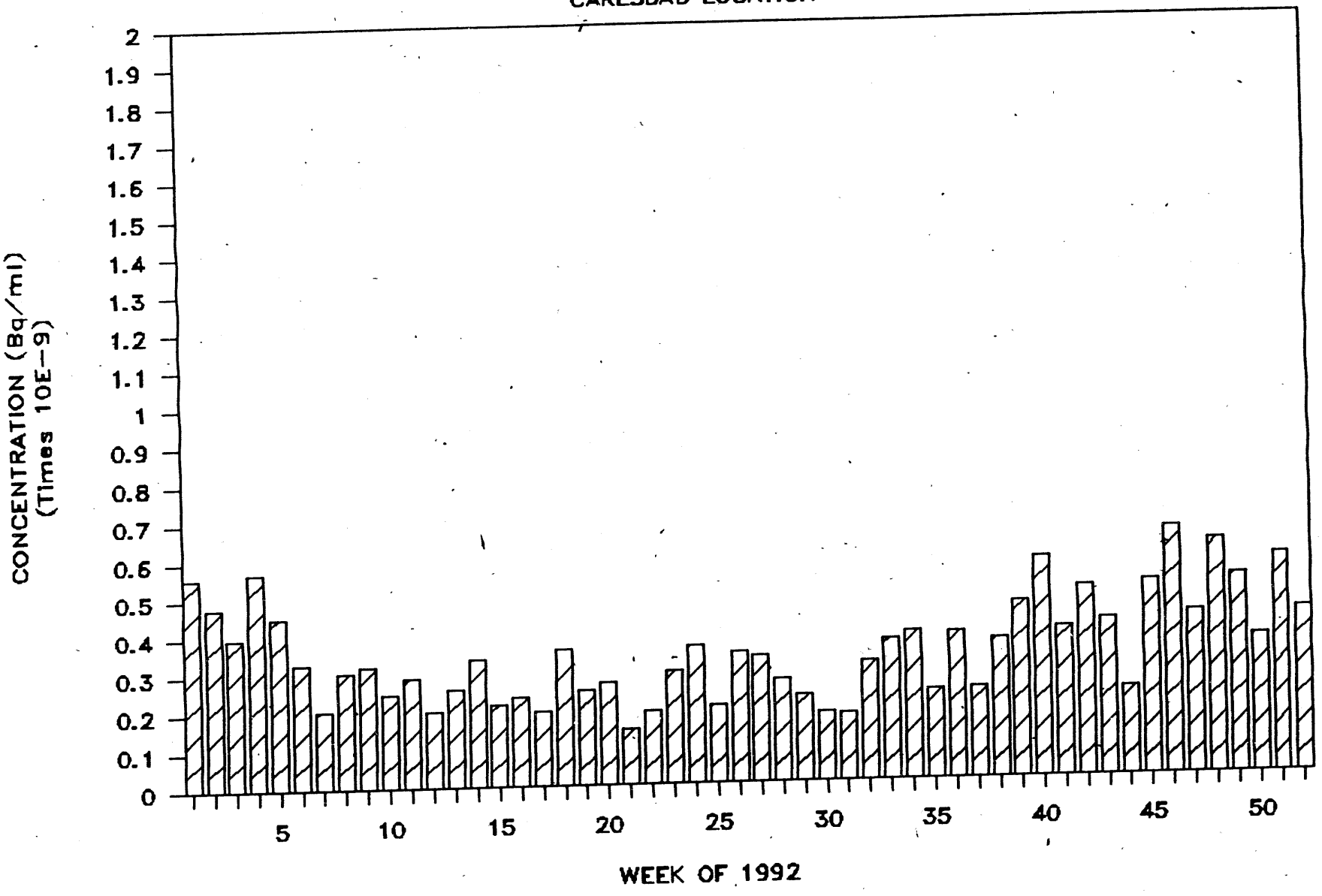
Neil Weber
New Mexico Environment Department
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

