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

Site Environmental Report
For
Calendar Year 2008

COVER: An American bald eagle *Haliaeetus leucocephalus* sits atop a dead bald cypress tree *Taxodium distichum* on the Bayou Choctaw SPR site.

STRATEGIC PETROLEUM RESERVE

SITE ENVIRONMENTAL REPORT

FOR

CALENDAR YEAR 2008

Document No. AAA9008.01
Version 1.0

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

Malcolm Baldrige National Quality Award 2005 Award Recipient

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

September 24, 2009

09-ESH-013

Distribution

SITE ENVIRONMENTAL REPORT FOR 2008 - STRATEGIC PETROLEUM RESERVE

Enclosed for your information is a copy of the Site Environmental Report for Calendar Year 2008 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 2008 environmental monitoring program.

If you have any question or desire additional information, please contact G. Rick Shutt of the Project Management Office, Office of Technical Assurance at (504) 734-4339.

Sincerely,

William C. Gibson, Jr.
Project Manager

FE-4441(W. Woods)

Enclosure:
As stated

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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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ABBREVIATIONS AND ACRONYMS

ac	acre
A&E	Architect and Engineer
AFFF	aqueous film forming foam
AFV	Alternate Fuel Vehicle
AGSC	ASRC Gulf States Constructors, LLC
ANAB	ANSI-ASQ National Accreditation Board
ANSI	American National Standards Institute
AP	Affirmative Procurement
APHA	American Public Health Association
ASQ	American Society for Quality
ASRC	Artic Slope Regional Corporation
ASTM	American Society for Testing and Materials
avg	average

ABBREVIATIONS AND ACRONYMS (continued)

BACT	best available control technology
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
BST	Behavioral Safety Technology
°C	degrees Celsius
CAA	Clean Air Act
CAP	corrective action plan
CBT	computer-based training
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
CFS	cubic feet per second
CFR	Code of Federal Regulations
CI	contour interval
CMD	Coastal Management Division of LDNR
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
E2P2	Energy Efficiency / Pollution Prevention
E&P	Exploration and Production
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 (continued)

EMS	Environmental Management System
EO	executive order
EOT	Extension of Time
EP	Energy Policy
EPA	United States Environmental Protection Agency
EPACT	Energy Policy Act
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
E-W	East-West
FAR	Federal Acquisition Regulations
FEMP	Federal Energy Management Program
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
FWPCA	Federal Water Pollution Control Act
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
gpd	gallons per day
GSA	General Services Administration
GWPMP	Ground Water Protection and Management Plan
HAP	hazardous air pollutant
HVAC	Heating Ventilation Air Conditioning
HW	hazardous waste
ICW	Intracoastal Waterway
ISM	Integrated Safety Management
ISO	International Organization for Standardization
IR	Infrared
km	kilometers
kV	kilovolts
kWhs	kilowatt hours
LA	Louisiana
lab	laboratory
LAC	Louisiana Administrative Code
lbs	pounds
LCF	Light Commercial Facility

ABBREVIATIONS AND ACRONYMS (continued)

LCMS	Lake Charles Meter Station
LCUP	Louisiana Coastal Use Permit
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
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	milliliters
m/yr	meters per year
max	maximum
MCL	maximum contaminant levels
MDEQ	Mississippi Department of Environmental Quality
MDR	maximum diversion rate
mgd	million gallons per day
mg/l	milligrams per liter
mmb	million barrels
MPAR	Maintenance Performance Appraisal Report
m/sec	meters per second
M&O	management & operating
MS	Mississippi
msl	mean sea level
MSDS	Material Safety Data Sheets
MSGP	multi-sector general permit
mt	metric tons
MW	monitoring well
N	north
NAAQS	National Ambient Air Quality Standards
NAEP	National Association of Environmental Professionals
NAICS	North American Industry Classification System
NE	northeast
NEPA	National Environmental Policy Act
NEPT	National Environmental Performance Track
NFAATT	No Further Action At This Time
NFRAP	No Further Remedial Action Planned
NHPA	National Historic Preservation Act
NIMS	National Incident Management System
NMID	number of measures identified
NMIN	number of measures installed

ABBREVIATIONS AND ACRONYMS (continued)

NO	New Orleans
NODCOE	U.S. Army Corps of Engineers, New Orleans District
NOEC	No Observed Effect Concentration
NOEP	New Orleans Emergency Preparedness
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
N-S	North-South
NSR	new source review
NV	not a valid or statistically meaningful number
NW	northwest
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
P&A	plug and abandon
P2	Pollution Prevention
P2E2	Pollution Prevention Energy Efficiency (see E2P2)
PC	personal computer
PCB	polychlorinated biphenyl
PdM	predictive maintenance
PE	performance evaluation
pH	negative logarithm of the hydrogen ion concentration
PID	Performance Improvement Department
PM_{10}	particulate matter (less than 10 microns)
PMO	Project Management Office
PPA	Pollution Prevention Act of 1990
PPOA	Pollution Prevention Opportunity Assessment
PPP	Pollution Prevention Plan
ppt	parts per thousand
PREP	Preparedness for Response Exercise Program
PSD	prevention of significant deterioration
PSI	pounds per square inch
PVC	Polyvinyl Chloride
PW	periphery well
PZ	piezometer
QC	quality control
QPL	Qualified Products List
RAB	Registrar Accreditation Board

ABBREVIATIONS AND ACRONYMS (continued)

RCRA	Resource Conservation and Recovery Act
RCT	Railroad Commission of Texas
RECAP	Risk Evaluation Corrective Action Program
ROD	Record of Decision
RQ	reportable quantity
RWIS	raw water intake structure
S	south
SAL	salinity
SAP	Systems, Applications and Products (SAP GmbH)
SARA	Superfund Amendments and Reauthorization Act
SCIB	small craft intrusion barrier
SDWA	Safe Drinking Water Act
SE	southeast
SEMIS	SPR ES&H Management Information System
SER	Site Environmental Report
SHPO	State Historic Preservation Office
SIC	Standard Industrial Classification
SIP	state implementation plan
SO_2	sulfur dioxide
SOC	security operations center
SO_X	Sulfur oxides
SPCC	Spill Prevention Control and Countermeasures
SPR	Strategic Petroleum Reserve
SPRPMO	Strategic Petroleum Reserve Project Management Office
SSni	Screening Standards Non Industrial
SQG	small quantity generator
STP	sewage treatment plant
s.u.	standard units
SW	southwest
SWPPP	Storm Water Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
TCLP	Toxicity Characteristic Leaching Procedure
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

ABBREVIATIONS AND ACRONYMS (continued)

TVP	True Vapor Pressure
TX	Texas
UIC	underground injection control
URS	United Research Services
USCG	United States Coast Guard
UST	underground storage tank
VOC	volatile organic compound
VWS	Verification Well Study
WAD	Work Authorization Directive
VWS	verification well study
W	west
WH	West Hackberry
WILT	Weeks Island Long Term

VERSION HISTORY

Version History AAA9008.01, Site Environmental Report for Calendar Year 2008		
VERSION	DESCRIPTION	EFFECTIVE DATE
1.0	New document.	DRAFT

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 physical environment, an overview of the SPR environmental program, and a recapitulation of special environmental activities and events associated with each SPR site during 2008. One such activity was the participation of the Environmental Department in the DOE Frac Tank Emission Reduction Team. The use of Big Hill tank 7 in lieu of frac tanks resulted in avoidance of eight tons of VOC emissions and a savings of $256 in air emissions fees. Had there been a drawdown, degassing at Big Hill would have avoided a theoretical 500 tons VOC at the terminals, representing a market value of over $1 million in the current TCEQ emission banking and trading program.

There were no reportable crude oil or brine spills during 2008. There was a release of diesel fuel that occurred at the Big Hill site during 2008 as the result of Hurricane Ike. The long-term trend for reportable oil and brine spills has declined substantially from 27 in 1990 down to none in 2008. There was one minor permit noncompliance which had no environmental impact.

Concern for the environment is integrated into daily activities through environmental management. In addition, adherence to the requirements of Executive Order 13423, which replaced EO 13148 and other EOs, also ensures that a high level environmental stewardship is maintained. This new order involved formation of an SPR Transformational Energy Action Management Initiative to support a comprehensive requirements review, extensive conferencing participation, and submittal of a formal DM implementation strategy focusing on a project management approach. 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 SPR Environmental Management System (EMS) and the ISO 14001 standard, as part of a greater Integrated Safety Management System.

The SPR management and operating contractor's EMS has been certified by a third party registrar against the international ISO 14001 standard since May 2000. The DOE EMS was self-certified in 2007. The SPR is a charter member of the EPA National Environmental Performance Track (NEPT) program and in 2008 completed its second year of a three-year membership in the program. Less than half of the charter members have been able to maintain such continuous membership like the SPR has since the inception of this elite program. The Big Hill and Bryan Mound sites were also selected by the Texas Commission on Environmental Quality (TCEQ) as the first Platinum Level members of their Clean Texas program. Both programs recognize and reward facilities that have environmental management systems and manage beyond regulatory requirements. Continued membership is a perquisite for the reduced emissions monitoring in Texas, which save the SPR $20,000 per year.

The SPR sites were inspected or visited on sixteen occasions by outside regulatory agencies or third party auditors during 2008. There were no findings associated with the regulatory agency inspections. The minor noncompliance that occurred at Big Hill was self-reported under state and federal discharge permits for all SPR sites during 2008. No Clean Air Act, Clean Water Act or RCRA Notice of Violations (NOV) were received.

During 2008 the SPR facilities in Louisiana, Mississippi and Texas continued to operate as Conditionally Exempt Small Quantity Generators. The SPR is not a hazardous waste treatment, storage, or disposal facility. Superfund Amendments and Reauthorization Act Title III, Tier Two, reports for each facility were prepared and submitted to a number of agencies detailing the kinds and amounts of hazardous substances on SPR facilities. The submittal of a Toxic Release Inventory Form R was not be required in 2008 because the SPR did not introduce crude oil into commerce (drawdown) during 2007. There was a drawdown subsequent to hurricanes Gustav and Ike in 2008 and will be reported in 2009.

The SPR facilities operate under the National Pollutant Discharge Elimination System. LDEQ has primacy for the Louisiana NPDES program while the Railroad Commission of Texas, which has SPR jurisdiction in Texas, does not. Consequently, at this time, there is a dual federal and state discharge program at the Texas sites. 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 and TCEQ for the Louisiana and Texas sites respectively. The monitoring of air pollutants and the calculation of air emissions at the SPR indicated that all the sites operated in accordance with air quality regulatory requirements during CY 2008. Air emission/release plume modeling for all SPR caverns was completed and presented for update to the SPR emergency response documents.

The SPR met its drill and exercise requirements for 2008 under the Oil Pollution Act of 1990 through the National Preparedness for Response Exercise Program.

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 appraisals at the New Orleans Headquarters and the Bayou Choctaw, Big Hill, and West Hackberry sites, meeting with Management and Operations (M&O) and construction contractor management staff, reviewing environmental practices and performance indicators, environmental management systems, and reviewing findings with contractor staff. During 2008 there were nine low risk environmental findings associated with the DOE SPRPMO audits. All of these findings were corrected by the end of 2008. Internal M&O contractor environmental assessments at four of the five SPR sites during 2008 identified no high or medium risk environmental findings, nine environmental findings, and two EMS nonconformities. All were classified as low risk hazards, minor deviations for internal requirements and regulations. All of the findings and the nonconformities have been closed. Table 2-7 (Section 2) of this report provides a tabulation of the M&O environmental assessments. Twice during 2008, Advanced Waste Management Systems, Inc., a third party registrar, audited the DynMcDermott Petroleum Operations Company (DM) EMS against the ISO 14001 standard. One minor non-conformance was found. A corrective action plan was generated and closed in 2008. Four of the five nonconformities generated in 2007 were also closed. None of the findings identified environmental degradation. Surveillance Audits are conducted by the registrar every six months and resulted in the recommendation for continued certification verifying that the EMS remains suitable, adequate, and effective.

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 DOE on-site management appraisals were performed in compliance with the SPRPMO Order 220.1, and criterion 10 of DOE Order 414.1C. DM's internal assessments were conducted in accordance with the instruction, Organizational Assessment (NOI1000.72). This characterization, discussion, and presentation illustrate the SPR's environmental performance measures program.

DM is the SPR Expansion Integrator for the SPRPMO. Environmental activities associated with expansion started with the environmental assessments at the Richton main site. These included the Biological Assessment, Cultural/Archeological Survey, and Liability survey. Information from these reports will be utilized in the eventual permitting process. This is critical path work in the overall expansion construction schedule.

Again this year the SPR was the recipient of the DOE Fossil Energy ESS&H award for Voluntary Process Change to Reduce Volatile Organic Compounds (VOC) Emissions from SPR Workover Operations (see section 2). More significantly, the SPR was chosen as the 2008 recipient for the Association of Environmental and Engineering geologists (AEG's) "Outstanding Environmental and Engineering project Award. This award was presented to the SPR for greatly demonstrating the application of environmental and engineering geology principles to the solution of a problem that directly affects the public welfare. Representatives from DOE, DM, URS, and AGSC, and are pictured along with the President of the AEG and the Chair of the Awards Committee of the Lower Mississippi Valley section. Sandia National Labs was not available

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

End of Section

1. INTRODUCTION

This Site Environmental Report (SER) presents a summary of environmental data gathered at or near Strategic Petroleum Reserve (SPR) sites to characterizing site environmental management performance, confirming compliance with environmental standards and requirements, assuring protection of the public, and highlighting significant programs and efforts (DOE Order 231.1A, DOE Manual 231.1-1A, change 2).

The creation of the 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 SPR in salt caverns. The caverns were created deep within the massive Louann salt deposits that underlie most of the Texas and Louisiana coastline. The caverns currently in use 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. SPR 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. The SPR presently consists of four Gulf Coast underground salt dome oil storage facilities, warehouse facilities, and a project management facility. Two other sites are no longer active SPR storage facilities, Weeks Island and St. James Terminal. Weeks Island was decommissioned in November 1999 and sold in March 2008. St. James Terminal was leased to Shell Pipeline in January 1997 and is no longer an active SPR storage facility, it continues as SPR property and therefore, is addressed in this report.

The SPR crude oil storage sites are located near marsh or other wetland areas so 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.

1.1 BAYOU CHOCTAW

The SPR's Bayou Choctaw storage facility is located in Iberville Parish, Louisiana. Development of the 356-acre 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 proper is normally dry and protected from spring flooding by the site's flood control levees and pumps. The surrounding area 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 270-acre Big Hill storage facility is located in Jefferson County, Texas. Big Hill 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. The nearby ponds and marsh provide excellent habitat for the American alligator and over-wintering waterfowl. 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 Big Hill. Wildlife in the area includes coyote, rabbits, raccoon, and many bird species.

1.3 BRYAN MOUND

The Bryan Mound storage facility, located in Brazoria County, Texas, occupies 500 acres, which almost encompasses the entire Bryan Mound salt dome. 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 cover and feeding grounds 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 ST. JAMES TERMINAL

The St. James Terminal located along the Mississippi River in St. James Parish, Louisiana was leased to Shell Pipeline in 1997. The 173-acre site consists of the main facility and two satellite docks located on the west Mississippi River batture. A small onsite area was identified as contaminated with crude oil and remediation efforts toward clean closure through bioremediation were completed this year..

1.5 WEST HACKBERRY

The 565-acre West Hackberry storage facility is located in Cameron Parish, Louisiana. 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 with a nearby warehouse in Harahan, Louisiana, part of the New Orleans metropolitan area. 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. Office and warehouse space is leased, not owned, by the Department of Energy.

1.7 STENNIS WAREHOUSE

The Stennis Warehouse facility is located in Hancock County, Mississippi. The warehouse, and adjacent concrete aprons and parking lot occupy approximately 3.4 acres within the John C. Stennis Space Center. The warehouse has been leased from the U.S. Army since 2004. It is used to maintain and store heavy pieces of equipment and piping in support of the four storage sites. It also has office space permanently used by its tenants and, if needed, temporarily used by headquarters personnel.

End of Section

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 A1 and A2.

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 (SPRPMO P 451.1B) is applied to SPR operations through the current M&O contractor's Environmental Policy (both in 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). The M&O contractor operates on behalf of DOE with regard to waste classification, representations, shipments, and disposal for all SPR activities. Additional responsibilities, as applicable, are assigned to the Architect-Engineering (A&E) contractor, URS Group, Inc., the Construction Management services contractor, ASRC Gulf States Constructors, LLC (AGSC), and SPR subcontractors. DM has been under contract to DOE since April 1, 1993.

The SPRPMO Environmental, Safety, and Health (ES&H) 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 protection and preservation of the environment. Compliance status in this year's report reflects compliance activities conducted by DOE and DM personnel. The SPRPMO has self-certified that it operates an EMS conforming to the ISO 14001 standard.

To illustrate its commitment to excellence with regard to environmental management, DM also operates with an EMS that is certified against the ISO 14001 standard by a third party registrar. This EMS reinforces conformance with DOE Order 450.1A, the environmental management requirements of Executive Order 13423, and strengthens the environmental leg of the SPR Integrated Safety Management (ISM) system.

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

a. a NEPA program that provides a comprehensive environmental review of all projects including 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 discharges, to identify the impact of such spills or discharges 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 routine SPR operations 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. discharge procedures 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 are proficient 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 and biobased 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. a 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 U.S. Fish and Wildlife Service (F&WS), the Louisiana Department of Environmental Quality (LDEQ), the Louisiana Department of Natural Resources (LDNR), the Louisiana Department of Wildlife and Fisheries (LDWF), the Railroad Commission of Texas (RCT), the Texas Commission on Environmental Quality (TCEQ), the Texas General Land Office (GLO), Texas Parks and Wildlife Department (TPWD), and the Mississippi Department of Environmental Quality (MDEQ). These agencies issue permits, review compliance reports, inspect site operations, and oversee compliance with regulations.

Executive Orders (EO)

In January 2007, the President of the U.S. enacted a new Executive Order (EO) 13423, Strengthening Federal Environmental, Energy, and Transportation Management. This new EO consolidated and strengthened five previous executive orders and two memorandums of understanding and established new and updated goals, practices, and reporting requirements for environmental, energy, and transportation performance and accountability. The EO requires federal agencies to lead by example in advancing the nation's energy security and environmental performance. During 2008, the SPR made a concerted effort to successfully comply with the

goals of the EO and associated requirements based on the implementation strategies developed in 2007.

The SPR responded to these associated DOE guidance and implementation memoranda through several initiatives. One of these is the organization of the DM Environmental Department to increase efficiency and place added emphasis on key program areas. Job tasks are arranged into the functions of Chemical Management, NEPA and Air Quality, Waste Management, Surface and Ground Water, Environmental Management Systems, Pollution Prevention, and Environmental Compliance.

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 (DOE O 450.1A) and National Environmental Policy Act (NEPA) Compliance Program (DOE O 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, 2008 THROUGH DEC. 31, 2008)

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 95 wastewater and stormwater discharge monitoring stations that remained unchanged during this period, and 35 active (core-structure) individual 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 2008 the SPR self reported a single minor noncompliance with state and federal water discharge permits to regulatory agencies under the permit self-reporting provisions. The noncompliance is discussed further in Sections 2.3 and 5.4.

In 2004, the SPR, on its own initiative, requested minor modifications to both of the Texas site individual NPDES permits to increase the minimum nozzle exit velocity from the

assigned 20 feet per second (fps) to 30 fps in order to increase dispersion of the offshore brine discharge further reducing potential impacts to organisms in the receiving waters. These modification requests were granted effective February, 2005 and were re-authorized with the permit renewal applications submitted in April, 2008 which were noted acted upon in CY2008. Louisiana has primary enforcement responsibility for the NPDES discharge program, issuing permits under the Clean Water Act. LDEQ issued the Bayou Choctaw facility a renewed Light Commercial general permit early in the calendar year 2006 which remained in full force during 2008. West Hackberry's combined individual and general permit discharge authority remained unchanged during this period.

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.

Each SPR storage site and the Stennis warehouse comply 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 SPCC 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 2008, no "new-construction" projects occurred in jurisdictional wetlands in Louisiana or Texas requiring Corps of Engineers permitting actions from the New Orleans and Galveston districts or separate Coastal Zone Management approval (Department of Natural Resources – Coastal Zone Management in Louisiana and the General Land Office in Texas). Four project authorizations resulted from reviews of work involving routine maintenance and repairs to pipelines and in-kind replacement of authorized fencing destroyed by Hurricane Ike (see photo). In addition, there were several maintenance notifications made for dredging at the raw water intake structures (RWIS), and traveling screen removals for repair and associated 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. Facility Response Plans (FRP) on the SPR have been combined with the site emergency response procedures in accordance with the EPA "One Plan" scheme and 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 are approved by the appropriate federal and state regulatory agencies. The Texas sites maintain their individual OSPRA certifications in accordance with state requirements.

The SPR conducts emergency drills or hands-on training of its sites each quarter in accordance with the National Preparedness for Response Program (PREP), along with full equipment deployment exercises (announced and unannounced) at each site annually. A professional staff of emergency management personnel from DM New Orleans conducts these drills and exercises and includes the participation of public and regulatory/governmental agencies as available.

The SPR utilizes the National Incident Management System (NIMS), 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 granted 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 is disposed via brine pipelines that extend into the Gulf of Mexico. Some ancillary commercial disposal wells are used occasionally. The 2008 Annual Report Form OR-1 for underground injection was completed and submitted on schedule to the LDNR.

Historic ground water evaluations have indicated the presence of some shallow ground water impacts from salt water at the Bryan Mound and West Hackberry sites. At Bryan Mound, data suggests that use of unlined brine storage pits by the previous industrial tenants may have been a major contributor to the salt impacted ground water located east of the site's closed large brine storage pond. In a parallel project, the post-closure monitoring near the Bryan Mound brine storage pond is provided through this report to the RCT as requested.

The West Hackberry site completed closure of its brine ponds under a corrective action plan (CAP) negotiated with LDNR. All remedial recovery pumping was successfully completed in 2001. Post closure monitoring of certain wells for 30 years is currently met by monitoring quarterly and reporting annually in this SER, which is shared with LDNR.

Ground water monitoring of the uppermost interconnected aquifer at all SPR sites is mandated through DOE orders for surveillance assessment and are coordinated on the SPR through the Environmental Monitoring Plan (EMP). Details of the ground water monitoring of the site wide well nets are presented in Chapter 6. Of note this year are the recognized saltwater impacts from Hurricane Ike storm surge to five of the wells located at two of the sites closest to the landfall, Big Hill and West Hackberry. Salinity spikes stemming from temporary saltwater inundation of the affected wells are discussed .

Weeks Island was sold April 2008 at which time the remaining monitoring wells were permanently plugged and abandoned.

Potable water systems at Bryan Mound, Big Hill, and Bayou Choctaw are classified by state and federal regulations as “non-transient, non-community” public water systems, and these sites are required to have potable water monitoring programs. Like at Bryan Mound and Big Hill, local public water systems supply drinking water to the West Hackberry site, New Orleans headquarters, and the New Orleans and Stennis warehouses. Unlike the two Texas storage sites, potable water monitoring programs are not required at these sites. These facilities are recognized as water purchasers only.

Water purchased and distributed by Big Hill and Bryan Mound is disinfected with chloramine by their suppliers Bayou Choctaw produces, treats (with chlorine), and distributes groundwater from a well on-site.

In 2008, drinking water samples were taken monthly at Big Hill and Bryan Mound and quarterly at Bayou Choctaw for total coliform testing by state-approved outside laboratories. Residual chloramine was monitored weekly at Big Hill and Bryan Mound. Residual chlorine was monitored daily at Bayou Choctaw.

Potable water at Bryan Mound, Big Hill, and Bayou Choctaw has been tested under state programs for lead and copper, most recently in 2002 and 2008 at Bryan Mound and Bayou Choctaw, respectively, and in 2005 at Big Hill. Test results dictate that Bayou Choctaw maintain a corrosion control program to protect piping and help ensure the drinking water lead and copper concentration action thresholds are not exceeded. Lead and copper are tested every two years at Bayou Choctaw, and the results indicate that the corrosion control program has been successful.

Annual testing for disinfection by-products continued in 2008 at Bryan Mound and Big Hill. Bayou Choctaw is on a three year cycle with testing last completed in 2006. Testing is conducted through the TCEQ and the Louisiana Department of Health and Hospitals. Most recent tests results for the two groups of disinfection by-products – trihalomethanes and haloacetic acids – show that concentrations were below the maximum contaminant levels (MCL) at the three sites. Previous to 2005, the MCL for both contaminants were exceeded at Bayou Choctaw and required quarterly testing. However, the results in 2005 and 2006 were below the MCL for both by-products, allowing testing to be reduced to every three years.

Big Hill, Bryan Mound, and Bayou Choctaw calculate maximum residual disinfectant levels (free chlorine at Bayou Choctaw, and chloramine at Big Hill and Bryan Mound), based on a running annual arithmetic average. Calculated results at both sites have not exceeded the regulatory MCL Disinfectants.

Clean Air Act (CAA)

The SPR sites comply with the applicable provisions of the CAA and State Implementation Plans (SIP) through permitting and following applicable regulations. The state agencies have primacy (LDEQ and TCEQ). 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 EPA multi-sector general storm water discharge authority for storm water associated with industrial activity and similar Louisiana and Mississippi requirements. This multimedia document consolidates these regulatory agency requirements with the more general DOE Order 450.1A and E.O. 13423, 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, even if not required to do so by 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 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.

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 and MDEQ in Mississippi. 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, the sites 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 associated with underground hydrocarbon storage activities are regulated under the corresponding state programs for managing drilling fluids, produced waters, and other wastes related to 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 did not include the underground storage of hydrocarbons in the scope of the E&P criteria. Under LA and TX regulations, underground storage of hydrocarbons is included in the E&P scope. In order to remain in compliance with federal law, the SPR does not dispose of hazardous waste under the "E&P" exemption rules. The SPR characterizes all E&P waste streams to determine if they exhibit hazardous characteristics, and any that do are managed and disposed as hazardous waste. The SPR disposes of non-hazardous wastes generated by the E&P process at state approved E&P disposal facilities. During CY 2008, 51.3 percent of non-hazardous E&P wastes (45.4 tons) generated on the SPR 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 2008, hazardous wastes were shipped from the SPR LA and TX sites. These wastes primarily consisted of: crude oil/toluene, excess chemical reagents, and spent non-TCLP compliant bulbs (SPR TX sites only). There were no shipments of hazardous waste from the MS SPR Warehouse site. The hazardous waste that was generated consisted primarily of laboratory wastes (generated SPR site-wide), and non-TCLP compliant bulbs (generated at SPR Texas sites). During CY 2008, all SPR sites averaged hazardous waste generation rates well within the CESQG limits.

The SPR achieved the 100% Affirmative Procurement (AP) purchases target for fiscal year 2008. All purchases qualified as recycled products or justified virgin products. There were no purchases of virgin products in 2008.

Figures 2-1 and 2-2 illustrate FY 2008 monthly waste generation versus the pro-rated fiscal year's target of 500 lbs and the trend of hazardous waste reduction since 1993, respectively.

The DOE and M&O contractor's corporate environmental 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. Brake drums from the lifts at the Weeks Island mine were taken out of service and are presently boxed, shrink-wrapped, and stored in the New Orleans warehouse. Disposition of these brake drums is scheduled for 2009. 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.

