U.S. DEPARTMENT OF ENERGY
STRATEGIC PETROLEUM RESERVE
PROJECT MANAGEMENT OFFICE
NEW ORLEANS, LOUISIANA

Site Environmental Report For Calendar Year 2003

Department of Energy
Strategic Petroleum Reserve Project Management Office
900 Commerce Road East
New Orleans, Louisiana 70123

October 5, 2004

Distribution:

SITE ENVIRONMENTAL REPORT FOR 2003 - STRATEGIC PETROLEUM RESERVE

Enclosed for your information is a copy of the Site Environmental Report for Calendar Year 2003 for the U.S. Department of Energy's Strategic Petroleum Reserve. This report is prepared and published annually for distribution to local, state, and federal government agencies, the Congress, the public, and the news media. The report was prepared for the Department of Energy by DynMcDermott Petroleum Operations Company.

To the best of my knowledge, this report accurately summarizes and discusses the results of the 2003 environmental monitoring program.

If you have any questions or desire additional information, please contact William L. Vierling of the Project Management Office Environmental, Safety and Health Division at (504) 734-4985.

Sincerely,

William C. Gibson, Jr.
Project Manager

FE-4441:(B. Smith)

Enclosure
As Stated

STRATEGIC PETROLEUM RESERVE

SITE ENVIRONMENTAL REPORT

FOR

CALENDAR YEAR 2003

Document No. ASE5400.64B0

Prepared for the U. S. Department of Energy
Strategic Petroleum Reserve Project Management Office
under Contract No. DE-AC96-93PO92207

DynMcDermott Petroleum Operations Company
850 South Clearview Parkway
New Orleans, Louisiana 70123

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QUESTIONNAIRE/READER COMMENT FORM

Please submit your questions/comments on a photocopy of this page and forward it to the following address:

DynMcDermott Petroleum Operations Company
Environmental Department, EF-20
850 South Clearview Parkway
New Orleans, LA 70123

A copy of your comments will be sent to the originator for response.

Date: ________________

Name of Submitter:____

Street or P.O. Box: ____

City/State/Zip code: ____

Organization (if applicable): ____

Comments: ____

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(Attach other sheets as needed)
(for originator's use)

Subject Matter Expert (SME): __________________________ Date: _________

SME's Response:____

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LIST OF EFFECTIVE PAGES

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

LIST OF FIGURES

LIST OF FIGURES
(continued)

LIST OF TABLES

LIST OF TABLES (continued)

LIST OF TABLES (continued)

ABBREVIATIONS AND ACRONYMS

ac	acre
A&E	Architect and Engineer
AFFF	aqueous film forming foam
AFV	Alternate Fuel Vehicle
AP	Affirmative Procurement
APHA	American Public Health Association
ASTM	American Society for Testing and Materials
avg	average
bbl	barrel (1 bbl = 42 gallons)
BC	Bayou Choctaw
BDL	below detectable limit
BH	Big Hill
bls	below land surface
BM	Bryan Mound
BOD_5	five day biochemical oxygen demand
°C	degrees Celsius
CAA	Clean Air Act
CAP	corrective action plan
CEMP	Code of Environmental Management Principles
CEQ	Council for Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESQG	conditionally exempt small quantity generator

ABBREVIATIONS AND ACRONYMS

CFS	Cubic feet per second
CFR	Code of Federal Regulations
CO	carbon monoxide
COD	chemical oxygen demand
COE	United States Army Corps of Engineers
CPG	Comprehensive Procurement Guidelines
CQI	Continuous Quality Improvement
CV	coefficient of variation
CWA	Clean Water Act
CY	calendar year
DCS	Distributed Control System
DM	DynMcDermott Petroleum Operations Company
DMR	discharge monitoring report
DO	dissolved oxygen
DOE	United States Department of Energy
DOT	United States Department of Transportation
E2	Energy Efficiency
EA	environmental assessment
EFH	East Fillhole
EIQ	emissions inventory questionnaire
EIS	emissions inventory summary
EIS	environmental impact statement
EMP	Environmental Monitoring Plan

ABBREVIATIONS AND ACRONYMS

EMS	Environmental Management System
EO	executive order
EP	Energy Policy
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Emergency Response Procedure
ERT	emergency response team
ESA	Endangered Species Act
ES&H	Environmental Safety & Health
ESH&Q	Environmental, Safety, Health, and Quality Assurance
FAR	Federal Acquisition Regulations
FFCA	Federal Facilities Compliance Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FRP	Facility Response Plan
ft	feet
ft/yr	feet per year
FTX	Field training exercise
F&WS	United States Fish and Wildlife Service
FY	Fiscal Year
GALCOE	U.S. Army Corps of Engineers, Galveston District
GC	gas chromatographic
GLO	General Land Office

ABBREVIATIONS AND ACRONYMS

gpd	gallons per day
GSA	General Services Administration
GWPMP	Ground Water Protection and Management Plan
HAP	hazardous air pollutant
HVAC	High Ventilation Air Conditioning
HW	hazardous waste
ICW	Intracoastal Waterway
ISM	Integrated Safety Management
ISO	International Organization for Standardization
IR	Infrared
km	kilometers
LA	Louisiana
lab	laboratory
LAC	Louisiana Administrative Code
lbs	pounds
LCMS	Lake Charles Meter Station
LDEQ	Louisiana Department of Environmental Quality
LDHH	Louisiana Department of Health and Hospitals
LELAP	Louisiana Environmental Laboratory Accreditation Program
LLEA	local law enforcement agency
LPG	Liquefied Petroleum Gas
LPG2	Liquefied Petroleum Gas

ABBREVIATIONS AND ACRONYMS

LDNR	Louisiana Department of Natural Resources
LPDES	Louisiana Pollutant Discharge Elimination System
LWDPS	Louisiana Water Discharge Permit System
m	meters
m^3	cubic meters
ml	milliters
m/yr	meters per year
max	maximum
mgd	million gallons per day
mg/l	milligrams per liter
mmb	million barrels
MPAR	Achieve weighted average
m/sec	meters per second
M&O	management & operating
MSDS	Material Safety Data Sheets
MSGP	multi-sector general permit
mt	metric tons
NAAQS	National Ambient Air Quality Standards
N	North
NEPA	National Environmental Policy Act
NEPT	National Environmental Performance Track
NFRAP	No Further Remedial Action Planned
NHPA	National Historic Preservation Act

ABBREVIATIONS AND ACRONYMS

NIIMS	National Interagency Incident Management System
NO	New Orleans
NOCOE	U.S. Army Corps of Engineers, New Orleans District
NOEC	No observed effects concentration
NOI	Notice of Intent
NORM	naturally occurring radioactive material
NOV	notice of violation
NOx	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List (CERCLA)
NRC	National Response Center
NSR	new source review
NV	not a valid or statistically meaningful number
NWP	nationwide permit
O&G	oil and grease
OPA	Oil Pollution Act of 1990
OSPRA	Oil Spill Prevention and Response Act
OVA	organic vapor analyzer
P2	Pollution Prevention
P2E2	Pollution Prevention Energy Efficiency
PCB	polychlorinated biphenyl
PE	performance evaluation
pH	negative logarithm of the hydrogen ion concentration

ABBREVIATIONS AND ACRONYMS

PM_{10}	particulate matter (less than 10 microns)
PMO	Project Management Office
PPOA	Pollution Prevention Opportunity Assessment
PPP	Pollution Prevention Plan
ppt	parts per thousand
PREP	Preparedness for Response Exercise Program
PSD	prevention of significant deterioration
PVC	Polyvinyl Chloride
QC	quality control
RCRA	Resource Conservation and Recovery Act
RCT	Railroad Commission of Texas
RECAP	Risk Evaluation Corrective Action Program
ROD	Record of Determination
RWIS	raw water intake structure
S	South
SAL	salinity
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SER	Site Environmental Report
SIC	Standard Industrial Classification
SIP	state implementation plan
SO_2	sulfur dioxide
SOC	security operations center

ABBREVIATIONS AND ACRONYMS

SO_X	Sulfur oxides
SPCC	Spill Prevention Control and Countermeasures
SPR	Strategic Petroleum Reserve
SPRPMO	Strategic Petroleum Reserve Project Management Office
SQG	small quantity generator
STP	sewage treatment plant
s.u.	standard units
SW	southwest
TCEQ	Texas Commission on Environmental Quality
TDH&PT	Texas Department of Highways and Public Transportation
TDS	total dissolved solids
TNRCC	Texas Natural Resource Conservation Commission
TOC	total organic carbon
TPDES	Texas Pollution Discharge Elimination System
TPH	Total Petroleum Hydrocarbons
TPQ	threshold planning quantity
tpy	tons per year
TRI	Toxic Release Inventory
TSCA	Toxic Substance Control Act
TSD	Treatment Storage Disposal
TSS	total suspended solids
TVP	True Vapor Pressure

ABBREVIATIONS AND ACRONYMS

TX	Texas
UIC	underground injection control
USCG	United States Coast Guard
UST	underground storage tank
VOC	volatile organic compound
WAD	Work Authorization Directive
VWS	verification well study
W	west
WH	West Hackberry
WILT	Weeks Island Long Term

EXECUTIVE SUMMARY

The purpose of this Site Environmental Report (SER) is to characterize site environmental management performance, confirm compliance with environmental standards and requirements, and highlight significant programs and efforts for the U. S. Department of Energy (DOE) Strategic Petroleum Reserve (SPR). The SER, prepared annually, serves the public by summarizing monitoring data collected to assess how the SPR impacts the environment. The SER provides a balanced synopsis of non-radiological monitoring and regulatory compliance data, affirms that the SPR has been operating within acceptable regulatory limits and promotes pollution prevention, and illustrates the success of SPR efforts toward continual improvement.

Included in this report is a description of each site's environment, an overview of the SPR environmental program, and a recapitulation of special environmental activities and events associated with each SPR site during CY 2003.

There were no reportable brine spills and three reportable oil spills which totaled seven barrels during CY 2003. Despite the fact that there were three oil spills, the percentage spilled was very small, (0.00001 percent), when compared to the amount of oil that was received and transferred internally at the SPR (10.7 million m^3 (67.1 mmb) The longer-term trend for oil and brine spills has declined substantially from 27 in 1990 down to three in CY 2003. The oil spills were reported to the appropriate agencies where applicable and immediately cleaned up with no observed environmental impact.

Concern for the environment is integrated into daily activities through environmental management. In addition, adherence to the requirements Executive Order 13148 also ensures that a high level environmental stewardship is maintained. The SPR's continuing efforts to improve the quality, cost effectiveness, and seamless integration of environmental awareness and control into all operations are consistent with the Code of Environmental Management Principles (CEMP) and the ISO 14001 standard. Environmental management is a part of a greater Integrated Safety Management System.

The SPR management and operating contractor's environmental management system (EMS) has been certified by a third party registrar against the international ISO 14001 standard since May 2000. The SPR is also a charter member of the EPA National Environmental Performance Track (NEPT) program. This program recognizes and rewards facilities that have environmental management systems and manage beyond regulatory requirements.

The SPR sites were inspected or visited on fifteen occasions by outside regulatory agencies or third party auditors during CY 2003. There were no minor findings associated with these inspections. Three minor noncompliances were self-reported under state and federal discharge permits for all SPR sites during CY 2003, and no Clean Air Act or Clean Water Act Notice of Violations (NOV) were received.

During CY 2003 the SPR facilities in Louisiana and Texas continued to operate as Conditionally Exempt Small Quantity Generators (CESQG) and take advantage of relaxed regulatory requirements. The SPR is not a hazardous waste treatment, storage, or disposal (TSD) facility. Superfund Amendments and Reauthorization Act (SARA) Title III, Tier Two, reports are prepared and submitted to agencies every year detailing the kinds and amounts of hazardous substances on SPR facilities. Submissions of Toxic Release Inventory Reports were not required during 2003 because the SPR did not place crude oil into commerce.

The SPR facilities operate under the National Pollutant Discharge Elimination System (NPDES). The Louisiana Department of Environmental Quality (LDEQ) has primacy for the Louisiana NPDES program (LPDES) while the Railroad Commission of Texas (RCT), which has SPR jurisdiction in Texas, does not. Consequently, at this time, there is a dual federal and state discharge program only at the Texas sites. Refer to Federal Register / Vol. 63, No. 185 / Thursday, September 24, 1998 / Notices. Also, each SPR site operates in accordance with a Pollution Prevention Plan prepared in accordance with a separately issued general permit for storm water associated with industrial activity.

The air quality programs at the SPR facilities are regulated by LDEQ for the Louisiana sites and the Texas Commssion on Environmental Quality (TCEQ) for the Texas sites. The effluent monitoring of hazardous and non-hazardous air pollutants at the SPR indicated that all the sites operated in accordance with air quality regulatory requirements during CY 2003.

The SPR met its drill and exercise requirements for CY 2003 under the Oil Pollution Act of 1990 (OPA) through the National Preparedness for Response Exercise Program (PREP).

Environmental compliance and management audits were conducted in-house and by outside entities. DOE Strategic Petroleum Reserve Project Management Office (SPRPMO) appraisal teams conducted formal annual visits to each site, meeting with contractor management staff, reviewing environmental practices and performance indicators, environmental management systems, and reviewing findings with management and operations (M&O) contractor staff. Internal M&O contractor environmental assessments at the five SPR sites during 2003 identified no high or medium risk Environmental findings and seventeen low risk Environmental findings. None of the findings indicated that there was any environmental degradation occurring as result of these findings. Twice during 2003, a third party registrar, Advanced Waste Management Systems, Inc., who verifies certification against the ISO 14001 standard, audited the DynMcDermott Petroleum Operations Company (DM) EMS and no non-conformances were found. Surveillance Audits are conducted by the registrar every six months.

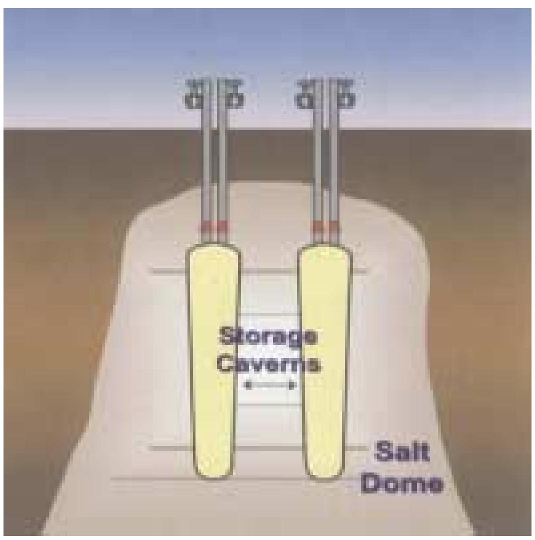
The SER also characterizes environmental management performance and programs pertinent to the SPR. The active permits and the results of the environmental monitoring program (i.e., air, surface water, ground water, and water discharges) are discussed within each section by site. The quality assurance program utilized at the SPR is presented and includes results from laboratory and field audits and studies performed internally and by regulatory agencies. Internal DM Organizational Assessments are performed in compliance with the SPRPMO Order 220.1 and criterion 10 of DOE Order 414.1A. This characterization, discussion, and presentation illustrate the SPR's environmental performance measures program.

The Questionnaire/Reader Comment Form located inside the front cover of this document may be utilized to submit questions or comments to the originator for response.

1. INTRODUCTION

As required by DOE Order 231.1A, the purpose of this Site Environmental Report (SER) is to present a summary of environmental data gathered at or near SPR sites to characterize site environmental management performance, confirm compliance with environmental standards and requirements, assure protection of the public, and highlight significant programs and efforts.

The creation of the Strategic Petroleum Reserve (SPR) was mandated by Congress in Title I, Part B, of the Energy Policy and Conservation Act (P.L. 94-163), of December 22, 1975. The SPR provides the United States with sufficient petroleum reserves to mitigate the effects of a significant oil supply interruption.



Emergency crude oil supplies are stored by the Strategic Petroleum Reserve in salt caverns. The caverns were created deep within the massive salt deposits that underlie most of the Texas and Louisiana coastline. The caverns were created through the process of solution mining. The utilization of the caverns to store crude oil provides assurance against normal hazards associated with the above ground storage, offers the best security, and is the most affordable means of storage. The cost of using caverns to store crude oil is up to 10 times less than aboveground tanks and 20 times less than hard rock mines.

Storage locations along the Gulf Coast were selected because of the combination of a preponderance of salt domes and proximity to a key portion of the Nation's commercial oil transport network in the region. Strategic Reserve oil can be

distributed through interstate pipelines to nearly half of the Nation's oil refineries or loaded into ships or barges for transport to other refineries. By the end of 2003, the SPR consisted of four Gulf Coast underground salt dome oil storage facilities (two in Louisiana and two in Texas) and a project management facility (in Louisiana). A fifth site, Weeks Island in Iberia Parish, La, was decommissioned in November 1999 and a sixth site, St. James Terminal in St. James Parish, LA was leased to Shell Pipeline in January 1997. Although these sites are no longer SPR active storage facilities, environmental surveillance activities continue; therefore, the sites are addressed in this report.

Due to the location of the SPR crude oil storage sites near marsh or wetland areas, protection of the environment through oil spill prevention and control is a primary commitment. Each SPR site has structures in place to contain or divert any harmful release that could impact surrounding waterways or land areas. Onsite spill control equipment, detailed emergency plans, and extensive training are used to ensure that the environment is safeguarded.

At year’s end, the SPR employed approximately 765 government and contractor personnel, excluding subcontract maintenance and construction personnel.

1.1 BAYOU CHOCTAW

The Strategic Petroleum Reserve (SPR) Bayou Choctaw storage facility is located in Iberville Parish, Louisiana. The storage facility occupies 356 acres.

The Bayou Choctaw salt dome was selected as a storage site early in the SPR program due to its existing brine caverns, which could be readily converted to oil storage and its proximity to commercial marine and pipeline crude oil distribution facilities. Development of the site was initiated in 1977 and completed in 1991. Small canals and bayous flow through the site area and join larger bodies of water off-site.

The area surrounding the site is a freshwater swamp, which includes substantial stands of bottomland hardwoods with interconnecting waterways. The site property is normally dry and protected from spring flooding by the site's flood control levees and pumps. The surrounding forest and swamp provides habitat for a diverse wildlife population, including many kinds of birds and mammals such as raccoon and deer, and reptiles including the American alligator.

1.2 BIG HILL

The Strategic Petroleum Reserve (SPR) Big Hill storage facility is located in Jefferson County, Texas. The storage site covers approximately 270 acres over the Big Hill salt dome.

The Big Hill storage facility is the SPR's most recently constructed storage facility and is located close to commercial marine and pipeline crude oil distribution facilities. Development of the site was initiated in 1982 and completed in 1991.

Most of the site is upland habitat, consisting of tall grass. A few 150-year-old live oak trees are present on the site. Identified bird concentrations and rookeries are located in the area of the site.

No rare, threatened, or endangered species habitat has been identified in the vicinity of the Big Hill site. Wildlife in the area includes coyote, rabbits, raccoon, and many bird species. The nearby ponds and marsh provide excellent habitat for the American alligator and over-wintering waterfowl.

1.3 BRYAN MOUND

The Strategic Petroleum Reserve (SPR) Bryan Mound storage facility is located in Brazoria County, Texas. The storage facility occupies 500 acres, which almost encompasses the entire Bryan Mound salt dome.

The Bryan Mound salt dome was selected as a storage site early in the SPR program due to its existing brine caverns, which could be readily converted to oil storage, and its proximity to commercial marine and pipeline crude oil distribution facilities. Development of the site was initiated in 1977 and completed in 1987.

The marsh and prairie areas surrounding Bryan Mound are typical of those found throughout this region of the Texas Gulf Coast. Brackish marshland dominates the low-lying portions of the site. The coastal prairie is covered with tall grass forming a cover for wildlife. Water bodies surrounding the site provide a diverse ecosystem. Marshes and tidal pools are ideal habitats for a variety of birds, aquatic life, and mammals. Migratory waterfowl as well as nutria, raccoon, skunks, rattlesnakes, turtles, and frogs can be found on and in the area surrounding Bryan Mound.

1.4 WEEKS ISLAND

The Weeks Island facility located in Iberia Parish, Louisiana, was decommissioned in 1999 and is currently under ongoing long term groundwater monitoring.

The area surrounding the island is a combination of marsh, bayous, manmade canals, and bays, contiguous with the Gulf of Mexico, that provide a vast estuarine nursery ground for an array of commercially and recreationally important finfish and shellfish.

The vegetation communities on Weeks Island are diverse. Lowland hardwood species proliferate in the very fertile loam soil common at the higher elevations. The predominant tree species are oak, magnolia, and hickory, and extend down to the surrounding marsh. Pecan trees are also present. Gulls, terns, herons, and egrets are common in the marsh area.

Mink, nutria, river otter, and raccoon are the most common inhabitants of the intermediate marshes. Other mammals found at Weeks Island are opossum, bats, squirrels, swamp rabbit, bobcat, white-tailed deer, and coyote. Weeks Island is the home of one of the densest breeding populations of the Louisiana black bear, which has been listed as a threatened species by the U.S. Fish and Wildlife Service (F&WS) under authority of the Endangered Species Act (ESA).

Weeks Island and the surrounding wetlands are also frequented by a variety of endangered or threatened avian species, including the brown pelican, bald eagle, peregrine falcon, the piping plover, and least tern. The wetlands to the southwest of Weeks Island are a breeding area for least terns. The American alligator occurs in the marshes adjacent to the site.

1.5 WEST HACKBERRY

The Strategic Petroleum Reserve (SPR) West Hackberry storage facility is located in Cameron Parish, Louisiana. The storage site covers approximately 565 acres on top of the West Hackberry salt dome.

The West Hackberry salt dome was selected as a storage site early in the SPR program due to its existing brine caverns, which could be readily converted to oil storage and its proximity to commercial marine and pipeline crude oil distribution facilities. Development of the site was initiated in 1977 and completed in 1988.

Numerous canals and natural waterways bisect the area. The surrounding area consists of marshland with natural ridges. These ridges, called cheniers, typically support grass and trees and affect water flow through the marshes. In many areas, lakes, bayous, and canals are concentrated so that the marsh may not seem to be a landmass, but rather a large region of small islands.

The marshlands surrounding the West Hackberry site provide excellent habitat for a variety of wetland species. Many bird species frequent the area, including southern bald eagle, Arctic peregrine falcon, brown pelicans, and waterfowl. Other inhabitants include red fox, raccoon, nutria, opossum, wolf, bobcat, rabbits, and white-tailed deer. The American alligator is extremely common, breeding and nesting in this area. The marsh also supports a variety of other reptiles, fish, shellfish, and mammals.

1.6 SPR HEADQUARTERS

The project management office for SPR operations is housed in two adjacent office buildings and a nearby warehouse in Harahan, Louisiana. This facility is the main office through which DynMcDermott manages, operates, maintains and supports the crude oil reserve sites. Activities conducted at the New Orleans office complex are predominantly administrative with nearby warehouse capacity to augment project-wide equipment storage. Office and warehouse space is leased, not owned, by the Department of Energy. During 2003 DOE also began the process to relocate part its storage location to the Stennis Warehouse located near Picayune, MS. This topic is further addressed in section 2 of this report.

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2. COMPLIANCE SUMMARY

General

The SPR operates in conformance with standards established by federal, state, and local statutes and regulations, Executive Orders, and Department of Energy (DOE) orders and directives. A list of environmental federal, state, and many of the DOE standards that, in varying degrees, affect the SPR is provided in Appendix A.

The DOE Office of Deputy Assistant Secretary for the Petroleum Reserves has overall programmatic responsibility for establishing the objectives of the SPR. The SPRPMO Project Manager is responsible for implementing these goals and objectives including articulating an Environmental Policy statement that is responsive to Departmental requirements. The DOE policy is applied to SPR operations through the current M&O contractor's Environmental Policy (Appendix B.)

The SPR has had an Environmental Protection Program since its inception and initial operation in 1978. The SPRPMO has assigned contractual responsibilities for implementation of the program to the current Management & Operating (M&O) contractor, DynMcDermott Petroleum Operations Company (DM). Additional responsibilities, as applicable, are assigned to the Architect-Engineering (A&E) contractor, S&B Infrastructure, Ltd., the Construction Management services contractor, Artic Slope Regional Corporation Constructors, Inc. (ACI), and SPR subcontractors. DM has been under contract to DOE since April 1, 1993.

The SPRPMO Environmental, Safety, Health, and Quality Assurance (ESH&Q) division is responsible for development and oversight of ES&H programs and provides direction, technical guidance, and independent oversight to its prime contractors in the implementation of environmental programs and assessment of contractor performance.

It is the SPR's policy and practice to conduct operations in compliance with all applicable environmental requirements with the highest regard for the protection and preservation of the environment. Compliance status in this year's report reflects compliance activities conducted by DOE and DM personnel.

The SPR has incorporated the following five broad Code of Environmental Management Principles (CEMP) into the implementation of its Integrated Safety Management (ISM) system:

1. management commitment;
2. compliance assurance and pollution prevention;
3. enabling systems;
4. performance and accountability; and
5. measurement and improvement.

Also, to further illustrate a commitment to excellence with regard to environmental management, DM operates with an EMS that is certified against the ISO 14001 standard by a third party registrar. This EMS further reinforces conformance with CEMP and then environmental management requirements of Executive Order 13148, and strengthens the environmental leg of the SPR ISM program.

A summary of the programs and procedures that presently make up the SPR environmental protection program are:

a. A NEPA program that provides a comprehensive environmental review of all projects to include Purchase Requisitions, Engineering Scopes of Work, Engineering Change Proposals, Design Reviews, and Design Changes for all SPR activities;
b. A wetlands and floodplains management program that addresses projects that have an impact on Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act. and state coastal zone management programs

c. inspections, appraisals, assessments, and surveillance which provide regular monitoring to ensure compliance with regulatory and policy requirements;

d. a non-routine reporting program directed toward notification of oil, brine, or hazardous substance spills, or noncompliant effluent emissions, to identify the impact of such spills or emissions on property and the environment, and to comply with regulatory requirements;

e. a routine reporting program directed toward fulfilling self-reporting obligations under water, air, and waste permits and regulations;

f. a permit monitoring program to ensure compliance with all permit requirements and limitations, onsite operations and maintenance activities;

g. an environmental monitoring program to detect any possible influence the SPR might have on surface waters and ground waters on or near SPR sites and to provide a baseline in the event of an environmental upset;

h. a discharge procedure used by each site when releasing liquid from any authorized containment or control system;

i. an environmental training program to ensure that applicable personnel are aware of the SPR Environmental Management System and environmental laws and regulations and trained in oil and hazardous material spill prevention, and safe handling of hazardous waste;

j. a pollution prevention program which focuses on source reduction, recycling, reuse, affirmative procurement and proper disposal of all wastes produced on the SPR sites;

k. an underground injection control program mandated by the Safe Drinking Water Act (SDWA) to ensure sound operation of Class II underground wells/caverns for brine disposal or hydrocarbon storage to protect aquifers;

l. regulatory review program for identification of new environmental requirements; and

m. an employee environmental awards program to recognize activities, initiatives, and innovative approaches for improved environmental management and pollution prevention;

Regulatory

The principal agencies responsible for enforcing environmental regulations at SPR facilities are the Environmental Protection Agency (EPA) Region VI, the New Orleans and Galveston Districts of the U.S. Army Corps of Engineers (COE), the Louisiana Department of Environmental Quality (LDEQ), the Louisiana Department of Natural Resources (LDNR), the Railroad Commission of Texas (RCT), the Texas Commission on Environmental Quality (TCEQ), and the Texas General Land Office (GLO). These agencies issue permits, review compliance reports, inspect site operations, and oversee compliance with regulations.

Executive Orders (E.O.)

The SPR follows and operates in conformance with numerous Executive Orders applicable to its operation. Five of the previously existing major orders are Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition (E.O. 13101), Greening the Government Through Efficient Energy Management (E.O. 13123), Developing and Promoting Bio-based Products and Bio-energy (E. O. 13134), Greening the Government Through Leadership in Environmental Management (E.O. 13148), and Greening the Government Through Federal Fleet and Transportation Efficiency (E.O. 13149).

The SPR has responded to these and the associated DOE guidance and implementation memoranda through several initiatives. One of these was the reorganization of the DM Environmental Department to increase efficiency and place added emphasis on key program areas. By rearranging and consolidating job tasks by function into new job descriptions and titles, Chemical Management, NEPA and Air Quality, Waste Management, Surface and Ground Water, Environmental Management Systems, Pollution Prevention, and General Environmental Analyst positions were established and filled. This arrangement of resources was successful as indicated by the accomplishments described elsewhere in this report.

DOE environmental staff includes a NEPA Compliance Officer, who also has responsibility for Pollution Prevention / Waste Management, and an Environmental Program Manager, whose responsibilities include Air Quality, Surface and Ground Water, and Environmental Management Systems.

The SPR follows and operates in conformance with numerous DOE Orders applicable to its operation. Two of the major orders include General Environmental Protection Program (450.1) and National Environmental Policy Act (NEPA) Compliance Program (451.1B). The orders establish some of the policies of the SPRPMO that help to ensure environmental stewardship is maintained.

2.1 COMPLIANCE STATUS (JAN. 1, 2003 THROUGH DEC. 31, 2003)

A major component of the SPR's compliance program is associated with meeting regulations under the Clean Water Act. At the beginning of the year, the SPR sites had a total of ninety five wastewater and stormwater discharge monitoring stations that remained unchanged during this period, and 35 active wetland permits authorizing various structures at each of the sites.

The SPR is also required to meet many requirements under the Clean Air Act and the Safe Drinking Water Act and conduct waste management activities in accordance with the Resource Conservation and Recovery Act (RCRA) and state guidelines.

The following sections highlight primary compliance activities at the SPR sites by environmental statute.

Clean Water Act (CWA)

The SPR sites comply with the CWA through permitting under the National Pollution Discharge Elimination System (NPDES) program, following the spill prevention control and countermeasures (SPCC) regulations, complying with the requirements of the Oil Pollution Act of 1990 (OPA), and complying with the wetlands usage program.

During 2003 the SPR submitted three minor noncompliances with state and federal water discharge permits to regulatory agencies under the permit self-reporting provisions. These noncompliances are discussed further in Sections 2.3 and 5.4.

The administratively complete renewal applications from 1993 for the Big Hill site and from 2000 for the Bryan Mound site, remained the authority for water discharges limited through the NPDES program throughout the majority of 2003 for the two Texas sites. Contact with the Regional Performance Track coordinator, made early in 2002, led to an intermittent effort by EPA Region VI permit writers to commence the arduous task of rewriting both of those expired but administratively extended permits. This processed continued into 2003 and resulted in the issuance of final permits for both sites in September 2003, effective November 1, 2003. In Louisiana, NPDES water discharge permits have been replaced with equivalent state permits (LPDES) under LDEQ's primacy granted in late 1999. Both

Louisiana sites' permits must be renewed with applications 180 days prior to their 5th anniversary/expiration dates. Therefore, one application must be prepared for CY2003 and another in CY2004.

The SPR maintains a Louisiana statewide permit from LDEQ for discharge of hydrostatic test water that minimizes permit-filing fees and increases flexibility in support of site construction and maintenance activities.

Since 1994, in addition to maintaining federal coverage, the two Texas SPR sites have operated under authority granted with Texas Pollutant Discharge Elimination System (TPDES) permits issued by the RCT, who has not yet received primacy from EPA. This coverage imposes some additional testing, reporting, and other administrative duties beyond the parallel Federal NPDES program. These permits were renewed in 1999.

Each SPR site complies with the Federal Spill, Prevention, Control, and Countermeasures (SPCC) regulations and in Louisiana with the state SPCC regulations by following a plan that addresses prevention and containment of petroleum and hazardous substance spills. All of the SPR spill plans are current in accordance with Title 40 CFR 112 and corresponding state regulations.

The SPR sites obtain permits from the U.S. Army Corps of Engineers and Coastal Zone Management representatives of the responsible state agencies whenever fill, discharge, or dredging occurs in a wetland.

During 2003, SPR projects occurred in jurisdictional wetlands in Louisiana and Texas requiring Corps of Engineers permit actions from the New Orleans and Galveston districts in addition to Coastal Zone Management approval (Department of Natural Resources – Coastal Zone Management in Louisiana and the General Land Office in Texas). Projects resulted from work involving maintenance dredging and spoil placement at the raw water intake structures (RWIS), bridge replacements, and pipeline or brine disposal line maintenance at the sites erosion control structure enhancements and modification, and traveling screen repairs and replacements.

Oil Pollution Act (OPA) of 1990

SPR emergency programs, planning, and management are guided by OPA 90 regulatory standards for onshore storage facilities, pipelines, and marine terminal facilities. SPR site Facility Response Plans (FRP) were developed to meet or exceed the requirement of OPA 90 and related state acts such as the Oil Spill Prevention and Response Act (OSPRA) in Texas. The plans were approved by the appropriate federal and state regulatory agencies. Since their approval, the FRPs have been combined with the site emergency response procedures (ERP) in accordance with the EPA one plan scheme. The Texas sites maintain their individual OSPRA certifications to present and respond to oil spills within the state.

The National Preparedness for Response Exercise Program (PREP) has been adopted and incorporated into the SPR Emergency Management

exercise program since 1994. SPR sites conduct emergency drills or hands-on training each quarter. A professional staff of emergency management exercise personnel from DM New Orleans conducts two equipment deployment exercises at each site annually. The annual site exercises include the participation of public and regulatory/governmental agencies.

The SPR has adopted the National Interagency Incident Management System (NIIMS), the response management system required by the National Oil and Hazardous Substances Pollution Contingency Plan. SPR site and New Orleans response management personnel have been trained in the unified Incident Command System and a team of selected New Orleans personnel is available to support extended site emergency operations when needed.

Safe Drinking Water Act (SDWA)

The SPR oil storage caverns and brine disposal wells are regulated by the SDWA. The EPA has given primacy under the SDWA to both Louisiana and Texas Underground Injection Control (UIC) programs, which regulate underground hydrocarbon storage, related brine disposal, and oil field wastes. The SPR operates 21 saltwater disposal wells for the Louisiana sites. In Texas, brine disposal is done through brine pipelines that extend into the Gulf of Mexico. Some ancillary commercial disposal wells are used occasionally. The 2003 Annual Report Form OR-1 was completed and submitted on schedule to the LDNR. Historic ground water evaluations have indicated the presence of shallow ground water impacts from salt water at the Bryan Mound and West Hackberry sites.

At Bryan Mound, more recently analyzed data suggests that pre-DOE use of unlined brine storage pits may have been a major contributor to the salt impacted ground water located east of the site's closed large brine storage pond.

The West Hackberry site negotiated a corrective action plan (CAP) for the leaking brine ponds with LDNR that was finalized in February 1992. Both of the separately permitted but contiguous brine ponds were replaced with above ground tanks during 1998, which left only implementation of the approved closure plan, which was completed in November 1999. The CAP required ground water recovery pumping, ground water monitoring, and submission of quarterly recovery monitoring reports. Early in 2001, these ground water recovery reports ended and were replaced with quarterly reports for a yearlong post-recovery-pumping period. All of the recovery pumping ceased at the end of March and on April 1st the yearlong evaluation began. In 2003, on the second anniversary of the year long evaluation a two-year summary was prepared and issued. In 1993, LDNR issued a requirement to continue to monitor certain wells for 30 years after closure of the three adjacent permanent anhydrite disposal pits in place. This requirement is currently met by monitoring quarterly and reporting annually in this SER.

In a parallel project, the approved brine storage pond closure plan was also implemented at Bryan Mound in 1999 and submissions of associated ground water data in annual SERs as requested by the Pits and Ponds enforcement group of RCT has continued.

A program to establish baseline ground water conditions at Weeks Island prior to making post-decommissioning comparisons was initiated in 1996 and maintained as planned until November 1999 when it was converted to post-decommissioning “detection” monitoring. This activity established background information about the groundwater and then transitioned to long-term ground water monitoring assurance. The original program involving four wells was expanded to include supplemental measuring points at the former east Fill-Hole location and a well located in the center of the former freeze plug established at the sinkhole No. 1 location. This sampling and testing program is referred to as Weeks Island Long-term (WILT) monitoring. Long-term ground water monitoring activities continued as required through 2003. In June 2001 the former sinkhole No. 1 reappeared after substantial thawing of the subsurface freeze plug had occurred. The sinkhole claimed (destroyed) the centermost freeze plug well (4270) by

August 2001 while routine monitoring at all other locations continued. Late in the CY 2002, routine sampling indicated the sporadic presence of total petroleum hydrocarbons (TPH) in several well locations above the historic method detection limits. Additional detailed investigations carrying over into CY 2003 utilizing a more specific gas chromatographic (GC) method document no impacts at the 1 mg/l level. The EPA method 8015 is now being transitioned to avoid the false positives suspected with interferences associated with the former wide-spectrum IR testing.

Potable water systems at Bryan Mound, Big Hill, and Bayou Choctaw are classified as "non-transient, non-community public water systems. The West Hackberry potable water system is part of the larger Hackberry public water system. Big Hill and Bryan Mound distribute purchased treated (chlorinated) surface water received from local purveyors. Bayou Choctaw produces, treats and distributes groundwater from a well on-site.

In 2003, drinking water samples were taken monthly at the three sites for total coliform testing by state-approved outside laboratories. Residual chlorine was also monitored weekly at Big Hill and Bayou Choctaw, and weekly residual chloramine monitoring was begun at Bryan Mound. Potable water at Bryan Mound and Bayou Choctaw have been tested for lead and copper repeatedly in previous years (most recently in 2002 and 2001, respectively) under state programs, and test results have prompted Bayou Choctaw to implement a corrosion protection program so that lead and copper concentration action thresholds are not exceeded.

Clean Air Act (CAA)

The SPR sites comply with the applicable provisions of the CAA and State Implementation Plans (SIP) through permitting with the state agencies having primacy (LDEQ and TCEQ) and following applicable regulations. All of the SPR sites are located in attainment areas for all National Ambient Air Quality Standards (NAAQS) pollutants with the exception of ozone. West Hackberry is located in an attainment area for ozone; therefore, the Prevention of Significant Deterioration (PSD) permitting program regulates it. Big Hill, Bryan Mound, and Bayou Choctaw are located in non-attainment areas for ozone; therefore, the New Source Review (NSR) permitting program applies. None of the SPR sites are considered to be major sources during normal operations under PSD, NSR, Title III hazardous air pollutant, or Title V operating permit regulations. All of the facilities operate in accordance with the provisions of the applicable state air permits.

Pollution Prevention Act of 1990 (PPA)

Each SPR site operates in accordance with a Storm Water Pollution Prevention Plan prepared in accordance with the EPA renewed multi-sector general storm water permits and similar Louisiana requirements. This multimedia document consolidates these regulatory agency requirements with the more general DOE Order 450.1. and E.O. 13148, which require a Pollution Prevention Program, and the related Waste Minimization and Solid Waste Management Plans.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

The SPR has not needed to conduct response activities pursuant to this act. DOE Order 5480.14 required all DOE-owned sites to evaluate compliance with CERCLA. The SPR completed DOE Phase I and II reports (similar to CERCLA's Preliminary Assessment and Site Investigation process) in 1986 and 1987, respectively. The reports assessed each site for the potential presence of inactive hazardous waste sites, and recommended no further action under CERCLA criteria. The DOE Phase I and II reports were submitted to EPA Region VI, and as a result all SPR sites are considered as No Further Remedial Action Planned (NFRAP) to reflect the findings in the reports.

Superfund Amendments and Reauthorization Act (SARA)

SARA Title III Tier Two reports, also known as Emergency Planning and Community Right-to-Know Act (EPCRA) Section 312 reports, were prepared and distributed as required by March 1st to state and local emergency planning committees and local fire departments. Tables 2-2 through 2-7 contain a summary of the inventory information that was submitted for CY 2003. The SPR continued to use an electronic format as required by the state implementing agencies for the preparation and submission of Tier Two Reports for the Louisiana and Texas sites.

SPR sites are required to report under EPCRA Section 313, by submitting Toxic Release Inventory (TRI) Form R when reporting thresholds, defined by emissions from crude oil placed in commerce, are exceeded. Specifically when crude oil is placed in commerce, it is considered to be repackaging of hazardous substances and must be reported. During CY 2003 there were no activities at the SPR that would have required the submittal of a TRI Form R.

Resource Conservation and Recovery Act (RCRA)

Hazardous wastes generated on the SPR are managed in strict compliance with state and EPA hazardous waste programs. The EPA has delegated the hazardous waste program to LDEQ in Louisiana. SPR Texas sites fall under the jurisdiction of the RCT, which has not yet received delegation; therefore, the SPR complies with both EPA and RCT regulations in Texas.

Large quantities of hazardous waste are not routinely generated at the SPR and the sites have in the past been typically classified as either Conditionally Exempt Small Quantity Generators (CESQG), or Small Quantity Generators (SQG). Hazardous wastes are not treated, stored, or disposed at the SPR sites and therefore, they are not RCRA-permitted treatment, storage, and disposal (TSD) facilities. Each site has an EPA generator number that is used to track the manifesting of hazardous waste for off-site treatment or disposal. None of the SPR sites are identified on the National Priority Listing (NPL) under CERCLA.

SPR non-hazardous wastes which are associated with underground hydrocarbon storage activities are regulated under the corresponding state programs for managing drilling fluids, produced waters, and other wastes associated with the exploration, development, production or storage of crude oil or natural gas. These wastes are referred to as Exploration and Production (E&P) wastes. Hazardous E&P wastes are exempted from RCRA, but Congress does not include the underground storage of hydrocarbons in the scope of the E&P criteria. However, under LA and TX regulations, E&P substances are included. For this reason, in order to remain in compliance with federal law, the SPR has not and will not dispose of hazardous waste under the "E&P" exemption rules. The SPR characterizes its E&P waste streams to determine if they exhibit hazardous characteristics, and any that do are managed and disposed as hazardous waste. The SPR does dispose of non-hazardous wastes generated by the E&P process at state approved E&P disposal facilities. All non-hazardous E&P wastes generated on the SPR during CY 2003 were recycled.

Other non-hazardous wastes, such as office wastes, are managed in accordance with state solid waste programs. The appropriate waste management strategy is based on the results of waste stream characterization.

During CY 2003, the only hazardous wastes that were shipped from the SPR sites were fluorescent bulbs in TX. There were no shipments of hazardous waste from the LA SPR sites. The hazardous waste that was generated consisted primarily of laboratory wastes (generated SPR site-wide), and fluorescent bulbs (generated at SPR Texas sites). During CY 2003, all SPR sites averaged hazardous waste generation rates well within the CESQG limits. Based on this CESQG status, the two Texas sites submitted Voluntary Notifications of Exemption Form 2003 Hazardous Oil and Gas Waste Reporting. Although the three Louisiana sites were also exempt from filing annual hazardous waste reports, there is no corresponding exemption report required for LDEQ.

The DOE and M&O contractor's corporate policies stress the SPR's commitment to waste management and environmental protection (Appendix B).

Toxic Substances Control Act (TSCA)

Friable asbestos is not present at SPR sites. Small amounts of nonfriable asbestos usually in the form of seals or gaskets are disposed of locally as they are taken out of service, in accordance with applicable solid waste regulations. Non-asbestos replacement components are used. No liquid-filled electrical equipment or hydraulic equipment currently used on the SPR has been identified as PCB equipment or PCB contaminated under TSCA. Procedures are in place to preclude or prohibit purchase of equipment containing either friable asbestos or PCBs.

National Environmental Policy Act (NEPA)

Over 650 documents that included design reviews, scopes of work, and purchase requests were evaluated for NEPA review in 2003. Out of these documents, only twenty two required NEPA categorical exclusion documentation. None of the projects associated with these documents had the potential to adversely affect any environmentally or culturally sensitive resources, such as structures of historic, archeological, or architectural significance or any threatened or endangered species or their habitat. Also, no wetlands were adversely impacted as a result of these actions. All of these NEPA reviews resulted in categorical exclusions that did not require further action.

During 2003, the SPR began preparation of a Supplement Analysis of the site-specific and programmatic EISs to determine if these documents continued to adequately address the environmental impacts associated with the current SPR mission and supporting activities. Scheduled for completion in early 2004, this document will result in a decision that either the current NEPA documentation is adequate, or that it is necessary to prepare a Supplemental EIS.

No Environmental Impact Statements (EIS) were initiated during CY 2003.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Much of the SPR property is developed with buildings, piping, cable trays, and other structures where the use of pesticide products is necessary to control unwanted vegetation and other pests. During CY 2003 several types of pesticide products were evaluated to assist the SPR sites with control of vegetation and maintenance of the security zone areas. Each pesticide product was thoroughly researched and evaluated for toxicity, persistence in the environment, and harm to non-target wildlife. All pesticide products were used in accordance with manufacturers' labels.

Endangered Species Act (ESA)

In a continuing effort to minimize disruption and provide suitable habitat to the existing migratory birds at SPR sites, bird-nesting areas are closed or otherwise protected during critical periods to prevent disturbance as a result of site operations. The F&WS is consulted in regard to appropriate actions taken that may affect migratory birds or threatened and endangered species. For example, the F&WS is consulted prior to the removal and relocation of nuisance wildlife.

As part of the conditional coverage obtained through the re-issued Multi Sector General Permit (MSGP), a required signatory on each Notice of Intent (NOI) precipitated a formal review of site-specific potential endangered species impacts. This was accomplished prior to finalizing the NOIs and involved an update/comparison step with original Environmental Impact Statements (EISs), with the current ESA lists, and a generalized evaluation or assessment of any potential impacts relating to or resulting from SPR storm water "sheet flow" run-off. No potential impacts were discerned.

National Historic Preservation Act (NHPA)

No site activities performed in 2003 required coordination with State Historical Preservation Offices. This review activity included the required similar NHPA review step for submission of the MSGP Notices of Intent as detailed in the previous ESA section. No places on or eligible to the National Register of Historic Places are located on or adjacent to SPR sites, with the exception of the Bryan Mound SPR site which is located on a Texas State Historical Place recognized since 1968 for its significance to the sulfur mining industry and long-term development of the nearby town of Freeport. A monument commemorates the historical significance of this location.

Federal Facilities Compliance Act (FFCA)

During CY 2003 none of the SPR sites generated any waste considered to be hazardous and radioactive (mixed waste). Therefore, this act did not apply to the SPR.

Atomic Energy Act of 1954

X-ray and other sealed radioactive sources are used at the SPR to perform analytical, monitoring and scanning activities. Conformance with this act is demonstrated by following state implementing agency radiation control regulations.

Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds and the Migratory Bird Treaty Act

The active storage facilities comprising the Strategic Petroleum Reserve are located in a variety of environs and migratory pathways along the Gulf Coast of Texas and Louisiana. As such, a variety of waterfowl and other nesting birds frequent our sites during a typical year. Environmental awareness of the migratory bird issues commences at the site level. Each site ES&H Manager implements site-wide surveillance, through others as appropriate, in the conduct of normal operations. Nests when discovered are flagged in the field for the nesting season (ex. Least Terns); equipment has been designated for limited/restricted use on occasion (ex. Mockingbird and Shrike nests); and utility poles slated for replacement/repair were deferred until woodpecker nesting had concluded. Each of these activities is an example of the close coordination maintained with local Fish & Wildlife representatives at our sites in fulfillment of their stewardship responsibilities.

Executive Order (E.O.) 11988 "Floodplain Management"

Since the inception of the SPR, compliance with E.O. 11988 has been maintained by complying with NEPA requirements, identifying potential environmental impacts, and obtaining permits through the COE and state coastal management agencies prior to any construction, maintenance, rehabilitation, or installation of structures and facilities.

Executive Order (E.O.) 11990 "Protection of Wetlands"

The measures that illustrate the SPR compliance with E.O. 11988 are also used to comply with E.O. 11990 and ensure that any practicable steps to minimize harm to wetlands are identified and taken.

Executive Order (E.O.) 13101, "Greening the Government Through Waste Prevention, Recycling and Federal Acquisition"

E.O. 13101 superceded and replaced E.O. 12873, but it retained the intent of the latter and strengthened its implementation through enhanced management requirements. One of the key programs in E.O. 13101 is Affirmative Procurement (AP), the purchasing of EPA-designated items (54 items listed under 8 categories) that contain recovered material. The DOE Affirmative Procurement Program ensures that items composed of recovered materials will be purchased to the maximum extent practicable, consistent with Federal Law and Procurement Regulations (RCRA 6002 and Federal Acquisition Regulations (FAR)). The SPR is committed to meeting the Secretary of Energy's goal of achieving 100 percent success in purchasing of AP products, restricting its procurement and tracking processes for purchase of affirmative procurement materials. In 2003, the SPR continued to incorporate AP specifications into contracts involving constructions projects. Affirmative Procurement success was 100 percent for CY 2003.

Executive Order (E.O.) 13148 "Greening the Government through Leadership in Environmental Management"

On April 21, 2000, E.O. 13148 superseded the pollution control plan requirements of E.O. 12088, "Federal Compliance with Pollution Control Standards". In accordance with all applicable pollution control standards, the SPR complies with E.O. 13148. These requirements were satisfied through implementation of the SPR Pollution Prevention Plan. The plan includes the SPR Pollution Prevention and Energy Efficiency Leadership Goals required by several executive orders and DOE memoranda, which include hazardous and non-hazardous waste reduction.

Between 1994 and 2003 the SPR reduced hazardous waste generation by 95 percent, down to 0.38 mt (0.42 tons). The CY 2003 reduction rate is slightly higher than that of CY 2002 due to the increased frequency of laboratory analysis as the result of oil fill operations at the SPR. With the exception of laboratory waste, other waste streams at the SPR continued to be reduced due to increased awareness, surveillance, management participation, and waste minimization efforts on the part of all SPR employees. Figures 2-1 and 2-2 illustrate how the waste generation rate decreased well below the fiscal year's target of 3000 lbs by the end of FY 2003 and the reduction of hazardous waste since 1994.

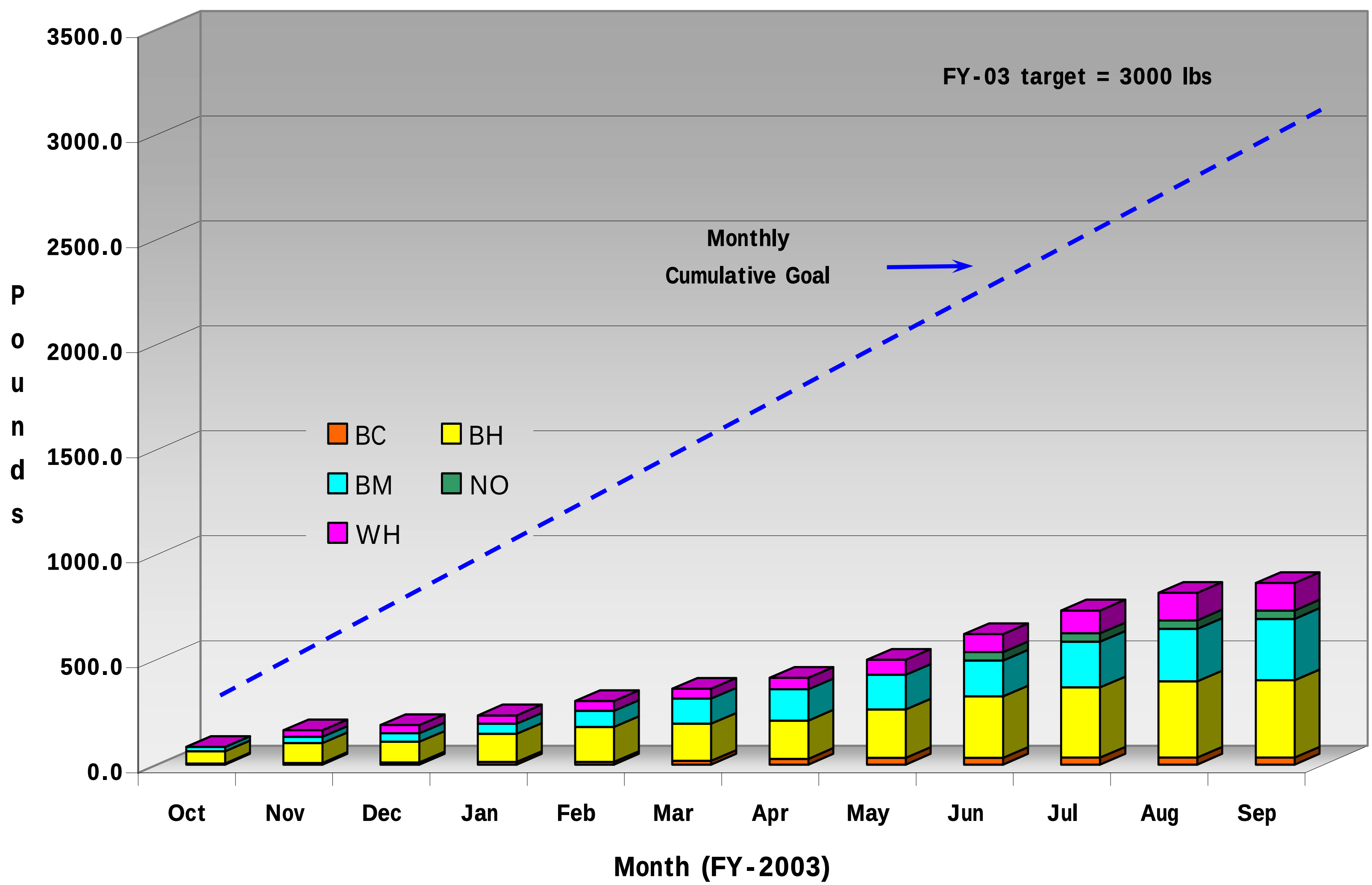


Figure 2-1. FY 2003 Monthly Hazardous Waste Generation

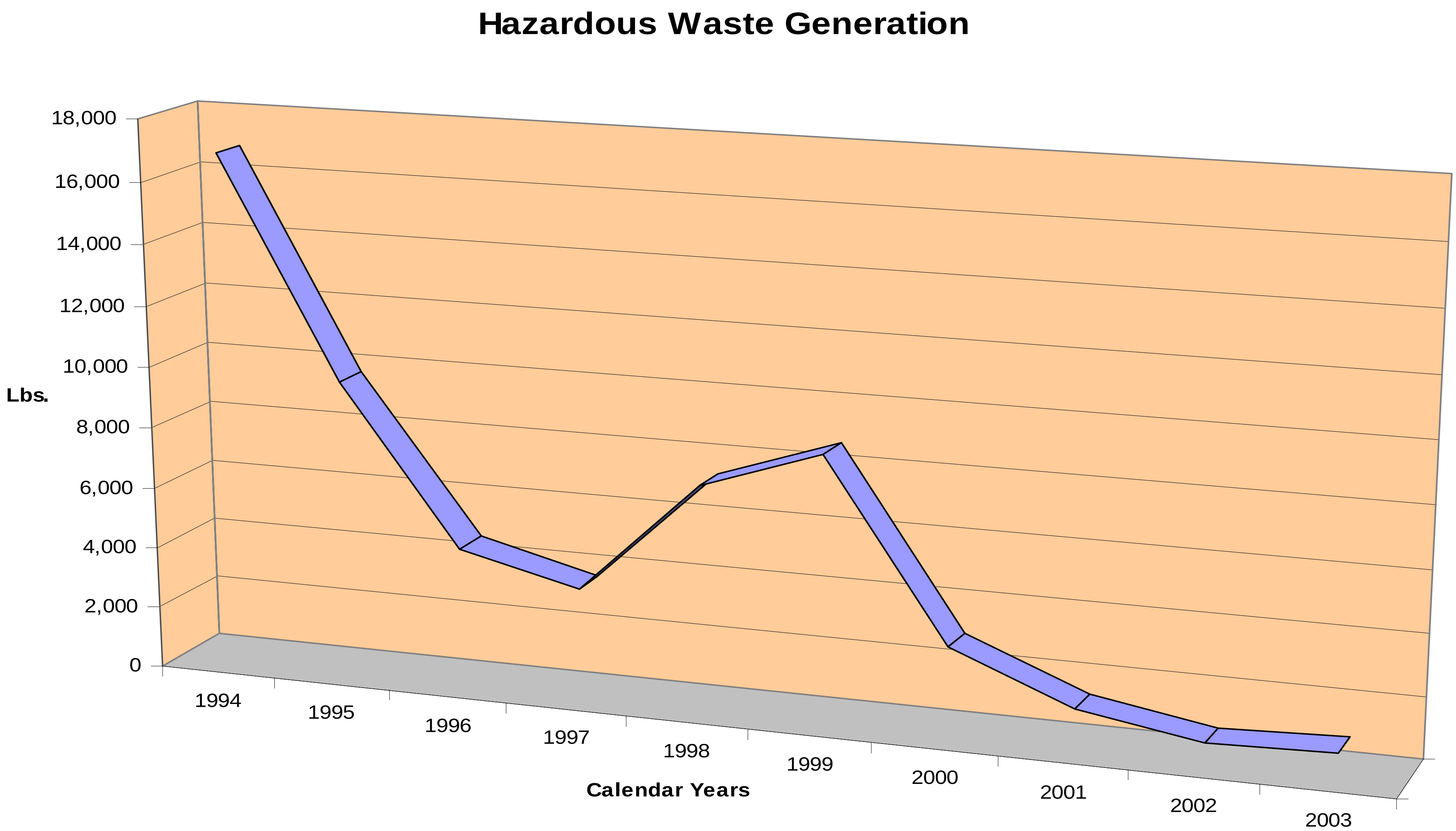
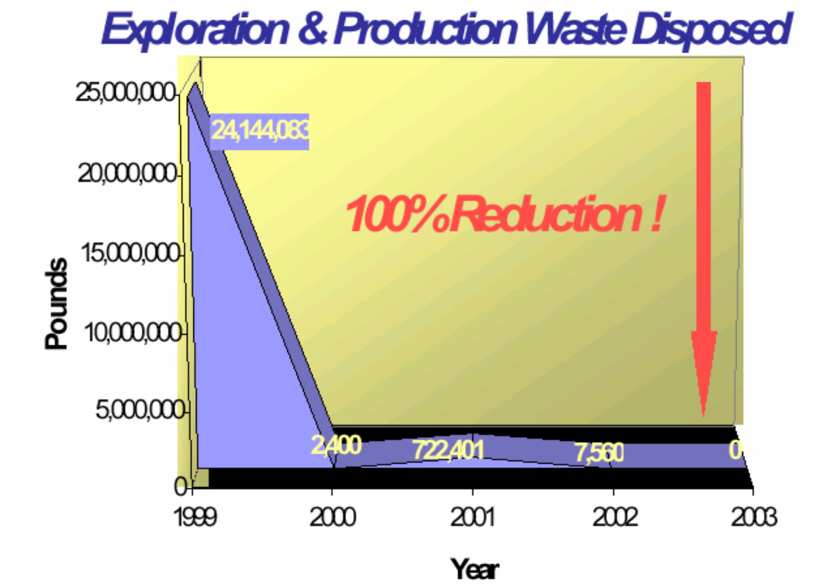


Figure 2-2. SPR Hazardous Waste Generation CY 1994 to CY 2003

The SPR takes an environmental leadership role by striving to eliminate or reduce all SPR waste streams at the source whenever possible.

In CY 2003, the SPR recycled 113,549 lbs of paper as compared to 99,350 lbs in 2002. A decrease in paper purchased combined with an increase of all paper recycled indicates progress in increasing source reduction and recycling efforts for the SPR. The SPR Procurement Directorate eliminated the need for hardcopies for sole source justification, GSA/GWAC, authorization letters, contractual agreements and or/insurance certificates in 2003. The original document is scanned and linked into an electronic database (SAP), eliminating the need for hardcopy. This project was recognized as a pollution prevention accomplishment saving $44,839 in labor, storage, and supplies.