APPENDICES

APPENDIX 1
GROSS ALPHA CONCENTRATION

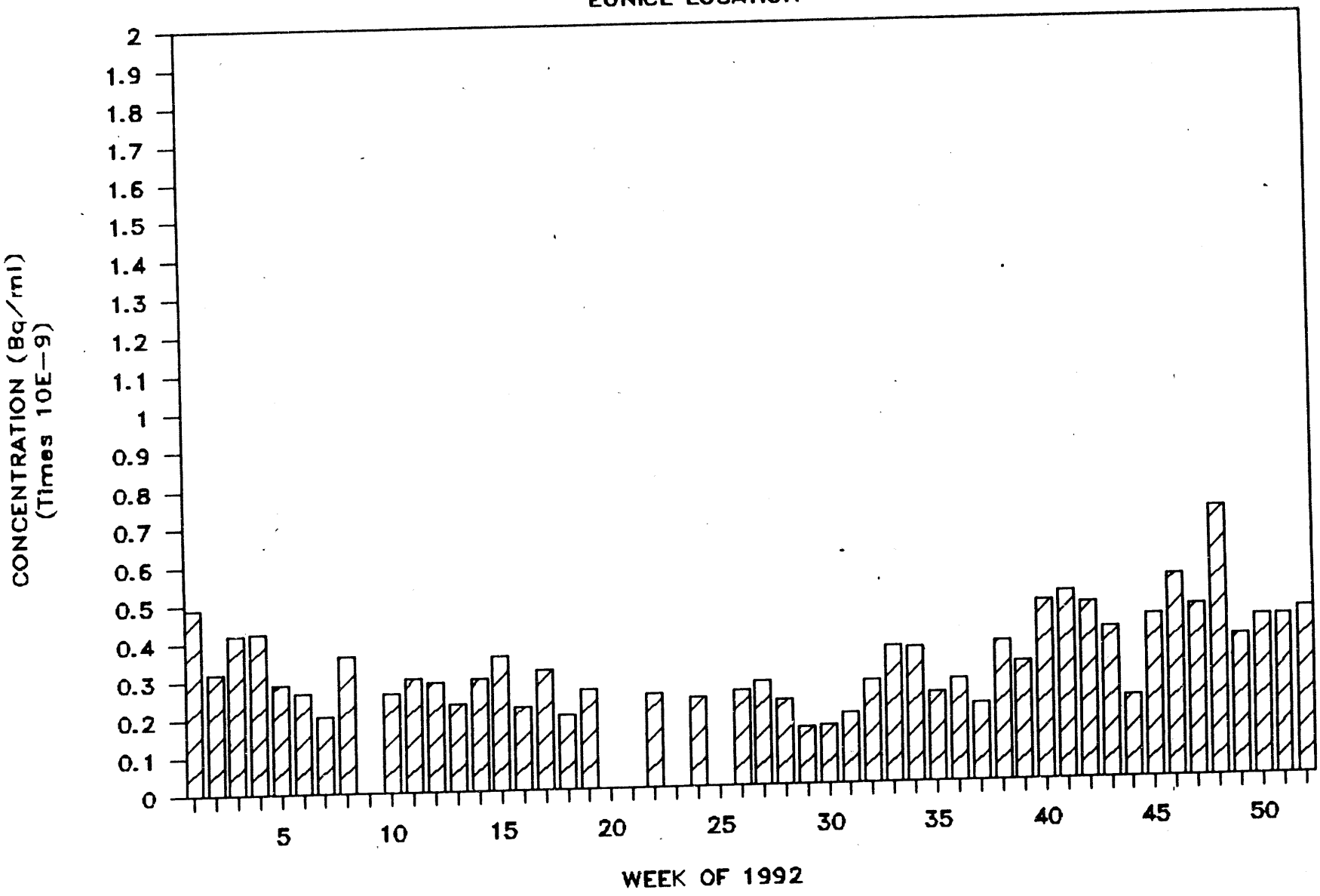
ALPHA CONCENTRATION

CARLSBAD LOCATION



ALPHA CONCENTRATION

EUNICE LOCATION



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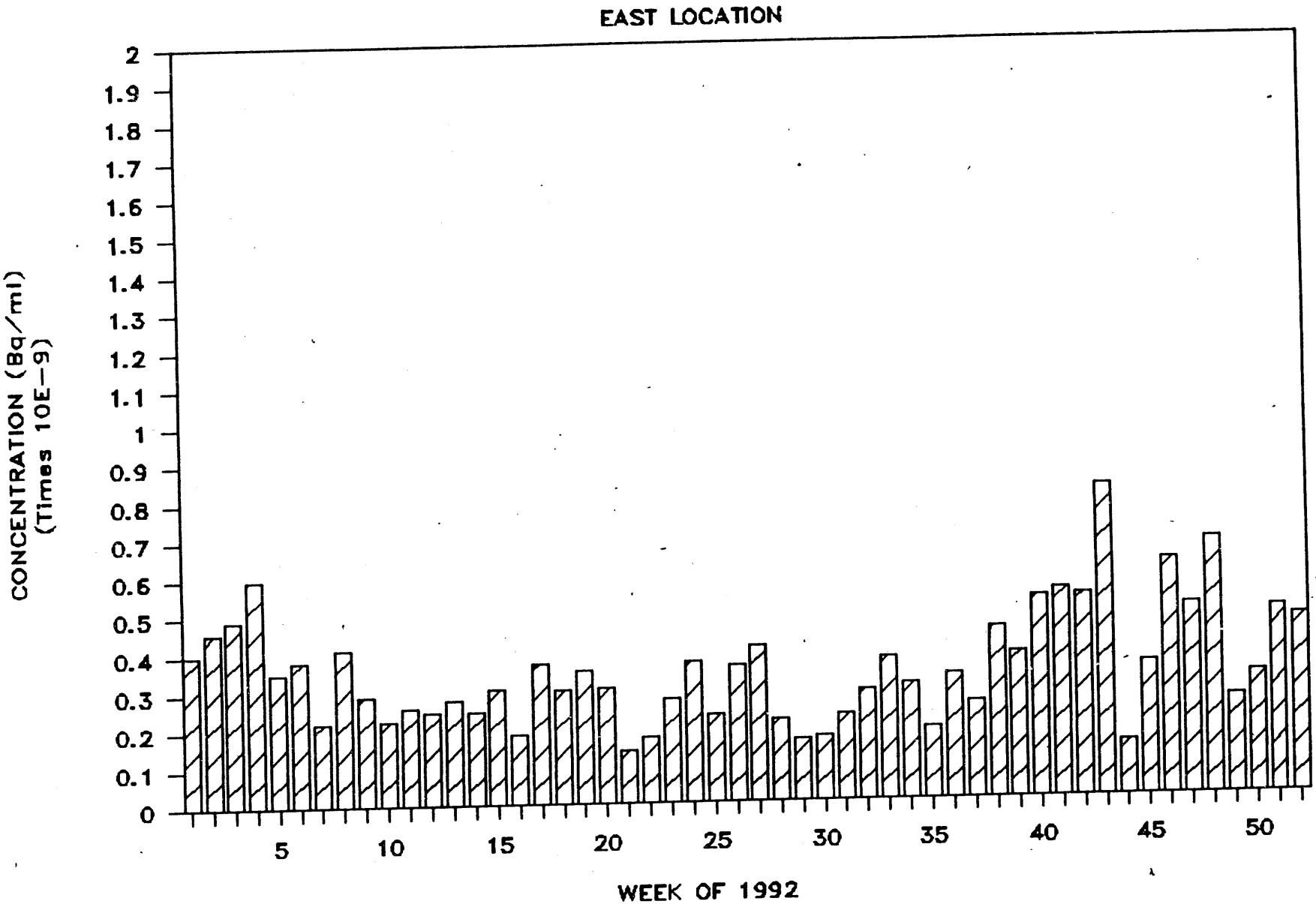

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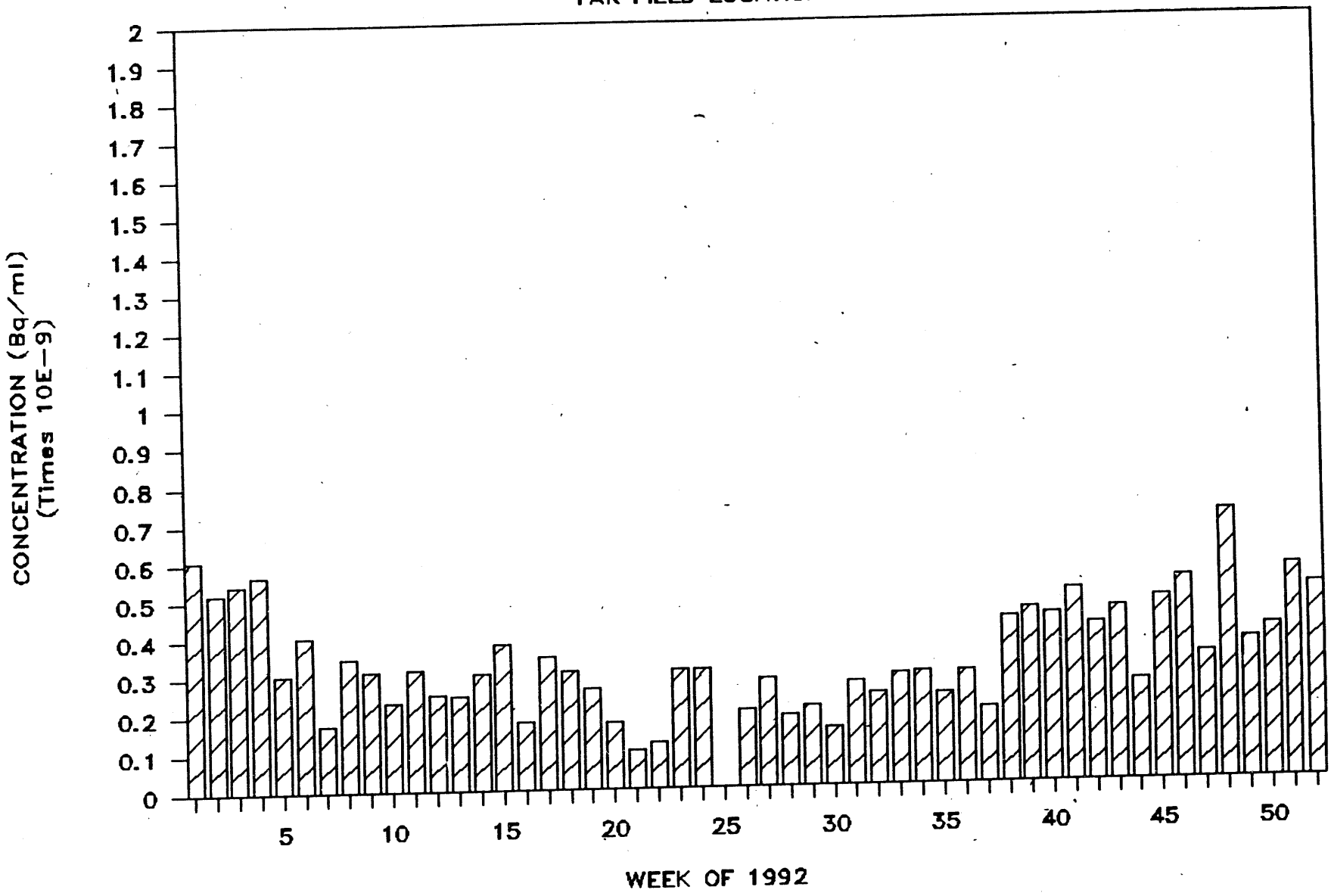
FAR FIELD LOCATION