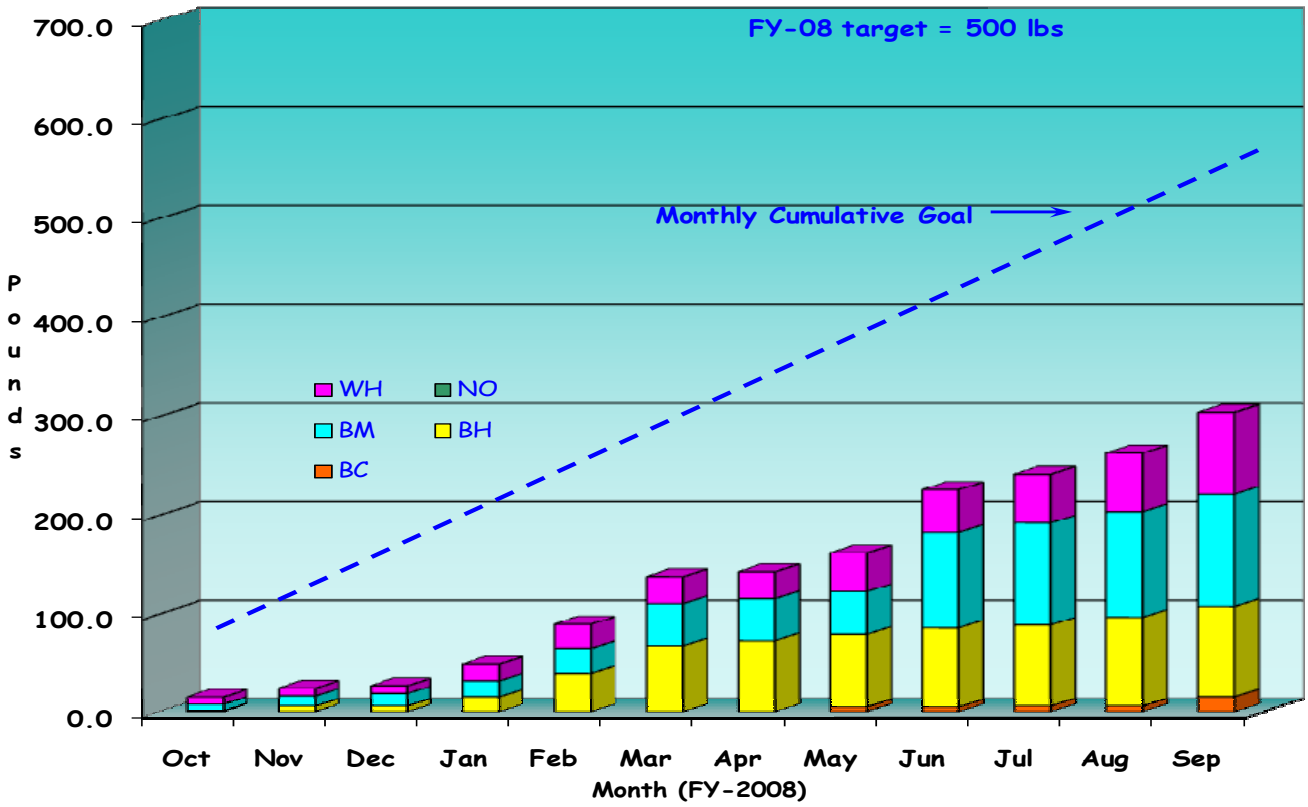


Figure 2-1. FY 2008 Monthly Hazardous Waste Generation

National Environmental Policy Act (NEPA)

Approximately 600 documents that included design reviews, engineering change proposals, deviations and waivers, and purchase requisitions were evaluated for NEPA review in 2008. Out of these documents, sixty-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.

As a result of the Record of Decision (ROD) published in February 2007 by DOE Headquarters for the Environmental Impact Statement (EIS) (DOE/EIS-0385) and continued consultation and coordination with federal, state, and local agencies, DOE notified all interested parties on January 23, 2008 of its decision to prepare a SEIS to address new issues raised relating to the water source for leaching caverns and the location of certain facilities for the planned expansion site at Richton. A Notice of Intent was published on March 5, 2008 that provides details about the scope and content of the SEIS. The SEIS process includes a public comment period during which interested

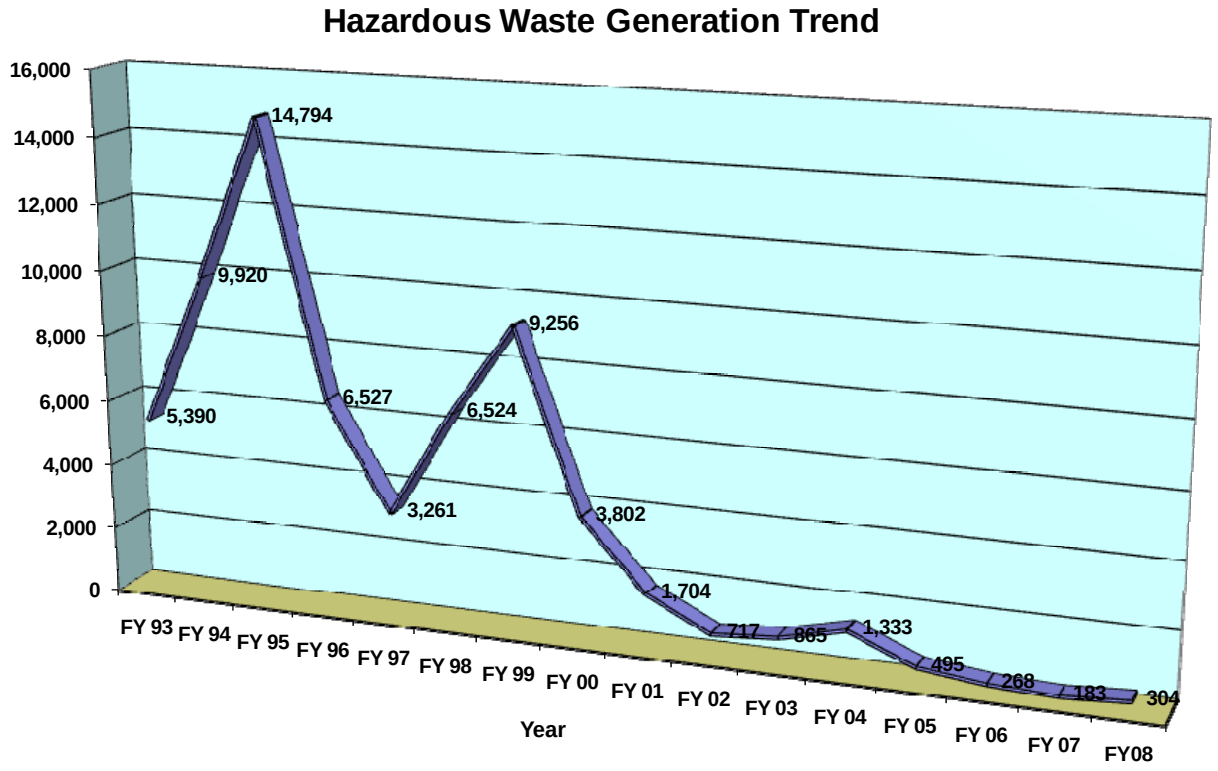


Figure 2-2. SPR Hazardous Waste Generation FY 1993 to FY 2008

agencies, organizations, Native American tribes, and members of the public will be encouraged to provide input and submit comments regarding the issues and impacts to be addressed and alternatives to be considered. Three public meetings were also announced. An amended notice was published on March 21, 2008, to add a fourth public meeting.

Meetings were held in the Mississippi counties of Perry, Greene, George and Jackson during April 7-10, 2008. The public scoping period, to include both oral and written comments, concluded on April 29, 2008. Transcripts from the public meetings and the comments received during the scoping period are available here: http://www.fe.doe.gov/programs/reserves/spr/SEIS%20Comments/Richton_SEIS_Comments.html . The direct links to the original EIS and ROD follow: http://www.fossil.energy.gov/programs/reserves/publications/Pubs-SPR/2006_SPR_EIS.html

http://www.fe.doe.gov/programs/reserves/spr/ROD_FINAL_02-14-07.pdf

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 2008 the SPR continued to use pesticide products to control pests in buildings, control vegetation throughout site grounds and the security zone areas, and mitigate the reduction of the number of personnel dedicated to mowing. Although the use of pesticides and herbicides is a necessary and integral part of property maintenance on the SPR, there is a concerted effort made, through screening of chemicals prior to purchase, to restrict the use of those products to the least harmful to the environment and the employees.

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 original conditional coverage and as 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 at that time. The MSGP coverage has since been migrated to either the individual or general permits issued to each site.

National Historic Preservation Act (NHPA)

No site projects required certified reviews by the Louisiana State Historical Preservation Office in 2008. A historic project-wide review step for the NHPA to accompany the MSGP Notices of Intent as detailed in the previous ESA section was accomplished in 2006. No places on or eligible to the National Register of Historic Places are located on or adjacent to SPR sites. The Bryan Mound SPR site is located on a Texas State Historical Place 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 2008 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 (EO) 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 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. Selected fields are not mowed from early fall through early spring at Bryan Mound to provide food and shelter for migrating birds. Similarly at the Bayou Choctaw site a feed plot is provided for wintering wildlife. When discovered, nesting areas at all sites are flagged in the field for the nesting season (e.g. least terns); and equipment has been designated for limited/restricted use on occasion when they harbor bird nests (e.g. by mockingbird, mourning dove, and shrikes). At the West Hackberry site selected areas are not mowed and/or are posted to avoid from early spring through mid summer to allow bird nesting and brooding. These activities illustrate the coordination maintained with local Fish & Wildlife representatives at the SPR sites in fulfillment of environmental stewardship. (Photo shows one of a pair of great-horned owls nesting inside Bryan Mound's warehouse.)

Executive Order (EO) 11988, "Floodplain Management"

Since the inception of the SPR, compliance with EO 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 (EO) 11990, "Protection of Wetlands"

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

EO 13423, "Strengthening Federal Environmental, Energy, and Transportation Management"

EO 13423 was published in January 2007 replacing five previous executive orders by consolidating their intent into one all encompassing order. The SPR has made significant progress in improving environmental and energy performance, and as a result of this EO, is building on that success by integrating and updating prior practices and goals. Implementation of the EO includes sustainable practices for:

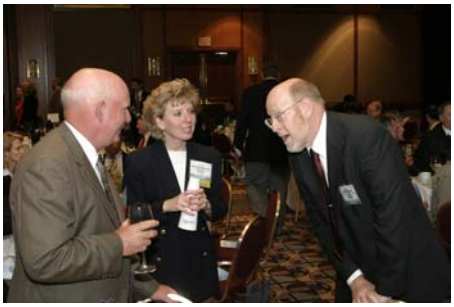
- Energy efficiency and greenhouse gas emission reductions
- Renewable energy usage
- Water consumption reduction
- Green products and services acquisition

- Pollution prevention, including toxic chemical use reduction
- Increased waste prevention and recycling
- Reduced solid waste diversion
- High performance building design
- Vehicle fleet management including alternative fuels usage
- Electronics stewardship

The SPR has been successful in meeting the goal of increased green products and services procurement. The purchase of biobased products have met the requirements of *the BioPreferred Program (Farm Security and Rural Investment Act (FSRIA) 2002 and* EO 13423) or they have been justified non-biobased purchases. The procurement of EPEAT registered computers by the SPR has also met the requirements of the EO.

Membership in EPA's Performance Track and Texas' Clean Texas Programs

The Performance Track program recognizes outstanding environmental management of U.S. agencies and facilities. In November 2000 the five SPR facilities were accepted as a single multi-site member to join 228 charter members. The first three-year membership commitment was completed in 2003. The SPR has since applied for and been accepted into the third round of charter memberships. While there are currently about 500 members, less than 50% of the original charter members have succeeded in maintaining their continuous charter membership as has the SPR. 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. As a result of their environmental achievements, Performance Track members are rewarded with recognition, access to state of the art information, and regulatory and administrative flexibility. Big Hill and Bryan Mound sites maintain a "Platinum Level" membership in the Clean Texas Environmental Leadership Program. The platinum level of this state program is analogous to the platinum level of the EPA's Performance Track program, except that individual sites are recognized for membership. (Photo taken of R. McGough, DM CEO and M. Huff, DM EMS Specialist, at the fifth annual National Environmental Partnership Summit held in Baltimore.)



To maintain their membership Performance Track and Clean Texas members must make measurable commitments for environmental improvement and report these metrics annually. Data on achieving Clean Texas commitments are included in the Performance Track annual reports. The reports for 2001 through 2007 are available to the public at the EPA website http://www.epa.gov/performancetrack/pubs.htm

The SPR chose the following five performance commitments for its current triennial membership. Success in meeting the three-year commitments is discussed as follows:

1. *Reduce Waste to Air through Degassing Crude Oil* –Degasification lowers the VOC emission (waste to the air) after purchase by our customers at off-site terminals and

refineries when the oil is distributed in commerce during a drawdown. A VOC emission avoidance of 1,500 tons is estimated based on the gas/oil ratio of treated and untreated oils in different caverns that would be involved in a 62-day 93 million barrel movement (1.5 million barrels/day, 67% sweet and 33% sour) to commerce during the summer (July/August) of 2009 – a worst case scenario for VOC emissions. Using the 2006 baseline of 1,500 tons of emissions to avoid, by the end of 2008 we had treated enough crude oil to avoid a total of 727 tons of VOC emissions.

2. *Reduce VOC Emissions from Workover Operations* – During cavern workover operations the amount of VOCs emitted to the atmosphere is dependent on cavern pressure, oil and air temperature, oil chemistry, and equipment used for the transfer. During workovers in 2008 equipment and methodologies were implemented in order to reduce the number of tons of VOCs emitted to only 1.96 tons. The 2006 baseline was 30.25 tons. We committed to emitting no more than 25.7 tons by 2009.

3. *Improve Material Procurement Practices* – Many cleaning products contain harmful chemicals that can have adverse effect on worker health, therefore reducing the amount of these chemicals used promotes a healthier environment for employees and janitorial staff. This commitment calls for the replacement of alcohols, glycols, diethanolamine, and solvents in the top three categories of cleaning chemicals purchased by the sites (determined by the number of gallons of hand cleaners, all purpose cleaners and window cleaners purchased). The 2006 baseline of 714 pounds of target chemicals will be reduced to 357 pounds by 2009. At the end of 2008 the number of target chemicals purchased was 172 pounds.

4. *Green Building Integration into Standard Specifications* – Green building is the practice of creating a healthier and more resource-efficient methodology of construction which can maximize both economic and environmental performance. All SPR building specification will be reviewed and where applicable U.S. Green Building Standards will be incorporated. The new specifications will be implemented in four future building projects.

5. Wildlife set-asides total 92 acres across all sites on the SPR. This triennial commitment increased acreage by an additional 13 acres in 2007. The sites manage their set-asides as habitat for migrating waterfowl and songbirds as well as for indigenous mammals by maintaining food plots, curtailing mowing to allow grasses to go to seed, and providing nest boxes. At one site invasive vegetation has been removed and replanted with native plants.

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 2-1 through 2-6 contain a summary of the inventory information that was submitted for 2008. 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 SPR facilities in Louisiana, Texas, and Mississippi.

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. This form must be submitted by July 1 for the reporting thresholds exceeded during the

preceding calendar year. The submittal of a (TRI) Form R was not required in 2008 because the SPR did not introduce any crude oil into commerce in 2007.

International Organization for Standardization (ISO 14001) Certification

On May 19, 2000, the DM environmental management system (EMS) was first evaluated by an independent registrar (accredited by the ANSI-ASQ National Accreditation Board (ANAB)) and certified in conformance with the International Organization for Standardization 14001 standard. The DM EMS was recertified in 2003 and again in 2006 by the same ANAB accredited Registrar. Between certifications the registrar has conducted surveillance audits to evaluate the DM EMS every six months.

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 2-1. 2008 Louisiana SARA Title III Tier Two Summary at Bayou Choctaw

Chemical Name (Category)	* Max Daily Amt (lbs.)	Location
CRUDE OIL PETROLEUM	> 1 Billion	FLAMMABLE STORAGE BUILDING, SITE TANKS, PIPING, UNDERGROUND CAVERNS
DIESEL FUEL #2	10,000 – 99,999	EMERGENCY GENERATOR FUEL TANK, PROPERTY TANK 2
FC-203CF LIGHTWATER BRAND AFFF	1,000 – 9,999	FOAM DELUGE BLDG
FLOGARD POT805	100 – 999	POTABLE WATER BUILDING
GASOLINE, INCLUDING CASING HEAD	10,000 – 99,999	PROPERTY TANK 1
GERMICIDAL BLEACH	1,000 – 9,999	BLDG 402, POTABLE WATER BUILDING
MOTOR OIL	1,000 – 9,999	FLAMMABLE STORAGE BUILDING, PROPERTY LAYDOWN, MAINTENANCE BAY, PROPERTY FLAMMABLE CABINET, BENCHSTOCK,
SODIUM CHLORIDE	1,000 – 9,999	POTABLE WATER BUILDING
PAINTS, FLAMMABLE OR COMBUSTIBLE	100 – 999	FLAMMABLE STORAGE BUILDING, BENCHSTOCK

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

Table 2-2. 2008 Texas SARA Title III Tier Two Summary at Big Hill

Chemical Name (Category)	* Max Daily Amt (lbs.)	Location
CRUDE OIL	> 1 Billion	BHT-2, BHT-6, BHT-7, BHT-10, SITE TANKS, PIPING, UNDERGROUND CAVERNS
DIESEL FUEL	10,000 – 99,999	BHT-4, BHT-11, BHT-50, BHT-51, WORKOVER RIG
FC-203A LIGHT WATER BRAND ATC/AFFF	1,000 – 9,999	BOAT SHED, ERT PAD, FIRE TRUCK, FOAM BLDG-BHT 16

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

Table 2-3. 2008 Texas SARA Title III Tier Two Summary at Bryan Mound

Chemical Name (Category)	*Max Daily Amt (lbs.)	Location
CRUDE OIL	> 1 Billion	SITE TANKS, PIPING UNDERGROUND CAVERNS
DIESEL FUEL	10,000 – 99,999	LAYDOWN YARD, FUEL TANK AREA, WORKOVER RIG
LUBRICANT OIL	10,000 – 99,999	FLAMMABLE LOCKER, PAINT SHED, WAREHOUSE, SHOP
DIETHANOLAMINE	10,000 – 99,999	DEGAS AMINE CONTACTOR
GASOLINE, [CASING-HEAD AND NATURAL]	10,000 – 99,999	LAYDOWN AREA, FUEL TANK AREA

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

Table 2-4. 2008 Louisiana SARA Title III Tier Two Summary at Stennis Warehouse

Chemical Name (Category)	*Max Daily Amt (lbs.)	Location
DIESEL FUEL	10,000 – 99,999	OUTSIDE OF WAREHOUSE

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

Table 2-5. 2008 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

Table 2-6. 2008 Louisiana SARA Title III Tier Two Summary at West Hackberry

Chemical Name (Category)	*Max Daily Amt (lbs.)	Location
BACTRON K-95	1,000 – 9,999	ABOVE GROUND TANK
CHEMGUARD PURPLE K DRY CHEMICAL	1,000 – 9,999	BLDG 305
CRUDE OIL PETROLEUM	> 1 Billion	LCMS PIPING, SITE TANKS, PIPING, UNDERGROUND CAVERNS, WAREHOUSE E
DIESEL FUEL # 2	1,000 – 9,999	FUEL PUMP TANK, MAINTENANCE LAYDOWN YARD, WORKOVER RIG
FC-203 CF LIGHT WATER BRAND AFFF	10,000 – 99,999	FIRE TRUCK WHFT3, FOAM STORAGE BLDG
FC-600 LIGHT WATER BRAND ATC/AFFF	1,000 – 9,999	BLDG 303, BLDG 304
GASOLINE, INCLUDING CASING HEAD	10,000 – 99,999	FUEL PUMP TANK, LSW LAYDOWN YARD, MAINTENANCE LAYDOWN YARD, MEACHAM BRINE TANK AREA
MOTOR OIL	1,000 – 9,999	ENVIRONMENTAL LAB, FLAMMABLE STORAGE BUILDING, HPPP FLAMMABLE CABINET, LCMS BLDG 320, LSW LAYDOWN YARD, MAIN GATE, OCB 5KV SUBSTATION, WAREHOUSE A, WAREHOUSE D, WORKOVER RIG
PAINTS, FLAMMABLE OR COMBUSTIBLE	100 – 999	FLAMMABLE STORAGE BUILDING, WORKOVER RIG
PROPANE	1,000 – 9,999	LCMS PROPANE TANK
GARNET, ABRASIVE GRAINS & POWDERS	1,000 – 9,999	PAINT LAYDOWN YARD
SWEEPING COMPOUND WAX BASE	1,000 – 9,999	WAREHOUSE

* 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 and ethane gas (non-regulated) that has migrated from the salt in the salt dome is released, stripping regulated pollutants (VOC) into the atmosphere. Also, geothermal processes raise the crude oil temperature, elevating the true vapor pressure (TVP) potentially above the atmospheric pressure of 14.7 pounds per square inch (PSI). This elevated vapor pressure may exceed regulatory limits for storage in floating roof tanks, potentially affecting some of the SPR sites and receiving commercial terminals (customers). Beginning in 1995 the SPR conducted operations to separate and remove gas from stored oil, in addition to heat exchangers used to cool oil prior to transport offsite. Recent operation of the degas plant at Big Hill began in early 2004 and completed operations in October 2006. The degas plant was disassembled and moved to Bryan Mound in 2007 and started operations in September 2007. The degas plant continued operation at Bryan Mound throughout 2008. The SPR received the Office of Fossil Energy Excellence in ES&H Award 2008 for Voluntary Process Change to Reduce Volatile Organic Compounds (VOC) Emissions from SPR Workover Operations. The annual award was presented by DOE ESS&H for the use of floating roof tanks to reduce VOCs from workover operations.

Billion Barrel Expansion

The Record of Decision (ROD) for the expansion EIS was signed by DOE Secretary Bodman on February 14, 2007 to expand the SPR storage capacity to one billion barrels. Following the publication of the ROD, the SPR identified the necessary environmental tasks and related budget necessary for the expansion process. The SPR contracted for the conduct of an Environmental Assessment at the Richton site (see photo) to include biological (wetlands and endangered species surveys), liability, and cultural/archeological surveys. The original assessment was completed December 2008. Additional acreage was identified for assessment, that report is scheduled for completion in March 2009.

Hurricanes Gustav and Ike

Two major hurricanes made landfall along the Texas and Louisiana coast during 2008. Both Big Hill and West Hackberry were extensively damaged from winds and high water while Bryan Mound and Bayou Choctaw sustained some damage. The photos on the following pages provide pictorial evidence of some of the damage. The clean-up of the

debris followed strict environmental guidelines. Where possible material such as fencing was sent to a recycler, vegetative debris was mulched. Site and New Orleans environmental played pivotal roles working with regulators and disposers to minimize material that would have to be landfilled or disposed as hazardous waste.

DOE On-Site Appraisal

SPRPMO On-Site Management Appraisal teams conduct formal visits to SPR sites 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. Issues reviewed in FY 2008 included permits/permit compliance (air and water); ground water monitoring programs; reporting to regulators; and waste characterization, accumulation, management, accountability, and reporting. EMS issues examined included communication, achieving environmental objectives, and records management. Findings were tracked to completion in the DOE Consolidated Corrective Action Plan and in the DM Assessment Tracking System (ATS). During FY 2008 there were nine low risk environmental findings associated with the audits, and all were corrected in CY 2008.

BC Brine Disposal Road

BM Maintenance Building

BM Fence Around Laydown Yard

WH Flooded Cavern Pads

WH Cavern 108

WH Meter Station Fence

WH Alligator Cleanup

BH Debris Around Entry Portal

BH Drowned Cows

BH Surviving Cows on Site's High Point

BH Fence Damage

BH Raw Water Intake Structure

M&O Contractor Organizational Assessment

The New Orleans environmental group conducted annual EMS and compliance assessments at four of the five sites in FY 2008. Assessors were independent of the operating sites and were not accountable to those directly responsible for the issues audited. The West Hackberry site was scheduled for auditing in September, but this audit was cancelled due to severe local damage caused by Hurricane Ike. The audit was rescheduled for early 2009.

EMS related issues were examined based on all 17 elements of the ISO 14001:2004 Standard. All elements were reviewed at least once (and preferably twice) during the audit year. Environmental compliance was examined through the framework of the EMS and included compliance with regulations, DOE contract requirements, and other internal and external requirements. Compliance issues examined were related to air, water, waste, toxic chemicals, and pollution prevention programs. Findings were tracked to completion in ATS.

Specific audit topics were also chosen based on current management concerns and the results of previous audits. Potable water management and the use of the SPR Qualified Products List (QPL) continued to be environmental concerns for 2008. Performance improvements made since 2003 in managing potable water systems at Bayou Choctaw, Big Hill, and Bryan Mound indicate greater awareness of regulatory requirements by certified water operators. The use of the Purchasing of Environmentally Friendly Products from the QPL has increased from 81.6% in 2004 to a high of 97.2% in 2007and down slightly to 94.2% in 2008. Improved compliance will require continuing communication with product requestors and purchasers in using the QPL.

DM identified nine compliance findings and two EMS nonconformities during FY 2008. All compliance findings and nonconformities were classified as low risk hazards, minor deviations from internal requirements and regulations. Corrective action plans were developed and implemented for all. All of the findings and nonconformities were closed in 2008. Table 2-7 is a tabulation of 2008 findings/non-conformity by site.

Table 2-7. FY 2008 M&O Contractor Organizational Assessment
Environmental Findings and Non-Conformances

Site	High Risk Hazard (compliance)	Medium Risk Hazard (compliance)	Low Risk Hazard (compliance)	Low Risk Hazard EMS
Bayou Choctaw	0	0	4	0
Big Hill	0	0	2	1
Bryan Mound	0	0	2	1
New Orleans	0	0	1	0
West Hackberry	No Assessment	No Assessment	No Assessment	No Assessment

Third Party EMS Audits

Two surveillance audits were conducted in 2008 by the DM ISO 14001 registrar, Advanced Waste Management Systems, Inc. Each crude oil storage site and the Stennis Warehouse were audited once, and the New Orleans site (headquarters) twice. The performance of DM's EMS was evaluated through the review of 10 of the 17 elements of the ISO 14001 standard. In 2008 one new minor nonconformity was generated. A corrective action plan was developed for the nonconformity and it was closed during FY 2008. Four of five other minor nonconformities generated in FY 2007 were also closed in FY 2008. A recommendation was given for DM to maintain the ISO 14001 certification at the conclusion of both audits.

Regulatory Inspections/Visits

There were ten inspections or visits by or on behalf of regulatory agencies to SPR facilities in 2008 summarized in Table 2-8. These visits are usually routine and are conducted by the regulatory agencies to ensure compliance or to address concerns regarding activities at the SPR facilities. However, the Big Hill site was also visited by regulators in response to emergency conditions brought on by Hurricane Ike, and West Hackberry assisted the US Coast Guard in their investigation of an oil spill on contiguous Black Lake. There was one state regulatory finding associated with an inspection of the Big Hill potable water distribution system.

Table 2-8. Summary of Regulatory and Third-Party Inspections/Visits During 2008

Site	Organization	Remarks
BC	LDHH	The Safe Drinking Water Division of the Louisiana Department of Health and Hospitals (LDHH) visited Bayou Choctaw and collected samples from the potable water well for the required 3 year chemical analysis of the water well. Results from the testing showed all parameters were below detection limits.
	LDNR	Two representatives from the Enforcement office of the Engineering division of the Louisiana Dept of Natural Resources (LDNR) conducted a basic visual inspection of all wells (crude and brine disposal) at Bayou Choctaw, confirmed their locations (with GPS) and required signage, and took photographs. There were no written findings, however an old bore hole (DOE #2) was documented and discussion with others at LDNR for future plugging and abandonment.
	ISO 14001 Registrar	Surveillance audit conducted. Recertification recommended.
BH	TGLO	Texas General Land Office (TGLO) conducted their annual Oil Spill Prevention and Response Audit (OSPRA) inspection of the BH Oil Spill Prevention and Response Plan. Everything was in order; no findings.
	ISO 14001 Registrar	Surveillance audit conducted. Recertification recommended.
	TCEQ	TCEQ (Beaumont Office, Public Water Supply Section) A survey of the BH potable water system was conducted. Two findings were generated, as follows: 1) The site had no water system operating manual, and 2) there was no flush valve on a single dead-end line to welding shop. Finding 1) was later dropped by TCEQ since the regulatory citation did not apply. In response to Finding 2), the site immediately installed a flush valve on the dead-end line and began routine flushing of this leg of the distribution system.
	TCEQ subcontractor	Visited site and sampled potable water for disinfectant by-products testing.
	Texas Animal Health Commission/USDA	Individuals from the Texas Animal Health Commission and the USDA visited BH after Hurricane Ike as part of the disaster recovery effort to evaluate animal carcass disposal options.
	TCEQ	Shortly after Hurricane Ike, five inspectors approached the BH raw water intake structure by boat and asked a DM employee several questions regarding environmental issues due to recent Hurricane Ike, such as spills, environmental conditions of the area surrounding the structure, and implementing environmental oversight. The inspectors learned that the

		site was actively addressing environmental issues, and they left.
	TCEQ	TCEQ received information about two unknown drums washing up on BH property during Hurricane Ike. Two personnel were sent to the site where they marked the drums and recorded their GPS position. They transferred the information to EPA who picked up the drums at a later date. The site over-packed the drums in place (to prevent a release) and kept them in their original locations.
BM	ISO 14001 Registrar	Surveillance audit conducted. Recertification recommended.
	TGLO	TGLO conducted their annual Oil Spill Prevention and Response Audit (OSPRA) inspection of the BM Oil Spill Prevention and Response Plan. Everything was in order; no findings.
NO	ISO 14001 Registrar	Two surveillance audits conducted. Recertification recommended after both audits.
SW	ISO 14001 Registrar	Surveillance audit conducted. Recertification recommended.
WH	USCG	WH personnel assisted the US Coast Guard track down a spill in Black Lake. A USCG helicopter reported to the WH Control Room that there was oil in the water near a wellhead in Black Lake and asked if the site had observed anything. The USCG sent personnel out to investigate and requested boat assistance and access to the lake through the site. WH Personnel assisted initially by checking the shoreline on SPR property and contacting nearby industry. On arrival, USCG personnel were transported to the site boat dock and toured Black Lake. Later, a different offsite USCG team investigating the incident reported they had located the source and responsible party, and the USCG contingent at WH left the site.
	ISO 14001 Registrar	Surveillance audit conducted. Recertification recommended.