In CY 2003, 3,845,815 lbs of E&P wastes were generated as a result of routine site operations such as pond or tank cleanouts and disposal well sandlift operations. After testing determined the non-hazardous nature of these wastes, all 3.8 million pounds (100 percent) were recycled by use of a production process known as landfarming.



This is a significant improvement from FY2001 when 48 percent of the SPR's E&P waste was recycled or diverted with a 52 percent disposal rate.

Pollution prevention is integrated into the SPR mission through policies, procedures, instructions, performance measures, and standards. This was accomplished by: updating the goals and training, computerizing the regulatory tracking, self-assessments, and continual improvement priority planning. Pollution prevention is also integrated into the Behavioral Safety process at all sites by including pollution prevention behaviors in the critical behavior inventory list. To heighten employee pollution prevention awareness and behavioral safety, observers "observe" the work force and note defined pollution prevention behaviors providing positive reinforcement for those beneficial behaviors.

In CY 2003 DynMcDermott received three Louisiana Environmental Management Awards at the highest Excellence

Level, from the Louisiana Quality Foundation for the Bayou Choctaw, New Orleans, and West Hackberry sites. The award recognizes leadership in environmental management.

In CY 2003 the SPR Bryan Mound site was recognized by the Texas Commission on Environmental Quality for 0 coliform

non-compliances over a 5-year period for a public water supply. This was an unsolicited recognition by the agency.

The SPR was recognized for “Integrating Environmental Management into Business Systems” by the National Association of Environmental Professionals (NAEP) at their Annual Conference with a National Environmental Excellence Award. Bill Bozzo (DynMcDermott Environmental Manager) is pictured accepting the award on behalf of the SPR from Cynthia Fridgen, NAEP President.

During CY 2003, the process of screening purchase requests against the SPR Qualified Products List and the Affirmative Procurement guidelines continued to assure that products purchased met environmental criteria established to reduce waste, toxicity and ensure purchasing of EPA-designated and environmentally friendly products.

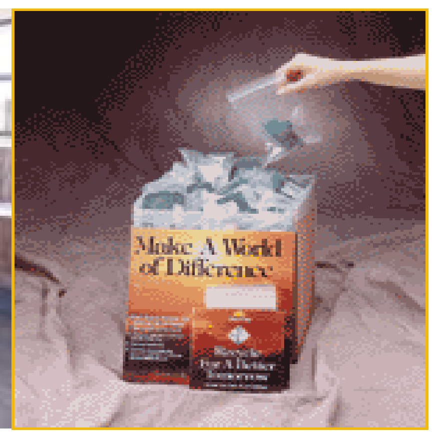
The requirements of E.O. 13148 and SPR consolidated P2/E2 initiatives required by E.O. 13123 “Greening the Government Through Efficient Energy Management” are delineated in Table 2-1.

One of the DOE Energy Efficiency and Pollution Prevention (E2P2) Leadership Goals requires that the SPR reduce hazardous waste from routine operations by 90 percent by the year 2005. Eliminating hazardous waste generated from mercury-containing fluorescent lamps is included as part of this goal. The steps to reduce waste included the following:

1) Purchase only Phillips ALTO (green) bulbs that appear on the approved Qualified Products List. Other vendor literature proclaiming bulbs to be green are not certified nor approved for purchase.
2) Seek purchase approval from NOLA Chemical Management Specialist on unusual sized bulbs that may not be available as ALTO.
3) Specify ALTO bulbs or request no bulbs when purchasing equipment. This will eliminate the possibility of hazardous bulbs being delivered with equipment.
4) In Texas, segregate the spent bulbs. Report the number and weight of hazardous as well as "green" bulbs monthly to the NOLA Waste Specialist.
5) Fluorescent bulbs are recycled through a lamp recycling vendor. In addition, incandescent bulbs, flood lamps, and non-PCB light ballasts can also be recycled.

A Pollution Prevention Opportunity Assistance visit was conducted by DOE Fossil Energy at Bayou Choctaw in June 2003. The purpose of the visit was to evaluate SPR P2 and E2 Leadership Goals and examine the possibility of developing new projects to achieve goals.

The SPR Toner Cartridge Recycling Team concluded with senior management's approval to proceed with implementation



in August 2003. The SPR expanded its laser toner cartridge program to other consumables, including the color inks.

A third party vendor, Recycle First was chosen as the designated recycling contractor. While the team's mission was to reduce sanitary waste through recycling, it will reap an additional benefit. The improved process is anticipated to save approximately \$11K per year in man-hours and postage by outsourcing to Recycle First.

There will also be an estimated monetary return of $1,000 per year for cartridges that are recycled.

Table 2-1. SPR P2 and E2 Leadership Goals

	SPR POLLUTION PREVENTION AND ENERGY EFFICIENCY LEADERSHIP GOALS	**2003 ACTION TO REACH TARGETED GOALS**
1	Reduce Hazardous Waste from routine operations by 90 % by 2005, using a 1993 baseline.	• Continued to implement recommendations of the Lab Waste Team Project to reduce hazardous waste on the SPR. • Revisited Fluorescent Lamp Team of 1999 and expand recycling of lamps, bulbs and fixtures where feasible. • Continued to implement procedures and recommendations from Paint Waste Team. • Updated Environmental Instruction (s) where applicable • Made improvements to the SPR Qualified Products List • Proposed a Bench Stock Contract and Chemical Purchasing Team under PID • Communicated with consultants to provide product substitution analyses. • Developed and expand ESH webpage to improve communication of HW generation. • Followed through on E2P2 Plan listed items to verify compliance. • Prepared Annual Waste Min and P2 Progress Report to DOE in Nov 2003. • Tracked P2 accomplishments through year • FY Target 3,000 lbs (1.36 metric tons) • 1993 baseline = 5390 lbs or 2.44 metric tons.
2	Reduce releases of toxic chemicals subject to Toxic Chemical Release Inventory (TRI) reporting by 90% by 2005, using a 1993 baseline.	TRI reporting is not applicable since the reporting occurs only during the SPR crude oil movement as required to meet SPR mission objectives. In the baseline year of 1993, no TRI Report was required.

Table 2-1. SPR P2 and E2 Leadership Goals (continued)

	SPR POLLUTION PREVENTION AND ENERGY EFFICIENCY LEADERSHIP GOALS	2003 ACTION TO REACH TARGETED GOALS
3	Reduce sanitary waste from routine operations by 75% by 2005 and 80% by 2010 using a 1993 baseline.	• Continued effort for further reduction through implementation of goal 4. • Continued to work with sites to get more items out of the trash and into recycling (cans and cardboard). • Communicated with counterparts routinely to emphasis cost associated with waste reduction. • Followed through on E2P2 Plan to assure compliance. • Developed and promoted improved method for communication and collecting sanitary waste numbers. Develop and expand ESH webpage. • FY 03 Goal = 2,482,942 lbs. (1126 metric tons) • 1993 baseline = 6,816,508 lbs or 3,090 metric tons.
4	Recycle 45% of sanitary waste from all operations by 2005 and 50 percent by 2010.	• Finished Cardboard Baler Project at BM and continue tracking success at NO. • Participated in at least one other recycling promotional (Mardi Gras Bead or Telephone Book Recycling) • Updated budget and renewed the contract for NOLA recycling program. • Proposed Toner Cartridge Recycling Team through PID program. • Utilized various media to promote recycling and reuse (SPR banner and newsletter). • Worked with sites to improve their specific recycling programs. • Prepared Annual Waste Min and P2 Progress Report to DOE in Nov 2003. • Followed through on E2P2 Plan to assure compliance • 2003 Goal = 15% was achieved and exceeded • Budgeted: $8K for NOLA recycling contract
5	Reduce waste resulting from cleanup, stabilization, and decommissioning activities by 10 % on an annual basis.	Not Applicable – cleanup, stabilization, decommissioning activities are not ongoing activities at the SPR.

Table 2-1. SPR P2 and E2 Leadership Goals (continued)

	SPR POLLUTION PREVENTION AND ENERGY EFFICIENCY LEADERSHIP GOALS	2003 ACTION TO REACH TARGETED GOALS
6	Increase purchases of EPA-designated items with recycle content to 100%, except when not available competitively at reasonable price or do not meet performance standards.	The Affirmative Procurement (AP) procedure is to ensure the purchase of AP items unless there is written justification that the product is not available competitively, within a reasonable time frame, does not meet appropriate performance standards, or is available only at an unreasonable price. AP items that have a MSDS are included on the Qualified Product List that is used for daily purchases. • Updated the Guidance and vendor list to assists the buyer in achieving AP purchases. An AP library was expanded in public folders. • A success rate of 100% was achieved in 2003. Work Authorization Directive (WAD) targets were increased to a minimum of 95% and a maximum target of 100%. • Advanced Affirmative Procurement Training was provided to all owners of the procurement process.
7	Reduce energy consumption through life-cycle cost effective measures by: • 40% by 2005 and 45% by 2010 per gross square foot for buildings, using a 1985 baseline. • Revised 1985 baseline of 4,943,309 kWhs.	FY 2003 Projection =12.00% at 4,350,112 kWhs NEW ORLEANS BUILDINGS (850 South Clearview and 900 East Commerce) • Finished installation light sensors for offices, hallways, and restrooms. • Installed fluorescent lighting reflectors. • Conducted annual balancing of the air conditioning and heating systems in the New Orleans buildings is recommended to conserve energy.
		Note: As the New Orleans buildings are all leased, there is a limited performance period which limits life cycle cost analysis and which also may limit achieving a 40% reduction by FY 2005. Increased occupancy by 35% in building 850, due to elimination office space at 800 building, will offset savings in energy consumption that would otherwise have been realized.
		The electrical power consumption of the field sites (as measured in kilowatt-hours) comprises this measure. The power consumption of the field sites will be far more dependent on the operating mode of the SPR (the requirement to draw down oil, fill with oil, redistribute oil, or conduct operational tests) than on the effort to improve the efficiency of the equipment and the buildings. Nevertheless, efforts to improve the efficiency of the process and the buildings continue.)

Table 2-1. SPR P2 and E2 Leadership Goals (continued)

	SPR POLLUTION PREVENTION AND ENERGY EFFICIENCY LEADERSHIP GOALS	2003 ACTION TO REACH TARGETED GOALS
7 (cont.)	• 20 percent by 2005 and 30 percent by 2010 per gross square foot, or per other unit as applicable, for laboratory and industrial facilities, using a 1990 baseline of 35,283,191 kWhs	**METERED PROCESS (SPR storage sites: BC, WH, BH and BM)** • Completed site security outdoor controls at BM (BM-MM-407), BH (BH-MM-406), WH (WH-MM-405), and BC (BC-MM-404) in fall 2002 • BH lighting upgrades are scheduled for installation in FY2003. • BC HVAC temperature control upgrade, air conditioning building upgrades and lighting upgrades are scheduled for installation in FY2004. Design to begin in 2003 in buildings 401, 402 and 413 (BC-MM-400) • BM HVAC temperature control upgrade, air conditioning building upgrades and lighting upgrades are scheduled for installation in FY2005-6. The AC was replaced in building 210 in FY 2003. • WH air conditioning building upgrades and lighting upgrades are scheduled for installation in FY2005. • BH airlock vestibules, HVAC temperature controls, and air conditioning building upgrades are scheduled for installation in FY2007. • Undefined energy efficiency task is scheduled for all four SPR storage sites in FY2007. • BM project to insulate the property warehouse (building 202) roof and walls. • Began the effort to break out hotel load to meet DOE mandates and EO 13123 or to obtain new DOE directive if project is cost prohibitive. $50K carried forward to FY 2003 for this effort
8	Increase the purchase of electricity from clean energy sources: a) Increase purchase of electricity from renewable energy sources by including provisions for such purchase as a component of our request for bids in 100% of all future DOE competitive solicitations for electricity. b) Increase the purchase of electricity from less greenhouse gas-intensive sources, including, but not limited to, new advanced technology fossil energy systems, hydroelectric, and other highly efficient generating technologies.	The SPR is served by two commercial electrical power utility companies: Entergy (Bayou Choctaw, West Hackberry, and Big Hill) and Reliant Energy (Bryan Mound). There are currently no other options for purchase of power in the region. The SPR purchases power from these companies in accordance with tariffs that are approved by the Public Service Commission of Louisiana or the Public Utility Commission of Texas, and neither Entergy nor Reliant has available tariffs for purchase of "Green" power. Future purchases of electrical power will include provisions for Green Power should such power become available.

Table 2-1. SPR P2 and E2 Leadership Goals (continued)

	SPR POLLUTION PREVENTION AND ENERGY EFFICIENCY LEADERSHIP GOALS	2003 ACTION TO REACH TARGETED GOALS
9	Retrofit or replace 100% of chillers greater than 150 tons of cooling capacity and manufactured before 1984 that uses class I refrigerants by 2005.	Not applicable as the SPR does not have chillers greater than 150 tons capacity.
10	Eliminate use of class I ozone depleting substances by 2010, to the extent economically practicable, and to the extent that safe alternative chemicals are available for DOE class I applications.	DM Halon Disposition Report details plans to eliminate Halon at SPR sites by 2010. • 2,048 pounds of Halon was removed in 2003. • There are no other class I ozone depleting substances on the SPR.
11	Reduce greenhouse gas emissions attributed to facility energy use through life-cycle cost-effective measures by 25% by 2005 and 30% by 2010, using 1990 as a baseline.	Not Applicable. The only greenhouse gas emissions attributed to facility energy use is from emergency equipment (diesel generators, diesel pumps). They are only used for power generation during an emergency, which is considered an upset condition and not applicable.
12	Reduce our entire fleet's annual petroleum consumption by at least 20% by 2005 in comparison to 1999, including improving the fuel economy of new light duty vehicle acquisitions, and by other means.	• Continued with replacement of older vehicles with compact and subcompact vehicles. • Continued with replacement of existing vehicles with new alternative fuel vehicles. • Conducted analysis for feasibility of fueling station for alternative fuel at BC, BH, BM, and WH • Continued to track usage of LPG (propane) vs. gasoline. • Have in place a contractor for "fuel delivery" once a week of propane to service alternative fuel vehicles NOTE: Due to recent security enhancements that include purchasing additional non-alternative fuel vehicles, achievement of the targets may be hindered. • Baseline1999- 158,140 gallons of petroleum fuel was consumed.
13	Acquire annually at least 75% of light duty vehicles as alternative fuel vehicles (AFV), in accordance with the requirements of the Energy Policy Act 1992.	An approved program is underway to replace existing gasoline vehicles with alternate fuel vehicles. The approved plan achieves 75 percent of vehicle replacements as alternate fuel vehicles (LPG2 ½ ton pick up trucks) over the next five years. • Completed purchase of electric vehicles except where scooter replacement is not feasible. In 2003 electric vehicles on the SPR totaled to 34. • Developed WAD for electric vehicles. • Continued with leasing of GSA vehicles that are alternate fuel. (LPG) NOTE: Due to recent security enhancements, which include purchasing additional non-alternative fuel vehicles, achievement of the targets may be hindered.

Table 2-1. SPR P2 and E2 Leadership Goals (continued)

	SPR POLLUTION PREVENTION AND ENERGY EFFICIENCY LEADERSHIP GOALS	2003 ACTION TO REACH TARGETED GOALS
14	Increase usage rate of alternative fuel in departmental alternative fuel vehicles to 75% by 2005 and 90% by 2010 in areas where alternative fuel infrastructure is available.	• Continued to replace gasoline vehicles with alternative fuel vehicles (AFV). • Evaluated the option of implementing LPG fueling stations. Projected 2004 installation date was tabled. • In the interim established a contract for delivery of LPG weekly for filling of AFV. NOTE: The use of alternative fuel vehicles would involve high costs, making them unlikely to be acceptable in New Orleans. In addition, the New Orleans area does not presently have alternative fuel infrastructure. Alternative fuel vehicles are being purchased at other SPR sites with a contractor making deliveries of LPG for fueling.

Membership in EPA's Performance Track Program

In mid-2000 EPA implemented the National Environmental Performance Track Program in response to E.O. 13148. The program promotes and recognizes outstanding environmental management performance in agencies and facilities. The SPR applied for membership soon after the program was announced and all 5 SPR facilities were accepted as part of 228 charter members named nationwide. Member facilities are top environmental performers who systematically manage environmental responsibilities, reduce and prevent pollution, and are good corporate neighbors. They have working environmental management systems, are committed to continuous improvement, public outreach, and performance reporting, and have achieved a record of sustained compliance with environmental regulations.

In recognition of their environmental achievements, Performance Track members are rewarded with recognition, access to state of the art information, and regulatory and administrative flexibility.

In its application, the SPR agreed to make the following four performance commitments over the next three years:

1. Reduce hazardous solid waste by 960 lbs.
2. Reduce storage/usage of Halon 1301 by 1356 lbs.
3. Reduce solid waste through increased recycling to less than 351 tons per year.
4. Reduce emissions of greenhouse gases, VOCs, NO_X, SO_X, PM_{10}, and CO by at least 9.9 tons through elimination/replacement of gasoline fleet vehicles with gasoline/propane and electric equivalents.

Performance Track members must complete an annual performance report that documents their progress toward meeting the performance commitments. The reports for CY 2001 and 2002 are available to the public at the EPA website www.epa.gov/performancetrack. They include information on facility assessments and inspections, corrective actions taken as a result of assessments and inspections, community outreach, and success in meeting the four commitments. Success in meeting the commitments in CY 2003 is discussed as follows.

The commitment for reducing hazardous waste was surpassed during all three years of the three-year commitment. Hazardous waste generation was reduced to 1364 pounds in CY 2001, decreased further to 706 pounds in CY 2002, and rose slightly to 847 pounds in CY 2003 - well below the not-to-exceed 3,000-pound performance commitment. Over the past three years great effort has been made in reducing paint waste. No paint waste was generated in CY 2003 although painting continued. Crude oil lab waste and old-style (high mercury content) spent fluorescent bulbs became the primary contribution to hazardous waste generation in

CY 2003. Lab waste has been reduced through source reduction – reduction in sampling frequency and required tests – with no loss in program quality or integrity. Old-style spent fluorescent bulbs are classified as hazardous waste in Texas. Efforts are underway to replace these bulbs with newer-style non-hazardous (lower mercury content) equivalents.

A total of 2,048 pounds of Halon 1301 were removed in CY 2003, exceeding the three year commitment of 1356 pounds by 1.5 times. All Halon remaining on the SPR will be removed in CY 2004.

Solid waste (excluding E&P wastes) reduction through recycling, waste minimization, and reuse continues to escalate. The not-to-exceed goal of 1,133 metric tons generated per fiscal year was handily surpassed in FY 2003 (203.9 metric tons generated). The increase is attributed to identifying and segregating significant waste streams that can be recycled, such as cardboard, concrete, scrap metal, and wood pallets. All exploration and production waste generated in 2003 was recycled, rather than disposed.

An almost 10 ton reduction of fleet vehicle emissions (NO_X, CO, SO_2, PM_{10}, and VOCs) began in CY 2001 through the replacement of gasoline-powered scooters and light duty trucks with electric scooters and dual fuel (gasoline/propane) trucks. Despite more miles driven in CY 2002, more emissions were avoided (10.2 tons) when 19 additional scooters were replaced with electric equivalents (28 total) and 11 additional trucks (19 total) were replaced with dual fuel equivalents. Six more electric scooters were added to the fleet in CY 2003, and 12.4 tons of emissions were avoided. Although emissions avoided by burning propane in the dual fuel trucks were not significant, effort was made to burn propane before switching to gasoline. Propane was delivered to the Big Hill site for refueling, and trucks at West Hackberry were refueled when they were driven to town. A local off-site source of propane was not readily available for trucks used at Bayou Choctaw and Bryan Mound.

E.O. 13148 also replaced E.O. 12856, "Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements." This order was revoked and replaced in April of 2000 by Executive Order 13148, “Greening the Government Through Leadership in Environmental Management.” Tables 2-2 through 2-6 provide a summary of 2003 SARA reporting for each site. Offsite SPR pipelines in Louisiana containing crude oil were reported separately from SPR sites (Table 2-7). There were no extremely hazardous substances in excess of the Threshold Planning Quantity (TPQ) in 2003, negating the possibility of reportable releases under that category.

EPCRA, Section 313, regulations require applicable facilities to complete an annual TRI Form R Report. These regulations now apply to facilities with Standard Industrial Classification (SIC) Code 5171 that process, or otherwise use any listed toxic chemical in quantities above specific threshold limits in a calendar year. EPCRA section 313 requires SPR sites, as SIC code 5171 facilities to report when placing sufficient quantities of product in commerce. During CY 2003 the SPR did not conduct any activities that would require submission of the TRI form R and forwarded appropriate notification correspondence to the EPA, TCEQ, and LDEQ to ensure compliance.

International Organization for Standardization (ISO 14001) Certification

On May 19, 2000, the DM environmental management system (EMS) was evaluated by an independent registrar and found in conformance with the International Organization for Standardization 14001 standard. In accordance with ANSI-RAB requirements, the EMS must be recertified every three years. A recertification audit was completed by an independent registrar on May 15, 2003, and no non-conformances were found. Certification of the EMS was continued and later verified with a semi-annual surveillance audit conducted by a registrar in November. No non-conformances were identified in that audit as well.

DOE Order 435.1, “Radioactive Waste Management”

There are no processes that generate radioactive wastes at any of the SPR sites and therefore this order does not apply.

DOE Order 5400.5, “Radiation Protection of the Public and the Environment”

In addition to the X-ray sources used in equipment the SPR does subcontract work where sealed radioactive sources are used in monitoring activities. This topic is addressed in Section 4 of this report.

Table 2-2. 2003 Louisiana SARA Title III Tier Two Summary at Bayou Choctaw

Chemical Name (Category)	* Max Daily Amt (lbs.)	Location
Bromotrifluoromethane	1,000 - 9,999	Building 401
Crude oil, petroleum	> 1 billion	Site tanks, piping, and underground caverns. Flammable Storage Building
Diesel fuel #2	10,000 - 99,999	Emergency generator fuel tank, Property tank # 2, Wescorp Storage, Workover Rig Yard, Kostmayer Laydown Yard
FC-203CE Lightwater Brand AFFF	10,000 - 99,999	Foam storage building
FC-203CF Lightwater Brand AFFF	1,000 – 9,999	Foam deluge building
Flogard POT805	100 – 999	Potable Water Building
Gasoline	10,000 - 99,999	Property tank # 1, Kostmayer Laydown Yard
Gas, Oxygen	100 – 999	Environmental Lab, Cylinder rack, Wescorp Storage, Kostmayer Laydown Yard
Monsanto Rodeo Herbicide	1,000 – 9,999	Property Warehouse, Flammable Storage Building
Motor Oil	1,000 - 9,999	Bench stock, Flammable storage building, Flammable storage cabinet, High pressure pump pad, Maintenance bay, Property flammable cabinet, Wescorp Storage, Workover Rig Yard
Paints, flammable or combustible	1,000 – 9,999	Wescorp Storage, Workover Rig Yard
Red River 90 Spray Adjuvant Herbicide	100 – 999	Flammable storage building, Property warehouse

Table 2-2. 2003 Louisiana SARA Title III Tier Two Summary at Bayou Choctaw (Continued)

Chemical Name (Category)	* Max Daily Amt (lbs.)	Location
Silica, Crystalline Quartz	10,000 – 99,999	Wescorp Storage
Simple Green Cleaner/Degreaser/Deodorizer	100 – 999	Benchstock Property Warehouse
Sodium Chloride	1,000 - 9,999	Potable water building
Sodium Hypochlorite Solution	100 - 999	Potable water building

* Reporting range specified by LA SARA Title III Tier Two Reporting Requirement

Table 2-3. 2003 Texas SARA Title III Tier Two Summary at Big Hill

Chemical Name (Category)	* Max Daily Amt (lbs.)	Location
Ammonium Bisulfite, solution	10,000 - 99,999	Brine pad, Raw water injection pad, Equipment Pad
Ansulite 3% AFFF AFC-3A	10,000 – 99,999	ERT Pad, Fire Truck, Foam Bldg. BHT-16
Crude oil, petroleum	> 1 billion	Site tanks, piping, and underground caverns. BHT-7, BHT-10
Diesel fuel	10,000 - 99,999	BHT-11, BHT-51, Rental Tank, BHT-50, BHT-4, BHSE-46-1, BHSE-46-2, Degas Construction Area, Big Hill Diesel Tank, Workover Rig Yard, Tank Inside Building
FC-600 Lightwater Brand ATC/AFFF	10,000 - 99,999	Boat Shed, ERT Pad, Foam Building (BHT-16),
Gasoline	10,000 - 99,999	BHT-52, Big Hill Unleaded Gas Tank, Big Hill Diesel Tank
Motor Oil	10,000 – 99,999	Benchstock, Drum Storage, Flammable Storage Building 817, Property Warehouse, RWIP, RWIS, Workover Rig Yard

*Reporting range specified by Texas SARA Title III Tier Two Reporting Requirement

Table 2-4. 2003 Texas SARA Title III Tier Two Summary at Bryan Mound

Chemical Name (Category)	*Max Daily Amt (lbs.)	Location
Crude oil, petroleum	> 1 billion	Site Tanks, Piping, and Underground Caverns
Diesel fuel	10,000 - 99,999	Fuel Tank Area
FC-203CF Light Water Brand AFFF	100,000 - 999,000	AFFF Fixed systems, Storage and Mobil units
Gasoline	10,000 - 99,999	Fuel Tank Area
Motor Oil	10,000 – 99,999	Bldg. 202, Bldg. 235-T, Bldg. 243, Bldg. 244, Property Warehouse, I&E Shop, Paint Shed, C Storage Laydown Yard, Diked Area

* Reporting range specified by Texas SARA Title III Tier Two Reporting Requirement

Table 2-5. 2003 Louisiana SARA Title III Tier Two Summary at New Orleans Warehouse

Chemical Name (Category)	*Max Daily Amt (lbs.)	Location
Antifreeze Compound	1,000 – 9,999	East Wall of RPX Warehouse
Diesel fuel #2	1,000 – 9,999	Above Ground Tank, Air Compressor Trailers, Warehouse Fire Cabinet 1
Motor Oil	1,000 – 9,999	Fire Cabinet 3, Fire Cabinet 5, Fire Cabinet 6, RPX Warehouse

* Reporting range specified by LA SARA Title III Tier Two Reporting Requirement

Table 2-6. 2003 Louisiana SARA Title III Tier Two Summary at West Hackberry

Chemical Name (Category)	*Max Daily Amt (lbs.)	Location
Bromotrifluoromethane	1,000 - 9,999	Building 301
Crude oil, petroleum	> 1 billion	Warehouse E, Site tanks, piping, underground caverns, Lake Charles meter station piping
Diesel fuel #2	10,000 - 99,999	Fuel Pump Tank, Work over Rig, Maintenance Lay down Yard
FC-203CF Light Water Brand AFFF	10,000 – 99,999	Foam Storage Bldg.
FC-600 Lightwater Brand ATC/AFFF	10,000 - 99,999	Foam Storage Building, Site Fire Systems
Gasoline	10,000 - 99,999	Fuel Pump Tank, Maintenance Lay down Yard LSW Lay down Yard
Monsanto Rodeo Herbicide	100 - 999	Flammable Storage Building
Motor Oil	10,000 - 99,999	Workover Rig, Flammable Storage Building, HPPP Flammable Cabinet, Slop Oil Pad, Warehouse D, Armory – MCC, OCB 5KB Substation, Main Gate, Workover Rig Yard
Oil Base Sweep EZ Floor Sweep	100 – 999	Warehouse A, Warehouse D
Paints, flammable or combustible	1,000 – 9,999	Flammable Storage Building, Laydown Yard, Laydown Yard, Workover Rig Part House, Workover Rig Yard, Field Trailer
Portland Cement	1,000 – 9,999	LSW Laydown Yard
Silica, crystalline-quartz	1,000 - 9,999	Paint Laydown Yard

* Reporting range specified by LA SARA Title III Tier Two Reporting Requirement

Table 2-7. 2003 Louisiana SARA Title III Tier Two Summary in Offsite Pipelines

Chemical Name (Category)	*Max Daily Amt (lbs.)	Location
Crude oil, petroleum	50,000,000 - 99,999,999	Off-site pipelines in Calcasieu Parish, LA (West Hackberry)
Crude oil, petroleum	10,000,000 - 49,999,999	Off-site pipelines in Cameron Parish, LA (West Hackberry)

* Reporting range specified by LA SARA Title III Tier Two Reporting Requirement

2.2 MAJOR ENVIRONMENTAL ISSUES AND ACTIONS

Gassy Oil

When SPR crude oil is brought to surface facilities, methane gas (non-regulated) that has migrated from the salt in the salt dome can release stripping regulated pollutants (VOC) into the atmosphere. Also, geothermal processes raise the crude oil temperature and can elevate the true vapor pressure (TVP) to a point where it is above the regulatory limits for storage in floating roof tanks, potentially affecting some of the SPR sites and receiving commercial terminals. The SPR first confirmed this phenomenon in 1993. The best option was to blend crude oil that had methane gas removed from it with other untreated oil during draw down in order to minimize the impact to air quality. The SPR conducted an operation from 1995 to 1997 to separate and remove gas. Due to the amount of gas regained, DOE and DM began readdressing the gassy oil phenomenon in 1999, planning for a second degas cycle of the next several years. Degas air permits for Big Hill and Bryan Mound were obtained from TCEQ in 2002 and construction was initiated at Big Hill. During CY 2003 construction for the Degas Unit continued throughout the year. Activities that involved environmental issues were coordinated with the respective disciplines in the environmental department.

St. James Soil Clean-Up

A due diligence inspection was conducted at St. James Terminal in February 1997 by Shell Pipeline in preparation for leasing the site from DOE. Two small (<1 acre) areas contained within the main site's property boundary exhibited indications of free-phase petroleum product in the shallow subsurface. Each of the two affected areas was associated with routine bulk crude oil handling facilities (a booster pump station and an on site pipeline pig trap) that had previously produced minor releases. The area of contamination at the booster pump area is approximately 342 square feet and the pig trap area was approximately 100 square feet.

Soil at the pig trap area was removed, and DOE received LDEQ's approval for closure of the area in 1997. Bailing at the booster pump station (BPS) area, via three geotechnical boreholes, was implemented due to the impracticability of excavation there.

Product recovery operations began in July 1997 and approximately 25 gallons of an oil and water mixture was removed from all three boreholes over a two-month period. The oil product recovery process has continued and as of the end of 2001 a total of an additional 3.8 gal of oil was removed. Oil volumes removed per bailing event are usually between 0.05 to 0.1 gals indicating that almost all of the free phase oil has been removed.

In September 1999 LDEQ verbally agreed to a proposed bioremediation program allowing DOE to apply a bioremediation agent to the contaminated area. Application began in early 2000, followed by confirmation sampling. The analytical data provided evidence that the Risk Evaluation Corrective Action Program (RECAP) parameters were reduced, however they still exceeded the RECAP standards. Subsequently additional bioremediation material was applied to the contaminated site followed by confirmation sampling.

Results indicated continued progress with some numbers below RECAP standards.

During the first quarter of CY 2003 an assessment of the St. James BPS provided information that the levels of contamination began to rise. This prompted DM Environmental Staff members to re-evaluate the area, data from previous assessments and historical data in order to develop another plan of action that may lead to closure of the area under RECAP in a more reasonable amount of time. This activity continued through out CY 2003 and involved input from the lessee, Shell Pipeline. Section 6 of this document contains more detailed information regarding this topic.

West Hackberry North Anhydrite Pit

During 2003, the closed WH Anhydrite pit began to exhibit visible signs of leaching from limited areas around the cap perimeter that were potentially caused from upward wicking of salt from the anhydrite in response to drought conditions prior to CY 2003. With increasing rainfall saltwater began to seep from the pit edges causing grass on several surface slope locations of the north pit to die. An initial response was made to contain all seepage and process through the site's saltwater disposal system. As rainfall events continued, the rate of seepage was noted to respond due to soil erosion and additional temporary remedial actions were employed to control and contain the seepage.

DM Environmental Staff members traveled to the site to observe these conditions and to provide technical assistance while the assessment of the conditions was pursued. Later as a final permanent remedy was under design, closure requirements were provided to S&B for incorporation in the development and selection of final repair options. The design for remediation and award of the task to a construction contractor is scheduled for CY 2004. Construction is scheduled to be completed in CY 2005.

Billion Barrel Expansion

During CY 2003 DM Environmental Staff provided extensive preliminary environmental input to billion barrel project. The support included the identification of environmental requirements (i.e., NEPA procedures, air quality criteria, water quality criteria, permitting constraints, etc.) and schedule impacts.

Stennis Warehouse

During CY 2003 DOE made the decision to relocate part of the SPR equipment storage operation from New Orleans, LA to the Stennis Space Center located near Picayune, MS. DM Environmental personnel participated in site visits to assess

conditions that may have caused environmental liability and reviewed site requirements, DOD regulations, and the MS regulations governing the management of the air, water, and solid waste. As a result of this process a zero discharge pump test stand was developed to preclude the need for a discharge permit and the risk of contaminating receiving waters.

Hurricane Claudette

The Bryan Mound site was affected by the adverse weather conditions brought on as a result of Hurricane Claudette. The primary impact was flooding due to a 6.7 foot tidal storm surge which caused flooding on the site. As a result of the flooding, the dike surrounding Cavern 116 filled with 36,000 barrels of storm surge water. The water was observed to contain no

evidence of oil contamination or an oily sheen and was pumped from the cavern with no impact or compliance issues. The storm surge also caused the site to be inundated with storm debris. DM environmental staff consulted with regulatory and federal wildlife refuge agencies and provided the site guidance on in situ burning and land fill disposal options. DOE decided to use the land fill option and 150 cubic yards of debris was transported to a local sanitary landfill for disposal. In addition, wildlife injured as a result of the storm were rescued and sent to a wildlife rehabilitation service.

DOE On-Site Appraisal

DOE SPRPMO On-Site Management Appraisal teams conduct formal visits to every SPR site annually. The teams meet with site contractor management staff and audit environmental compliance and environmental management system practices, survey performance indicators, and review the audit findings with the contractor staff during exit briefings. During CY 2003 there were five low risk environmental findings associated with the audits and all were corrected by April, 2004.

M&O Contractor Organizational Assessment

The New Orleans environmental group conducted annual EMS and compliance assessments of all five sites in 2003. Assessors were independent of the sites or, in New Orleans, were not accountable to those directly responsible for the issues audited.

Top management chose topics for review based on departmental performance evaluations, current management concerns, and the results of previous audits. Environmental concerns of top management for 2003 were the application of the Qualified Products List (all sites) and potable water management (Bryan Mound). Environmental compliance was determined through evaluating EMS performance which included compliance with regulations, DOE contract requirements, and other internal requirements. Findings are tracked to completion in the DOE Consolidated Corrective Action Plan and in the DM Assessment Tracking System (ATS).

DM identified 16 compliance findings and one EMS non-conformance during CY 2003. All were classified as low risk hazards, minor deviations from internal requirements and regulations. Corrective action plans for all of the findings and non-conformances were provided, and nine findings were closed in CY 2003. Table 2-8 is a tabulation of 2003 findings by site.

Third Party EMS Audits

A complete recertification audit and a shorter surveillance audit were conducted in CY 2003 by the DM ISO 14001 registrar, Advanced Waste Management Systems, Inc. All five sites were audited once, the New Orleans site (headquarters) twice. The success of DM in meeting the requirements of all 17 elements of the ISO 14001 standard was evaluated during 2003. There were no non-conformances with the ISO standard at each site and a strong recommendation was given for DM to maintain the ISO 14001 certification.

Regulatory Inspections/Visits

There were fifteen inspections or visits by regulatory agencies to SPR facilities in 2003. There were no findings associated with these inspections. Table 2-9 is a summary of the inspections/visits.

Table 2-8. 2003 M&O Contractor Organizational Assessment Environmental Findings

Site	High Risk Hazard (compliance)	Medium Risk Hazard (compliance)	Low Risk Hazard (compliance)	Low Risk Hazard EMS
Bayou Choctaw	0	0	0	0
Big Hill	0	0	2	0
Bryan Mound	0	0	5	0
New Orleans	0	0	6	1
West Hackberry	0	0	3	0

Table 2-9. Summary of Regulatory and Third-Party Inspections/Visits During 2003

Site	Organization	Remarks
BC	USDA Wildlife Services	Not an Inspection. Requested assistance visit. Mr. Dwight LeBlanc of the USDA Wildlife Services visited, at our request, on 03-05-03 to discuss methods of eliminating nuisance animals suspected of creating security nuisance alarms.
	NO COE	COE will provide comments in permit application response. Visual review of area for requested permit to expand security clear zone to 300 feet. No findings.
	ISO 14001 Registrar	ISO 14001 Surveillance Audit. No Findings. Strong recommendation to maintain certification.
BH	TCEQ	Field Operations Division Annual Investigation. No violations and no records requested for the SPR Air Program.
	TGLO	Annual inspection of Big Hill under OSPRA. No findings.
	TCEQ & ISO 14001 Registrar	ISO 14001 Recertification/Clean Texas Audit. No non-conformances and DM was recommended for re-certification. Two TCEQ auditors accompanied the registrar auditors and successfully completed the first partnership audit of this type under the developing Clean Texas/Cleaner World Certified National Leader program.

Table 2-9. Summary of Regulatory and Third-Party Inspections/Visits During 2003 (continued)

Site	Regulatory Agency	Remarks
BM	TCEQ & ISO 14001 Registrar	ISO 14001 Recertification/Clean Texas Audit. No non-conformances and DM was recommended for re-certification. Two TCEQ auditors accompanied the registrar auditors and successfully completed the first partnership audit of this type under the developing Clean Texas/Cleaner World Certified National Leader program.
	TCEQ	Inspection of residual chloramine concentration in potable water system as part of check on City of Freeport. Chloramine residuals were low, but no level specified for SPR system. No findings.
	TGLO	Scheduled Texas General Land Office Oil Spill Prevention and Response Audit of the Bryan Mound Oil Spill Prevention and Response Plan. No findings.
	USFWS	USFWS was invited to provide information on how it conducts "prescribed" burns. The agency provided a form to the SPR that could be used or modified in preparation for a controlled disposal burn. No findings.
NO	TCEQ - P2 and Industry Assistance Div.	Not a formal audit and no findings. Visited SPR headquarters while in New Orleans for a conference to obtain a high level overview of SPR EMS, including structure and responsibility with the Human Resources department. The purpose of the audit was to prepare for upcoming co-audit of the Texas sites with our ISO 14001 auditors and obtain input.
	TCEQ & ISO 14001 Registrar	DM was recommended for re-certification. No non-conformances. A Clean Texas/Cleaner World -EMS element of the audit was also conducted by the registrar.
	ISO 14001 Registrar	Strong recommendation to maintain certification. No non-conformances.
WH	USCG	Site tour & lunch, 16 Coast Guard personnel plus DM, invited for discussion on the ICS structure. No findings.
	ISO 14001 Registrar	Recommendation to maintain certification. No non-conformances.

Non-Routine Releases

The majority of the non-routine releases of pollutants occur with the spills of crude oil and brine into the environment from the SPR operations. In 2003, the SPR sites reported three crude oil spills and zero brine spills in quantities of one barrel (42 gallons) or greater or as otherwise required by regulation.

State and federal agencies require notification if an oil spill meets or exceeds the reportable criteria. This reportable criteria is established by each agency and may vary greatly in the amount to be considered a reportable spill. This is illustrated by the following examples: one barrel for the LDNR, five barrels for the RCT, or a sheen on a navigable waterway for the NRC

During CY 2003, the SPR moved (received and transferred internally) 10.7 million m^3 (67.1 mmb) of oil and disposed of 7.43 million m^3 (47.05 mmb) of brine. Additional spill information is listed in Tables 2-10 through 2-12.

The long-term trend for spills and releases has declined substantially from 26 in 1990 to three in 2003 as depicted in Figure 2-4.

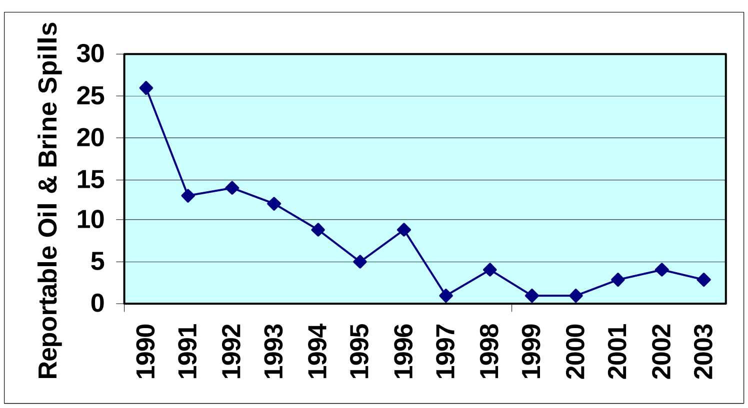


Figure 2-3. Number of Reportable Spills 1990-2003

Table 2-10. Number of Reportable Crude Oil Spills

Year	Total Spills	Volume Spilled m^3 (barrels)	Percent Spilled of Total Throughput
1982	24	847.0 (5,328)	0.00704
1983	21	380.9 (2,396)	0.00281
1984	13	134.8 (848)	0.00119
1985	7	85.4 (537)	0.00122
1986	5	1232.5 (7,753)	0.01041
1987	5	2.5 (16)	0.00002
1988	6	8.8 (55)	0.00001
1989	11	136.4 (858)	0.00004
1990	14	74.8 (467)	0.00003
1991	6	37.9 (237)	0.0004
1992	5	1.9 (12)	0.00006
1993	6	36.9 (232)	0.0007
1994	7	6.2 (39)	0.0003
1995	2	56.3 (354)	0.0006
1996	4	4.7 (30)	0.00002
1997	1	0.32 (2)	4.0×10^{-9}
1998	1	Sheen	N/A
1999	1	31.8 (200)	0.00056
2000	1	11.1 (70)	0.00011
2001	2	1.6 (10)	0.0000163
2002	0	0	0
2003	3	1.1 (7)	0.0000104

Table 2-11. 2003 Reportable Spills

Date	Location	Amount	Substance	Cause/Corrective Action
04/23/03	WH	4 Bbls	Oil	Triplex pump operations at Cav 108 to maintain zero pressure during workover. During pump down of frac tank via triplex pump, a suction hose loosened and released crude within diked containment of the well pad. Operation was shut down within 10 minutes and release stopped. All oil was recovered by vacuuming and flushing. Flush water and recovered oil were returned to site systems.
05/29/03	BM	Sheen	Oil	While installing a rebuilt traveling screen at RWIS, grease used to lubricate the drive chain fell into the sump creating a sheen on the water. Sump was boomed off to prevent sheen from further entering the water. Grease used may have been the wrong type. Investigation underway.
05/29/03	WH	3 Bbls	Oil	Workover crew was installing 10 ¾” casing into Cavern 110. Crew had shut rig down for lunch and a 2” valve was inadvertently left open allowing crude to release into wellhead cellar (36 bbls). Cellar filled and overflowed releasing 3-5 bbls of oil to flow onto the limestone pad.

Table 2-12. Number of Reportable Brine Spills

Year	Total Spills	Volume Spilled m^3 (barrels)	Percent Spilled of Total Throughput
1982	43	443.8 (2,792)	0.0005
1983	44	259.4 (1,632)	0.0002
1984	17	314.0 (1,975)	0.0003
1985	16	96,494.8 (607,000)	0.1308
1986	7	275.6 (1,734)	0.0017
1987	22	96.5 (608)	0.0003
1988	12	93.8 (586)	0.0001
1989	17	31,231.6 (825,512)	0.1395
1990	12	11,944.3 (74,650)	0.0170
1991	7	1,156.8 (7,230)	0.004
1992	9	48.0 (302)	0.003
1993	6	59.2 (370)	0.001
1994	2	14.4 (90)	0.0006
1995	3	131.1 (825)	0.0028
1996	5	179.7 (1,130)	0.0014
1997	0	0	0.0
1998	3	6.2 (39)	0.00028
1999	0	0	0.0
2000	0	0	0.0
2001	1	0.019 (0.12)	5.60×10^{-7}
2002	2	2.1 (13)	3.9×10^{-6}
2003	0	0	0

2.3 SUMMARY OF PERMITS (JAN. 1, 2003 THROUGH DEC. 31, 2003)

General

Permits in effect during 2003 include 12 state and federal CWA wastewater discharge permits, six CAA permits, 35 active COE wetlands (Section 404 of CWA) permits (not counting associated modifications and amendments), and over 100 oil field pit, underground injection well, and mining permits. In addition, a number of other minor permits were in effect during the year.

Many of these major permits are presented in tabular form in Section 3, Tables 3-2 through 3-7.

Permit Compliance

Compliance with environmental permits is assured by meeting the conditions detailed within the permit. These conditions can be monitoring of components or processes, monitoring of pollutant effluents to ensure they meet permit limits, maintaining structures in their original condition, and inspecting facilities.

Air quality operating permits require that piping components such as valves, flanges, pressure relief valves, and pump seals be inspected for leaks of VOC on a regular basis (quarterly in Texas and annually in Louisiana) using organic vapor analyzers (OVA). In addition, the Texas permits require that the flanges be inspected visually, audibly, and or by olfactory methods to identify any possible leaks on a weekly basis. All SPR air permits contain permit limitations based on pollutant emission rate in lbs. per hour and annual totals in tons per year.

The SPR ensures compliance with these permit limits by monitoring the processes that emit the pollutants. This includes monitoring usage of generators, volumes of crude oil, diesel, and gasoline movements through tanks, volume of painting, and others. The results of this effluent monitoring are reported to the agencies annually at Bryan Mound and Big Hill through an Emissions Inventory Questionnaire (EIQ). Bayou

Choctaw and West Hackberry do not require reporting because they are below the required emission limit to report. All air reports were submitted to the appropriate agencies on time.

Water discharge permits require visual monitoring of the effluents to ensure that they have no visible sheen or foaming. Other permit conditions relate to ensuring that analytical permit limits are met and reported. All SPR sites require periodic (daily, monthly and/or quarterly) reporting of permit limit compliance through the NPDES, LPDES, and TPDES Discharge Monitoring Reports (DMRs). All of these were submitted to the appropriate agencies on time.

Noncompliances

Three discharge permit noncompliances occurred out of a total of 5,112 permit-related analyses performed in 2003. Two of the three were the result of a sample being outside of the permit parameter limits with the remaining one resulting from probable laboratory error. All noncompliances were of short duration and immediately resolved, causing no observable adverse environmental impact.

The three non-compliances produced an overall project-wide 99.94 percent compliance rate for 2003. Summary information of NPDES exceedances and noncompliances is contained in Section 5.4, Tables 5-8, 5-10, and 5-12.

Notice of Violation (NOV)

During 2003, the SPR continued to maintain a status of low risk to the environment. NOVs have declined significantly from 9 (all administrative) in 1990 to zero since 1995 as depicted in Figure 2-5.

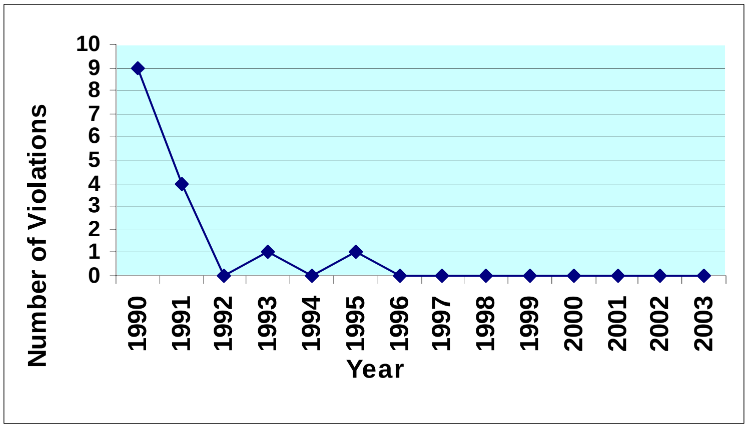


Figure 2-4. Number of Violations 1990-2003

2.4 SUCCESS IN MEETING PERFORMANCE MEASURES

General

Twenty-five performance measures were tracked in FY 2003. Twenty-two of these are identified as Work Authorization Directives (WADs). WADs are jointly developed for each fiscal year by DOE and DM and tracked for success.

WADs that measure environmental success originate from several departments. In FY 2003 seven of the WADs tracked were from the Environmental Department. Fifteen other WADS originating from other departments were included in the EMS. Three performance measures that are not WADs were also devised and tracked in the EMS. All performance measures were related to significant environmental aspects or interests of top management.

Performance measures that are part of the EMS are identified as "objectives." A "Target" (metrics that can be measured) is established for each objective. Those objectives based on WADs have two targets, a "minimum" level (all DOE contractors should meet as a minimum) and a more challenging "target" level.

Success in Meeting Performance Measures (Objectives)

The performance measures and targets, success in meeting them in FY 2003, and their performance trends since FY 2000 are delineated in Table 2-13.

Of 25 performance measures tracked in FY 2003, 24 met or surpassed the more challenging "target" level and one exceeded the minimum target level.

Over the past four years, performance improved in 14 objectives, remained steady in six, fluctuated slightly in three, and decreased slightly in one (although the targets were always met). Trending was not available for one objective because it was initiated in 2003.

Table 2-13 FY 03 OBJECTIVES AND TARGETS WITH PERFORMANCE

ID #	WAD ID	Aspect	Objective	Target Minimum	Target	Level of Achievement in FY 03	Performance Trend (Since FY 00, where tracked)
1	1.J.1.a (ENV)	Permit	Reduce permit exceedances reported on the Discharge Monitoring Reports	10 per year	5 per six months	Surpassed target. 2 for last 6 months and 6 for entire FY	Improved over FY00 (9), not as good as FY01 (4) or FY02 (2).
2	1.J.1.b (ENV)	Permit	Eliminate cited Clean Water Act, Clean Air Act, and RCRA (waste) violations	Not Applicable	0 per year	Met target. No violations.	No change. No violations since FY00.
3	1.J.1.c (ENV)	Spill	Reduce reportable occurrences of releases from operational facilities	Less than or equal to 6 per year	Less than or equal to 3 per six months	Met target (3 in past 6 months) and 4 for entire FY	Same as FY01 (4), not as good as FY00 or FY 02 (1).
4	1.T.A.1 (TSM – ENGRG)	Spill	In managing the Piping and Pipeline Assurance program, submit semiannual piping and pipeline assurance reports in accordance with schedule.	Within 30 days of schedule	On schedule	Met target. On schedule.	No change. Consistently on schedule since FY00.
5	1.T.1.b (TSM – FP/EM)	Spill	Ensure key spill equipment are available	90%	100%	Met target.	No change. Met target since FY00.
6	1.T.1.c(2)(TSM – FP/EM)	Spill	Ensure blanket order agreements are in place for spill response and clean up at each site.	One	Two or more	Surpassed target (150%).	Better than FY02 (106.1%) and FY01 (100%).
7	1.T.1.a (TSM – FP/EM)	Spill Fire Protection	Ensure emergency preparedness and response capabilities through training Emergency Response team (ERT) members.	80% ERT trained/site. 18 @ BC 20@ BM, BH, & WH	95% ERT trained/site	Surpassed target. 100% trained.	Same as FY02 and better than FY00 (97.3%) and FY01 (96.3%).

Table 2-13 FY 03 OBJECTIVES AND TARGETS WITH PERFORMANCE (continued)

OBJECTIVES AND TARGETS (continued)							
ID #	**WAD ID**	**Aspect**	**Objective**	**Target Minimum**	**Target**	**Level of Achievement in FY 03**	**Performance Trend (Since FY 00, where tracked)**
8	1.T.1c(1) (TSM – FP/EM)	Spill Fire Protection	Ensure Incident Commander/Qualified Individual at each site is trained in ICS (initial and refresher)	85%	100%	Met target.	Same as FY02, better than FY00.
9	1.J.2.a (ENV)	Waste	Reduce total amount of hazardous waste generated	Not Applicable	1500 lbs per 6 months	Surpassed target. Generated 865 lbs.	Slightly higher than FY02 (681 lbs) and much lower than FY00 (3803 lbs) and FY01 (1706 lbs).
10	1.M.3.a (MAINT)	Resource Use	Conduct a predictive maintenance program (PdM).	Complete 90% of all scheduled PdM activities	Complete 95% of all scheduled PdM activities	Surpassed target (99.5%).	New WAD. No previous data.
11	NONE	Monitoring and Surveillance Results	Submit environmental documents on time to DOE & regulators (timeliness & quality)	Not Applicable	100%	Met target.	Same as FY02 and FY01. Improved over FY00 (98%).
12	1.M.1.a(2) (MAINT)	Equipment Condition	Meet weighted average (MPAR) of quality of maintenance, preventive maintenance completion, maintenance support, scheduling effectiveness, productivity, corrective maintenance backlog, and readiness of critical must-operate equipment.	95% MPAR for SPR (all sites) each month.	> 98% MPAR for SPR (all sites) each month.	Overall average for FY 03 is 98.4%.	Almost the same as FY02 (98.5%), and better than FY 00 (97.3%) and FY01 (97.6%).

Table 2-13 FY 03 OBJECTIVES AND TARGETS WITH PERFORMANCE (continued)

OBJECTIVES AND TARGETS (continued)							
ID #	WAD ID	Aspect	Objective	Target Minimum	Target	Level of Achievement in FY 03	Performance Trend (Since FY 00, where tracked)
13	NONE	Document Review	Review all purchase requests, designs, summaries of work, and other documents sent to Environmental Department for review.	N/A	100%	Met target.	No change from FY01 or FY02.
14	1.T.1.c (TSM-S&H)	Worker Exposure	Control workplace hazards and integrate safety into all phases of work planning and execution through the behavioral safety contact rate (percent of DM employees observed monthly versus total number of DM employees) for each operating site.	75%	140%	Surpassed target (187.5% average)	Improved steadily since FY01 (131.08% in FY01 and 164.58% in FY02).
15	1.H.4.a	Spill	Maintain percent availability of physical protection system	Maintain critical facilities "in service" at 95%	Maintain all facilities "in service" at 95%	Data available for second half of FY 03 only. Surpassed target (99.6%).	Very slight improvement since FY02 (98%).
16	1.T.2	Fire Protection	Ensure fire protection capabilities at each site through prompt Priority One and Two fire protection system repairs.	6-month average equal to completion time of Must-Operate equipment repairs	6-month average less than completion time of Must-Operate equipment repairs	Surpassed target at all sites for Priority One and Two fire protection system repairs.	Improved since FY02 (BM met target for Priority 2 only in FY02).
17	NONE	Air Emissions Spill	Decrease the amount of Halon 1301 (Class I ozone depleting chemical) on the SPR.	Not Applicable	10%	Surpassed target (15% removed)	Improved since FY 00 through FY 02 (none removed)

Table 2-13 FY 03 OBJECTIVES AND TARGETS WITH PERFORMANCE (continued)

OBJECTIVES AND TARGETS (continued)							
ID #	WAD ID	Aspect	Objective	Target Minimum	Target Target	Level of Achievement in FY 03	Performance Trend (Since FY 00, where tracked)
18	1.L.A.5.a (6)	Air Emissions	Complete review of alternative of in-Service alternative fuel vehicle site utilization	By the end of 3rd quarter of FY 2003	Not Applicable	Met target. Completed by end of 3rd quarter.	Same as in FY02.
19	1.J.2.b	Waste	Reduce total amount of sanitary waste generated	1.3 million lbs per 6 months	500,000 lbs per 6 months	Surpassed target. Generated 446,437 lbs for the entire year	Steady reduction since FY00: 650,557 lbs in FY00 607,120 lbs in FY01 484,059 lbs in FY02
20	1.J.2.c	Waste	Increase recycling of sanitary waste through waste diversion.	15%	20%	Surpassed target. (38%)	Lower than last year (49%) and FY 00 (59%), but better than FY 01 (32%)
21	1.J.2.d	Resource Use	Increase purchasing of EPA designated recycled content products (affirmative procurement)	95%	100%	Met target.	Same as last year and better than FY00 (83%) and FY01 (87%).
22	1.L.A.5	Resource Use	Control overall site electric loads to minimize utility costs and/or reduce consumption through efficiency improvements, including Utility Demand Side Management Programs. (Unplanned operations will be factored out of evaluation)	$\frac{(FY90-FY03)}{FY90}$ ≥ 0.20 FY=Power usage during fiscal year	$\frac{(FY90-FY03)}{FY90}$ ≥ 0.225	Surpassed minimum for FY 03 at 20.61%.	Slight improvement over FY02 (19.21%).

Table 2-13 FY 03 OBJECTIVES AND TARGETS WITH PERFORMANCE (continued)

OBJECTIVES AND TARGETS (continued)							
ID #	WAD ID	Aspect	Objective	Target Minimum	Target	Level of Achievement in FY 03	Performance Trend (Since FY 00, where tracked)
23	1.L.B.2	Monitoring and Surveillance Results	a. Complete Level 1 and 2 milestones associated with Cavern Integrity Tests b. Complete Level 3 milestones associated with performance, accurate, and timely reporting of cavern integrity tests.	N/A 95%	100% 100%	Met target. Met target.	Level I not tracked previously. For Level 2: same as last year and better than FY01 (59.26%). For Level 3: same as last year and better than FY01 (93.94%)
24	1.T(TSM-PM)4.b	Public Involvement	Complete community outreach activities, using annual plan as baseline	90%	100%	Surpassed target (105.6%).	Less than last year (156%).
25	1.H.1.d	Public Involvement	Ensure active continuance of Local Law Enforcement Agency (LLEA) program	Maintain active letters of under-standing	Maintain monthly site contact and achieve participation during field training exercises	Met target. LLEA have participated in every FTX exercise.	Same as last year. Strong participation.

3. ENVIRONMENTAL PROGRAM INFORMATION

The environmental program is implemented by the prime M&O contractor for the SPR on behalf of DOE (permittee) and is designed to support the SPR through tasks aimed at avoiding or minimizing adverse environmental effects from the SPR on surrounding lands, air, and water bodies.

The monitoring and inspection program, originally developed under guidance of the SPR Programmatic Environmental Action Report and Site Environmental Action Reports, now conforms to the monitoring program by DOE Order 450.1. This program includes monitoring permitted NPDES outfalls and air emissions, conducting other required federal and state inspections, and surveillance sampling and analysis of site-associated surface and ground water quality. This makes possible the assessment of environmental impacts relative to the baseline and early detection of water quality degradation that may occur from SPR operations.

The results of the individual program areas such as air emissions monitoring and reporting, NPDES compliance, water quality monitoring, and ground water monitoring for 2003 are discussed in sections 5 and 6.

3.1 ASSOCIATED PLANS AND PROCEDURES

Associated plans that support the SPR environmental program include site specific Emergency Response Procedures with spill reporting procedures; the site-specific Spill Prevention, Control, and Countermeasures Plans (SPCC); the Environmental Monitoring Plan (EMP) which incorporates the Ground Water Protection Management Program (GWPMP) plan; and the Pollution Prevention Plan (PPP). The GWPMP document and the EMP were originally published as separate documents. The GWPMP was incorporated into the EMP in 2000. The EMP and the PPP are reviewed and updated annually and now are published to conform with guidance found with the DOE Order 450.1.

Associated procedures that support the SPR environmental program are located in the DM Environmental Instructions Manual. These procedures identify requirements, responsible personnel, deadlines, and governing standards. Each site has developed instructions where needed that implement the environmental program specific to their facility.

The ISO 14001 Environmental Management System Manual was developed to describe and provide direction to DM policies, plans, and procedures that make up the environmental management system and to illustrate how the EMS conforms to the ISO 14001 standard. This document is reviewed and revised at least annually.

3.2 REPORTING

Proper operation of the SPR with respect to the environment involves several types of reports and reporting procedures. The basic reports are summarized briefly in this section.