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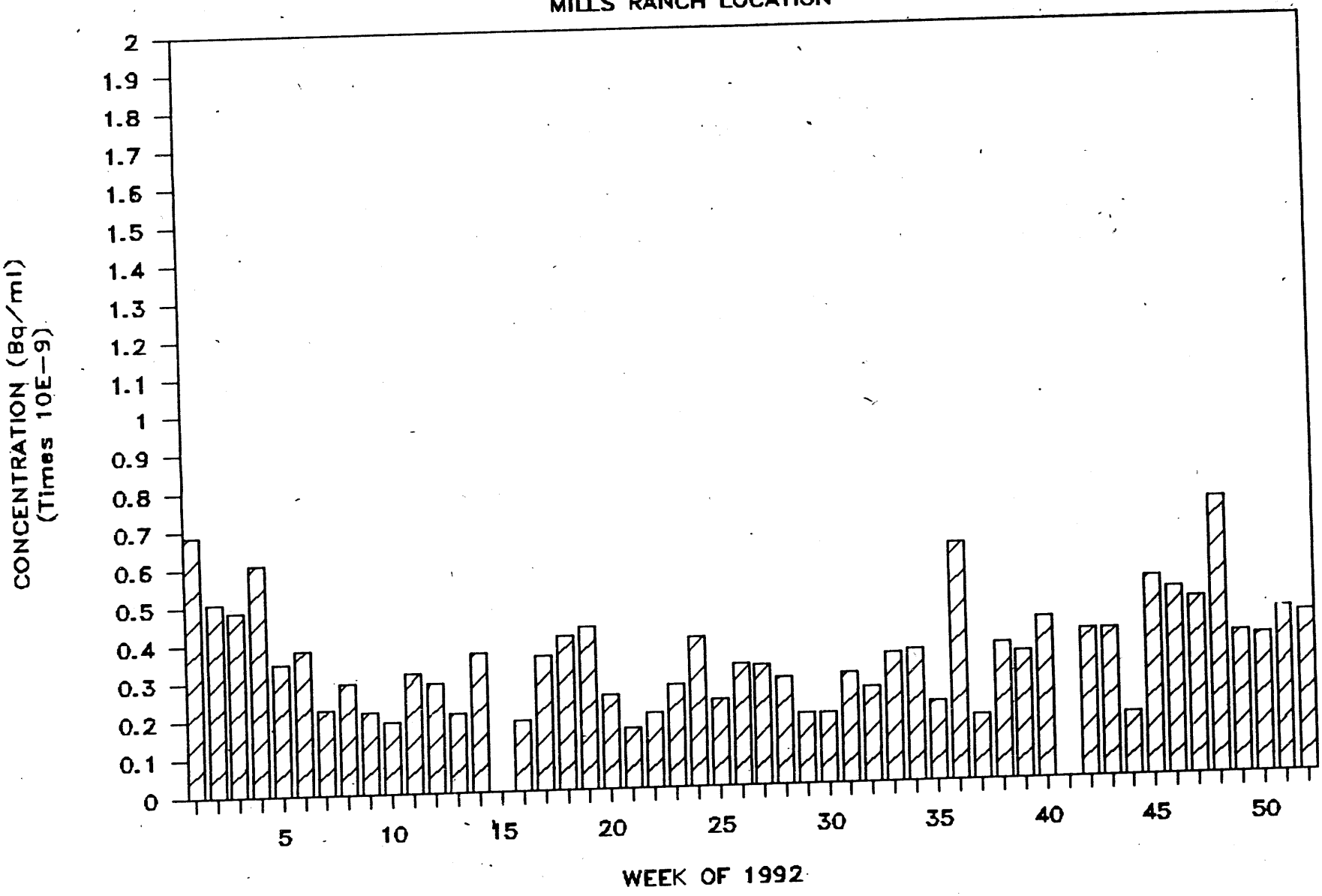