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 2008, there was one reportable release of diesel fuel from a small storage tank impacted by Hurricane Ike storm surge at the Big Hill RWIS. During this period there were no reportable crude oil or brine spills at the SPR.

State and federal agencies require notification if an oil spill meets or exceeds the reportable criteria. This reportable criterion 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 2008, the SPR moved (received and transferred internally) 15.2 million m^3 (95.6 mmb) of oil and disposed of 1.85 million m^3 (11.579 mmb) of brine. Additional spill information is listed in Tables 2-9 through 2-11. The long-term trend for crude oil and brine spills and releases has declined substantially from 26 in 1990 to zero in 2008 as depicted in Figure 2-3.

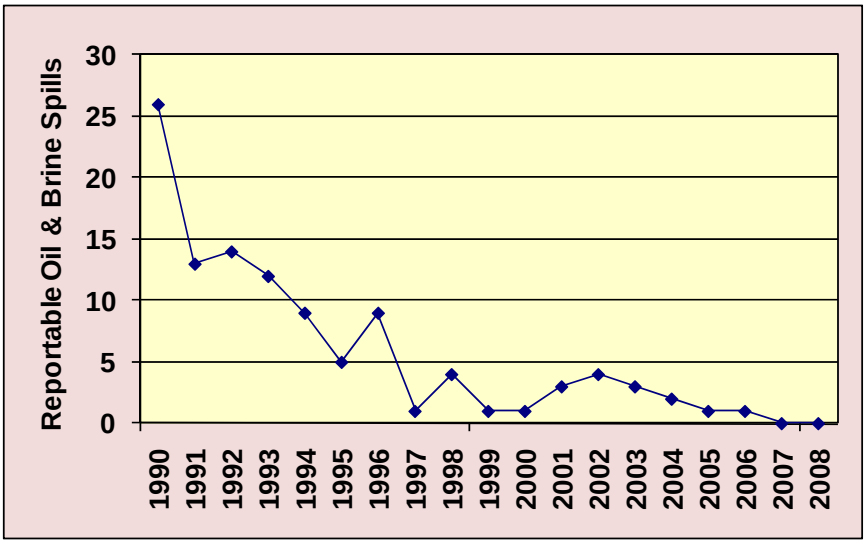


Figure 2-3. Number of Reportable Crude Oil & Brine Spills 1990-2008

Table 2-9. Number of Reportable 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	0.0
2003	3	1.1 (7)	0.0000104
2004	1*	$5.6X10^{-3}$ (0.001)*	0.0*
2005	0	0	0.0
2006	1	0.5 (3)	3.3×10^{-6}
2007	0	0	0.0
2008	1*	0.4 (2.4)*	0.0*

Note: During 2004 and 2008 there were no reportable crude oil spills at the SPR. The spill that occurred during 2004 resulted from a sheen due to a diesel fuel spill on a navigable waterway. During Hurricane Ike (2008) the diesel tank was moved from its foundation and released its contents to the floodwaters near/on the ICW, a navigable waterway.

Table 2-10. 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	131,231.6 (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	0.0
2004	1	1.6 (10)	2.2×10^{-7}
2005	1	27 .0 (170)	5.5×10^{-6}
2006	0	0	0.0
2007	0	0	0.0
2008	0	0	0.0

2.3 SUMMARY OF PERMITS (JAN. 1, 2008 THROUGH DEC. 31, 2008)

General

Permits in effect during 2008 include 10 state and federal CWA wastewater discharge permits, five CAA permits, 35 active original structure 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 3-6.

The Big Hill air permit was renewed by TCEQ on January 11, 2008. The new permit is valid for ten years and will need to be renewed by January 10, 2018.

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 piping components such as valves, flanges, pressure relief valves, and pump seals be inspected for leaks of VOC on a regular basis (biennially 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 pounds per hour and tons per year.

The SPR ensures compliance with these permit limits by monitoring the processes that emit the pollutants. This includes monitoring use of generators, volumes of crude oil, diesel, and gasoline movements through tanks, volume of painting, and others. The results of this 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 in Louisiana. All air reports were submitted to the appropriate agencies on time.

Water discharge permits require that analytical permit limits are met and reported. Other permit conditions require visual monitoring of the effluents to ensure that they have no visible sheen or foaming. All SPR sites periodically (daily, monthly and/or quarterly) monitor permit limit compliance with quarterly reporting through the NPDES, LPDES, and RCT Statewide Rule 8 Discharge Monitoring Reports (DMRs). All such reports were submitted to the appropriate agencies on time in 2008.

Noncompliances

A single discharge permit noncompliance occurred at the SPR out of a total of 1,127 permit-related analyses reported in 2008. The only noncompliance in the year occurred with an oil & grease test result from a well pad retained stormwater sample taken at the Big Hill site was reported by a contract lab as 18.3 mg/l which exceeds the effluent limit of 15 mg/l. The result was questioned and found to meet the lab's QA/QC criteria. Internal investigations at the site failed to reveal any causative or responsible factor and tests before and immediately after the sampling revealed no such impact. All other associated permit test parameters (pH, TOC, and salinity) were also found to be satisfactory. This physical noncompliance was of short duration causing no observable adverse environmental impact.

The single discharge permit noncompliance produced an overall project-wide 99.91 percent compliance rate for 2008. Summary information of the single NPDES exceedance and noncompliance is contained in Section 5.4, on Table 5-7.

Environmental Reportable Project Events

Project events equal all reportable spills, both oil and brine, and all discharge permit non-compliances. These events are used to provide a summary of SPR performance as illustrated in Figure 2-4. During 2008 there were two environmental reportable project events at the SPR.

Notice of Violation (NOV)

During 2008, the SPR continued to maintain a status of low risk to the environment. NOVs related to CAA, CWA, and RCRA activities have declined significantly from 9 (all administrative) in 1990 to zero since 1996 as depicted in Figure 2-5.

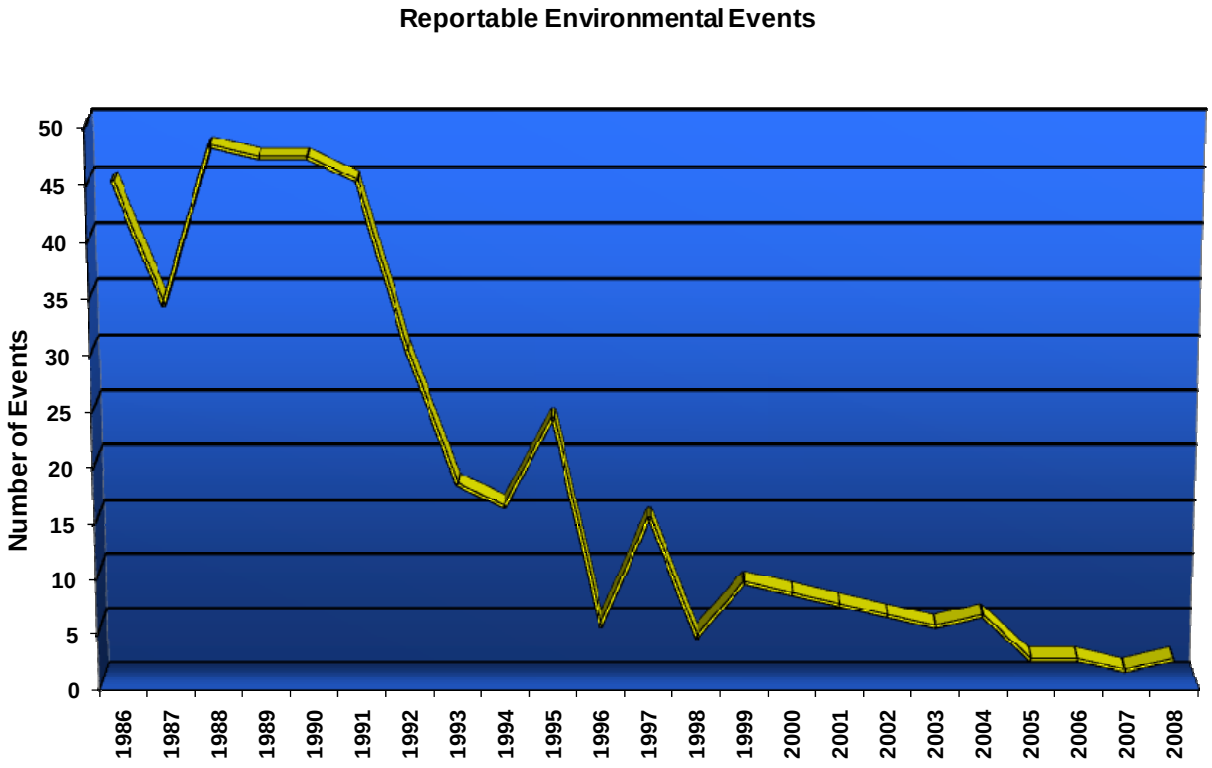


Figure 2-4. SPR Environmental Project Events 1986 - 2008

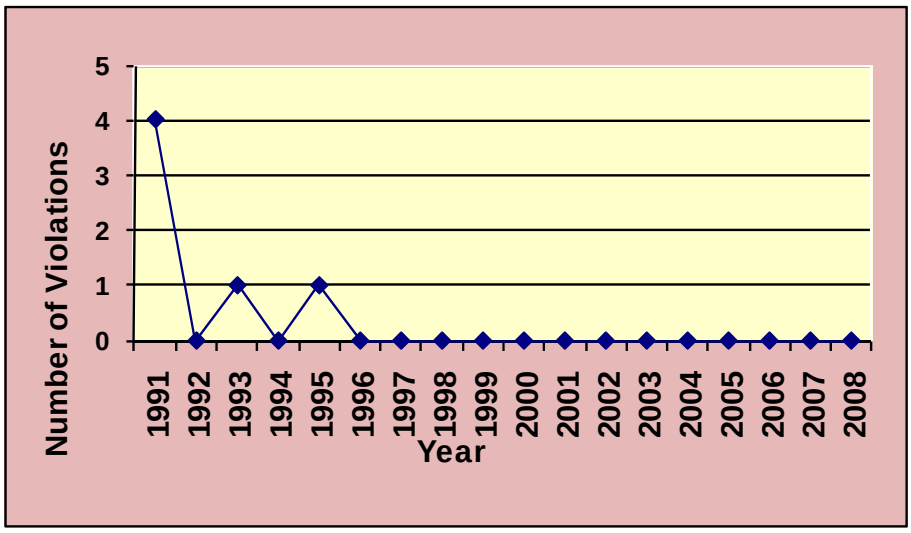


Figure 2-5. Number of Violations 1991-2008

2.4 SUCCESS IN MEETING PERFORMANCE MEASURES

General

Thirty performance measures were tracked by the DM EMS in FY 2008. A performance measure that is part of the EMS is identified as an environmental objective. A target (a metric that can be measured) is established for each objective. Many objectives have

two targets, a minimum level (all DOE contractors should meet as a minimum) and a more challenging "stretch" level.

Twenty of these EMS targets are identified in contract Work Authorization Directives (WADs) as contract objectives. WAD objectives and targets are jointly developed for each fiscal year by DOE and DM and tracked for success. WAD targets originate from several departments. In FY 2008 nine of the targets tracked were from the Environmental Department WAD, and eleven other targets originated from WADs from other departments. The other ten performance measures were based on environmental commitments made for EPA's Performance Track and TCEQ's Clean Texas programs and management interests. All performance measures were related to significant environmental aspects or interests to top management.

Success in Meeting Environmental Objectives

The environmental objectives and targets, success in meeting them in FY 2008, and their performance trends since FY 2000 are delineated in Table 2-11.

Of 30 environmental objectives tracked in FY 2008, 26 met or surpassed the more challenging stretch target level, one met the minimum target, one objective did not meet the minimum target, and data gathering continues on two, three-year objectives that have not yet been met. Most of the environmental objectives have been tracked for several years. The following highlights provide an overview of the 5 to 9-year measurements of success in meeting the targets:

- **improved performance** on 6 objectives
  - reduce generation of sanitary waste
  - increase purchase of non-hydroelectric renewable energy
  - reduce VOC emissions from workover operations by 15%
  - reduce waste to air (VOC) by 1500 tons/yr through degassing crude oil at BM
  - provide habitat on site to protect wildlife
  - replace top three cleaning products with environmentally preferable biobased products
- **steady performance** on 16 objectives
  - avoid regulatory violations
  - reduce reportable releases
  - purchase affirmative procurement products
  - increase purchasing of biobased products
  - review all documents sent to the Environmental Department
  - submit environmental documents on time to DOE and regulators
  - complete and submit Pipeline and Pipeline Integrity Report
  - have key emergency equipment available
  - have basic ordering agreements in place for emergencies
  - train number of ERT personnel
  - train Incident Commander/Qualified Individuals
  - complete PREP exercises
  - train Protective Force to assist in support response
  - plan and administer effective community outreach program
  - meet maintenance performance appraisal report (MPAR) index
  - conduct predictive maintenance program
- **waning performance** on 7 objectives
  - reduce permit exceedances
  - reduce generation of hazardous waste
  - increase recycling of sanitary waste through waste diversion

  - increase use of the Qualified Products List
  - purchase low standby power devices
  - completion of Priority One and Two fire repairs
  - review and revise all applicable building standard specifications to include green building
- **no trend** yet on 1 objective
  - purchase electricity from new renewable energy sources

Table 2-11. FY 08 OBJECTIVES AND TARGETS WITH PERFORMANCE

OBJECTIVES AND TARGETS								
ID #	**WAD ID**	**Aspect**	**Objective**	**Target**		**Level of Achievement in FY 2008**	**Performance (Since FY00)**	**Trend**
				Minimum	**Stretch**			
1	2008 - 1.J.I (ENV)	Discharges	Reduce permit exceedances reported on the Discharge Monitoring Reports	No more than 8 annually	No more than 4 annually	Surpassed target. 2 permit exceedances	9 in 2000 4 in 2001 2 in 2002 6 in 2003 3 in 2004 1 in 2005 1 in 2006 1 in 2007	Slight increase in exceedances
2	2008 - 1.J (ENV)	Spill Discharges Air Emissions Monitoring Wetlands disturbance Drainage Navigation Public exposure	Avoid cited Clean Water Act, Clean Air Act, and RCRA (waste) enforcement actions (notices of violations)	Not Applicable	0 per year	Met target. 0 violations	0 violations from FY00 through 2007 and past 10 years.	Steady
3	2008 – 1.J.I (ENV)	Spill	Reduce reportable occurrences of releases from operational facilities	No more than 8 annually	No more than 4 annually	Surpassed target. 1 reportable release	1 in 2000 4 in 2001 1 in 2002 4 in 2003 2 in 2004 1 in 2005 1 in 2006 0 in 2007	Steady

OBJECTIVES AND TARGETS								
ID #	**WAD ID**	**Aspect**	**Objective**	**Target**		**Level of Achievement in FY 2008**	**Performance (Since FY00)**	**Trend**
				Minimum	**Stretch**			
4	2008 - 1.J.1.a (ENV)	Waste	Reduce total amount of hazardous waste generated.	Not Applicable	No more than 500 lbs/yr total	Surpassed target with 290 lbs generated.	3802 lbs in 2000 1712 lbs in 2001 717 lbs in 2002 865 lbs in 2003 1333 lbs in 2004 495 lbs in 2005 268 lbs in 2006 182 lbs in 2007	Improved since 2000, but beginning to increase - exceeded generation in FY 2006 and 2007.
5	2008 – 1.J.1 (ENV)	Waste	Reduce total amount of sanitary waste generated	Not Applicable	No more than 0.90 million lbs/yr	Surpassed target. 393,273 lbs (0.39 million lbs) generated.	636,502 lbs in 2000 607,120 lbs in 2001 484,059 lbs in 2002 449,637 lbs in 2003 437,997 lbs in 2004 402,616 lbs in 2005 449,754 lbs in 2006 404,774 lbs in 2007	Consistently Improved through 2005, peaked in 2006, and dropped again in 2007 and 2008.
6	2008 – 1.J.I (ENV)	Waste	Increase recycling of sanitary waste through waste diversion	Not Applicable	47%	Surpassed target. 64% recycled.	52% in 2000 69% in 2001 40% in 2002 38% in 2003 41% in 2004 88% in 2005 69% in 2006 91% in 2007	Not as good as last year. Dropping back to 2006 level.

OBJECTIVES AND TARGETS								
ID #	**WAD ID**	**Aspect**	**Objective**	**Target**		**Level of Achievement in FY 2008**	**Performance (Since FY00)**	**Trend**
				Minimum	**Stretch**			
7	2008 – 1.J.1	Resource Use	Increase purchasing of EPA designated recycled content products (affirmative procurement)	Not Applicable	100%	Met target. 100%	83% in FY00 87% in FY01 100% from 2002 through 2004 98.4% in 2005 100% in 2006 and 2007	Steady
8	Section 9002 of Farm Security and Rural Investment Act (FSRIA) and Energy Policy Act 2005)	Resource Use	Increase purchasing of biobased products.	Not Applicable	100%	Met target. 100%	100% in 2007	Steady
9	Env. Instr. Manual	Waste	Increase use of the Qualified Products List (QPL)	Not Applicable	At least 92% products sampled found as "approved" on QPL	Surpassed target. 94.2 % approved SPR wide. BC: 92.5% BH: 95% BM: 94.5% NO/SW: 94.6% (WH is not included – QPL evaluation was postponed until 2009 due to Hurricane Ike)	81.6% found approved in 2004 94.2% found approved in 2005 92.5% found approved in 2006 97.2 % found approved in 2007	Not as good as in 2007, but second best year in five years.
10	2008 ENV	Waste Spill Air Emissions Resource Use	Review all purchase requests, designs, summaries of work, and other documents sent to Environmental Department for review.	Not Applicable	100%	Met target. 100% of information expected to contain environmental issues has been reviewed.	100% from 2001 through 2008	Steady
11	2008 ENV	Monitoring and Surveillance Results	Submit environmental documents on time to DOE & regulators (timeliness & quality)	Not Applicable	100%	Met target. 100%	98% in 2000 100% from 2001 through 2008	Steady
12	NONE Energy Mgmt. Perf. Agreement	Resource Use	Purchase low standby power devices from 5 of the 10 device types identified at http://oahu.lbl.gov/	At least 5 device types	At least 7 device types	Exceeded minimum target. 6 devices purchased.	7 types purchased in 2004 - 2007	Slightly worse than 2004 – 2007.

OBJECTIVES AND TARGETS								
ID #	**WAD ID**	**Aspect**	**Objective**	**Target**		**Level of Achievement in FY 2008**	**Performance (Since FY00)**	**Trend**
				Minimum	**Stretch**			
13	PEMP Measure and Executive Order 13423	Resource Use	Increase the purchase of electricity from non-hydroelectric renewable energy sources (solar, geothermal, biomass, or wind technologies) by including provisions for such purchases as a component in all future DOE competitive solicitations for electricity.	Not applicable	6% of total electrical consumption/yr	Met target. Purchased 6% of total company consumption.	Purchased 5% of total company consumption in 2007.	Slight improvement over 2007.
14	PEMP Measure and Executive Order 13423	Resource Use	Purchase new renewable energy from new renewable sources.	Not applicable	At least 50% of the statutorily required renewable energy consumed in FY 2008.	Surpassed target. Purchased 100% from a new renewable energy source, Horse Hollow Wind Energy Center.	No trend yet. New objective.	No trend yet
15	2008 TSM – ENG	Spill Monitoring and Surveillance Results	Submit annual Pipeline and Pipeline Integrity report by 10/31/08 for previous fiscal year.	Not Applicable	On schedule	Met target. Report was submitted on schedule.	On schedule since 2000.	Steady
16	2008 - 1.T.1.b (TSM – FP/EM)	Spill	Ensure key emergency equipment is available	90%	100%	Met target. 100% all sites.	100% since 2000.	Steady
17	2008 TSM FP-EM	Spill Fire	Ensure basic ordering agreements are in place for spill response and clean up at each site.	At least 1/site	At least 2/site	Surpassed target. 11 BOAs for spills 2 BOAs for fire until 2010	Greater than 100% since 2001	Steady
18	2008 - 1.T.1.a TSM – FP/EM	Spill Fire	Ensure emergency preparedness and response capabilities through quarterly training Emergency Response Team (ERT) members.	95% ERT trained/site. 18 @ BC 20@ BM, BH, & WH	100% ERT trained/site	Met target of 100% trained. 20 @ BC 25 @ BM 23 @ BH 22 @ WH	97.3% in 2000 96.3% in 2001 100% from 2002 through 2008	Steady
19	2008 TSM FP-EM	Spill Fire	Ensure Incident Commander/Qualified Individual at each site is trained in ICS to the appropriate level.	Not Applicable	100%	Met target. 100% trained by May.	100% from 2002 through 2008	Steady
20	2008 - 1.T.1.c (TSM-FP-EM)	Spill	Successfully complete Preparedness for Response Exercise Program (PREP) drills/exercises	Not Applicable	100% of PREP objectives tested/site/yr (prorated)	Met target. Drills completed as follows: WH: 4/08 BM: 6/08 BC: 8/08 BH: no drill; met regional test requirements	Tracked since 2005. Remains at 100% for regulatory (CY) measurement.	Steady
21	2008 - 1.T.1.d (ATSM-FP-EM)	Spill Fire	Train Protective Force to assist in Support Response.	Train 50% of Protective Force Officers	Train 75% of Protective Force Officers	Surpassed target. 85%-98% of officers trained/month	100% of target from 2004 through 2006 92.8% in 2007.	Steady

OBJECTIVES AND TARGETS								
ID #	**WAD ID**	**Aspect**	**Objective**	**Target**		**Level of Achievement in FY 2008**	**Performance (Since FY00)**	**Trend**
				Minimum	**Stretch**			
22	2008 (TSM FP-EM)	Fire	Ensure fire protection capabilities at each site through prompt Priority One and Two fire protection system repairs.	Not Applicable	Average time to complete fire protection repairs less than 17 days for Priority One repairs and less than 61 days for Priority Two repairs.	All sites except BM completed Priority One repairs in less than 17 days each month. BM had 1 monthly excursion. No sites completed Priority Two repairs in less than 61 days for all months. Monthly excursions are as follows: BC: 10/07, 8/08, and 9/08 BH: 1/08, 3/08, 4/08, 6/08, and 7/08 BM: 3/08 and 4/08 WH: 10/07, 12/07, 3/08, and 8/08	2002: Surpassed target (except at BM – Priority Two only) at all sites 2003 & 2004: Surpassed targets at all sites. 2005: BH & WH met Priority One, BH & BC met Priority Two 2006: BC met target for Priority One and Two. BH met Priority One. 2007: Surpassed target at all sites for Priority One. Surpassed target for Priority Two at BC only.	Performance of Priority 1 repairs remains steady, but Priority Two repairs are worsening.
23	2008 TSM PROJ MGMT	Public Involve-ment	Plan and administer an effective community outreach program. Complete community outreach activities using the Annual DOE SPR Public Outreach Plan as a baseline.	Complete all activities in accordance with the plan.	Complete activities in addition to those planned.	115% Completed all scheduled activities and more.	156% in 2002 105.6% in 2003 105+% in 2004 103+% in 2005 and 2006 100% in 2007	Steady
24	None. P-Track and Clean Texas Programs, CY 2007-2009 objective	Air Emissions	Reduce VOC emissions by at least 15% from the cavern workover process. This is a three year objective to be achieved by the end of CY 09	Not Applicable	Do not exceed 25.7 tons/yr (CY 2007 - 2009)	Surpassed target. Only 1.96 tons of VOCs lost to atmosphere.	In 2008 the loss was only a small fraction of that lost in 2006 and 2007.	Much better overall than 2006 (30.24 tons lost) and 2007 (11.45 tons lost).
25	None. P-Track and Clean Texas Programs, CY 2007-2009 objective	Air Emissions	Reduce waste to air (VOC) through degassing crude oil at BM to avoid emissions off-site when oil is moved into Commerce. This is a three year objective to be achieved by the end of CY 09.	Not applicable	Avoid 1500 tons/yr during a drawdown at BM in the summer of 2009.	512-904 tons would be avoided so far during a drawdown in 2009. The range of avoidance is due to the potential mix of sweet and sour crude oil streams during the event.	178 tons would be avoided by the end of CY 2007	Much better performance than in 2007 (more time spent degassing).

OBJECTIVES AND TARGETS								
ID #	**WAD ID**	**Aspect**	**Objective**	**Target Minimum**	**Target Stretch**	**Level of Achievement in FY 2008**	**Performance (Since FY00)**	**Trend**
26	None. P-Track and Clean Texas Programs, CY 2007-2009 objective	Wildlife Exposure	Provide habitat on site to protect wildlife. This is a three year objective to be achieved by the end of CY 09 for P-Track and Clean Texas.	Not Applicable	At least 92.7 acres total BC: 8 acres WH: 37.7 acres BH: 2 acres BM: 45 acres	Met target. 92.7 acres set aside.	In 2008: BM: BB Whistling ducks nesting in nest boxes. GB heron nesting on osprey tower. WH: Mowing curtailed to mid-summer on set-asides. BC: 5 acres of canal levee were overseeded & used as food plot. BN stilts and quail nesting on site BH: 12 bald cypress planted around pond. Mowing curtailed during spring. 3 new purple martin houses installed.	Target surpasses the 2004-2006 achievement of 77 acres and remains the same as for 2007. Improvements were made in 2008 to attract and support wildlife.
27	2008 - 1.M.1 (MAINT)	Spill Air Emissions Waste	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 each month	98% MPAR for each month	Surpassed target. SPR: 98.3%	97.3% in 2000 97.6% in 2001 98.5% in 2002 98.4% in 2003 and 2004 98.3% in 2005 98.2% in 2006 98.2% in 2007	Steady overall
28	2008 -1.M.2 (MAINT)	Resource Use	Conduct a predictive maintenance program (PdM) that will identify potential equipment failures.	Achieve 90% weighted average PdM Index each month	Achieve 95% weighted average PdM Index each month	Surpassed target. 99.8% overall	Completed scheduled PdM activities: 99.5% in 2003 99.98% in 2004 99.93% in 2005 100% in 2006 98.8% in 2007	Steady

OBJECTIVES AND TARGETS								
ID #	**WAD ID**	**Aspect**	**Objective**	**Target**		**Level of Achievement in FY 2008**	**Performance (Since FY00)**	**Trend**
				Minimum	**Stretch**			
29	None. P-Track and Clean Texas Programs, CY 2007-2009 objective	Resource Use Waste Air Emissions Project Design	Review and revise all applicable building standard specifications to include green building materials, methods, and strategies. Implement these specifications though construction tasks BC-MM-638, WH-MM-640, BH-MM-641, and BM-MM-639. This is a three year objective to be achieved by the end of CY 09 for P-Track and Clean Texas.	Not Applicable	Review and revise 100% of applicable specs, 33% each year for three years. Implement specs in four site constructions tasks.	26% of the 61 identified specs were greened by URS by the end of November, 2007. Seven specs (11%) were greened in 2008 which was less than the 33% target.	The 33%/yr review target was surpassed in 2007, but not in FY 2008. Building upgrade tasks completed include BM-MM-639, BH-MM-641, WH-MM-640, and BC-MM-638. Welding shop replacement at BM (in task BM-MM-639) was eliminated.	Repairing damages from Hurricanes Gustav and Ike and contracting issues contributed to delays in the review of specifications.
30	None. P-Track and Clean Texas Programs, CY 2007-2009 objective	Resource Use Waste Environ-mental Exposure	Replace top three cleaning products used that contain the following four harmful non-biobased constituents… Alcohol Glycol DEA Solvents… with environmentally preferable biobased products, reducing the amount of harmful constituents used by 50%/yr.	Not Applicable	Do not use more than 357 lbs/yr of targeted harmful constituents in top three cleaning products.	Only 172.16 lbs were used in FY 2008.	By the end of 2007, 348.5 lbs of target harmful constituents were used in the top three categories of cleaning products - hand cleaners, window cleaners, and all-purpose cleaners.	Improvement. Surpassed target in first two years of this three year objective, and reduction was dramatic in 2008.

End of Section

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 450.1A. 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 2008 are discussed in sections 5 and 6.

3.1 ASSOCIATED PLANS AND PROCEDURES

Associated plans that support the SPR environmental program include the Emergency Management Plan and Implementing Procedures, the 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) which includes the stormwater pollution plans for each site. The EMP, GWPMP, and the PPP are reviewed and updated annually; the SPCC plans are reviewed and revised as needed or every five years per regulation.