3.2.1 Spill Reports

Site Emergency Response Procedures address reporting spills to the SPR contractor, DOE, and appropriate regulatory agencies. Specific reporting procedures are dependent upon several key factors including the quantity and type of material spilled, immediate and potential impacts of the spill, and spill location (e.g., wetland or water body). All spills of hazardous substances are first verbally reported to site management and then through the SPR contractor management reporting system to New Orleans contractor and DOE management. Verbal notification and associated written reports to the appropriate regulatory agencies occur as required, if the spill meets the reportable criteria. Final written reports from the sites are submitted after cleanup, unless otherwise directed by the DOE or appropriate regulatory agency.

3.2.2 Discharge Monitoring Reports

Wastewater and storm water discharges from SPR sites are authorized by EPA through the NPDES Program; through the LDEQ by the Louisiana Pollutant Discharge Elimination System (LPDES). The EPA has not yet delegated the NPDES program to the Railroad Commission of Texas (RCT) so parallel EPA NPDES and Texas Pollutant Discharge Elimination System (TPDES) Programs are in place for Big Hill and Bryan Mound. The reports are prepared and submitted in accordance with site-specific permit requirements. All discharge permits issued to the SPR require quarterly reporting to the appropriate agency(s) (LDEQ, or RCT and EPA). Included in each report is an explanation of the cause and actions taken to correct any noncompliance or bypass that may have occurred during the reporting period.

3.2.3 Other Reports

The SPR contractor provides several other reports to, or on behalf of DOE. Table 3-1 contains a comprehensive list of environmental plans and reports.

Table 3-1. Federal, State, and Local Reporting Requirements

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
Clean Air Act	Control of hydrocarbon emissions from tanks, valves, and piping	TCEQ	Air Emissions Permit	Annual Emissions Inventory Questionnaires
		TCEQ	Air Emissions Permit Special Requirement	Monthly Tank Emissions
Clean Water Act as amended (FWPCA)	Wastewater discharges	U.S. EPA, Region VI	NPDES Permit	Monthly monitoring reports
		LA Dept. of Env. Quality (LDEQ)	Water Discharge Permit	Quarterly monitoring reports
Clean Water Act as amended (FWPCA) (continued)		Railroad Commission of Texas (RCT)	Water Discharge Permit	Quarterly monitoring reports
	Spill Prevention, Control and Countermeasures (SPCC)	U.S. EPA, LDEQ	SPCC Plan	Submit existing plan when spills on navigable waters exceed 1000 gals or occur $\geq$2x in 1 year
	Discharge notification	LDEQ, TCEQ, RCT, U.S. DOT, EPA	Verbal and written notification	Non-permitted discharges over RQ
	Dredging maintenance, and any construction in wetlands for structures. (Sections 404 & 10)	U.S. Army Corps of Engineers (COE)	Construct & Maintain Permit, Maintenance Notifications	Two-week advance of work start, notice suspension, and end.
	Wildlife refuges	U.S. Fish and Wildlife Service (US F&WS)	Right-of-way for Construction and Maintenance	None

Table 3-1. Federal, State, and Local Reporting Requirements (continued)

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
Coastal Zone Management Act	Wetlands construction within state coastal management zones	Louisiana Dept. of Natural Resources (LDNR), Texas General Land Office (GLO)	Federal project consistency determinations	None
DOE Order 450.1*	Environmental Planning and Monitoring	DOE	Environmental Protection and Implementation Plan	Annual revision
			Ground Water Protection Management Program Plan	Annual review (now contained in EMP)
			Environmental Monitoring Plan	Annual revision
			Site Environmental Report	Annual report
			Performance Indicators	Quarterly report
	Waste Management	DOE	Annual Report on Waste Generation and Pollution Prevention Progress	Annual summary of all wastes
EO 13101	Affirmative Procurement	DOE	Affirmative Procurement Report	Annual report
Federal Migratory Bird Act	Disturbance of bird nests	US F&WS	Special Purpose Permit	As requested by USFWS
Miscellaneous State Environmental Regulations	Use of salt domes	LDNR	Permit for Use of Salt Domes for Hydro-carbon Storage	None
	Water withdrawal from coastal areas	TCEQ	Water Appropriation Permit	Annual Usage Report
	Pipeline usage	RCT	Pipeline and Gathering System Certification (T-4C)	Annual Certification
	Operation of brine ponds	LDNR, RCT	Operate and Maintain Permit	None

***Note: Reporting requirements changed as the result of the replacement of DOE Order 5400.1 with DOE Order 450.1.**

Table 3-1. Federal, State, and Local Reporting Requirements (continued)

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
National Environmental Performance Track Program	Environmental Management Systems	U.S. EPA	In 2000 the initial membership application was submitted to EPA and approved for a 3 year commitment to the program	Annual progress report
National Environmental Policy Act	Review of proposed projects for environmental considerations	U.S. Council on Environmental Quality (CEQ)	Environmental Impact statements, Environmental Assessments	Only when not tiered under other EIS or EA.
			Categorical Exclusions	For projects that require consent.
Oil Pollution Act of 1990 (amendment of FWPCA)	Oil spill response	U.S. EPA, LDEQ, USCG, TCEQ	Emergency Response Procedures, Oil Spill Response Cert.	None
		U.S. Dept. of Transportation (DOT)	Pipeline Response Plan	None
Oil Spill Prevention & Response Act of 1991	Oil spill response in Texas coastal zone	GLO	Discharge Prevention and Response Plan	Report spills of oil as required
			Discharge Prevention and Response Facility Cert.	Annual review by agency.
Pollution Prevention Act of 1990	Strategy to incorporate pollution prevention into ES&H goals	EPA, DOE	Pollution Prevention Plan, Waste Min Plan, Waste Mgmt Plan, Storm water Pollution Prevention Plan	None
Resource Conservation and Recovery Act	Hazardous waste generation and disposal	LDEQ	Annual Generators Report	Annual report to agency
			LA Notification of HW Activity	New waste stream, change in generator status
			LA Uniform HW Manifest	Complete and submit form with disposal

Table 3-1. Federal, State, and Local Reporting Requirements (continued)

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
Resource Conservation and Recovery Act (continued)	Hazardous waste generation and disposal (continued)	RCT	TX Uniform HW Manifest	Complete and submit form with disposal
			Oil and Gas Waste Report	Annotate Report to Agency
			Texas Notification of hazardous waste activity	New waste stream or change in generator status
	Used oil burned for recovery	LDEQ, RCT	Uniform HW Manifest (Recycling)	Complete and submit form with disposal
	Non-hazardous oilfield waste disposal (exploration and production)	LDNR	Non-Hazardous Oilfield Waste Shipping Control Ticket (UIC-28)	Complete and submit form with disposal
	Non-hazardous special	LDEQ, TCEQ	Shipping Paper	Complete and submit form with disposal
	Waste Management	LDEQ, TCEQ	Monthly waste inventory form	Complete for documentation
			Weekly waste inspection form	Complete for documentation
Safe Drinking Water Act	Cavern formation, well workovers, and salt-water disposal wells	LDNR, Office of Conservation, Under-ground Injection and Mining Division	Well Work over Permit (WH-1)	Well Work over Report
			Cavern Inspection (29-M)	Semi-annual Cavern Inspection Report
			Saltwater Disposal (UIC-10)	Annual Saltwater Disposal Well Report
			Cavern Integrity Test Report	Annual Cavern Integrity
			Oil Wells Integrity (W-10)	Annual Oil Well Status Report

Table 3-1. Federal, State, and Local Reporting Requirements (continued)

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
Safe Drinking Water Act (continued)		RCT	Brine Injection Permit (H-10)	Annual Disposal/ Injection Wells Reports
	Potable water	LA Dept. of Health & Hospitals (LDHH)	Monthly Chlorine Residual Concentration Quarterly total coliform test (BC)	Retain on site Retain results on site
		TCEQ	Weekly disinfectant residual concentration Monthly total coliform test	Monthly Retain results on site
	Storage of oil in underground salt domes	LDNR, RCT	Storage permit	None
Superfund Amendment Reauthorization Act	Reporting of inventories of hazardous substances and materials stored on site	Louisiana Dept. of Public Safety and Corrections, Texas Dept. of Health	Title III, Tier II	Annual Inventory Report
	Reporting of discharges of all listed hazardous materials	EPA	Toxic Release Inventory, Form R	Complete and submit form when threshold exceeded

3.3 ENVIRONMENTAL PERMITS

The active environmental permits required by regulatory agencies to construct, operate, and maintain the SPR are discussed by site.

The SPR holds a general permit to discharge hydrostatic test water in the state of Louisiana that applies to the Louisiana SPR sites, including offsite pipelines. This permit requires quarterly reporting.

On August 27, 1996, Region VI EPA granted LDEQ primacy for the NPDES program in Louisiana that includes responsibility for all compliance and enforcement actions relating to the discharge of water in Louisiana.

LDEQ issued new general storm water permits to the two active Louisiana sites that were made effective at the beginning of 2001.

Since the RCT does not have primacy for the NPDES program, Big Hill and Bryan Mound completed Notices of Intent (NOI's) and operated under the EPA Multi-sector General Permit (MSGP) for storm water.

The air permits for the SPR facilities are administered by the LDEQ in Louisiana and the TCEQ in Texas. The air permits did not require modification or renewal in CY2003.

3.3.1 Bayou Choctaw

Table 3-2 lists the permits at Bayou Choctaw. Individual work permits are received from the Louisiana Underground Injection Control Division of LDNR for each well work over performed. State inspectors periodically visit the site to observe SPR operations. Bayou Choctaw operates under the water and air programs delegated to Louisiana by EPA.

LDNR issued a concurrence in June 2002 for the addition of corrosion inhibiting chemicals in low concentrations to lifted raw water for drawdown per a request made after a bench scale environmental chemical testing had been completed.

Blanket fees and basic renewal information were supplied to the Department of Health and Hospitals for the continued certified operations of the Bayou Choctaw and West Hackberry site's potable water systems in September 2003.

The U.S. Army Corps of Engineers, New Orleans District, issued three permits to Bayou Choctaw in 2003 to install and maintain replacement bridges for the site's crossing of the N-S canal and also for one of the crossings occurring on the road to the brine disposal well pads. The third permit authorized installation and maintenance of a bulkhead and fill for bank stabilization in a slumping section of the N-S canal.

Table 3-2. Permits at Bayou Choctaw

PERMIT NUMBER	ISSUING* AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
LA0053040	LDEQ	LPDES	11/1/99	10/31/2004	(1)
LAR05M557	LDEQ	LPDES*	01/24/01	09/2005	(2)
1280-00015- 02	LDEQ	Air	12/2/99	Open	(3)
None	LDNR	Injection	01/11/83	Open	(4)
SDS-1	LDNR	Injection	09/09/77	Open	(5)
LMNOD-SP (Bull Bay) 3	COE	Constr. & Maintain	01/30/79	-	(6)
LMNOD-SP (Iberville Parish Wetlands) 7	COE	Constr. & Maintain	09/26/77	-	(7)
LMNOD-SP (Iberville Parish Wetlands) 10	COE	Constr. & Maintain	06/12/78	-	(8)
LMNOD-SP (Iberville Parish Wetlands) 17	COE	Constr. & Maintain	11/06/78	-	(9)
LMNOD-SP (Iberville Parish Wetlands) 31	COE	Constr. & Maintain	05/27/80	-	(10)
LMNOD-SP (Iberville Parish Wetlands) 102	COE	Constr. & Maintain	09/26/77	-	(11)
WN-20-020-0168	COE	Constr. & Maintain	04/02/02	-	(12)

Table 3-2. Permits at Bayou Choctaw (continued)

PERMIT NUMBER	ISSUING* AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
WT-20-020-2654	COE	Constr. & Maintain	08/20/02	-	(13)
WT-20-020-3621	COE	Constr. & Maintain	09/17/02	-	(14)
LMNOD-SP (Bayou Plaquemine)	COE	Constr. & Maintain	09/26/77	-	(15)
CT-20-030-1379-0	COE	Constr. & Maintain	03/12/03	-	(16)
CT-20-030-1501-0	COE	Constr. & Maintain	03/28/03	-	(17)
CT-20-030-3087-0	COE	Constr. & Maintain	07/25/03	-	(18)

(1) LDEQ obtained primacy and issued and LPDES permit with former NPDES number this year.
(2) LPDES* Multi-Sector General Permit (MSGP) coverage for Storm Water Associated with Industrial Activity obtained as a renewal with a NOI dated 1/22/01; coverage was automatic 48 hours after postmark. State issued LPDES permit in May 2001.
(3) Site air operating permit modified 12/99
(4) Letter of financial responsibility to plug and abandon injection wells.
(5) Permit approved use of salt dome cavities for storage of liquid hydrocarbons.
(6) Maintain Bull Bay 24" brine disposal pipeline recorded with applicable Registrar of Deeds.
(7) Construct and maintain well pads (brine disposal wells).
(8) Enlarge existing well pads and construct access roads (brine disposal wells 1, 2, & 3.)
(9) Construct and maintain access road to brine disposal well area. NOTE: brine disposal pipeline was constructed under NWP authority and maintenance is allowed in conjunction with the access road permit. Major maintenance performed in 1996.
(10) Construct and maintain well pad, levees, access road & appurtenances to Cavern 102 and additional bank stabilization, warehouse pad and culvert per additions of 1983.
(11) Construct and maintain ring levee, drill site and appurtenances, Well 101.
(12) Install and maintain fill with culverts for parking. Permit authorized a construction period until 4/30/2007.
(13) Install and maintain culverts and fill to construct minor roadway crossings. Activity authorized under NWP-14 and provides a construction period until 8/20/2004.
(14) Replace, repair and maintain security fence with concrete footing and curbing. Activity authorized under NWP-3 and provides a construction period until 9/17/2004.
(15) Install and maintain 36-inch petroleum products pipeline under and across Bayou Plaquemine
(16) Install and maintain a replacement N-S bridge for an existing, permitted N-S bridge on the Main Site. Activity authorized under NWP-3; provides a construction period until 3/12/2005.
(17) Install and maintain a replacement brine disposal access road bridge for an existing permitted structure on the brine disposal access road. Activity authorized under NWP-3, provides a construction period until 3/28/2005.
(18) Install and maintain a bulkhead and fill for bank stabilization in the North-South Canal on the Main Site. Activity authorized under NWP-13 providing a construction period until 7/25/2005.

3.3.2 Big Hill

Table 3-3 lists the permits at Big Hill. In 2003, the site appropriated 246669.21m^3 (200.0 acre-feet) of water from the Intracoastal Waterway exclusive of water for fire protection. This represents only 0.66 percent of the recently revised total allowable withdrawal for a year. The certified affidavit and annual report of water usage was forwarded to the TCEQ as required in 2003.

The NPDES renewal application, forwarded to Region VI EPA in November 1993, and accepted as administratively complete on December 22, 1993, was worked on throughout 2002 and the early part of 2003, with a final permit being issued in September 2003, effective November 1, 2003.

The Railroad Commission of Texas successfully renewed the state TPDES water discharge permit for Big Hill in 1999 and this permit remains current until October 1, 2004. Renewal application activity for this permit must precede the expiration by 90 days or as directed within CY 2004.

Big Hill continues to mix slightly higher pH raw water with the intermittent low pH brines in the onsite brine pond, sufficiently buffering the low pH prior to discharge in order to meet permitted effluent limitations as required. The forms T-4C were forwarded to the appropriate branch of the Railroad Commission of Texas (RCT) in early November 2003, for the Big Hill crude oil pipeline distribution system.

The permit required two brine line integrity test results were provided EPA Region 6 during the calendar year 2003.

Both agencies holding water discharge permits for the Texas sites concurred with the addition of corrosion inhibiting chemicals in low concentrations in the raw water ahead of the heat exchanger units under the condition of Presidential drawdown in 2001 and the additional bench scale environmental chemical testing data provided in CY 2002 to be acted upon officially by each agency in subsequent permit renewal actions. This was done in EPA's renewed authority issued in 2003, and, the renewal application to be prepared for the 2004 expiring state permit UHS-006, shall include the prescribed raw water chemical additions.

Both the federal and state agencies were prior notified of the proposed start-up of the site's Degas Unit after a December notification of the addition of a retained stormwater discharge point/outfall for the unit's slop oil storage and general operations.

Table 3-3. Permits at Big Hill

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
TX0092827	EPA	NPDES	11/01/03	10/31/08	(1)
NOI	EPA	NPDES*	01/24/01	09/2005	(2)
SWGCO-RP 16536 (01,02,03,04, 05)	COE	Constr. & Maintain	01/11/84	- Dredging clause to 12/2008	(3) (4)
P-7	F&WS	Constr. & Operate	07/31/86	06/30/2036	(5)
9256	TCEQ	Air	04/22/98	04/22/2008	Site Air Permit
51839	TCEQ	Air	08/15/02	08/15/2012	Degas Permit
02939	RCT	Operate	11/28/83	Open	(6)
P000226A & P000226B	RCT	Operate/ Maintain	09/19/84	Open	(7)
0048295, 0048320, 004816, 004817	RCT	Operate	05/09/83 06/23/83	Open Open	(8)
UHS-006	RCT	Water Disch.	10/01/99	09/30/2004	(9)
4045A	TNRCC	Water Use	11/14/83	Open	(10)

(1) Renewal submitted 11/24/93 - accepted as administratively complete 12/22/93. Acted upon through 2002 and 2003 with final permit issued in September 2003, effective 1NOV03.

(2) NPDES* Multi-Sector General Permit (MSGP) coverage for Storm Water Associated with Industrial Activity obtained as a renewal with a NOI dated 1/22/01; coverage was automatic 48 hours after postmark.

(3) Permits and modifications to construct and maintain RWIS, raw water 48" pipeline, brine disposal 48" pipeline, crude oil 36" pipeline. Maintenance dredging clause renewed until 12/31/08. Modified in 1996 for new integrity test method.

(4) Completion of raw water, brine disposal, and crude oil pipeline extended. Amended to install offshore pipeline by trenching.

(5) Completion of pipeline construction extended. (48" Brine Pipeline)

(6) Pipeline distribution system registration to operate crude oil lines. Renewed annually.

(7) Permits to operate and maintain anhydrite and brine/oil pits. Modifications are on file.

(8) Permits to create, operate, and maintain an underground hydrocarbon storage facility consisting of 14 caverns.

(9) Corresponds to TX0092827 (EPA-NPDES). Permit renewed by RCT with an effective date of 10/01/99.

(10) Permit amended in 1990 to allow for annual diversion of no more than 117,291 acre feet of water and to authorize diversion until termination of the project as a SPR operation. Modified in 1996 to reduce water set aside down to 30,000 ac/ft per year. Maximum Diversion Rate 175 cfs.

3.3.3 Bryan Mound

Table 3-4 lists the permits for the Bryan Mound site. The Bryan Mound site has the second SPR permit from TCEQ for the appropriation of state waters for the leaching program, site utility, and fire protection systems. The permit requires a yearly report of the quantity of water used. In 2003, the site used a total of 120645.91 m^3 (97.82 acre-feet) of water from the Brazos River Diversion Channel. The water appropriation permit was successfully amended in 2001 to accommodate a 130 cfs Maximum Diversion Rate and to allow water usage until the declared life of this project. The certified affidavit and annual report of water usage was forwarded as required in 2003.

During CY 2003 one notification for maintenance dredging in the approach channel to the RWIS was made for COE permit 12347 (as amended in 1995). The renewal application for the expired NPDES permit TX0074012 forwarded and accepted as administratively complete in 2000 and action was initiated in 2002 and continued into 2003, with a final renewed permit issued in September 2003, effective November 1, 2003. Required reporting for 2003 involved the semi-annual brine line integrity tests to Region 6 EPA (two successful testing reports were sent in 2003); wastewater operators' reports to TCEQ; and crude oil pipeline system operations renewal.

Both agencies holding water discharge permits for the Texas sites concurred with the addition of corrosion inhibiting chemicals in low concentrations in the raw water ahead of the heat exchanger units under the condition of Presidential drawdown in 2001 and the additional bench scale environmental chemical testing data provided in CY 2002 are to be acted upon officially by each agency in subsequent permit renewal actions. This was done in EPA's renewed authority issued in 2003, and, the renewal application prepared for the expiring state permit UHS-004, was finalized and transmitted, as directed, in December, 2003. That application also included the prescribed raw water chemical additions.

The forms T-4C were forwarded to the appropriate branch of the RCT in early November 2003.

The site's annual potable water systems fee was paid as required in December 2003 and the annual raw water use fee was paid earlier in February 2003.

Table 3-4. Permits at Bryan Mound.

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
TX0074012	EPA	NPDES	11/01/03	10/31/08	(1)
NOI	EPA	NPDES*	01/24/01	09/2005	(2)
SWGCO-RP-12347 (03)	COE	Constr & Maintain	02/22/78	-Dredging clause open to 12/2006	(3)
3-67-782 (Docket#)	RCT	Injection	08/21/78	Open	(4)
3-70-377 (Docket#)	RCT	Injection	12/18/78	Open	(4)
P001447	RCT	Operate	10/30/84	Open	(5)
3681A	TNRCC	Water Use	07/20/81	Open	(6)
UHS-004	RCT	Water Disch	04/01/99	03/31/04	(7)
82-8475	TDH&PT	Constr.	01/01/83	Open	(8)
SWGCO-RP-11666	COE	Constr. & Maintain	10/15/77	-	(9)
SWGCO-RP-12112	COE	Constr. & Maintain	07/25/77	-	(10)
SWGCO-RP-12062 (03)	COE	Constr. & Maintain	10/10/78	-	(11)
SWGCO-RP-14114 (01)	COE	Constr. & Maintain	05/18/85	-	(12)
SWGCO-RP-16177	COE	Constr. & Maintain	09/07/82	-	(13)
SWGCO-RP-13435 (01)	COE	Constr. & Maintain	05/21/79	-	(14)

Table 3-4. Permits at Bryan Mound (continued)

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
04994	RCT	Operate	08/01/00	-	(15)
6176B	TCEQ	Air	06/12/02	06/12/12	Site Air Permit
52962	TCEQ	Air	11/07/02	11/07/12	Degas Permit

(1) Renewal submitted 03/03/00. Accepted as administratively complete 05/22/00. Acted upon through 2002 and 2003 with final permit issued in September 2003, effective 1NOV03.
(2) NPDES* Multi-Sector General Permit (MSGP) coverage for Storm Water Associated with Industrial Activity obtained as a renewal with a NOI dated 1/22/01; coverage was automatic 48 hours after postmark.
(3) Maintenance dredging of raw water intake extended to 12/31/06. (SWGCO-RP 12347 authorized construction of RWIS). Extension/renewal authorizes spoil area addition.
(4) Approval of oil storage and salt disposal program.
(5) Authority to operate brine pond.
(6) Permit expires after at project end, covers 52000 ac/ft/yr and MDR of 130 CFS per 2001 amendment.
(7) Corresponds with TX0074012 (EPA-NPDES). (Renewal submitted 1/30/89, RCT acted on permit in August, 1993; effective 10/1/93)
(8) Corresponds with SWGCO-RP-16177.
(9) For 30-inch crude oil pipeline to 3 miles SW from Freeport
(10) For 30-inch crude oil pipeline to 2 miles S from Freeport
(11) For 36-inch brine disposal pipeline & diffuser. Revision/amendment (01) deleted special condition (a) requiring maximized deep well injection; (02) approved construction of 24-inch replacement pipeline and diffuser in January 12, 1993. (03) Added the offshore additions the new integrity test method.
(12) General permit for pipeline crossings by directional drilling in navigable waters
(13) Place an 8-inch water line (PVC, potable)
(14) For construction of cavern pads 101, 102, 103, 111, and 113 in wetlands. Mod.01 added access road and fill placement for DCS-2.
(15) Pipeline distribution system registration to operate crude oil lines. Renewed annually with T-4C.

3.3.4 St. James

The SPRPMO successfully completed a long-term leasing arrangement for use of the St. James site by the private corporation Shell Pipeline in 1997. Shell Pipeline retains all responsibility for maintaining necessary permits at St. James.

3.3.5 Weeks Island

The permits for Weeks Island are listed in Table 3-5.

Long-term ground water monitoring implemented for the SDS-8 supplement continued on a quarterly basis in 2003. Sporadic and spurious elevated TPH readings identified in November 2002, and confirmed in early December were subsequently tested with a more specific gas chromatographic procedure in early 2003. A series of comparative testing utilizing the two methodologies was completed in the regular quarterly sampling regimen by May. These newer method 8015 confirmatory evaluations suggest that the former infrared broad spectrum method was subject to naturally occurring interferences not associated with crude oil or crude oil components. The former sinkhole No. 1, held in abeyance by maintenance of a subsurface freeze plug, reappeared back in June 2001, as the freeze plug thawed. The reactivation was closely monitored throughout CY2003 and does not appear to threaten the long-term closure of the decommissioned mine. Long term ground water and geotechnical monitoring will continue on a quarterly basis through 2004 as proposed upon final decommissioning in 1999. At the 5-year anniversary point, in November 2004, the overall monitoring program will be re-visited and revised with LDNR.

Table 3-5. Permits at Weeks Island

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
SDS-8	LDNR	Injection	02/16/79 revised for post closure 9/99	Terminated	(1)
SDS-8 Supplement	LDNR	Decommission Supplement	9/1/99	Open	(2)

(1) Approval for use of salt dome cavities for storage of liquid hydrocarbons.
(2) Supplement for the decommissioning activities

3.3.6 West Hackberry

A closure-complete report was prepared and filed with LDNR in February 2000 for the decommissioning work for the interconnected brine pond system and in petition for revocation of those permits. As a partial response to the report and proposals, the recovery pumping was authorized to cease and a yearlong evaluation commenced in April 2001 which concluded with a final Summary Report mailed to LDNR in September 2002. The

Summary Report provided detailed analyses of the physical and chemical data during the initial 5 quarters of recovery cessation and again proposed resuming long-term site-wide ground water detection monitoring. That report was not acted upon during the remaining portion of the calendar year. When the second anniversary of the yearlong evaluation period came in 2003, a second report summarizing the complete two years of data was prepared and sent to LDNR with new, more comprehensive, interpretation. LDNR initiated their detailed review of all of these data in December 2003.

In August 2003, a complete and detailed renewal application was prepared, finalized, and mailed to LDEQ for the site's expiring LPDES water discharge permit LA0053031. As required by regulation, an acceptable application must precede permit expiration by 180 days. The properly executed renewal application was transmitted earlier than required and was subsequently determined "administratively complete" allowing the continuation of the site's authority to operate and discharge with an expired permit until such time as a renewed permit is provided. The current permit will expire on midnight, 1/31/2004.

A single COE permit was issued during CY 2003 for the West Hackberry site for construction and maintenance activities.

Permits for West Hackberry are listed in Table 3-6.

Table 3-6. Permits at West Hackberry

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
LA0053031	LDEQ	LPDES	02/01/99	1/31/2004	(1)
LAR05M559	LDEQ	LPDES	01/24/01	09/2005	(2)
LMNOD-SP (LTCS) 26	COE	Constr.& Maintain	02/08/79	-	(3)
LMNOD-SP (Black Lk) 31	COE	Constr.& Maintain	10/26/82	-	(4)
LMNOD-SP (Black Lk) 43	COE	Constr.& Maintain	07/26/84	-	(5)
LMNOD-SP (Gulf of Mexico) 2574	COE	Constr.& Maintain	08/11/80	-	(6)
LMNOD-SE (LTCS) 40	COE	Constr.& Maintain	05/25/88	-	(7)
LMNOD-SP (Cameron Parish Wetlands) 162	COE	Constr. & Maintain	03/09/78	-	(8)
SDS-9	LDNR	Injection	08/07/79	Open	(9)
None	LDNR	Injection	01/11/83	Open	(10)
971198-9	LDNR	Injection	09/27/83	Open	(11)
0560-00019-02	LDEQ	Air	11/24/97	Open	-
SWGCO-RP-12342	COE	Constr. & Maintain	03/28/78	-	(12)
LMNOD-SP (Cameron Parish Wetlands) 152	COE	Constr. & Maintain	03/16/78	-	(13)
LMNOD-SP (Cameron Parish Wetlands) 276	COE	Constr. & Maintain	02/11/80	-	(14)
WN20-000-3972-0	COE	Constr. & Maintain	8/31/00	-	(15)
WO-20-020-1136	COE	Constr. & Maintain	01/25/02 02/19/02	-	(16)
WO-20-020-3607	COE	Constr. & Maintain	10/23/02	-	(17)
WW-20-030-3748	COE	Constr. & Maintain	10/22/03	-	(18)

(1) LDEQ obtained primacy and issued and LPDES permit with former NPDES number.
(2) LPDES *Multi-Sector General Permit (MSGP) coverage for Storm Water Associated with Industrial Activity obtained as a renewal with a NOI dated 1/22/01; coverage was automatic 48 hours after postmark State issued LPDES permit in May 2001.
(3) Maintenance dredging for raw water intake.
(4) Maintenance dredging for firewater canal and extended boat slip access amendment of 1993.
(5) Construction of erosion control dike completed in 1986. Maintenance dredging open until 7/26/94; addition of riprap amendment of 1993 open until 1995.
(6) Amended to install parallel pipeline (05/29/86).
(7) Permit to construct and maintain 36" crude oil pipeline from site to Texoma/LC Meter Station.
(8) Permit to maintain 42" crude oil pipeline.
(9) Approval to create 16 additional salt dome cavities
(10) Letter of financial responsibility to close all injection wells on this site
(11) Approval to construct and operate wells 117A and B.
(12) For 42" crude oil pipeline crossings of waters & waterways in Texas
(13) For brine disposal wells, well pads, and brine disposal pipelines, (12", 20", & 24")
(14) For well pads, levees, and access roads (Wells 110, 111, 112, 113, 114, & 115)
(15) Category I programmatic general permit. Repair exposed 42-inch crude oil pipeline.
(16) Restore riprap along the north perimeter dike adjacent to Cavern 6 and Black Lake. Permit authorized a construction period until 1/25/2007.

(17) Deposit fill in the fire ditch. Permit authorized a construction period until 10/23/2007.
(18) Modifications to the existing Boat Ramp; and, re-establishment of the erosion control breakwater in Black Lake along the north side of the site. Authorizes construction period until October 31, 2008 and includes an associated Water Quality Certification and Federal Consistency Determination for the activity.

3.4 WASTE MINIMIZATION PROGRAM

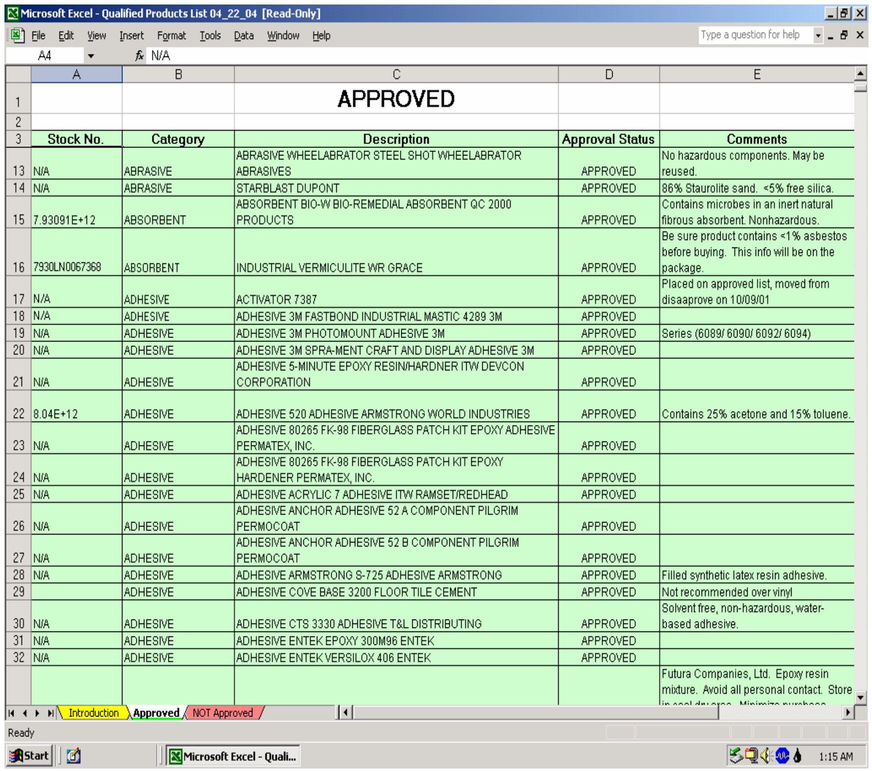
The waste minimization program reduces the generation of all wastes including hazardous, non-hazardous sanitary, and Exploration & Production (E&P) wastes. The SPR generated RCRA hazardous and sanitary (non-hazardous municipal and non-hazardous oil field) wastes during 2003. The only shipments of hazardous wastes from the SPR during CY 2003 were fluorescent lamps from the two Texas sites. Although these lamps are recycled, they are regulated as hazardous waste by the RCT. There were no shipments of hazardous waste from the Louisiana SPR sites during CY 2003. The SPR sent 208.7 mt (460,032 lbs.) of sanitary waste off-site for disposal during CY2003. All E&P wastes generated were recycled in 2003. The SPR successfully met the hazardous and non-hazardous sanitary waste generation targets and did not exceed 3,000 and 1,000,000 lbs respectively. DM environmental staff members were able to assist in this success by a thorough review of the potential waste streams, evaluation of all possible recycling alternatives, communication with SPR site personnel, and consultation with federal and state regulatory agencies as required.

Materials and respective amounts recycled during CY 2003 are delineated in Table 3-7.

Table 3-7. CY2003 Materials Recycled from all SPR Sites

Recycled Material	Recycled (lbs)	Recycled (metric tons)
Aluminum Cans (including co-mingled w/plastics)	1,425	0.65
Antifreeze	487	0.22
Bulbs (Hazardous & Non-hazardous)	1,254	0.57
Concrete	96,000	43.54
Fuel tank bottoms	1,800	0.82
Fuel Filters	5	0.002
Gasoline & H2O	1,883	0.85
Lead Acid Batteries	7,766	3.52
Light Ballasts	238	0.11
Lithium Batteries	5	0.002
Nickel-Cadmium Batteries	69	0.03
Oil Filters	70	.03
Paper & Cardboard	113,549	51.50
Sheet/Scrap Metal	6,435	2.92
Spirals, combs	8	0.003
Toner Cartridges	2,774	1.26
Used Oil Burned for Energy Recovery (UOBE)	16,097	7.30
Used Lumber	800	0.36
Used Tires	150	0.07
Total	250,815	113.77

The SPR Chemical Management Program is successful in restricting use of chemical products to those that are most environmentally friendly. One of the key tools to select chemical products is the SPR Qualified Products List. This list is updated throughout the year and contains materials that have been reviewed and assigned an approval status for purchase at the SPR.


Microsoft Excel - Qualified Products List 04_22_04 [Read-Only]

APPROVED

	Stock No.	Category	Description	Approval Status	Comments
13	N/A	ABRASIVE	ABRASIVE WHEELABRATOR STEEL SHOT WHEELABRATOR ABRASIVES	APPROVED	No hazardous components. May be reused.
14	N/A	ABRASIVE	STARBLAST DUPONT	APPROVED	86% Staurolite sand. <5% free silica.
15	7.93091E+12	ABSORBENT	ABSORBENT BIO-W BIO-REMEDIAL ABSORBENT QC 2000 PRODUCTS	APPROVED	Contains microbes in an inert natural fibrous absorbent. Nonhazardous.
16	7930LN0067368	ABSORBENT	INDUSTRIAL VERMICULITE WR GRACE	APPROVED	Be sure product contains <1% asbestos before buying. This info will be on the package.
17	N/A	ADHESIVE	ACTIVATOR 7387	APPROVED	Placed on approved list, moved from disaaprove on 10/09/01
18	N/A	ADHESIVE	ADHESIVE 3M FASTBOND INDUSTRIAL MASTIC 4289 3M	APPROVED	
19	N/A	ADHESIVE	ADHESIVE 3M PHOTOMOUNT ADHESIVE 3M	APPROVED	Series (6089/ 6090/ 6092/ 6094)
20	N/A	ADHESIVE	ADHESIVE 3M SPRA-MENT CRAFT AND DISPLAY ADHESIVE 3M	APPROVED	
21	N/A	ADHESIVE	ADHESIVE 5-MINUTE EPOXY RESIN/HARDNER ITW DEVCON CORPORATION	APPROVED	
22	8.04E+12	ADHESIVE	ADHESIVE 520 ADHESIVE ARMSTRONG WORLD INDUSTRIES	APPROVED	Contains 25% acetone and 15% toluene.
23	N/A	ADHESIVE	ADHESIVE 80265 FK-98 FIBERGLASS PATCH KIT EPOXY ADHESIVE PERMATEX, INC.	APPROVED	
24	N/A	ADHESIVE	ADHESIVE 80265 FK-98 FIBERGLASS PATCH KIT EPOXY HARDENER PERMATEX, INC.	APPROVED	
25	N/A	ADHESIVE	ADHESIVE ACRYLIC 7 ADHESIVE ITW RAMSET/REDHEAD	APPROVED	
26	N/A	ADHESIVE	ADHESIVE ANCHOR ADHESIVE 52 A COMPONENT PILGRIM PERMOCOAT	APPROVED	
27	N/A	ADHESIVE	ADHESIVE ANCHOR ADHESIVE 52 B COMPONENT PILGRIM PERMOCOAT	APPROVED	
28	N/A	ADHESIVE	ADHESIVE ARMSTRONG S-725 ADHESIVE ARMSTRONG	APPROVED	Filled synthetic latex resin adhesive.
29		ADHESIVE	ADHESIVE COVE BASE 3200 FLOOR TILE CEMENT	APPROVED	Not recommended over vinyl
30	N/A	ADHESIVE	ADHESIVE CTS 3330 ADHESIVE T&L DISTRIBUTING	APPROVED	Solvent free, non-hazardous, water-based adhesive.
31	N/A	ADHESIVE	ADHESIVE ENTEK EPOXY 300M96 ENTEK	APPROVED	
32	N/A	ADHESIVE	ADHESIVE ENTEK VERSILOX 406 ENTEK	APPROVED	
					Futura Companies, Ltd. Epoxy resin mixture. Avoid all personal contact. Store

Introduction | Approved | NOT Approved

Source reduction and process improvements are encouraged to reduce waste generation. In 2003, one of the SPR P2 accomplishments included making a process change involved in weed control at Bayou Choctaw. The weed control truck, tank, and hand-sprayers were replaced by an All-Terrain Vehicle housed with a 26-gallon boom sprayer. A grass-cutting bush hog was used for additional weed control. The new process reduces labor equipment costs and chemical application (by 80%). The cost savings of this project was $11,000/yr.

3.5 POLLUTION PREVENTION (P2)

The DM project manager and his staff, in support of the DOE Project Management Office (PMO), administer and implement the SPR P2 Program. The program's purpose is to unite SPR P2 activities into one program, integrate these activities into all SPR operations, support technology development programs aimed at minimizing multimedia waste generation, and coordinate P2 efforts with SPR sites. The P2 Team is composed of all SPR employees.

The P2 Advocates Team, composed of staff from each site, several departments in New Orleans, and a DOE representative, disseminate awareness throughout the SPR. P2 announcements and suggestions are communicated via monthly conference calls and the SPR electronic banner. Minutes are published on the outlook public folders and the Environmental Webpage, which are available to all SPR employees.

In 2003, the SPR was very aggressive in continuing to integrate the EMS into its business operations. These efforts reaped direct benefits to the DOE both in cost savings and waste reduction. As a result, the SPR was a recipient of the National Association of Environmental Professionals National Environmental Excellence Award. Each of the SPR Louisiana sites was also recognized by the Louisiana Quality Foundation for Environmental Excellence.

In 2003, the SPR Toner Recycling Team expanded the recycling program beyond laser cartridges to include other printing consumables including but not limited to inkjets, drums and fax cartridges. The result was an annual cost savings of $12,000. The team was recognized by the DM Cost Savings Program.

During March 2003 New Orleans SPR collected 565 pounds of Mardi Gras Beads which were donated to the Greater New Orleans Association of Retarded Citizens. The workers and students clean and bundle the beads to further develop their skills and help raise money to further their education. The Diversity committee, coordinating with the P2 Program, collected 67 cell phones which were donated to the Jefferson Parish Sheriff’s Department for distribution to the elderly. These types of activities raise employee awareness of recycling and directly benefit the surrounding community.

All SPR employees generate waste and are responsible for properly managing their waste according to regulatory requirements, completing corresponding training, and complying with procedural and contractual requirements to minimize the generation of waste from spills or mixing of different waste streams. To achieve waste minimization/reduction and P2, the SPR promotes the use of non-hazardous substitutes for hazardous materials in all activities. P2 activities are incorporated in the design, development, construction, operation, and maintenance of all projects and activities.

In 2003, Big Hill employees found a viable alternative to painting the 190 foot communications tower. A Med Intensity strobe light was installed which meets the FAA/FCC requirements for daytime visibility. The costs of labor, materials, equipment, transportation, and supervision/inspection were reduced and any possible waste generation was eliminated. The project was reported to DOE HQ as 2003 P2 Accomplishment with a cost savings of $70,052.

SPR employees have a general awareness of buying recycled items in accordance with the Comprehensive Procurement Guidelines (CPG), which is EPA's continuing effort to promote the use of materials recovered from solid waste. Buying recycled-content products ensures that the materials collected in recycling programs will be used again in the manufacture of new products. In 2003, the SPR continued to streamline the tracking system of purchases in the SAP system.

In 2003, the SPR achieved 100 percent success for purchasing Affirmative Procurement products. During September 2003 alone, the SPR spent in excess of $500,000 on concrete which was used to install a parking lot at Bayou Choctaw ($447,500), a parking lot at the Big Hill Degas Plant ($44,000) and some additional major maintenance jobs at Bryan Mound. These jobs successfully satisfy the requirement for the purchasing of specific EPA-designated recycled materials mandated by Executive Order 13101. It also helps fulfill the SPR target Pollution Prevention Goal #6: Increase purchases of EPA-designated items with recycle content to 100 percent except when not available competitively at reasonable price or that do not meet.

All of these efforts contribute to the SPR meeting the Pollution Prevention/Energy Efficient (P2E2) Goal # 4: Recycle 45 percent of sanitary waste by year 2005.

A P2E2 committee was established with the purpose of developing and coordinating energy efficiency and pollution prevention projects for the SPR. The committee meets on a quarterly basis to incorporate activities designated by the DOE Energy Policy Act of 1992, which calls for programs designed to incorporate energy heating/cooling initiatives and accelerate the introduction of alternative fuel vehicles to reduce the nation's dependence on imported oil.

In June 2003, the SPR E2P2 committee participated in a Pollution Prevention Opportunity Assessment (PPOA) with the DOE Office of Fossil Energy which successfully resulted in generating a new list of potential projects to be considered for the out years. The projects evaluated in 2003 included: Use of Optima Batteries in the GEM vehicles, Streamlining the Property Excess Program, New Initiatives to Reduce Waste, and Battery Recycling Program Expansion.

SPR M&O staff members also participated in a fourth consecutive beach sweep program in September 2003. Beach Sweep is a nationally organized shoreline clean-up event sponsored in New Orleans, LA by the Lake Pontchartrain Basin Foundation.

SPR NOLA staff and their family members collected seven bags of trash and one bag of recyclables along a quarter mile route along the south shore of Lake Pontchartrain.


The participation also included the Big Hill site's sponsorship of two Boy Scout troops that collected trash near High Island and a portion of shoreline along the Trinity River at Anahuac and the

Bryan Mound site's coordination with the Freeport Area Swim Team (FAST) that resulted in the collection of twenty five bags of trash and debris from Bryan Beach.

3.6 INTEGRATED SAFETY MANAGEMENT (ISM)

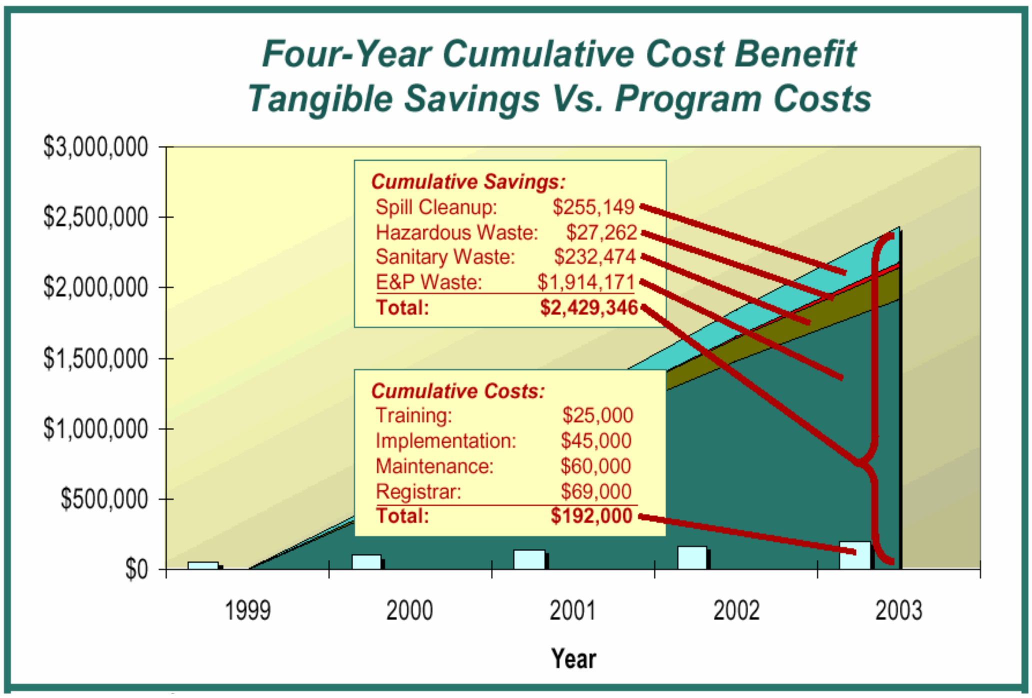
The Environmental Management System (EMS) is the environmental leg of ISM that is integrated throughout all SPR activities. The SPR ISM utilizes the EMS to infuse ISM principles throughout the environmental program. In the same regard EMS elements are directed up through the overreaching ISM system.

3.7 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

An EMS is the environmental component of ISM and complies with provisions of executive order 13148. Environmental considerations are interwoven into management and work programs and practices at all levels so as to achieve DOE's mission while achieving prevention of pollution, continuous improvement, and compliance with requirements. Protection of the public and the environment is achieved in the process, which begins with a formal NEPA review at the conceptual stage of the project and ends with the project's completion under controlled conditions that minimize environmental impact. A NEPA review includes the recognition of the environmental aspects of the project that, if not managed, could result in detrimental environmental impact when the project is completed. Thus, by integrating NEPA into the EMS, the SPR enhances protection of the environment and manages its environmental obligations in a safe and effective manner.

The SPR patterns its EMS in accordance with the ISO 14001 EMS standard. There is a top-down commitment to full implementation of this EMS. The DM EMS establishes the necessary organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, and maintaining the environmental policy.

Due to the accomplishments of the EMS, a refocus of management attention and employee involvement since 1999 has reduced hazardous waste disposal costs by $27,262, sanitary waste disposal expenditures by $232,474 and spill clean-up costs by $255,149.



disposal costs by $1,914,171. This equates to approximately $607,336 savings annually ($2,429,346 since 1999) for pollution prevention efforts targeted directly at reducing spills, hazardous waste, sanitary waste, and E&P wastes through source reduction and expansion of recycling programs.

3.8 TRAINING

Site personnel with environmental responsibilities and Emergency Response Team (ERT) personnel have received training in environmental plans and procedures. Site management personnel are knowledgeable of environmental procedures; spill reporting procedures, site-specific Spill Prevention Control and Countermeasures (SPCC) Plans, Emergency Response Procedures, and compliance awareness. ERT personnel from all sites

participate in annual spill response refresher and hazardous materials technician training currently provided at the Texas A&M University, Engineering Extension Service facilities. Onsite drills and exercises are also provided to hone spill management strategies, practice spill cleanup methodologies, and sharpen control skills. Site response personnel are trained to rapidly and effectively contain and cleanup oil, brine, and hazardous substance spills under the circumstances typical at each SPR site. New Orleans personnel, who will be expected to provide site support during an incident response, have also been trained to the hazardous materials technician level and receive refresher training annually.

All site personnel and unescorted site visitors receive compliance awareness training via "The Active Force of Protection" videotape which provides an overview of the environmental program including individual responsibilities under the program. SPCC and Hazardous Waste Handling training is mandatory and provided to the applicable site personnel annually.

All site personnel also receive computer-based ISO 14001 EMS training annually. The training provides an overview of those elements of the ISO 14001 standard that involve all personnel. It also identifies environmental aspects and impacts of SPR activities.

M&O contractor environmental staff members are trained to the National Registry of Environmental Professionals, Registered Environmental Manager (REM), level and are independently certified as such through examination.

In order to better assist the SPR sites with regard to performing SPR site assessments, and Treatment Storage Disposal (TSD) facility due diligence inspections, several M&O environmental staff members completed ISO 14001 Lead Auditor certification training.

DOE environmental staff provides oversight of M&O and construction contractor activities and have completed ISO 14001 Lead Auditor Certification, and NEPA, and environmental compliance training. DOE staff certifications include Registrar

Accreditation Board EMS Lead Auditor registration, REM designation, and certified EH&S manager.

3.9 ES&H WEBSITE

In order to provide an efficient and effective means of obtaining information about key environmental topics at the SPR, a website was developed. This website is only available on the SPR internal intranet and contains a summary of all the major environmental regulatory and program information, including active permits, procedures and this report, and is updated monthly.

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4. ENVIRONMENTAL RADIOLOGICAL PROGRAM INFORMATION

Radioactive sources at the SPR consist of X-ray that is used in laboratory and scanning equipment or other sealed sources brought on site for the purpose of performing radiography and cavern wire-line type logging operations. Procedures are in place to protect personnel from exposure during these operations. In addition the SPR is subject to inspections by the state implementing agencies (Louisiana Department of Environmental Quality and Texas Department of Health) and required notices to employees are posted on each X-ray scanning device.

4.1 SEALED SOURCES

At the SPR sealed sources of radiation are used for monitoring activities related to the physical properties of crude oil, brine, and cavern dimensions. During CY 2003 sealed sources were used at the SPR to perform a total of 179 cavern integrity monitoring activities without the occurrence of any incidents.

4.2 NATURALLY OCCURRING RADIOACTIVE MATERIALS (NORM)

A contracted survey, conducted at all SPR sites and the commercial pipe yard where SPR piping is stored, was completed in early 1991. The results, no readings of elevated levels at any location, were submitted to the states as required by Louisiana and Texas regulations. No additional monitoring is required due to the negative results of this 1991 NORM survey.

5. ENVIRONMENTAL NON-RADIOLOGICAL PROGRAM INFORMATION

A primary goal of DOE and the SPR contractor is to ensure that all SPR activities are conducted in accordance with sound environmental practices and that the environmental integrity of the SPR sites and their respective surroundings is maintained.

Effluent and surveillance monitoring are conducted at the SPR sites to assess the impact of SPR activity on air, surface water, and ground water. Effluent monitoring consists of measuring the pollutants of concern in airborne and liquid effluents at all the sites while surveillance monitoring consists of sampling the environmental media at or around the sites.

5.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

In CY 2003 the DM achieved triennial recertification of its EMS to the ISO 14001 standard. The EMS was initially certified in May of 2000, but recent changes in ANSI Registrar Accreditation Board requirements require EMS recertification every three years. The DM EMS includes the necessary organizational structure, activity planning, designation of responsibilities, practices, procedures, processes, and resources to support and validate the DM Environmental Policy, ASP5400.2 (Appendix B).

Conformance of the EMS to the ISO 14001 standard is illustrated through the ISO 14001 Environmental Management System Manual, ASI5400.55. This document provides description or reference to DM policies, plans, procedures, environmental aspects and impacts, and objectives and targets that are the foundation of the EMS. Environmental management programs conducted to achieve environmental objectives are briefly described in Table 5-1 EMS Program Achievement.

Table 5-1 EMS Program Achievement

Environmental Objective	How Achieved
Reduce hazardous waste generation	A P2/E2 Leadership goal. Refer to Item 1, Table 2-1.
Reduce sanitary waste generation	A P2/E2 Leadership goal. Refer to Item 3, Table 2-1.
Increase recycling of sanitary waste through waste diversion	A P2/E2 Leadership goal. Refer to Item 4, Table 2-1.
Meet environmental actions and submit documents to DOE and regulators on/before milestone dates	Milestone dates are agreed upon with environmental personnel prior to discussion with DOE and their subsequent establishment. They are tracked by environmental personnel and DOE via DM's weekly environmental Summary of Significant Environmental Impacts and Activities.
Review purchase requests, designs, summaries of work, and other documents by due dates	Each department has a focal point for receiving documents for review. The documents are distributed by the focal point to subject matter experts for review and comment.
Reduce environmental permit exceedances	Personnel involved with activities that involve environmental permits are aware of permit limitations that can be affected by their activities. When they do occur, exceedances are formally addressed real time in an Occurrence Report. The reports prompt a description of occurrence, cause, and corrective action. To provide awareness and promote corrective action, the information is also provided monthly in a report to the DM President and to upper management at the monthly project review meeting for discussion.
Reduce violations to the Clean Air, Clean Water, and Resource Recovery and Conservation Acts	Awareness is provided to site personnel through spill prevention and waste management training. Reportable releases are documented and managed like permit exceedances. Waste accumulation areas are inspected weekly and waste inventories are conducted monthly. Waste reports are reviewed monthly for compliance issues by ES&H Managers and the New Orleans waste management specialist.
Reduce the number of reportable occurrences of releases	During a release, trained emergency response personnel respond to control and minimize spill impact. Releases are documented and reviewed in the same manner as permit exceedances and violations to the Clean Air and Clean Water Acts.

Table 5-1 EMS Program Achievement (continued)

Environmental Objective	How Achieved
Maintain EMS certification to the ISO 14001 Standard	Money and time are budgeted to accommodate third party audits by an RAB accredited registrar. Audit dates are scheduled with the registrar and participating sites months in advance to assure that a minimum of two audits are completed by the end of June and December.
Increase purchasing of EPA designated recycled content products (affirmative procurement)	A P2/E2 Leadership goal. Refer to Item 6, Table 2-1.
Maintain a high Maintenance Performance Appraisal Report (MPAR) score for the maintenance program	A well-maintained facility should equate to fewer environmental impacts such as spills. MPAR is a weighted average that is calculated and published monthly in a detailed report. It is used to measure performance related to quality of maintenance, preventive maintenance completion, maintenance support, scheduling effectiveness, productivity, corrective maintenance backlog, and readiness of critical must-operate equipment. Maintenance related criteria that are measured include quality, support to other areas, mission readiness, scheduling effectiveness, productivity, preventive maintenance completion, and backlog. Each criterion has a goal, and failure to achieve a goal serves as an indicator for attention.
Conduct an effective predictive maintenance program (PdM).	Data is systematically collected and analyzed on equipment essential for drawdown and fill operations to prevent failure and possible resultant spills and fires. Equipment performance is monitored during actual use and during exercises. Vibration monitoring is a critical part of PdM. Other types of predictive maintenance testing include monitoring of pump flow and head performance, utilizing thermography to inspect electrical distribution systems, testing oil in rotating equipment to determine machine and lubricant condition, analyzing motor data, and utilizing airborne ultrasonic technology to detect electrical abnormalities.
Complete planned community outreach projects.	A Public Outreach Plan is developed by DOE and implemented each year by the DM Strategic Performance and Communications Group. The plan address four areas of focus – community outreach, primary customer outreach, environmental safety and health outreach, and new initiatives. The plan lists the year’s activities and provides a description for each. Employee awareness and participation in community outreach is promoted.

Table 5-1 EMS Program Achievement (continued)

Environmental Objective	How Achieved
Complete milestones associated with cavern integrity testing and reporting.	Cavern integrity tests are completed to identify and prevent leakage from subterranean cavern piping into geological formations. Meeting milestones of a regimented test program is a proactive approach to preventing releases.
Maintain site physical protection (security) systems.	A physically secure site should be less vulnerable to environmental impact by subversive elements. Security systems are constantly monitored for performance by the site's protective force. Discrepancies are reported daily to the site security specialist for review and initiation of a work order for repair. Work orders for the PPS systems are given very high priority – the same as drawdown critical equipment. Also, the site security specialist champions the work orders during the work scheduling meetings.
Complete and submit semi-annual piping and pipeline assurance reports on schedule.	Piping and pipeline assurance reports culminate pipe integrity inspection and testing activities. These activities support spill prevention. Site piping undergoes ultrasonic testing every six months. Pipeline integrity is measured through the following inspections: cathodic protection, quarterly rectifier, annual ground potential, close interval (ground potential) every 3 years, six-month corrosion coupon, 3-5 year smart pig, 5–year navigable water way, and pipeline over flights every two weeks.
Ensure key spill equipment is available.	Each site has key spill equipment that is tailored to site conditions. The equipment is inventoried quarterly by the site's emergency management coordinator. Any operational discrepancies are noted and corrective action is taken.
Ensure basic order agreements are in place for spill response and clean up at each site.	Each site has agreements with at least two spill response contractors - a primary and an alternate. When choosing contractors, factors such as company location, available/type of equipment, and available manpower are considered. The contractors are called out to participate in annual drills where their performance is evaluated.

Table 5-1 EMS Program Achievement (continued)

Environmental Objective	How Achieved
Ensure emergency response capabilities through training emergency response team (ERT) members.	Each site has a group of well-trained ERT personnel who can respond to emergencies such as spills and fire. Training is budgeted annually. New ERT members receive 40 hours of fire training independent of the SPR. The New Orleans Emergency Preparedness group and the site emergency coordinators develop refresher training annually. All pertinent topics are covered within a three-year cycle, with specific topics receiving more emphasis than others. Refresher training has been conducted at Texas A&M University. Unannounced and scheduled site drills are also conducted at each site to test skills and strategies.
Ensure that the Incident Commander/Qualified Individual at each site is trained in Incident Command.	Due to the potential size and complexity of SPR emergencies, and the probability that emergency response will include outside agencies and other entities, many key management at all sites (including New Orleans) who could serve as the incident commander or qualified individual have received computer based training in Incident Command. Incident management is tested during every drill.
Ensure fire protection capabilities at each site through prompt Priority One and Two fire protection system repairs.	Work orders to repair fire protection equipment are tracked weekly to assure that they receive sufficient attention for prompt resolution. The site fire protection specialist reviews open work orders during regularly scheduled work planning meetings and champions work orders for fire system repair. The level of response to repair fire equipment is gauged against the level of response provided to must-operate equipment. Fire system repairs are to be completed as promptly or sooner than the time for vital operational equipment repairs.
Reduce the amount of Halon 1301 (a Class I ozone depleting substance) on the SPR	A P2/E2 Leadership goal. Refer to Item 10, Table 2-1. SPR-wide Halon removal began in late 2003. The gas will be replaced with early fire detection systems. Work will be completed in 2004.

Table 5-1 EMS Program Achievement (continued)

Environmental Objective	How Achieved
Complete a review of alternative of in-service alternative fuel vehicle site utilization.	A P2/E2 Leadership goal. Refer to Items 12, 13, and 14, Table 2-1. Site vehicle utilization is examined to determine current transportation needs.
Minimize utility costs by controlling overall electric loads and reduce energy consumption through efficiency improvements.	A P2/E2 Leadership goal. Refer to Item 7, Table 2-1.
Ensure active continuance of local law enforcement agency (LLEA) programs.	Monthly contact is made with law enforcement agencies (from federal to local) that support the SPR. Field tactical exercises are held annually at each site, and supporting agencies are invited to participate.
Control workplace hazards and integrate safety into all phases of work planning and execution through the behavioral safety contact rate.	The behavioral safety program includes environmental behavioral that promotes pollution prevention. Working employees are monitored and briefed by trained behavioral safety observers who look for behavior that supports waste paper minimization, recycling, and spill prevention.