ALPHA CONCENTRATION

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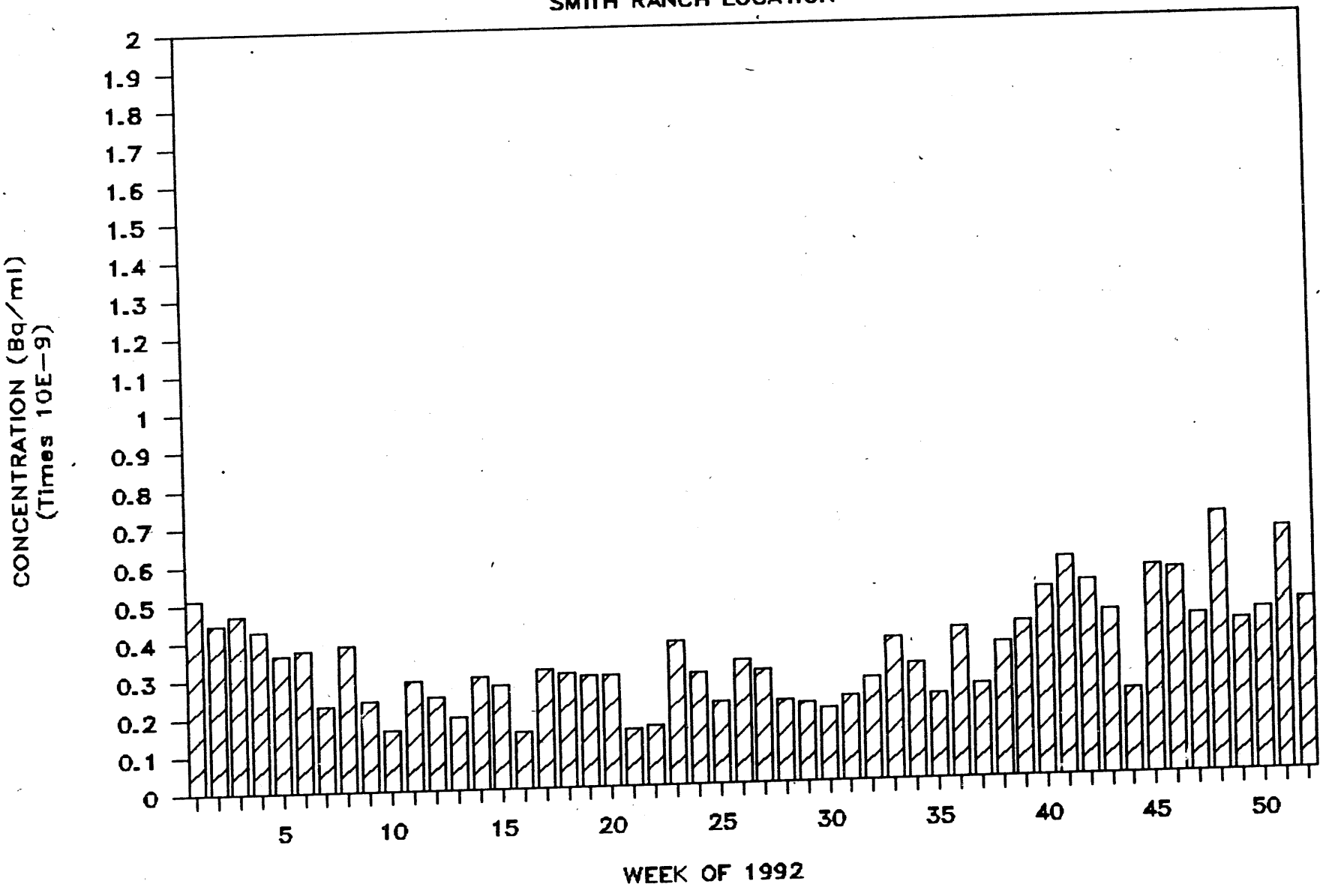
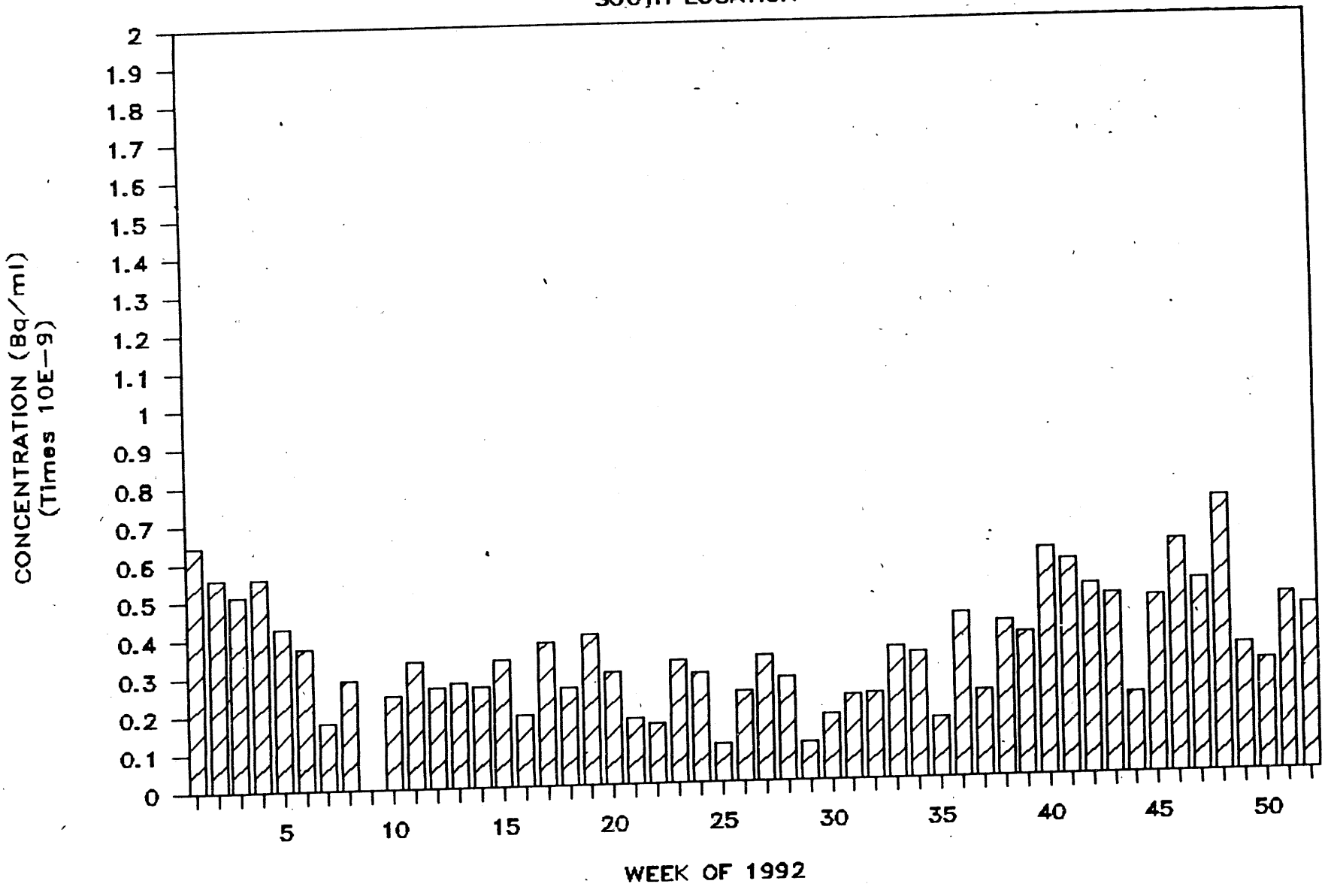