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 Reporting

Site Emergency Response Procedures address spill reporting requirements of 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. The tool to document these spills is the Operations Control Center (OCC) Non-Routine and Occurrence Report form that is completed at the site level and then forwarded to the New Orleans OCC. 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 and 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 RCT Rule 8 water discharge programs are in place for Big Hill and Bryan Mound. The routine monitoring 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). Should a noncompliance or bypass occur during the reporting period, an explanation of the cause and actions taken to correct the event is included in the corresponding quarterly report.

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 regulations and reporting requirements applicable to the SPR.

Table 3-1. Federal, State, and Local Regulatory 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	Quarterly monitoring reports
		LA Dept. of Env. Quality (LDEQ)	Water Discharge Permit	Quarterly monitoring reports
		Railroad Commission of Texas (RCT)	Water Discharge Permit	Quarterly monitoring reports

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
	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 ≥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
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 450.1A	Environmental Planning and Monitoring	DOE	Ground Water Protection Management Program Plan	Annual review (now contained in EMP)
			Environmental Monitoring Plan	Annual revision
			Site Environmental Report	Annual report
			Performance Indicators	Monthly electronic updates in PB Views data management system and quarterly report
DOE Order 451.1B	Waste Management / Pollution Prevention	DOE	Annual Report on Waste Generation and Pollution Prevention Progress	Annual summary of all wastes
	NEPA Compliance	DOE	NEPA Planning Summary	Annual Report
			EIS Supplement Analysis	As needed
EO 13423	Affirmative Procurement	DOE	Affirmative Procurement Report	Annual report (combined with EPEAT and Biobased reports)
	Electronic Product Environmental Assessment Tool (EPEAT)	DOE	EPEAT Report	Annual report (combined with Affirmative Procurement and Biobased reports)
	Compliance	DOE	Implementation Report	Quarterly status reports
EO 13352	Conflict Resolution	U.S. Council on Environmental Quality (CEQ)	Report on actions to implement EO regarding facilitation of cooperative conservation	Annual report
Farm Security and Rural Investment Act of 2002	Procurement	USDA	Biobased Procurement Report	Annual report (combined with Affirmative Procurement and EPEAT reports)
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 Hydrocarbon 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

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
	Operation of relined brine ponds 7&37 BH	RCT	Operate and Maintain Permit, Weekly Leak Detection	Retain on site
	Surveillance of closed brine and anhydrite ponds	LDNR, RCT	Closure agreements, annual ground water monitoring results	Report in SER
	Wastewater	TCEQ	DM operator's license	None
	Potable water	TCEQ	DM company operations license	None
National Environmental Performance Track Program	Environmental Management Systems	EPA	Applicable environmental requirements, audit results, performance in meeting commitments, and outreach information	Annual progress report; Triennial renewal
Clean Texas Program, Platinum Level	Environmental Management Systems	TCEQ	Applicable environmental requirements, audit results, performance in meeting commitments, and outreach information	Annual progress report. Progress is reported in the National Environmental Performance Track Report; Triennial renewal
National Environmental Policy Act	Review of proposed projects for environmental considerations	CEQ	Environmental Impact statements, Environmental Assessments	Only when not tiered under other EIS or EA.
			Categorical Exclusions	For projects that require consent.
	Inclusion of cooperating agencies in NEPA process	CEQ	Agency participation in NEPA activities to ensure adequate information in the decision-making process	Memorandum, as needed
Oil Pollution Act of 1990 (amendment of FWPCA)	Oil spill response	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	Annual update to Pollution Prevention Plan
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
		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

Regulation, Statute or Directive	Regulated Area	Enforcement Agency	Types of Required Permits, Applications, or Documentation	Routine Reporting Requirements
	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
	Affirmative Procurement	EPA	Affirmative Procurement Report	Annual Report (combined with EPEAT and Biobased reports)
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
		RCT	Brine Injection Permit (H-10)	Annual Disposal/ Injection Wells Reports
	Potable water	LA Dept. of Health & Hospitals (LDHH)	Daily chlorine residual concentration (BC)	Retain on site
			Quarterly total coliform test (BC)	Retain results on site
			Annual disinfectant and disinfectant by-products test (BC)	Submit to LDHH
			Lead and copper test	Frequency based on past test results
		TCEQ	Weekly disinfectant residual concentration (BM and BH)	Quarterly to agency
			Monthly total coliform test (BM and BH)	Retain results on site
			Annual disinfectant and disinfectant by-products test (BM)	Submit to TCEQ
			Lead and copper test	Frequency based on past test result
	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 Two	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 all of the Louisiana SPR sites, and their offsite pipelines. This permit requires quarterly discharge monitoring reporting.

LDEQ has primacy for the NPDES program in Louisiana that includes responsibility for all compliance and enforcement actions relating to the discharge of water in Louisiana. The LDEQ-issued general storm water permit coverage remained in-force throughout 2008 for West Hackberry and the renewal general permit issued early in 2006 for Bayou Choctaw authorizing all of their discharges replaced both the state administered individual permit and separate MSGP coverage there.

Since the RCT does not have primacy for the NPDES program, Big Hill and Bryan Mound operate under parallel EPA and RCT discharge permits. In addition to maintaining federal coverage, the two Texas SPR sites operate under authority granted with Statewide Rule 8 water discharge permits issued by the RCT. Modifications for nozzle exit velocity and NOI's for the administratively extended federal MSGP coverage for sheet flow (non point source) storm water associated with industrial activity remained in force during 2008.

The Certification of No Exposure processed to the MDEQ for the Mississippi Stennis Warehousing operations in lieu of MSGP stormwater coverage at that location remained in force during 2008.

The air permits for the SPR facilities are administered by the LDEQ in Louisiana and the TCEQ in Texas. The SPR air permits did not require modification in 2008. The Big Hill air permit was renewed by TCEQ on January 11, 2008 and is valid for ten years.

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.

The 2004 LPDES renewal application for Bayou Choctaw resulted in the issuance of renewed authority to discharge effective January 6, 2006. This general permit for Light Commercial Facilities (LCF) permit LAG480540 effectively replaced the site's individual permit LA0053040 and the MSGP permit LAR05M577. However, the state's LCF permit expired on July 31, 2006, and coverage has been administratively extended to all permittees pending internal renewal actions and state level adjudication.

The site's security perimeter "clear sight zone" authorized and implemented by the NODCOE in the summer of 2006 was maintained by site personnel throughout 2008.

Table 3-2. Permits at Bayou Choctaw

PERMIT NUMBER	ISSUING AGENCY	PERMIT TYPE	EFFECTIVE DATE	EXPIRATION DATE	COMMENTS
LAG480540	LDEQ	LPDES	01/06/06	07/31/06 (extended)	(1),(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)
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)
MVN-2004-4453-CT	COE	Constr. & Maintain	10/14/04	-	(19)
MVN-2003-2234-CT	COE	Constr. & Maintain	02/2/06	-	(20)

* COE permits remain active for the life of the structure.

(1) LDEQ cancelled the LPDES converted permit LA0053040 and LA MSGP permit LAR05M577 replacing both with a single Light Commercial Facility (LCF) general permit LAG480540.
(2) The state's LPDES LCF general permit (LAG48000) expired on 7/31/2006 and discharge authority has been extended indefinitely (stayed) for all permittees pending LPDES internal permitting actions and state level adjudication per LPDES enforcement.
(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.
(19) Install and maintain refurbished Bailey Bridge crossing over Wilbert's Canal via NWP14, providing construction period for 2 years.
(20) Implement and maintain an expanded clear sight security perimeter zone. Requires compensatory mitigation and long-term oversight of the mitigation bank sites.

3.3.2 Big Hill

Table 3-3 lists the permits at Big Hill. In 2008, the site appropriated 62,803 m^3 (51 acre-feet) of water from the Intracoastal Waterway exclusive of water for fire protection. This represents less than two tenths of one 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 2008.

The NPDES permit required brine line integrity test demonstrated integrity and the results were provided to EPA Region 6 during 2008.

The M&O contractor is registered with TCEQ as a Public Water System Operations Company (registration # WC0000073) since Big Hill (and Bryan Mound) provides sanitary control of their purchased water distribution system on-site. A renewal application including current licensed water operators, was submitted to TCEQ in 2008.

A renewal application for Big Hill's NPDES permit TX0092827 was submitted as required by regulation to Region 6 EPA in April 2008, more than 180 days prior to expiration. The application officially received May 28, was found administratively complete in a letter dated June 18, 2008, allowing the site to continue discharges beyond expiration should a renewed permit not be finalized. As of the end of CY2008, no final permitting action had been received therefore all original permit (2003) conditions and subsequent approved minor permit modifications (2005) remained in full force beyond 2008. The Big Hill air permit was renewed by TCEQ on January 11, 2008 and is valid for ten years.

The security fencing surrounding the site RWIS was ruined by Hurricane Ike storm surge and in need of in-kind replacement. The excavation work, occurring in non-productive wetlands was authorized by location, the original structures' maintenance clause, and the current nationwide, permit No. 3, Maintenance.

3.3.3 Bryan Mound

Table 3-4 lists the permits for the Bryan Mound site. The Bryan Mound site has a 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 2008, the site used a total of 99,746 m^3 (81 acre-feet) of water from the Brazos River Diversion Channel, representing just over one-tenth percent of the annual water usage authorized. The certified affidavit and annual report of water usage was forwarded as required in 2008.

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 Admin Extend 6/18/2008	(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	01/11/08	01/10/2018	Site Air 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.	01/01/05	12/31/2009	(9)
4045A	TNRCC	Water Use	11/14/83	Open	(10)

(1) Renewal submitted 4/23/2008 - accepted as administratively complete 6/18/2008. Not acted upon through 2008.
(2) NPDES Multi-Sector General Permit (MSGP) coverage for Storm Water Associated with Industrial Activity expired in October 2005 and was automatically extended by EPA until a renewed permit is made effective.
(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 12/30/2004 with an effective date of 1/1/05.
(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.

Maintenance dredging in the approach channel to the RWIS was not implemented in 2008.

A renewal application for Bryan Mound's NPDES permit TX0074012 was submitted as required by regulation to Region 6 EPA in April 2008, more than 180 days prior to expiration. The application officially received April 25, was found administratively complete in a letter dated June 18, 2008, allowing the site to continue discharges beyond expiration should a renewed permit not be finalized. As of the end of 2008, no final permitting action had been received all original permit (2003) conditions and subsequent approved minor permit modifications (2005) remained in full force during 2008.

Required reporting for 2008 involved the successful annual brine line integrity test to Region 6 EPA, wastewater operators' reports to TCEQ; and crude oil pipeline system operations renewal to the RCT.

The M&O contractor registered with TCEQ as a Public Water System Operations Company (registration # WC0000073) since Bryan Mound (and Big Hill) provides sanitary control of their purchased water distribution system on-site. A renewal application including current licensed water operators, was submitted to TCEQ in 2008.

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 Admin Extended 6/18/2008	(1)
NOI	EPA	NPDES	01/24/01	09/2005	(2)
SWGCO-RP-12347 (03), repl. by SWG-2006-2568	COE	Constr & Maintain	02/22/78	Dredging clause open to 12/2017	(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	04/01/04	03/31/09	(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)
04994	RCT	Operate	08/01/00	Open	(15)
6176B	TCEQ	Air	06/12/02	06/12/12	Site Air Permit
52962	TCEQ	Air	11/07/02	11/07/12	Degas Permit

* COE permits remain active for the life of the structure.

(1) Renewal submitted 4/23/2008. Accepted as administratively complete 6/18/2008. Not acted upon through 2008.
(2) NPDES Multi-Sector General Permit (MSGP) coverage for Storm Water Associated with Industrial Activity expired in October, 2005, and was administratively extended by EPA until a renewed permit is made effective.
(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. A renewal application for an Extension of Time (EOT) provided to GALCOE in November was not acted upon in 2006.
(4) Approval of oil storage and salt disposal program.
(5) Authority to operate brine pond.
(6) Permit expires at project end, covers 52000 ac/ft/yr and MDR of 130 CFS per 2001 amendment.
(7) Corresponds with TX0074012 (EPA-NPDES). (Renewal submitted 12/9/03, RCT acted on permit in March, '04, effective 4/1/04.)
(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 negotiated a twenty year 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 concurrent with their lease.

3.3.5 Stennis Warehouse

There are no permits for the Stennis Warehouse facility. A Certificate of No Exposure, declaring that all activities are conducted in a manner that will not expose potential pollutants to stormwater, was approved by the Mississippi Department of Environmental Quality (MDEQ) in lieu of operating under a multi-sector general permit. Air emissions from Stennis Warehouse operations are *de minimus*, requiring no permitting or reporting activity.

3.3.6 Weeks Island

The permits for Weeks Island are listed in Table 3-5. In 2005 the overall monitoring program was determined to be complete by LDNR per a concurrence letter dated October 31, 2005. As a result no physical monitoring or sampling activities occurred in 2008. All remaining wells on the DOE-owned properties were properly plugged and abandoned in a single project action in 2008 following the final property transfer to a private individual.

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 as modified to reflect completion of decommissioning monitoring.

3.3.7 West Hackberry

Since renewal of the discharge authority effective November 1, 2004, the site continued to operate with the permit prescribed streamlined effluent monitoring involving a combination of three outfalls numerically limited with an individual permit. The remainder of the storm water retained in secondary containments and storm water associated with industrial activity are addressed under the written Storm Water Pollution Prevention Plan (SWPPP) required by the state's Multi-Sector General Permit.

No construction activities, requiring permits review, authorization or permitting agency activity occurred in jurisdictional wetlands during 2008. Permits for the West Hackberry SPR site 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	11/1/04	10/31/09	(1)
LAR05M559	LDEQ	LPDES	05/27/06	04/30/11	(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 (Letter)	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. Renewed in 2004.
(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. State renewed authority for the MSGP became effective 5/1/2006; a re-instatement letter effective 5/27/2006 replaced the expired coverage with the new MSGP authority (and conditions) maintaining existing permit number.
(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. Still active
(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 successfully met the hazardous and non-hazardous sanitary waste generation targets generating less than 500 lbs and 900,000 lbs respectively during CY 2008. Although E&P wastes are not included in these targets, during CY 2008 the SPR recycled 41.2 mt (45.4 tons) of wastes generated by the E&P process. 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 2008 are delineated in Table 3-7.

Table 3-7. CY 2008 Materials Recycled from all SPR Sites

CATEGORY	RECYCLED (LBS)	RECYCLED (METRIC TONS)
ALUMINUM CANS	905.000	0.338
ALUMINUM/PLASTIC COMINGLED	505.000	0.188
BALLASTS	323.000	0.121
BATTERIES	10,576.160	3.947
BLAST MEDIA	42,900.000	16.012
CORRUGATED CARDBOARD	17,145.000	6.399
E&P	90,808.500	33.894
ENERGY RELATED LAB EQUIPMENT	7,630.000	2.848
FILTERS, FUEL	31.000	0.012
FILTERS, OIL	175.000	0.065
IRON/STEEL	208,100.000	77.672
MARDI GRAS BEADS	800.000	0.299
MERCURY	1.000	0.000
OFFICE AND MIXED PAPER	89,475.000	33.396
PAINT	1,320.000	0.493
PLASTIC	5.000	0.002
RECYCLED ELECTRONICS	39,599.000	14.780
SPENT BULBS	329.960	0.123
TONER CARTRIDGES	2,343.000	0.875
UNIFORMS (DONATED)	182.000	0.068
USED OIL	3,661.000	1.366

The SPR Chemical Management Program is successful in restricting use of chemical products to those that are more environmentally friendly. One of the key tools to select chemical products is the SPR Qualified Products List.

In 2007, the Performance Improvement Team Greening SPR Janitorial Services Contracts discussed current janitorial contracts and how their environmental performance could be improved. Using the SPR Qualified Products List as one of its main tools, the team was successful in presenting its recommendations to the Joint Performance Management Council. These recommendations included:

- Team research determined quality "green" or biobased janitorial products are available and can be purchased and used by the SPR
- Upon renewal of each site's janitorial services contract, insert language indicating the SPR will provide all janitorial chemicals and supplies
- Use the SPR Qualified Products List to control all janitorial chemical and supply purchases.

The team mission parallels the P-Track commitments of the SPR and will help reach these goals. The final janitorial contract was renewed in May 2008 for Big Hill and completed the implementation of these recommendations.

3.5 POLLUTION PREVENTION (P2)

The purpose of the SPR P2 program is to integrate P2 activities into all SPR operations, support technology development programs aimed at minimizing multimedia waste generation, and coordinate P2 efforts with SPR sites. All SPR employees have P2 responsibilities under the program.

The P2 Advocates Team, composed of staff from across the SPR, disseminate awareness throughout the SPR. P2 announcements and suggestions are communicated via scheduled quarterly conference calls; the SPR electronic banner; and the SPR's quarterly newsletter, the "ESPRIT." P2 conference minutes, news articles, and program updates are published on the DM Environmental webpage, which is available to all SPR employees. In 2008, the SPR continued its aggressive integration of the P2 and EMS programs into its business operations, providing both cost savings and pollution reduction.

An SPR Performance Improvement Team was chartered in 2008 to "Align SPR Procurement Processes with the EO 13423." This team's focus is on defining and complying with the increased federal acquisition requirements as specified in the EO and DOE Order 450.1A, and any other applicable procurement guidance documents. By benchmarking other DOE facilities and conducting GAP analysis of current SPR processes/specifications against the new requirements, the team will define a solution(s) / recommendation(s) to align SPR procurements with these requirements where practicable and feasible. Consideration is being given to all SPR procurement procedures, standard specifications, environmental procedures, construction contractor interface agreements, and other DOE contractors.

In recognition of Earth Day, P2 information was distributed by email to all SPR employees throughout the week leading up to Earth Day. The SPR's 2008 Earth Day theme was "Caring for Planet Earth is not just for Tree Huggers." In this spirit, SPR employees were provided with informative web links containing information on numerous sustainable solutions with emphasis on wetlands restoration. Several handouts were

distributed to SPR employees including compact fluorescent bulbs (CFLs), and rain gauges made of recycled material. The photo shows BH employees potting seedlings to give to local schools for later planting.

Each year the SPR joins in America Recycles Day to raise awareness of and encourage recycling efforts by all employees. The national theme in 2008 was “It All Comes Back To You”. The SPR chose to emphasize the destructive environmental impact caused by non-recycled plastic shopping bags. To promote curbing the use of these bags, employees were provided a reusable shopping bag along with a reusable automobile litter bag.

SPR employees continued support of annual Beach Sweep activities for the ninth year.

Volunteers also included employees, relatives, and friends. All SPR sites, including New Orleans, are located in coastal regions throughout Louisiana and Texas. The SPR’s participation in this important event during 2008 means that SPR volunteers along with other participants worldwide, prevented tens of thousands of pounds of debris from washing into waterways and onto beaches based on the Ocean Conservancy’s measure.

During 2008, SPR employees increased participation in the Federal Transportation Subsidy Program which provides incentives to encourage federal employees to use mass transit or vanpooling as their preferred commuting choice. By partnering with another federal agency (Minerals Management Services) increased benefits such as reduced air emissions and fuel consumption are realized as well as increased safety and cost savings for the participants.

All SPR employees generate waste and are responsible for properly managing it. SPR requirements, corresponding training, and compliance with procedural and contractual requirements minimize its generation. To further achieve waste minimization/reduction, the SPR promotes the use of non-hazardous substitutes, prevention of spills, and proper management of those wastes generated. These and other P2 activities are incorporated in the design, construction, operation, and maintenance of all projects and activities.

SPR employees are trained on buying items with recycled content in accordance with the Comprehensive Procurement Guidelines (CPG), which is EPA's continuing effort to promote the use of materials recovered from solid waste. DM employees empowered to

make purchases are required annually to take a computer based training (CBT) course on Affirmative Procurement. This helps ensure that the materials collected in recycling programs will be reused again in the manufacture of new products.

In 2008, the SPR again achieved 100 percent success for purchasing Affirmative Procurement products, helping to fulfill the SPR target Pollution Prevention Goal to increase purchases of EPA-designated items with recycle content, as referenced in Section 2.

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 overarching ISM system.

3.7 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

An SPR EMS complies with provisions of executive order 13423 and DOE Order 450.1A. 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. By integrating the NEPA process into the EMS, the SPR enhances protection of the environment. Protection of the public and the environment is achieved throughout all phases of a project beginning with a formal NEPA review at the conceptual stage of a project and ending 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. The end point of the project, such as the construction, installation, and use of a piece of equipment, is also examined for environmental aspects so that impact is controlled from implementation forward. Section 5.1 discusses the SPR EMS in greater detail.

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 Beaumont Emergency Services Training facility. Onsite drills and exercises are also conducted 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 circumstances typical at each SPR site. New Orleans personnel, who are expected to provide site support during an incident response, have also been trained to the hazardous materials technician level. All site personnel, unescorted subcontractors, and some site visitors receive compliance awareness training via "The Active Force of

Protection" video which provides an overview of the environmental program including individual responsibilities under the program. Spill Prevention and Waste Management/Hazardous Waste Handling training is mandatory and conducted annually for those personnel who could discover, prevent, or respond to spills, and handle or supervise the handling of wastes.

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 relates environmental aspects and impacts of SPR activities and environmental objectives to be achieved that year. A select group of personnel receive biennial CBT-based AP training.

As a goal, all 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.

Several M&O environmental staff members have completed ISO 14001 Lead Auditor certification training in order to better assist the SPR sites with regard to performing SPR site assessments, and due-diligence inspections of disposal and recycling facilities.

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 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, an ES&H 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. The website is typically updated monthly, or more frequently when appropriate.

In addition, a brief description of the DM ES&H program is available to the public at www.DynMcDermott.com. This report and other DOE ES&H information is available to the public at www.spr.doe.gov/esh/.

End of Section

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 2007 sealed sources were used at the SPR to perform 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 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.

End of Section

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

5.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

Two EMSs are employed at the SPR for environmental management, one at the DOE project management office (PMO) level and one at the M&O contractor level. DOE self-certified their EMS to the ISO 14001:2004 Standard in 2005. The M&O contractor's (DM) EMS was initially certified to the ISO 14001:1996 standard by an RAB (now ANAB) accredited registrar in 2000 and re-certified in 2003. Recertification to the updated ISO 14001:2004 standard occurred in 2006 and was maintained throughout 2007. Both EMSs include the organizational structure, activity planning, designation of responsibilities, practices, procedures, processes, and resources to support and validate the DM and DOE Environmental Policies, ASP5400.2 and SPRPMO P 451.1B, respectively (Appendix B).

Conformance of the EMS to the ISO 14001 standard is illustrated through the DOE order "SPRPMO Environmental Management System," (SPRPMO O 450.1A) and the DM procedure "ISO 14001 Environmental Management System Manual," (ASI5400.55). These documents provide descriptions and references to SPR policies, plans, procedures, environmental aspects and impacts, and objectives and targets that are the foundation of the EMSs. The 17 ISO elements are identified in these documents with discussions on how DM and DOE implement them. Some DOE EMS requirements flow down to the M&O contractor and include portions of the M&O contractor's EMS. Environmental management programs conducted in 2007 to achieve environmental objectives are described in appendix C, Environmental Management System Program Achievement for 2007.

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, select SPR site personnel have received training on wildlife rescue and rehabilitation techniques including oiled wildlife response. This training allows personnel to work under the supervision of a licensed rehabilitator or manage contract rehabilitators. Trained personnel have special knowledge and skills in the wildlife rescue and rehabilitation techniques necessary in support of the emergency incident command

structure organization. An oil spill at the SPR sites could affect large numbers of protected migratory birds and wildlife requiring many trained and certified responders.

5.3 AIR QUALITY MONITORING

Air pollutants of concern 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, ethyl benzene, and xylene. However these are emitted in relatively small quantities that do not trigger HAP reporting. 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.

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

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).

Monitoring for air pollutants is conducted at both Texas (Big Hill and Bryan Mound) and Louisiana sites (Bayou Choctaw and West Hackberry). The results are reported to the Texas state agency through Environmental Inventory Questionnaires (EIQs). The Louisiana 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 have a mechanical shoe seal that requires seal inspections every year.

5.3.1 Bayou Choctaw

Located in a moderate non-attainment area for ozone, 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 submit an emissions inventory summary (EIS) to report its annual emissions.

Although Bayou Choctaw is exempt from reporting emissions, monitoring was conducted in 2008 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, fugitive emissions from monitoring piping components for acceptability, and monitoring the run-time of the emergency generators. Bayou Choctaw operated in accordance with all air quality regulatory requirements in 2008. Table 5-1 is a summary of the permitted limits and actual emissions for Bayou Choctaw.

Table 5-1. Parameters for the Bayou Choctaw Emission Points

Emission Point Description	Parameter	Permit Limits Metric tpy (tpy)	Actual Emissions Metric tpy (tpy)
Crude & Slop Oil Tanks	VOC	2.43(2.67)	0.54 (0.59)
Gasoline Fuel Tank	VOC	0.52 (0.57)	0.16 (0.18)
Frac Tanks	VOC	1.42 (1.56)	0 (0)
Brine Pond	VOC	1.14 (1.26)	0.12 (0.13)
Fugitive Emissions	VOC	1.66 (1.83)	0.03 (0.03)
Air Eliminator	VOC	0.04 (0.04)	0 (0)
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)	0.06 (0.07) 0.07 (0.08) 0 (0) 2.11 (2.33) 0.51 (0.56)

5.3.2 Big Hill

Located in a moderate non-attainment area for ozone, Big Hill is permitted to emit 7.44 metric tpy (8.20 tpy) of VOC. Since the site is located in an ozone non-attainment area, it is required to use an EIQ to report its annual emissions. Monitoring was conducted in 2008 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; and monitoring the run-time of the emergency generators. Big Hill operated in accordance with all air quality regulatory requirements in 2008. Table 5-2 is a summary of the permitted limits and actual emissions for Big Hill.

Table 5-2. Parameters for the Big Hill Emission Points

Emission Point Description	Parameter	Permit Limits, Metric tpy (tpy)	Actual Emissions Metric tpy (tpy)
Crude & Slop Oil Tanks	VOC	1.45 (1.60)	0.23 (0.25)
Gasoline & Diesel Fuel Tanks	VOC	0.35 (0.39)	0.31 (0.34)
Brine Pond	VOC	2.86 (3.15)	0.26 (0.29)
Fugitive Emissions	VOC	2.59 (2.86)	0.07 (0.08)
Air Eliminator	VOC	0.07 (0.08)	0 (0)
Solvent Recycler	VOC Acetone	0.01 (0.01) 0.01 (0.01)	0 (0) 0 (0)
Emergency Generators/Pumps	VOC PM_{10} SO_2 NO_x CO	0.10 (0.11) 0.09 (0.10) 0.64 (0.70) 2.30 (2.54) 0.53 (0.58)	0.02 (0.02) 0.02 (0.02) 0.10 (0.11) 0.42 (0.46) 0.10 (0.11)

5.3.3 Bryan Mound

Located in a severe non-attainment area for ozone, Bryan Mound 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. Monitoring was conducted in 2007 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; and monitoring the run-time of the emergency generators. Bryan Mound operated in accordance with all air quality regulatory requirements in 2007. Table 5-3 is a summary of the permitted limits and actual emissions for Bryan Mound.

Table 5-3. Parameters for the Bryan Mound Emission Points

Emission Point Description	Parameter	Permit Limits, Metric tpy (tpy)	Actual Emissions Metric tpy (tpy)
Crude Oil Tanks	VOC	9.35 (10.31)	5.42 (5.97)
Gasoline & Diesel Fuel Tanks	VOC	0.38 (0.42)	0.34 (0.37)
Brine Tank	VOC	4.92 (5.42)	2.27 (2.50)
Fugitive Emissions	VOC	0.89 (0.98)	0.08 (0.09)
Paints & Solvents	VOC	0.62 (0.68)	0.24 (0.27)
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)	0.03 (0.03) 0.03 (0.03) 0.02 (0.02) 0.26 (0.29) 0.06 (0.07)
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)	0.29 (0.32) 4.63 (5.10) 6.18 (6.81) 0.05 (0.06) 0.42 (0.46)

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 90.8 metric tpy (100 tpy), it is not required to submit an EIS to report its annual emissions. Although West Hackberry is exempt from reporting emissions, monitoring was conducted in 2008 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 fugitive emission acceptability, and monitoring the run-time of the emergency generators. West Hackberry operated in accordance with all air quality regulatory requirements in 2008. Table 5-4 is a summary of the permitted limits and actual emissions for West Hackberry.