5.2 PROTECTION OF BIOTA

As addressed in previous sections of this report, the SPR does not maintain radioactive processes and thus there is not a requirement to monitor radioactive doses in the surrounding biota. The SPR does, however, take steps in accordance with the DM Environmental Policy (Appendix B) and standards established by DOE, to ensure that the surrounding wildlife population is not impacted.

In addition, SPR site personnel have received training on wildlife rescue and rehabilitation techniques. Select DM employees have received training in Oiled Wildlife Response. An oil spill at the SPR sites could affect large numbers of protected migratory birds and wildlife requiring many trained and certified responders. Trained personnel have special knowledge and skills in the wildlife rescue and rehabilitation techniques necessary in support of the emergency incident command structure organization.

5.3 AIR QUALITY EFFLUENT MONITORING

The air pollutants of concern that are emitted by the SPR sites are either hazardous or have an impact on the ambient air quality. The hazardous air pollutants (HAP) are benzene, toluene, ethylbenzene, and xylene. The non-hazardous pollutants that have an impact on air quality are non-methane/non-ethane volatile organic compounds (VOC), nitrogen oxides (NOx), sulfur dioxides (SO_2), carbon monoxide (CO), and particulate matter (PM_{10}). The quantity of these pollutants emitted is minor relative to other facilities in the respective air quality regions.

Effluent monitoring for air pollutants consists of monitoring processes and calculating the effluent volume through the use of acceptable industry practices. These results are compared to the permitted limits to ensure that they are in compliance.

Effluent monitoring at the SPR consists of measuring the following in order to quantify emissions:

- run-time of diesel powered emergency electrical generators;
- volume and type of crude oil flowed through frac tanks, floating roof tanks, diesel tanks, gasoline tanks, and oil-water separators;
- volume of paint and solvent used on-site;
- volume of brine which may release VOCs placed into the brine pond;
- number of piping components that emit over the acceptable regulatory limits (leakers) by monitoring all components with an organic vapor analyzer (OVA).

Effluent monitoring for air pollutants is conducted at both Texas (Big Hill and Bryan Mound) and two Louisiana sites (Bayou Choctaw and West Hackberry). The results are reported to state agencies through EIQs, except for Bayou Choctaw and West Hackberry. These sites are exempt from reporting because their emissions are below the regulatory threshold for reporting in their respective air quality regions. Even though the results of monitoring for Bayou Choctaw and West Hackberry are not reported, they are used to determine ongoing compliance with the permit and assure adequate performance of emission control equipment.

Another type of monitoring conducted at the SPR sites is air pollution control equipment monitoring. The air regulations require that the seals on internal and external floating roof tanks be inspected at frequent intervals for visible tears, holes, or cumulative gaps exceeding regulatory limits and to ensure they are operating accordingly. Big Hill has an external floating roof tank that requires inspection of the primary (every five years) and secondary (semi-annual) seals. The three internal floating roof tanks at Bryan Mound require seal inspections every year because the roofs only have a mechanical shoe seal.

5.3.1 Bayou Choctaw

In June of 2003 the EPA downgraded the ozone non-attainment area where Bayou Choctaw from serious to severe. Bayou Choctaw is permitted to emit 7.4 metric tpy (8.14 tpy) of VOC. Since this site emits less than nine metric tpy (10 tpy), it is not required to use an emissions inventory summary (EIS) to report its annual emissions.

Although Bayou Choctaw is exempt from reporting emissions, effluent monitoring was conducted in 2003 on all permitted sources. These sources include the volume of crude oil in slop tanks and frac tanks, volume of brine flowing through the brine pond, monitoring piping components to determine if there are leakers, and monitoring the run-time of the emergency generators.

Bayou Choctaw operated in accordance with all air quality regulatory requirements in 2003. Table 5-2 is a summary of the permitted limits for Bayou Choctaw.

Table 5-2. Parameters for the Bayou Choctaw Emission Points

Emission Point Description	**Parameter**	**Permit Limits Metric tpy (tpy)**
Crude & Slop Oil Tanks	VOC	2.43(2.67)
Gasoline Fuel Tank	VOC	0.52 (0.57)
Frac Tanks	VOC	1.42 (1.56)
Brine Pond	VOC	1.14 (1.26)
Fugitive Emissions	VOC	1.66 (1.83)
Air Eliminator	VOC	0.04 (0.04)
Emergency Generators/Pumps	VOC PM_{10} SO_2 NO_x CO	0.19 (0.21) 0.18 (0.20) 0.72 (0.79) 5.54 (6.09) 1.26 (1.39)

5.3.2 Big Hill

Located in a moderate non-attainment area for ozone, Big Hill is permitted to emit 16.6 metric tpy (18.35 tpy) of VOC. Since it emits more than nine metric tpy (10 tpy), it is required to use an emissions inventory questionnaire (EIQ) to report its annual emissions. Effluent monitoring was conducted in 2003 on all permitted sources such as the volume of crude oil in slop tanks, frac tanks, and surge tank; volume of brine into the brine pond; monitoring piping components to determine number of leakers; and monitoring the run-time of the emergency generators. Big Hill operated in accordance with all air quality regulatory requirements in 2003. Table 5-3 is a summary of the permitted limits for Big Hill.

Table 5-3. Parameters for the Big Hill Emission Points

Emission Point Description	Parameter	Permit Limits, Metric tpy (tpy)
Crude & Slop Oil Tanks	VOC	0.59 (0.65)
Gasoline & Diesel Fuel Tanks	VOC	0.25 (0.28)
Brine Pond	VOC	2.86 (3.15)
Fugitive Emissions	VOC	8.47 (9.34)
Air Eliminator	VOC	1.36 (1.50)
Solvent Recycler	VOC Acetone	0.05 (0.06) 0.01 (0.01)
Emergency Generators/Pumps	VOC PM_{10} SO_2 NO_x CO	0.11 (0.12) 0.07 (0.08) 0.64 (0.71) 2.38 (2.62) 0.52 (0.57)
Degas Plant	VOC NO_x CO SO_2 PM_{10}	2.95 (3.25) 14.14 (15.59) 18.11 (19.96) 0.44 (0.48) 1.24 (1.37)

5.3.3 Bryan Mound

Located in a severe non-attainment area for ozone, is permitted to emit 19.7 metric tpy (21.8 tpy) of VOC. Since the site emits more than nine metric tpy (10 tpy), it is required to use an EIQ to report its annual emissions. Effluent monitoring was conducted in 2003 on all permitted sources. These sources include the volume of crude oil in slop tanks, frac tanks, and three internal floating roof tanks; volume of brine into the brine tank; monitoring piping components to determine number of leakers; and monitoring the run-time of the emergency generators. Bryan Mound operated in accordance with all air quality regulatory requirements in 2003. Table 5-4 is a summary of the permitted limits for Bryan Mound.

Table 5-4. Parameters for the Bryan Mound Emission Points

Emission Point Description	Parameter	Permit Limits, Metric tpy (tpy)
Crude Oil Tanks	VOC	9.35 (10.31)
Gasoline & Diesel Fuel Tanks	VOC	0.38 (0.42)
Brine Tank	VOC	4.92 (5.42)
Fugitive Emissions	VOC	0.89 (0.98)
Paints & Solvents	VOC	0.62 (0.68)
Emergency Generators/Pumps	VOC PM_{10} SO_2 NO_x CO	0.06 (0.07) 0.06 (0.07) 0.50 (0.55) 1.62 (1.79) 0.37 (0.41)
Degas Plant	VOC NO_x CO SO_2 PM_{10}	3.48 (3.84) 13.67 (15.07) 17.23 (18.99) 0.34 (0.37) 1.24 (1.37)

5.3.4 West Hackberry

Located in an ozone attainment area, West Hackberry is permitted to emit 37 metric tpy (40.8 tpy) of VOC. Since the site emits less than 45.4 metric tpy (50 tpy), it is not required to use an EIS to report its annual emissions.

Although West Hackberry is exempt from reporting emissions, effluent monitoring was conducted in 2002 on all permitted sources. These sources include the volume of crude oil in slop tanks and frac tanks, volume of brine into the brine tank, monitoring piping components to determine number of leakers, and monitoring the run-time of the emergency generators. West Hackberry operated in accordance with all air quality regulatory requirements in 2003. Table 5-5 is a summary of the permitted limits for West Hackberry.

Table 5-5. Parameters for the West Hackberry Emission Points

Emission Point Description	Parameter	Permit Limits, Metric tpy (tpy)
Slop Oil Tanks	VOC	1.81 (1.99)
Gasoline Fuel Tank	VOC	0.25 (0.28)
Frac Tanks	VOC	23.86 (26.30)
Brine Tank	VOC	0.95 (1.05)
Fugitive Emissions	VOC	9.71 (10.70)
Air Eliminator	VOC	0.06 (0.07)
Emergency Generators/Pumps	VOC PM_{10} SO_2 NO_x CO	0.41 (0.45) 0.20 (0.22) 0.02 (0.02) 12.59 (13.88) 2.75 (3.03)

5.4 WATER DISCHARGE EFFLUENT MONITORING

The water discharge permit-monitoring program fulfills the requirements of the EPA NPDES, and corresponding states TPDES and LPDES programs. All SPR point source discharges are conducted in compliance with these federal and state programs.

SPR personnel regularly conducted point source discharges from all sites during 2003. These discharges are grouped as:

a. brine discharge to the Gulf of Mexico;
b. storm water runoff from tank, well, and pump pads;
c. rinse water from vehicles at specific locations draining to permitted outfalls;
d. effluent from package sewage treatment plants; and
e. hydrostatic test water from piping or tanks (LA only).

The SPR disposed of 7.43 million m^3 (47.05 mmb) of brine (mostly saturated sodium chloride solution with some infrequent discharges of lower salinities than normally attributed to brine) during 2003. Approximately 64.6 percent of the brine was disposed in the Gulf of Mexico via the Big Hill (53.6 percent of the total) and the Bryan Mound (11 percent of the total) brine disposal pipelines. The remainder was disposed in saline aquifers via injection wells at the Bayou Choctaw (0.4 percent of the total) and West Hackberry (35 percent of the total) sites.

During 2003, 5,112 measurements and analyses were performed to monitor wastewater discharge quality from the SPR in accordance with NPDES and corresponding state permits. The SPR was in compliance with permit requirements for approximately 99.94 percent of the analyses performed. A total of three permit non-compliances were reported during CY 2003. This information is listed in Tables 5-8, 5-10, and 5-12.

All non-compliances were of short duration and immediately resolved, causing no observable adverse environmental impact.

Parameters monitored varied by site and discharge. Separate tables provide specific parameters and the most frequent sampling interval (based on permit limitations). More frequent measurements are often made of certain parameters that assist with unit operations; these additional data are reported as required by the permits. The data measurement variations observed during CY 2003 is discussed in separate sections by site.

5.4.1 Bayou Choctaw

Bayou Choctaw personnel performed a total of 58 measurements on permitted outfalls and reporting stations to monitor LPDES permit compliance during 2003. Table 5-6 provides the permit required monitoring parameters and limits for the Bayou Choctaw outfalls. There were no noncompliances in 2003 resulting in a 100 percent site compliance performance record for the year.

Most monitoring is related to water discharges regulated under the Louisiana Department of Environmental Quality (LDEQ) Office of Water Resources LPDES permit. Discharges are from two package sewage treatment plants (STP), and stormwater runoff from well pads, pump pads (containment areas), and the site vehicle rinsing station.

Table 5-6. Parameters for the Bayou Choctaw Outfalls

Location/Discharge	**Parameter**	**Frequency***	**Compliance Range**
Sewage Treatment Plants	Flow BOD_5 TSS pH Fecal Coliform	1/6 months 1/6 months 1/6 months 1/6 months 1/6 months	(Report only) <45 mg/l Avg. <45 mg/l max 6.0 – 9.0 s.u. <400 col./100 ml
Raw Water System Test Water, Raw Water System Maintenance Diversion Water, Fire System Test Water, Facility Wash Water	pH TOC Oil & Grease	Annually if discharged	6.0 to 9.0 s.u. <50 mg/l <15 mg/l
Piping (50:50 Clorox/ Wash Water)	pH TOC	Annually if discharged	6.0 to 9.0 s.u. < 50 mg/l
Storm Water	Flow Oil and Grease pH TOC Visible Sheen	1/quarter 1/quarter 1/quarter 1/quarter 1/discharge	(report only) <15 mg/l max 6.0 – 9.0 s.u. <50 mg/l no presence
Vehicle Rinsing	TOC Oil and grease pH	Annually if discharged	<50 mg/l <15 mg/l 6.0-9.0 s.u.

* Permit requires an increase in the sampling frequency when an exceedance occurs.

5.4.2 Big Hill

During 2003, 2541 measurements were performed to monitor NPDES and state discharge permit compliance. Table 5-7 provides the permit required monitoring parameters and limits for the Big Hill outfalls. There was one noncompliance during 2003 (Table 5-8) resulting in a 99.96 percent site compliance performance level.

Water discharges at Big Hill are regulated and enforced through the EPA NPDES permit program and the similar RCT discharge permit program (TPDES). The discharges at the site involve brine to the Gulf of Mexico, hydroclone blow down into the Intracoastal Waterway, effluent from the sewage treatment plant and storm water from well pads and pump pads. There were no discharges during 2003 from the hydroclone blow down system.

Region 6 US EPA reissued the Big Hill NPDES permit in September 2003, with an effective date of November 1, 2003. The reissued permits (both Bryan Mound and Big Hill) contain many revised sampling and testing changes along with revised organization of the site's outfalls, arranged primarily so as to coincide with the current state permits.

Table 5-7. Parameters for the Big Hill Outfalls

Location/Discharge	Parameter	Frequency*	Compliance Range
Brine to Gulf	Flow Velocity Oil & Grease TDS TSS pH DO Biomonitoring Integrity Tests	Continuously Per flow 1/mo 1/mo 1/mo 1/mo Daily 1/qtr 1/yr	0.27 million m3/day >6.1 m/sec (20 ft/sec) <15 mg/l max, <10 mg/l avg. (report only) (report only) 6.0 - 9.0 s.u. detectable (when using O_2 scavenger) Lethal NOEC 3.0% Offshore within 4% of onshore
Storm Water Outfalls	Oil and Grease TOC pH Salinity	1/mo 1/mo 1/mo 1/mo	<15 mg/l < 75 mg/l 6.0 - 9.0 s.u. <8 ppt (RWIS report only RCT)
Recirculated Raw Water	Flow	1/mo	Report only
Sewage Treatment Plant	Flow BOD_5 COD (RCT only) TSS pH	5 days/wk 1/mo 1/mo 1/mo 1/mo	(report only) <45 mg/l max <20 mg/l avg. <250 mg/l max <150 mg/l avg. <45 mg/l max <20 mg/l avg. 6.0 - 9.0 s.u.
Hydro clone Blow down (not used)	Flow TSS pH	1/wk 1/wk 1/wk	report report 6.0 - 9.0 s.u.

*Permit requires an increase in the sampling frequency when an exceedance occurs.

Table 5-8. 2003 Permit Noncompliances at Big Hill

Date	Outfall Location	Permit Parameter	Value (Limit)	Cause
7/07/03	003 Stormwater	TOC	119 mg/l (50mg/l)	Total organic carbon (TOC) for a single day's discharge was found to be 119 mg/l, exceeding discharge limits. Duplicate analyses confirmed the high value. Further investigation determined the causative factor to be decomposing grass clippings in the retained stormwater (moat) for the containment surrounding the tank BHT-7.

5.4.3 Bryan Mound

Bryan Mound personnel made 1930 measurements on permitted outfalls for the purpose of monitoring NPDES and state discharge permit compliance during 2003. Table 5-9 provides the permit-required parameters and limits for the Bryan Mound outfalls. There was one noncompliance during 2003 (Table 5-10) resulting in a 99.95 percent site compliance performance level.

Water discharges at Bryan Mound are regulated and enforced through the EPA NPDES permit program and the similar RCT discharge permit program for state waters (TPDES). Under provisions of the new federal permit (effective November 1, 2003), Bryan Mound had the frequency of its biomonitoring increased to quarterly and with the Critical Dilution Factor (CDF) increased to 3% on the lethal No Observed Effect Concentration (NOEC). Many other minor changes to the permit also occurred during this renewal, completed in tandem with the Big Hill NPDES permit and the changes are reflected in the Table 5-9. The four categories of permitted discharges remained brine to the Gulf of Mexico; stormwater from the tank farm, well pads, and pump pads; recirculated water from the intake pumps; and package sewage treatment plant effluent. In December, 2003, a renewal application was provided to and found administratively complete by the RCT for renewal of the state permit UHS-004, due to expire in March, 2004.

Table 5-9. Parameters for the Bryan Mound Outfalls

Location/Discharge	Parameter	Frequency*	Compliance Range
Brine to Gulf	Flow Velocity Oil & Grease TDS TSS pH Biomonitoring Integrity test	Continuously Per flow 1/wk(RCT) 1/mo 1/mo 1/mo 1/qtr 1/yr	report only >6.1 m/sec (20 ft/sec) <15 mg/l max <10 mg/l avg. (report only) (report only) 6.0 - 9.0 s.u. Lethal NOEC 3.0% Offshore within 4% of onshore
Storm Water	Oil and Grease TOC pH Salinity	1/qtr 1/qtr 1/qtr 1/qtr	<15 mg/l <75 mg/l 6.0 - 9.0 s.u. < 8 ppt
Recirculated Raw Water	Flow	1/mo	Report only
Sewage Treatment Plant	Flow BOD_5 TSS pH	1/mo 2/mo 2/mo 2/mo	Report only <20 mg/l avg. <45 mg/l max <20 mg/l avg. <45 mg/l max 6.0 - 9.0 s.u.

*Permit requires an increase in the sampling frequency when an exceedance occurs.

Table 5-10 2003 Permit Noncompliances at Bryan Mound

Date	Outfall Location	Permit Parameter	Value (Limit)	Cause
11/03/03	002 Sewage Treatment Plant	BOD5	Max observed 51.6 mg/l (45 mg/l)	The value 51.6 mg/l reported by a contract lab for the sample date shown. Cause was undeterminable as STP appeared to be in good "health" and other parameters remained in compliance as well as additional follow-on evaluations.

5.4.4 West Hackberry

West Hackberry personnel performed 588 measurements on permitted outfalls to monitor LPDES compliance during 2003. Table 5-11 provides the permit-required parameters and limits for the West Hackberry outfalls. There was one noncompliance during 2003 (Table 5-12), resulting in a 99.83 percent site compliance level.

The water discharges at the West Hackberry site were regulated under the EPA (NPDES) permit administered by the state of Louisiana under the LPDES permit program. Since the issuance of the current LPDES permit in 1999 the site has no reporting requirements for the former offshore brine line that has been removed from active service. In August 2003, the West Hackberry LPDES permit was the subject of a renewal application. The application was submitted and found administratively complete, thereby extending the permit due to expire in February 2004, until a renewed permit is prepared and issued.

Table 5-11. Parameters for the West Hackberry Outfalls

Location/Discharge	Parameter	Frequency**	Compliance Range
Fire Water, Air Conditioner Condensate, Inspection Pit Discharges, Ground Water Discharges, Raw Water Test Discharges (incl. Non-contact Once-through Cooling Water and Diversion Water)	TOC Oil & Grease pH Visible sheen	None None None None	≤50 mg/l ≤15 mg/l 6.0 to 9.0 s.u. no presence
Storm Water (Wellpads & Containments at Slop Oil Tank battery, slop oil tank booster pump pad, vehicle rinse station, brine storage tank area, High Pressure Pump Pad, Fuel Storage Area, Emergency Generator, Lake Charles Meter Station, and RWIS Transformer Area)	Flow Oil and Grease TOC pH Visible Sheen	1/quarter 1/quarter 1/quarter 1/quarter 1/day	(report only) ≤15 mg/l ≤ 50 mg/l 6.0 - 9.0 s.u. no presence
Treated Sanitary Wastewater	Flow BOD_5 TSS pH fecal coliform	1/6 months 1/6 months 1/6 months 1/6 months 1/6 months	Report < 45 mg/l < 45 mg/l 6.0 to 9.0 s.u. < 400 col./100 ml

** Permit requires an increase in the sampling frequency when an exceedance occurs

Table 5-12 2003 Permit Noncompliances at West Hackberry

Date	Outfall Location	Permit Parameter	Value (Limit)	Cause
07/07/03	007 Stormwater Cavern 105	Oil & Grease	Max observed 18.2 mg/l (15 mg/l)	The value 18.2 mg/l reported by a contract lab for the sample date shown. Cause was undeterminable as no signs of O&G were noted in the field for the discharge. Therefore, no duplicate tests were available for confirmation; site personnel suspect some form of analytical problem.

5.5 SURFACE WATER QUALITY SURVEILLANCE MONITORING

During 2003, surface waters of the Bayou Choctaw, Big Hill, Bryan Mound, and West Hackberry SPR sites were sampled and monitored for general water quality according to the SPR Environmental Monitoring Plan. Monitoring is conducted to provide early detection of surface water quality degradation resulting from SPR operations. It is separate from, and in addition to, the water discharge permit monitoring program

Data and statistics are presented in tabular form by site in Tables 5-12 through 5-15. All observed values that were below detectable limit (BDL) were evaluated as one-half the detection limit for statistical calculation purposes. In addition to commonly used summary statistical methods, the coefficient of variation (CV) treatment was incorporated to evaluate the data. The coefficient of variation is used to quickly identify data sets with a high incidence of variation. Values approaching or exceeding 100 percent indicate that one standard deviation from the stated mean encompasses zero. This method draws attention to highly variable or skewed data sets for further evaluation. Extremely low values of CV (approaching or equal 0 percent) indicate the standard deviation is small, relative to the mean, such as would be the case if a preponderance of measurements fell below the method limit of detectability.

5.5.1 Bayou Choctaw

Samples were collected and analyzed monthly, where possible, for six surface water-monitoring stations. Monitoring stations A through G are identified in Figure 5-1. Parameters monitored include pH, salinity (SAL), temperature, dissolved oxygen (DO), oil and grease (O&G), and total organic carbon (TOC) (Table 5-13). A discussion of each parameter follows.

5.5.1.1 Hydrogen Ion Activity (pH)

The annual median values of pH for all the monitored stations ranged from 7.1 to 7.3 s.u. which is consistent with the ambient conditions of surrounding waters. The complete range for all measurements at all stations for 2003 is 6.2 to 8.4 s.u. Fluctuations observed are attributed to environmental and seasonal factors such as variations in rainfall, temperature, and aquatic system flushing.

5.5.1.2 Temperature

Observed temperature ranged from 7.2 ºC to 30.9 ºC. Temperature fluctuations were consistent among all stations and are attributed solely to meteorological conditions since the Bayou Choctaw site produces no thermal discharges.

5.5.1.3 Salinity (SAL)

In 2003, average annual salinities ranged from 0.5 ppt (indicating below detectable limits) to 3.2 ppt (Station C). Wetland stations A, D, E, F and G revealed below detectable limits throughout the year in their respective databases for 2003. It is believed these values are a response to the return of rainfall and a break of the drought experienced during a large portion of the past couple of years. The largest measurement (3.2 ppt) occurred at Station C this year. No explicable activities relating to salinity occurred upstream of the point. The spike was very short term as 8 of the 12 measurements were BDL. None of the measured values are expected to produce any discernible physical impacts.

5.5.1.4 Oil and Grease (O&G)

Oil and grease levels were below detectable levels (<5 mg/l) at 3 of the 7 stations throughout 2003, with only 3 of the 21 total measurements found above the lower detectable limit and with the maximum reading of 5.2 mg/l observed at station F. All of these data favorably reflect continued good site housekeeping and effective site spill prevention, control, and response efforts.

5.5.1.5 Dissolved Oxygen (DO)

The consistency in DO observations suggests that SPR runoff and discharges do not significantly reduce or affect the DO of receiving waters. The lower levels observed at 0.0 and 0.1 mg/l at various times are attributed to high temperature and high natural organic loading combined with low flow and minimal flushing typically observed at times in a wetland environment. Peak levels approaching 7.9 mg/l are attributed to high primary productivity. All of the CV percentages were acceptably low and very similar at all of the stations throughout the year indicating consistent measurements with similar variability. This same trend is also evident in comparison with the previous year.

5.5.1.6 Total Organic Carbon (TOC)

Average annual TOC concentrations ranged from 6.9 to 10.7 mg/l. This range of TOC is indicative of biologically stable surface waters. High TOC readings correlate with high organic loading that is usually found in stagnant or sluggish water bodies of limited volume, such as an evaporating pool of water. Stations B, C, and F produced the higher CV percentages (~50%) indicating wider variability during the year. The highest value measured was only 22.5 mg/l occurring at Station F and is believed to reflect the normal range of background TOC in the area below the confluence of both the N-S and E-W canals which drain large areas of shallow swamps south and southeast of the main site. This measurement also occurred in mid-summer and may have been affected by short-duration low flows occurring between large sporadic rain events. The relatively low values observed around the site sampling locations as well as the peaks produced no discernible physical impacts and are not out of line with the natural setting or system receiving episodic rainfall.

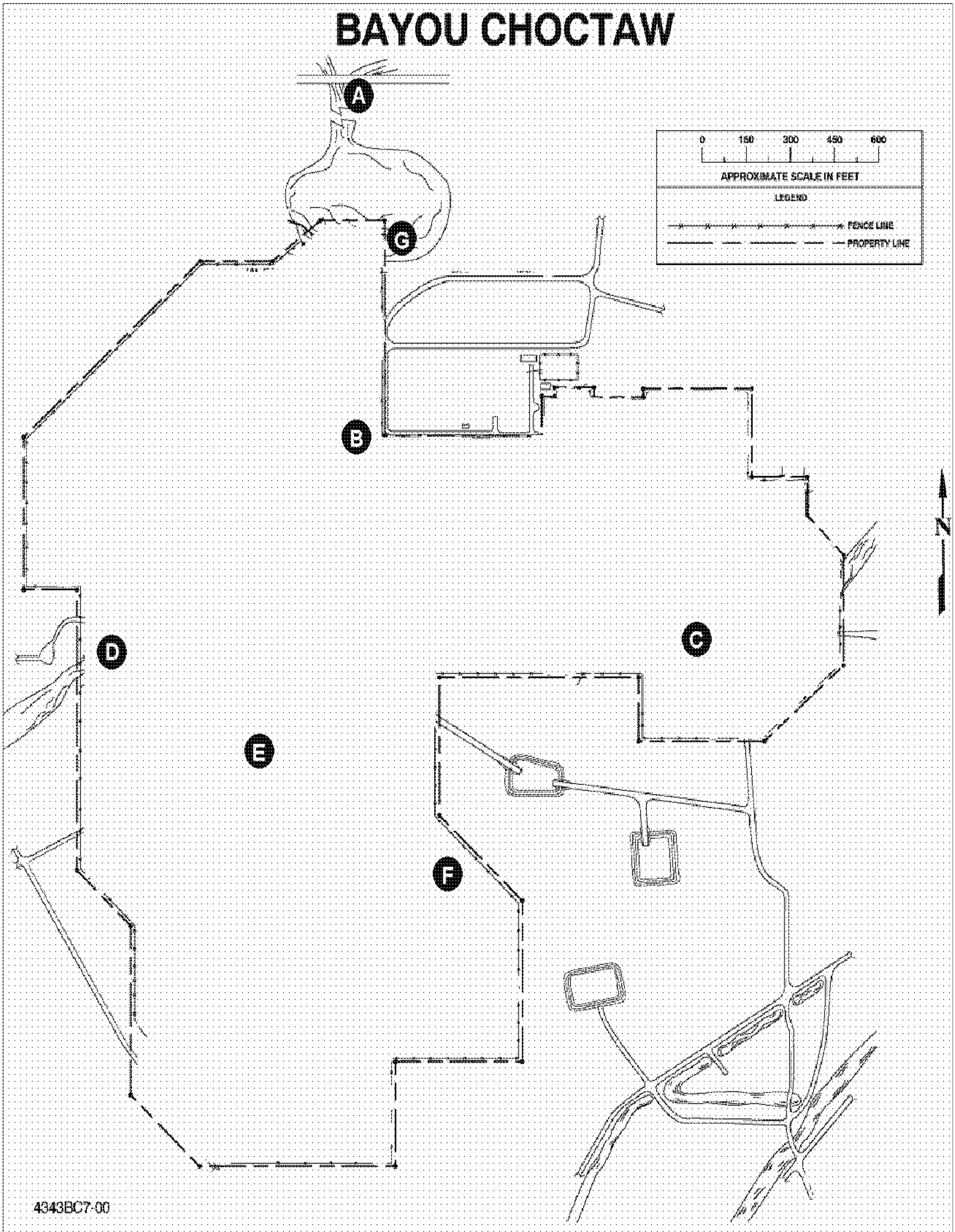


Figure 5-1. (Sheet 1 of 2) Bayou Choctaw Environmental Monitoring Stations

Water Quality Monitoring Stations

A. Canal north of Cavern Lake at perimeter road bridge
B. Ditch running under the road to warehouse on West side of the road in area of heat exchangers.
C. East-West Canal at Intersection of road to brine disposal wells
D. East-West Canal
E. Wetland Area
F. Wetland Area
G. Near Raw Water Intake

Figure 5-1. (Sheet 2 of 2) Bayou Choctaw Environmental Monitoring Stations

Table 5-13. 2003 Data Summary for Bayou Choctaw Monitoring Stations

Station	Statistical Parameters	pH (s.u.)	Temperature (deg. C)	Salinity (ppt)	Oil & Grease (mg/l)	Dissolved Oxygen (mg/l)	Total Organic Carbon (mg/l)
A	Sample Size	11	11	11.	3	11	11
	Number of BDL	0	NV	11	2	0	0
	Maximum	7.9	28.4	0.5	5.1	6.2	15.0
	Minimum	6.6	8.6	0.5	2.5	0.1	3.0
	Mean	NV	19.6	0.5	3.4	2.9	8.6
	Median	7.2	18.9	0.5	2.5	2.3	7.2
	Standard Deviation	NV	6.7	0.0	1.5	1.7	4.0
	Coefficient of Variation	NV	34.1	0.0	44.6	59.8	46.4
B	Sample Size	11	11	11	3	11	11
	Number of BDL	0	NV	2	3	0	0
	Maximum	7.7	27.3	3.0	2.5	6.2	16.1
	Minimum	6.8	8.0	0.5	2.5	0.0	3.1
	Mean	NV	19.3	1.6	2.5	2.3	9.1
	Median	7.2	19.7	1.5	2.5	1.3	7.8
	Standard Deviation	NV	5.7	0.8	0.0	2.1	4.7
	Coefficient of Variation	NV	29.6	48.0	0.0	89.9	51.4
C	Sample Size	12	12	12	3	12	12
	Number of BDL	0	NV	8	2	0	0
	Maximum	7.6	30.9	3.2	5.0	7.7	14.0
	Minimum	6.8	8.5	0.5	2.5	1.6	2.3
	Mean	NV	21.0	1.0	3.3	3.9	6.9
	Median	7.1	21.0	0.5	2.5	3.9	7.7
	Standard Deviation	NV	6.8	0.8	1.4	2.0	3.7
	Coefficient of Variation	NV	32.5	87.3	43.3	52.0	54.3
D	Sample Size	11	11	11	3	11	11
	Number of BDL	0	NV	11	3	0	0
	Maximum	7.9	28.1	0.5	2.5	5.6	15.0
	Minimum	6.6	7.2	0.5	2.5	1.9	2.6
	Mean	NV	19.8	0.5	2.5	3.5	7.9
	Median	7.2	19.8	0.5	2.5	3.3	7.9
	Standard Deviation	NV	6.5	0.0	0.0	1.2	3.4
	Coefficient of Variation	NV	32.7	0.0	0.0	33.3	43.3
E	Sample Size	11	11	11	3	11	11
	Number of BDL	0	NV	11	2	0	0
	Maximum	7.8	28.5	0.5	5.0	4.8	14.6
	Minimum	6.2	8.7	0.5	2.5	0.6	1.7
	Mean	NV	19.5	0.5	3.3	2.3	8.7
	Median	7.3	21.3	0.5	2.5	1.4	8.9
	Standard Deviation	NV	6.5	0.0	1.4	1.8	3.7
	Coefficient of Variation	NV	33.6	0.0	43.3	75.6	42.4

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

Table 5-13 2003 Data Summary for Bayou Choctaw Monitoring Stations (continued)

Station	Statistical Parameters	pH (s.u.)	Temperature (deg. C)	Salinity (ppt)	Oil & Grease (mg/l)	Dissolved Oxygen (mg/l)	Total Organic Carbon (mg/l)
F	Sample Size	11	11	11	3	11	11
	Number of BDL	0	NV	11	2	0	0
	Maximum	8.1	28.7	0.5	5.2	7.5	22.5
	Minimum	6.3	8.6	0.5	2.5	0.1	1.2
	Mean	NV	19.9	0.5	3.4	2.6	10.7
	Median	7.2	20.8	0.5	2.5	1.9	8.8
	Standard Deviation	NV	6.2	0.0	1.6	2.4	5.8
	Coefficient of Variation	NV	31.2	0.0	45.8	90.0	54.2
G	Sample Size	11	11	11	3	11	11
	Number of BDL	0	NV	11	3	0	0
	Maximum	8.4	28.7	0.5	2.5	7.5	12.6
	Minimum	6.9	7.7	0.5	2.5	1.8	3.0
	Mean	NV	19.4	0.5	2.5	4.7	7.9
	Median	7.2	19.7	0.5	2.5	4.7	7.3
	Standard Deviation	NV	7.0	0.0	0.0	1.9	3.6
	Coefficient of Variation	NV	35.9	0.0	0.0	39.7	45.6

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

5.5.1.7 General Observations

Based on the above discussion, the following general observations are made regarding the quality of Bayou Choctaw surface waters.

a. The surrounding surface waters continue to have a relatively neutral pH. No spikes either high or low are evident in this year’s data set.

b. Observed salinity measurements remained generally low and within the historical range. Many stations reflected evidence of an apparent break in the longstanding drought of 4 years or more as 4 of 7 stations reported no measurable salinity at all.

c. Temperature variations were caused by seasonal changes. There are no thermal processes used at any SPR site.

d. Occasionally, low DO levels are attributed to high temperatures and organic loading resulting from low flow and minimal flushing typically observed in backwater swamp areas.

e. The occasional oil and grease levels sporadically detected throughout the year at random stations confirm that site oil inventories are effectively managed, minimizing any impact on the Bayou Choctaw environs.

5.5.2 Big Hill

Monitoring stations were established at five locations (Figure 5-2) to assess site-associated surface water quality and to provide early detection of any surface water quality degradation that may result from SPR operations. Parameters including pH, temperature, salinity (SAL), oil and grease (O&G), dissolved oxygen (DO), and total organic carbon (TOC) were monitored (Table 5-14).

5.5.2.1 Hydrogen Ion Activity (pH)

The 2003 data show the pH of site and surrounding surface waters remained between 6.2 and 8.3 s.u. The annual median values of pH for each of the monitored stations ranged from 6.7 to 7.5 s.u.

5.5.2.2 Temperature

Temperatures observed in 2003 ranged from 10ºC to 36ºC exhibiting the characteristics expected from seasonal meteorological changes. Temperature fluctuations were very similar among all stations.

5.5.2.3 Salinity (SAL)

Annual average salinities were generally quite low throughout most of the year ranging from fresh on the site all year long to a maximum of 11.6 ppt at the RWIS location on the ICW nearer the

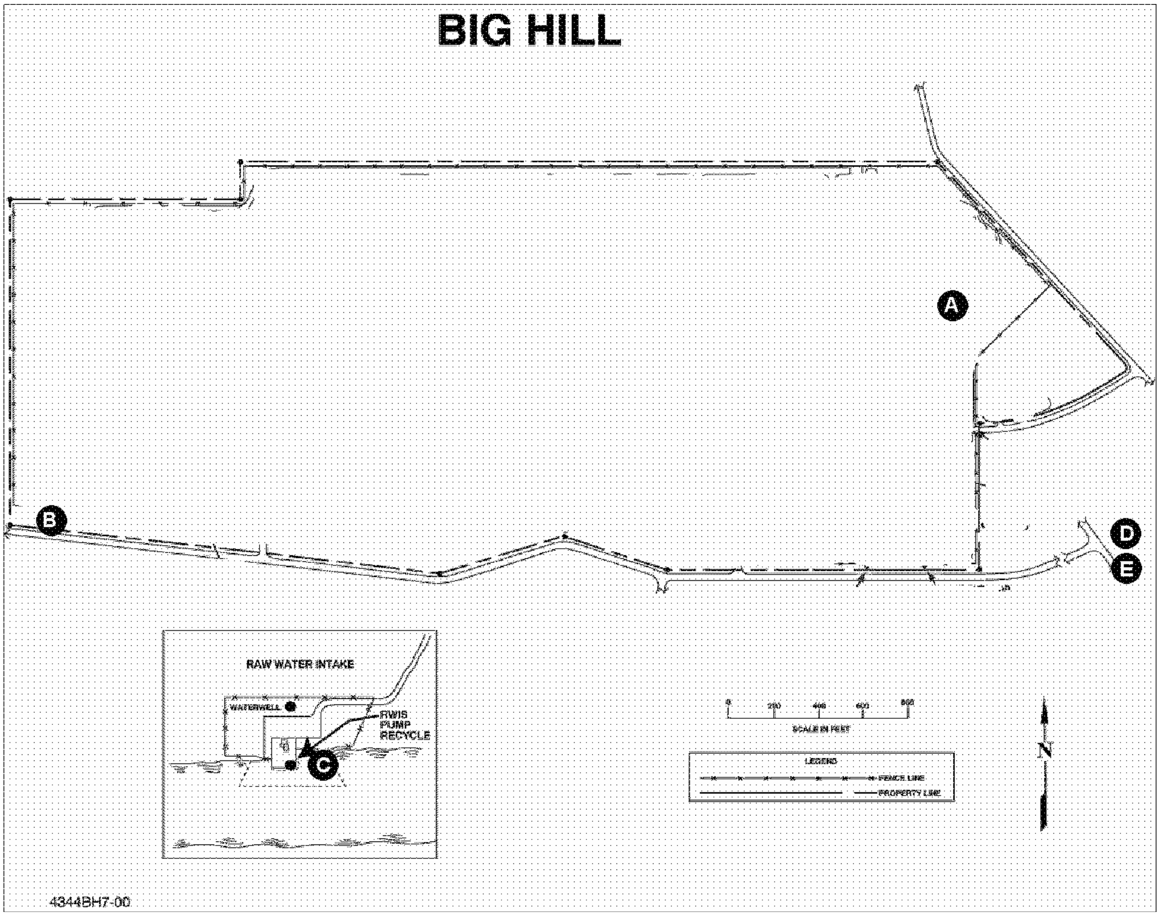
Gulf. Several stations recorded excessive to large CV's this year indicative of the low quantifications determined in a dataset predominated by values below the detectable limits. No brine releases or chronic impacts are indicated.

5.5.2.4 Oil and Grease (O&G)

All of Oil & Grease results made for all stations were below the detectable limit of 5 mg/l this year. No indication of crude oil impacts from SPR activities was found or observed at any of these stations during the sampling episodes.

5.5.2.5 Dissolved Oxygen (DO)

Dissolved oxygen generally is greatest in the winter and spring and lowest from summer through fall. DO peaks were observed in the months of January and March and the lowest values were determined in June, August and November this year. The lowest valid variability was found at the RWIS where the greater flow and depth of the ICW provides a more constant dissolved oxygen level. The station with the most DO variability during the year was the Pipkin Reservoir sampling station D, about 2 miles southeast from the site. The overall range in DO was found to be 1.2 to 8.8 mg/l with a range of 3.3 to 5.1 mg/l in mean values from all sites tested during the year.



Water Quality Monitoring Stations

A Pond receiving effluent from site sewage treatment plant (STP)
B Wilbur Road ditch – southwest of site
C RWIS at Intracoastal Waterway
D Pipkin Reservoir – (1.8 Miles from map location)
E Gator Hole (3.1 Miles from map location)

Figure 5-2. Big Hill Environmental Monitoring Stations

Table 5-14. 2003 Data Summary for Big Hill Monitoring Stations

Station	Statistical Parameters	pH (s.u.)	Temperature (deg. C)	Salinity (ppt)	Oil & Grease (mg/l)	Dissolved Oxygen (mg/l)	Total Organic Carbon (mg/l)
A	Sample Size	2	2	2	1	2	2
	Number of BDL	0	NV	2	1	0	0
	Maximum	6.8	26.0	0.5	2.5	3.6	5.4
	Minimum	6.6	22.0	0.5	2.5	2.9	4.1
	Mean	NV	24.0	0.5	2.5	3.3	4.8
	Median	6.7	24.0	0.5	2.5	3.3	4.8
	Standard Deviation	NV	2.8	0.0	0.0	0.5	0.9
	Coefficient of Variation	NV	11.8	0.0	0.0	13.9	18.8
B	Sample Size	12	12	12	4	12	12
	Number of BDL	0	NV	5	4	0	0
	Maximum	7.6	33.0	7.6	2.5	6.4	16.7
	Minimum	7.0	11.0	0.5	2.5	1.7	3.4
	Mean	NV	23.1	1.9	2.5	4.3	11.4
	Median	7.5	23.5	1.0	2.5	4.1	10.6
	Standard Deviation	NV	7.4	2.1	0.0	1.3	3.7
	Coefficient of Variation	NV	31.9	110.5	0.0	30.9	32.3
C	Sample Size	12	12	12	4	12	12
	Number of BDL	0	NV	2	4	0	0
	Maximum	7.9	32.0	16.6	2.5	6.0	16.3
	Minimum	6.7	12.0	0.5	2.5	3.4	5.7
	Mean	NV	22.7	6.8	2.5	4.8	8.5
	Median	7.5	24.0	5.9	2.5	4.9	8.0
	Standard Deviation	NV	6.9	5.9	0.0	0.8	2.9
	Coefficient of Variation	NV	30.3	86.3	0.0	17.4	33.7
D	Sample Size	12	12	12	4	12	12
	Number of BDL	0	NV	8	4	0	0
	Maximum	8.3	36.0	11.1	2.5	8.8	25.8
	Minimum	6.5	10.0	0.5	2.5	1.2	10.3
	Mean	NV	23.3	2.8	2.5	5.1	18.2
	Median	7.6	24.5	0.5	2.5	5.0	17.5
	Standard Deviation	NV	7.7	3.9	0.0	2.1	4.9
	Coefficient of Variation	NV	33.3	136.4	0.0	41.2	26.8
E	Sample Size	12	12	12	4	12	12
	Number of BDL	0	NV	2	4	0	0
	Maximum	7.9	32.0	13.4	2.5	6.1	18.7
	Minimum	6.2	11.0	0.5	2.5	3.0	8.2
	Mean	NV	22.8	5.2	2.5	4.4	12.0
	Median	7.2	24.0	3.1	2.5	4.5	11.4
	Standard Deviation	NV	6.8	4.9	0.0	1.0	3.2
	Coefficient of Variation	NV	30.0	92.9	0.0	21.8	26.7

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

5.5.2.6 Total Organic Carbon (TOC)

Average annual TOC concentrations varied from 4.8 to 18.2 mg/l over the year at the five monitoring stations, ranging from 3.4 to 25.8 mg/l. The higher TOC levels observed are believed indicative of potential biological decomposition events.

5.5.2.7 General Observations

Based on the above discussion, the following general observations are made regarding the quality of Big Hill surface waters.

a. The fresh surface waters had a nearly neutral pH, but pH was generally found to be higher in brackish water as expected.
b. The observed salinity measurements were low on the site and increased in natural fashion from fresh water at the site to an intermediate brackish and highly variable water regime at the ICW.
c. Surrounding surface waters were neither contaminated nor affected by SPR crude oil.
d. Temperature variations followed seasonal meteorological changes.
e. Dissolved oxygen and total organic carbon fluctuations were within typical ranges indicative of seasonal meteorological and biological influences for such a setting and range of environments.

5.5.3 <u>Bryan Mound</u>

Surface waters surrounding the Bryan Mound site were monitored during 2003. Blue Lake has seven sampling stations and Mud Lake has three established stations.

Surface water monitoring stations are identified in Figure 5-3. Stations A through C and E through G are located along the Blue Lake shoreline to monitor effects of site runoff. Station D, located farther away from the site in Blue Lake, serves as a control. Stations H and I are located along the Mud Lake shoreline to monitor effects of site runoff. Station J, which is located near the central point of Mud Lake, serves as a control.

Parameters monitored in the Bryan Mound surface waters include pH, temperature, salinity (SAL), oil and grease (O&G), Dissolved Oxygen (DO), and total organic carbon (TOC) (Table 5-15).

Area-wide drought conditions affecting the annual sampling routine by lowering lake levels beyond the established sample points for about half the year last year were not in effect this year as abundant but sporadic rainfall has returned to the area.

5.5.3.1 Hydrogen Ion Activity (pH)

In 2003 the pH of Blue Lake and Mud Lake was slightly basic, ranging from 7.4 to 8.8 s.u. for the dataset and the same range for both the control stations. All stations in Blue Lake were generally found to be slightly more basic throughout the sample year than those in Mud Lake. These data are indicative of natural waters devoid of carbon dioxide and generally hard in regard to mineral content. Marine and brackish waters, such as those in Blue Lake and Mud Lake, typically have somewhat elevated pH levels and high mineral content.

The pH fluctuations measured in these formerly drought-affected surface waters are comparable to the normal range of variability historically seen at the Bryan Mound site.

5.5.3.2 Temperature

Temperatures observed in 2003 ranged from 11.8º C to 34.6º C and reflect almost a complete year of ambient surface water testing. The deduction can be made, however, that the range of fluctuations are attributed to meteorological events.

5.5.3.3 Salinity (SAL)

Observed salinity fluctuations ranged from below the detection limit <1.0 to only 1.4 ppt in Blue Lake and from <1.0 to 18.4 ppt in Mud Lake. Salinity fluctuations are attributed to meteorological and tidal conditions rather than site operations, since salinity observed at control sample stations D and J varied consistently with those found along site shorelines. The higher salinity values in Mud Lake are primarily caused by the strong tidal and wind influence on the lake, and its more direct link with the nearby Gulf of Mexico through the Intracoastal Waterway. This year's dataset reflects the return to more normal rainfall patterns as the ambient salinity measurements were noticeably fresher than last year’s, which was skewed by the limited episodic rainfall occurring then.

5.5.3.4 Oil and Grease (O&G)

All of the O&G measurements made during the course of the 2003 calendar year were found below the method detectable limit of 5 mg/l. These data are reflective of effective spill prevention and good housekeeping practices being maintained.

5.5.3.5 Dissolved Oxygen (DO)

During 2003, DO was measured nine to twelve times from all stations during the year. Sufficient water was available for measurement in both Blue and Mud Lakes throughout all the seasons this year. This year, presumably in response to the abundant and regular rainfall, both locations revealed no differences or significant seasonality in terms of oxygen content. All measurements reflect adequate ambient DO throughout the year and indicate “no apparent impact” from SPR operations.

5.5.3.6 Total Organic Carbon (TOC)

In 2003 the observed TOC values ranged from 3.9 mg/l to 55.9 mg/l. In Blue Lake the measurements ranged from 9.5 to the 55.9 mg/l. The TOC observations in Mud Lake were generally lower but more variable ranging from the 3.9 mg/l to 52.2 mg/l. Higher TOC measured in Blue Lake is attributed to primary productivity and low volumetric flushing. The TOC levels observed in both lakes, however, are indicative of healthy unaffected ambient conditions.

5.5.3.7 General Observations

Based on the above discussions, the following general observations are made regarding the quality of Bryan Mound surface waters.

a. The observed pH was stable for the period tested and slightly basic in both Blue Lake and Mud Lake, but typical of brackish waters. Of the two receiving waters, Blue Lake was consistently found the more basic this year.

b. Temperature and salinity fluctuations observed during the period tested are attributed to meteorological and tidal conditions rather than site operations.

c. Higher TOC levels observed in Blue Lake are attributed to higher primary productivity and low flushing of this surface water body.

d. The dissolved oxygen level measured in both Blue Lake and Mud Lake was within typical ranges indicative of seasonal meteorological and biological influences for such a setting and environment.

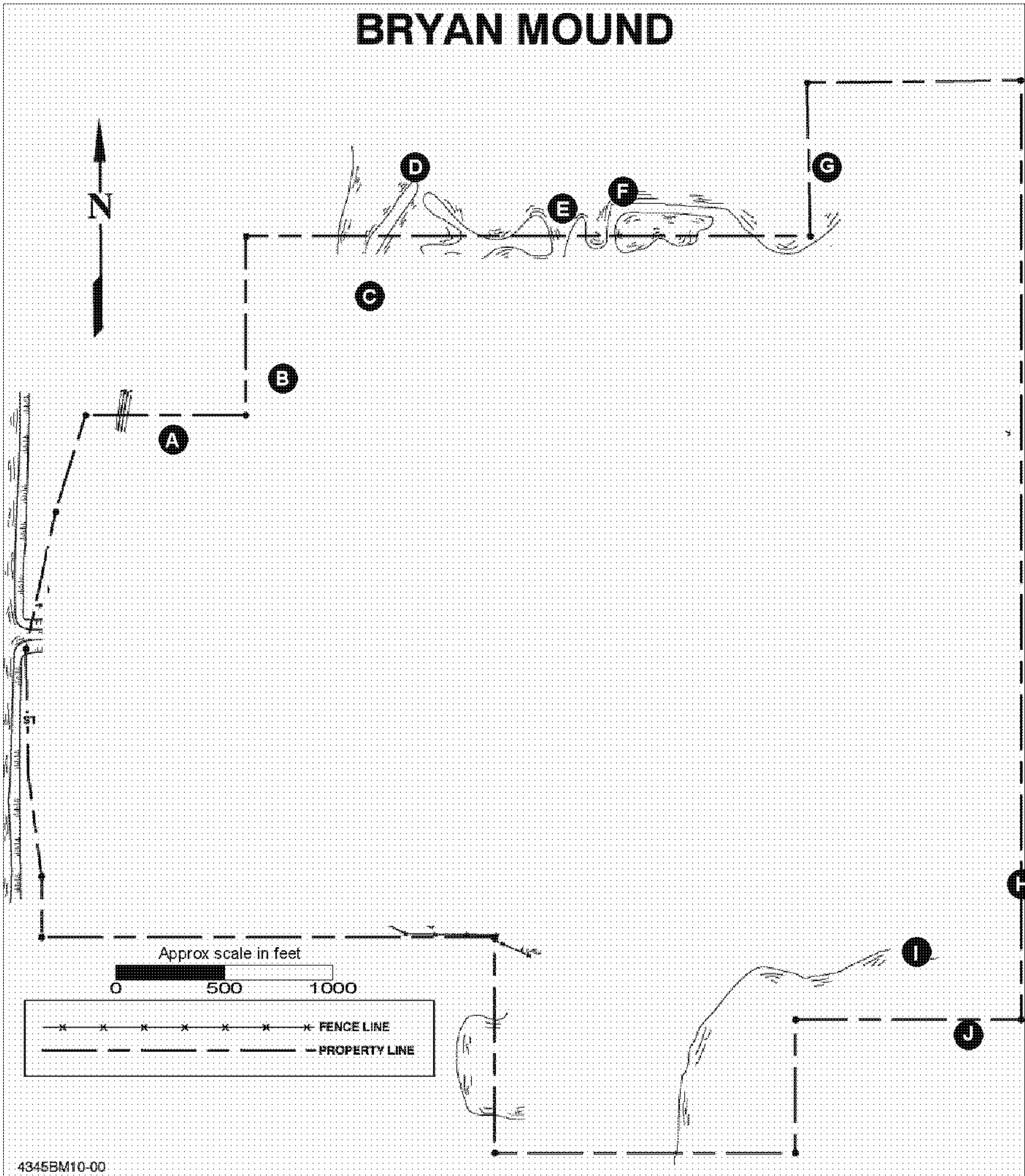


Figure 5-3. (Sheet 1 of 2) Bryan Mound Environmental Monitoring Stations

Water Quality Monitoring Stations

A	Blue Lake
B	Blue Lake
C	Blue Lake
D	Blue Lake - Control Point 1
E	Blue Lake
F	Blue Lake
G	Blue Lake
H	Mud Lake
I	Mud Lake
J	Mud Lake – Control Point 2

Figure 5-3. (Sheet 2 of 2) Bryan Mound Environmental Monitoring Stations

Table 5-15. 2003 Data Summary for Bryan Mound Monitoring Stations

Station	Statistical Parameters	pH (s.u.)	Temperature (deg. C)	Salinity (ppt)	Oil & Grease (mg/l)	Dissolved Oxygen (mg/l)	Total Organic Carbon (mg/l)
A	Sample Size	12	12	12	5	12	12
	Number of BDL	0	NV	1	5	0	0
	Maximum	8.8	30.8	1.4	2.5	11.6	53.0
	Minimum	7.6	11.9	0.5	2.5	4.7	10.4
	Mean	NV	22.7	1.1	2.5	9.0	20.2
	Median	8.3	23.1	1.2	2.5	9.5	17.2
	Standard Deviation	NV	6.5	0.2	0.0	1.9	11.2
	Coefficient of Variation	NV	28.6	20.2	0.0	21.3	55.2
B	Sample Size	12	12	12	5	12	12
	Number of BDL	0	NV	1	5	0	0
	Maximum	8.8	31.1	1.4	2.5	12.5	54.6
	Minimum	7.6	12.0	0.5	2.5	6.9	10.8
	Mean	NV	22.8	1.1	2.5	9.6	24.6
	Median	8.4	23.2	1.1	2.5	9.4	21.2
	Standard Deviation	NV	6.8	0.2	0.0	1.9	13.1
	Coefficient of Variation	NV	29.7	20.1	0.0	19.8	53.1
C	Sample Size	12	12	12	5	12	12
	Number of BDL	0	NV	1	5	0	0
	Maximum	8.8	31.7	1.4	2.5	15.3	55.9
	Minimum	8.2	11.8	0.5	2.5	5.8	10.5
	Mean	NV	22.6	1.1	2.5	9.7	23.2
	Median	8.4	22.8	1.1	2.5	9.0	17.6
	Standard Deviation	NV	6.7	0.2	0.0	2.6	13.8
	Coefficient of Variation	NV	29.7	20.8	0.0	26.5	59.7
D	Sample Size	12	12	12	5	12	12
	Number of BDL	0	NV	1	5	0	0
	Maximum	8.7	31.4	1.4	2.5	12.6	52.8
	Minimum	7.8	12.0	0.5	2.5	6.1	9.6
	Mean	NV	22.6	1.1	2.5	9.4	20.9
	Median	8.4	22.9	1.1	2.5	9.4	16.9
	Standard Deviation	0.2	6.8	0.2	0.0	2.1	11.7
	Coefficient of Variation	2.7	30.0	20.1	0.0	22.8	56.3
E	Sample Size	12	12	12	5	12	12
	Number of BDL	0	NV	1	5	0	0
	Maximum	8.7	31.7	1.4	2.5	12.7	52.2
	Minimum	8.0	12.2	0.5	2.5	7.1	9.7
	Mean	NV	22.8	1.1	2.5	9.4	22.9
	Median	8.4	23.1	1.1	2.5	9.4	17.7
	Standard Deviation	NV	6.8	0.2	0.0	1.8	12.9
	Coefficient of Variation	NV	29.8	20.1	0.0	19.4	56.5

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

Table 5-15 2003 Data Summary for Bryan Mound Monitoring Stations (continued)

Station	Statistical Parameters	pH (s.u.)	Temperature (deg. C)	Salinity (ppt)	Oil & Grease (mg/l)	Dissolved Oxygen (mg/l)	Total Organic Carbon (mg/l)
F	Sample Size	12	12	12	5	12	12
	Number of BDL	0	NV	1	5	0	0
	Maximum	8.8	31.6	1.4	2.5	12.4	51.3
	Minimum	8.2	11.9	0.5	2.5	7.2	9.5
	Mean	NV	22.8	1.1	2.5	9.5	19.9
	Median	8.5	23.1	1.1	2.5	9.0	16.3
	Standard Deviation	NV	6.9	0.2	0.0	1.8	10.8
	Coefficient of Variation	NV	30.2	20.1	0.0	18.9	54.4
G	Sample Size	11	11	11	5	11	11
	Number of BDL	0	NV	0	5	0	0
	Maximum	8.7	32.0	1.4	2.5	13.8	52.2
	Minimum	8.2	11.8	1.0	2.5	8.0	12.8
	Mean	NV	22.5	1.1	2.5	10.4	20.8
	Median	8.5	21.5	1.1	2.5	9.8	17.1
	Standard Deviation	NV	7.3	0.1	0.0	1.9	11.1
	Coefficient of Variation	NV	32.3	11.3	0.0	18.4	53.2
H	Sample Size	9	9	9	4	9	9
	Number of BDL	0	NV	0	4	0	0
	Maximum	8.3	34.6	18.3	2.5	13.9	34.5
	Minimum	7.4	13.1	6.7	2.5	4.5	4.4
	Mean	NV	25.4	11.2	2.5	9.4	9.1
	Median	8.0	28.7	9.9	2.5	8.7	5.7
	Standard Deviation	NV	7.6	3.7	0.0	2.9	9.6
	Coefficient of Variation	NV	29.8	33.2	0.0	31.2	105.7
I	Sample Size	9	9	9	4	9	9
	Number of BDL	0	NV	0	4	0	0
	Maximum	8.5	33.3	18.4	2.5	17.3	35.9
	Minimum	7.7	14.0	6.2	2.5	5.2	4.1
	Mean	NV	25.2	11.0	2.5	10.6	9.0
	Median	8.0	27.3	9.8	2.5	9.4	6.1
	Standard Deviation	NV	6.9	3.8	0.0	3.9	10.1
	Coefficient of Variation	NV	27.3	34.6	0.0	37.2	113.2
J	Sample Size	9	9	9	3	9	9
	Number of BDL	0	NV	0	3	0	0
	Maximum	8.2	33.0	18.4	2.5	16.7	40.1
	Minimum	7.4	16.5	6.6	2.5	4.0	3.9
	Mean	NV	25.8	10.6	2.5	9.5	10.7
	Median	8.0	29.0	9.4	2.5	9.3	6.3
	Standard Deviation	NV	6.6	3.8	0.0	3.5	11.4
	Coefficient of Variation	NV	25.4	36.1	0.0	37.3	106.2

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

5.5.4 West Hackberry

In 2003, six surface water quality stations (Figure 5-4) were monitored monthly (where practicable) at West Hackberry. Parameters monitored include pH, temperature, salinity (SAL), dissolved oxygen (DO), oil and grease (O&G), and total organic carbon (TOC) (Table 5-16).

5.5.4.1 Hydrogen Ion Activity (pH)

The pH of site and surrounding waters ranged between 6.5 and 8.9 s.u., and annual median values ranged from 7.2 to 8.4 s.u. from all stations. The ambient waters measured were slightly more basic this year versus last. Two stations (D&E) located in stormwater ditches eventually exiting the main site produced maximum values of 8.9 s.u. each. These fleeting numbers reflect travel paths and long but intermittent travel times over crushed limestone placed for erosion control and trafficability. These two stations generally reveal more basic run-off than those of the larger volume and free-flowing receiving water stations.

Fluctuations observed are relatively minor and attributed to environmental and seasonal factors such as variation in rainfall, temperature, algae and biotic growth, aquatic system flushing and the buffering effects of crushed limestone gravel on slightly acidic rainfall.

5.5.4.2 Temperature

Observed temperatures in 2003 were consistent with observations at other sites and were indicative of regional climatic effects. No off-normal measurements were observed. Recorded temperatures ranged from 9.0º C to 33.0º C and were found very consistent among stations.