ALPHA CONCENTRATION

SOUTH LOCATION



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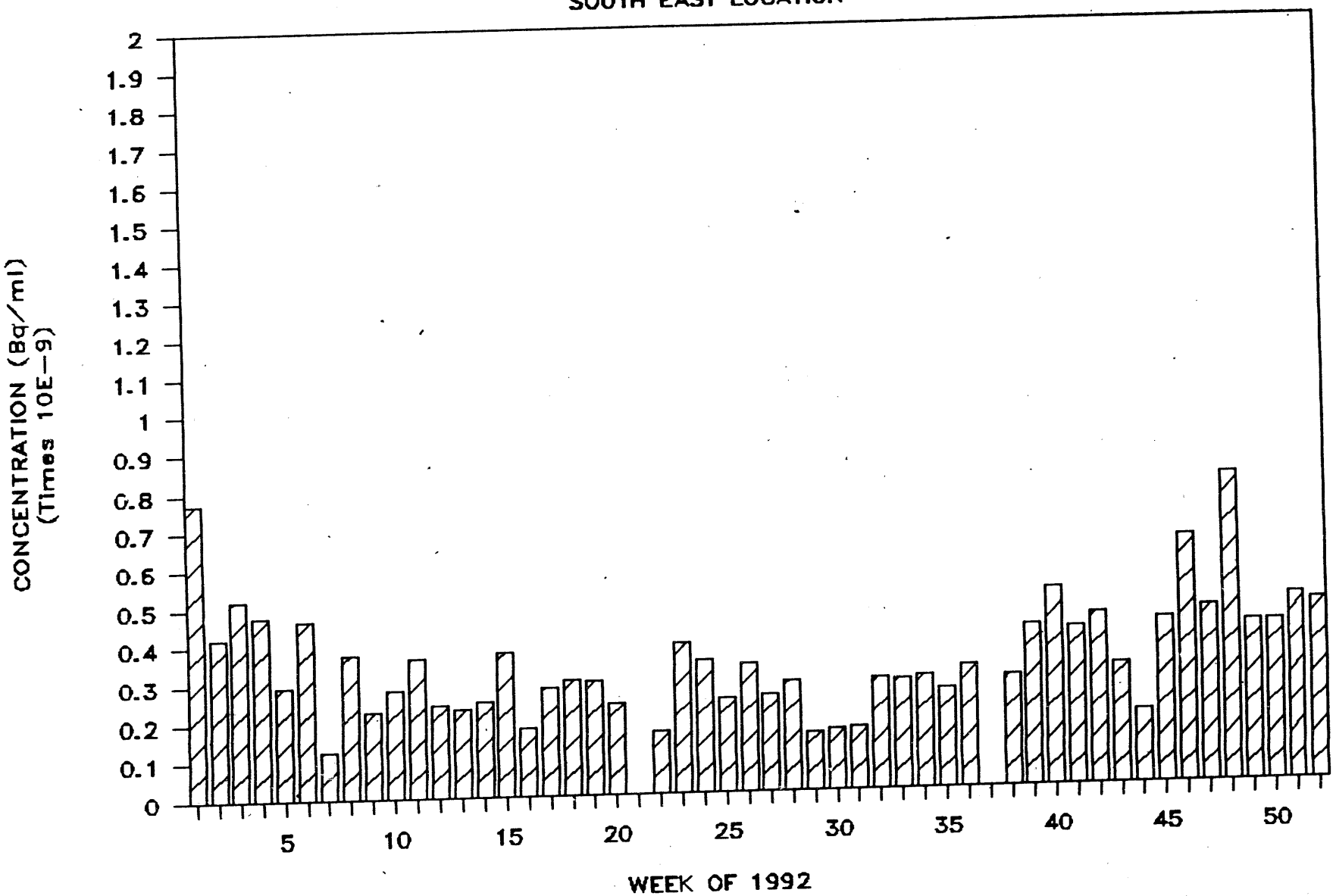