Table 5-4. Parameters for the West Hackberry Emission Points

Emission Point Description	Parameter	Permit Limits, Metric tpy (tpy)	Actual Emissions Metric tpy (tpy)
Slop Oil Tanks	VOC	1.81 (1.99)	0.63 (0.69)
Gasoline Fuel Tank	VOC	0.25 (0.28)	0.37 (0.41)
Frac Tanks	VOC	23.86 (26.30)	0.03 (0.03)
Brine Tank	VOC	0.95 (1.05)	2.18 (2.40)
Fugitive Emissions	VOC	9.71 (10.70)	0.10 (0.11)
Air Eliminator	VOC	0.06 (0.07)	0 (0)
Emergency Generators/Pumps	VOC	0.41 (0.45)	0.12 (0.13)
	PM_{10}	0.20 (0.22)	0.13 (0.14)
	SO_2	0.02 (0.02)	0.01 (.01)
	NO_x	12.59 (13.88)	4.43 (4.88)
	CO	2.75 (3.03)	1.02 (1.12)

5.4 WATER DISCHARGE EFFLUENT MONITORING

The water discharge permit-monitoring program fulfills the requirements of the EPA NPDES, and corresponding states RCT Rule 8 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 2007. 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 1.85 million m^3 (11.579 mmb) of brine (mostly saturated sodium chloride solution with some infrequent discharges of lower salinities than normally attributed to brine) during 2008. Approximately 48.6 percent of the brine was disposed in the Gulf of Mexico via the Bryan Mound (42.68 percent of the total) and the Big Hill (5.92 percent of the total) brine disposal pipelines. The remainder (51.4 percent) was disposed in saline aquifers via injection wells at the West Hackberry (50.74 percent of the total) and Bayou Choctaw (0.66 percent of the total) sites. These figures represent an overall project-wide increase in brine disposal of 5.3 percent versus the 2007 calendar year.

During 2008, 1,127 measurements and analyses were performed and reported 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 99.91 percent of the analyses performed in 2008. Only a single permit non-compliance required reporting in 2008. This single noncompliance was of short duration causing no observable adverse environmental impact. Detailed information for this non-compliance is provided in section 5.4.2 of this report.

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 2008 are discussed in separate sections by site.

5.4.1 Bayou Choctaw

Bayou Choctaw personnel performed and reported a total of 43 measurements on permitted outfalls and reporting stations to monitor LPDES permit compliance during 2008. Table 5-5 provides the permit required monitoring parameters and limits for the Bayou Choctaw outfalls, reflecting the changes associated with the permit renewal effective early in January. There were no permit non-compliances at Bayou Choctaw in 2008 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), a permit limited vehicle rinsing station with the site's stormwater runoff from well pads, pump pads (containment areas), addressed as a cross-reference to the LA MSGP and in the permit required SWPPP.

Table 5-5. 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, GPD) <45 mg/l Avg. <45 mg/l max 6.0 – 9.0 s.u. <400 col./100 ml
Storm Water (from former named/numbered outfalls)	Systematic Visual Observation	1/quarter (if discharging)	maintain written observations
Vehicle Rinsing (without soaps and/or detergents)	Flow TOC Oil and grease pH	1/quarter 1/quarter 1/quarter 1/quarter	Estimate in GPD <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 2008, 563 measurements were performed reported to monitor NPDES and state discharge permit compliance. Table 5-6 provides the permit required monitoring parameters and limits for the Big Hill outfalls. There was one noncompliance during 2008 resulting in a 99.82 percent site compliance performance level (Table 5-7).

Water discharges at Big Hill are regulated and enforced through the EPA NPDES permit program and the similar RCT discharge permit program (Rule 8). 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 2008 from the hydroclone blow down system.

Table 5-6. Parameters for the Big Hill Outfalls

Location/Discharge	Parameter	Frequency*	Compliance Range
Brine to Gulf	Flow	Continuously	0.27 million m3/day
	Velocity	Per flow	>9.1 m/sec (30 ft/sec)
	Oil & Grease	1/mo	<15 mg/l max, <10 mg/l avg.
	TDS	1/mo	(report only)
	TSS	1/mo	(report only)
	pH	1/mo	6.0 - 9.0 s.u.
	DO	Daily	detectable (when using O_2 scavenger)
	Biomonitoring	1/qtr	Lethal NOEC 2.5%
	Integrity Tests	1/yr	Offshore within 4% of onshore
Storm Water Outfalls	Oil and Grease	1/qtr	<15 mg/l
	TOC	1/qtr	< 75 mg/l
	pH	1/qtr	6.0 - 9.0 s.u.
	Salinity	1/qtr	<8 ppt
Recirculated Raw Water	Flow	1/mo	Report only
Sewage Treatment Plant	Flow	5 days/wk	(report only)
	BOD_5	1/mo	<45 mg/l max <20 mg/l avg.
	TSS	1/mo	<45 mg/l max <20 mg/l avg.
	pH	1/mo	6.0 - 9.0 s.u.
Hydroclone Blow down (not used)	Flow	1/wk	report
	TSS	1/wk	report
	pH	1/wk	6.0 - 9.0 s.u.

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

Table 5-7. 2008 Permit Noncompliance at Big Hill

Date	Outfall Location	Permit Parameter	Value (Limit)	Cause
3/11/2008	003; retained stormwater from Well pad 108	Oil & Grease	18.3 mg/l (15.0 mg/l)	Contract Laboratory data point indicated a lab verifiable 18.3 mg/l for an oil & grease test reported to BH on 3/28. Site lab tests for all other stormwater parameters, including visual “no sheen” were all found within limits. No construction or other activity occurred on the pad prior to the sampling. Tests before 3/11 and after review of the test receipt (3/31) produced below detectable limits for O&G. No verifiable cause was found with the investigations.

5.4.3 Bryan Mound

Bryan Mound personnel made and reported 415 measurements on permitted outfalls for the purpose of monitoring NPDES and state discharge permit compliance during 2008. Table 5-8 provides the permit-required parameters and limits for the Bryan Mound outfalls. There were no noncompliances during 2008 resulting in 100 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 (Rule 8).

Table 5-8. Parameters for the Bryan Mound Outfalls

Location/Discharge	Parameter	Frequency*	Compliance Range
Brine to Gulf	Flow	Continuously	report only
	Velocity	Per flow	>9.1 m/sec (30 ft/sec)
	Oil & Grease	1/mo	<15 mg/l max <10 mg/l avg.
	TDS	1/mo	(report only)
	TSS	1/mo	(report only)
	pH	1/mo	6.0 - 9.0 s.u.
	Biomonitoring	1/qtr	Lethal NOEC 2.5%
	Integrity test	1/yr	Offshore within 4% of onshore
Storm Water	Oil and Grease	1/qtr	<15 mg/l
	TOC	1/qtr	<75 mg/l
	pH	1/qtr	6.0 - 9.0 s.u.
	Salinity	1/qtr	< 8 ppt
Recirculated Raw Water	Flow	1/mo	Report only
Sewage Treatment Plant	Flow	1/mo	Report only
	BOD_5	1/mo	<20 mg/l avg. <45 mg/l max
	TSS	1/mo	<20 mg/l avg. <45 mg/l max
	pH	1/mo	6.0 - 9.0 s.u.

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

5.4.4 West Hackberry

West Hackberry personnel performed and reported 106 measurements on permitted outfalls to monitor LPDES permit compliance during 2008. Table 5-9 provides the permit-required parameters and limits for the West Hackberry outfalls. There were no permit non-compliances during 2008 resulting in a 100 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 removed from service in 1999 the site has had no permit controlled testing or reporting requirements for the former offshore brine line. The current permit covers treated sanitary sewage, car rinsing, and an intermittent mixed discharge of raw water, storm water and once-through non-contact bearing cooling water with separate effluent limitations and incorporates coverage for all of the former named stormwater outfalls under the state's MSGP. Certain named non-storm water discharges are addressed via the required site SWPPP. That permit coverage remained in full-force during 2008 as detailed in Table 5-9.

Table 5-9. Parameters for the West Hackberry Outfalls

Location/Discharge	Parameter	Frequency*	Compliance Range
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)	Visual Observations made in accordance with Sector P (SIC Code 5171) of the current MSGP	1/quarter	perform and record standardized observations and maintain onsite in accordance with the SWPPP and/or site instruction
External Vehicle Rinsing/Washing	Flow (Daily Max) COD TSS O&G + visual pH	1/quarter 1/quarter 1/quarter 1/quarter 1/quarter	Report est. (gpd) ≤300 mg/l ≤45 mg/l ≤15 mg/ (vis. Y/N) 6.0 to 9.0 s.u.
Treated Sanitary Wastewater	Flow BOD_5 TSS pH fecal coliform	1/quarter 1/quarter 1/quarter 1/quarter 1/quarter	Report meas. (gpd) ≤ 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

5.5 SURFACE WATER QUALITY SURVEILLANCE MONITORING

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 in 2008. 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 Appendix D, Tables D-1 through D-4. Observed values that were below detectable limit (BDL) were assigned a value of 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 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 with very stable data, or if a preponderance of the measurements fell below the method limit of detectability.

5.5.1 Bayou Choctaw

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

Hydrogen Ion Activity - The annual median values of pH for all the monitored stations ranged from 7.2 to 7.4 s.u., consistent with the ambient conditions of surrounding waters. The complete range for all measurements at all stations for 2008 is 6.9 to 9.1 s.u. Fluctuations observed are attributed to environmental and seasonal factors such as variations in rainfall, temperature, and aquatic system flushing.

Temperature - Observed temperature ranged from 12.2 °C to 28.9 °C. Temperature fluctuations were consistent among all stations and are attributed solely to meteorological conditions since the Bayou Choctaw site produces no thermal discharges.

Salinity - Average annual salinities in 2008 ranged from 0.5 ppt (indicating below detectable limits) to 1.3 ppt (Station F). Wetland stations A, C, E, and G revealed below detectable limits throughout the year in their respective databases. It is believed that most of these values are a response to the return of near normal rainfall.

Oil and Grease - All samples at the seven stations were below the detectable limit (5.0 mg/l) calculated at 2.5 mg/l for statistical calculations. These data favorably reflect continued good site housekeeping and effective site spill prevention, control, and response efforts.

Dissolved Oxygen - Overall, DO average and median levels are low (below the minimum threshold <5 mg/l). These low numbers are attributed to high temperature and high natural organic loading combined with low flow and minimal flushing typically observed at times in the two wetland area stations. Peak levels over 6.0 mg/l at stations A and G are attributed to increases primary productivity.

Total Organic Carbon - Average annual TOC concentrations ranged from 7.0 to 11.1 mg/l. High TOC readings typically 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. The highest value measured was 30.0 mg/l occurring at Station A and a 29.0 mg/l at Station G suggest low flows to stagnant water at the stations for those months. 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.

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

- The surrounding surface waters continue to have a relatively neutral to slightly basic pH, with infrequent more basic excursions attributable to a localized flushing (runoff) action with the episodic rainfall.
- Observed salinity measurements remained generally low and within the historical range.
- Temperature variations were caused by seasonal changes. There are no thermal processes used at any SPR site.

- Low minimum and annual average DO levels are attributed to high temperatures and organic loading resulting from low flow and minimal flushing typically observed in backwater swamp areas.
- No stations measured any oil and grease levels above the method detection limit confirming 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 D-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. It must be noted that Station A has only minimal sampling coverage again this year. Because this sample point is located at an overflow point to a former onsite stock pond that first receives the site's treated effluent, it has become rare that a monthly flowing surface water sample can be taken due to low rainfall and the infrequent batching from the sewage treatment plant. Parameters including pH, temperature, salinity, oil and grease, dissolved oxygen, and total organic carbon were monitored (Table D-2).

Hydrogen Ion Activity - The 2008 data show the pH of site and surrounding surface waters remained between 6.6 and 8.4 s.u. The annual median values of pH for each of the monitored stations ranged from 7.6 to 7.8 s.u. and indicate that in general the area waters sampled became slightly more basic versus last year's readings.

Temperature - Temperatures observed in 2008 ranged from 11 °C to 31 °C exhibiting the characteristics expected from seasonal meteorological changes. All stations reported very similar ranges and temporal fluctuations throughout the year.

Salinity – Long-term average annual salinities are generally quite low for the Big Hill stations and setting typically ranging from fresh on the site all year long to a maximum, usually in the upper teens, associated with the tidally influenced RWIS location on the ICW (Station C) nearest the Gulf. Because of its location, Station C also routinely has a higher mean and a higher median salinity as compared to the other stations. This year four of the five stations reported highly variable salinity data as revealed in the exceptionally high CV values exceeding 100 percent. This can indicate a normally stable dataset with a single outlying value or a dataset that is highly variable with each measurement. At Big Hill, the only station with an acceptably low CV (below 100 percent) was station C at the ICW. This sampling point which is normally fairly high in salt content because it is close to the Gulf and tidally influenced, was apparently not as greatly affected overall with the saltwater storm surge "spike" from hurricane Ike in September. The remaining more freshwater stations were greatly affected by the single salt spike from this storm and then also the subsequent higher measurements following until normal rainfall flushed the area (and sampling points out). Hurricane Ike sent a surge of saltwater from the Gulf onto land more than 10 miles inland inundating the main site three to four feet. This action although ephemeral did leave its mark on the area surface water bodies, especially with salt impacts. All of the SPR stations show remarkable recoveries, indicative of natural flushing.

Oil and Grease - No oil & grease value was found above the historic detectable limit of 5 mg/l this year. No indication of oil impacts from SPR activities was found or observed during the sampling episodes. Station A had only a single O&G sample again this year.

Dissolved Oxygen - 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 February and the lowest values were determined in the summer with low values in December at all stations. The lowest variability was found at the outfall of the onsite pond (Station A) with the CV being 27.1 where the infrequent flows may have imparted a more constant dissolved oxygen level that the infrequent testing embellished. The station with the most DO variability during the year was sampling station B with a CV of 53.3. The overall range in DO was found to be 0.7 mg/l to 9.3 mg/l with a mean range of 3.9 mg/l to 8.0 mg/l from all sites tested during the year. Two stations (both B and C) produced samples with DO levels below 1 mg/l. Levels below 1.0 mg/l cannot support much aerobic life.

Total Organic Carbon - Average annual TOC concentrations varied from 8.4 to 23.6 mg/l over the year at the five monitoring stations. Total TOC samples ranged from 5.6 to 40.6 mg/l. Stations B, D, and E had significantly higher levels of TOC than other stations. The consistently higher TOC levels observed are believed to be a result of reduced flushing (drought) and higher organic loading throughout the year

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

- The fresh surface waters had a nearly neutral pH, but were found to range wider and also slightly higher than in 2007.
- The observed salinity measurements were lower 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. The storm surge from Hurricane Ike greatly affected the salinity measurements at Big Hill site and environs this year.
- Surrounding surface waters were neither contaminated nor affected by SPR crude oil.
- Temperature variations followed seasonal meteorological changes.
- In general, low dissolved oxygen and high total organic carbon fluctuations were within typical ranges indicative of seasonal meteorological and biological influences for such a setting and range of environments. DO levels did not drop below 0.7 mg/l thus being able to sustain life and TOC levels did not exceed stormwater discharge standards.

5.5.3 Bryan Mound

Surface waters surrounding the Bryan Mound site were monitored during 2008. Blue Lake has seven sampling stations and Mud Lake has three established stations. Surface water monitoring stations are identified in Figure D-3. Stations A through C and E through G are located along the Blue Lake shoreline to monitor effects of site runoff. Stations H and I are located along the Mud Lake shoreline to monitor effects of site runoff. Stations D and J, located further from the site, serve as controls. The results from these controls will not be included in the analysis, but will serve as references.

Parameters monitored in the Bryan Mound surface waters include pH, temperature, salinity, oil and grease, dissolved oxygen, and total organic carbon (Table D-3). Mud Lake water levels were high enough this year to accomplish up to 10 monthly sampling events again this year as last compared to only three during 2006.

Hydrogen Ion Activity - In 2008 the pH range for Blue Lake and Mud Lake stations was from 6.5 to 8.6 s.u. for the datasets. The control point for Blue Lake produced a similar range of 7.3 s.u. to 8.4 s.u. The range for the Mud Lake control was 6.8 to 7.8 s.u. The results reveal a slightly basic condition for Blue Lake, and slightly more acidic for Mud Lake, while also proving an analogous condition for the controls. 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 this year are comparable to the normal range of variability historically seen at the Bryan Mound site even with the storm surge from Ike in September.

Temperature - Temperatures observed in 2008 ranged from 9.3 °C to 30.4 °C and reflect nearly a complete set of monthly ambient surface water testing. The deduction can be made, however, that the range of fluctuations are attributed to meteorological events.

Salinity - Observed salinity fluctuations ranged from 1.7 ppt to only 2.9 ppt in Blue Lake and from 6.9 ppt to 29.6 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, its more direct link with the nearby Gulf of Mexico through the Intracoastal Waterway and of course some initial surge from Hurricane Ike. This year's dataset does reflect the return to more normal rainfall patterns very similar to last year.

Oil and Grease – With the exception of single spurious value of 16.0 mg/l and 11.6 mg/l at stations C and G respectively, all of the remaining O&G measurements made during 2008 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.

Dissolved Oxygen- During 2008, DO was measured 10 to 11 times from all stations in Blue Lake and Mud Lake during the year. This year both lakes revealed differences in oxygen content that reflect positively with variation in salinities. Mud Lake has direct tidal influence with estuarine/Gulf waters slightly lower in DO concentrations. Blue Lake reflects a fresher regime, thus a higher oxygen carrying capacity. Fluctuations in DO levels are consistent with both control points. All measurements indicate “no apparent impact” from SPR operations. Blue Lake, means and medians that range from 11.5 mg/l to 12.3 mg/l and 10.8 mg/l to 12.3 mg/l verify that overall DO levels were more than adequate for any aquatic life throughout the year. Mud Lake’s lowest DO measurement

of 6.1 mg/l, exceeded Blue Lake's low of 4.9 mg/l this year, however, means for all stations were above 11 mg/l and medians ranging from (10.9 to 11.4 mg/l) support the likelihood that lower DO levels are infrequent and that Mud Lake was stable during the somewhat more limited sampling episodes.

Total Organic Carbon - In 2008, all of the 72 measurements of Blue Lake ranged from 25.5 to 49.7 mg/l. The ten TOC observations made at each of the two Mud Lake stations were lower ranging from 14.4 mg/l to 33.5 mg/l. Both control points have results that are similar to the two lakes. 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.

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

- 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 slightly more basic again this year.
- Temperature and salinity fluctuations observed during the period tested are attributed to meteorological and tidal conditions rather than site operations.
- Higher TOC levels observed in Blue Lake are attributed to higher primary productivity and low flushing of this surface water body.
- 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 and overall were found to be higher in both lakes in 2008 versus 2007.

5.5.4 West Hackberry

In 2008, six surface water quality stations (Figure D-4) were monitored monthly at West Hackberry. Parameters monitored (Table D-4) include pH, temperature, salinity, dissolved oxygen, oil and grease, and total organic carbon.

Hydrogen Ion Activity - The pH of surface waters ranged between 6.6 and 8.7 s.u., and annual median values ranged from 7.4 to 8.0 s.u. from all stations. The ambient waters measured were slightly more basic overall than last year's data. Station E, located in a stormwater ditch below the site's HPP, that eventually exits the main site to Black Lake produced the highest median value this year with an 8.0s.u. Station D, also located in a main site stormwater ditch, produced the highest single value of 8.7 s.u. for all stations. Although the travel paths and long but intermittent travel times over crushed limestone placed for erosion control and trafficability would tend to raise pH levels, the rainfall events of 2008 reduced that tendency. 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.

Temperature - Observed temperatures in 2008 were consistent with observations at other sites and were indicative of regional climatic effects. No off-normal measurements were

observed. Recorded temperatures ranged from 11.0 °C to 32.0 °C and were found very consistent among stations.

Salinity - 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 (4.3 to 16.6 ppt in Black Lake) and (<1 to 14.5 ppt in the ICW) are more conducive to supporting euryhaline organisms with variable salinity tolerance and those with sufficient mobility to avoid salinity stresses that occur with seasonal changes. Station F on the ICW reflected a wider range due to the influences of the tides and proximity to diluted but saltier Gulf waters. However, mean annual salinity observed at the ICW (5.2 ppt) was lower than that of Black Lake (10.1 to 10.2 ppt) due largely to the fresher water influences received from more northerly drainage ways and brackish water with limited movement to or from Black Lake. Hurricane Ike may have pushed some more salty water up the Calcasieu Ship Channel and into Black Lake with its temporary surge in September. However, the main site Stations D and E had the lowest salinities, with 23 out of 24 samples being 1.0 ppt or BDL. Salinities observed at these two upland site stations were affected by rainfall induced surface runoff and not by Black Lake. The salinity mean in the drainage ditch at the southeast corner of the site (Station D) was 0.5 ppt, while the mean at the high pressure pump pad (Station E) was BDL all year.

Oil and Grease – With the exception of a single measured 10 ppt from onsite Station E, observed O&G levels were below the detectable level (5 mg/l) for all six monitoring stations during 2008. These data are reflective of effective spill prevention and good housekeeping practices being maintained by site personnel.

Dissolved Oxygen - Minimum DO levels were at levels that support aquatic life, ranging from 4.4 to 16.1 mg/l. Dissolved oxygen was most variable at onsite Station E as opposed to the open and flowing receiving water stations. Since all other parameters have similar patterns with the other stations, Station E's variability and wider ranging DO values can be attributed to natural factors, such as aeration and biological oxygen demand. Station E, this year, produced both the highest single measurement and the highest median value. Greater surface area and water movement through currents and wave action always provide continuous aeration of the lake and ICW water. Mean DO values ranged from 6.9 to 9.0 mg/l across the six sampling stations.

Total Organic Carbon - TOC concentrations for 2008 ranged from 2.8 to 22.8 mg/l with Station E experiencing both the lowest and highest single values of all the stations again this year. This range is not out of line with the nature of the water bodies 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 10.2 mg/l with the HPP station (E) experiencing the most variability and largest range throughout the year. Because the variation is so consistent among the remaining stations, and especially so for the Black Lake stations, it is indicated that these measurements reflect a return of consistent rainfall to Black Lake and also the surrounding environs.

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

- pH and temperature remained fairly stable, and in general, the waters remained slightly basic but shifted a little more acidic overall at all stations this year, reflective of the return to more abundant rainfall and the typical seasonal influences.
- Detectable salinity levels were found mainly in Black Lake and the ICW. The salinity measurements made throughout 2008 were consistent with the ambient and slightly brackish receiving water environment, reflective of the return of abundant rainfall to the area.
- Other than a single 10 mg/l value at station E, oil and grease levels were below the detectable limit at all six stations throughout 2008, which is indicative of good housekeeping.
- All dissolved oxygen levels at site and Black Lake stations were consistently high and did not appear adversely affected by site operations. The ICW station (F) has the lowest annual mean and median values this year, possibly reflective of sporadic but increased biological oxygen demands after rainfall/run-off events.
- Total organic carbon concentrations were quite similar at all stations with the exception of station E throughout the year suggesting no substantial transient bio-contamination or ecological events. The increased variability at the site drainage station (E) results from the wider range of the values found (E had the lowest value and highest value) at the locations during the year but nothing indicative of any impact or impairment.

End of Section

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

Ground water monitoring is performed at the Bayou Choctaw, Big Hill, Bryan Mound, and West Hackberry sites to comply with DOE Order 450.1A, and also in the case of 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 governed by an agreement between DOE and the LDNR to report annual ground water monitoring data through this document. At the Weeks Island, Louisiana site, long-term ground water monitoring has been accepted as complete as part of the state approved decommissioning plan. Bryan Mound ground water quality is conveyed annually to the RCT via copy of this report. Wells surrounding the operating brine storage and disposal pond system at Big Hill monitor groundwater as part of permit required leak detection. The St. James terminal has undergone and completed a remediation to satisfy state criteria for some limited crude oil leakage. Because follow-on studies indicated the presence of only trace quantities, there is no permanent site-wide ground water monitoring at the leased St. James facility.

Available ground water salinity data collected for the past five years are presented graphically (Appendix E), 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, providing easier comparisons among the monitoring stations.

Three of the storage sites have a long history of industrialized development primarily involving the mining of salt and associated minerals that were used for various purposes and as feedstock. A 10 ppt cut-off for salinity is used in this report in making comparisons for assessing affected and unaffected waters. This is not a regulatory limit but rather a value, given the setting, which represents usable versus unusable water. At Bryan Mound, however, because of its particular site specific and historic mining conditions, a 20 ppt cut-off is employed for evaluating the generalized ambient shallow ground water conditions there.

6.1 BAYOU CHOCTAW

The Plaquemine Aquifer, the main source of fresh water for the site and several surrounding municipalities, 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 sediment in the aquifer consists predominantly of Atchafalaya clay. The interface of freshwater and saline water occurs at a depth of 122 to 150 m (400-500 ft) below the surface on the dome. Ground water levels in the Plaquemine Aquifer respond locally with the Mississippi River, flowing away from it during the high river stage and towards the river when in the low stage. Other, more predominant, local influences to the general site-wide flow patterns are manifested by structural features; such as the piercing salt dome 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 E-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. Seven additional similarly screened wells were installed at various locations around the main site, and one off site near a selected brine disposal well pad. BC PW3 was plugged and abandoned in the original VWS study.

These periphery wells (PWs) 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 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 of the ground water movement within the shallow 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 (Figure E-2).

Ground water salinity observed at all of the four pond wells (BC MW1 through BC MW4, Figure E-3) has historically been above an ambient cut-off concentration of 10 ppt, somewhat high for a fresh water environment. This condition of elevated salinity is attributed to a previous owner’s salt water brine operational activities and possibly some more recent brine handling activities. Three of these wells (BC MW1, BC MW2, and BC MW3) exhibit 5 year traces this year that are either below or near the 10 ppt cut-off and the fourth well BC MW4 has revealed a sub-10 ppt level since the last half of 2006. 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 former steep decline observed at well BC MW3, indicative of the passage of a small plume has flattened and now appears to be slowly responding to the muted effects of a historic upgradient release event. BC MW1, now showing a reversal to a slight decreasing five-year trace, has all of its measured values well below 10 ppt.

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 trending now reflects a strong downward trace reflective of the passage of a small saltwater slug. Much of the variability exhibited with the earlier data may have resulted from over purging and inconsistently applied sampling techniques. However, the advent of dedicated low-flow sampling apparatus and techniques has aided the ground water testing by assuring more representative sampling. 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 and to the north. A 1991 brine spill on the nearby low pressure pump pad north of the well BC MW3 appears to have passed beyond both this well and the further down gradient 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. This year's keynote observation is that of trend reversals with the five-year traces. Several of the wells located on the main site are showing trend reversals compared to last year's windows presumptively in response to changing rainfall. With such slow ground water movement being applied to a series of salinity values all below 10 ppt, slight fluctuations can cause the five-year trends to change direction (flip-flop) with a single year's data addition.

This year, well BC MW1, up gradient of the brine pond, has developed a slightly decreasing five-year salinity trend below 10 ppt, being driven by the "uptick" that occurred in the 2006 timeframe. Last year this same well exhibited a slightly increasing trend despite the "jump" but in general it is noted that the salinity values continue to fluctuate around 4 ppt or less throughout the well's current five year window. Well BC MW2, the intercept well immediately down gradient of the brine pond reveals a five year trace this year of slightly increasing salinity but with only one value reaching 3 ppt. These changes in trending at such low concentration are inevitable and especially exacerbated when numerous below detectable limit samples are contained within the dataset.

With full implementation of the low-flow sampling methodology and the early more variable data no longer affecting the five-year trending, more realistic and reliable groundwater interpretations and trending of the data are evident. Well BC MW1 situated hydraulically on the up gradient side of the brine pond and well BC MW2 located immediately down gradient hydraulically of this potential source (see Figure E-2) reveal fluctuating salinity levels sometimes in opposition for their positions, possibly due to this effect. 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 has encountered this area of existing affected ground water and this year's five-year trace continues to indicate a steady freshening or decreasing trend from 60 ppt to 45 ppt in this area that 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 now exhibiting an essentially stable trend. The slightly increasing five-year trend varying around the 10 ppt cut-off which was nudging below that level to ambient in 2005, is now revealing a continuing mild downswing that began after a peak in mid-2007. This reversal which was indicative of the passage of an ephemeral impact of a former piping leak found and repaired near the low pressure pump pad in 1991, is now more suggestive of a second response that may involve some trailing effects of that historical event and changes in rainfall conditions from drought to more abundant and frequent rainfall.

With the exception of BC PW5 and BC PW7 all of the PW well series wells indicate decreasing five-year salinity trends this year. In both locations (and plots) the current five-year trace is influenced by the omission of the historical higher values commencing

with the earlier annual samplings and also by the quarterly sampling regime now in-place. At the well location BC PW5 especially, this year's five-year window continued with a slight upward trending trace potentially due to the absence of some earlier historic peaks in the dataset; the 2007 data however revealing a freshening trend for that year and 2008 basically showing a flat trace within minor fluctuations.. The salinity levels currently fluctuate at or below the 10 ppt cut-off and we shall closely watch this well for changes.

All of these monitored locations appear to fluctuate regularly over the entire period of record, but generally with decreasing trend lines and especially with decreasing variability for each well despite the occasional trend reversals noted in the shorter-term five-year windows presented. 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 potential 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 over the dome is limited from near the surface to a depth of -30 m (-98 ft) mean sea level. The town of Winnie, situated off the dome and to the west, 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 E-4) began in 1987. Big Hill personnel began sampling these wells by the low-flow method in May 1995. Ground water contours from these and all of the Big Hill site monitor wells developed on winter quarter data are shown on Figure E-5.