5.5.4.3 Salinity (SAL)

Meteorological factors such as wind, tide, and rainfall contributed to the salinity variation observed in brackish Black Lake (Stations A, B, and C) and the Intracoastal Waterway (Station F). Salinity ranges observed in these water bodies (<1 to 15.6 ppt in Black Lake) and (<1 to 10.3 ppt in the ICW) are more conducive to supporting euryhaline organisms and those with sufficient mobility to avoid salinity stresses that occur with seasonal changes. Mean annual salinity observed at the ICW (3.5 ppt) was lower than that of Black Lake (5.6 to 6.5 ppt) due largely to the fresher water influences received from more northerly drainage ways.

Salinities observed at the two upland site stations were affected by surface runoff and not by Black Lake. Salinity means in the drainage ditch at the southwest corner of the site (Station D) and at the high pressure pump pad (Station E) were both 0.5, which confirmed values all below the detection limit (BDL). No salt effects were associated with the high pressure pump pad this year, which revealed all values below BDL. Station F on the ICW reflected the higher values and wider range than any of the other sampled stations due to the influences of the tides and proximity to diluted but saltier Gulf waters at this location.

5.5.4.4 Oil and Grease (O&G)

Observed O&G levels were below the detectable level (5 mg/l) for all monitoring stations during 2003. The data reflect effective spill prevention and good housekeeping by site personnel.

5.5.4.5 Dissolved Oxygen (DO)

The DO levels observed at all stations are suitable for aquatic life. Dissolved oxygen was somewhat more variable overall at the two site stations as opposed to the open and flowing receiving water stations. Greater surface area and water movement through currents and wave action provided continuous aeration of the lake and ICW water. Water movement at the ditch (Station D) and the high pressure pump pad retention pond (Station E) were sufficient to provide some aeration throughout 2003.

5.5.4.6 Total Organic Carbon (TOC)

The range of TOC concentrations for 2003 ranged from 3.8 to 25.8 mg/l with Station D experiencing the highest single value of 25.8 mg/l during the year. This value is not out of line with the generalized industrial setting and is very consistent with the measurements obtained during the year at all Black Lake stations. The average annual TOC concentrations by station ranged from 7.8 to 13.0 mg/l with main site station D experiencing the most variability throughout the year producing both the highest mean and maximum values as well as the lowest value overall. Because the variation is so consistent among the remaining stations, it is indicated that these measurements reflect a return of consistent rainfall to Black Lake and the surrounding environs.

5.5.4.7 General Observations

The following observations are made, based on the above discussion, concerning operational impacts on the West Hackberry aquatic environs.

a. pH and temperature remained fairly stable, generally slightly basic, and a little warmer overall and were only affected by seasonal factors.

b. The salinity measurements made throughout 2003 were consistent with the ambient and only slightly brackish receiving water environment, reflective of the return of rainfall to the area.

c. Oil and grease levels were below the detectable limit at all stations throughout 2003, which is indicative of good housekeeping.

d. Dissolved oxygen levels at site and Black Lake stations were consistently high and did not appear adversely affected by site operations.

e. Total organic carbon concentrations were quite similar at all stations with the exception of station D throughout the year suggesting no substantial transient bio-contamination or ecological events. The increased variability noted at site run-off station D results from the wider range of measurements made there during the year but nothing indicative of impact or impairment.

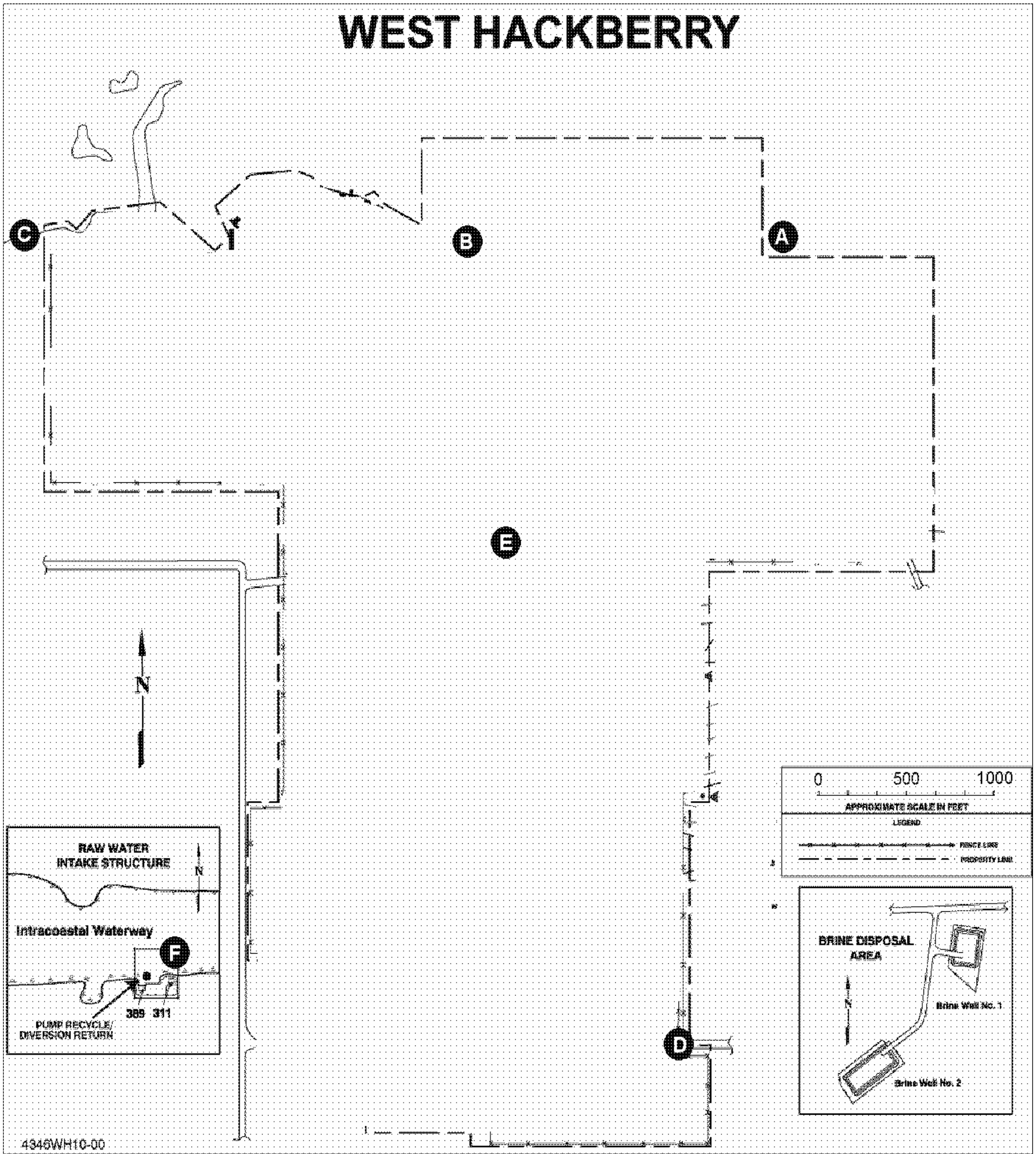


Figure 5-4. (Sheet 1 of 2) West Hackberry Environmental Monitoring

Stations<u>Water Quality Monitoring Stations</u>

A Black Lake

B Black Lake

C Black Lake

D Southeast drainage ditch

E High-pressure pump pad

F Raw water intake structure (Intracoastal Waterway)

Figure 5-4. (Sheet 2 of 2) West Hackberry Environmental Monitoring Stations

Table 5-16. 2003 Data Summary for West Hackberry Monitoring Stations

Station	Statistical Parameters	pH (s.u.)	Temperature (deg. C)	Salinity (ppt)	Oil & Grease (mg/l)	Dissolved Oxygen (mg/l)	Total Organic Carbon (mg/l)
A	Sample Size	12	12	12	4	9	11
	Number of BDL	0	NV	1	4	0	0
	Maximum	8.2	31.0	15.5	2.5	9.4	10.4
	Minimum	6.9	9.0	0.5	2.5	3.9	6.7
	Mean	NV	21.9	6.5	2.5	6.4	7.8
	Median	7.7	22.0	6.7	2.5	5.7	7.5
	Standard Deviation	NV	7.0	4.5	0.0	2.0	1.1
	Coefficient of Variation	NV	31.9	69.9	0.0	30.4	14.7
B	Sample Size	12	12	12	4	9	12
	Number of BDL	0	NV	1	4	0	0
	Maximum	8.0	31.0	15.6	2.5	8.3	9.3
	Minimum	6.9	9.0	0.5	2.5	4.3	6.5
	Mean	NV	21.9	6.1	2.5	6.6	7.9
	Median	7.8	22.0	6.5	2.5	7.0	7.9
	Standard Deviation	NV	7.2	4.3	0.0	1.3	1.0
	Coefficient of Variation	NV	32.7	70.6	0.0	19.4	12.7
C	Sample Size	13	13	13	4	11	13
	Number of BDL	0	NV	2	4	0	0
	Maximum	8.0	33.0	15.0	2.5	12.2	9.6
	Minimum	7.3	9.0	0.5	2.5	3.2	6.9
	Mean	NV	22.0	5.6	2.5	7.4	8.4
	Median	7.8	20.0	5.1	2.5	8.0	8.2
	Standard Deviation	NV	7.5	4.5	0.0	2.5	0.9
	Coefficient of Variation	NV	34.0	79.6	0.0	34.1	10.4
D	Sample Size	11	11	11	4	10	11
	Number of BDL	0	NV	11	4	1	0
	Maximum	8.9	30.0	0.5	2.5	12.7	25.8
	Minimum	7.7	14.0	0.5	2.5	0.1	3.9
	Mean	NV	22.6	0.5	2.5	7.4	13.0
	Median	8.3	25.0	0.5	2.5	8.3	11.8
	Standard Deviation	NV	5.4	0.0	0.0	4.2	6.0
	Coefficient of Variation	NV	23.8	0.0	0.0	56.6	46.0

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

Table 5-16 2003 Data Summary for West Hackberry Monitoring Stations (continued)

Station	Statistical Parameters	pH (s.u.)	Temperature (deg. C)	Salinity (ppt)	Oil & Grease (mg/l)	Dissolved Oxygen (mg/l)	Total Organic Carbon (mg/l)
E	Sample Size	11	11	11	4	9	11
	Number of BDL	0	NV	11	4	0	0
	Maximum	8.9	30.0	0.5	2.5	16.7	13.5
	Minimum	7.4	15.0	0.5	2.5	3.5	3.8
	Mean	NV	23.0	0.5	2.5	8.9	8.5
	Median	8.4	25.0	0.5	2.5	8.6	8.0
	Standard Deviation	NV	5.3	0.0	0.0	4.0	3.3
	Coefficient of Variation	NV	23.0	0.0	0.0	44.8	39.0
F	Sample Size	14	14	14	4	12	14
	Number of BDL	0	NV	6	4	0	0
	Maximum	7.7	33.0	10.3	2.5	11.1	12.0
	Minimum	6.5	10.0	0.5	2.5	3.6	6.8
	Mean	NV	22.9	3.5	2.5	6.9	8.6
	Median	7.2	22.0	1.6	2.5	6.6	8.1
	Standard Deviation	NV	7.3	3.5	0.0	2.2	1.4
	Coefficient of Variation	NV	31.7	102.1	0.0	32.0	16.8

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.

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6. SITE HYDROLOGY, GROUND WATER MONITORING AND PUBLIC DRINKING WATER PROTECTION

Ground water monitoring is performed at the Bayou Choctaw, Big Hill, Bryan Mound, Weeks Island and West Hackberry sites to comply with DOE Order 450.1, and in the case of Weeks Island and West Hackberry, a state agency agreement. Salinity is measured and the potential presence of hydrocarbons is screened at all sites. The monitoring scheme performed at West Hackberry is required by an agreement between DOE and the LDNR. West Hackberry ground water monitoring and recovery activities were reported quarterly, as required, to the LDNR in 2003. At the Weeks Island site, long-term ground water monitoring is performed and reported as part of the state approved decommissioning plan. Bryan Mound ground water quality has been conveyed annually via separate copy of this report to the RCT by special request since 1998. Wells enclosing the operating interconnected brine storage and disposal pond system at Big Hill are monitored as part of permit required leak detection. The St. James terminal has undergone a thorough remediation to satisfy state criteria for some limited crude oil leakage. During 2002, follow-on studies taken have indicated the presence of only trace quantities of remnant crude oil contamination in a limited area of backfill soils there. Because of this, there are no permanent site-wide ground water monitoring stations located at the leased St. James facility although the monitored crude oil attenuation continued throughout 2003.

Ground water salinity data collected for the past five years are presented graphically, as available for the historic site well nets and for the more recently installed Periphery Well (PW) series. These data are then discussed within each site-specific section and any gaps in data for the graphs are noted. The graphs' Y-axes have been standardized with few noted exceptions at either the 0–10 ppt or 0–100 ppt as the baseline dependent upon the historical range. This allows for easier to follow comparisons among the monitoring stations at all the SPR sites.

6.1 BAYOU CHOCTAW

The Plaquemine Aquifer is the main source of fresh water for the site and several surrounding municipalities. It is located approximately 18 m (60 ft) below the surface and extends to a depth of 150 to 182 m (500-600 ft). The upper 18 m (60 ft) of sediments in the aquifer consists of predominantly Atchafalaya clay. The interface of freshwater and saline water occurs at a depth of 122 to 150 m (400-500 ft) below the surface. Ground water in the Plaquemine Aquifer communicates locally with the Mississippi River, flowing away from it during the high river stage and towards the river when in the low stage. Other local influences to the general flow patterns are manifested by structural features; such as the piercing salt domes and proximity to off-take.

Historically, there have been four monitoring wells (BC MW1, BC MW2, BC MW3, and BC MW4) circumscribing the brine storage pond at Bayou Choctaw (Figure 6-1). These wells were drilled roughly 9 m (30 ft) below land surface (bls) generally at the corners of the structure to monitor potential impact from the brine storage pond and any other potential nearby shallow contamination sources. The verification well study placed seven additional similarly screened wells at various selected locations around the main site and one remotely located near a selected brine disposal well pad.

These periphery wells have now been added to the site's monitoring scheme to enhance evaluation of ground water flow direction and outlying salinity movements and variation. The monitoring results of these wells are also presented in this report because there are now sufficient data to maintain representative five-year trending charts as with the historical pond monitoring wells. The CY 1996 Site Environmental Report contains a detailed overview of the Phase II (periphery well) studies of this site. An adjunct of these studies is the determination of an estimated linear velocity for the shallow ground water movement of the monitored zone. For Bayou Choctaw the water in the shallow zone moves an estimated 1.2 to 2.4 m (4 feet to 8 feet) per year in a generally radial direction off the main site and underlying dome, loosely mimicking the ground contours.

Groundwater salinity observed at all of the four historical pond wells (BC MW1 through BC MW4, Figure 6-2) has historically been observed above an ambient cut-off concentration of 10 ppt for a fresh water environment for many years. This condition of elevated salinity is attributed to a previous owner's distant past operational activities and possibly some more recent brine handling activities. All four wells exhibit seasonal salinity fluctuations that are affected by rainfall. Higher salinity values usually occur in late winter and early spring, and lower salinity measurements have been observed in late spring and summer. The five-year trend at each of these four well locations, however, continues to decrease or is stable with time and all in a very similar fashion. Two wells BC MW1 and BC MW2 have decreased enough over this time period to warrant reduction of their scales to 1 to 10 ppt. The former steep decline observed at well BC MW3 indicative of the passage of a small plume is now flattened and appears to be slowly responding to the muted effects of a former impact or time-limited release event.

Past surface brine spills and other activities from previous occupants of the area may have also affected the ground water salinity observed in these shallow wells. The long-term salinity range observed at well BC MW3 that had been much greater than that of the other three historical wells appears to be returning to the ambient conditions more reflective of background, as observed with wells BC MW1 and BC MW2. Well BC MW4 located down gradient of the site and south of the E-W canal has revealed a somewhat elevated overall salinity concentration, but the long-term time-series trend is decidedly downward. Much of the variability exhibited with the earlier data may have resulted from over purging and inconsistently applied sampling techniques. At this site, the advent of the dedicated low-flow sampling apparatus and technique has greatly aided the ground water testing by assuring that a more representative sample is routinely obtained. Ground water surface piezometric data of all the wells indicate that ground water movement is radial in all directions from the high point on the dome around Cavern 15. A 1992 brine spill on the nearby low pressure pump pad north of the well may have elevated the salinity in that area, and its southerly movement was first captured by BC MW3.

This year’s 5-year historical graph of BCMW3 indicates that the salinity is now only slightly rising at the tail-end of this 5-year window and the transient effects of the historic spill has become either dilute or has moved past this monitoring position to potentially influence the further down gradient position well BC MW4.

Long-term salinity trends have been established which, when examined within the context of the radial ground water movement, assist in identifying possible areas or sources of contamination. With the exception of the stable to slightly rising trend at BC MW3 each of the five-year trending charts for the Bayou Choctaw historical and periphery wells indicate decreasing salinity.

At the up gradient well BC MW1 and the immediately down gradient intercept well BC MW2 a continuing general (five-year trend) of decreasing salinity continues into 2003.

The variability evident with the data sets previous to and including 1998 attest to the consistency associated with the advent of the low-flow sampling methodology. It is that early variability which results in the long-term decreasing trends noted now. Well BC MW1 is situated on the up gradient side of the brine pond and well BC MW2 appears to be immediately down gradient of this potential source (see Figure 6-3). Another potential source of subsurface contamination may be residuals from historical activity that occurred along the northwest corner of the pond. Periphery well BC PW2 encountered this area of existing affected ground water. The limited measurements obtained since its installation indicate no trends but rather a flat (with time) area of impact that, judging from the flow patterns, would be up gradient of and therefore not associated with the current brine pond operations.

Although it has in the past captured the most saline ground water on the site, BC MW3 is remaining essentially stable in salinity over time now. The slightly upward sloping portion of the five-year salinity trend evident at BC MW3 is interpreted to confirm the passage of an ephemeral impact of a former piping leak found and repaired near the low pressure pump pad in 1989/1990. The data now indicate the impact of that piping break was recovered to ambient for this position and the year 1996 reflected the majority of that change. In addition, the variability noted commencing in mid-year 2001 may be the advent of some trailing effects of that historical event.

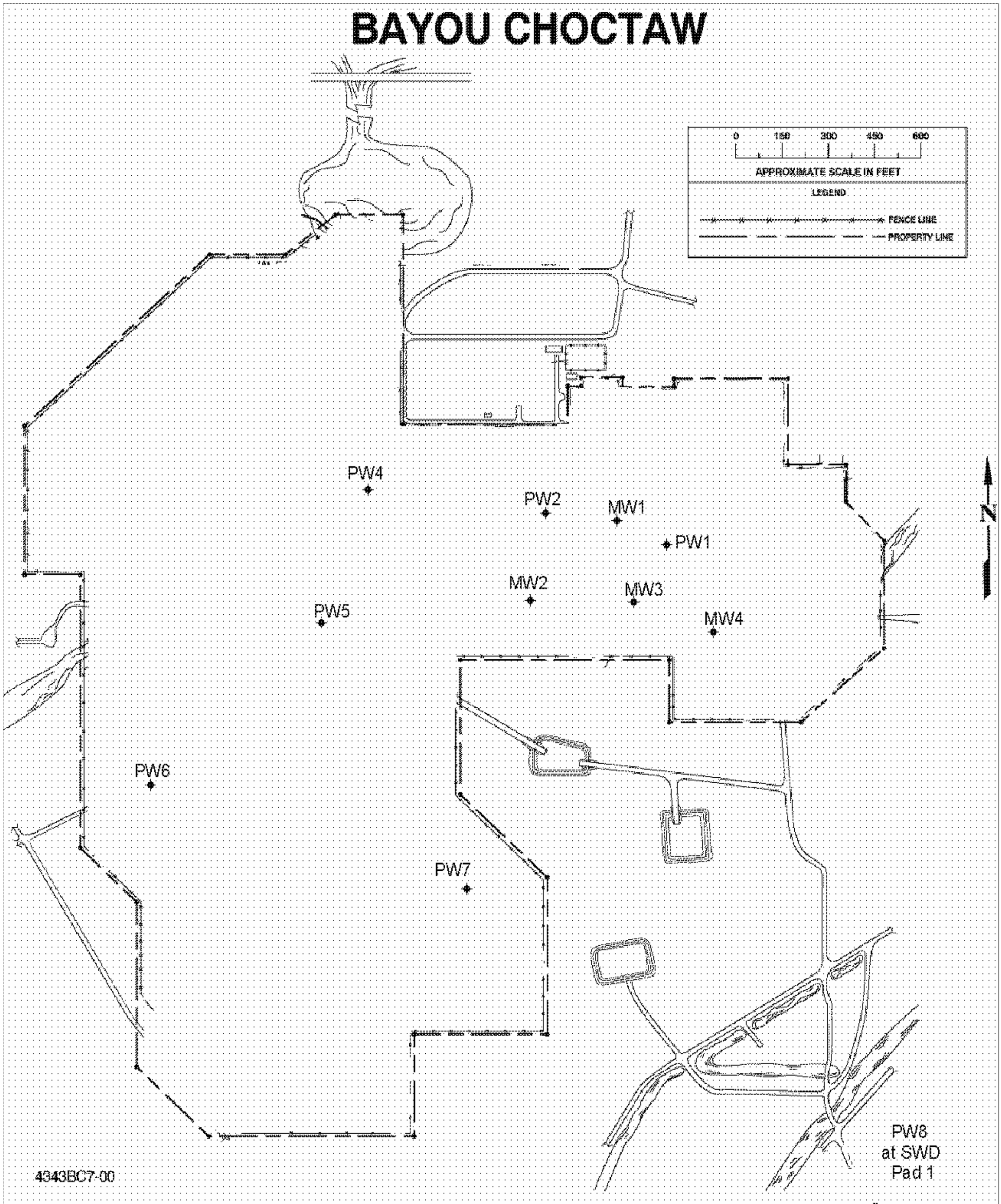


Figure 6-1. Bayou Choctaw Ground Water Monitoring Stations

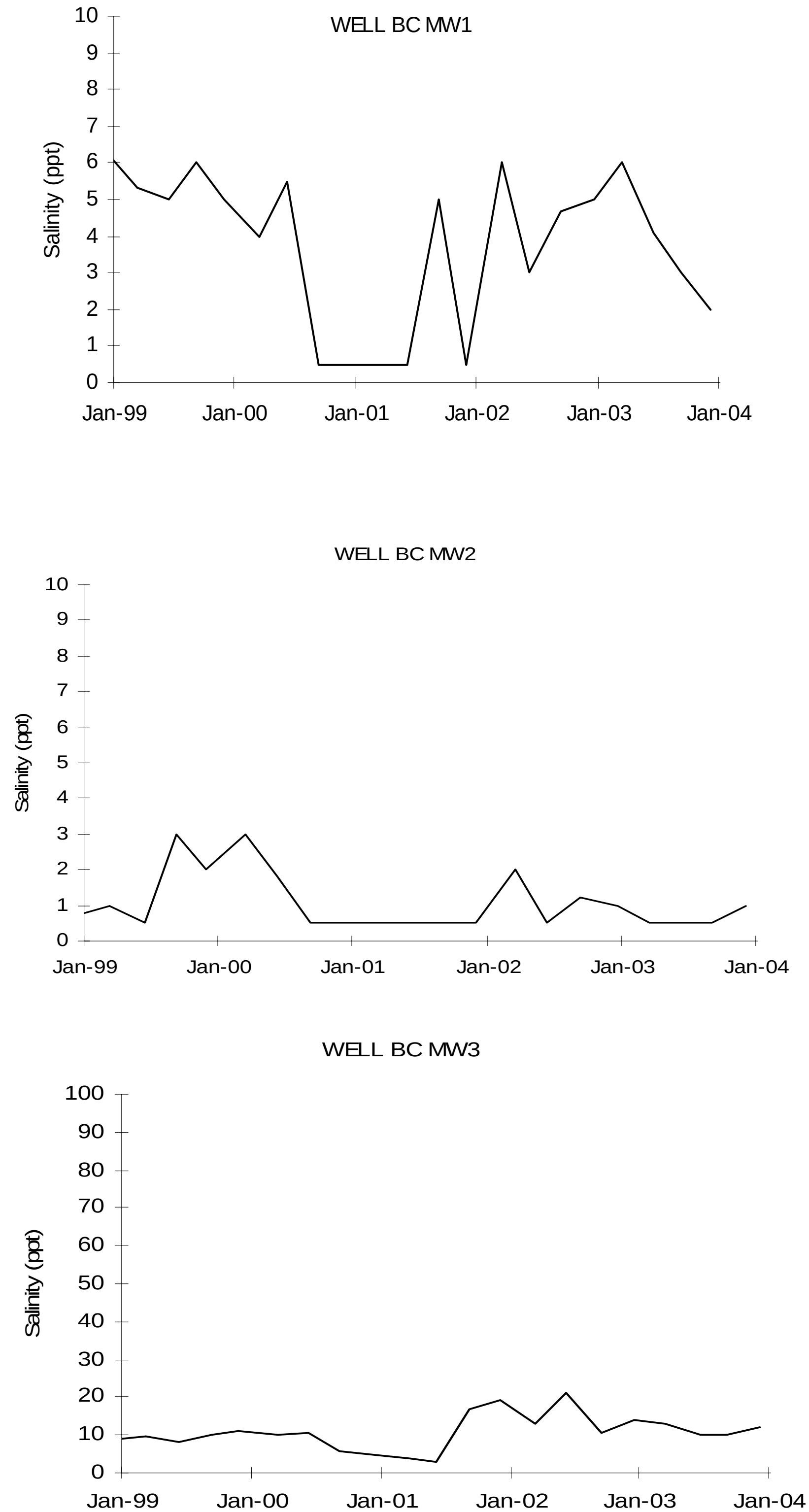
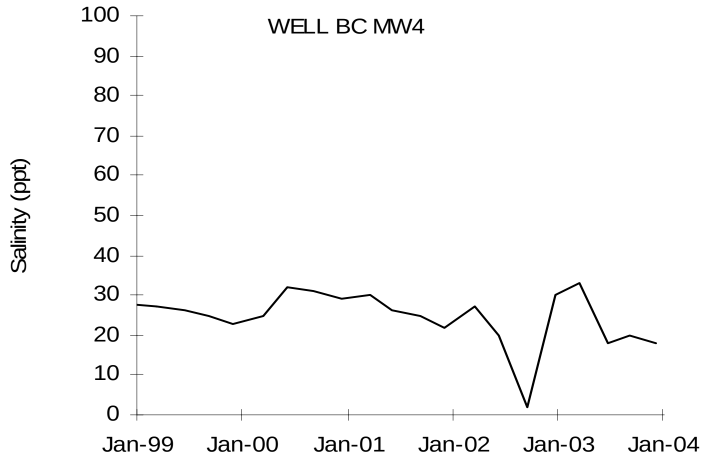
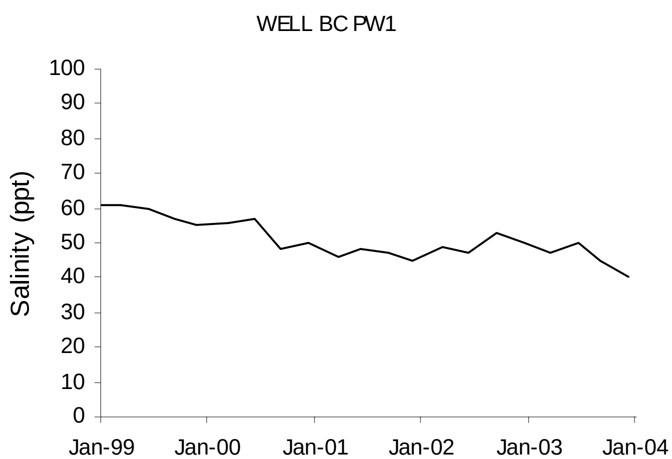


Figure 6-2. Bayou Choctaw Ground Water Monitoring Well Salinities





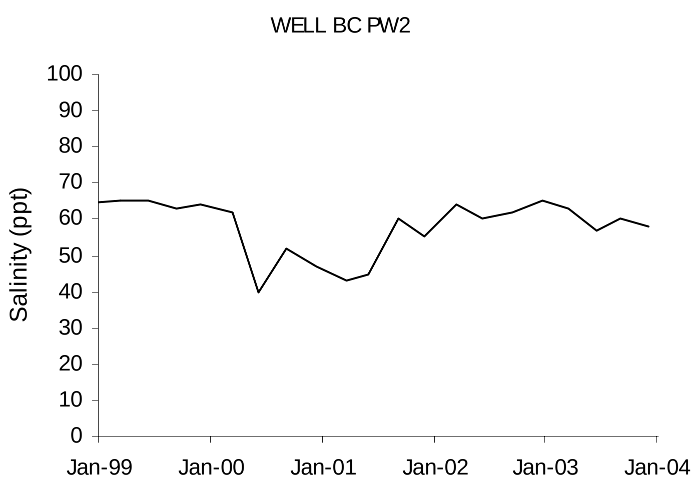
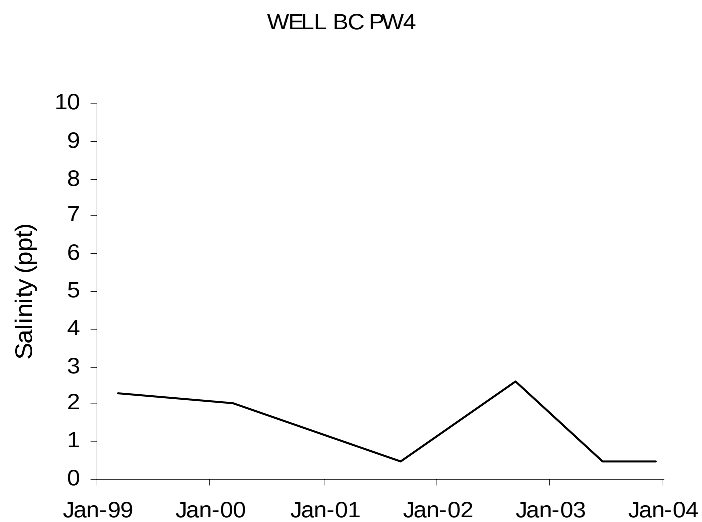
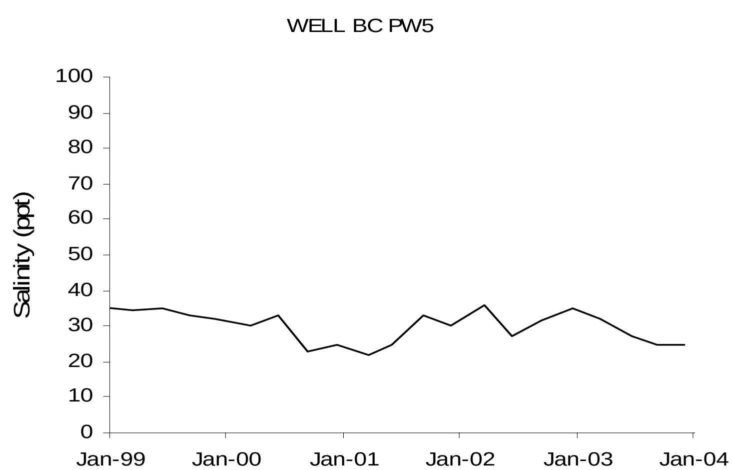


Figure 6-2. Bayou Choctaw Ground Water Monitoring Well Salinities (continued)





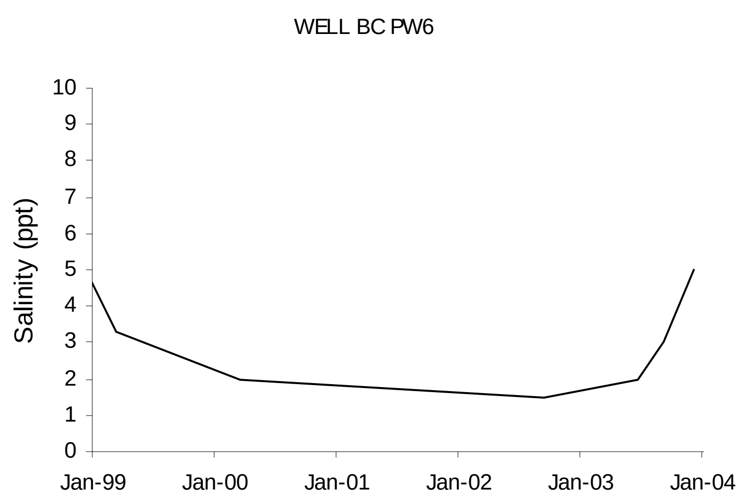


Figure 6-2. Bayou Choctaw Ground Water Monitoring Well Salinities (continued)

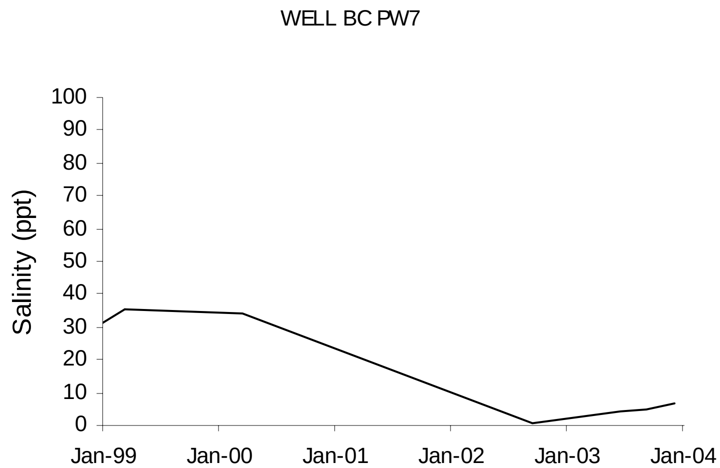


Figure 6-2. Bayou Choctaw Ground Water Monitoring Well Salinities (continued)

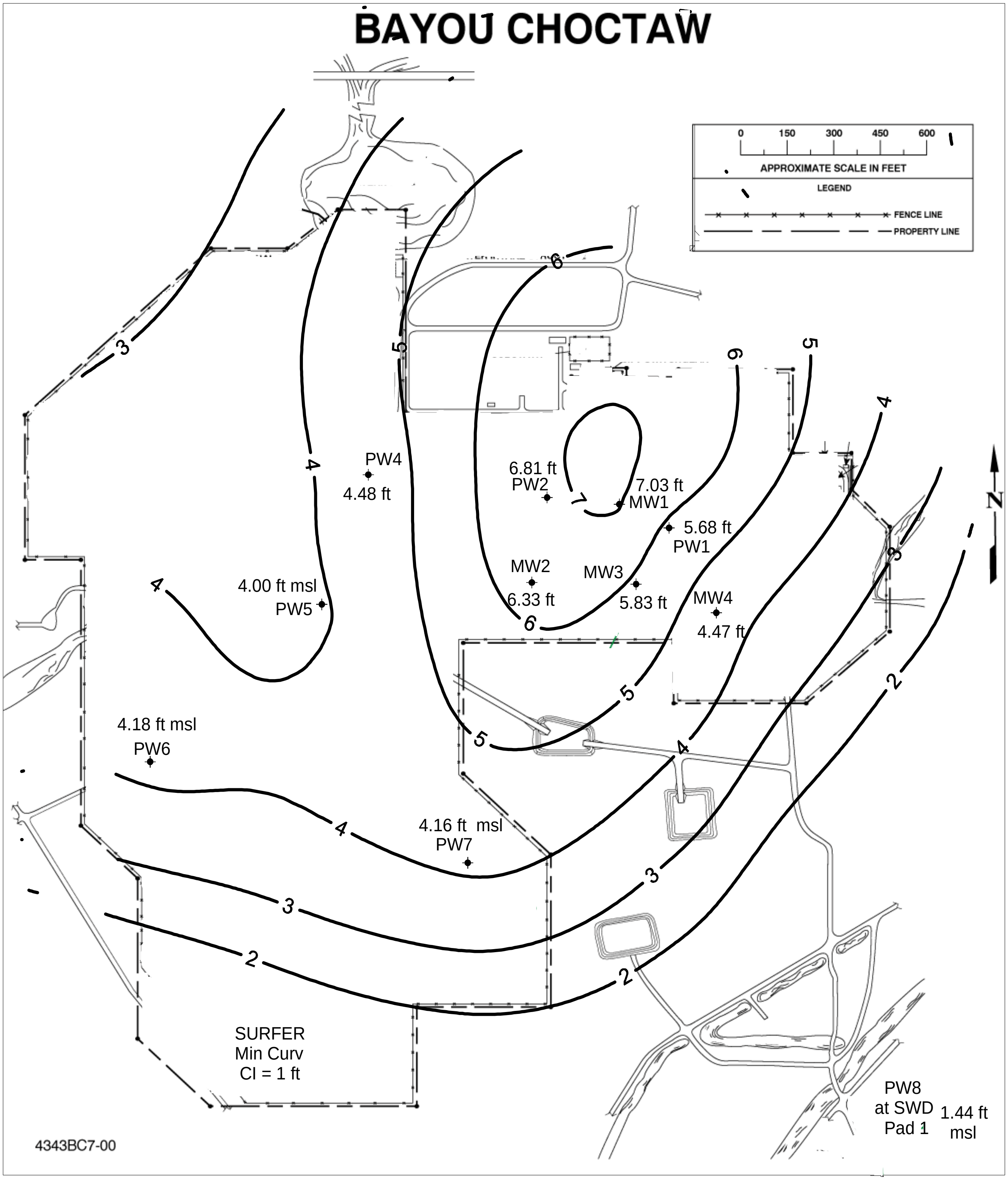


Figure 6-3. Bayou Choctaw Shallow Ground Water Contoured Elevations Summer 2003

The present five-year salinity trend of well BC MW4 defines a moderating salinity with time. The trend now seen is downward and the wide fluctuations observed in the earlier portions of the well's history appear to have moderated as well. This well is situated away from and down gradient of the brine pond and also down gradient of the effects observed near the formerly higher salinity well BC MW3.

Changes in sampling methodology implemented in 1995 and 1996 may have affected the historical trending at all positions. The overall general five-year decreasing trend is definitely evident with this year’s 5-year window and the more reliable data set.

All of PW well series data obtained beyond the original scope of that project indicate flat (BC PW6) or decreasing salinity trends over these 5-year window data sets. All of these monitored locations appear to fluctuate regularly over the entire period of record, but in general, decreasing or flat trend lines are evident with each of the wells. Future ground water data, including that from the periphery wells added from the Phase II verification studies and ongoing inspections of the brine pond and site piping, will assist in identifying any contamination originating from SPR activities. The shallow ground water monitoring well net for this site is adequately placed and sampled to serve as a complete site-wide detection monitoring system.

6.2 BIG HILL

The three major subsurface hydrogeological formations in the Big Hill site vicinity are the Chicot and Evangeline aquifers and the Burkeville aquitard. The major source of fresh water is the Chicot Aquifer, which is compressed from uplift and piercement over the

Big Hill salt dome. Fresh water in the upper Chicot Aquifer is limited from near the surface to a depth of -30 m (-98 ft) mean sea level. The town of Winnie uses fresh water from the upper Chicot Aquifer. Beaumont and nearby Port Arthur both draw fresh water from the lower Chicot Aquifer.

Sampling of six monitoring wells (wells BH MW1 to BH MW6) around the brine disposal pond system (Figure 6-4) began in 1987. Big Hill personnel began sampling these wells by the low-flow method in May 1995.

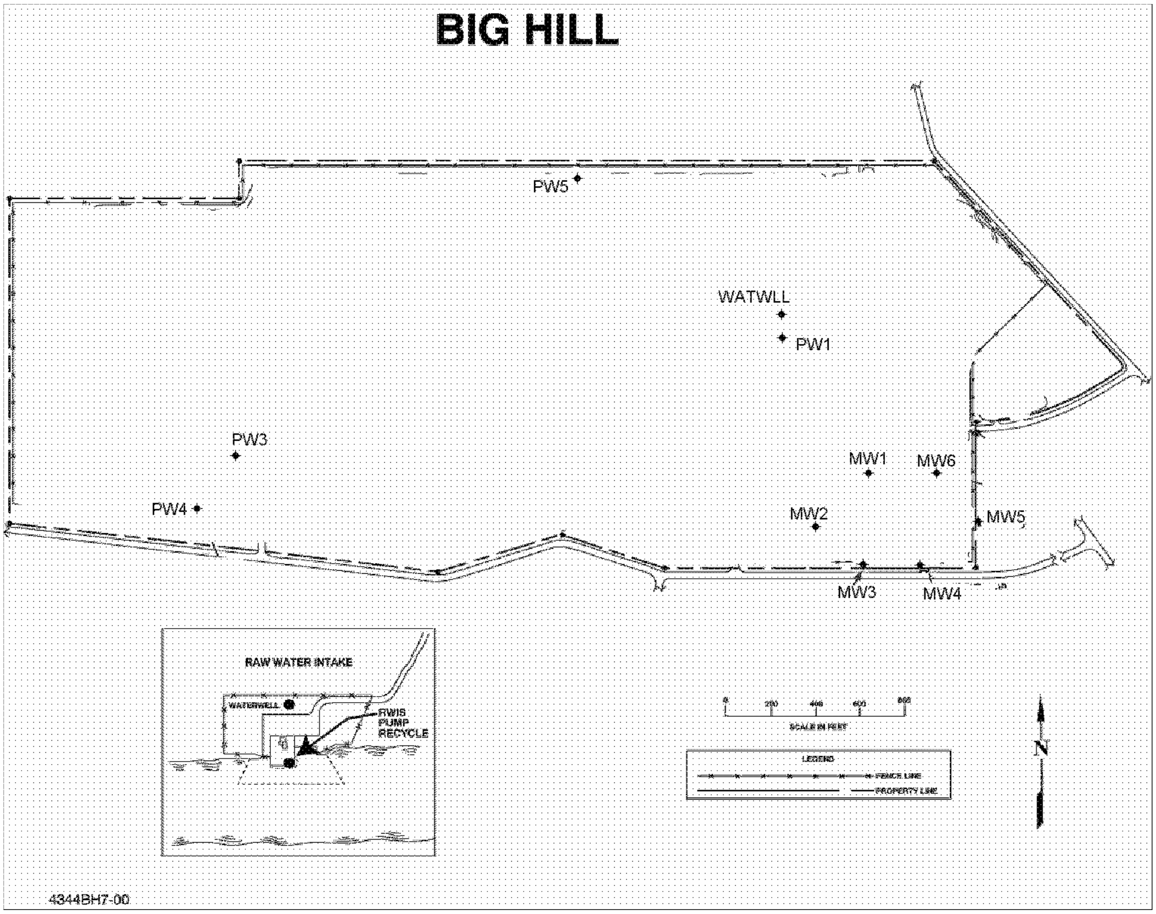
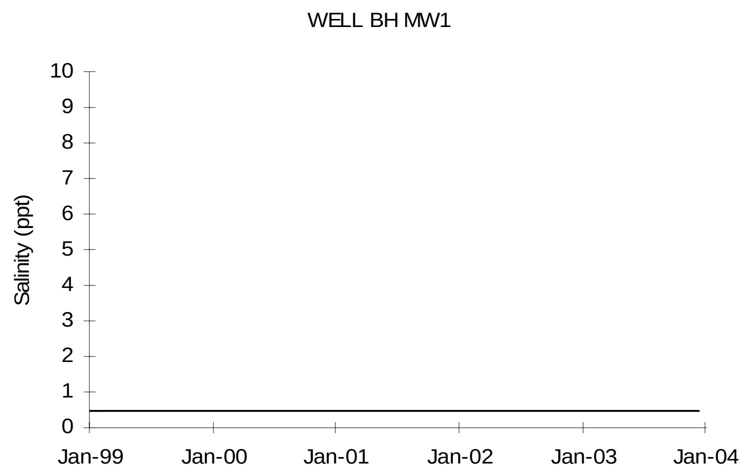
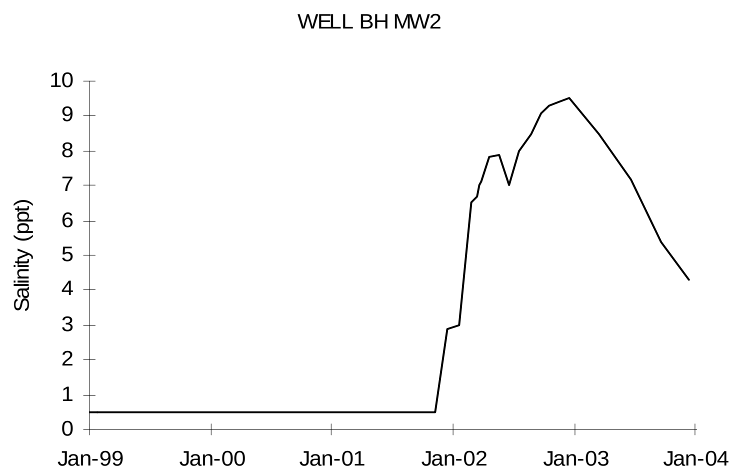


Figure 6-4. Big Hill Ground Water Monitoring Wells





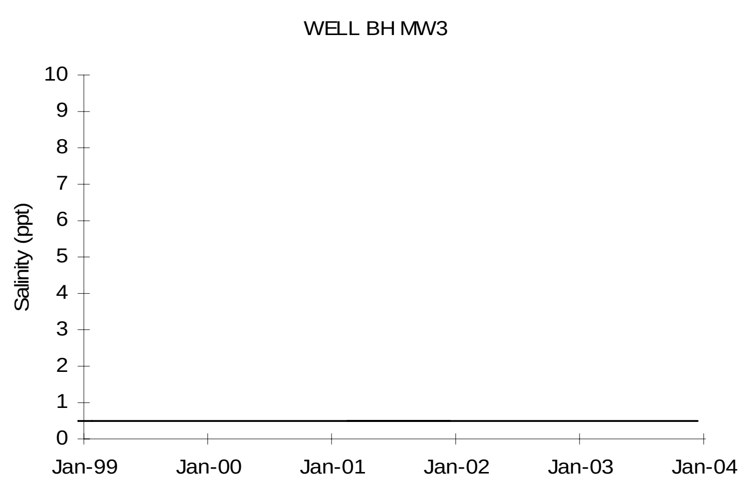
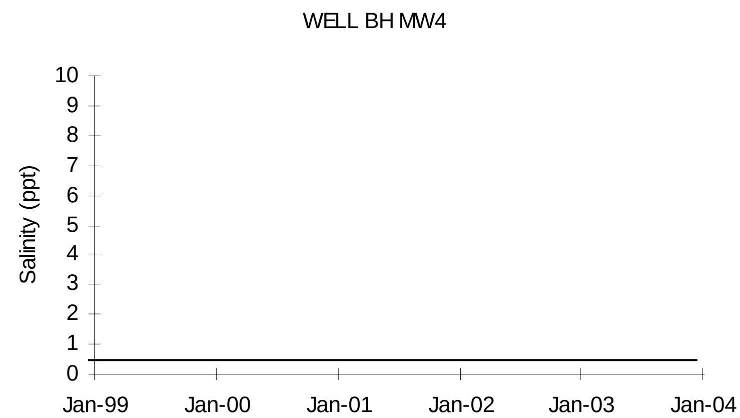
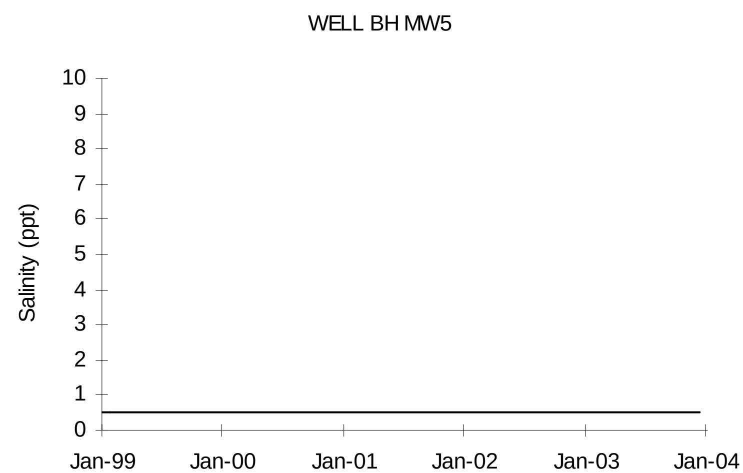


Figure 6-5. Big Hill Ground Water Monitoring Well Salinities





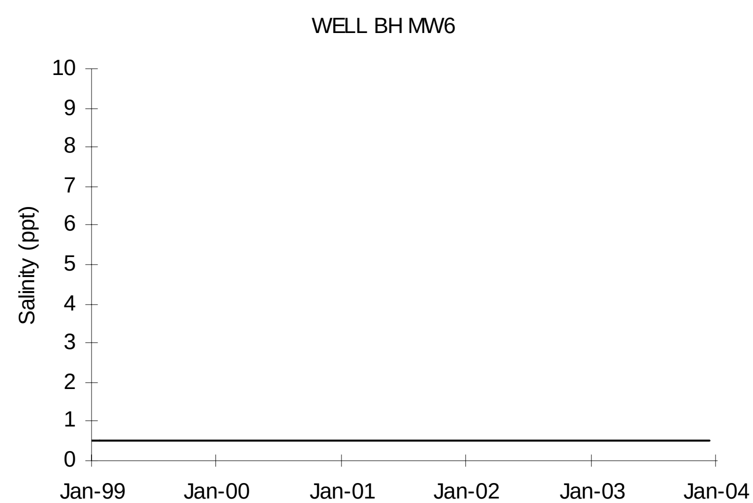
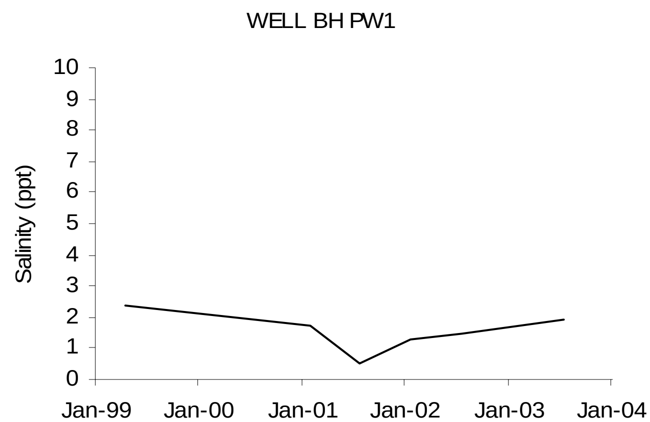
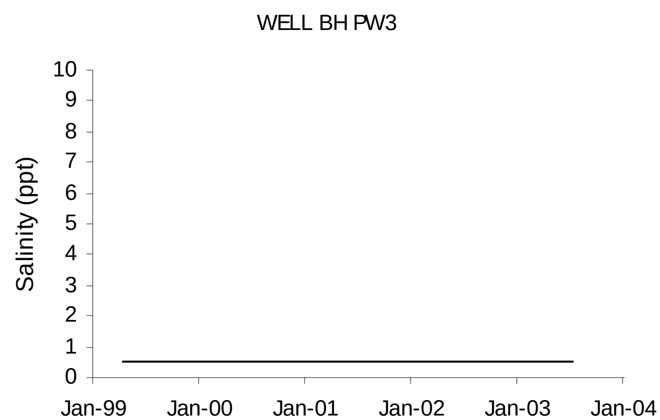


Figure 6-5. Big Hill Ground Water Monitoring Well Salinities (continued)





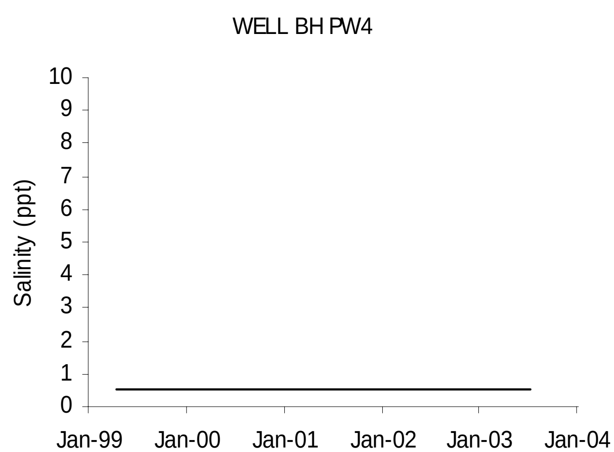


Figure 6-5. Big Hill Ground Water Monitoring Well Salinities (continued)

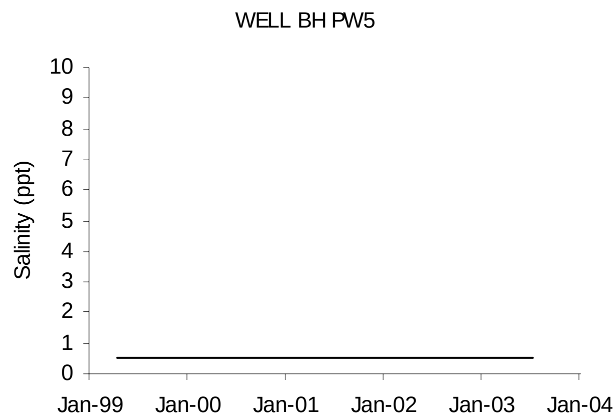


Figure 6-5. Big Hill Ground Water Monitoring Well Salinities (continued)

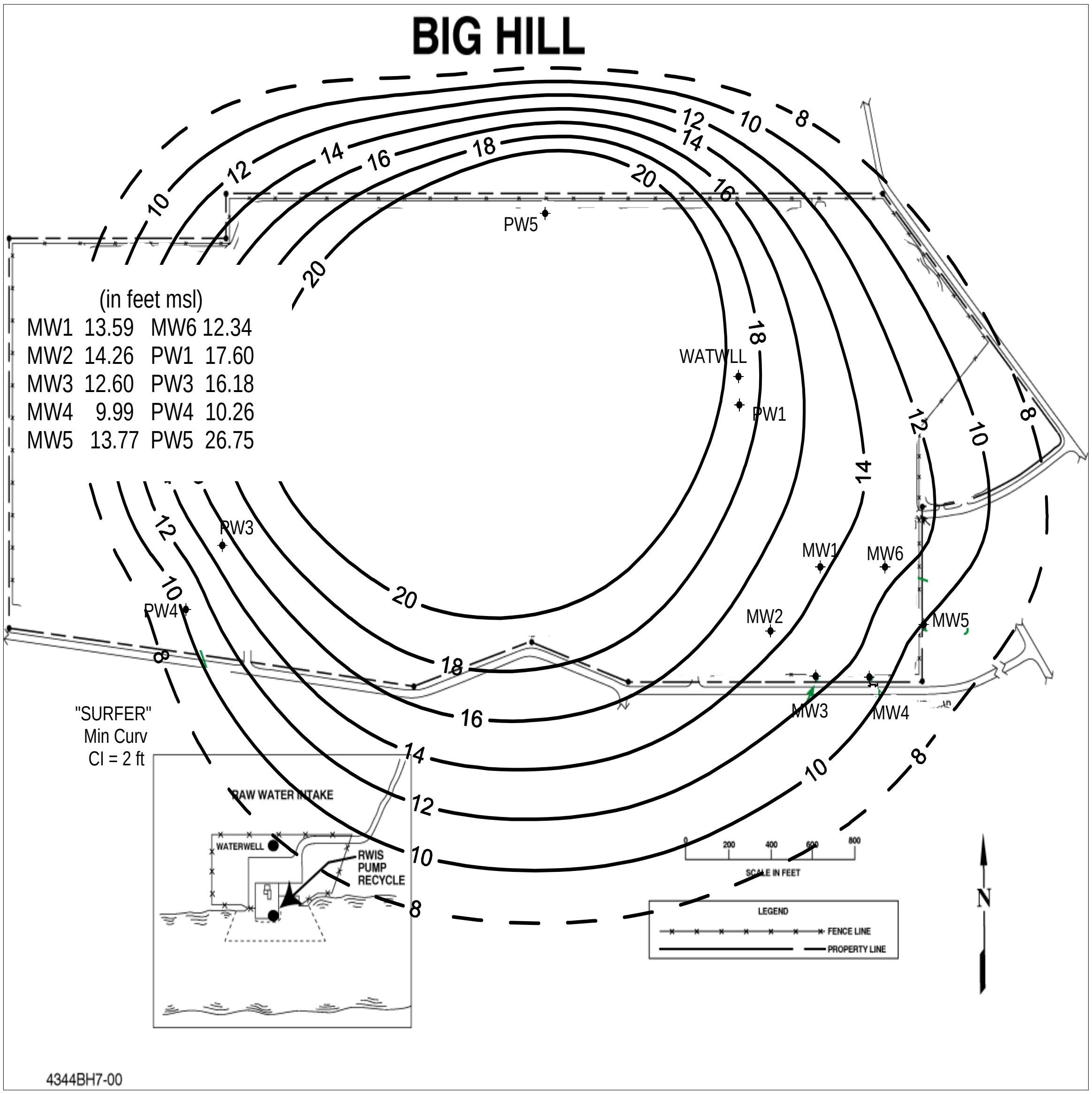


Figure 6-6. Big Hill Shallow Ground Water Contoured Elevations Winter 2003

The interconnected pond system is composed of three contiguous Hypalon®-lined ponds, of which two have a protective concrete topcoat. All three have an under drain system contained within a surrounding slurry wall system keyed to an underlying clay bed.

Salinity data collected from the six wells for the past five years indicate complete consistency among them until the last monthly sample obtained in 2001 for well BH MW2. Salinity of ground water from all wells had remained at or below the detection limit (1 ppt) of the salinity meter used until the 2.9 ppt measured on the sample taken in December 2001 for BH MW2 (Figure 6-5). All observed values that are below the established detection limit are evaluated as one-half the detection limit for statistical calculations. With the exception of BH MW2, beginning at the close of 2001, no measured impacts have been determined in the current five-year history graphically presented. No ground water effects associated with the pond operation are evident since monitoring was begun in 1987 as BH MW2 is on the up-gradient side of that pond. Flow in this monitored zone has been estimated at almost 4 m (12 ft) per year based on observed gradients and the soil permeability information developed from the Verification Well Study of 1996. Translation of the arrival time of the salt front at BH MW2, a better estimate of the water velocity approaches 15 m (50 ft) per year. However, saltwater diffusion effects may overestimate actual water flow in this case.

This year we are presenting water level measurements contoured from the winter timeframe. Figure 6.6 presents the contours of data obtained on a date in the winter quarter for all the wells. The gradients and flow direction remain very similar to the spring contours from 2000 and the last two year’s summer quarter contours. In the vicinity of the brine storage pond (wells MW1 through MW6) the flow is southeasterly. The overall basic shallow flow regime mimics the ground surface and appears to moving radially off the underlying salt dome structure.

The single well (BH MW2) showing salinity, beginning in 2001 is now interpreted as a first arrival of some remnant impacts from an upgradient buried brine piping release that occurred in 1990 just outside of the southeast corner of cavern pad 111. This well is, and has historically remained, on the up gradient flow side of the brine pond storage operations. The up gradient source of salinity attributed to this elevated date has been identified from the historical files as a below ground pipeline leak that was discovered, reported, and remediated in 1990. This 90-barrel brine leak was repaired and the salty soils were thought to have been over- excavated. It is now obvious that remnant residual salt effects spread into the shallow water-bearing zone from this point source and the travel time closely matches the expected estimated arrival time at BM MW2. This occurrence was monitored closely in the field during 2003 and has been compared to historical file information that aid our continued observations. Because the pond operations are down gradient from this well and because an historic up gradient brine release had occurred, the ongoing brine storage pond operations are not considered the source of the elevated salinity passing this monitored position. In addition, both the salinity and pH values measured are too low for the values associated with the continuous saturated brine source represented by the brine pond holding system.