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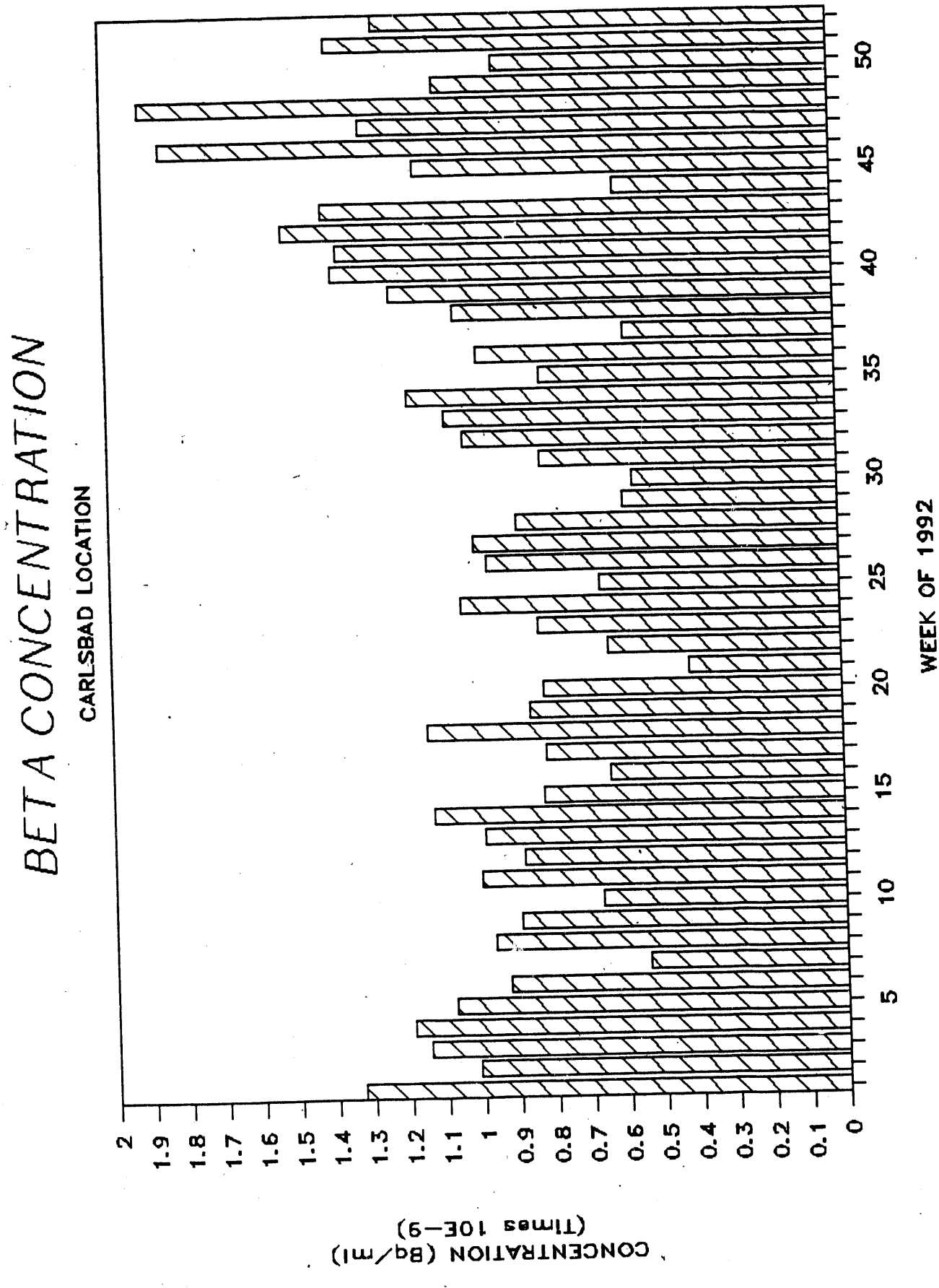
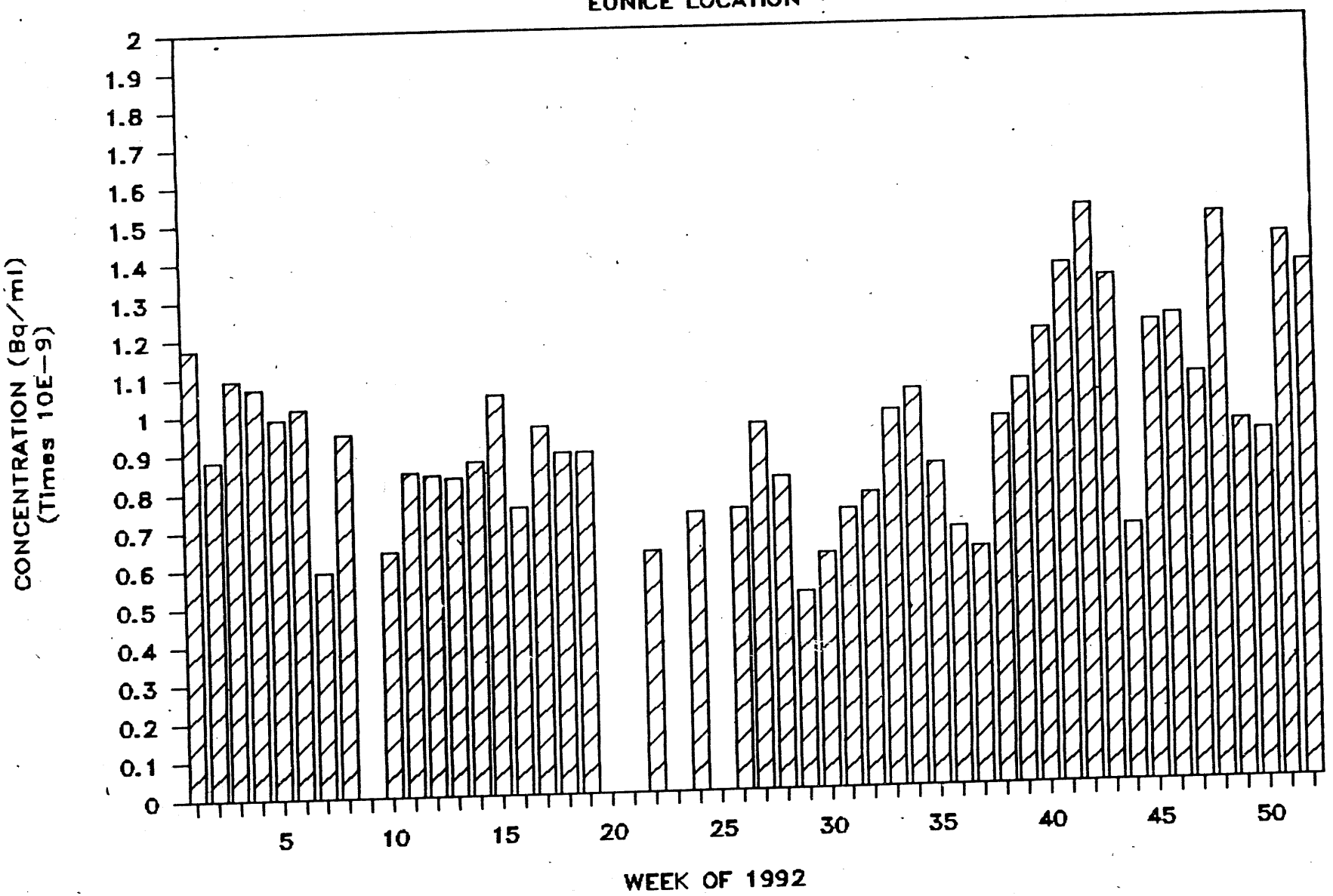
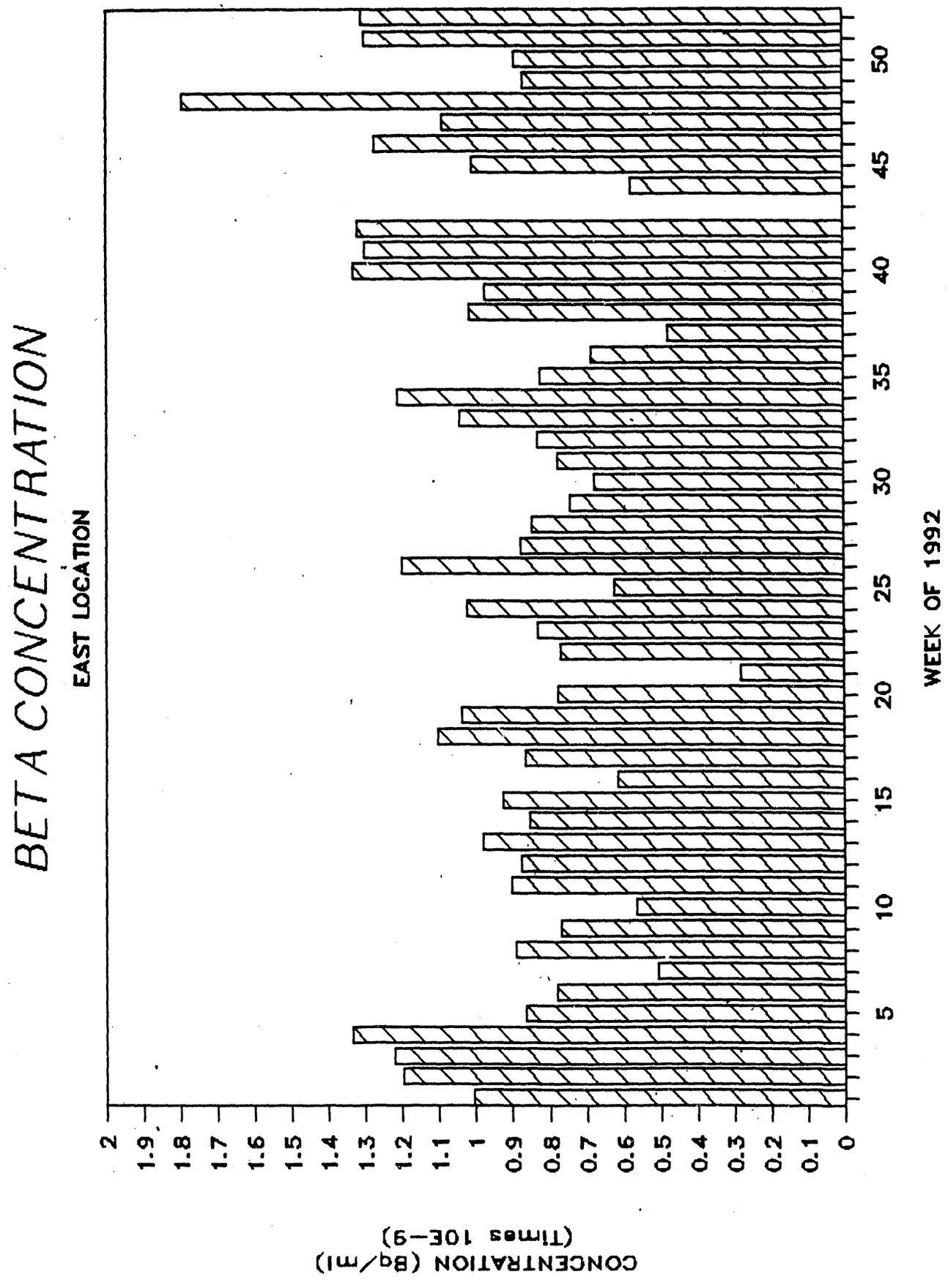
GROSS BETA CONCENTRATION