The interconnected brine pond system is composed of three contiguous PVC-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. Commencing in August 2006, a renovation project to replace the liner material in the second and third ponds in the series, was implemented. The project was completed there and the three-pond system was re-commissioned in August 2007.

Salinity data collected from the six permit required wells surrounding the ponds have for the past five years indicated complete consistency and absence of effects below detection limits until 2001 for well BH MW2, which is on the up-gradient side of the ponds (Figure E-6). All observed values that are below the established detection limit are evaluated as one-half the detection limit for statistical calculations. No ground water effects associated with the pond operation are evident since monitoring was begun in 1987. The salinity increase in BH MW2, up-gradient (northwest of) the ponds, is attributed to a previous release from buried piping. During 2007, the basic trace of the monthly salinity measurements began to climb again as was first observed in 2001. The

freshening trend closing out last year trace was especially pronounced, however, commencing in January 2007, and throughout the remainder of the year, the trend was decidedly upward. The salinity peak reached near the end of calendar year 2007 to early 2008 is suggestive of the slow passage of a second pulse or slug of affected groundwater ostensibly associated with the historic release further upgradient near cavern pad 113. Groundwater 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. Translation of the arrival time of the salt front at BH MW2, from the previous release location better estimates the water velocity of 15 m (50 ft) per year. However, saltwater diffusion effects may overestimate actual water flow in this case. The upward trend was watched and appeared to turning downward (freshening) until Hurricane Ike forced a huge storm surge of saltwater from the Gulf inundated the site. Several of the wells BH MW2, BH MW5, and BH PW4, appear “contaminated” by the saltwater pushed onto the site overtopping several well casings temporarily and allowing saltwater to infiltrate through breather holes in their caps. These three wells have shown remarkable recoveries during the last few months of 2008 and shall still be utilized to assess saltwater impacts as their traces show improving conditions with each subsequent sampling.

Figure E-5 presents the contours of data obtained on a date in the winter quarter for all the site wells, as representative of 2008. The gradients and flow direction remain very similar to all of the previous contouring staggered throughout the calendar year in order to account for any seasonality. 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 be moving radially off the underlying salt dome structure. This contouring appearance cannot be corroborated due to lack of control points off the site in a northwesterly direction. As with our other sites, it is suspected that regional flow regimes are locally modified by the underlying piercements.

Well BH PW1 located further up-gradient from the pond system, and well BH PW4 near the southwest corner, are the only two periphery wells showing any trace of measurable salinity on the site. The trace at BH PW1 has a small uptick back in the 2004/2005 timeframe that has been followed with BDL measurements since. This regular pattern may be indicative of a small pulse which may have been associated with either changes in rainfall, a lag time, or a nearby historical brine soils impact At BH PW4, however, the trace had been basically characterized as flat and salt free until a 1 ppt measurement was made in 2005 and value of 1.3 ppt was measured in 2007. The graphing then became dominated by a 17 ppt spike at this very low (site elevation) position, when the well was inundated with salt containing Hurricane Ike storm surge when Ike came ashore September 13, 2008. This well is only regularly sampled and tested quarterly by routine but we shall watch closely for this well to follow the improving-trace pattern as with the two other Hurricane Ike affected wells in 2009.

The well BH PW2 was plugged and abandoned as part of the original VWS Study in the 1995/1996 timeframe and therefore is not depicted as an active well on the site well locator map.

6.3 BRYAN MOUND

Site monitoring wells screened in two water bearing zones, 6 and 15 m (20 and 50 ft) bls, indicate that no shallow fresh water exists in the uppermost inter-connected aquifer over the Bryan Mound salt dome structure. 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 up gradient of the Bryan Mound salt dome.

Fifteen monitoring wells have been drilled at Bryan Mound in four phases between 1981 and 1990 (Figure E-7). Sampling began shortly after installation. Wells BM BP1S, BM BP2S, and BM PZ2S have been removed from monitoring service due to casing damage. 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.

All five-year traces this year reflect only the low-flow sampling method which produces less data variability and which helps to assure more consistent and representative sampling of the shallow aquifers across the SPR. The resulting time trending graphs now more accurately reflect the Bryan Mound site’s ground water conditions. Six of the 12 total shallow zone wells around the site reveal increasing trends of saltier conditions for the current 5 –year windows with only one of the five remaining freshening wells having a basic flat trace. Three of the six total deep wells reveal their same general continuing saltier trending this year, with the exception being: BM PW 2D (which reversed its upward trend from 2006) because of the position of the single anomalous spike occurring in 2005. Well BM MW1D although is down gradient of a pre-DOE source has its current five-year trend being decidedly downward probably due to the freshening data points from 2006 and the loss of lows in 2003 now off the current “window.” The trending was also aided with freshening conditions continuing through 2007 and on into 2008 despite large swings in the dataset.

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, however, remained relatively constant over time.

After an overall step change in salinity evident in both the paired wells back in 1995, BM MW1S and BM MW1D, a decidedly consistent and similar freshening (downward) trend was observed in both zones until the 2005 five-year trace where the deep zone well BM MW1D began trending upwards briefly, while the shallow zone well screened above it, BM MW1S, continued its consistent freshening. Both wells are currently showing the large swings but the freshening trend for both wells has returned and may be the result of a slug of salty water slowly passing the position in both the deeper monitored zone and the shallow monitored zone. Only the water level measurements now support the idea that the two zones are hydraulically separate or at best very poorly connected at this location.

Salinity measurements (>20 ppt) observed in the shallow zone near the SOC (BM MW5) now begin to reveal an overall moderately increasing trend despite the many big salinity swings evident throughout the current five-year trace. These swings and trending are not indicative of any significant or noteworthy recent releases or events. The current five-year trace also appears to be moderating or flattening versus last year. A salinity swing is found only this year in deep well of the pair BM MW2S and BM MW2D. The rise occurring in the shallow well early in the year (2006) has become muted and flat to that of a mild upward trend basically following a 10 ppt level. The deep well complement has also become flat despite swings evident in the 5-year dataset. Salinity observed in the unaffected (<20 ppt) deep and shallow well pair at the northwest corner of the site (BM MW4S and BM MW4D) continue the upward trending reversal occurring below 10 ppt; with the shallow well showing big swings but decidedly creeping upward, and with the underlying deep zone well rising more slowly now and at a lower overall salinity indicative of differing waters even though the water level measurements in this single well-pair do not show the pronounced hydraulic separation (water level difference) noted with all the other deep and shallow well pairs on the site.

BM MW3, because of a single anomalous outlier in 2006, continues to show a slightly increasing salinity trend over this five-year period even though the whole dataset for 2007 and 2008 have salinity numbers that are similar, show a flat trace and all below 10 ppt.

Site ground water movement in the shallow, 6 m bls (20 ft), zone is found to be flowing radially (in all directions) off the dome (see Figure E-8). The flow direction in the deeper zone results from a NW-SE trending recharge zone causing flow to move in a northeasterly manner over half the site and in a southwesterly manner for the remaining half (see Figure E-9) again responding to the topographic expression of the underlying piercement. The water level data for the winter quarter of 2008 were contoured using the new re-leveled measuring points from 2005 and again this year the data do not produce any dramatic changes in flow direction interpretation but reveal gradients that 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 completely smoothed and regular revealing no discernable anomalies or tendencies versus the previous years. These shallow zone conditions are watched for subtle changes, as a return to more normal rainfall amounts and patterns, could also produce the same effect through localized recharge.

The water level contouring of the deeper zone wells is now tending to show an apparent response to some localized recharge perhaps appearing more pronounced because of a long period of consistent flattening of the gradients with time, especially in the center of the site that preceded these measurements.

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. Operations pre-dating DOE ownership included brine retention in two separate unlined elongated abandoned ponds reclaimed (filled) by DOE in this same area. The second and considerably smaller area lies southeast of the security operations center (SOC) adjacent to a closed anhydrite and drilling muds confinement area. Site-wide salinity trending charts are presented as Figure E-10.

The five-year trending line for BM MW4S steepened its upward trace and its deeper complement, well BM MW4D, followed suit but at a lower overall salinity, with both wells' traces, however, remaining below 10 ppt.

The shallow well BM MW3S continues to show a slightly increasing trend this year due to the spurious single measurement of 38 ppt in 2006. This was the only measurement made in that year due to the location being blocked by an extensive construction project and the measurements obtained in 2008 shows the well back down into the routine historic levels all below 10 ppt. 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 removed from brine storage service in September 1998. Removal of solids and closure construction activities concluded 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 seepage from before 1982 renovations of the pond, or from operations occurring before the SPR. 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 zone well BM PZ1S, directly down gradient from the former brine pond, reveals a continuing downward or freshening trend now with the consistent sampling regimen. And the shallow zone well BM MW1S also maintains a steadily freshening trend even with large swings in the dataset commencing in 2006 and continuing into 2008. Well BM BP1D, located south of the former SPR brine pond continues to trend slowly upward, but overall remaining below 20 ppt.

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 down gradient of the location of former below grade unlined brine retention ponds from pre-SPR operations. The high salinity of the deep well may also indicate some limited hydraulic communication of the two ground water zones occurring in or just up gradient of their location. It is also possible that complete saturation and permeation of the clayey separation layer between the two zones by a dense salt solution has occurred in a very limited area, as the water levels indicate continued hydraulic separation with almost 4feet of head difference noted. It is also likely that the deep well BM MW1D, may be screened in such very low permeability materials that with the resulting slow ground water movement in this zone basically has us sampling the same water over and over.

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. For the ten-year period from when the pond had all its contained liquids and solids removed late in 1998 until the close of 2008, the shallow ground water has not moved more than about 50 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 become evident in the monitoring.

Southeast of the SOC and adjacent to an anhydrite disposal area used during early construction is a second area where elevated salinity ground water is found. 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. The VWS study indicated 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 closed anhydrite disposal pit. The five-year trending charts for both of these wells indicate a continued upward trending that commenced in 2006. In the short-term (2008) there have been big swings evident with the historic dataset from BM MW5 which are becoming more moderate which may be a response to the general ground water movements or a response to localized historical rainfall conditions (post drought).

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 it therefore most likely predates SPR activity. Salinity measurements exceeding ambient levels (> 20 ppt) have been observed historically in both zones at wells BM MW2S and BM MW2D, with the shallow well BM MW2S fluctuating at or below 10 ppt from 2003 through 2008. 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.

Salt water effects are 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, with the exception of the single outlier of 2006 at BM MW3S. 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. During 2005 two anomalous spikes in salinity were observed at the paired deep and shallow wells BM PW2S and BM PW2D. These wells are located near the center of the site and are both therefore situated atop apparent site recharge areas based on the water level contouring. Not being down gradient of any known or potential salinity source and because these spikes were similarly noted and also found to be ephemeral (as normal levels were measured in subsequent samplings) and which have continued from 2006 to the present. 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 and any surface soil sources could eventually pick-up salt and percolate downward in pulses presumably with long lag times.

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.

As a result of due diligence studies undertaken prior to the lease of property to Shell Pipeline, crude oil contamination was identified on the shallowest perched water table at two limited areas at St. James. In 1998 the SPR entered an agreement with the LDEQ to perform monitoring and remediation of petroleum hydrocarbon contaminated soil and groundwater. In accordance with the Risk Evaluation/Corrective Action Program (RECAP) periodic monitoring, product recovery, and bioremediation activities were completed, with status reported to LDEQ on a quarterly basis.

The data from three consecutive sampling events that spanned from 2003 to 2006 were assessed under the MO-1 non-industrial standard criteria. Results indicated that clean closure without conveyance notification requirements was attainable. In July 2006, SPR personnel presented LDEQ with the results of this assessment and requested approval to begin steps towards closure of the contaminated area. Based on the data, LDEQ gave a verbal confirmation that the SPR could begin steps towards closure.

Due to the complexity of the closure report, DM focused the remainder of 2006 to evaluate previous historical data against RECAP 2003 closure criteria and procured the services of a qualified vendor to prepare the closure report along with a soil re-use plan for the excavated soil. This report was submitted to LDEQ in June 2007. A letter granting approval for a No Further Action At This Time (NFAATT) designation was received from LDEQ in 2008.

6.5 WEEKS ISLAND

The Chicot formation is the principal aquifer in the Weeks Island area. The aquifer's potentiometric surface is generally at or just below sea level upon the domal structure of Weeks Island and is found to slope slightly west southwesterly producing a very mild but noticeable gradient 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. No monitoring activity occurred in 2008. The site was sold to a private individual through the General Services Administration with the final transaction occurring in April 2008. Later, in the summer of 2008, all of the former monitor wells, the remaining fire water supply well, and the former East Fill-Hole location were properly plugged and abandoned; with the fill-hole configuration finalized as a long-term brine pressure bleed off-point per DNR approval occurring just atop the soil / salt interface of the underlying dome.

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 off the sides of the dome and more shallow directly over the dome where our site is situated. Areally limited zones found affected and monitored at the West Hackberry site are much nearer the ground surface, with a shallow zone at roughly 6 m (20 ft) bls and a deeper 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 linear velocity 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 velocity estimated to be 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 was one of five adjoining ponds comprising a pond system and solids management system that handled brine and anhydrite solids pumped from the storage caverns. The state approved brine pond-decommissioning plan was concluded in November 1999.

Eleven monitoring wells and 15 former recovery wells (Figure E-11) have been installed on the West Hackberry site in five phases. All were historically 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 E-14. Four of the seven wells originally installed for VWS were retained for additional water level measurement around the periphery of the main site brought the site total up to 30 and in the late fall 2006 three wells which were not part of any outside monitoring agreement (WH RW1S, WH RW1D, and WH RW2D, were plugged and abandoned due to cap maintenance construction activity for a closed anhydrite pond, which brings the final site total wells down to 27. Salinity data are depicted in the five-year trending graphs for all of these wells, however, certain wells are tested for salinity only once per year per our 2002 monitoring proposal for resumption of site-wide monitoring approved by LDNR in early 2004.

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 winter quarter of 2008 have been reduced to elevations, contoured, and are presented as Figures E-12 and E-13, Shallow Zone and Deep Zone, respectively. The effects of the long-term pumping have dissipated in both zones over time and the current data appear to reflect unaffected flow regimes. 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 for a number of years. The pressure gradient evident is very flat (low) and continues to maintain very slow travel times and indecisive (ephemeral) travel paths with no hard and fast direction beneath the site on this portion of the dome. The general appearance is that of a confined to semi-confined water bearing zone, receiving some recharge potential in the vicinity of wells WH P1D, WH P4D, and WH P2D, and with a potentiometric “sink” suggested with the measurements determined within the limited area bounded by the wells WH RW3D, WH RW4D, and WH MW1D.

Once the pumping wells were shut-in in April 2001, a five quarter evaluation interval was conducted that would cover 4 complete reporting periods under full shut-in. During this evaluation, the routine physicochemical data were collected and reported with very little interpretation leading to a detailed Summary Report at the conclusion. This Summary Report, mailed to LDNR in September 2002, 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. The 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 or 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 the same reinstatement of long-term site-wide ground water detection monitoring, which was officially acted upon by the agency in early 2004. After several exchanges of information via email a final letter was issued from LDNR's Office of Conservation that authorized the West Hackberry ground water recovery to revert to site-wide ground water monitoring per the proposal of September 2002, and which also concurred with the closure complete petition made for the interconnected brine pond system. This letter authority effectively allowed the site to re-commence site wide detection monitoring activities and also terminated the permits issued for the brine storage and management pits and the raw water holding pit.

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 at various times 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 approached 10 ppt cut-off.

An essentially 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 have shown notable freshening once the pumping ceased, with both having all their values in the five-year trending below 10 ppt. The five-year salinity trace in well WH RW2S on the south side of the former pond system reveals a continuing trend of increasing salinity this year in response to a large generalized (step change) in salinity that began in early 2007. This well had been trending slowly downward and the upward "jumps" in 2007 and persisting with a strange drop and even more pronounced upward spike in the fall of 2008, now control the tendency for this entire five-year period. Although the well should rightly be more greatly influenced by the proximity to the former brine pond, cap maintenance performed for an adjacent closed anhydrite pond may have temporarily overshadowed the trending by way of an even closer proximity. Of some concern also is the potential for the well to have been completely submerged temporarily when Ike came ashore just west of the site in September. The well had been converted to an at-grade configuration by necessity for the cap maintenance project. We shall watch this well more closely for any potential reversal of trending data in the future. Another well that reveals an "Ike Spike"

this year is well WH PW4A located out beyond the site's main haul road close to Black Lake. A single spike in salinity to 12.2 ppt was observed in the measurement made just 5 days after Ike came ashore and which reveals a rapid response back to a more normal 3.3 ppt salinity with the last sampling of the year in November. This well shall also be watched more closely to confirm the temporary submergence effect.

Well WH P4S is located on the southeast corner of the former brine pond and this year's five-year trace is moderating (becomes flatter) versus last year's continuing upward trend. Overall, since the step-change in salinity experienced in the years 1999 to 2001, when a pump change was made, the salinity levels have revealed a long history of big swings and resulting trend reversals. The big salinity swings also appear to be moderating and a more steady-state trace reflective of the slow dispersion and diffusion of the stratified saltwater appears to be becoming evident.

The well WH P3S, remaining in the center of the historic salinity plume, is also beginning to show moderation in terms of the wide fluctuations in salinity historically noted and also in terms of producing a span of freshening five-year trends that commenced in 2006. This well has shown a rapid response to pumping shut-in, which gradually passed into years of fluctuating traces, to the current traces of consistent freshening and diminishing swings, all indicative of a more mature steady-state plug of saltwater that is undergoing the slow effects of general dispersal driven by the gradual down gradient ground water movement and as aided by diffusion. Wide salinity swings were also noted historically with both of the wells WH P2S and WH P3S as these were the only two 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 former brine pond. Each of the wells exhibited a response to closure construction that eventually began to subside sometime in 2000 and even more so since recovery cessation. In fact, wells WH P1S and WH P5S both began exhibiting salinity below the 10 ppt cut-off within 2002 with nearby well WH RW1S joining them in that range for 2004 and remaining so through 2005 until it was plugged and abandoned in November 2006. Well WH P13S continues with this group by maintaining a continued freshening five-year trend with a long history of values below 10 ppt.

Many shallow wells exhibited 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 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. Certainly this seems the case now with well WH P3S and hopefully given time, at well WH P4S.

Ground water salinity conditions over most of the site have continued to improve and have settled into long-term gradual freshening trends. 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 also when the recovery pumping was ceased in the spring of 2001. 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 but historic impacts from former firewater line leakage and have since returned to ambient unaffected levels over the present five-year history. These two wells are tested annually now for salt content per the approved monitoring plan.

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 long-term [non-recovery] monitoring well that is affected by the shallow zone brine plume extending eastward from the former brine pond. Its salinity remains elevated (23.4 ppt average based on the 4 measurements in 2008) which has remained generally consistent since sampling began in 1992 (range 13 to 39 ppt, Std. D = 6.1 ppt, avg. = 27.4 ppt, n = 65). The overall trend since 1992 to present is slightly downward, however, the annual data for 2005, which revealed a "down tick" at the close of the year, was reversed in 2006; and, the general trace of that five-year window (2002 to 2006), although quite variable, indicated a gradual rise in salinity for the period. This year again, as the salinity continues to freshen (note the 2008 annual average remains below the historic average) the five-year trace reversal to that of slightly improving (downward) continues again. This basic change occurring so far away at the leading edge of the brine plume (300 or more feet) coupled with the corresponding freshening found in well WH P3S located further up gradient and closer to the former pond, may be indicative of gradual long-term dissipation commencing with the plume. This well's location may be situated at the very edge of the diffusion "halo" of the saltwater slug positioned just east of the former pond, which now with no pumping gradient to drive its movement, is undergoing dispersion and diffusion effects with time.

As defined in the final approved closure plan, the liner beneath the former pond's concrete weight-coat was required to be pierced to preclude any future concerns with long-term hydraulics. As a result, the salt-bearing soils beneath this liner, presumably, shall continue to respond to rainfall conditions and events.

The three wells WH RW1S, WH RW1D, and WH RW2D, that were successfully plugged and abandoned during 2006, as a result of routine maintenance completed on the cap of the closed in-place above grade south anhydrite pond, were not part of any named or authorized monitoring regime and with their historic traces well below 10 ppt, their graphs have been removed from this reporting.

End of Section

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, 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 Data Management System 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 PERFORMANCE EVALUATION SAMPLES

The Louisiana and Texas environmental agencies have mandated that any commercial laboratory submitting environmental results from samples to the state must be accredited by the state. The SPR laboratories by definition are not "commercial" and as a result are not required to participate. However, the laboratories analyze Performance Evaluation samples twice per calendar year and these data are provided to the appropriate state agency. Through this program, the Louisiana and Texas environmental agencies ensure 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 laboratories have successfully completed their 2008 round of blind samples. Resultant data was provided to the appropriate state agencies, 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 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 fifteen hundred quality assurance analyses were performed in 2008 to verify the continuing high quality of SPR laboratory data.

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 vendor's list maintained by the M&O Contractor Quality Assurance organization. The successful bidder must be on the approved vendor's 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 Persulfate – UV Oxidation, IR Combustion – 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
Biomonitoring	1006.0 1007.0	EPA-3 EPA-3	*Menidia beryllina* 7 day survival *Mysidopsis bahia* 7 day survival

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

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

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

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

Hach = Hach Company, Hach Water Analysis Handbook.

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

End of Section

APPENDIX A1

SPR – DM ES&H Standards*

* Standards as listed in this appendix are all legal and other requirements. They can include agreements with neighbors, local groups and agencies, state and Federal agencies. Types of documents are codes, standards, Executive Orders, DOE and SPRPMO Orders, mutual aid agreements and other procedural documentation. ES&H includes fire protection and emergency management as well as environmental, industrial safety, and industrial hygiene.

DESCRIPTION	STANDARD	AREA
National Environmental Policy Act Implementing Procedures	10 CFR 1021	MR
Compliance with Flood Plain/Wetlands Environmental Review	10 CFR 1022	MR
Occupational Radiation Protection - Applicable and Enforceable Portions	10 CFR 835	RP
Storage, Treatment, and Disposal of Nondefense Toxic and Hazardous Materials	10 USC 2692	HW
Boiler And Pressure Vessels - Degas Project Only	120 IAC	IS
(Aviation) Operating Requirements: Domestic, Flag, and Supplemental Operations	14 CFR 121	IS
(Aviation) Certifications and Operations	14 CFR 125	IS
(Aviation) Certification and Operations of Scheduled Air Carriers with Helicopters	14 CFR 127	IS
(Aviation) Rotorcraft External Load Operations	14 CFR 133	IS
(Aviation) Operating Requirements: Commuter and On-Demand Operations	14 CFR 135	IS
(Aviation) Agricultural Aircraft Operations	14 CFR 137	IS
(Aviation) Certification and Operation: Land Airport Serving Certain Air Carriers	14 CFR 139	IS
(Aviation) Repair Stations	14 CFR 145	IS
(Aviation) Objects Affecting Navigable Airspace	14 CFR 77	IS
(Aviation) Notification And Reporting - Accidents and Incidents	14 CFR 830	IS
(Aviation) General Operating and Flight Rules	14 CFR 91	IS
Oil and Gas Division	16 TAC I.3	CW TS
Environmental Recycling	16 TAC I.4	PP
Fish and Wildlife Coordination Act	16 U.S.C. §§ 661-666c	MR
Bald and Golden Eagle Protection Acts	16 U.S.C. §§ 668-668d	MR
Migratory Bird Treaty Act	16 U.S.C. §§ 703-711	MR
Endangered Species Act	16 USC Parts 1531-1544	MR
Radiation Control	25 TAC I.289	IH IS RP
Commerce In Explosives (ATF)	27 CFR 55	IS, CS, FP
Imminent Danger	29 CFR 1903.13	IS
Posting of Notice: Availability of the Act, Regulations, and Applicable Standards	29 CFR 1903.2	IS
Recordkeeping and Reporting Occupational Injuries and Illnesses	29 CFR 1904	IS
General (1 through 8)	29 CFR 1910 SUBPART A	IS,FP
Adoption and Extension of Established Federal Standards (11 through 19)	29 CFR 1910 SUBPART B	IS
Walking-Working Surfaces (21 through 30)	29 CFR 1910 SUBPART D	IS
Means of Egress (35 through 38)	29 CFR 1910 SUBPART E	IS
Powered Platforms, Manlifts, and Vehicle Mounted Work Platforms (66 through 68)	29 CFR 1910 SUBPART F	IS
Occupational Health and Environmental Control (94 through 98)	29 CFR 1910 SUBPART G	IH
Hazardous Materials (101 through 126)	29 CFR 1910 SUBPART H	IS,CS,FP
Personal Protective Equipment (132 through 139)	29 CFR 1910 SUBPART I	IS

DESCRIPTION	STANDARD	AREA
General Environmental Controls (141 through 147)	29 CFR 1910 SUBPART J	IS,FP
Medical and First Aid (151)	29 CFR 1910 SUBPART K	MS
Fire Protection (155 through 165)	29 CFR 1910 SUBPART L	IS,FP
Compressed Gas and Compressed Air Equipment (169)	29 CFR 1910 SUBPART M	IS
Materials Handling and Storage (176-179, 181, 183-184)	29 CFR 1910 SUBPART N	IS
Machinery and Machine Guarding (211 through 213, 215, 219)	29 CFR 1910 SUBPART O	IS
Hand/Portable Powered Tools and Other Hand-Held Equipment (241 through 244)	29 CFR 1910 SUBPART P	IS
Welding, Cutting, and Brazing (251 through 255)	29 CFR 1910 SUBPART Q	IS
Special Industries (268) Telecommunications	29 CFR 1910 SUBPART R	IS
Special Industries (269) Power generation, Transmission	29 CFR 1910 SUBPART R	IS
Electrical (301 through 306, 331–335, 399)	29 CFR 1910 SUBPART S	IS
Commercial Diving Operations (401 through 402, 410, 420-427, 430, 440-441)	29 CFR 1910 SUBPART T	IS
Toxic and Hazardous Substances (1000 through 1450 except 1029, 1043, 1045, 1047, 1050-1051)	29 CFR 1910 SUBPART Z	IH
Designations for General Industry Standards Incorporated Into Body of Construction Standards	29 CFR 1926 APPENDIX A	IS
General (1 through 5)	29 CFR 1926 SUBPART A	MO
General Interpretations (10 through 16)	29 CFR 1926 SUBPART B	IS
General Safety and Health Provisions (20 through 35)	29 CFR 1926 SUBPART C	IS,FP
Occupational Health and Environmental Controls (50 through 66)	29 CFR 1926 SUBPART D	IS
Personal Protection and Life Saving Equipment (95 through 107)	29 CFR 1926 SUBPART E	IS,FP
Fire Protection and Prevention (150 through 155)	29 CFR 1926 SUBPART F	IS,FP
Signs, Signals, and Barricades (200 through 203)	29 CFR 1926 SUBPART G	IS
Materials Handling, Storage, Use, and Disposal (250 through 252)	29 CFR 1926 SUBPART H	IS
Tools - Hand and Power (300 through 307)	29 CFR 1926 SUBPART I	IS
Welding and Cutting (350 through 354)	29 CFR 1926 SUBPART J	IS
Electrical (400 through 408, 416-417, 431-432, 441, 449)	29 CFR 1926 SUBPART K	IS
Scaffolds (450 through 454)	29 CFR 1926 SUBPART L	IS
Fall Protection (500 through 503)	29 CFR 1926 SUBPART M	IS
Cranes, Derricks, Hoists, Elevators, and Conveyors (550 through 555)	29 CFR 1926 SUBPART N	IS
Motor Vehicles, Mechanized Equipment, and Marine Operations (600 through 606)	29 CFR 1926 SUBPART O	IS
Excavations (650 through 652)	29 CFR 1926 SUBPART P	IS
Concrete and Masonry Construction (700 through 706)	29 CFR 1926 SUBPART Q	IS
Steel Erection (750 through 752)	29 CFR 1926 SUBPART R	IS
Demolition (850 through 860)	29 CFR 1926 SUBPART T	IS
Blasting and the Use of Explosives (900 through 914)	29 CFR 1926 SUBPART U	IS
Power Transmission and Distribution (950 through 960)	29 CFR 1926 SUBPART V	IS
Rollover Protective Structures; Overhead Protection (1000 through 1003)	29 CFR 1926 SUBPART W	IS