6.3 BRYAN MOUND

Site monitoring wells in two water bearing zones, 6 and 15 m (20 and 50 ft) bls indicate that no shallow fresh water exists over the salt dome in the uppermost inter-connected aquifer. This generalization was confirmed by the additional salinity data from the verification well study (VWS) in 1995-96. However, the Chicot and Evangeline Aquifers are fresh to slightly saline in the Bryan Mound area, and fresh water for Brazoria County is obtained from the upper portions of the Chicot upgradient of the Bryan Mound salt dome.

Fifteen monitoring wells have been drilled at Bryan Mound in four phases between 1981 and 1990 (Figure 6-7). Sampling began shortly after installation. Bryan Mound did not begin using the modified low flow sampling technique for these wells until September 1995. Wells BM BP1S, BM BP2S, and BM PZ2S have been removed from monitoring service due to casing damage. BM BP1S is discussed further below. Five additional shallow well locations and one additional deep well were installed in 1996 as part of the VWS, and all of these have been incorporated into the site's monitor well net.

The wide salinity fluctuations previously observed in the graphs occurring prior to the year 1997 have been moderating due to the implementation of a site-wide sampling methodology change. Consistent purging methods were instituted but poorly practiced commencing in September 1993, and a later modified (site-specific) version of the new low flow sampling technique was instituted commencing in the fall of 1995. The 5-year trending window covering 1998 through 2002 for the first time utilized only low-flow method sampling data. The low flow sampling method produces less data variability attributed to more consistent and representative sampling of the shallow aquifers across the SPR. The resulting data trending graphs are now believed to more accurately reflect the site's ground water conditions. Over the site as a whole, all shallow zone wells reveal stable or freshening conditions for this 5 –year window. This same general trend is evident with all of the deep zone wells too.

Salinity trends are evident in both salt-affected and unaffected areas. Elevated ground water salinity measurements in both the deep and shallow zones near the former brine pond and pump pad area have remained relatively constant overall, despite the earlier fluctuations noted which are believed to be an artifact of an inconsistent sampling technique.

After the overall step change in salinity evident back in 1995 at the paired wells BM MW1S and BM MW1D, which was possibly related to the change to a modified low-flow sampling method, a decidedly consistent and similar freshening trend is now noted in both zones at this location.

High salinity measurements (>20 ppt) observed in the shallow zone near the SOC (BM MW5) and in the deep and shallow well pair near the maintenance building (BM MW2S and BM MW2D) appear to be decreasing over the long term and not indicative of any significant or noteworthy recent releases or events. Salinity observed in the unaffected (<20 ppt) deep and shallow well pair at the northwest corner of the site (BM MW4S and BM MW4D) reveal an overall flat or slightly decreasing five year trend below 10 ppt; each showing very minor inconsequential fluctuations for CY 2003. BM MW3, also remaining under 10 ppt, shows a slight freshening trend over this 5-year period.

A 1991 study determined that site ground water movement in the shallow, 6 m bls (20 ft), zone was in the northerly direction toward Blue Lake while that of the deep, 15 m bls (50 ft), zone was in the southeasterly direction toward Mud Lake. Local movement is primarily affected by the domal upthrusting and the data from the VWS wells remaining after the study provide additional site coverage for a more reliable re-evaluation. With these new, more peripheral well locations, it is believed that the shallower zone is influenced more by the topography and appears to be flowing radially (in all directions) off the dome (see Figure 6-9, Zone). The flow direction in the lower zone has a bit more of an easterly component over the majority of the site resulting in an overall northeasterly flow direction (see Figure 6-10). The water level data for 2003 were contoured using a completely new set of re-leveled measuring points. The surveying was completed in the late spring of 2003. The new survey was needed, as many of the original site monitoring wells had not been leveled since before the VWS in 1995/1996. The survey data did not produce any dramatic changes in flow direction interpretation but the gradients appear to have steepened on portions of the site near the edges of the dome. Most notably the area of generalized mounding in the shallow zone near well BM PZ1S is now revealing a trough-like tendency versus the previous years. These shallow zone conditions will be watched for subtle changes, as a return to more normal rainfall amounts and patterns, could also produce the same effect through localized recharge.

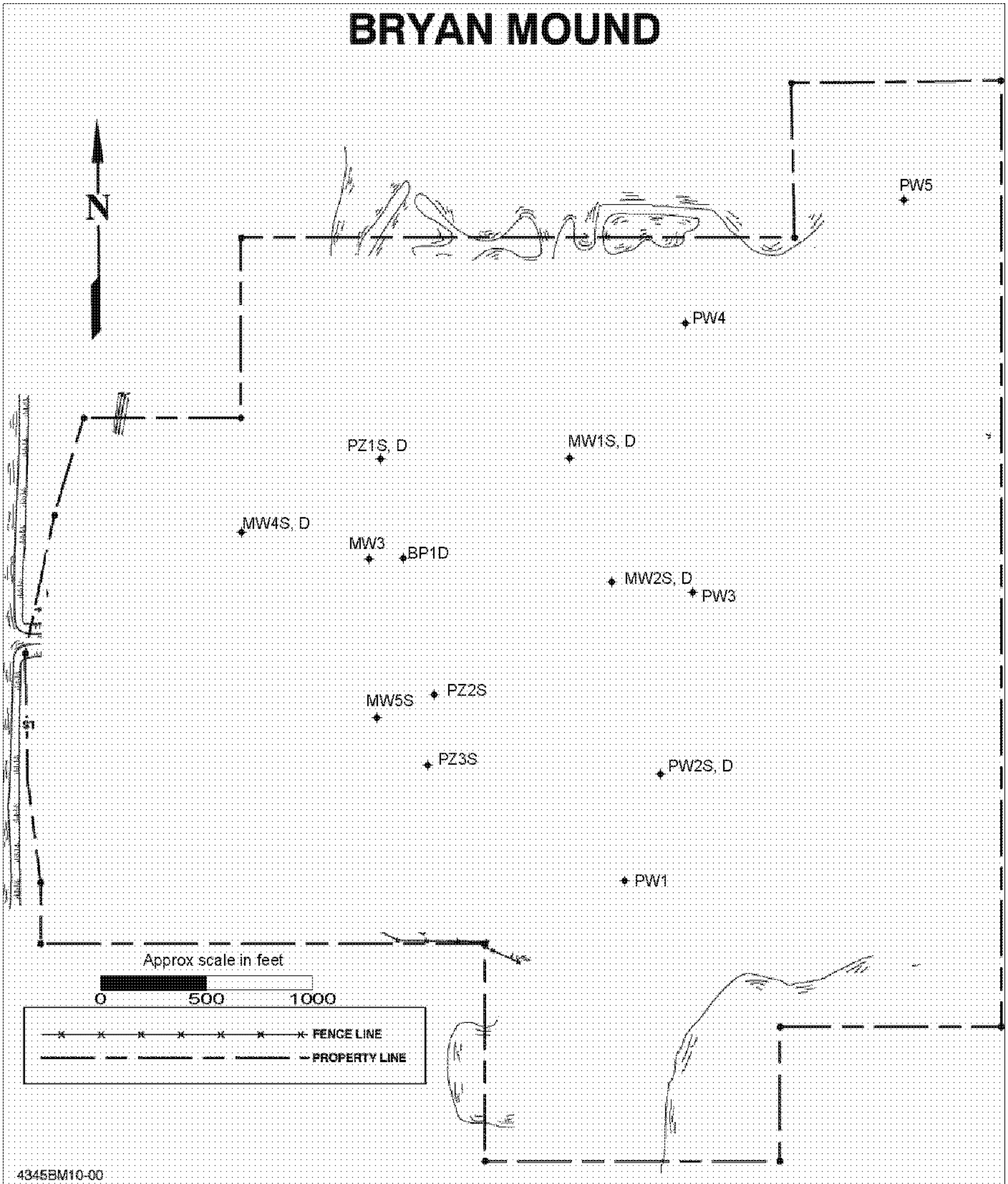
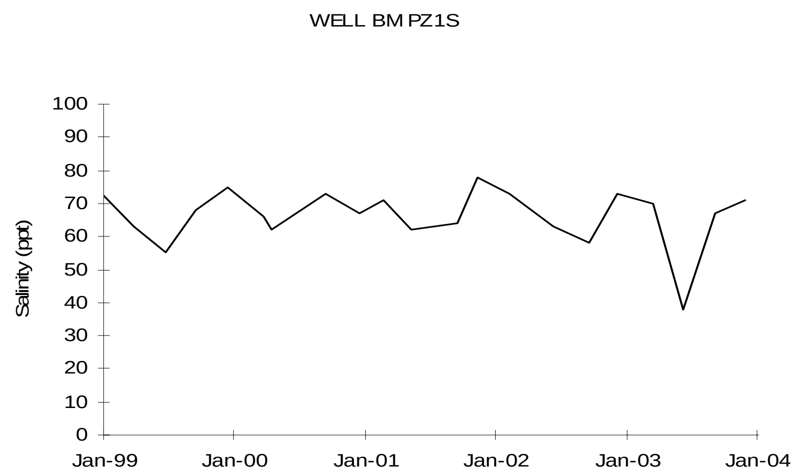
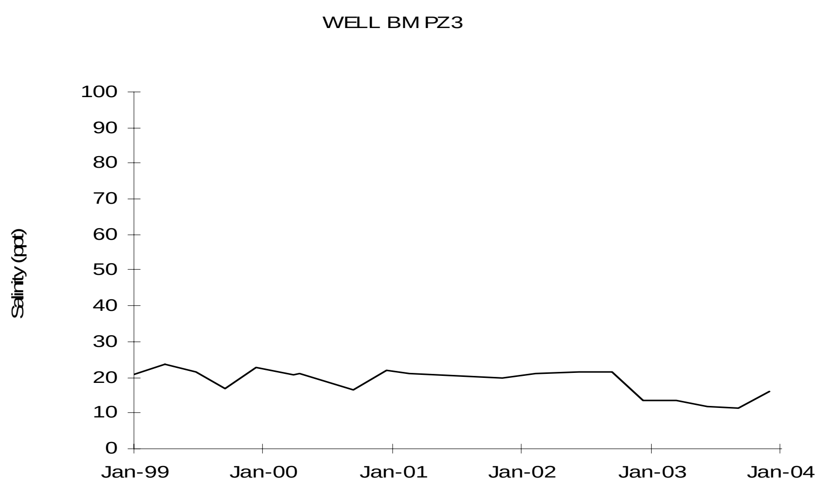


Figure 6-7. Bryan Mound Ground Water Monitoring Wells
(Deep and Shallow Shown)





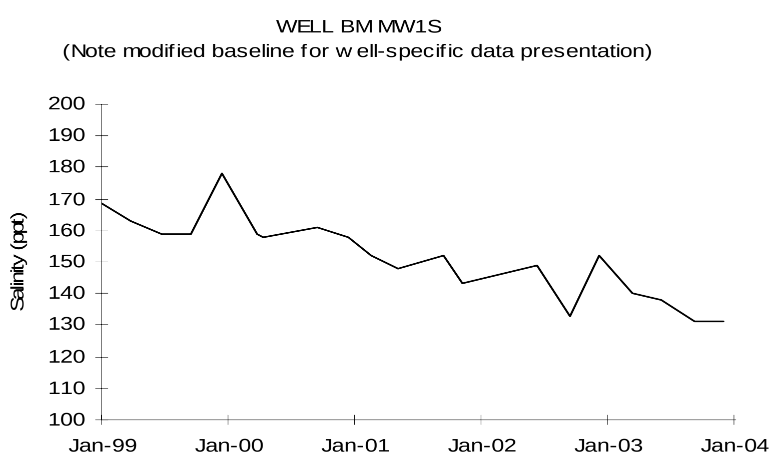
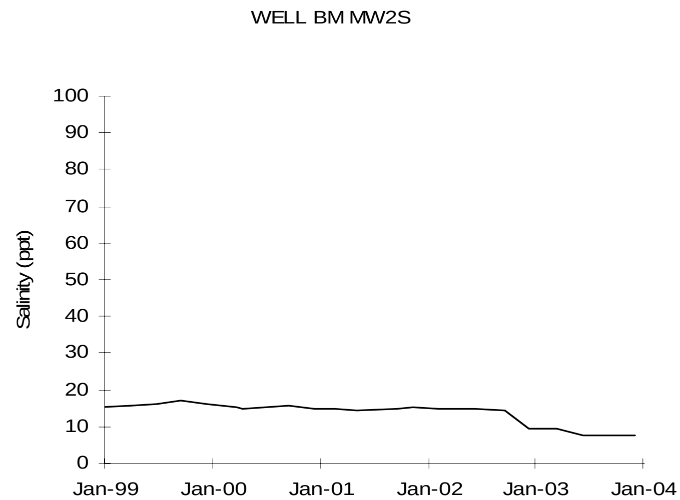
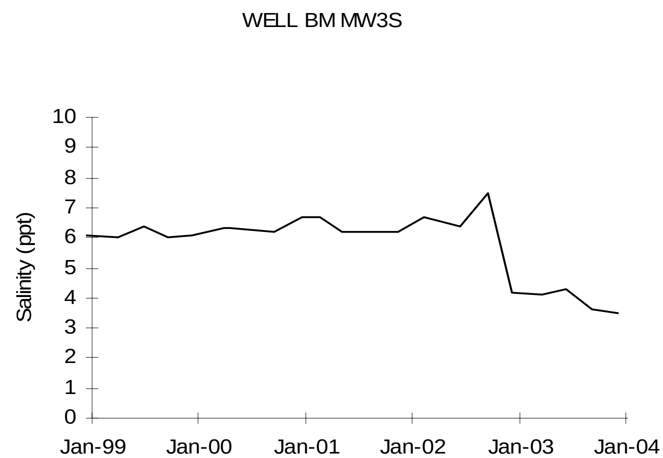


Figure 6-8. Bryan Mound Ground Water Monitoring Well Salinities





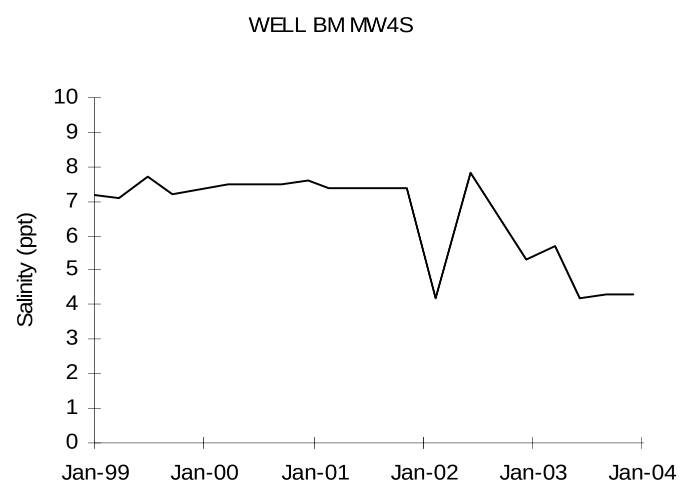
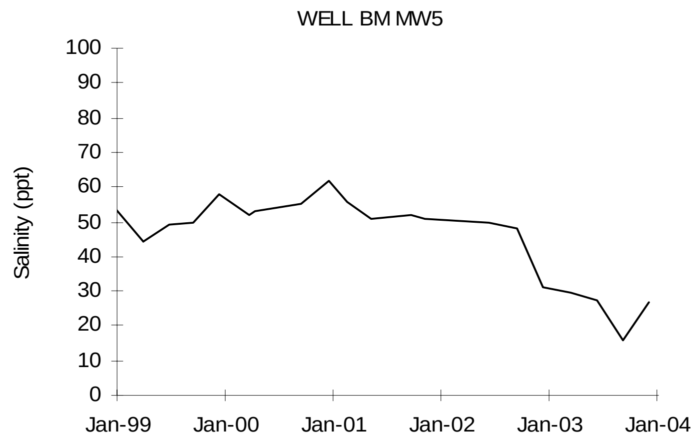
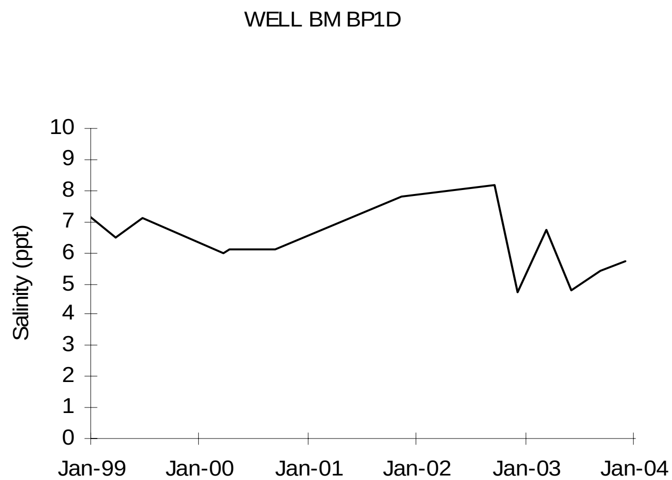


Figure 6-8. Bryan Mound Ground Water Monitoring Well Salinities (continued)





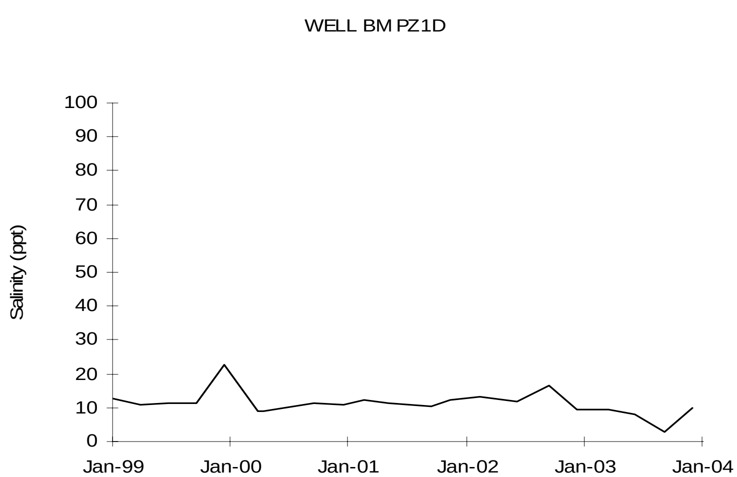
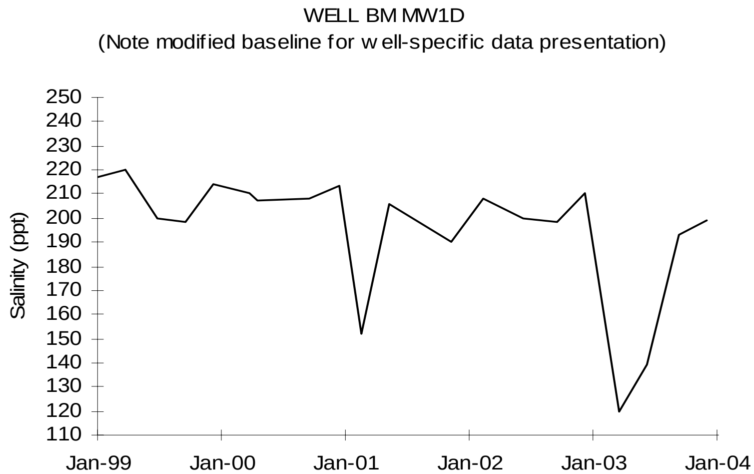
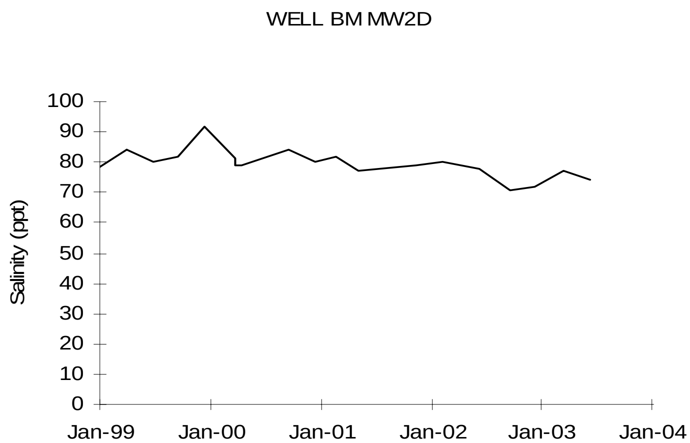


Figure 6-8. Bryan Mound Ground Water Monitoring Well Salinities (continued)





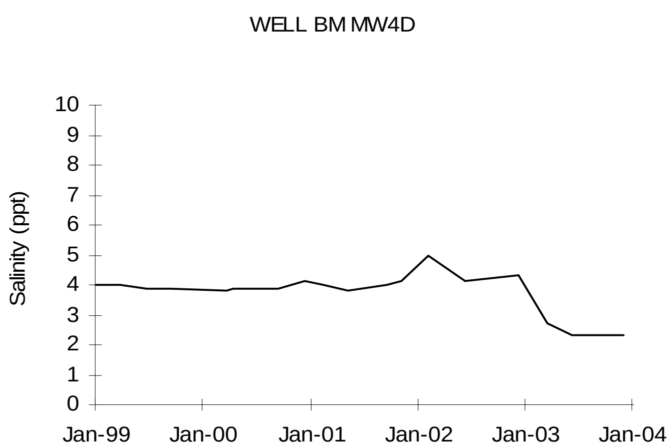
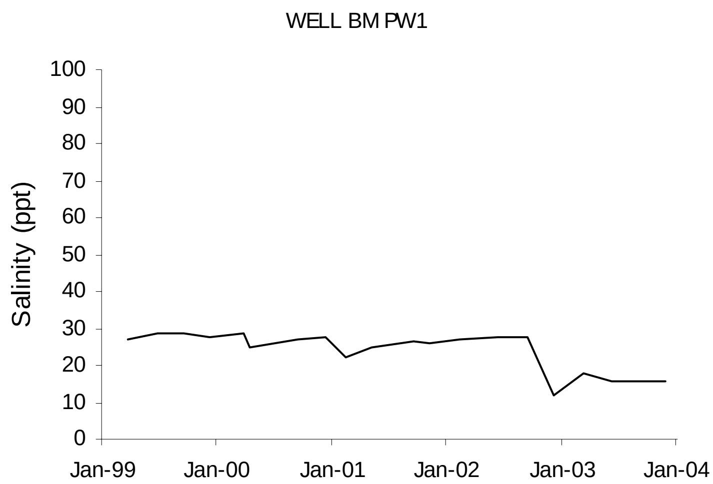
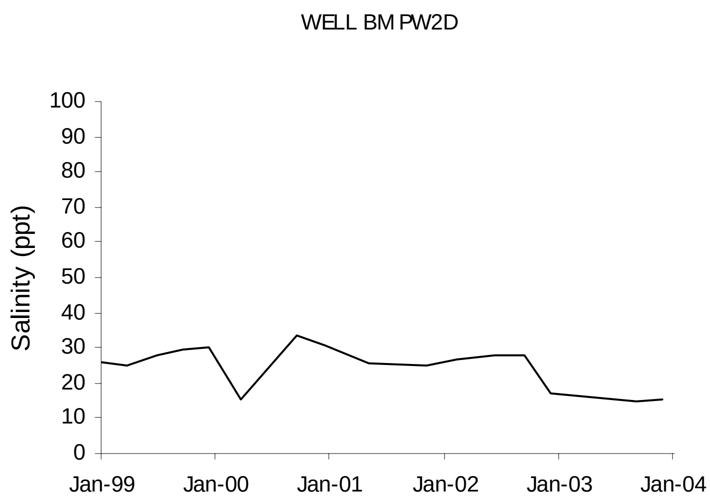


Figure 6-8. Bryan Mound Ground Water Monitoring Well Salinities (continued)





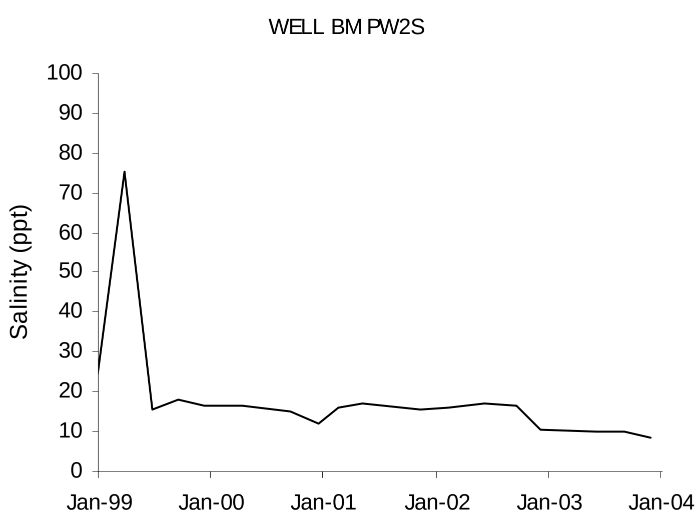
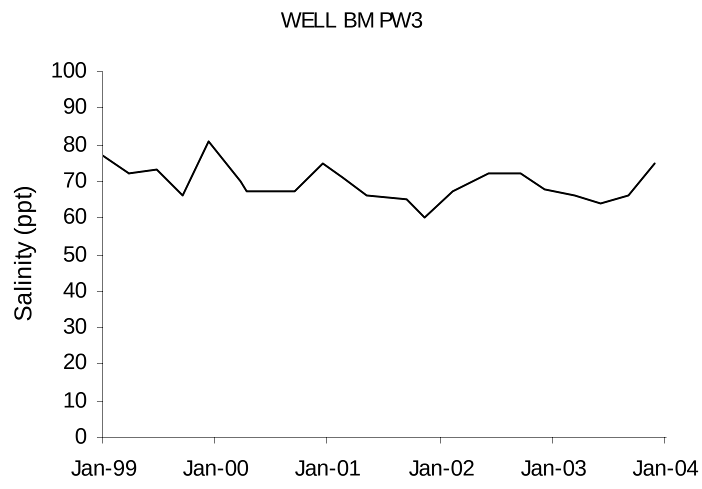
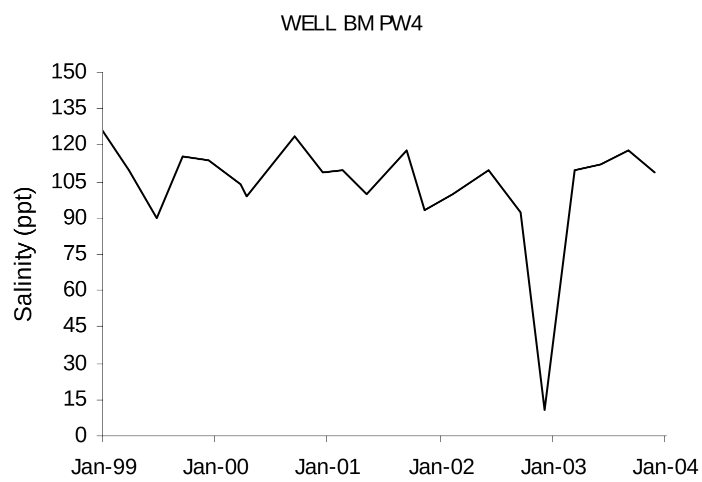


Figure 6-8. Bryan Mound Ground Water Monitoring Well Salinities (continued)





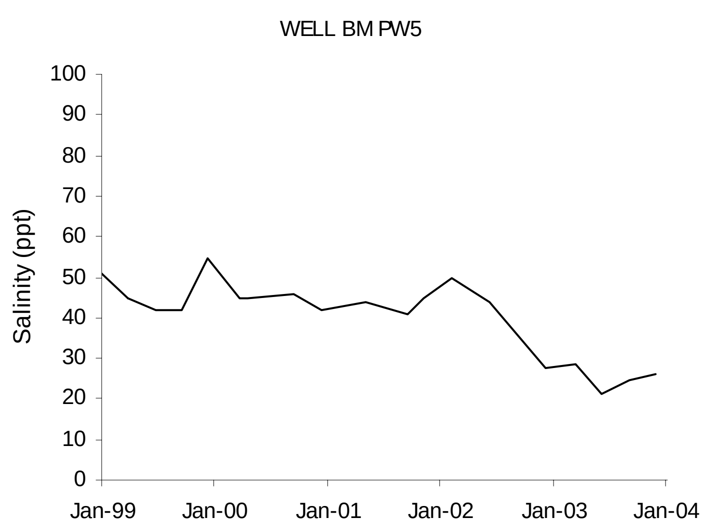


Figure 6-8. Bryan Mound Ground Water Monitoring Well Salinities (continued)

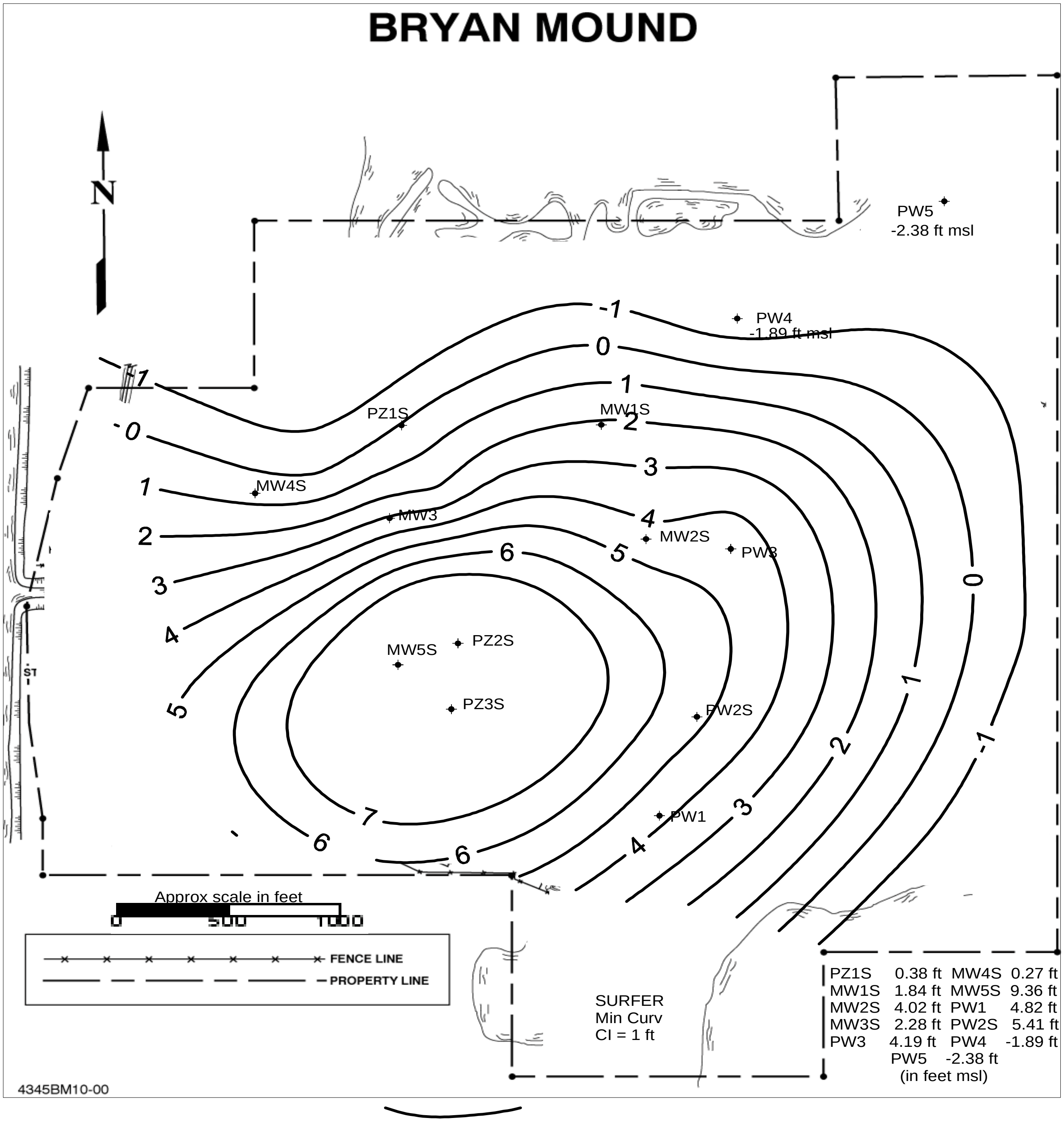


Figure 6-9. Bryan Mound Shallow Ground Water Zone Contoured Elevations
Summer 2003

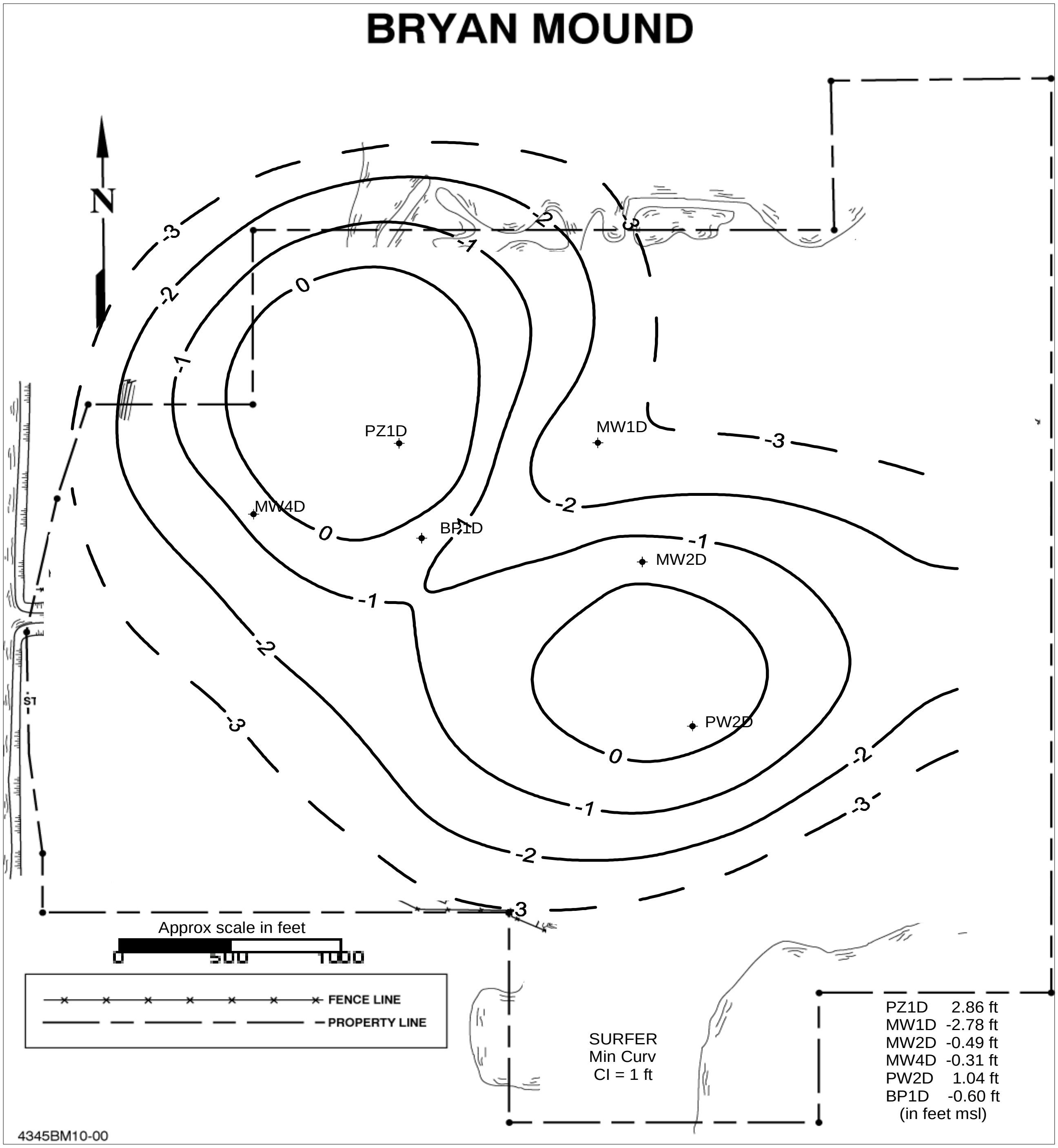


Figure 6-10. Bryan Mound Deep Ground Water Zone Contoured Elevations
Summer 2003

Both of these aquifers exhibit a very low average linear velocity ranging from an estimated 1.5 m/yr. (5 ft/yr.) in the shallow zone; to 3 m/yr. (10 ft/yr.) in the deeper zone. This slow movement is due to the combined effects of the clay content of the water bearing strata and very low hydraulic gradients which range from 0.0006 m/m to 0.001 m/m (0.002 ft/ft to 0.004 ft/ft). This low average velocity characteristic reduces the risk of contaminating any fresh and potable water bearing zones known to exist off the flanks of the subsurface dome.

When contoured two major areas emerge where ground water salinity exceeds ambient conditions (>20 ppt) for the Bryan Mound site. The first area stretches from the former brine pond eastward to the brine pump pads and to the vicinity of an older brine pond demolished by DOE in 1989, and then southward towards the center of the site and below the maintenance building already discussed. Historical operations (pre-dating DOE ownership) included brine retention in two separate unlined elongated abandoned ponds reclaimed (filled) by DOE in this same area. These historical operations were associated with the brine generation process of a former owner. The second and considerably smaller area lies southeast of the security operations center (SOC) adjacent to a closed anhydrite confinement area. The trending lines for the wells at each of these locations reveal a downward slope of freshening conditions (see graphs for BM MW1S; BM MW1D; BM MW2S; BM MW2D; and BM MW 5S.

Elevated salinity observed at shallow monitor wells since their installation, BM PZ1S, BM MW1S, and former BM BP1S, has been speculated to be associated with SPR brine storage pond activity. The large brine pond with a Hypalon (chlorosulfonated polyethylene) membrane was originally constructed in 1978. The pond was subsequently renovated and enlarged (raised levee for capacity) with installation of a new Hypalon® liner and a concrete weight coat in 1982. The Bryan Mound brine pond was successfully taken from brine storage service in September 1998 with subsequent solids removal and closure construction activities concluding in the early spring of 1999. Because of the very slow ground water movement rates and the estimated long lag-time needed for vertical migration, the salinity measurements observed in the pond area and especially those to the northeast and east could be the result of very early (pre-1982 renovations) seepage from the pond, or from proximity to former (pre-SPR) operations. Salinity of deep complements to wells BM PZ1S and former BM BP1S (BM PZ1D and BM BP1D) are much lower and considered ambient (<20 ppt) for the site. They indicate no contamination of the deep zone around the immediate vicinity of the former pond and no apparent direct communication with the shallow zone in this area. The shallow well BM MW1S reveals a downward or freshening trend now with the consistent sampling regimen and the downgradient shallow zone well BM PZ1S shows a flat or stable trend for the current 5-year trending window.

Data from the VWS completed in the summer of 1996 indicate that the primary location of shallow zone salinity impact is in the area of well BM MW1S, which is mirrored by elevated salinity in the underlying deep zone around BM MW1D. This is the location of former below grade unlined brine retention ponds from pre-SPR operations. The high salinity of the deep well may also indicate limited hydraulic communication of the two ground water zones in or just upgradient of that location. It is also possible that complete saturation and permeation of the clayey separation layer between the two zones by a dense and strongly ionic salt solution has occurred in a very limited area.

The former SPR brine pond was closed in 1999. The final annual structural inspection of the brine pond, made in November 1998, concluded that no obvious structural compromises of the pond's integrity had occurred. From the time when the pond had all its contained liquids and solids removed late in 1998 until the close of CY 2002 the shallow ground water has not moved more than about 20 to 30 feet laterally. Given the anticipated long lag-time for vertical migration and then the lateral distance required to be covered to the nearest wells, it may be some time for any potential post-closure salinity changes to be evident in the monitoring.

Southeast of the SOC is a second area where elevated salinity ground water is found, adjacent to an anhydrite disposal area used during early construction and leaching phases of the site which may be a contributory source of brine contamination effects. The limited area of contamination is intercepted in the shallow zone by well BM MW5S and perhaps BM PZ3S and has been relatively consistent over the history of long term monitoring, even though the VWS study gave us data indicating these wells may be affected more by diffusion than by flow gradient, especially at well BM PZ3S which is somewhat on the up-flow side of the anhydrite. The trending charts for both of these wells indicate a general freshening with time.

A suspect brine contamination source south of the site's maintenance building may be producing another area of elevated salinity. A definite source has not been identified or associated with any known historical SPR operations or incidents, and therefore most likely predates SPR activity. Salinity measurements exceeding ambient levels (>20ppt) are observed historically in both zones at wells BM MW2S and BM MW2D, with the shallow well BM MW2S remaining below 20 ppt from 1999 through 2003 with continuing improving quality. This area is masked when contoured, falling under the general "blanket" of the effects associated with the pre-SPR brining operations located in the north central portion of the site already described. This area may therefore be considered part and parcel of that historic saltwater release; being affected more by diffusion and dispersion rather than direct flow.

Brine contamination is not evident at the northwest corner of the site. Shallow zone monitor wells BM MW3S and BM MW4S near the southwest corner and west of the former brine pond, respectively, have historically remained relatively stable in the unaffected 5 to 10 ppt range. The ground water salinity at the northwest corner of the site is consistent or better than the salinity observed in Blue Lake, the adjoining surface water feature. These two wells are also down gradient of the anhydrite disposal area and do not reveal any impacts at this time. With only the new consistent sampling technique now being depicted on the 5-year graphs we find that commencing with this year's "window" well BM BP1D is reversing its former upward sloping trend line and reveals a flat to slightly downward trend, making all wells on the Bryan Mound site either stable or in a freshening mode. This observation reinforces the interpretation that current activities are not a contributing factor to the salinity levels observed at this site. Returning rainfall may also be recharging the wells locally but any surface soil sources would percolate downward. And most wells at this site are showing marked improvements with increasing regular rainfall.

6.4 SAINT JAMES

The Chicot Aquifer is the principal regional aquifer at St. James. The upper strata of the Chicot Aquifer are in direct hydrologic contact with the Mississippi River. Much of the ground water contained in this aquifer is slightly brackish. In the St. James area only the uppermost units contain fresh water.

St. James was leased to Shell Pipeline on January 31, 1997. No permanent ground water monitoring wells have been installed at the St. James site due to the absence of brine and chronic crude oil spills. Underground diesel and gasoline tanks were removed in 1995. As a result of due diligence studies undertaken prior to property transfer to Shell Pipeline, crude oil was located on the shallowest perched water table at two limited areas at St. James. Notification was made to LDEQ in January 1997.

Additional investigations and actions were implemented throughout CY 1997 and approximately 25 gallons of an oil and water mixture were removed. As a result, the pig trap area was approved as “no further action needed” by the state. Crude oil removal efforts, continued through CY 2001 at the booster pump station where since the inception of the recovery operation, 3.8 gallons of oil have been removed.

Remediation efforts toward clean closure through biodegradation under the Risk Evaluation/Corrective Action Program (RECAP) are ongoing. The Risk Evaluation/Corrective Action Program (RECAP) became final on December 20, 1998, allowing site evaluation and corrective action efforts specific for the subject location. Management Option 1 (MO-1) in RECAP appeared to be applicable to this particular site. DOE requested and was granted approval from LDEQ to follow a proposed Corrective Action Plan according to the referenced Management Option. This prompted continued remediation and sampling efforts. In addition LDEQ recommended the following steps be taken to assist in the remediation of this site.

1. Continue reduction of constituent (crude oil) concentration, toxicity, mobility, mass and volume to acceptable levels by monitored natural attenuation per section 2.12 (Monitored Natural Attenuation) of the RECAP.
2. Continue oil removal (if present) from the three monitoring wells at a frequency of once every six months until remediation goals are met.
3. Conduct total petroleum hydrocarbon (TPH) analyses on soil samples to be taken from the contaminated area once per year until TPH concentrations comply with the RECAP MO-1 limit.
4. Conduct gas chromatography (GC) analyses on oil removed from the three monitoring wells for the presence of light-end hydrocarbons to confirm the presence/absence of fresh oil once

per year until TPH concentrations comply with the RECAP MO-1 limit.

5. Submit an annual report delineating oil/water volumes removed, analytical data, and applicable site activities to the LDEQ.

The U.S. Department of Energy (DOE) submitted a FY 2001 progress report for this activity to LDEQ that included results of sampling activities (Tables 6-1 and 6-2), and other site specific information. Based on the results, DOE decided to continue remediation efforts toward clean closure through the (RECAP). Based on the last set of analytical data from the December 2001 sampling event, DOE proposed to LDEQ in October 2002 to cease remediation efforts. This proposal seemed logical since the analytical data from a period of four years provided evidence that the area of impact met the MO-1 criteria with only 3 of the 13 RECAP parameters for groundwater slightly above the RECAP standards. In December 2002 LDEQ submitted correspondence to DOE that would allow DOE to petition for the consideration of a No Further Action determination if four consecutive sampling events indicate levels of constituents of concern below applicable RECAP standards beginning CY 2003.

During a sampling event at the beginning of CY 2003, free phase petroleum material was found to be present at several of the sample locations. Analytical data provided evidence that the concentration of some to the RECAP constituents had significantly increased. Because of this DM decided to re-evaluate the area and attempt to determine the possible causes of the reoccurrence of this material. In addition, DM also decided to implement a Site Investigation Work Plan (SIWP) to further characterize soil and groundwater within the BPS to identify the constituents of concern (COCs) and determine the potential to obtain a No Further Action At This Time under RECAP guidelines. This plan was drafted and provided to LDEQ for approval.

DM personnel conducted several site visits to collect more information and make observations to determine if there were existing conditions that may have caused the increase in the amount of free phase seen. In addition, DM attended several meetings with Shell Pipeline personnel to provide an open forum of communication and attempt to find the root cause of the increase. As a result of the meetings, visits, research of past data and assessments, it was decided that a fingerprint sampling would be performed that would help to identify the source of the contamination. As a required sampling condition, Shell Pipeline also provided samples of crude and other petroleum based material that comparative fingerprint analysis would be performed. The result of the fingerprint analysis did not identify any current source of petroleum product material located at the site to match the contamination found in the BPS.

In November of 2003 DM received approval from LDEQ to implement the SIWP that would include the recovery of crude oil product and bioremediation of any excavated soil as a result of the product recovery operation.

Table 6-1. Parameters and Maximum Concentration Analyzed from the 1997, 2000 and 2001 Soil Sampling Efforts

Pollutant	RECAP MO-1 SOIL REQ (mg/kg)	JUNE' 97 Soil (mg/kg)	JUNE' 00 Soil (mg/kg)	MARCH 01 Soil (mg/kg)	DEC 01 SOIL (mg/kg)
acenaphthlene	39000	ND	ND	10.80	ND
anthracene	250000	ND	ND	18.00	ND
benzo(a) pyrene	0.36	ND	ND	16.50*	ND
chrysene	400	ND	ND	22.90	ND
dibenz(a,h) anthracene	0.36	ND	ND	2.71*	ND
indeno(1,2,3-cd)pyrene	3.6	ND	ND	5.13*	ND
benzo(k) fluoranthene	35	ND	ND	9.670	ND
benzo(a) anthracene	3.6	ND	ND	26.20*	ND
fluoranthene	3600	ND	ND	80.800	ND
fluorene	3100	ND	ND	5.3	ND
naphthalene	44	37.7	4.04	2.460	0.542
pyrene	2,700	ND	ND	63.90	ND
TPH - O	10,000	42,400*	3,120	772	361

* Concentration exceeds current RECAP requirement.
ND-Denotes not detected at or above the adjusted reporting limit

Table 6-2. Parameters and Maximum Concentration Analyzed from the 1997, 2000 and 2001 Ground Water Sampling Efforts

Pollutant	RECAP MO-1 GROUND-WATER REQ (mg/l)	JUNE' 97 Ground Water (mg/l)	JUNE' 00 Ground Water (mg/l)	MARCH 01 Ground Water (mg/l)	DEC 01 Ground Water (mg/l)
acenaphthlene	0.54	46500*	ND	0.250	ND
anthracene	0.11	1680	ND	ND	.00014
benzo(a) pyrene	0.0002	ND	ND	.002	0.002*
chrysene	0.000038	ND	ND	.0031	ND
dibenz(a,h) anthracene	0.01	ND	ND	.0140	ND
indeno(1,2,3-cd)pyrene	0.000091	ND	ND	.00026	ND
benzo(k) fluoranthene	0.00091	ND	ND	.052	0.001*
benzo(a) anthracene	0.00000038	ND	ND	ND	.012*
fluoranthene	0.032	4350	ND	.220	.0041
fluorene	0.078	35,900*	ND	.039	.006
naphthalene	0.22	114,000*	0.483*	.300*	.0725
pyrene	1.4	1,580*	ND	ND	ND
TPH - O	24	ND	160*	223*	83.9*

* Concentration exceeds current RECAP requirement.
ND-Denotes not detected at or above the adjusted reporting limit.

6.5 WEEKS ISLAND

The Chicot formation is the principal aquifer in the Weeks Island area. The aquifer's potentiometric surface is generally at just below sea level upon the domal structure of Weeks Island and is found to slope slightly west southwesterly towards Vermilion and Weeks Bays in the southwest quadrant where the majority of the island is occupied. The fresh water bearing sand layers that occur above the salt provide usable water for the local area.

A sinkhole, found in May 1992 on Morton Salt property, which could have potentially affected crude oil storage in the underlying mine, prompted further investigation and relocation of the crude oil stores and subsequent decommissioning of the Weeks Island site.

Enlargement of the sinkhole was continuous until arrested by construction and maintenance of a freeze wall plug created in the water table around the throat of a suspected crevasse leading down into the top of the salt formation. Relocation of the bulk of the mine's crude oil inventory to Bayou Choctaw and Big Hill oil storage sites was completed in 1999. Five ground water monitoring points outside of the freeze plug were identified and background or ambient conditions were assessed in the four wells surrounding the sinkhole for the three-year period prior to final decommissioning.

The VWS studies here were used to further the characterization efforts of the water table aquifer at the Weeks Island site and to install an additional well completing the “net” (see Figure 6-11, Weeks Island Long-Term Monitoring) for the subsequent long-term monitoring proposed. From these long-term monitoring positions, ground water was initially determined to flow generally toward the northwest at an approximate average linear velocity of around 75 feet per year based upon the low gradients observed applied to the rather large permeability measured. Subsequent monitoring has followed the flow direction from northwest around to the southwest presumably towards off take from a former nearby shallow well used for cooling and make-up for the freeze wall chillers and additional current offtake located further away to the southwest (see Figure 6-12) WILT 26 Flow Direction and Gradient.

The Weeks Island long-term monitoring program switched over to a detection-monitoring mode commencing with the November 1999 sampling. Quarterly samplings are now used to compare to the background conditions established prior to closure.

The spurious and sporadic quantifications of TPH encountered in late 2002, were continued under investigation in 2003. The investigations, which included specific field evaluations, finally revealed that the former TPH IR lab testing methodology should be replaced by the more specific gas chromatographic analytical method, TPH 8015 (oil). Throughout 2003, the TPH 8015 (oil) method was utilized and most tests have determined the absence of any TPH at the method detection limit of 0.150 mg/l. There have been some occasional spurious and variable concentrations quantified just above the new method’s lower detection limit usually associated with the fluids sampled from within the East Fill-Hole. These sporadic occurrences have been reported and will continue to be investigated in a systematic fashion with our routine quarterly monitoring schedule although the levels do not indicate any containment problems with the closed mine. The low concentrations measured thus far by both methods coupled with the rather low gradient and resultantly slow ground water movement on this portion of the Weeks Island dome support this approach as a prudent response to the values thus far determined.

As reported back in June 4, 2001, Morton Salt personnel discovered the surface expression of the former sinkhole location. The progress of the sinkhole’s expansion and eventual quiescence was followed throughout the 2003 calendar year. By the close of 2003 the subsidence rate had leveled off to something approaching about an inch per week. Morton personnel mounded fill-sand over the former hole on a monthly or less frequent basis based on the subsidence rate. The field observation program for the sinkhole returned to a quarterly schedule to coincide with the quarterly ground water sampling episodes.

The sinkhole remains cordoned-off and is backfilled with sand as-needed for safety precautions. A program of physical observations of this and the remaining decommissioned DOE facilities on the island is now maintained with the ground water monitoring program activities.

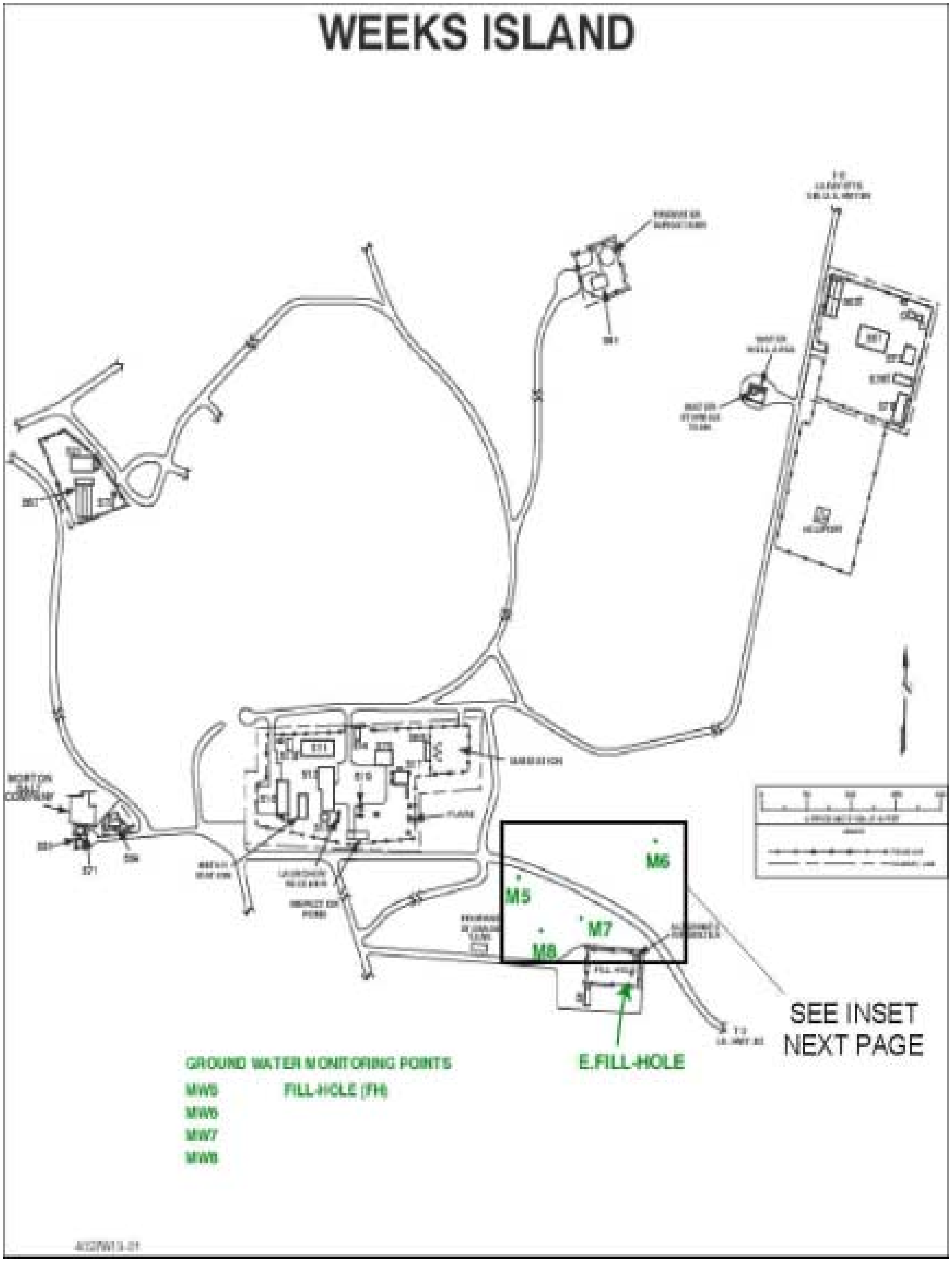


Figure 6-11. Weeks Island Long Term Monitoring

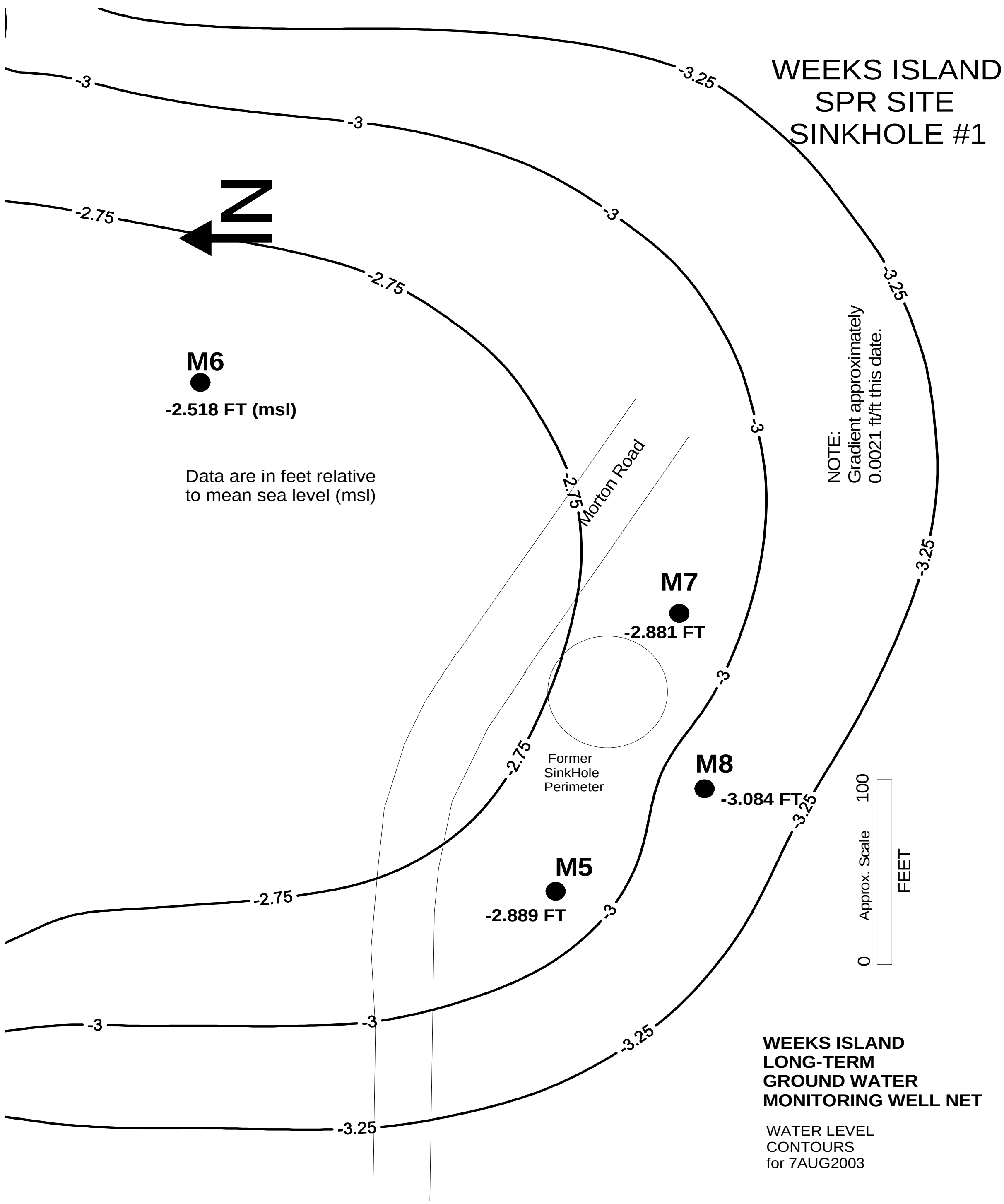


Figure 6-12. WILT 23 Flow Direction and Gradient Summer 2003

In addition to the ground water monitoring performed in the sinkhole area, fluid levels, flow data, and TPH tests are taken at the East Fill Hole (EFH) position. This structure was modified to accommodate pressure relief for the mine in the form of brine-bleed to the outside briney portion of the aquifer at the top of the salt dome. This mechanism was needed to adequately address the anticipated “mine-creep” from the decommissioned and brine backfilled storage chambers. Fluid level trending and salinity data gathered at the submerged sampling point of the EFH are prepared and evaluated with each trip. All of these data are compiled, evaluated, and reported on a regular basis for outside agency review.