BETA CONCENTRATION
CARLSBAD LOCATION
CONCENTRATION (Bq/ml)
(Times 10E-9)
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
5
10
15
20
25
30
35
40
45
50
WEEK OF 1992

BETA CONCENTRATION

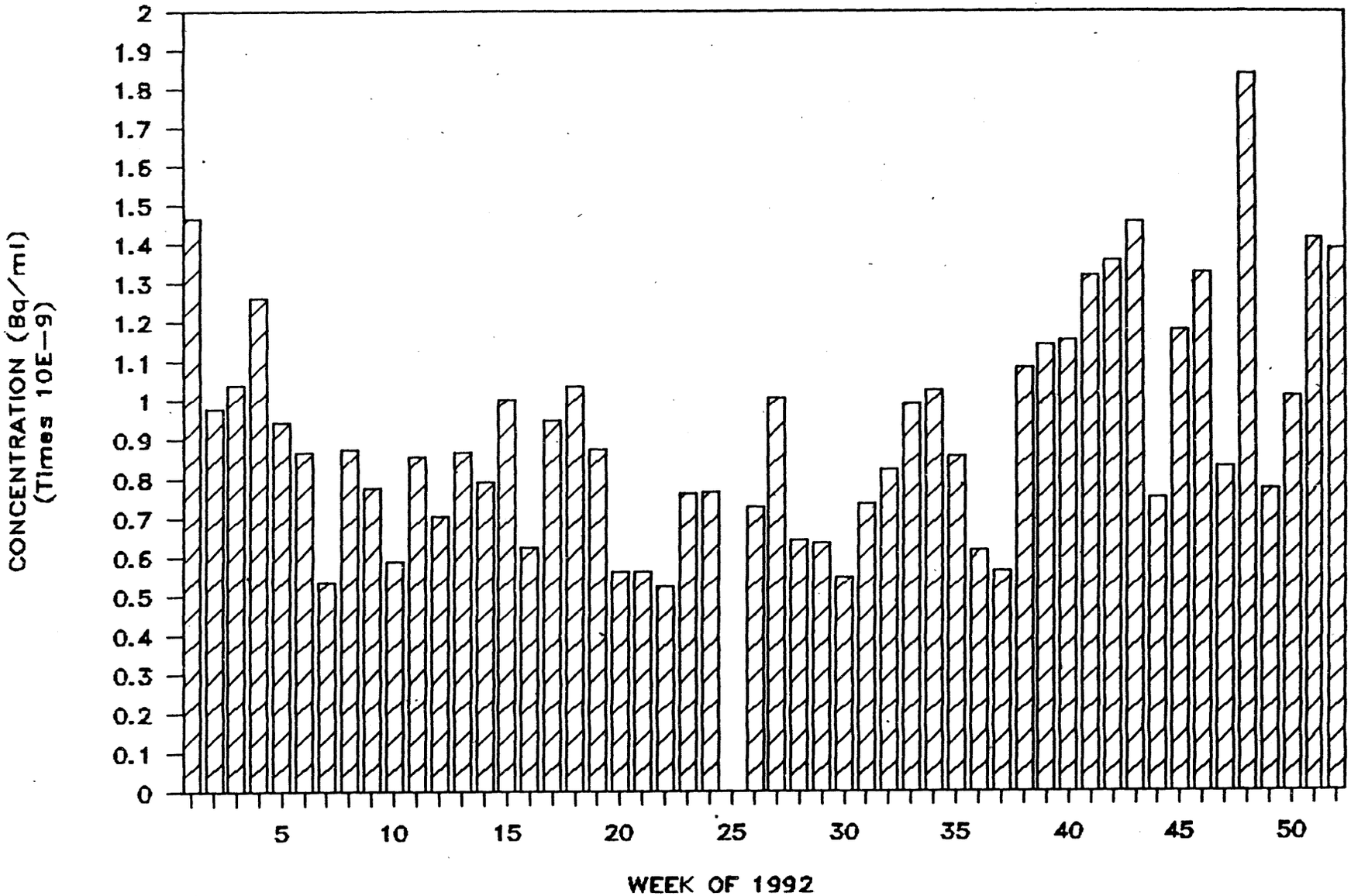
EUNICE LOCATION

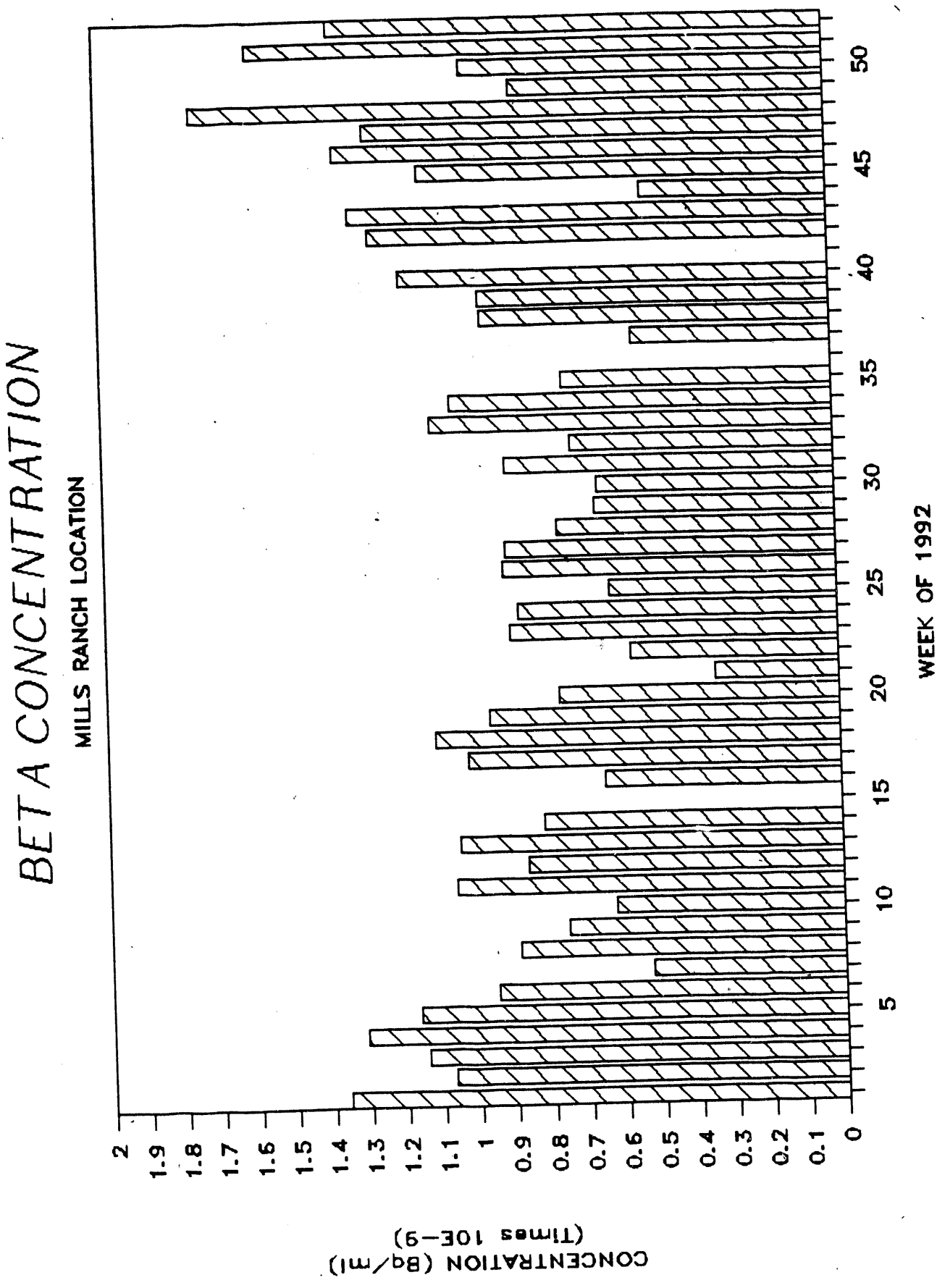


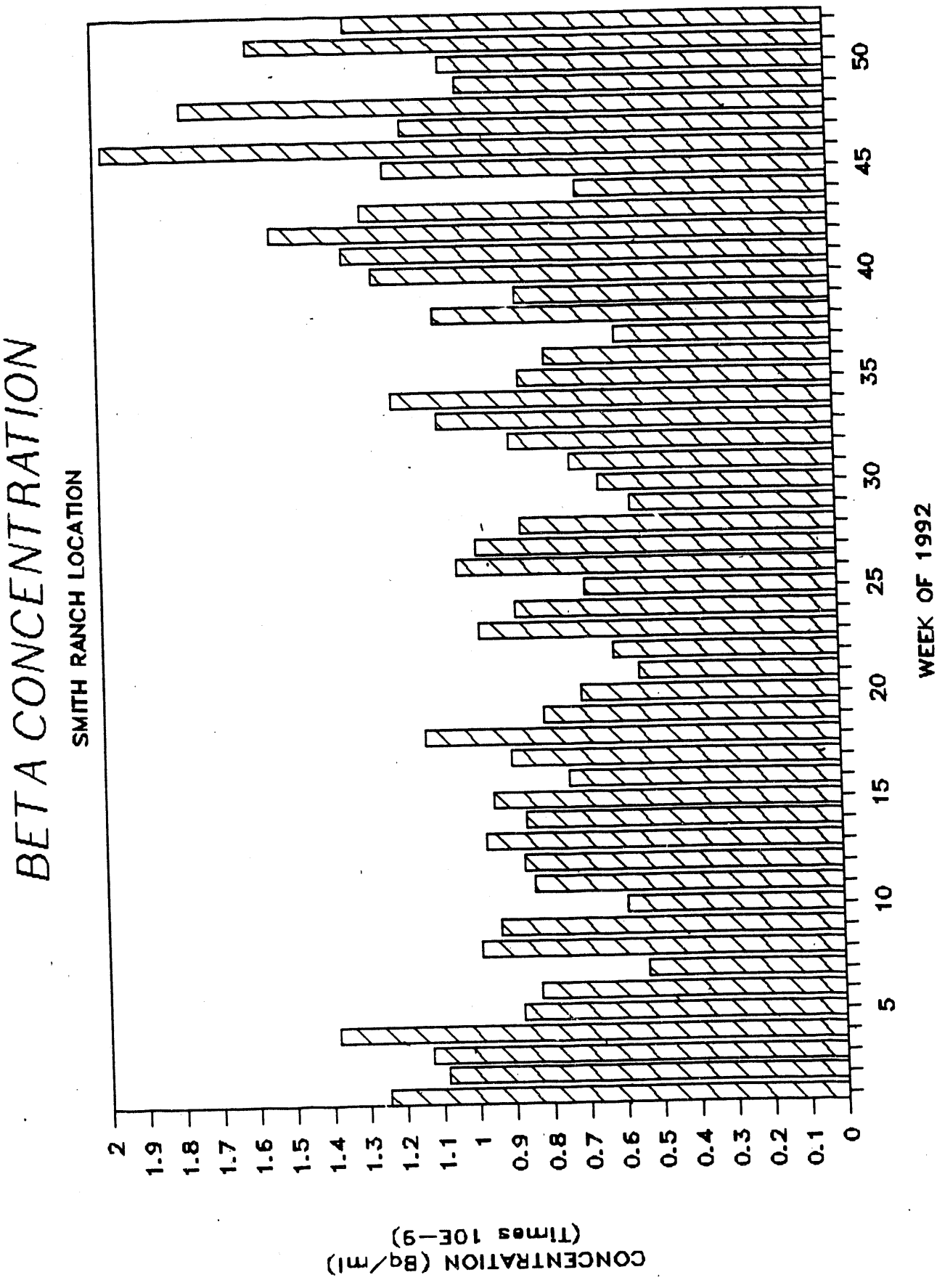

BETA CONCENTRATION
EAST LOCATION
CONCENTRATION (Bq/ml)
(Times 10E-9)
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
5
10
15
20
25
30
35
40
45
50
WEEK OF 1992

BETA CONCENTRATION

FAR FIELD LOCATION




BETA CONCENTRATION
MILLS RANCH LOCATION
CONCENTRATION (Bq/ml)
(Times 10E-9)
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
5
10
15
20
25
30
35
40
45
50
WEEK OF 1992


BETA CONCENTRATION
SMITH RANCH LOCATION
CONCENTRATION (Bq/ml)
(Times 10E-9)
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
5
10
15
20
25
30
35
40
45
50
WEEK OF 1992