DESCRIPTION	STANDARD	AREA
Stairways and Ladders (1050 through 1060)	29 CFR 1926 SUBPART X	IS
Diving (1071 through 1092)	29 CFR 1926 SUBPART Y	IS
Toxic and Hazardous Substances (1100 through 1152 except 1129, 1145, 1147)	29 CFR 1926 SUBPART Z	IH
Hazardous Materials Information Development, Preparedness and Response Act	30 LA RS 2361-2379 SARA Title III	CS
Occupational Licenses and Registrations	30 TAC 1.30	CW
Groundwater Protection Recommendation Letters and Fees	30 TAC 1.339	CW
General Air Quality Rules	30 TAC I.101	CA
Permits by Rule	30 TAC I.106	CA
Control of Air Pollution from Visible Emissions and Particulate Matter	30 TAC I.111	CA
Control of Air Pollution from Sulfur Compounds	30 TAC I.112	CA
Control of Air Pollution from Hazardous Air Pollutants	30 TAC I.113	CA
Control of Air Pollution from Motor Vehicles	30 TAC I.114	CA
Control of Air Pollution from Volatile Organic Compounds	30 TAC I.115	CA
Control of Air Pollution by Permits for New Construction or Modification	30 TAC I.116	CA
Control of Air Pollution from Nitrogen Compounds	30 TAC I.117	CA
Control of Air Pollution Episodes	30 TAC I.118	CA
Federal Operating Permits Program	30 TAC I.122	CA
Environmental Testing Laboratory Accreditation and Certification	30 TAC I.25	CW MR
Water Quality Certification	30 TAC I.279	CW
Applications Processing	30 TAC I.281	CW
Public Drinking Water	30 TAC I.290	CW
Water Rights, Procedural	30 TAC I.295	CW
Water Rights, Substantive	30 TAC I.297	CW
Surface Water Quality Standards	30 TAC I.307	CW
Sludge Use, Disposal, and Transportation	30 TAC I.312	HW
Used Oil	30 TAC I.324	PP
Spill Prevention and Control	30 TAC I.327	CW
Waste Minimization and Recycle	30 TAC I.328	PP
Municipal Solid Waste	30 TAC I.330	PP
Underground and Aboveground Storage Tanks	30 TAC I.334	HW
Industrial Solid Waste and Municipal Hazardous Waste	30 TAC I.335	HW
Radioactive Substance Rules	30 TAC I.336	RP
Regulatory Flexibility	30 TAC I.90	MR
Planning Division	31 TAC I.15	CW
Oil Spill Prevention and Response	31 TAC I.19	CW
Natural Resource Damage Assessment	31 TAC I.20	CW
Oil Spill Prevention and Response Hearings Procedures	31 TAC I.21	CW
Fisheries	31 TAC II.57	MR

DESCRIPTION	STANDARD	AREA
Wildlife	31 TAC II.65	MR
Resource Protection	31 TAC II.69	MR
Coastal Management Program	31 TAC XVI.501	CW
Coastal Management Program Boundary	31 TAC XVI.503	CW
Coastal Management Program	31 TAC XVI.504	CW
Council Procedures for State Consistency With Coastal Management Program Goals and Policies	31 TAC XVI.505	CW
Council Procedures for Federal Consistency With Coastal Management Program Goals and Priorities	31 TAC XVI.506	CW
Certain vehicles must stop at all railroad grade crossings (Explosives)	32 LA RS 173	TS
Permission for operation; crossing railroad grade crossings; markings	32 LA RS 251 Subpart J. Vehicles Transporting Explosives or Inflammables	TS
Equipment and inspection (Explosives)	32 LA RS 252	TS
Handling Class I (Explosive) Materials or Other Dangerous Cargo	33 CFR 126	CW
Control of Pollution by Oil and Hazardous Substances, Discharged Removed	33 CFR 153	CW
Facilities Transferring Oil or Hazardous Material in Bulk	33 CFR 154	CW
Oil and Hazardous Material Transfer Operations	33 CFR 156	CW
Reception Facilities for Oil, Noxious Liquid Substances, and Garbage (MARPOL)	33 CFR 158	HW
Permits for Structures or Work in or Affecting Navigable Waters of the U.S.	33 CFR 322	CW
Permits for Discharges of Dredged or Fill Material into Waters of the U.S.	33 CFR 323	CW
Process of Department of Army Permits	33 CFR 325	CW
Enforcement	33 CFR 326	CW
Definition of Waters of the United States	33 CFR 328	CW
Definition of Navigable Waters of the United States	33 CFR 329	CW
Nationwide Permits	33 CFR 330	CW
Compensatory Mitigation for Losses of Aquatic Resources	33 CFR 332	CW, MR
Markings of Structures, Sunken Vessels and Other Obstructions	33 CFR 64	CW
Aids to Navigation on Artificial Islands and Fixed Structures	33 CFR 67	CW
Private Aid to Navigation	33 CFR 68	CW
Risk Evaluation/Corrective Action Program	33 LAC I.13	MR
Groundwater Fees	33 LAC I.14	MR
Permit Review	33 LAC I.15	MR
Departmental Administrative Procedures	33 LAC I.3	MR
Notification Regulations and Procedures for Unauthorized Discharges	33 LAC I.39	MR
Policy and Intent	33 LAC I.45	MR
Program Requirements	33 LAC I.47	MR
Organization and Personnel Requirements	33 LAC I.49	MR
On-site Inspection/Evaluation	33 LAC I.51	MR
Quality System Requirements	33 LAC I.53	MR
Sample Protocol/Sample Integrity	33 LAC I.55	MR
Maintenance of Accreditation	33 LAC I.57	MR

DESCRIPTION	STANDARD	AREA
Emergency Response Regulations	33 LAC I.69	MR
General Provisions	33 LAC III.1	CA
Control of Emissions of Smoke	33 LAC III.11	CA
Emission Standards for Particulate Matter	33 LAC III.13	CA
Conformity	33 LAC III.14	CA
Rules and Regulations for the Fee System of the Air Quality Control Programs	33 LAC III.2	CA
Control of Emission of Organic Compounds	33 LAC III.21	CA
Odor Regulations	33 LAC III.29	CA
Standards of Performance for New Stationary Sources	33 LAC III.30	CA
Permit Procedures	33 LAC III.5	CA
Comprehensive Toxic Air Pollutant Emission Control Program	33 LAC III.51	CA
Area Sources of Toxic Air Pollutants	33 LAC III.53	CA
Prevention of Air Pollution Emergency Episodes	33 LAC III.56	CA
Chemical Accident Prevention and Minimization of Consequences	33 LAC III.59	CA
Ambient Air Quality	33 LAC III.7	CA
General Regulations on Control of Emissions and Emission Standards	33 LAC III.9	CA
General Provisions	33 LAC IX.1	CW
Surface Water Quality Standards	33 LAC IX.11	CW
Louisiana Water Pollution Control Fee System Regulation	33 LAC IX.13	CW
Water Quality Certification Procedures	33 LAC IX.15	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.17	CW
State of Louisiana Stream Control Commission	33 LAC IX.19	CW
The LPDES Program Definitions and General Program Requirements	33 LAC IX.23	CW
Permit Application and Special LPDES Program Requirements	33 LAC IX.25	CW
LPDES Permit Conditions	33 LAC IX.27	CW
Transfer, Modification, Revocation and Reissuance, and Termination of LPDES Permits	33 LAC IX.29	CW
Permits	33 LAC IX.3	CW
General LPDES Program Requirements	33 LAC IX.31	CW
Specific Decisionmaking Procedures Applicable to LPDES Permits	33 LAC IX.33	CW
Enforcement	33 LAC IX.5	CW
Effluent Standards	33 LAC IX.7	CW
Spill Prevention and Control	33 LAC IX.9	CW
General Provisions and Definitions	33 LAC V.1	HW
Definitions	33 LAC V.109	HW
Generators	33 LAC V.11	HW
Transporters	33 LAC V.13	HW
Treatment, Storage and Disposal Facilities	33 LAC V.15	HW
Containment Buildings	33 LAC V.18	HW

DESCRIPTION	STANDARD	AREA
Tanks	33 LAC V.19	HW
Containers	33 LAC V.21	HW
Prohibitions on Land Disposal	33 LAC V.22	HW
Corrective Action Management Units and Temporary Units	33 LAC V.26	HW
Transportation of Hazardous Liquids by Pipeline	33 LAC V.30	TS
Financial Requirements	33 LAC V.37	HW
Universal Wastes	33 LAC V.38	HW
Small Quantity Generators	33 LAC V.39	HW
Used Oil	33 LAC V.40	PP
Recyclable Materials	33 LAC V.41	PP
Lists of Hazardous Wastes	33 LAC V.49	HW
Fee Schedules	33 LAC V.51	HW
Manifest System for TSD Facilities	33 LAC V.9	HW
General Provisions and Definitions (solid waste regulations)	33 LAC VII.1	HW
Recycling and Waste Reduction Rules	33 LAC VII.103	PP
Waste Tires	33 LAC VII.105	PP
Scope and Mandatory Provisions of the Program	33 LAC VII.3	HW
Solid Waste Management System	33 LAC VII.5	HW
Solid Waste Standards	33 LAC VII.7	HW
Enforcement	33 LAC VII.9	HW
Program Applicability and Definitions	33 LAC XI.1	HW
Enforcement	33 LAC XI.15	HW
Registration Requirements, Standards and Fee Schedule	33 LAC XI.3	HW
Spill and Overfill Control	33 LAC XI.5	HW
Methods Release Detection and Release Reporting, Investigation, Confirmation and Response	33 LAC XI.7	HW
Out of Service UST Systems and Closure	33 LAC XI.9	HW
General Provisions	33 LAC XV.1	RP
Notices, Instructions, and Reports to Workers; Inspections	33 LAC XV.10	RP
Regulation and Licensing of Naturally Occurring Radioactive Material (NORM)	33 LAC XV.14	RP
Transportation of Radioactive Material	33 LAC XV.15	RP
Licensing and Radiation Safety Requirements for Irradiators	33 LAC XV.17	RP
Registration of Radiation Machines and Facilities	33 LAC XV.2	RP
Radiation Safety Requirements for Wireline Service Operations and Subsurface Tracer Studies	33 LAC XV.20	RP
Fee Schedule	33 LAC XV.25	RP
Licensing of Radioactive Material	33 LAC XV.3	RP
Standards for Protection Against Radiation	33 LAC XV.4	RP
Radiation Safety Requirements for Industrial Radiographic Operations	33 LAC XV.5	RP
Radiation Safety Requirements for Analytical X-Ray Equipment	33 LAC XV.8	RP
Advisory Council on Historical Preservation	36 CFR 800	MR

DESCRIPTION	STANDARD	AREA
Texas Commission on Fire Protection, Flammable Liquids	37 TAC XIII.501	FP
Pesticides	4 TAC I.7	CS
Asbestos	40 CFR 763	IH,CS
Criteria for State, Local, and Regional Oil Removal Contingency Plans	40 CFR 109	CW
Discharge of Oil	40 CFR 110	CW
Oil Pollution Prevention	40 CFR 112	CW
Designation of Hazardous Substances	40 CFR 116	CW
Determination of Reportable Quantities for Hazardous Substances	40 CFR 117	CW
State Certification of Activities Requiring a Federal License or Permit	40 CFR 121	CW
EPA Administrated Permit Programs: The National Pollutant Discharge Elimination System	40 CFR 122	CW
Procedures for Decision Making	40 CFR 124	CW
Criteria and Standards for NPDES	40 CFR 125	CW
Toxic Pollutant Effluent Standards	40 CFR 129	CW
Water Quality Planning and Management, Water Quality Standards	40 CFR 131	CW
Secondary Treatment Regulation	40 CFR 133	CW
Guidelines Establishing Test Procedures for the Analysis of Pollutants	40 CFR 136	CW
National Primary Drinking Water Regulations	40 CFR 141	CW
National Primary Drinking Water Regulations Implementation	40 CFR 142	CW
National Secondary Drinking Water Regulations	40 CFR 143	CW
Underground Injection Control Program	40 CFR 144	CW
Underground Injection Control Program: Criteria and Standards	40 CFR 146	CW
State Underground Injection Control Programs	40 CFR 147	CW
Sole Source Aquifers	40 CFR 149	CW
NEPA Purpose, Policy and Mandate	40 CFR 1500	MR
NEPA and Agency Planning	40 CFR 1501	MR
NEPA Environmental Impact Statement	40 CFR 1502	MR
NEPA Commenting	40 CFR 1503	MR
NEPA Predecision Referrals to the Council of Proposed Federal Actions Determined to be Environmentally Unsatisfactory	40 CFR 1504	MR
NEPA and Agency Decision Making	40 CFR 1505	MR
Other Requirements of NEPA	40 CFR 1506	MR
NEPA Agency Compliance	40 CFR 1507	MR
NEPA Terminology and Index	40 CFR 1508	MR
Freedom of Information Act Procedures	40 CFR 1515	MR
Privacy Act Implementation	40 CFR 1516	MR
Pesticide Registration and Classification Procedures	40 CFR 152	CS
Labeling Requirements for Pesticides and Devices	40 CFR 156	CS
Worker Protection Standards (Pesticides)	40 CFR 170	CS
Certification of Pesticide Applicators	40 CFR 171	CS
General	40 CFR 220	CW

DESCRIPTION	STANDARD	AREA
Ocean Dumping	40 CFR 228	CW
Section 404 (b) (1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material	40 CFR 230	CW, MR
Guidelines for Storage and Collection of Residential, Commercial, and Institutional Solid Wastes	40 CFR 243	HW
Comprehensive Procurement Guideline for Products Containing Recovered Materials	40 CFR 247	PP
Hazardous Waste Management System: General	40 CFR 260	HW
Identification and Listing of Hazardous Waste	40 CFR 261	HW
Standards Applicable to Generators of Hazardous Wastes	40 CFR 262	HW
Standards applicable to transporters of hazardous wastes	40 CFR 263	HW
Standards for Owners and Operators of Hazardous Waste, Treatment, Storage, and Disposal Facilities	40 CFR 264	HW
Standards for Management of Specific Hazardous Wastes	40 CFR 266	HW
Land Disposal Restrictions	40 CFR 268	HW
Requirements for Authorization of State Hazardous Waste Programs	40 CFR 271	HW
Approved State Hazardous Waste Management Programs	40 CFR 272	HW
Standard for Universal Waste Management	40 CFR 273	HW
Standards for Management of Used Oil	40 CFR 279	HW
Technical Standards and Corrective Action Requirements for Owners and Operators of UST	40 CFR 280	HW
Approved Underground Storage Tank Programs	40 CFR 282	HW
National Oil and Hazardous Substances Pollution Contingency Plans	40 CFR 300	CS
Designation of Reportable Quantities and Notification	40 CFR 302	CS
Emergency Planning and Notification	40 CFR 355	CS
Hazardous Chemical Reporting: Community Right-to-Know	40 CFR 370	CS
Toxic Chemical Release Reporting: Community Right-to-Know	40 CFR 372	CS
Reporting Hazardous Substance Activity When Selling or Transferring Federal Real Property	40 CFR 373	CS
General Provisions	40 CFR 401	CW
General Pretreatment Regulations for Existing and New Sources of Pollution	40 CFR 403	CW
Approval & Promulgation of Implementation Plans	40 CFR 52	CA
Ambient Air Monitoring	40 CFR 53	CA
Standards of Performance for New Stationary Sources	40 CFR 60	CA
Determination of Emissions from Volatile Compounds Leaks	40 CFR 60, Appendix A, Method 21	CA
National Emission Standards for Hazardous Air Pollutants	40 CFR 61	CA
National Emission Standards for Hazardous Air Pollutant for Source Categories	40 CFR 63	CA
Assessment and Collection of Noncompliance Penalties	40 CFR 66	CA
State Operating Permit Programs	40 CFR 70	CA
General	40 CFR 700	CS
PCB Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions	40 CFR 761	CS
Regulations of Fuels and Fuel Additives	40 CFR 80	CA
EPA Regulations Designating Areas for Air Quality Planning	40 CFR 81	CA
Protection of Stratospheric Ozone	40 CFR 82	CA

DESCRIPTION	STANDARD	AREA
Confiscation and disposal of explosives	40 LA RS 1472.11	IS
Unlawful storage of explosives	40 LA RS 1472.12	IS
Abandonment of explosives	40 LA RS 1472.13	IS
Careless use of explosives	40 LA RS 1472.18	IS
Reckless use of explosives	40 LA RS 1472.19	IS
License; manufacturer-distributor, dealer, user, or blaster of explosives	40 LA RS 1472.3	IS
Possession without license prohibited; exceptions (Explosives)	40 LA RS 1472.4	IS
Reports of losses or thefts; illegal use or illegal possession (Explosives)	40 LA RS 1472.7	IS
Energy Policy Act of 2005	42 USC 15801	MR, ABP, PP
Energy Conservation Reauthorization 1998	42 USC 6201 et seq.	MR, ABP, PP
Energy Policy and Conservation Act 1975 and 1994	42 USC 6291-6309	MR, ABP, PP
RCRA and Affirmative Procurement	42 USC 6962	MR, PP
National Environmental Policy	42 USC Chapter 55	MR
Air Pollution Prevention and Control	42 USC Chapter 85	CA
National Energy Policy Act of 1992	42 USC Chapter 91	MR, ABP, PP
Coastal Management	43 LAC I.7	CW
Water Resources Management	43 LAC VI	CW
Underwater Obstructions	43 LAC XI.3	TS
Pipeline Safety	43 LAC XI.5	TS
General Provisions (Statewide Order 29-B)	43 LAC XIX.1	CW
Fees	43 LAC XIX.2	CW
Class I, III, IV, and V Injection Wells (Statewide Order 29-N-1)	43 LAC XVII.1	CW
Hydrocarbon Storage Wells in Salt Dome Cavities (Statewide Order 29-M)	43 LAC XVII.3	CW
Certification (Water and Wastewater Operator Certification)	48 LAC V.73	CW
Drinking Water Program	48 LAC V.77	CW
Oil Spill Prevention and Response Plans	49 CFR 130	CS
General Information, Regulations, and Definitions	49 CFR 171	TS
Hazardous Material Tables, Hazardous Materials Communications Requirements and Emergency Response Information Requirements	49 CFR 172	TS
Shippers - General Requirements for Shipments and Packaging	49 CFR 173	TS
Carriage by Public Highway	49 CFR 177	TS
DOT Response Plans for Onshore Pipelines	49 CFR 194	TS
Transportation of Hazardous Liquids by Pipeline	49 CFR 195	TS
Drug and Alcohol Testing	49 CFR 199	TS
Commercial Driver's License Standards; Requirements and Penalties	49 CFR 383	TS
Endangered and Threatened Wildlife and Plants and Migratory Bird Permits	50 CFR 10, 13, 17, 21, 22	MR
General Provisions	50 CFR 450	MR
Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants	50 CFR Ch 1 Subch B	MR
Disposal of Birds or Quadrupeds Becoming a Nuisance	56 LA RS 112	MR
US Department of Agriculture Federal Biobased Products Preferred Procurement Program	7 CFR Part 2902	MR, PP, ABP

DESCRIPTION	STANDARD	AREA
Pesticide	7 LAC XXIII	CS
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)	7 USC 136	CS
Farm Security and Rural Investment Act (FSRIA) of 2002, Section 9002	7 USC 8102	MR, ABP, PP
Control of Nuisance Wild Quadrupeds	76 LAC V.125	MR
Nuisance Wildlife Control Operator Program	76 LAC V.127	MR
Stennis Warehouse Spill Prevention, Control, and Countermeasures Plan	AAA 4010.10	CW
Property Management Manual	AAA 7003.7	PP
Threshold Limit Values For Chemical Substances - Current Year & Applicable Substances	ACGIH TLV	IH
Area Contingency Plan for New Orleans	ACP USCG	CW
Area Contingency Plan for Port Arthur	ACP USCG	CW
Area Contingency Plan for Galveston	ACP USCG	CW
Area Contingency Plan for Lake Charles	ACP USCG	CW
Area Contingency Plan for EPA Region 6	ACP-EPA	CW
Hazardous Materials Management Education Program Observations and Recommendations: Environmental Mgmt, Hazardous Waste Minimization, and Pollution Prevention for the SPR Operations	AIHMM	PP
Drill and Exercise Program Plan	AL 5500.11	MO,MR
Standard Methods for the Examination of Water and Wastewater	Amer. Public Health Assoc.	CW
OSHA Referenced Standards	ANSI Standards	IS
Environmental Management Systems Specification With Guidance For Use	ANSI/ISO 14001:2004	MR
Compilation of Air Pollutant Emission Factors	AP-42	CA
Permit Regulations for the Construction and/or Operation of Air Emissions Equipment (Mississippi)	APC-S-2	CA
Amer. Petroleum Institute - Recommended Practices and Guides	API	MR
API Standard 653 for Tank Inspection, Repair, Alteration, and Reconstruction	API - Standard	CA
Environmental Effects of Army Actions	AR 200-2	MR
Conduct of Training for the SPR M&O Contractor	ASI 3400.1	MO, MR
Integrated Logistics Support Procedures	ASI 4000.10	FP
SPR Plant Maintenance System	ASI 4330.16	FP,IS
Environmental Instructions Manual	ASI 5400.15	MR
Conduct of Operations at the SPR	ASI 5480.19	MO,MR
Accident Prevention Manual	ASI 5480.22	IS
Security Operations Manual	ASI 5600.1	FP
Quality Assurance Instructions	ASI 5700.15	MR
Design Review Procedure	ASI 6430.15	MO,MR
Configuration Management Plan and Procedures	ASL 4700.1	MO,MR
SPR Environmental Monitoring Plan	ASL 5400.57	CW, CA
Fire Protection Manual	ASL 5480.18	FP
Emergency Readiness Assurance Plan	ASL 5500.10	MO,MR
Emergency Response Team Organization and Training Plan	ASL 5500.25	MO,MR
Emergency Management Plan and Implementing Procedures	ASL 5500.58	EM, FP

DESCRIPTION	STANDARD	AREA
Drawdown Management Plan	ASL 6400.18	MO,MR
Cavern Inventory & Integrity Control Plan	ASL 6400.30	CW
Drawdown Readiness Program Plan	ASL 7000.397	MO,MR
OSHA Referenced Standards	ASME Standards	IS
Integrated Logistics Support Master Plan	ASP 4000.11	FP
Environmental Policy	ASP 5400.2	MR
Interim Repair/Mitigation Authorization	ASR 4330.5	FP
SPR Crosstalk Information Exchange Program	ASR 7000.2	MO,MR
Readiness Review Board	ASR 7000.7	MO,MR
Membership in BRAMA	BC BRAMA	EM
Membership in Greater Baton Rouge Industry Alliance	BC Greater BR Industry Alliance	EM
Membership in Iberville CAER	BC Iberville CAER	EM
Membership in the Iberville LEPC	BC Iberville LEPC	EM
Membership in West Baton Rouge LEPC	BC West Baton Rouge LEPC	EM
Bayou Choctaw Emergency Response Procedures	BCI 5500.3	EM, FP
Bayou Choctaw Spill Prevention, Control, and Countermeasures Plan	BCL 5400.16	CW
Safety Agreement with NEWPARK	BH & NEWPARK	EM
Membership in the LEPC	BH LEPC	EM
Membership in the Local Law Enforcement Agency for BH	BH LLEA	EM
Membership in Sabine-Neches Chiefs Mutual Aid	BH Sabine-Neches Chiefs Mutual Aid	EM
Big Hill Emergency Response Procedures	BHI 5500.4	EM, FP
Big Hill Spill Prevention, Control, and Countermeasures Plan	BHL 5400.21	CW
Membership in the BMAT for BM	BM BMAT	EM
Membership in the Brazosport CAER	BM CAER	EM
Membership in the LEPC	BM LEPC	EM
Membership in the Local Law Enforcement Agency at BM	BM LLEA	EM
Agreement between BM and VDD on restrictions to working on Hurricane Levees near BM	BM VDD	EM
Bryan Mound Emergency Response Procedures	BMI 5500.5	EM, FP
Bryan Mound Spill Prevention, Control, and Countermeasures Plan	BML 5400.17	CW
Seminar on Site Characterization for Subsurface Remediations	CERI-89-224	CW
Fire Prevention and Protection; Emergency Services and Communication (Explosives)	Chapter 13 Jefferson Parish Code of Ordinances	FP
County Regulation of Matters Relating to Explosives and Weapons Subchapter A. Explosives	Chapter 235 TX Statutes, Local Government, Title 7	IS
State Fire Marshall (Explosives)	Chapter 417TX Statutes, Government, Council	FP
Operation and Movement of Vehicles (Explosives)	Chapter 545 TX Statutes, Transportation, Title 7	TS
Vehicle Equipment (Explosives)	Chapter 547 TX Statutes, Transportation, Title 7	TS
Hoisting And Rigging Handbook	DOE HDBK, 1090-9	IS
DOE Waste Minimization reporting Requirements, Nov. 1994	DOE Guideline	PP
Pollution Prevention Handbook	DOE Handbook	PP

DESCRIPTION	STANDARD	AREA
Waste Minimization Reporting System (Wmin) User's Guide	DOE Handbook	PP
Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan, Dec 1993	DOE Handbook	PP
EPA's Interim Final Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program	DOE Memorandum	PP
For all applicable DOE Orders See Contract No. DE-AC96-03PO92207 Applicable Standards List	DOE Orders	MO,MR
Pollution Prevention Program Plan	DOE S-0118	PP
Paint Repair of Exterior Metal Surfaces	DOE Standard Spec. 17900	PP
Management of Polychlorinated Biphenyls (PCBs)	DOE/EH-0350	CS, HW
Performance Objectives and Criteria for Conducting DOE Environmental Audits	DOE/EH-0358	MR
Annual report on Waste Generation and Waste Minimization Progress	DOE/EM-0276	PP
Standard for Fire Protection of DOE Electronic Computer/Data Processing Systems	DOE/EP-0108	FP
Waste Minimization/Pollution Prevention Crosscut Plan 1994	DOE/FM-0145	PP
Fire Protection for Relocatable Structures	DOE-STD-1088-95	FP
All SPR Environmental Permits as listed in the Annual Site Environmental Report (ASER)	Environmental Permits	CW, MR, AR
Protection and Enhancement of Environmental Quality	EO 11514	MR
Floodplain Management	EO 11988	CW
Protection of Wetlands	EO 11990	CW
Floodplain Management	EO 11992	CW
Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations	EO 12898	MR
Marine Protected Area	EO 13158	CW
Responsibilities of Federal Agencies to Protect Migratory Birds	EO 13186	MR
Energy Efficient Standby Power Devices	EO 13221	PP
Preserve America	EO 13287	MR
Strengthening Federal Environmental, Energy, and Transportation Management	EO 13423	MR, EO, ABP, PP
Protocol for Equipment Leak Emission Estimates, Jun 1993	EPA 453/R-93-026	CA
Practical Guide for Groundwater Sampling	EPA 600/2-85/105	CW
Handbook for Analytical Quality Control in Water and Wastewater Laboratories	EPA 600/4-79-019	CW
Methods for Chemical Analysis of Water and Wastes	EPA 600/4-79-020	CW
Handbook for Sampling and Sample Preservation of Water and Wastewater	EPA 600/4-82-029	CW
Addendum to Handbook for Sampling and Sample Preservation, EPA 600/4-82-029	EPA 600/4-83-039	CW
Microbiological Methods for Monitoring the Environment, Water and Wastes	EPA 600/8-78-017	CW
Facility Pollution Prevention Guide	EPA 600/R-92/088	PP
Short Term Methods for Measuring the Acute Toxicity of Effluents to Aquatic Organisms	EPA 821-R-02-014	CW
Water Measurement Manual	EPA 832B81102	CW
Storm Water Management for Industrial Activities	EPA 833-R-92-002	PP
Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, 4/1/86	EPA Region IV	MR
Current National Water Quality Criteria	EPA Web Site	CW
EPA Waste Minimization Opportunity Assessment Manual	EPA, ISBN:0-86587-752-1	PP