6.6 WEST HACKBERRY

The Chicot Aquifer, which occurs closest to the surface in the Hackberry area, contains predominantly fresh water with salinity increasing with depth and with proximity to the Gulf of Mexico. The majority of the ground water pumping from the Chicot Aquifer takes place in the Lake Charles area. Pumping is so great that a cone of depression has been created which has reversed the flow direction to the north. The fresh/saline water interface is approximately 213 m (700 ft) bls. Areal limited zones found affected and monitored at West Hackberry are much nearer the ground surface, with a shallow zone at roughly 6 m (20 ft) bls and a deep zone at roughly 15 m (50 ft) bls. Details provided by the VWS in 1996 indicate that the two zones contrast sharply in permeability, and as a result, their estimated linear velocity measurements are quite different. The range of flow rates estimated for the shallow zone is from 50 to 200 feet of movement per year, which results from both variable permeability values and varying gradients across the site. The deep zone exhibits a generalized flow rate estimate of only 7.5 feet per year, which is largely due to the more clayey nature of the sands conveying these waters and the lower gradients evident within the site's limited well net.

Situated directly atop the salt dome and given the long industrialized history of the site and the immediate area, a 10 ppt cut-off for salinity is used in comparisons for determining affected and unaffected waters as historical ambient conditions have been found highly variable across the site.

The 1991 Contamination Assessment Report and Remedial Alternatives Analysis identified the former brine pond as a source of ground water contamination. The decommissioned brine pond is one of five adjoining ponds comprising a pond system and solids management system that handled brine and anhydrite solids pumped from the storage caverns. As an abatement measure early in its history, the brine pond was cleaned, and obvious cracks in the liner's concrete weight-coat walls and floor were grouted to stop leakage. Ground water recovery around the pond was also increased at this time, which was to be maintained until a brine tank system could be constructed as a replacement. The state approved brine pond-decommissioning plan was concluded in November 1999.

Eleven monitoring wells and 15 recovery wells (Figure 6-13) have been installed on the West Hackberry site in five phases. All wells were used to either monitor or control brine contamination movement beneath the brine pond system. Salinity data gathered over the past five years at all wells is depicted in Figure 6-14. Four of the seven wells originally installed for VWS were retained for additional water level measurement around the periphery of the main site bringing the site total up to thirty. Salinity data, as available, are depicted in the five-year graphs.

West Hackberry personnel began using the low flow technique for sampling all non-pumping wells in December 1995. Water level measurements from both zones for the summer quarter timeframe of 2003 have been reduced to elevations, contoured, and are presented as Figures 6-15 and 6-16, Shallow Zone and Deep Zone, respectively. The effects of the long-term pumping appears to be greatly moderated to dissipated in both zones at the time the measurements were made in May, 2003. The contour map of the water levels in the underlying deep zone reveals a rather flat pressure derived gradient within the semi-confined water bearing zone. The low permeability of the deeper zone routinely produced very pronounced draw down levels at the former pumping wells, which in turn produced an unusually deep and pronounced cone of depression as an artifact of the contouring. The slow recharge to this lower permeability zone has been monitored closely throughout the calendar year. The pressure gradient evident is very low and continues to maintain very slow travel times and indecisive (ephemeral) travel paths with no hard and fast direction beneath the site. The general appearance is that of a fully recovered (or nearly so) confined water bearing zone, ostensibly receiving some recharge potential in the vicinity of wells WH P1D, WH P4D, and WH P2D.

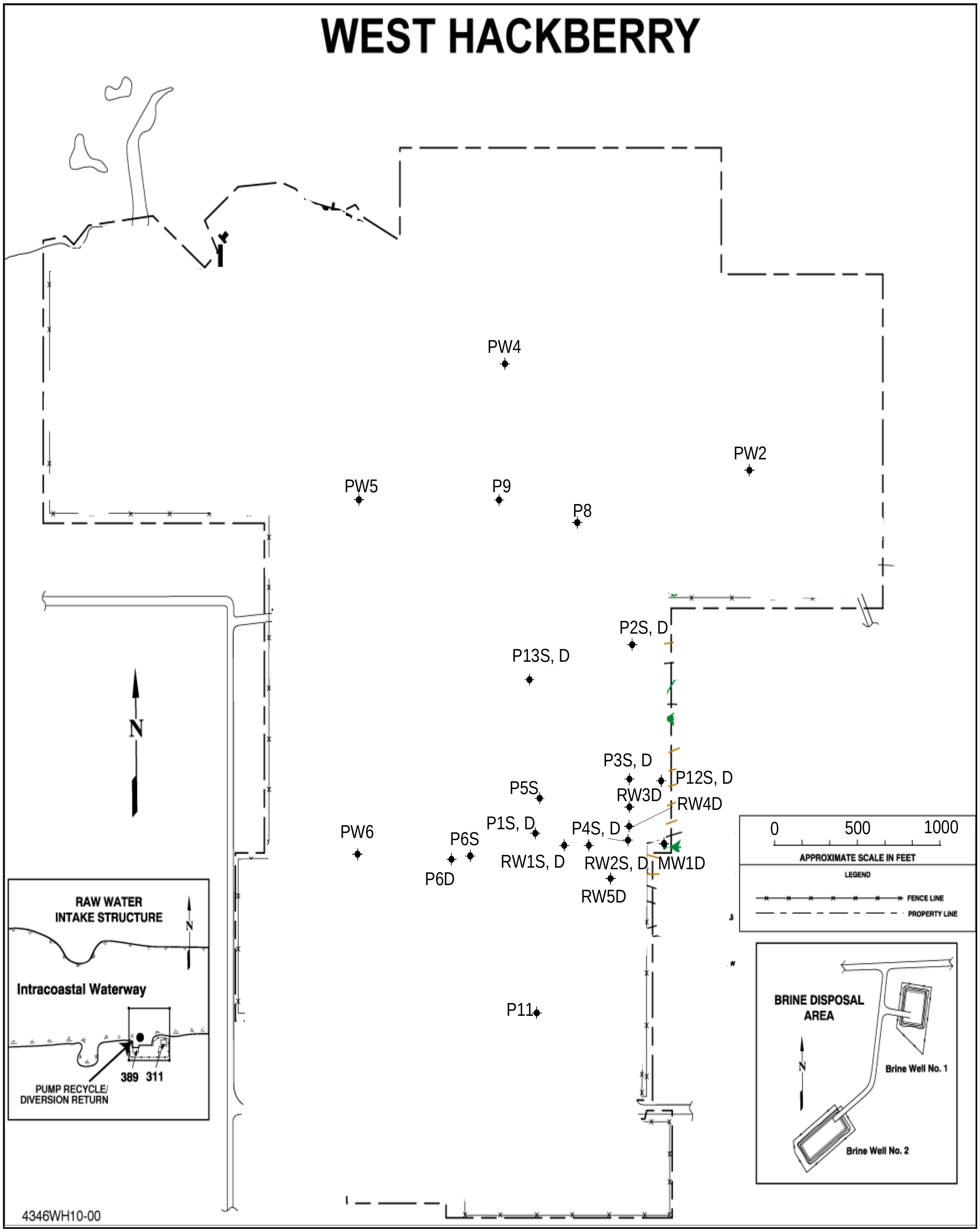
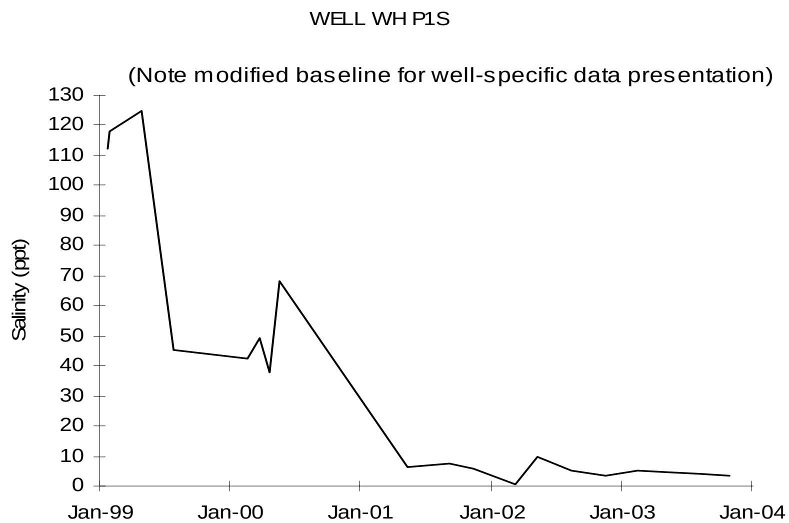
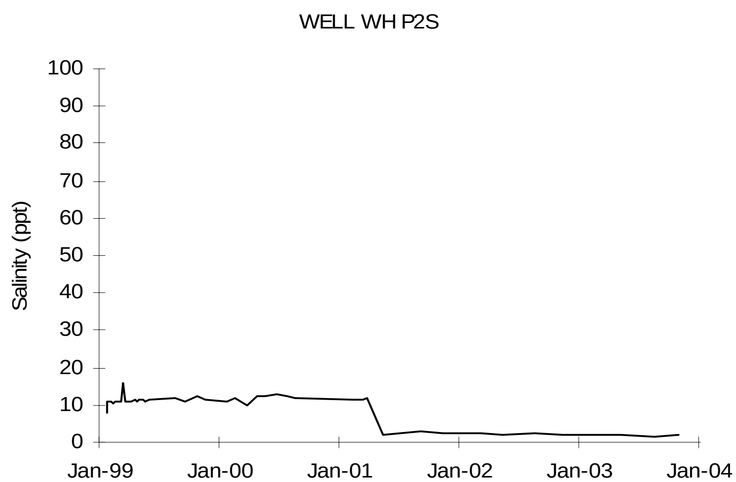


Figure 6-13. West Hackberry Ground Water Monitoring Wells
(Deep and Shallow Shown)





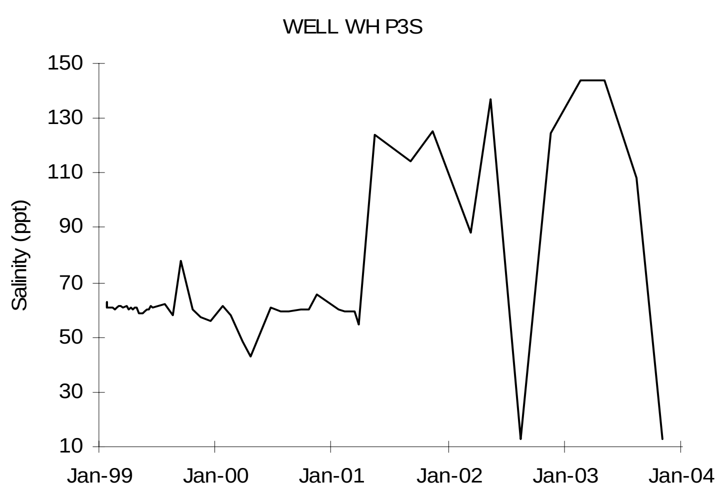


Figure 6-14. West Hackberry Ground Water Monitoring Well Salinities

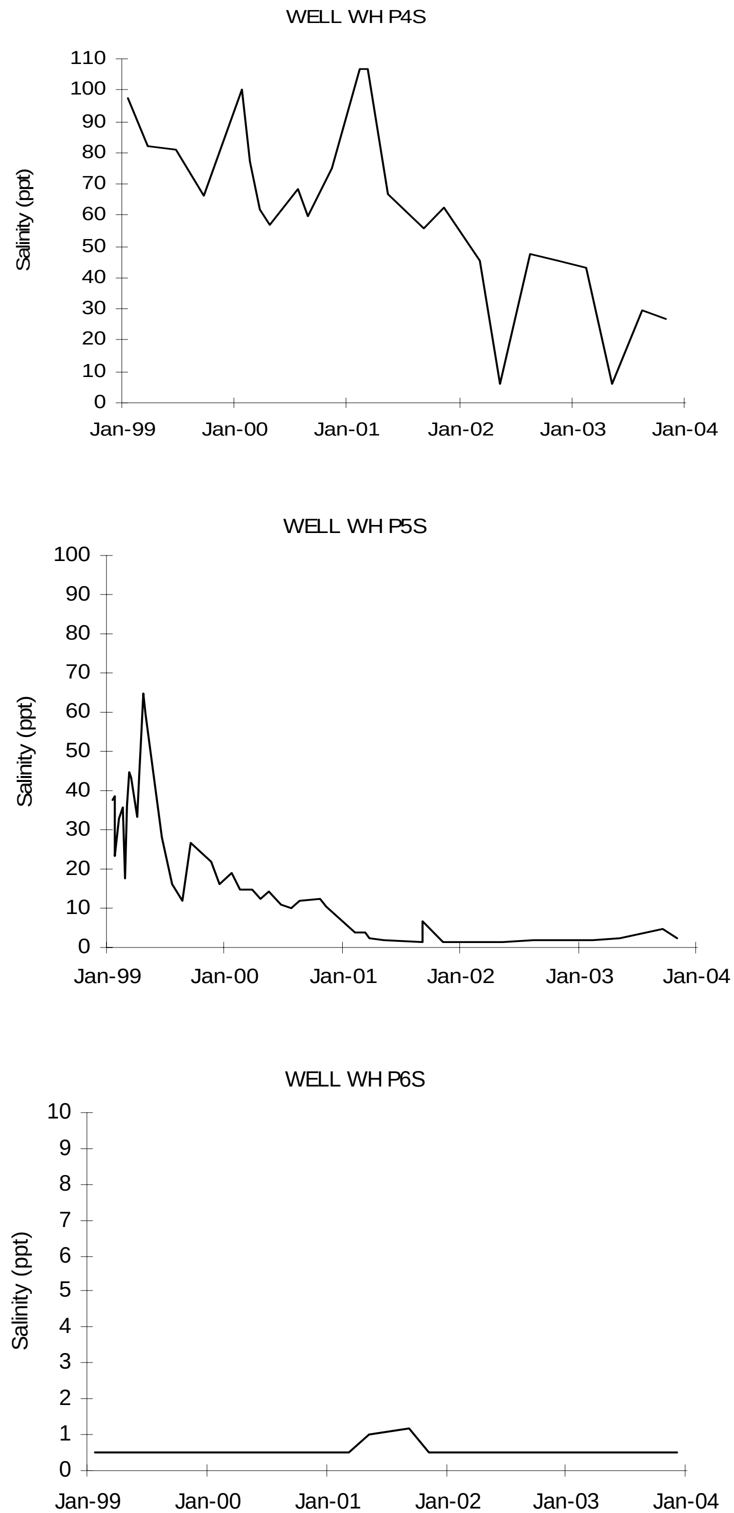
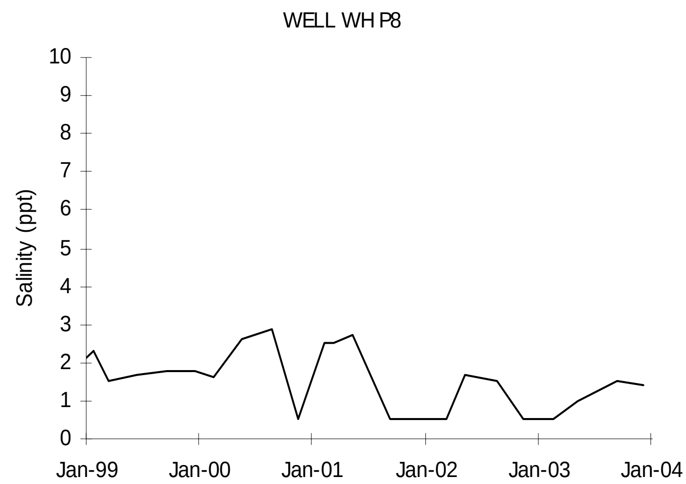
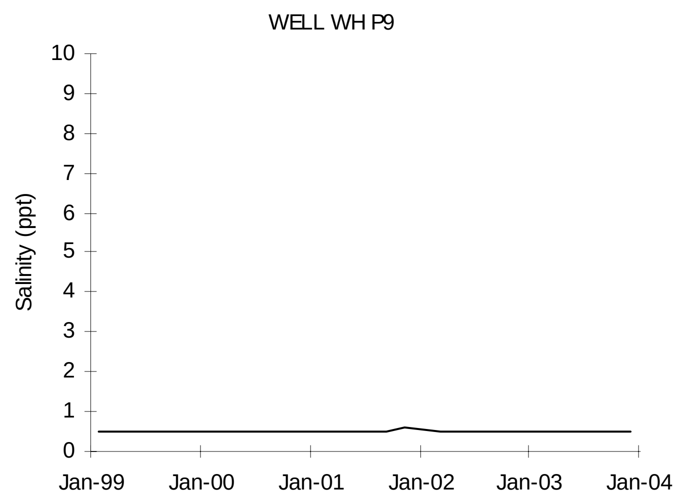


Figure 6-14. West Hackberry Ground Water Well Salinities (continued)





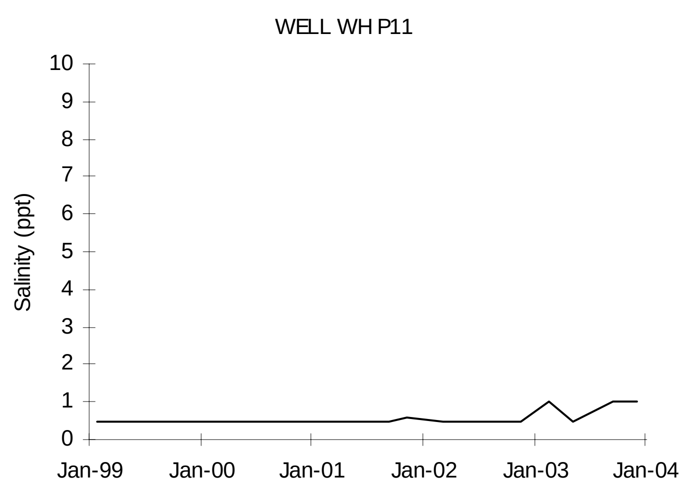
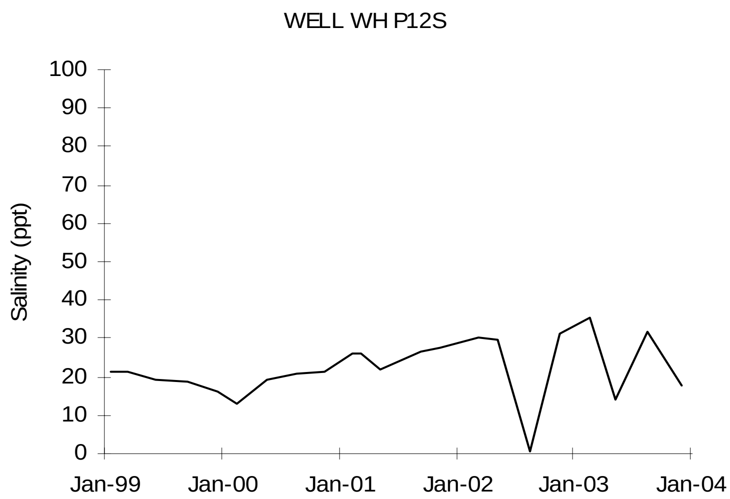
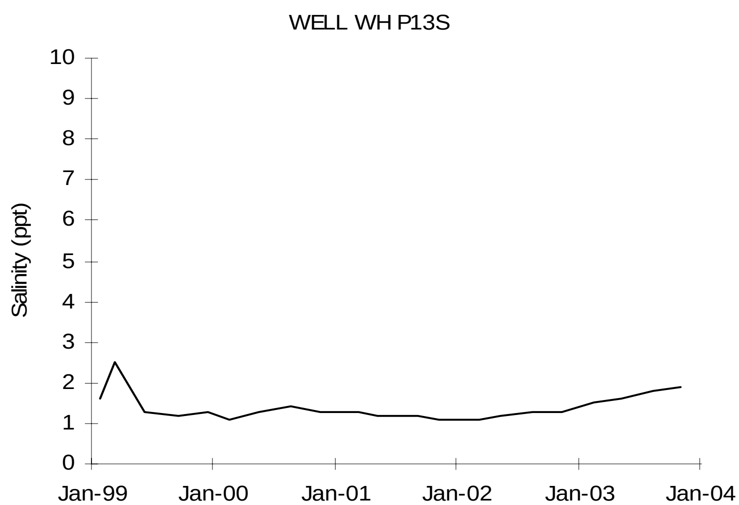


Figure 6-14. West Hackberry Ground Water Well Salinities (continued)





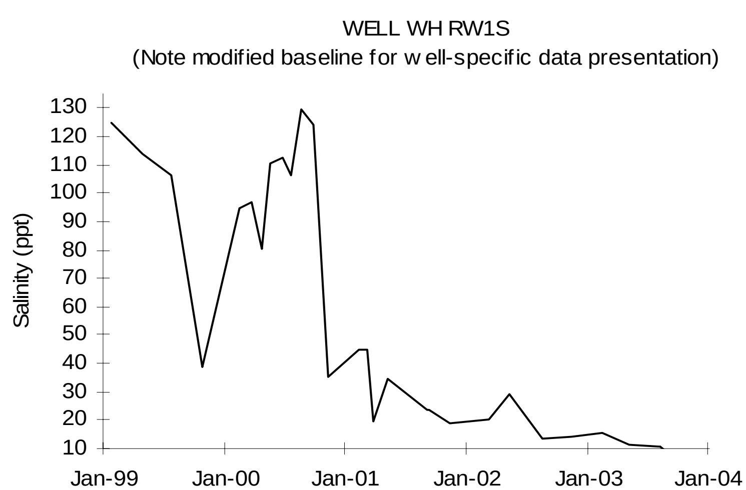
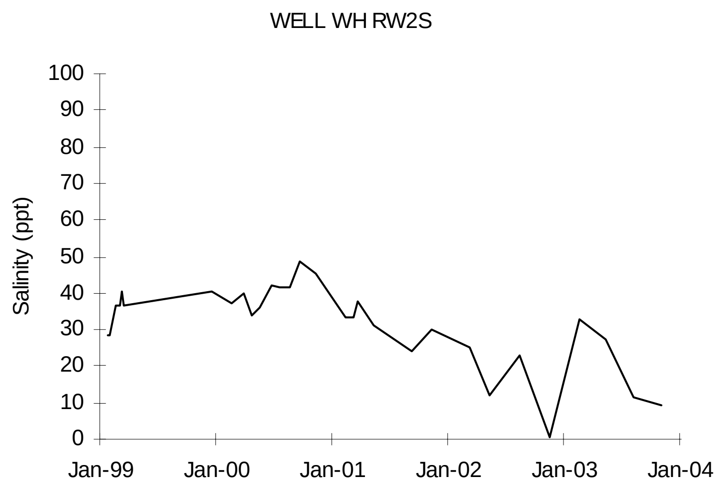
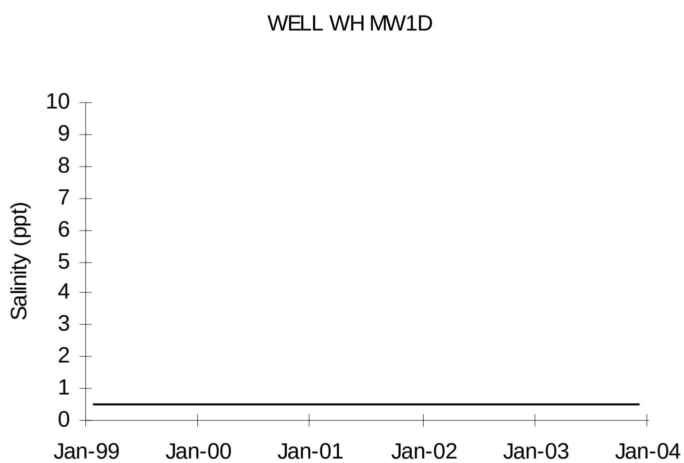


Figure 6-14. West Hackberry Ground Water Well Salinities (continued)





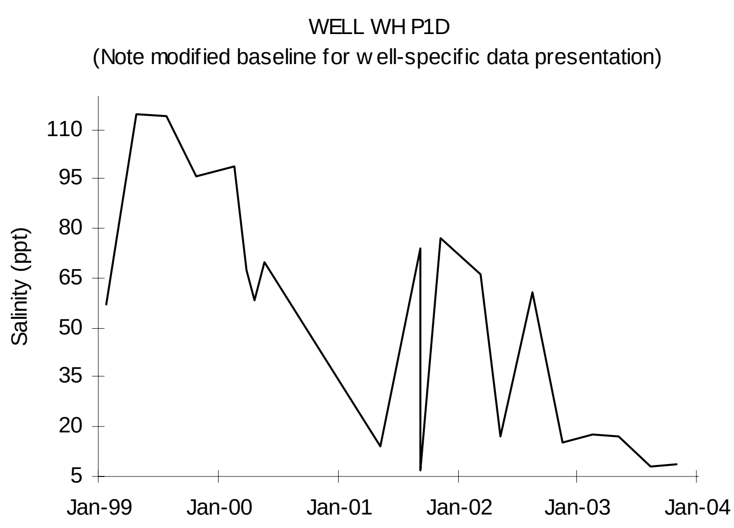
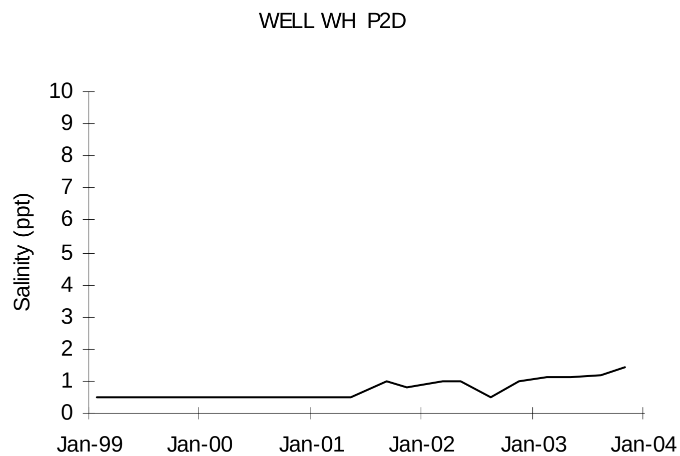
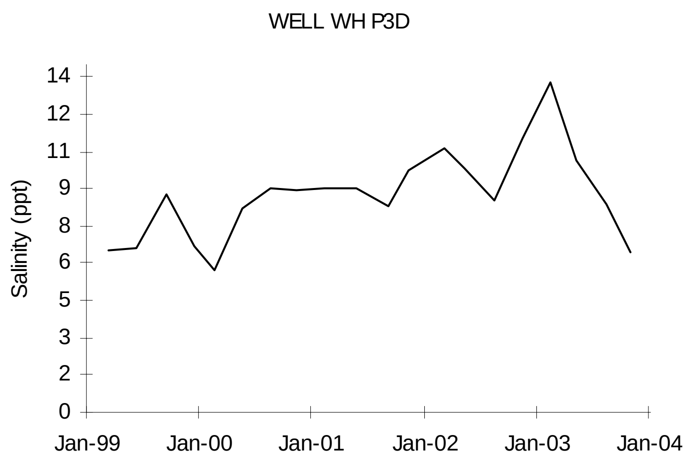


Figure 6-14. West Hackberry Ground Water Well Salinities (continued)





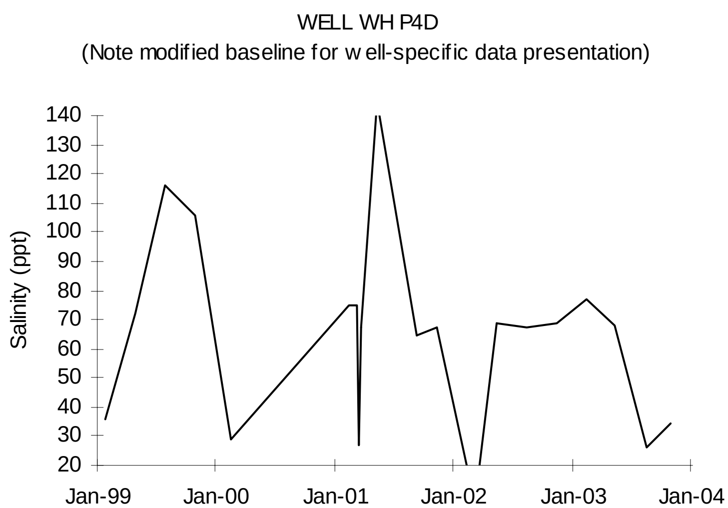
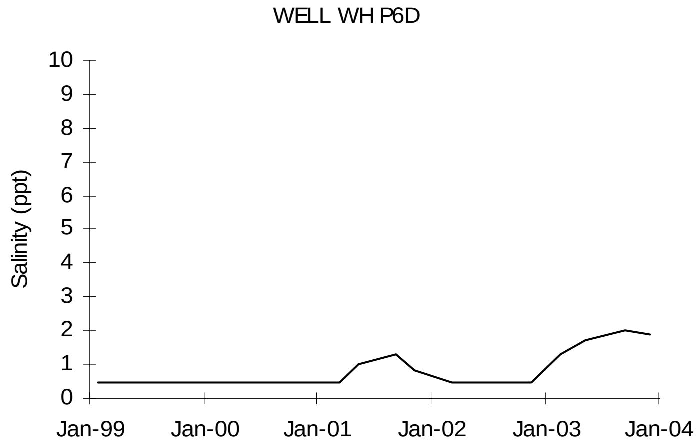
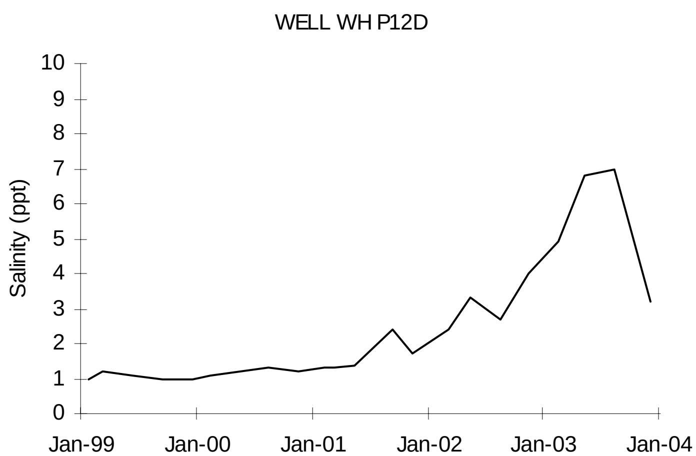


Figure 6-14. West Hackberry Ground Water Well Salinities (continued)





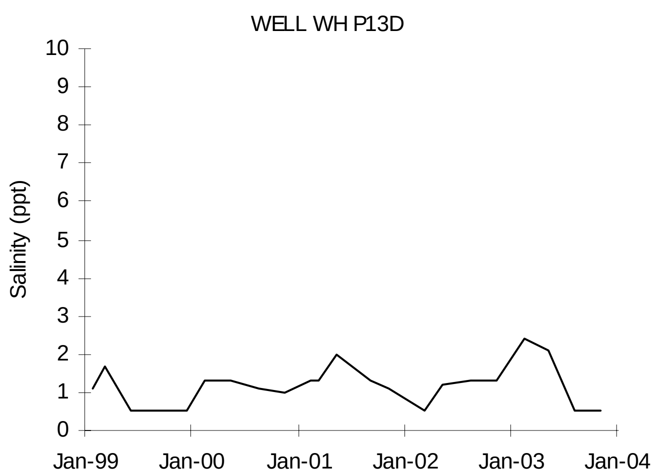
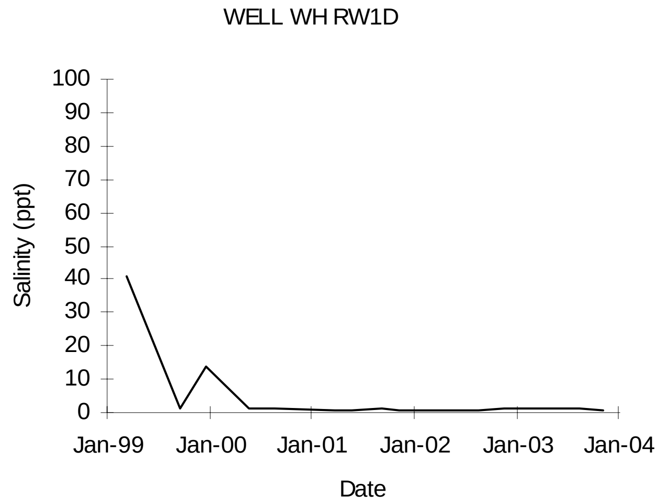
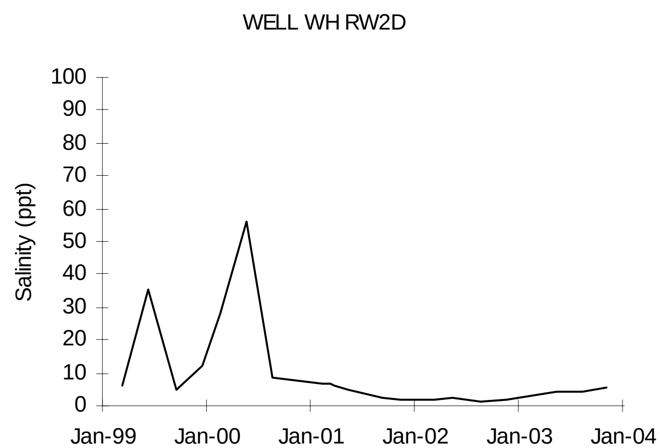


Figure 6-14. West Hackberry Ground Water Well Salinities (continued)





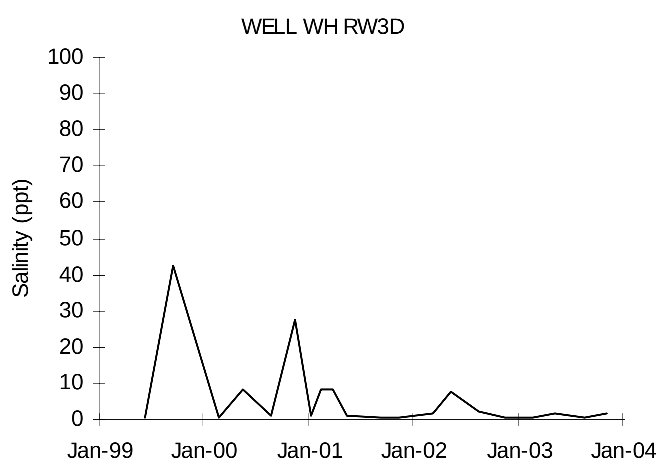
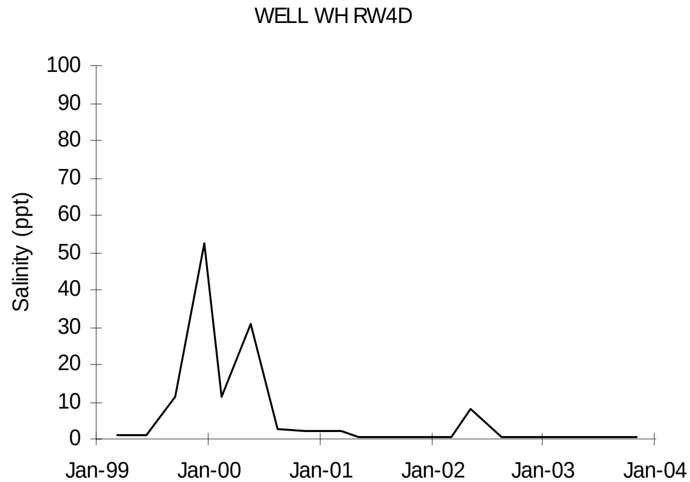
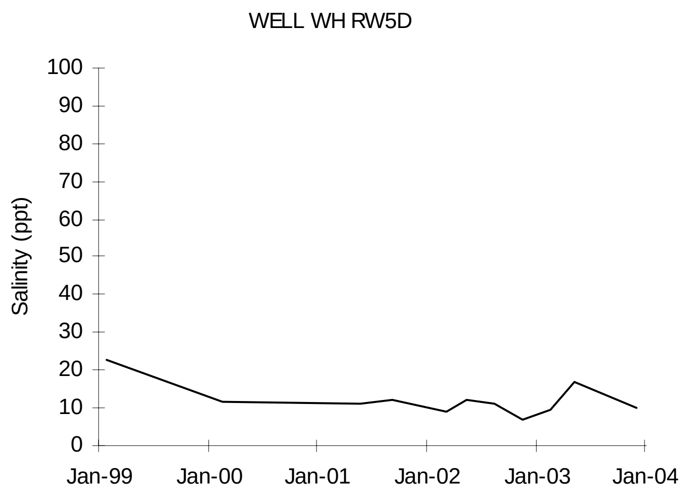


Figure 6-14. West Hackberry Ground Water Well Salinities (continued)





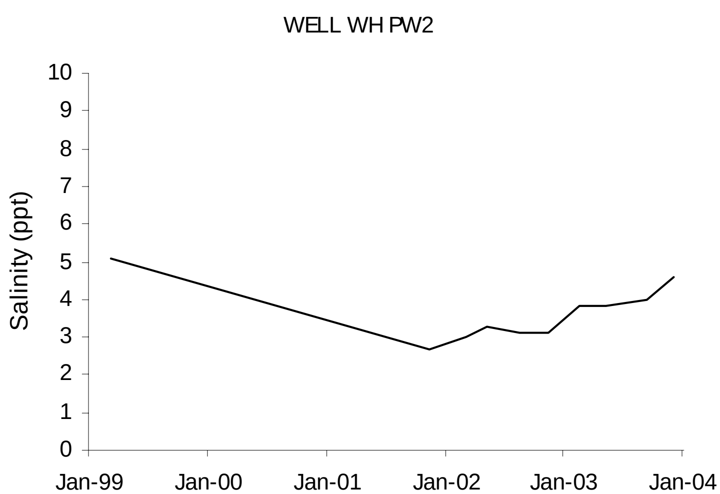
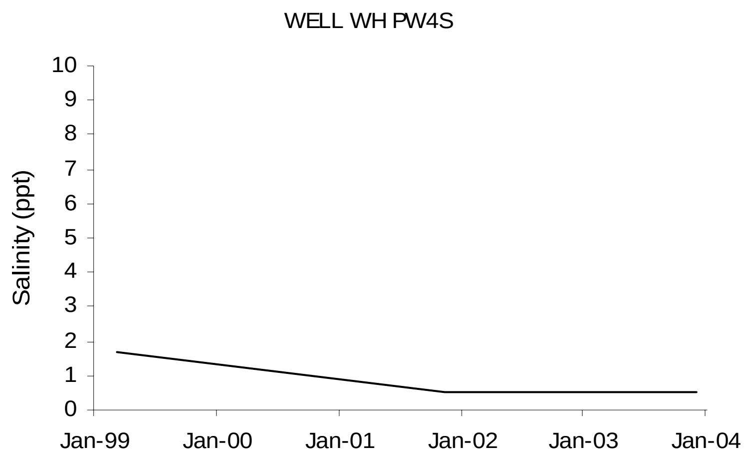
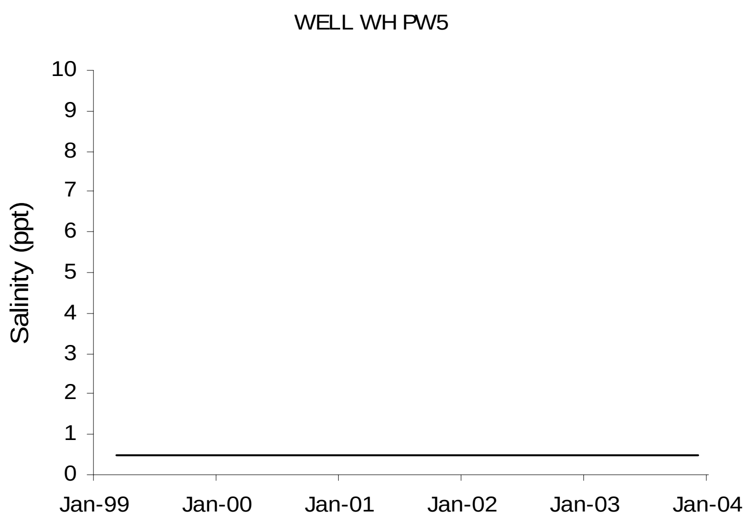


Figure 6-14. West Hackberry Ground Water Well Salinities (continued)





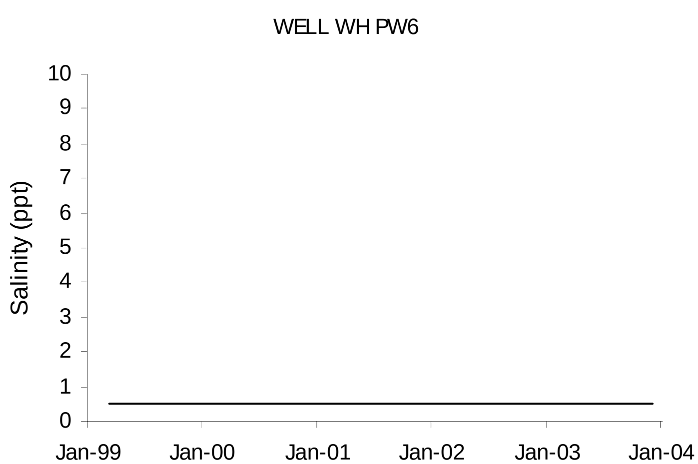


Figure 6-14. West Hackberry Ground Water Well Salinities (continued)

Ground water recovery from both affected zones beneath the brine pond system was once a very maintenance intensive project during the nearly nine years of Phase III continuous pumping. Pond decommissioning construction, which involved internal demolition, cleaning and testing, and final state-required liner puncturing, may have resulted in some of the interim salinity spikes commencing early in 1999. Loss of the pond for discharge management of recovered ground water hindered overall recovery operations in the latter two years of pumping due to a need for a new form of manifold discharge piping to the aboveground tanks. Manifolding also necessitated backflow prevention devices at each well location connection which required high maintenance due to mineralization and salts crystallization.

Once the pumping wells were shut-in commencing the first week of April 2001, the “Year Long Evaluation” began. During this 5 quarter evaluation interval that would cover 4 complete reporting periods under full shut-in, the routine physicochemical data were collected and reported with very little interpretation leading to a detailed Summary Report at the conclusion. This Summary Report was mailed to LDNR on September 3rd, 2002. The report presented all of the resulting data in both tabular and graphical forms and made direct comparisons to historical averages compiled during recovery as well as to the last pumping data points on a well by well basis. The primary focus was on any discernible changes in salinity at the wells around the site, however, water elevation changes within both monitored zones were showcased with time series hydrographs and with quarter by quarter contour mapping. All in all, the short period of one year of no pumping produced no dramatic salinity ramifications as some wells around the immediate former pond area noticeably improved (freshened) while others became more saline.

The cones of depression previously developed in both zones collapsed (filled in) more rapidly and noticeably in the shallow zone, however, this phenomenon was quite lengthy in duration which supported the long held suspicion that the zone is at best a leaky or semi-confined water bearing unit receiving some recharge locally perhaps even on the site. The underlying (less permeable) deep zone required a longer period to reveal a reversion to more ambient conditions. Again, this observation supports the concept of this water bearing unit being recharged primarily offsite, although leak-by at the limited deeper well locations cannot be discounted. A Second-Year, Year-Long Evaluation Report was prepared in 2003 representing a comprehensive review of the continued changes resulting from the cessation of recovery pumping for a second year and which also proposed a the same reinstatement of long-term site-wide ground water detection monitoring, which was not officially acted upon by the agency during CY2003.

Former recovery well salinity measurements depict a complex picture of ground water impacts beneath the former pond system. Salinity remains more elevated and spatially variable in the shallow zone than the deep zone with the exception of the two deep zone wells WH P1D and WH P4D on opposing west and east sides of the brine pond, respectively, where salinity, even though highly variable, has in the past inexplicably exceeded that of any other well. Both of these wells have shown marked improvement since recovery cessation and WH P1D has begun to approach the 10 ppt cut-off.

A stable brine plume exists in an east-northeastward shaped ellipse beneath the brine pond in the shallow zone from the southwest corner over to well WH P3-S. The saline ground water is defined primarily by five wells now. Recovery wells WH P1S and WH P5S formerly tugging on the plume from the west side of the pond show notable freshening once the pumping ceased. Wells WH RW1S and WH RW2S on the south side, and WH P4S on the east side each now reveal downward salinity trends with this year's 5-year trends. However, only WH P3S, in the center of the historic plume, now traces an apparent trend of increasing salinity over this year's five-year window presumably due to the rather large fluctuations in the historic dataset. Wide salinity fluctuations seen on the data graphs are attributed to salinity/density stratification occurring in the wells and to the oscillating cones of depression affecting both zones especially for those wells where fresher water mixes occurred when pumping was in effect. Wide salinity swings were also noted with both of the wells WH P2S and WH P3S as these were the only two wells where the high volume submersible pumps were used near the end of the recovery program.

Until sporadic spikes of elevated salinity were experienced with pond closure construction early in 1999, a slight decreasing salinity trend had been observed at wells WH P1S, WH P5S, and WH RW1S along the west side of the brine pond. Each of the wells exhibits a response to closure construction that eventually began to subside sometime in 2000 and even more so since recovery cessation. This time-series signature is especially noticeable in well WH P5S and is reflected in the post-closure data of the other two. In fact, wells WH P1S and WH P5S both began exhibiting salinity below the 10 ppt cut-off within CY2002 with nearby well WH RW1S not far behind (13 to 16 ppt).

Many shallow wells reveal an obvious salinity drop upon cessation of active recovery, this would be indicative of fresher recharge and to wells no longer pulling salty water through the formation to their screens. Relatively few (most notably hard pumped well WH P3S) responded with an abrupt salinity spike at shut-in. These wells were formerly pulling a fresher water mix across their screened length when actively pumping. With the pre-recovery ground water movement to the east now returning, it is expected that wells on the west side of the pond will eventually capture fresher, uncontaminated ground water from the western recharge area as the source of brine contamination was removed with pond closure in late 1999. The two shallow pumping wells WH P1S and WH P5S have already responded this way. This improving or decreasing salinity response will undoubtedly be delayed to the wells on the east and situated directly in the core of the plume as the overlying salt impregnated soils slowly respond to the now diminished available percolation and to the slow post-closure recharge.

The separate and specific one-year post recovery evaluation was mailed to LDNR on September 3, 2002. This report was prepared per guidance received in the concurrence to cease the recovery pumping dated March 2001. The evaluation covered the period April 2001 through May 2002, or five full quarters; the second report covered a similar period into 2003. The data indicate initial improvement in many of the peripheral recovery wells and muted effects elsewhere closer to or within the existing plume(s). Included in both with the evaluation reports was a proposal to resume long-term site wide detection ground water monitoring based upon the initial trends and indications. That proposal was not acted upon during CY 2003, so, during the interim period until written direction is provided, the monitoring conditions provided in the March 2001 recovery cessation concurrence remain in-place and in force.

Ground water salinity conditions over most of the site have improved and have also settled into a gradual freshening trend. As the five-year window for each well progresses beyond the former recovery operations, the graphs should reveal a very “quiet” shallow ground water monitoring regime similar to the response which began to occur shortly after the pond system was closed in early 1999 and then when the pumping was ceased in the spring of 2001.

It late 2003, contact was received from an LDNR facilitator and the review process was begun for the monitoring proposal contained in both of the yearlong evaluation reports.

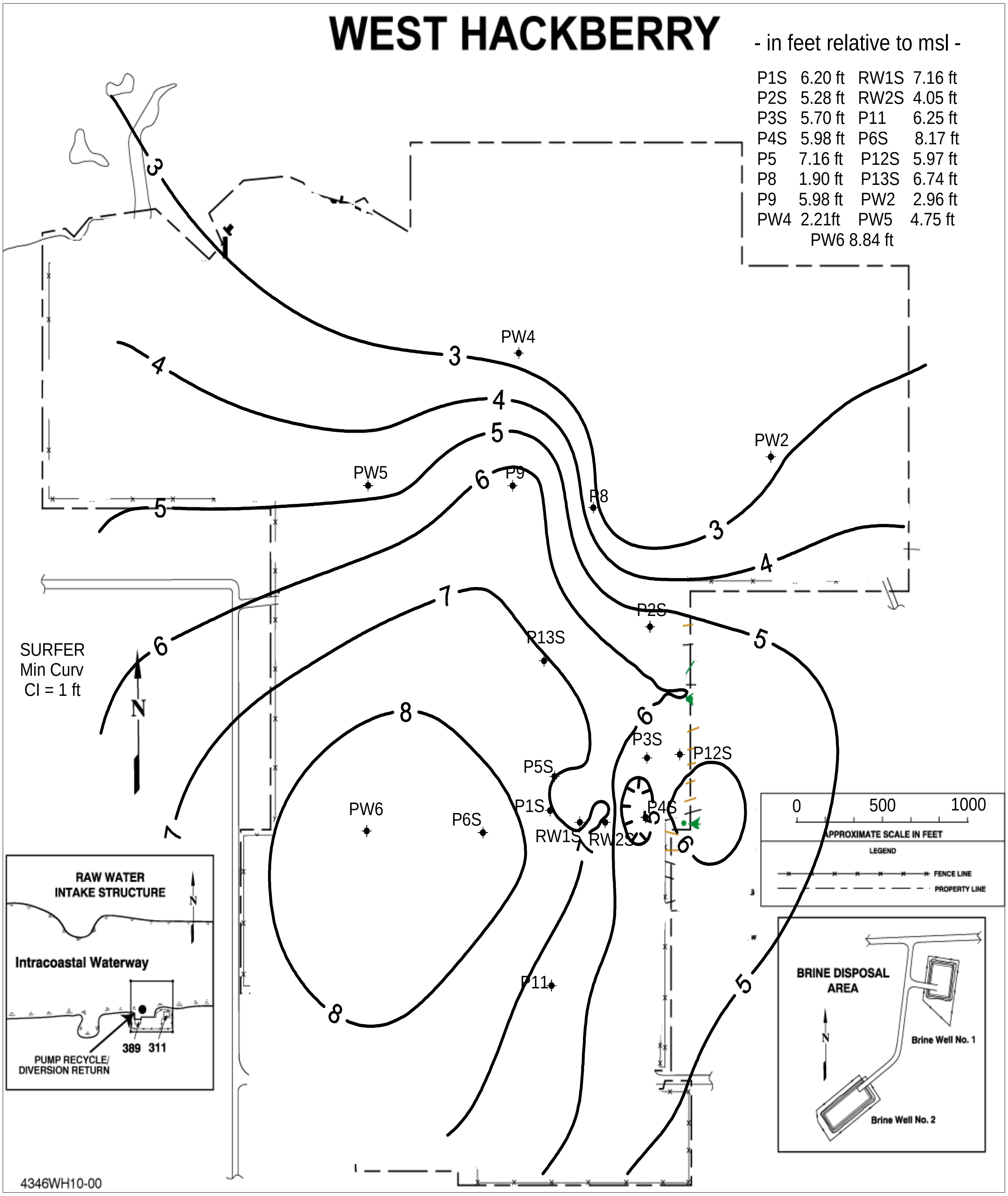


Figure 6-15. West Hackberry Shallow Ground Water Zone Contoured Elevations
Summer 2003

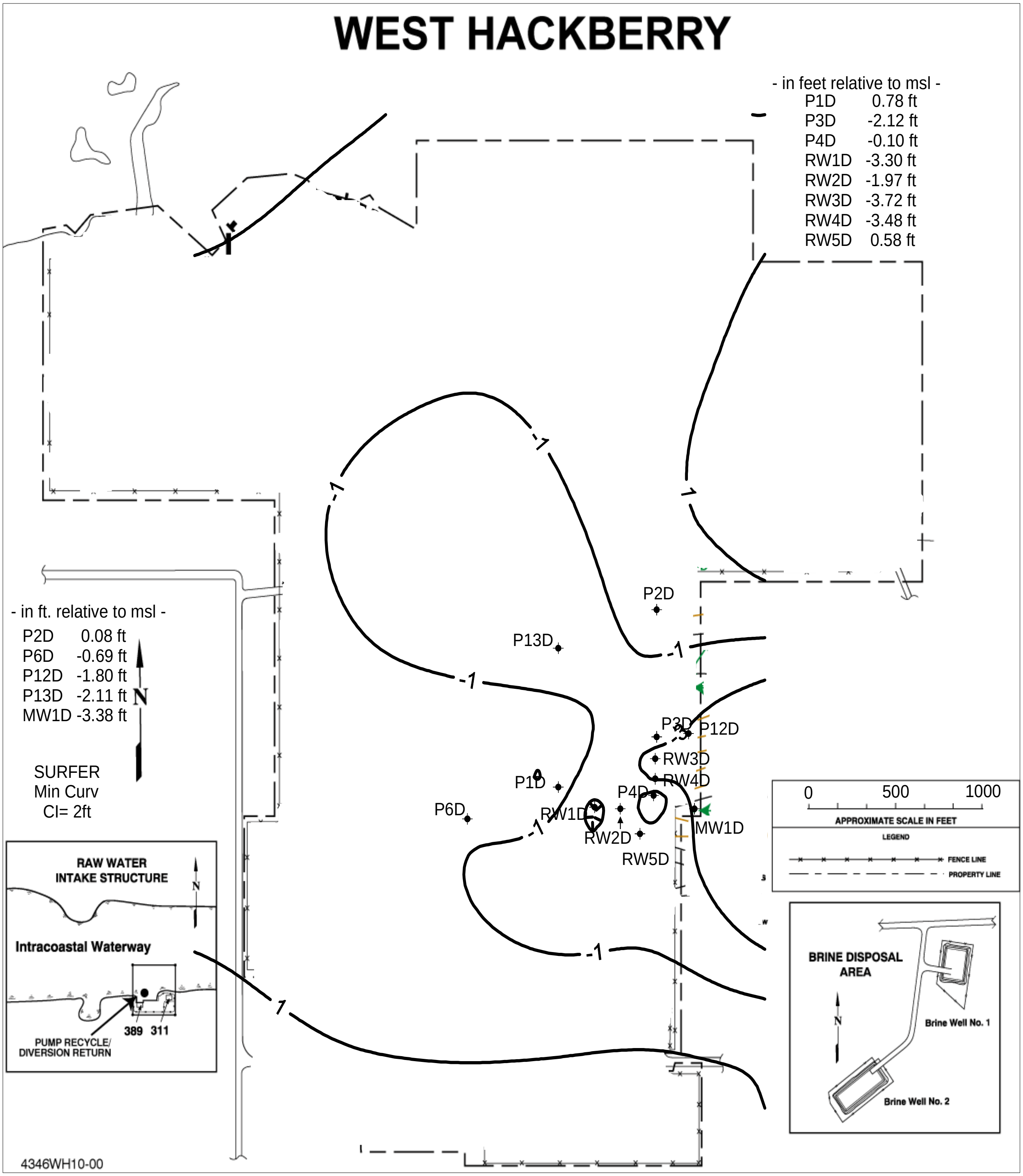


Figure 6-16. West Hackberry Deep Ground Water Zone Contoured Elevations
Summer 2003

Shallow monitoring wells WH P8, WH P9, and WH P11 at caverns 8, 9, and 11, respectively, are located away from the brine pond and intercept unaffected waters that are near ambient levels, compared to up-gradient well WH P6S. Two of these wells (WH P8 and WH P11) have detected minor localized impacts from former firewater line leakage and have since returned to ambient unaffected levels over the present five-year history.

Shallow zone monitoring wells WH P6S, WH P12S, and WH P13S, and deep zone monitoring wells WH P2D, WH P6D, WH P12D, WH P13D, and WH MW1D are nearer the brine pond than wells at the caverns and along the site's perimeter and with the exception of well WH P12S, also intercept ambient ground water. Well WH P12S is the only down gradient monitoring well that is affected by the shallow zone brine plume, extending eastward from the brine pond. Its salinity remains elevated (27.2 ppt annual average in 2003) which has been generally consistent since sampling began in 1992 (range 13.1 to 39 ppt, Std. D = 6.5 ppt, avg. = 27.70 ppt, n = 47); however, the well has shown a reversal of the freshening trend that commenced the last half of 1998. The gradual rise in salinity noted for 2000 and continuing into 2003 may have been a delayed (travel time) response to the closure construction spikes seen nearer the pond early in 1999 and perhaps the gradual down gradient plume movement towards this well. The overall trend since 1992 is downward and the annual data for 2003, although quite variable, indicate the advent of a new freshening period.

Long-term cones of depression have been sustained in both zones as a result of successful ground water recovery through the nine years of pumping and into the first quarter of 2001. The head differences in shallow and deep zone potentiometric surfaces indicate that the two zones are hydraulically separate; however, the overall potential remains downward and when combined with the increased density of saline water, contamination will always tend to seek lower elevations at this site. The two zones behave as leaky, poorly confined water-bearing units exhibiting static heads considerably above the elevations of an overlying confining unit. Recharge would be expected to occur somewhere off site at an up-gradient location; however, local topographic modifications of the surrounding area from the underlying salt piercement appear to have combined with the onsite offtake to locally modify the regional ground water movement beneath the site. From the addition of several outlying shallow wells placed for the VWS, we now find that ground water contours indicate a radial flow of water, reflecting surface topography, off the dome placing a recharge potential for the shallow zone directly under the main site in an N-S trending ridge. Insufficient data are available to assess the deeper zone in a similar fashion. The deeper zone exhibits an overall higher degree of confinement and is also considerably less permeable as evidenced in the much lower average linear velocity (flow rate) estimate of 7.5 ft/yr. versus the 50 ft/yr. to 200 ft/yr. estimated for the shallow zone.

7. QUALITY ASSURANCE

The SPR sites undergo periodic evaluation throughout the year in the form of annual internal audits as well as inspections by outside federal and state agencies. The structured laboratory quality assurance program has continued through the systematic application of acceptable accuracy and precision criteria at SPR laboratories. Compliance with this and other environmental program requirements was reviewed and evaluated at each site by means of DM's Organizational Assessments and program inspections at selected sites by state and federal environmental agencies. Results from the environmental program assessments are addressed in Section 2 of this report.

7.1 FIELD QUALITY CONTROL

All field environmental monitoring and surveillance activities are performed in accordance with standard procedures, which are maintained in DM’s Laboratory Programs and Procedures Manual and the Environmental Monitoring Plan and in individual sampling and analytical work instructions. These procedures include maintenance of chain-of-custody, collection of quality control (QC) samples, and field documentation.

7.2 DATA MANAGEMENT

SPR and contractor laboratories generate SPR data. All data generated by SPR laboratories are recorded and maintained in bound, numbered, and signed laboratory notebooks. Contractor laboratory data and accompanying QC data are received by the site laboratory or environmental department and retained on site as part of the original data file.

Water quality data are added to the SPR ES&H Management Information System (SEMIS) for retention, manipulation, and interpretation. The data are compiled and appear in various reports such as this Site Environmental Report, in support of assessments of the SPR, evaluations of explained events, and development of appropriate responses.

7.3 LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY LABORATORY ACCREDITATION PROGRAM (LELAP)

The Louisiana Department of Environmental Quality (LDEQ) has mandated that any laboratory submitting results from environmental samples to the department must be accredited by the state. DOE has required that all SPR laboratories including those in Texas, participate in the accreditation program. As part of this program the laboratories are required to analyze Performance Evaluation samples twice per calendar year, once in each the first and third quarter. Through this program, LDEQ ensures verifiable and consistent data generation by requiring the environmental analytical laboratories of permitted dischargers to perform analysis on blind samples for each of the permit parameters. The Bayou Choctaw, Big Hill, Bryan Mound and West Hackberry laboratories have completed and reviewed their accreditations. The Texas sites are accredited through this program because they may serve as a backup to the Louisiana site laboratories. The laboratories have successfully completed the first and third quarter 2003 round of blind samples. Resultant data was provided to LDEQ, via the Performance Evaluation (PE) sample contractor/provider, on a standard report form. The results of this study indicate that all SPR laboratories performed acceptably and are approved for continued DMR/LPDES analyses.

7.4 SPR LABORATORY ACCURACY AND PRECISION PROGRAM

The SPR laboratory quality assurance program is based on the U.S. EPA Handbook for Analytical Quality Control in Water and Wastewater Laboratories. This program focuses on the use of solvent or standard and method blanks, check standards, and for instrumental methods, final calibration blanks and final calibration verification standards with each analytical batch to verify quality control. Additionally, replicate and spiked samples are analyzed at a 10 percent frequency to determine precision and accuracy, respectively.

Analytical methodology is based on the procedures listed in Table 7-1. Over 800 hundred of these quality assurance analyses were performed in 2003 to verify the continuing high quality of SPR laboratory data.

The EPA quality control document advocates use of quality control charts to maintain and evaluate accuracy and precision data. The SPR uses a computer program to allow rapid and exact determinations of accuracy and precision without the necessity of manual quality control chart preparation.

7.5 CONTROL OF SUBCONTRACTOR LABORATORY QUALITY ASSURANCE

The M&O Contractor subcontracts some of the required analytical work. The Laboratories Programs and Procedures Manual contains mandatory guidelines by which such contracts must be prepared. In addition, the respective laboratory staff and M&O Contractor Quality Assurance, Operations and Maintenance, and Environmental staff review laboratory procurement documents.

Subcontractor laboratory service vendors are selected from an approved vendors list maintained by the M&O Contractor Quality Assurance organization. The successful bidder must be on the approved vendors list prior to the start of the laboratory contract. Vendors on the approved list are periodically reassessed by the M&O Contractor Quality Assurance and Operations and Maintenance organizations for adequacy of their analytical and quality assurance program.

Table 7-1. SPR Wastewater Analytical Methodology

Parameter	**Method**	**Source***	**Description**
Biochemical Oxygen Demand	5210(B) 405.1	APHA EPA-1	5 Day, 20^{o}C 5 Day, 20^{o} C
Chemical Oxygen Demand	D1252-88(B) 410.4 5220(D)	ASTM EPA-1 APHA	Micro Spectrophotometric Proc. Colorimetric, Manual Closed Reflux, Colorimetric
Fecal Coliform	Part III-C-2 9222(D)	EPA-2 APHA	Direct Membrane Filter Method Membrane Filter Procedure
Residual Chlorine	4500-C1(G) 330.5 8021	APHA EPA-1 Hach	DPD Colorimetric Spectrophotometric, DPD DPD Method
Oil & Grease (Total, Recoverable)	413.1	EPA-1	Gravimetric, Separatory Funnel Extraction
Oil & Grease (Partition, Gravimetric)	5520-(B)	APHA	Gravimetric, Separatory Funnel Extraction
Total Organic Carbon	415.1 D4839-88 5310(C) D2579(A) 5310(B)	EPA-1 ASTM APHA ASTM APHA	Combustion or Oxidation Persulfate – UV Oxidation, IR Combustion – IR
Dissolved Oxygen	D888-87(D) 360.1 360.2 4500-O(C) 4500-O(G)	ASTM EPA-1 EPA-1 APHA APHA	Membrane Electrode Membrane Electrode Winkler Method with Azide Mod. Winkler Method with Azide Mod. Membrane Electrode
Hydrogen Ion conc. (pH)	D1293-84(A&B) 150.1 4500-H^+(B)	ASTM EPA-1 APHA	Electrometric Electrometric Electrometric
Total Dissolved Solids (Residual, Filterable)	160.1 2540(C)	EPA-1 APHA	Gravimetric, Dried at 180^{o}C Gravimetric, Dried at 180^{o}C
Total Suspended Solids (Residual, Non-Filterable)	160.2 2540(D)	EPA-1 APHA	Gravimetric, Dried at 103-105^{o}C Gravimetric, Dried at 103-105^{o}C
Salinity	D4542-85 (Sect. 7) 2520(B) & 2510 210B	ASTM APHA APHA (16th Ed.)	Refractometric Electrical Conductivity Hydrometric

Table 7-1. SPR Wastewater Analytical Methodology (continued)

Parameter	**Method**	**Source***	**Description**
Biomonitoring	1006.0 1007.0	EPA-3 EPA-3	Menidia beryllina 7 day survival Mysidopsis bahia 7 day survival
Copper	200.7	EPA-1	Inductively coupled plasma atomic emission spectrometric method for trace element analysis of water and waste.

EPA-1 = U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Wastes, Document No. EPA - 600/4-79-020, March 1983.

APHA = American Public Health Association, et al., Standard Methods for the Examination of Water and Wastewater, 17th Ed., 1989.

EPA-2 = U.S. EPA, Microbiological Methods for Monitoring the Environment: Water and Wastes, Document No. EPA-600/8-78-017, December 1978.

ASTM = American Society for Testing and Materials, Annual Book of Standards, Section 11 - Water, Volumes 11.01 and 11.02, 1990.

Hach = Hach Company, Hach Water Analysis Handbook, 2nd Ed., 1992

EPA-3 = U.S. EPA, Short Term Methods for Estimnating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, Document No. EPA/600/4-87/028.

Appendix A
SPR - DM ENVIRONMENTAL STANDARDS

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STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
10 CFR 1021	MR	Compliance with the National Environmental Policy Act
10 CFR 1022	MR	Compliance with Flood Plain/Wetlands Environmental Review
10 CFR 835	RP	Occupational Radiation Protection - Applicable and Enforceable Portions
10 USC 2692	HW	Storage, treatment, and disposal of nondefense toxic and hazardous materials
14 CFR 77	IS	(Aviation) Objects Affecting Navigable Airspace
14 CFR 91	IS	(Aviation) General Operating and Flight Rules
14 CFR 121	IS	(Aviation) Operating Requirements: Domestic, Flag, and Supplemental Operations
14 CFR 125	IS	(Aviation) Certifications and Operations
14 CFR 127	IS	(Aviation) Certification and Operations of Scheduled Air Carriers with Helicopters
14 CFR 133	IS	(Aviation) Rotorcraft External Load Operations
14 CFR 135	IS	(Aviation) Operating Requirements: Commuter and On-Demand Operations
14 CFR 137	IS	(Aviation) Agricultural Aircraft Operations
14 CFR 139	IS	(Aviation) Certification and Operation: Land Airport Serving Certain Air Carriers
14 CFR 145	IS	(Aviation) Repair Stations
14 CFR 830	IS	(Aviation) Notification And Reporting - Accidents and Incidents
27 CFR 55	IS, CS, FP	Commerce In Explosives (ATF)
29 CFR 1903.2	IS	Posting of Notice: Availability of the Act, Regulations, and Applicable Standards
29 CFR 1903.13	IS	Imminent Danger
29 CFR 1904	MO	Recordkeeping and Reporting Occupational Injuries and Illnesses
29 CFR 1910 SUBPART A	IS,FP	General (1 through 8)
29 CFR 1910 SUBPART B	IS	Adoption and Extension of Established Federal Standards (11 through 19)
29 CFR 1910 SUBPART D	IS	Walking-Working Surfaces (21 through 30)
29 CFR 1910 SUBPART E	IS	Means of Egress (35 through 38)
29 CFR 1910 SUBPART F	IS	Powered Platforms, Manlifts, and Vehicle Mounted Work Platforms (66 through 68)
29 CFR 1910 SUBPART G	IH	Occupational Health and Environmental Control (94 through 98)

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
29 CFR 1910 SUBPART H	IS,CS,FP	Hazardous Materials (101 through 126)
29 CFR 1910 SUBPART I	IS	Personal Protective Equipment (132 through 139)
29 CFR 1910 SUBPART J	IS,FP	General Environmental Controls (141 through 147)
29 CFR 1910 SUBPART K	MS	Medical and First Aid (151)
29 CFR 1910 SUBPART L	IS,FP	Fire Protection (155 through 165)
29 CFR 1910 SUBPART M	IS	Compressed Gas and Compressed Air Equipment (169)
29 CFR 1910 SUBPART N	IS	Materials Handling and Storage (176-179, 181, 183-184)
29 CFR 1910 SUBPART O	IS	Machinery and Machine Guarding (211 through 213, 215, 219)
29 CFR 1910 SUBPART P	IS	Hand/Portable Powered Tools and Other Hand-Held Equipment (241 through 244)
29 CFR 1910 SUBPART Q	IS	Welding, Cutting, and Brazing (251 through 255)
29 CFR 1910 SUBPART R	IS	Special Industries (268) Telecommunications
29 CFR 1910 SUBPART R	IS	Special Industries (269) Power generation, Transmission
29 CFR 1910 SUBPART S	IS	Electrical (301 through 306, 331–335, 399)
29 CFR 1910 SUBPART T	IS	Commercial Diving Operations (401 through 402, 410, 420-427, 430, 440-441)
29 CFR 1910 SUBPART Z	IH	Toxic and Hazardous Substances (1000 through 1450 except 1029, 1043, 1045, 1047, 1050-1051)
29 CFR 1926 APPENDIX A	IS	Designations for General Industry Standards Incorporated Into Body of Construction Standards

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
29 CFR 1926 SUBPART A	MO	General (1 through 5)
29 CFR 1926 SUBPART B	IS	General Interpretations (10 through 16)
29 CFR 1926 SUBPART C	IS,FP	General Safety and Health Provisions (20 through 35)
29 CFR 1926 SUBPART D	IS	Occupational Health and Environmental Controls (50 through 66)
29 CFR 1926 SUBPART E	IS,FP	Personal Protection and Life Saving Equipment (95 through 107)
29 CFR 1926 SUBPART F	IS,FP	Fire Protection and Prevention (150 through 155)
29 CFR 1926 SUBPART G	IS	Signs, Signals, and Barricades (200 through 203)
29 CFR 1926 SUBPART H	IS	Materials Handling, Storage, Use, and Disposal (250 through 252)
29 CFR 1926 SUBPART I	IS	Tools - Hand and Power (300 through 307)
29 CFR 1926 SUBPART J	IS	Welding and Cutting (350 through 354)
29 CFR 1926 SUBPART K	IS	Electrical (400 through 408, 416-417, 431-432, 441, 449)
29 CFR 1926 SUBPART L	IS	Scaffolds (450 through 454)
29 CFR 1926 SUBPART M	IS	Fall Protection (500 through 503)
29 CFR 1926 SUBPART N	IS	Cranes, Derricks, Hoists, Elevators, and Conveyors (550 through 555)
29 CFR 1926 SUBPART O	IS	Motor Vehicles, Mechanized Equipment, and Marine Operations (600 through 606)
29 CFR 1926 SUBPART P	IS	Excavations (650 through 652)

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
29 CFR 1926 SUBPART Q	IS	Concrete and Masonry Construction (700 through 706)
29 CFR 1926 SUBPART R	IS	Steel Erection (750 through 752)
29 CFR 1926 SUBPART S	IS	Underground Construction, Caissons, Cofferdams, and Compressed Air (800 through 804)
29 CFR 1926 SUBPART T	IS	Demolition (850 through 860)
29 CFR 1926 SUBPART U	IS	Blasting and the Use of Explosives (900 through 914)
29 CFR 1926 SUBPART V	IS	Power Transmission and Distribution (950 through 960)
29 CFR 1926 SUBPART W	IS	Rollover Protective Structures; Overhead Protection (1000 through 1003)
29 CFR 1926 SUBPART X	IS	Stairways and Ladders (1050 through 1060)
29 CFR 1926 SUBPART Y	IS	Diving (1071 through 1092)
29 CFR 1926 SUBPART Z	IH	Toxic and Hazardous Substances (1100 through 1152 except 1129, 1145, 1147)
33 CFR 64	CW	Markings of Structures, Sunken Vessels and Other Obstructions
33 CFR 67	CW	Aids to Navigation on Artificial Islands and Fixed Structures
33 CFR 68	CW	Private Aid to Navigation
33 CFR 126	CW	Handling Class I (Explosive) Materials or Other Dangerous Cargo
33 CFR 153	CW	Control of Pollution by Oil and Hazardous Substances, Discharged Removed
33 CFR 154	CW	Facilities Transferring Oil or Hazardous Material in Bulk
33 CFR 156	CW	Oil and Hazardous Material Transfer Operations
33 CFR 158	HW	Reception Facilities for Oil, Noxious Liquid Substances, and Garbage (MARPOL)
33 CFR 322	CW	Permits for Structures or Work in or Affecting Navigable Waters of the U.S.
33 CFR 323	CW	Permits for Discharges of Dredged or Fill Material into Waters of the U.S.
33 CFR 325	CW	Process of Department of Army Permits
33 CFR 326	CW	Enforcement

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
33 CFR 328	CW	Definition of Waters of the United States
33 CFR 329	CW	Definition of Navigable Waters of the United States
33 CFR 330	CW	Nationwide Permits
36 CFR 800	MR	Advisory Council on Historical Preservation
40 CFR 52	CA	Approval & Promulgation of Implementation Plans
40 CFR 53	CA	Ambient Air Monitoring
40 CFR 60	CA	Standards of Performance for New Stationary Sources
40 CFR 60, Appendix A	CA	Determination of Emissions from Volatile Compounds Leaks
40 CFR 61	CA	National Emission Standards for Hazardous Air Pollutants
40 CFR 63	CA	National Emission Standards for Hazardous Air Pollutant for Source Categories
40 CFR 66	CA	Assessment and Collection of Noncompliance Penalties
40 CFR 70	CA	State Operating Permit Programs
40 CFR 80	CA	Regulations of Fuels and Fuel Additives
40 CFR 81	CA	EPA Regulations Designating Areas for Air Quality Planning
40 CFR 82	CA	Protection of Stratospheric Ozone
40 CFR 109	CW	Criteria for State, Local, and Regional Oil Removal Contingency Plans
40 CFR 110	CW	Discharge of Oil
40 CFR 112	CW	Oil Pollution Prevention
40 CFR 116	CW	Designation of Hazardous Substances
40 CFR 117	CW	Determination of Reportable Quantities for Hazardous Substances
40 CFR 121	CW	State Certification of Activities Requiring a Federal License or Permit
40 CFR 122	CW	EPA Administrated Permit Programs: NPDES
40 CFR 124	CW	Procedures for Decision Making
40 CFR 125	CW	Criteria and Standards for NPDES
40 CFR 129	CW	Toxic Pollutant Effluent Standards
40 CFR 131	CW	Water Quality Planning and Management, Water Quality Standards
40 CFR 133	CW	Secondary Treatment Regulation
40 CFR 136	CW	Guidelines Establishing Test Procedures for the Analysis of Pollutants
40 CFR 141	CW	National Primary Drinking Water Regulations
40 CFR 142	CW	National Primary Drinking Water Regulations Implementation
40 CFR 143	CW	National Secondary Drinking Water Regulations

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
40 CFR 144	CW	Underground Injection Control Program
40 CFR 146	CW	Underground Injection Control Program: Criteria and Standards
40 CFR 147	CW	State Underground Injection Control Programs
40 CFR 149	CW	Sole Source Aquifers
40 CFR 152	CS	Pesticide Registration and Classification Procedures
40 CFR 156	CS	Labeling Requirements for Pesticides and Devices
40 CFR 170	CS	Worker Protection Standards (Pesticides)
40 CFR 171	CS	Certification of Pesticide Applicators
40 CFR 220	CW	General
40 CFR 228	CW	Ocean Dumping
40 CFR 243	HW	Guidelines for Storage and Collection of Residential, Commercial, and Institutional Solid Wastes
40 CFR 247	HW	Comprehensive Procurement Guideline for Products Containing Recovered Materials
40 CFR 260	HW	Hazardous Waste Management System: General
40 CFR 261	HW	Identification and Listing of Hazardous Waste
40 CFR 262	HW	Standards Applicable to Generators of Hazardous Wastes
40 CFR 263	HW	Standards applicable to transporters of hazardous wastes
40 CFR 264	HW	Standards for Owners and Operators of Hazardous Waste, Treatment, Storage, and Disposal Facilities
40 CFR 266	HW	Standards for Management of Specific Hazardous Wastes
40 CFR 268	HW	Land Disposal Restrictions
40 CFR 272	HW	Approved State Hazardous Waste Management Programs
40 CFR 273	HW	Standard for Universal Waste Management
40 CFR 279	HW	Standards for Management of Used Oil
40 CFR 280	HW	Technical Standards and Corrective Action Requirements for Owners and Operators of UST
40 CFR 282	HW	Approved Underground Storage Tank Programs
40 CFR 300	CS	National Oil and Hazardous Substances Pollution Contingency Plans
40 CFR 302	CS	Designation of Reportable Quantities and Notification
40 CFR 355	CS	Emergency Planning and Notification
40 CFR 370	CS	Hazardous Chemical Reporting: Community Right-to-Know
40 CFR 372	CS	Toxic Chemical Release Reporting: Community Right-to-Know
40 CFR 373	CS	Reporting Hazardous Substance Activity When Selling or Transferring Federal Real Property
40 CFR 401	CW	General Provisions

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
40 CFR 403	CW	General Pretreatment Regulations for Existing and New Sources of Pollution
40 CFR 700	CS	General
40 CFR 761	CS	PCB Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
40 CFR 763	IH,CS	Asbestos
40 CFR 1500	MR	NEPAPurpose, Policy and Mandate
40 CFR 1501	MR	NEPA and Agency Planning
40 CFR 1502	MR	NEPA Environmental Impact Statement
40 CFR 1503	MR	NEPA Commenting
40 CFR 1504	MR	NEPA Predecision Referrals to the Council of Proposed Federal Actions Determined to be Environmentally Unsatisfactory
40 CFR 1505	MR	NEPA and Agency Decision Making
40 CFR 1506	MR	Other Requirements of NEPA
40 CFR 1507	MR	NEPA Agency Compliance
40 CFR 1508	MR	NEPA Terminology and Index
40 CFR 1515	MR	Freedom of Information Act Procedures
40 CFR 1516	MR	Privacy Act Implementation
42 USC Chapter 55	MR	National Environmental Policy
42 USC Chapter 85	CA	Air Pollution Prevention and Control
49 CFR 130	CS	Oil Spill Prevention and Response Plans
49 CFR 171	TS	General Information, Regulations, and Definitions
49 CFR 172	TS	Hazardous Material Tables, Hazardous Materials Communications Requirements and Emergency Response Information Requirements
49 CFR 173	TS	Shippers - General Requirements for Shipments and Packaging
49 CFR 177	TS	Carriage by Public Highway
49 CFR 194	TS	DOT Response Plans for Onshore Pipelines
49 CFR 195	TS	Transportation of Hazardous Liquids by Pipeline
49 CFR 199	TS	Drug Testing
50 CFR 10	MR	General Provisions
50 CFR 17	MR	Endangered and Threatened Wildlife and Plants
EO 11988	CW	Floodplain Management
EO 11990	CW	Protection of Wetlands

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
EO 11991	MR	Protection and Enhancement of Environmental Quality
EO 12088	MR	Federal Compliance with Pollution Control Requirements
EO 12898	MR	Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations
EO 13101	PP	Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition
EO 13123	PP,MR	Greening the Government Through Efficient Energy Management
EO 13148	MR	Greening the Government Through Leadership in Environmental Management
EO 13149	PP	Greening the Government Through Federal Fleet and Transportation Efficiency
EO 13158	CW	Marine Protected Area
EO 13186	MR	Responsibilities of Federal Agencies to Protect Migratory Birds
EO 13221	PP	Energy Efficient Standby Power Devices
7:LAC XXIII	CS	Pesticide
33:LAC I.3	MR	Departmental Administrative Procedures
33:LAC I.13	MR	Risk Evaluation/Corrective Action Program
33:LAC I.14	MR	Groundwater Fees
33:LAC I.15	MR	Permit Review
33:LAC I.39	MR	Notification Regulations and Procedures for Unauthorized Discharges
33:LAC I.45	MR	Policy and Intent
33:LAC I.47	MR	Program Requirements
33:LAC I.49	MR	Organization and Personnel Requirements
33:LAC I.51	MR	On-site Inspection/Evaluation
33:LAC I.53	MR	Quality System Requirements
33:LAC I.55	MR	Sample Protocol/Sample Integrity
33:LAC I.57	MR	Maintenance of Accreditation
33:LAC III.1	CA	General Provisions
33:LAC III.2	CA	Rules and Regulations for the Fee System of the Air Quality Control Programs
33:LAC III.5	CA	Permit Procedures
33:LAC III.7	CA	Ambient Air Quality
33:LAC III.9	CA	General Regulations on Control of Emissions and Emission Standards
33:LAC III.11	CA	Control of Emissions of Smoke
33:LAC III.13	CA	Emission Standards for Particulate Matter (including standards for some specific facilities)
33:LAC III.14	CA	Conformity

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
33:LAC III.15	CA	Emission Standards for Sulphur Dioxide
33:LAC III.17	CA	Control of Emission of Carbon Monoxide (new sources)
33:LAC III.21	CA	Control of Emission of Organic Compounds
33:LAC III.25	CA	Miscellaneous Incineration Rules
33:LAC III.29	CA	Odor Regulations
33:LAC III.30	CA	Standards of Performance for New Stationary Sources
33:LAC III.51	CA	Comprehensive Toxic Air Pollutant Emission Control Program
33:LAC III.53	CA	Minor Sources of Toxic Air Pollutants
33:LAC III.56	CA	Prevention of Air Pollution Emergency Episodes
33:LAC III.59	CA	Chemical Accident Prevention and Minimization of Consequences
33:LAC III.60	CA	Division's Source Test Manual
33:LAC V.1	HW	General Provisions and Definitions
33:LAC V.9	HW	Manifest System for TSD Facilities
33:LAC V.11	HW	Generators
33:LAC V.13	HW	Transporters
33:LAC V.15	HW	Treatment, Storage and Disposal Facilities
33:LAC V.18	HW	Containment Buildings
33:LAC V.19	HW	Tanks
33:LAC V.21	HW	Containers
33:LAC V.22	HW	Prohibitions on Land Disposal
33:LAC V.26	HW	Corrective Action Management Units and Temporary Units
33:LAC V.30	TS	Transportation of Hazardous Liquids by Pipeline
33:LAC V.37	HW	Financial Requirements
33:LAC V.38	HW	Universal Wastes
33:LAC V.39	HW	Small Quantity Generators
33:LAC V.40	PP	Used Oil
33:LAC V.41	PP	Recyclable Materials
33:LAC V.49	HW	Lists of Hazardous Wastes
33:LAC V.51	HW	Fee Schedules
33:LAC VII.1	HW	General Provisions and Definitions (solid waste regulations)
33:LAC VII.3	HW	Scope and Mandatory Provisions of the Program

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
33:LAC VII.5	HW	Solid Waste Management System
33:LAC VII.7	HW	Solid Waste Standards
33:LAC VII.9	HW	Enforcement
33:LAC VII.103	PP	Recycling and Waste Reduction Rules
33:LAC VII.105	PP	Waste Tires
33:LAC IX.1	CW	General Provisions
33:LAC IX.3	CW	Permits
33:LAC IX.5	CW	Enforcement
33:LAC IX.7	CW	Effluent Standards
33:LAC IX.9	CW	Spill Prevention and Control
33:LAC IX.11	CW	Surface Water Quality Standards
33:LAC IX.13	CW	Louisiana Water Pollution Control Fee System Regulation
33:LAC IX.15	CW	Water Quality Certification Procedures
33:LAC IX.17	CW	Rules Governing Disposal of Waste Oil, Oil Field Brine, and All Other Materials Resulting From the Drilling for, Production of, or Transportation of Oil, Gas or Sulphur (as amended January 27, 1953)
33:LAC IX.19	CW	State of Louisiana Control Commission
33:LAC IX.23	CW	The LPDES Program Definitions and General Program Requirements
33:LAC XI.1	HW	Program Applicability and Definitions
33:LAC XI.3	HW	Registration Requirements, Standards and Fee Schedule
33:LAC XI.5	HW	Spill and Overfill Control
33:LAC XI.7	HW	Methods Release Detection and Release Reporting, Investigation, Confirmation and Response
33:LAC XI.9	HW	Out of Service UST Systems and Closure
33:LAC XI.15	HW	Enforcement
43:LAC I.7	CW	Coastal Management
43:LAC VI	CW	Water Resources Management
43:LAC XI.3	TS	Underwater Obstructions
43:LAC XI.5	TS	Pipeline Safety
43:LAC XVII.1	CW	Class I, III, IV, and V Injection Wells (Statewide Order 29-N-1)
43:LAC XVII.3	CW	Hydrocarbon Storage Wells in Salt Dome Cavities (Statewide Order 29-M)
43:LAC XIX.1	CW	General Provisions (Statewide Order 29-B)
43:LAC XIX.2	CW	Fees

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
48:LAC V.73	CW	Certification
48:LAC V.75	CW	Sewerage Program
48:LAC V.77	CW	Drinking Water Program
51:LAC I	CW	Public Health- Sanitary Code
70:LAC XIII.1	CW	Water Wells
70:LAC XIII.3	CW	Water Well Construction
70:LAC XIII.5	CW	Plugging and Sealing Abandoned Water Wells and Holes
70:LAC XIII.7	CW	Reporting Abandoned Wells and Holes
LAC:XV chpt 1	RP	Radiation Protection - General Provisions
LAC:XV chpt 2	RP	Registration of Radiation Machines and Facilities
LAC:XV chpt 3	RP	Licensing of Radioactive Material
LAC:XV chpt 4	RP	Standards for Protection Against Radiation
LAC:XV chpt 5	RP	Radiation Safety Requirements for Industrial Radiographic Operations
4:TAC I.7	CS	Pesticides
16:TAC I.3	CW TS	Oil and Gas Division
25:TAC I.301	CW	Wastewater Surveillance and Technology
25:TAC I.325	HW	Solid Waste Management
25:TAC I.337	CW	Water Hygiene
30:TAC I.25	CW MR	Environmental Testing Laboratory Accreditation and Certification
30:TAC 1.30	CW	Occupational Licenses and Registrations
30:TAC I.90	MR	Regulatory Flexibility
30:TAC I.101	CA	General Air Quality Rules
30:TAC I.106	CA	Exemption from Permitting
30:TAC I.111	CA	Control of Air Pollution from Visible Emissions and Particulate Matter
30:TAC I.112	CA	Control of Air Pollution from Sulfur Compounds
30:TAC I.113	CA	Control of Air Pollution from Toxic Materials
30:TAC I.114	CA	Control of Air Pollution from Motor Vehicles
30:TAC I.115	CA	Control of Air Pollution from Volatile Organic Compounds
30:TAC I.116	CA	Control of Air Pollution by Permits for New Construction or Modification
30:TAC I.117	CA	Control of Air Pollution from Nitrogen Compounds
30:TAC I.118	CA	Control of Air Pollution by Episode

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
30:TAC I.119	CA	Control of Air Pollution from Carbon Monoxide
30:TAC I.122	CA	Federal Operating Permits
30:TAC I.279	CW	Water Quality Certification
30:TAC I.281	CW	Applications Processing
30:TAC I.285	CW	On-site Sewage Facilities
30:TAC I.290	CW	Public Drinking Water
30:TAC I.294	CW	Underground Water Management Areas
30:TAC I.295	CW	Water Rights, Procedural
30:TAC I.297	CW	Water Rights, Substantive
30:TAC I.307	CW	Surface Water Quality Standards
30:TAC I.312	HW	Sludge Use, Disposal, and Transportation
30:TAC I.324	CW	Used Oil
30:TAC I.325	CW	Certificates of Competency
30:TAC I.327	CW	Spill Prevention and Control
30:TAC I.328	PP	Waste Minimization and Recycle
30:TAC I.330	PP	Municipal Solid Waste
30:TAC I.334	HW	Underground and Aboveground Storage Tanks
30:TAC I.335	HW	Industrial Solid Waste and Municipal Hazardous Waste
30:TAC I.343	CW	Oil and Hazardous Substances General Provisions
31:TAC I.15	CW	Planning Division
31:TAC I.19	CW	Oil Spill Prevention and Response
31:TAC I.20	CW	Natural Resource Damage Assessment
31:TAC I.21	CW	Oil Spill Prevention and Response Hearings Procedures
31:TAC II.57	MR	Fisheries
31:TAC II.65	MR	Wildlife
31:TAC II.69	MR	Resource Protection
31:TAC XVI.503	CW	Coastal Management Program
37:TAC XIII.501	FP	Texas Commission on Fire Protection, Flammable Liquids
No number	CA	Technical Guidance Package for Chemical Sources, Storage Tanks, TNRCC, Feb 1995
No number	CA	Technical Guidance Package for Chemical Sources, Equipment Leak Fugitives, TNRCC, Mar 1995
RS 30:2361-2379	CS	Hazardous Materials Information Development, Preparedness and Response Act

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
SARA Title III		
RS 32:173	TS	Certain vehicles must stop at all railroad grade crossings (Explosives)
RS 32:251 Subpart J. Vehicles Transporting Explosives or Inflammables	TS	Permission for operation; crossing railroad grade crossings; markings
RS 32:252	TS	Equipment and inspection (Explosives)
RS 40:1472.3	IS	License; manufacturer-distributor, dealer, user, or blaster of explosives
RS 40:1472.4	IS	Possession without license prohibited; exceptions (Explosives)
RS 40:1472.7	IS	Reports of losses or thefts; illegal use or illegal possession (Explosives)
RS 40:1472.11	IS	Confiscation and disposal of explosives
RS 40:1472.12	IS	Unlawful storage of explosives
RS 40:1472.13	IS	Abandonment of explosives
RS 40:1472.18	IS	Careless use of explosives
RS 40:1472.19	IS	Reckless use of explosives
TCRA, 505-507 SARA Title III	CS	Texas Tier Two Reporting Forms and Instructions
TRCR part 11	RP	Texas Regulations for Control of Radiation - General provisions
TRCR part 12	RP	Texas Regulations for Control of Radiation - Fees
TRCR part 13	RP	Texas Regulations for Control of Radiation - Hearing and Enforcement Procedures
TRCR part 21	RP	Standards for Protection Against Radiation - Permissible Doses, Precautionary Procedures, Waste Disposal
TRCR part 22	RP	Notices, Instructions and Reports to Workers; Inspections
TRCR part 31	RP	Radiation Safety Requirements and Licensing and Registration Procedures for Industrial Radiography
TRCR part 41	RP	Licensing of Radioactive Material -Exemptions, Licenses, General Licenses, Specific Licenses, Reciprocity, Transport
ANSI Standards	IS	OSHA Referenced Standards
ANSI/ISO 14001-1996	MR	Environmental Management Systems Specification With Guidance For Use
ASME Standards	IS	OSHA Referenced Standards
Chapter 13 Jefferson Parish Code of Ordinances	FP	Fire Prevention and Protection; Emergency Services and Communication (Explosives)

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
Chapter 235 TX Statutes, Local Government, Title 7	IS	County Regulation of Matters Relating to Explosives and Weapons Subchapter A. Explosives
Chapter 417 TX Statutes, Government, Council	FP	State Fire Marshall (Explosives)
Chapter 545 TX Statutes, Transportation, Title 7	TS	Operation and Movement of Vehicles (Explosives)
Chapter 547 TX Statutes, Transportation, Title 7	TS	Vehicle Equipment (Explosives)
EPA 453/R-93-026	CA	Protocol for Equipment Leak Emission Estimates, Jun 1993
EPA 530/R-93-001	CW	RCRA Groundwater Monitoring; Draft Technical Guidance
EPA 600/2-85/105	CW	Practical Guide for Groundwater Sampling
EPA 600/4-78-012	CW	Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms
EPA 600/4-79-019	CW	Handbook for Analytical Quality Control in Water and Wastewater Laboratories
EPA 600/4-79-020	CW	Methods for Chemical Analysis of Water and Wastes
EPA 600/4-82-029	CW	Handbook for Sampling and Sample Preservation of Water and Wastewater
EPA/600/4-83-039	CW	Addendum to Handbook for Sampling and Sample Preservation, EPA 600/4-82-029
EPA/600/8-78-017	CW	Microbiological Methods for Monitoring the Environment, Water and Wastes
EPA/600/R-92/088	PP	Facility Pollution Prevention Guide
EPA 833-R-92-002	PP	Storm Water Management for Industrial Activities
EPA, ISBN:0-86587-279-1	CW	EPA Groundwater Handbook
EPA, ISBN:0-86587-752-1	PP	EPA Waste Minimization Opportunity Assessment Manual
EPA Region IV	MR	Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, 4/1/86
FAA AC 150/5345-27	IS	Specification for 8' and 12' Unlighted and Externally Lighted Wind Cone Assembly
FAA AC 150/5390-2	IS	Heliport Design, January 4, 1988
FAA AC 70/7460-1G	IS	Obstruction Marking and Lighting, October 1985
NFPA	FP	Fire Protection Handbook
NFPA 1	FP	Fire Prevention Code
NFPA 10	FP	Portable Fire Extinguishers

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
NFPA 11	FP	Low Expansion Foam
NFPA 12	FP	Carbon Dioxide Extinguishing Systems
NFPA 12A	FP	Halon 1301 Fire Extinguishing Systems
NFPA 13	FP	Installation of Sprinkler Systems
NFPA 14	FP	Installation of Standpipe and Hose Systems
NFPA 15	FP	Water Spray Fixed Systems
NFPA 16	FP	Deluge Foam-Water Sprinkler Systems and Foam-Water Spray Systems
NFPA 20	FP	Installation of Centrifugal Fire Pumps
NFPA 24	FP	Installation of Private Fire Service Mains and Theri Appurtenances
NFPA 25	FP	Water-Based Fire Protection Systems
NFPA 30	FP	Flammable and Combustible Liquids Code
NFPA 37	FP	Stationary Combustion Engines and Gas Turbines
NFPA 43D	FP	Storage of Pesticides
NFPA 45	FP	Fire Protection for Laboratories Using Chemicals
NFPA 49	FP	Hazardous Chemical Data
NFPA 51B	FP	Cutting and Welding Processes
NFPA 54	FP	National Fuel Gas Code
NFPA 55	FP	Compressed and Liquefied Gases in Portable Cylinders
NFPA 70	FP, IS	National Electric Code
NFPA 70B	FP	Electrical Equipment Maintenance
NFPA 70E	FP	Electrical Safety Requirements for Employee Workplaces
NFPA 72	FP	National Fire Alarm Code
NFPA 75	FP	Protection of Electronic Computer/Data Processing Equipment
NFPA 77	FP	Static Electricity
NFPA 80	FP	Fire Doors and Fire Windows
NFPA 80A	FP	Exterior Fire Exposures
NFPA 90A	FP	Installation of Air Conditioning and Ventilating Systems
NFPA 92A	FP	Smoke Control Systems
NFPA 96	FP	Ventilation Control and Fire Protection of Commercial Cooking Operations
NFPA 101	FP, IS	Safety to Life from Fire in Buildings and Structures
NFPA 101A	FP	Alternative Approaches to Life Safety

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
NFPA 110	FP	Emergency and Standby Power Systems
NFPA 122	FP	Fire Prevention and Control in Underground Metal and Nonmetal Mines
NFPA 170	FP	Fire Safety Symbols
NFPA 204	FP	Roof Coverings and Roof Deck Constructions
NFPA 220	FP	Types of Building Construction
NFPA 221	FP	Fire Walls and Fire Barrier Walls
NFPA 231	FP	General Storage
NFPA 231C	FP	Rack Storage of Materials
NFPA 232	FP	Protection of Records
NFPA 241	FP	Construction, Alteration, and Demolition Operations
NFPA 253	FP	Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
NFPA 255	FP	Test of Surface Burning Characteristics of Building Materials
NFPA 291	FP	Fire Flow Testing and Marking of Hydrants
NFPA 295	FP	Wildfire Control
NFPA 297	FP	Principles and Practices for Communication Systems
NFPA 302	FP	Pleasure and Commercial Motor Craft
NFPA 306	FP	Control of Gas Hazards on Vessels
NFPA 307	FP	Marine Terminals, Piers, and Wharves
NFPA 321	FP	Basic Classification of Flammable and Combustible Liquids
NFPA 325	FP	Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids
NFPA 326	FP	Safe Entry of Underground Storage Tanks
NFPA 327	FP	Cleaning of Safeguarding Small Tanks and Containers Without Entry
NFPA 328	FP	Control of Flammable and Combustible Liquids and Gases in Manholes, Sewers, and Similar Underground Structures
NFPA 329	FP	Handling Underground Releases of Flammable and Combustible Liquids
NFPA 385	FP	Tank Vehicles for Flammable and Combustible Liquids
NFPA 402M	FP	Aircraft Rescue and Fire Fighting Operations
NFPA 418	FP	Heliports
NFPA 430	FP	Liquid and Solid Oxidizers
NFPA 471	FP	Responding to Hazardous Materials Incidents
NFPA 472	FP	Professional Competence of Responders to Hazardous Materials Incidents

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
NFPA 491M	FP	Hazardous Chemical Reactions
NFPA 495	FP	Explosive Materials Code
NFPA 497A	FP	Classification of Class I Hazardous Locations for Electrical Installations in Chemical Process Areas
NFPA 505	FP	Powered Industrial Trucks Including Type Designations, Areas of Use, Maintenance and Operations
NFPA 512	FP	Truck Fire Protection
NFPA 550	FP	Fire Safety Concepts Tree
NFPA 600	FP	Industrial Fire Brigades
NFPA 601	FP	Guard Service in Fire Prevention
NFPA 703	FP	Fire Retardant Impregnated Wood and Dire Retardant Coatings for Building Materials
NFPA 704	FP	Identification of the Fire Hazards of Materials
NFPA 780	FP	Installation of Lightning Protection Systems
NFPA 820	FP	Fire Protection in Wastewater Treatment and Collection Facilities
NFPA 901	FP	Standard Classifications for Incident Reporting and Fire Protection Data
NFPA 902M	FP	Fire Reporting Field Incident Manual
NFPA 903	FP	Fire Reporting Property Survey Guide
NFPA 904	FP	Incident Follow-Up Report Guide
NFPA 906	FP	Fire Incident Field Notes
NFPA 921	FP	Fire and Explosion Investigations, Guide for
NFPA 1000	FP	Fire Service Professional Qualifications Accreditation and Certifications System
NFPA 1021	FP	Fire Officer Professional Qualifications
NFPA 1031	FP	Professional Qualification of Fire Inspector
NFPA 1033	FP	Fire Investigator Professional Qualifications
NFPA 1401	FP	Fire Protection Training Reports and Records
NFPA 1404	FP	Fire Department Self-Contained Breathing Apparatus Program
NFPA 1406	FP	Outside Live Fire Training Evolutions
NFPA 1410	FP	Training for Initial Fire Attack
NFPA 1420	FP	Pre-Incident Planning for Warehouse Occupancies
NFPA 1500	FP	Fire Department Occupational Safety and Health Program
NFPA 1561	FP	Fire Department Incident Management System
NFPA 1582	FP	Medical Requirements for Fire Fighters
NFPA 1901	FP	Pumper Fire Apparatus

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
NFPA 1902	FP	Initial Attack Fire Apparatus
NFPA 1903	FP	Mobile Water Supply Fire Apparatus
NFPA 1911	FP	Service Tests of Pumps on Fire Department Apparatus
NFPA 1921	FP	Fire Department Portable Pumping Units
NFPA 1922	FP	Fire Service Self-Contained Pumping Units
NFPA 1932	FP	Use, Maintenance and Service Testing of Fire Department Ground Ladders
NFPA 1961	FP	Fire Hose
NFPA 1962	FP	Care, Use, and Service Testing of Fire Hose Including Connections and Nozzles
NFPA 1963	FP	Fire Hose Connections
NFPA 1964	FP	Spray Nozzles (Shutoff and Tip)
NFPA 1971	FP	Protective Clothing for Structural Fire Fighting
NFPA 1972	FP	Helmets for Structural Fire Fighting
NFPA 1973	FP	Gloves for Structural Fire Fighting
NFPA 1974	FP	Protective Footwear for Structural Fire Fighting
NFPA 1976	FP	Protective Clothing for Proximity Fire Fighting
NFPA 1981	FP	Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters
NFPA 1983	FP	Fire Service Life Safety Rope and Systems Components
NFPA 1991	FP	Vapor-Protective Suits for Hazardous Chemical Emergencies
NFPA 1992	FP	Liquid Splash-Protective Suits for Hazardous Chemical Emergencies
NFPA 1993	FP	Support Function Protective Garments for Hazardous Chemical Operations
NFPA 1999	FP	Protective Clothing for Medical Emergency Operations
DOE/EH-0350	CA	Management of Polychlorinated Biphenyls (PCBs)
DOE/EH-0358	MR	Performance Objectives and Criteria for Conducting DOE Environmental Audits
DOE G 450.4-1B	MR	Integrated Safety Management System Guide, March 2001
DOE G 414.1-1A	MR	Management Assessment And Independent Assessment Guide, May 2001
DOE/EM-0276	PP	Annual report on Waste Generation and Waste Minimization Progress
DOE/EP-0108	FP	Standard for Fire Protection of DOE Electronic Computer/Data Processing Systems
DOE/FM-0145	PP	Waste Minimization/Pollution Prevention Crosscut Plan 1994
DOE Guideline	PP	DOE Waste Minimization reporting Requirements, Nov. 1994
DOE Handbook	PP	Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan, Dec 1993
DOE Handbook	PP	Pollution Prevention Handbook

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
DOE Handbook	PP	Waste Minimization Reporting System (Wmin) User's Guide
DOE HDBK, 1090-9	IS	Hoisting And Rigging Handbook
DOE Memorandum	PP	EPA's Interim Final Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program
DOE Orders	MO,MR	For all applicable DOE Orders See Contract No. DE-AC96-03PO92207 Applicable Standards List
SPRMO 220.2	MO	Observations report
DOE S-0118	PP	Pollution Prevention Program Plan
DOE-STD-1088-95	FP	Fire Protection for Relocatable Structures
DOE Standard Spec. 17900	PP	Paint Repair of Exterior Metal Surfaces
SPRPMO O 3790.1	MR	Employee Occupational Medical and Counseling Programs
No number	MO,MR	Environmental, Safety, and Health Management Plan (FY 1998 - FY 2002)
SEN-15-90	MR	National Environmental Policy Act
SEN-22-90	HW	DOE Policy on Signatures of RCRA Permit Applications
SEN-37-92	PP	Waste Minimization Crosscut Plan Implementation
AL 5500.11	MO,MR	Drill and Exercise Program Plan
ASE 5400.48	MR	Annual Site Environmental Report
ASI 3400.1	MO, MR	Conduct of Training for the SPR M&O Contractor
ASI 4000.10	FP	Integrated Logistics Support Procedures
ASI 4330.16	FP,IS	Work Order System Procedures
ASI 4400.4	PP	Supply Services Manual
ASI 5400.15	MR	Environmental Instructions Manual
ASI 5480.19	MO,MR	Conduct of Operations at the SPR
ASI 5480.22	IS	Accident Prevention Manual
ASI 5600.1	FP	Security Operations Manual
ASI 5700.11	IS	Root Cause Analysis Instruction
ASI 5700.15	MR	Quality Assurance Manual
ASI 6410.2	FP	Construction Management Procedures Manual
ASI 6430.15	MO,MR	Design Review Procedure
ASL 1000.15	MR	Self-Assessment Program Implementation Plan
ASL 4700.1	MO,MR	Configuration Management Plan and Procedures
ASL 5480.18	FP	Fire Protection Manual
ASL 5480.44	IS	Electrical Safety Program Plan

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
ASL 6400.30	CW	Cavern Inventory & Integrity Control Plan
ASL 5500.1	MO,MR	Emergency Management Plan
ASL 5500.10	MO,MR	Emergency Readiness Assurance Plan
ASL 5500.25	MO,MR	Emergency Response Team Organization and Training Plan
ASL 5500.58	EM, FP	Emergency Management Plan and Implementing Procedures
ASL 6400.18	MO,MR	Drawdown Management Plan
ASL 6400.31	MO,MR	Drawdown Readiness Program Plan
ASP 4000.11	FP	Integrated Logistics Support Master Plan
ASP 5000.8	MO,MR	Master Action Tracking Management and Control System
ASP 5400.2	MR	Environmental
ASR 4330.5	FP	Interim Repair/Mitigation Authorization
ASR 5480.49	MO,MR	Environmental, Safety and Health (ES&H) Orientation Video Program
ASR 5700.3	MO,MR	Independent Quality Assurance Assessments
ASR 5700.4	FP	Deviation and Waiver Requests
ASR 7000.1	MO,MR	Readiness Review Board
ASR 7000.2	MO,MR	SPR Crosstalk Information Exchange Program
BCL 5400.16	CW	Bayou Choctaw Spill Prevention, Control, and Countermeasures Plan
BCI 5500.3	EM, FP	Bayou Choctaw Emergency Response Procedures
BHL 5400.21	CW	Big Hill Spill Prevention, Control, and Countermeasures Plan
BHI 5500.4	EM, FP	Big Hill Emergency Response Procedures
BMI 6420.27	FP	Bryan Mound Foam Deluge System Interim Operations Manual
BML 5400.17	CW	Bryan Mound Spill Prevention, Control, and Countermeasures Plan
BMI 5500.5	EM, FP	Bryan Mound Emergency Response Procedures
D506-01162-02	FP	Bryan Mound: Preventive Maintenance Procedures Manual
D506-01163-03	FP	West Hackberry: Preventive Maintenance Procedures Manual
D506-01164-04	FP	Bayou Choctaw: Preventive Maintenance Procedures Manual
D506-01167-07	FP	St. James: Preventive Maintenance Procedures Manual
D506-01168-08	FP	Big Hill: Preventive Maintenance Procedures Manual
D506-02569-09	TSM, CS	Hazardous Materials Packaging & Transportation Plan
D506-03287-09	HW,PP,CW	Pollution Prevention Plan
MSL 7000.133	CW, HW	Laboratory Programs & Procedures

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
NOL 5400.44	CW	New Orleans Warehouse Spill Prevention, Control, and Countermeasures Plan
NOI 1000.72	MR	Organizational and Management Assessments
No number	CW,PP,CA, HW,CS	Environmental Exhibit 6.6
No number	CW	SPR Groundwater Protection Management Program
No number	PP,HW	SPR Qualified Products List
No number	MO, MR	SPRPMO Environmental, Safety and Health Manual
No number	MO, MR	SPRPMO Level III Design Criteria
WHL 5400.20	CW	West Hackberry Spill Prevention, Control, and Countermeasures Plan
WHI 5500.9	EM,FP	West Hackberry Emergency Response Procedures
120 IAC	IS	Boiler And Pressure Vessels - Degas Project Only
055-001-01049-4	CW	Quality Criteria for Water
ACGIH TLV	IH	Threshold Limit Values For Chemical Substances - Current Year & Applicable Substances
ACP USCG	CW	Area Contingency Plan for New Orleans
ACP USCG	CW	Area Contingency Plan for Lake Charles
ACP USCG	CW	Area Contingency Plan for Port Arthur
ACP USCG	CW	Area Contingency Plan for Galveston
ACP-EPA	CW	Area Contingency Plan for EPA Region 6
AIHMM	PP	Hazardous Materials Management Education Program Observations and Recommendations: Environmental Mgmt, Hazardous Waste Minimization, and Pollution Prevention for the SPR Operations
American Public Health Assoc.	CW	Standard Methods for the Examination of Water and Wastewater
AP-42	CA	Compilation of Air Pollutant Emission Factors, Mobile Sources
APC-S-2	CA	Permit Regulations for the Construction and/or Operation of Air Emissions Equipment (Mississippi)
API	MR	Amer. Petroleum Institute - Recommended Practices and Guides
API - Standard	CA	API Standard 653 for Tank Inspection, Repair, Alteration, and Reconstruction
AR 200-2	MR	Environmental Effects of Army Actions
CERI-89-224	CW	Seminar on Site Characterization for Subsurface Remediations
FM	FP	Factory Mutual - Approval Guide and Loss Prevention Data Sheets
HW-1	HW	Hazardous Waste Management Regulations (Mississippi)
ICIMF	IS	Oil Cos. International. Marine Forum - International Oil Tanker and Terminal Safety Guide

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

STANDARD	AREA	DESCRIPTION
IEEE Standards	IS	OSHA Referenced Standards
LP 92-03	PP	Pollution Prevention Assessment Manual for Texas Businesses
LW-1	CW	Surface Water and Ground Water Use and Protection Regulations (Mississippi)
MIL-HDBK-1008	FP	Fire Protection for Facilities - Engineering, Design and Construction
MP 94W0000131	CA	SPR Gas and Geothermal Heat Effects on Crude Oil Vapor Pressure, Dec. 1994
NACE	FP, IS	National Association of Corrosion Engineers
NEC	FP, IS	National Electric Safety Code
No number	CW	Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook (LDOTD and LDEQ)
No number	CW	Earth Manual, 2nd Ed.
No number	CW	Engineering Geology Field Manual
No number	CW, CA	Environmental Monitoring Plan
No number	CW	Groundwater Manual
No number	CW	Groundwater Program
No number	CA	Louisiana Air Permit Procedures Manual, Jun 1995
No number	CW	Louisiana's Suggested Chemical Weed Control Guide for 1994 (LA Cooperative Extension Services)
No number	CA	Nonattainment New Source Review Guidance Manual, Oct 1993
No number	CW	The Sterling Brine Handbook (Int'l Salt Co.)
No number	CW	Water Measurement Manual
OSWER-9950.1 (1986)	CW	RCRA Groundwater Technical Enforcement Guidance Document (TEGD)
RBCA (OS21)	CW	Proposed Approach for Implementing a Louisiana Dept. of Env. Quality Risk-Based Corrective Action Program
RG-133	PP	Pollution Prevention Assessment Manual
SW-2	HW	Nonhazardous Solid Waste Management Regulations and Criteria (Mississippi)
UFC/UBC	FP	International Conference of Building Officials - Uniform Building Code and Uniform Fire Code
UL	FP	Underwriter's Laboratory - Building Materials, Fire Resistance, Fire Prot. Equip., & Haz. Location Equip. Directories
Water Supply Paper 1473	CW	Study and Interpretation of the Chemical Characteristics of Natural Water (HEM)
Y-87-1	CW	Corps. of Engineers Wetlands Delineation Manual

STRATEGIC PETROLEUM RESERVE - DM ENVIRONMENTAL STANDARDS

KEY TO ACRONYMS:

AIHMM	American Institute of Hazardous Materials Mgmt.
API	American Petroleum Institute
CA	Protection of Air Quality
CFR	Code of Federal Regulations
CS	Control of Toxic Substances
CW	Protection of Water Quality
EO	Executive Order
ESH	Environmental, Safety, and Health Directorate
FM	Factory Mutual
FP	Fire Protection
HW	Solid and Hazardous Waste Generation and Control
IH	Industrial Hygiene
IS	Industrial Safety
LAC	Louisiana Administrative Code
M	Manual (DOE)
MO	Management and Oversight
MR	Management, Oversight, and Reporting
MS	Medical Services
NEC	National Electric Code
NFPA	National Fire Protection Association
O	Order (DOE)
P	Policy (DOE)
PP	Pollution Prevention and Waste Minimization
RCRA	Resource Conservation and Recovery Act
RP	Radiation Protection
SEN	Secretary of Energy Notice
TAC	Texas Administrative Code
TRCR	Texas Regulations for the Control of Radiation
TS	Transportation Safety
UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriter’s Laboratory

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Appendix A-1
SPRPMO ES&H Directives

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SPRPMO ES&H Directives

Directive	Description
DOE O 151.1A	Comprehensive Emergency Management System
DOE O 225.1A	Accident Investigations
DOE O 231.1 Change 2	Environment, Safety and Health Reporting
DOE O 232.1A	Occurrence Reporting and Processing of Operations Information
DOE O 420.1 Change 1-3	Facility Safety
DOE O 430.1A	Life-Cycle Asset Management
DOE O 430.2A	Departmental Energy and Utilities Management
DOE O 440.1A	Worker Protection Management for DOE Federal and Contractor Employees
DOE O 440.2A	Aviation Management Safety
DOE O 451.1B Change 1	National Environmental Policy Act Compliance Program
DOE O 460.1A	Packaging and Transportation Safety
DOE O 460.2 Change 1	Departmental Materials Transportation and Packaging Management
DOE 1300.3	Policy on the Protection of Human Subjects
DOE O 450.1 Change 1	General Environmental Program
DOE 5400.5 Change 1&2	Radiation Protection of the Public and the Environment
DOE 5480.4 Change 1-4	Environmental Protection, Safety, and Health Protection Standards
DOE 5480.19 Change 1	Conduct of Operations Requirements for DOE Facilities
DOE 5480.22 Change 1&2	Technical Safety Requirements
DOE 5530.1A	Accident Response Group
DOE 6430.1A	General Design Criteria
DOE M 232.1-1A	Occurrence Reporting and Processing of Operations Information
DOE M 440.1-1	DOE Explosives Manual

SPRPMO ES&H Directives

Directive	Description
DOE P 411.1	Safety Management Functions, Responsibilities, and Authorities Policy
DOE P 441.1	DOE Radiological Health and Safety Policy
DOE P 450.1	Environment, Safety and Health Policy for the DOE Complex
DOE P 450.2 A	Identifying, Implementing, and Complying with ES&H Requirements
DOE P 450.3	Authorizing Use of the Necessary and Sufficient Process For Standards based ES&H
DOE P 450.4	Safety Management System Policy
DOE P 450.5	Line Environment, Safety, and Health Oversight
DOE P 450.6	Secretarial, Policy Statement Environmental, Safety, and Health

Appendix B
SPR Environmental Policy

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U. S. Department of Energy
STRATEGIC PETROLEUM RESERVE
PROJECT MANAGEMENT OFFICE
New Orleans, La.

POLICY

SPRPMO P 451.1

DATE:	**02-28-01**
SUNSET REVIEW:	**02-28-03**
EXPIRES:	**02-28-05**

SUBJECT: ENVIRONMENTAL POLICY STATEMENT

1. **PURPOSE AND SCOPE.** The purpose of this Environmental Policy Statement is to confirm the commitment of the Department of Energy (DOE) Strategic Petroleum Reserve Project Management Office (SPRPMO) to the goal of environmental protection for all PMO activities.

2. **POLICY.** It is the policy and practice of the SPRPMO, as an operating unit of DOE, to conduct its operations in an environmentally sound manner. Protection of the environment and protection of the public are responsibilities that are of paramount importance to our facilities.

   It is the SPRPMO's policy and practice to conduct our operations in compliance with applicable Federal, state, and local environmental statutes, regulations, and standards. The SPRPMO is firmly committed to ensuring incorporation of all Departmental and national environmental goals in the daily conduct of business. SPRPMO's environmental management program shall pursue continual improvement in performance by establishing and maintaining documented environmental objectives and targets that correspond to the mission, vision, and core values subscribed to at the SPRPMO.

   DOE Management and Operation and other contractors also share our responsibilities for good environmental management. We expect our contractors to conduct facility operations in an environmentally sound manner that limits the risk to the environment and protects the public health.

   It is the SPRPMO's goal to create a pollution prevention ethic within the work place. It is the SPRPMO's policy to undertake appropriate measures to prevent the generation of wastes, and other residual materials requiring disposal or release to the environment through recycling, reuse, and source reduction. Where the generation of such wastes cannot be avoided, the SPRPMO will take actions to reduce their volume and toxicity and ensure proper disposal. Employee initiative in the establishment of sound pollution prevention and waste minimization practices is encouraged by all levels of facility management. We will work cooperatively and openly with the appropriate Federal, state, and local agencies, public stakeholders, and site employees to prevent pollution, achieve environmental compliance and enhance environmental quality.

   It is our goal to design, develop, construct, operate, and maintain facilities and operations in a manner that shall be resource-efficient and will protect the quality of the environment consistent with our mission.

William C. Gibson, Jr.
William C. Gibson, Jr.
Project Manager
Strategic Petroleum Reserve

DISTRIBUTION: All SPRPMO Employees **INITIATED BY:** APM, Technical Assurance

POLICY

DynMcDermott Petroleum Operations Company

RESPONSIBLE FUNCTION: ENVIRONMENTAL	SUPERSEDES: ASP5400.2, H0, "ENVIRONMENTAL POLICY"	POLICY NO: ASP5400.2 VERSION: I0 PAGE 1
AUTHOR: MIKE HUFF	APPROVED BY:	
OWNER: KIRKLAND JONES	R. MCGOUGH, PROJECT MANAGER	

Title: **Environmental Policy**

Effective Date: 12/5/03

Significant Changes Since the Last Revision. Added wording that more explicitly states that DM will be involved in community environmental outreach in section B. Revision bars in the right margin mark the changed paragraphs.

Policy Statement: DynMcDermott operates only in an environmentally responsible manner.

DynMcDermott Petroleum Operations Company (DM) is committed to continued excellence, leadership, and stewardship in protecting the environment through its environmental management system (EMS). DM will manage, operate, and maintain the Strategic Petroleum Reserve (SPR) sites with the highest regard for the protection of human health and the environment within the confines of the SPR sites and the community. Top management considers this commitment, as well as the commitment to compliance and continual improvement, essential to DM's operation of the SPR.

A. Line Responsibility. Environmental protection is a line responsibility and the responsibility of every employee. All DM employees are aware of their responsibilities for conformance with this policy and DM procedures that support the EMS. Environmental protection is an important measure of employee performance.

B. Policy Commitments. In keeping with this policy and the nature and scale of SPR activities and their impact on the environment, DM pledges, through excellence in environmental management, to:

- comply with relevant legislation and other requirements to which we subscribe
- prevent pollution
- continually improve.

DM incorporates these commitments, from top management down, in all phases of its activities, including concept, design, development, construction, operations, and decommissioning. DM fully complies with federal, state, and local environmental laws, regulations, statutes, and permits, and with other requirements including the Department of Energy (DOE), industry, and internal environmental standards, as applicable. Pollution prevention, with emphasis on source reduction, has been and continues to be a prime consideration in process design and operations and is viewed by management as a

TITLE: Environmental Policy	POLICY NO: ASP5400.2 VERSION: I0 PAGE 2

fundamental activity, as are safety and loss prevention. DM strives to continually improve processes and systems through decision-making, implementation, and training.

DM also commits to local community environmental outreach through establishing, supporting, or sponsoring local environmental partnerships, programs, or projects that meet local needs.

C. **Impacts, Aspects, Objectives, and Targets.** Significant environmental impacts are controlled through recognizing the environmental aspects related to these impacts and establishing and meeting environmental objectives and targets to protect the environment. Objectives and targets include those described in the Environmental Work Authorization Directive (a part of the DOE/DM contract) and those that are based on environmental requirements; environmental aspects; appropriate available technology; financial, operational, and business considerations; and the views of interested parties. Objectives and targets are set annually and evaluated at least annually to measure environmental performance and facilitate continual improvement.

D. **Policy and EMS Information Availability.** This policy is available to the public on request and through the annual publication of the SPR Site Environmental Report. Information about DM's environmental performance and the operation of the EMS is shared with the community and other external interested parties on request and through the Site Environmental Report, the DM Environmental Advisory Committee, and pollution prevention advocacy groups in Louisiana and Texas.

E. **Review and Approval.** This policy is reviewed annually by the Management Review Team and approved by the project manager. It is revised, as necessary, in response to changing conditions, EMS audit results, and the commitment to continual improvement.

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DISTRIBUTION

This report is distributed widely by the Department of Energy's Strategic Petroleum Reserve Project Management Office to local, state, and federal government agencies, the Congress, the public, and the news media.