DESCRIPTION STANDARD AREA

DESCRIPTION	STANDARD	AREA
Specification for 8’ and 12’ Unlighted and Externally Lighted Wind Cone Assembly	FAA AC 150/5345-27	IS
Heliport Design, January 4, 1988	FAA AC 150/5390-2	IS
Obstruction Marking and Lighting, October 1985	FAA AC 70/7460-1G	IS
For all applicable FAR and DEAR Clauses see Contract DE-AC96-03PO92207, Applicable Clauses List	FAR and DEAR Clauses	MR, PP, CA, CW, HW, CS
Factory Mutual - Approval Guide and Loss Prevention Data Sheets	FM	FP
Hazardous Waste Management Regulations (Mississippi)	HW-1	HW
Oil Cos. International. Marine Forum - International Oil Tanker and Terminal Safety Guide	ICIMF	IS
OSHA Referenced Standards	IEEE Standards	IS
SPR Management and Operating and Construction Management Services Contractors-Environmental	IWA: DOE-DM-AGSC	CA, CS, CW, EM, FP, HW, MR, PP
SPR Management and Operating and Construction Management Services Contractors-Safety and Health	IWA: DOE-DM-AGSC	EM, FP, IH, IS, RP, TS
Pollution Prevention Assessment Manual for Texas Businesses	LP 92-03	PP
Surface Water and Ground Water Use and Protection (Mississippi)	LW-2	CW
Regarding Implementation of the Executive Order 13186, “Responsibilities of Federal Agencies to Protect Migratory Birds"	MOU- USFWS	MR
MOU with ATFE for Louisiana Sites during Emergencies	MOU with ATFE in LA	EM
MOU with ATFE for the Texas Sites during Emergencies	MOU with ATFE TX	EM
MOU with the BCSO for BM during Emergencies	MOU with BCSO	EM
MOU with Cameron Parish Sheriff's Office for WH during Emergencies	MOU with CamPSO	EM
MOU with Calcasieu Parish Sheriff's Office for WH during Emergencies	MOU with CPSO	EM
MOU with the FBI for Louisiana Sites during Emergencies	MOU with FBI in LA	EM
MOU with the FBI for the Texas Sites during Emergencies	MOU with FBI TX	EM
MOU with Ft. Polk for Louisiana Sites during Emergencies	MOU with Ft. Polk	EM
MOU with JCSO for BH during Emergencies	MOU with JCSO	EM
MOU with LA Homeland Security for Louisiana Sites during Emergencies	MOU with LA Homeland Security	EM
MOU with LA State Police for Louisiana Sites during Emergencies	MOU with LA State Police	EM
MOU with US Army 797th Explosive Ordinance Co. for the Texas Sites during Emergencies	MOU with US Army 797 EOC	EM
SPR Gas and Geothermal Heat Effects on Crude Oil Vapor Pressure, Dec. 1994	MP 94W0000131	CA
Power to Capture or Destroy Animals Injurious to Property	MSC Section 49-1-39	MR
Nuisance Wildlife	MSC Section 49-7-1	MR
Laboratory Programs & Procedures	MSL 7000.133	CW, HW
National Association of Corrosion Engineers	NACE	FP, IS
National Electric Safety Code	NEC	FP, IS
Fire Protection Handbook	NFPA	FP
Uniform Fire Code	NFPA 1	FP
Standard for Portable Fire Extinguishers	NFPA 10	FP
Standard for Fire Service Professional Qualifications Accreditation and Certification Systems	NFPA 1000	FP
Life Safety Code®	NFPA 101	FP, IS
Guide on Alternative Approaches to Life Safety	NFPA 101A	FP

DESCRIPTION	STANDARD	AREA
Code for Means of Egress for Buildings and Structures	NFPA 101B	FP
Standard for Fire Officer Professional Qualifications	NFPA 1021	FP
Standard for Professional Qualifications for Fire Inspector and Plan Examiner	NFPA 1031	FP
Standard for Professional Qualifications for Fire Investigator	NFPA 1033	FP
Standard for Fire Service Instructor Professional Qualifications	NFPA 1041	FP
Standard for the Installation of Smoke Door Assemblies	NFPA 105	FP
Standard for Industrial Fire Brigade Member Professional Qualifications	NFPA 1081	FP
Standard for Low-, Medium-, and High-Expansion Foam Systems	NFPA 11	FP
Standard for Emergency and Standby Power Systems	NFPA 110	FP
Standard on Stored Electrical Energy Emergency and Standby Power Systems	NFPA 111	FP
Standard for the Installation of Sprinkler Systems	NFPA 13	FP
Recommended Practice for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems	NFPA 13E	FP
Standard for the Installation of Standpipe and Hose Systems	NFPA 14	FP
Recommended Practice for Fire Service Training Reports and Records	NFPA 1401	FP
Standard for Fire Service Respiratory Protection Training	NFPA 1404	FP
Standard on Training for Initial Emergency Scene Operations	NFPA 1410	FP
Standard for Water Spray Fixed Systems for Fire Protection	NFPA 15	FP
Standard on Fire Department Occupational Safety and Health Program	NFPA 1500	FP
Standard on Emergency Services Incident Management System	NFPA 1561	FP
Standard on Comprehensive Occupational Medical Program for Fire Departments	NFPA 1582	FP
Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems	NFPA 16	FP
Standard on Disaster/Emergency Management and Business Continuity Programs 2007 Edition	NFPA 1600	FP
Standard for Dry Chemical Extinguishing Systems	NFPA 17	FP
Standard for Fire Safety Symbols	NFPA 170	FP
Standard for Automotive Fire Apparatus	NFPA 1901	FP
Standard for Service Tests of Fire Pump Systems on Fire Apparatus	NFPA 1911	FP
Standard on Fire Hose	NFPA 1961	FP
Standard for the Inspection, Care and Use of Fire Hose, Couplings and Nozzles; and the Service Testing of Fire Hose	NFPA 1962	FP
Standard for Fire Hose Connections	NFPA 1963	FP
Standard for Spray Nozzles	NFPA 1964	FP
Standard for Fire Hose Appliances	NFPA 1965	FP
Standard on Protective Ensemble For Structural Fire Fighting	NFPA 1971	FP
Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services	NFPA 1981	FP
Standard on Fire Service Life Safety Rope and System Components	NFPA 1983	FP
Standard on Vapor-Protective Ensembles for Hazardous Materials Emergencies	NFPA 1991	FP
Standard on Liquid Splash-Protective Ensembles and Clothing for Hazardous Materials Emergencies	NFPA 1992	FP
Standard on Protective Clothing for Emergency Medical Operations	NFPA 1999	FP
Standard for the Installation of Stationary Pumps for Fire Protection	NFPA 20	FP

DESCRIPTION	STANDARD	AREA
Standard on Clean Agent Fire Extinguishing Systems, 2004 Edition	NFPA 2001	FP
Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire 2001 Edition	NFPA 2012	FP
Standard for Smoke and Heat Venting	NFPA 204	FP
Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire 2001 Edition	NFPA 2113	FP
Standard for Water Tanks for Private Fire Protection	NFPA 22	FP
Standard on Types of Building Construction	NFPA 220	FP
Standard for Fire Walls and Fire Barrier Walls	NFPA 221	FP
Standard for the Protection of Records	NFPA 232	FP
Standard for the Installation of Private Fire Service Mains and Their Appurtenances	NFPA 24	FP
Standard for Safeguarding Construction, Alteration, and Demolition Operations	NFPA 241	FP
Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems	NFPA 25	FP
Standard Methods of Tests of Fire Resistance of Building Construction and Materials	NFPA 251	FP
Standard Methods of Fire Tests of Door Assemblies	NFPA 252	FP
Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source	NFPA 253	FP
Standard Method of Test of Surface Burning Characteristics of Building Materials	NFPA 255	FP
Standard Methods of Fire Tests of Roof Coverings	NFPA 256	FP
Recommended Practice for Fire Flow Testing and Marking of Hydrants	NFPA 291	FP
Flammable and Combustible Liquids Code	NFPA 30	FP
Fire Protection Standard for Pleasure and Commercial Motor Craft	NFPA 302	FP
Standard for the Control of Gas Hazards on Vessels	NFPA 306	FP
Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves	NFPA 307	FP
Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair	NFPA 326	FP
Recommended Practice for Handling Releases of Flammable and Combustible Liquids and Gases	NFPA 329	FP
Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	NFPA 37	FP
Standard for Tank Vehicles for Flammable and Combustible Liquids	NFPA 385	FP
Standard for Heliports	NFPA 418	FP
Code for the Storage of Liquid and Solid Oxidizers	NFPA 430	FP
Standard on Fire Protection for Laboratories Using Chemicals	NFPA 45	FP
Standard for Professional Competence of Responders to Hazardous Materials Incidents	NFPA 472	FP
Standard for Competencies for EMS Personnel Responding to Hazardous Materials/WMD Incidents	NFPA 473	FP
Explosive Materials Code	NFPA 495	FP
Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas	NFPA 497	FP
Building Construction and Safety Code	NFPA 5000	FP
Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operation	NFPA 505	FP
Standard for Fire Prevention During Welding, Cutting, and Other Hot Work	NFPA 51B	FP
National Fuel Gas Code	NFPA 54	FP

DESCRIPTION	STANDARD	AREA
Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks	NFPA 55	FP
Guide to the Fire Safety Concepts Tree	NFPA 550	FP
Liquefied Petroleum Gas Code	NFPA 58	FP
Standard on Industrial Fire Brigades	NFPA 600	FP
Standard for Security Services in Fire Loss Prevention	NFPA 601	FP
National Electrical Code	NFPA 70	FP, IS
Standard for Fire Retardant Impregnated Wood and Fire Retardant Coatings and Building Materials	NFPA 703	FP
Standard System for the Identification of the Hazards of Materials for Emergency Response	NFPA 704	FP
Recommended Practice for Electrical Equipment Maintenance	NFPA 70B	FP
Standard for Electrical Safety in the Workplace	NFPA 70E	FP
National Fire Alarm Code	NFPA 72	FP
Standard for the Protection of Information Technology Equipment	NFPA 75	FP
Standard on Water Mist Fire Protection Systems	NFPA 750	FP
Recommended Practice on Static Electricity	NFPA 77	FP
Standard for the Installation of Lightning Protection Systems	NFPA 780	FP
Electrical Standard for Industrial Machinery	NFPA 79	FP
Standard for Fire Doors and Fire Windows	NFPA 80	FP
Recommended Practice for Protection of Buildings from Exterior Fire Exposures	NFPA 80A	FP
Standard for Fire Protection in Wastewater Treatment and Collection Facilities	NFPA 820	FP
Standard Classifications for Incident Reporting and Fire Protection Data	NFPA 901	FP
Standard for the Installation of Air-Conditioning and Ventilating Systems	NFPA 90A	FP
Standard for the Installation of Warm Air Heating and Air-Conditioning Systems	NFPA 90B	FP
Guide for Fire and Explosion Investigations	NFPA 921	FP
Recommended Practice for Smoke-Control Systems	NFPA 92A	FP
Construction of Geotechnical Boreholes and Groundwater Monitoring Systems Handbook (LDOTD and LDEQ)	No number	CW
Membership in Clean Texas Program http://www.cleantexas.org/index.cfm	No number	MR
Louisiana's Suggested Chemical Weed Control Guide for 1994 (LA Cooperative Extension Services)	No number	CW
Membership in EPA National Environmental Performance Track Program http://www.epa.gov/performancetrack/program/index.htm	No number	MR
Membership in Louisiana Environmental Leadership Program (LaELP) http://www.deq.state.la.us/assistance/elp	No number	MR
The Sterling Brine Handbook (Int'l Salt Co.)	No number	CW
Earth Manual, 3rd Ed., U.S. Department of the Interior, Bureau of Reclamation	No number	CW
Environmental, Safety, and Health Management Plan (FY 1998 - FY 2002)	No number	MO,MR
SPRPMO Level III Design Criteria	No number	MO, MR
Technical Guidance Package for Chemical Sources, Storage Tanks, TCEQ, Feb 2001	No number	CA
SPR Qualified Products List	No number	PP,HW, CS
Organizational and Management Assessments	NOI 1000.72	MR
Pipkin Ranch Road Use Restrictions in Emergencies	Pipkin Ranch Road	EM

DESCRIPTION	STANDARD	AREA
Mississippi DWFP Nuisance Animals	P. N. LE-3799 and LEI 3799	MR
Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action Program	RECAP (2003)	CW
Pollution Prevention Assessment Manual	RG-133	PP
DOE Policy on Signatures of RCRA Permit Applications	SEN-22-90	HW
Nonhazardous Solid Waste Management Regulations and Criteria (Mississippi)	SW-2	HW
Texas Tier Two Reporting Forms and Instructions	TCRA, 505-507 SARA Title III	CS
Special Licenses and Permits	TPWC Chapter 43	MR
Birds; Protection of Nongame Birds; Destroying Nests or Eggs	TPWC Chapter 64	MR
Alligators	TPWC Chapter 65	MR
Disposition of Protected Wildlife	TPWC Section 43.024	MR
Alligators in Texas: Rules, regulations, and general information, 2006-2007	TPWD	MR
Texas Regulations for Control of Radiation - General provisions	TRCR part 11	RP
Texas Regulations for Control of Radiation - Fees	TRCR part 12	RP
Texas Regulations for Control of Radiation - Hearing and Enforcement Procedures	TRCR part 13	RP
Standards for Protection Against Radiation - Permissible Doses, Precautionary Procedures, Waste Disposal	TRCR part 21	RP
Notices, Instructions and Reports to Workers; Inspections	TRCR part 22	RP
Radiation Safety Requirements and Licensing and Registration Procedures for Industrial Radiography	TRCR part 31	RP
Licensing of Radioactive Material -Exemptions, Licenses, General Licenses, Specific Licenses, Reciprocity, Transport	TRCR part 41	RP
Fire Protection Engineering for Facilities	UFC 3-600-01	FP
International Conference of Building Officials - Uniform Building Code and Uniform Fire Code	UFC/UBC	FP
Underwriter's Laboratory - Building Materials, Fire Resistance, Fire Prot. Equip., & Haz. Location Equip. Directories	UL	FP
West Hackberry Emergency Response Procedures	WHI 5500.9	EM,FP
West Hackberry Spill Prevention, Control, and Countermeasures Plan	WHL 5400.20	CW

End of Appendix A-1

Appendix A2
SPRPMO ES&H Directives

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SPRPMO ES&H Directives

Directive	Description
DOE O 151.1C	Comprehensive Emergency Management System
DOE O 225.1A	Accident Investigations
DOE O 231.1A Change 1	Environment, Safety and Health Reporting
DOE O 420.1B	Facility Safety
DOE O 430.1B	Real Property Asset Management
DOE O 430.2B	Departmental Energy and Utilities Management
DOE O 440.1B	Worker Protection Management for DOE Federal and Contractor Employees
DOE O 440.2B Change 1A	Aviation Management Safety
DOE O 450.1 Change 2 Admin Change 1	General Environmental Program
DOE O 451.1B Change 1	National Environmental Policy Act Compliance Program
DOE O 460.1B	Packaging and Transportation Safety
DOE O 460.2A	Departmental Materials Transportation and Packaging Management
DOE O 5400.5 Change 2	Radiation Protection of the Public and the Environment
DOE O 5480.19 Change 2	Conduct of Operations Requirements for DOE Facilities
DOE M 231.1-1A Change 2	Environmental, Safety and Health Reporting Manual
DOE M 231.1-2	Occurrence Reporting and Processing of Operations Information
DOE M 440.1-1A	DOE Explosives Safety Manual
DOE M 450.4-1	Integrated Safety Management System 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 450.2 A	Identifying, Implementing, and Complying with Environmental, Safety and Health Requirements
DOE P 450.3	Authorizing Use of the Necessary and Sufficient Process For Standards-Based Environmental, Safety and Health Management
DOE P 450.4	Safety Management System Policy
DOE P 450.7	Environmental, Safety and Health (ES&H) Goals
SPRPMO O 231.1A	Occurrence Reporting and Processing System
SPRPMO O 450.1	Environmental Management System
SPRPMO O 451.1C	National Environmental Policy Act Implementation Plan
SPRPMO P 451.1C	SPR Environmental Policy

Appendix B

DOE Policy
SPRPMO Policy 451.1B, “Environmental Policy Statement”

DM Policy
ASP5400.2, “Environmental Policy”

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UNOFFICIAL

U. S. Department of Energy

STRATEGIC PETROLEUM RESERVE PROJECT MANAGEMENT OFFICE

New Orleans, La.

POLICY

SPRPMO P 451.1B

APPROVED: 01/09/07

SUBJECT: ENVIRONMENTAL POLICY STATEMENT

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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, including management and oversight of contractors, and decision-making for concept, design, development, construction, operations, and decommissioning.

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 and their environmental programs.

   The SPRPMO top management establishes the Environmental Management System (EMS) to implement this policy, including the following:

   a. **Regulatory Compliance** with applicable Federal, state, and local environmental legal, regulatory, and other requirements that relate to the environmental aspects of the SPRPMO.

   b. **Pollution Prevention** 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.

   c. **Continual Improvement** of the EMS and environmental performance, as appropriate, by establishing and maintaining documented environmental objectives and targets.

   Our EMS strengthens environmental accountability in the decision-making process and is designed to comply with DOE Order 450.1, Environmental Protection Program; and the principles of the International Organization for Standardization, ISO 14001, *Environmental Management Systems – Specification with Guidance for Use* (2004). The SPRPMO's EMS provides a formal, organized process to plan, perform, assess, and improve environmental performance.
   We will communicate this policy to all DOE employees and all other persons working for or on behalf of the DOE at the SPR, make it available to the public, and

maintain procedures to receive and respond to inquiries from external interested parties. This policy will be reviewed periodically and revised to reflect changing conditions and information. The policy provides the framework for setting and reviewing environmental objectives and targets.

We will also be an **environmentally responsible neighbor** in the communities where we operate and act quickly and responsibly to correct incidents or conditions that endanger health, safety, or the environment, report them to authorities promptly, and inform everyone who may be affected by them. We will minimize harm to endangered species and their habitats, ecologically sensitive areas, and cultural resources, and will strive to conserve energy and natural resources.

DOE Management and Operating, Construction Management, Architect-Engineering (A&E) 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.

We will work cooperatively and openly with the appropriate Federal, state, and local agencies, public stakeholders, and site employees to prevent pollution, ensure 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.
Project Manager
Strategic Petroleum Reserve

POLICY

DynMcDermott Petroleum Operations Company

RESPONSIBLE FUNCTION: DM ENVIRONMENTAL **AUTHOR:** MICHAEL HUFF DM EMS Specialist **OWNER:** BILL BOZZO DM ES&H Director	**SUPERSEDES:** ASP5400.2 2.0, "ENVIRONMENTAL POLICY" **APPROVED BY:** See E-Mail Approval R. MCGOUGH, DM PROJECT MANAGER	**POLICY NO: ASP5400.2** **VERSION: 3.0** **PAGE 3**

TITLE: ENVIRONMENTAL POLICY

Effective Date: December 9, 2008

Directing Documents:
a) International Organization for Standardization. ISO 14001:2004(E), "Environmental Management Systems – Requirements with Guidance for Use"
b) Executive Order 13423, "Strengthening Federal Environmental, Energy, and Transportation Management"
c) DOE O 430.2B, "Departmental Energy, Renewable Energy and Transportation Management"
d) DOE O 450.1A, "Environmental Management Program"

Policy Statement: **The Strategic Petroleum Reserve operates only in an environmentally responsible manner.**

Environmentally responsible manner **means that top management pledges all functional levels will:**

- **comply with applicable legal and other requirements to which the SPR subscribes which relate to the environmental aspects of SPR activities,**
- **prevent pollution though design, processes, practices, techniques, materials, products and services so that detrimental environmental impact is reduced or eliminated, and**
- **continually improve environmental performance through the EMS.**

This environmental policy is implemented by DM top management through an environmental management system (EMS) under an integrated safety management (ISM) umbrella.

This environmental policy applies to the facilities and pipelines that comprise the Strategic Petroleum Reserve (SPR) as well as its neighbors in surrounding communities. The mission of SPR is to store petroleum and maintain drawdown readiness. Protection of the environment, workers, and the public are responsibilities of

paramount importance. To control environmental impact, the Department of Energy and its contractors who work at the SPR endorse environmental protection at all management levels and integrate it into all phases of activity – from concept, design, development, construction, operation, maintenance, and decommissioning.

This environmental policy provides the framework for setting and reviewing environmental objectives and targets that assure excellence in environmental management. It is communicated to all persons working for or on behalf of DM, and is available on request at all SPR facilities and electronically on-line at www.dynmcdermott.com .

Functional Oversight: The DynMcDermott (DM) Environmental Department is responsible for assuring the periodic review of this policy by DM top management as well as its update.

Version History – Significant Changes		
Version	Description	Effective date
3.0	This is a complete revision structured after policy requirements set by ISO 14001:2004 standard with respective information from previous DOE and DM environmental policies.	12/9/08
2.0	Minor revisions were made to the scope of the policy and to align this policy with the DOE Environmental Policy (SPRPMO P 451.1B) and the DOE ES&H Manual (SPRPMO M 450.1-1A).	11/29/07
1.0	Versioning was changed to 1.0 in concert with requirements of the new Documentum document management system. In Section A., misuse of resources was added as a negative environmental impact, and environmental enhancement was added as a means of creating positive environmental impact.	11/21/06
K1	Minor revisions include deletion of “Draft” from header on pages 2 through 4 of the document and addition of effective date for K0 on this version history table. No significant content changes were made. Revision bars from the K0 version were left in this version.	12/20/05
K0	Policy was revised to support requirements of the ISO 14001:2004 Standard.	12/02/05

Version	Description	Effective date
J0	Policy was re-formatted in accordance with the DM Document Control and Management Program. Functional oversight for the policy was added. The policy is now more accessible to the Public through the DM website (added web address in paragraph D).	12/15/04
I0	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.	12/05/03
H0	Added wording that more clearly states: top management's commitment to compliance and continual improvement (see B below), the framework for establishing and reviewing objectives and targets (C), and requirements for revision of the policy (E). Revision bars in the right margin mark the changed paragraphs.	11/11/02
G0	Deleted specific responsibilities from this document and revised to contain only policy information. The deleted information is covered in other documents.	11/29/01
F0	Changed "ES&H' to "ES&Q". Deleted section 4.J, Quality Assurance, and moved 4.J.[1] under 4.B, ES&Q Director. Changed the term "independent assessment" under 4.J.[1] to "management appraisal". Deleted section 4.M., Information Systems. Other minor changes were made to sentence structure. Changed paragraphs are marked with a revision bar in the right margin.	5/01/01
E0	Combined subsections 3.3.B and 3.3.C into a single paragraph entitled Prevention of Pollution and added the words "prevent pollution" to 3.2. Expanded wording in 3.3.D., Compliance, regarding other requirements. In section 4, responsibilities, added environmental management system representative and general responsibilities. Changed paragraphs are marked with a revision bar in the right margin.	4/28/00

Version	Description	Effective date
D0	Added the following policy statement "DynMcDermott operates only in an environmentally responsible manner." (3.1) Added 4.C.[1]h. which states that the environmental manager will "assign a person to fill the role of environmental management system coordinator." Changed paragraphs are marked with a revision bar in the right margin.	2/10/00
C0	Completely revised in a new format. Revised the reference list. Incorporated material to conform to the ISO 14001 standard. Incorporated policy on waste management in section 3. Added project manager responsibilities. Added environmental manager responsibility. Added Human Resources and Development and Information Systems responsibilities. Added responsibilities of managers and employees. Changed paragraphs are marked with a revision bar in the right margin.	7/27/98
B0	Annual review with no changes. Version not documented.	1997 Date unknown.
A0	New document. Version not documented.	5/3/96

END OF DOCUMENT

End of Appendix

AAA9008.01
Version 1.0

Appendix C

ENVIRONMENTAL MANAGEMENT SYSTEMS

PROGRAM ACHIEVEMENTS

for 2008

Environmental Objective		Implementation
1.	Reduce permit exceedances reported on the Discharge Monitoring Reports.	Personnel involved with activities that involve environmental permits are made aware of permit limitations that can be affected by their activities. Communication is key to awareness. Improvement can be made in understanding and communicating up front to those involved the permit requirements associated with an activity before the activity is performed. When an exceedance occurs, it is addressed formally, in real time, in an Occurrence Report. The report form prompts a description of the occurrence, cause, and corrective action. To provide awareness and promote corrective action, the information is also provided monthly in a report to the DM project manager and to upper management for discussion at the monthly project review meeting.
2.	Avoid cited Clean Water Act, Clean Air Act, and RCRA (waste) enforcement actions (notices of violations)	Awareness is provided to site personnel through annual spill prevention and waste management training. To promote improvement, spills and excursions that have occurred on the SPR since the last training session are discussed. Reportable releases are documented and managed like permit exceedances. Waste accumulation areas are inspected weekly and waste inventories are conducted monthly to assure compliance with accumulation requirements. Waste reports are reviewed monthly for compliance issues by ES&H managers and the New Orleans waste management specialist.
3.	Reduce reportable occurrences of releases from operational facilities	The number of reportable spills has been reduced through a combination of spill awareness by personnel, systematic preparation for activities that can cause a spill, and the upgrade of equipment that can fail and cause a release. Emphasis continues to be placed on personnel behavior, procedures, and equipment to minimize mishaps. Releases are documented and reviewed in the same manner as permit exceedances and violations to the Clean Air and Clean Water Acts.
4.	Reduce total amount of hazardous waste generated.	The types of wastes that make up the hazardous waste stream have been examined, and the processes that contribute to the waste stream have been evaluated and modified if needed to reduce or eliminate waste.
5.	Reduce total amount of sanitary waste generated.	Waste generation at all sites is characterized and tracked. Waste reduction and recycling efforts are discussed quarterly via conference calls with site P2 advocates to promote and enforce waste reduction.
6.	Increase recycling of sanitary waste through waste diversion.	Office wastes that can be recycled reasonably are diverted from trash cans and placed in recycle bins. Bulk and prevailing components of the sanitary waste stream (i.e. cardboard) are scrutinized for recycling potential. Other waste components are recycled when accepted by those recyclers approved by DM to receive SPR materials. Emphasis is placed on bulk materials from construction activities that could be recycled.

Environmental Objective		Implementation
7.	Increase purchasing of EPA designated recycled content products (affirmative procurement).	Affirmative procurement (AP) performance has improved through increased awareness of the AP procurement program, increased awareness of those products identified by EPA as AP, and the identification of more vendors who can provide products that meet AP criteria. AP awareness training is provided to all DM personnel on hire and at least every two years thereafter. AP is also discussed with P2 advocates during quarterly P2 conference calls.
8.	Increase purchasing of biobased products.	The purchase of biobased products is the same as that for AP.
9.	Increase use of the Qualified Products List (QPL).	Chemical products screened for environmental issues prior to purchase reduce the risk of hazardous waste generation later when used, promote efficient product use, and decrease unnecessary user exposure. Product requestors select chemical products previously approved on the QPL or obtain the approval of an unlisted product from the Environmental Department in New Orleans before purchasing. Awareness of the program and how to use the QPL has been increased to bolster program success.
10.	Review all purchase requests, designs, summaries of work, and other documents sent to Environmental Department for review.	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.
11.	Submit environmental documents on time to DOE and regulators (timeliness and quality).	Milestone dates for document completion are agreed upon with environmental personnel prior to discussion with DOE and their subsequent establishment. Document milestones are tracked by environmental personnel weekly via DM's Summary of Significant Environmental Impacts and Activities Report and quarterly for DM's performance evaluation by DOE.
12.	Purchase low standby power devices from 5 of the 10 device types identified at http://oahu.lbl.gov/	Effort has been made to purchase low standby power devices identified by the Federal Energy Management Program. Computer monitors with a one watt standby power consuming feature are purchased to support Thin Client PC technology employed at all sites. All devices purchased also meet "Energy Star" requirements, and Energy Star devices have been flagged in the electronic material database.
13.	Purchase electricity for hotel and process operations from non-hydroelectric renewable energy sources.	EO 13423 ("Strengthening Federal Environmental, Energy, and Transportation Management") mandates that federal facilities purchase electricity from renewable energy sources. Wind generated electricity credits are purchased annually.
14.	Purchase new renewable energy from new renewable sources.	Wind energy credits were purchased for power generated from a wind farm constructed after 1999 (designated as a "new" renewable energy source).
15.	In managing the Piping and Pipeline Assurance program, submit annual Pipeline and Piping Integrity reports by 10/31/08 for the previous fiscal year.	Piping and pipeline assurance reports document pipe integrity assessments. These assessments support spill prevention. They report significant pipeline and piping activities, problems, deficiencies, and concerns. They also report on repairs or inspections of deficiencies and proposed inspections, studies, and repairs to determine piping and pipeline conditions.

Environmental Objective		Implementation
16.	Ensure key emergency equipment is available.	Each site has key emergency equipment that is tailored to site conditions. The equipment is inventoried quarterly by the site's fire protection/emergency management specialist. Any operational discrepancies are noted and corrective action is taken.
17.	Ensure basic ordering agreements are in place for spill response and clean up at each site.	DM has a sufficient number of agreements with spill response contractors to ensure at least one and preferably two or more are available at any time for call-out. When choosing contractors, factors such as company location, availability/type of equipment, and availability of manpower are considered. Effort continues to be made to partner with contractors with the resources that ideally suit the SPR sites. The contractors are also called out to participate in annual drills where their performance is evaluated.
18.	Ensure emergency preparedness and 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 fires. Training is budgeted annually by the New Orleans Emergency Preparedness (NOEP) department. New ERT members receive 40 hours of fire training and 40 hours of HazMat level training at an independent off-site training facility that is evaluated and certified by the NOEP department. Refresher training is provided annually with pertinent topics covered within a three-year cycle and specific topics receiving more emphasis than others. Unannounced and scheduled site drills are also conducted at each site to test skills, tactics, and strategies.
19.	Ensure Incident Commander/Qualified Individual at each site is trained in ICS.	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 training in Incident Command. The NOEP department develops the training program and conducts quarterly response notification exercises. Incident management is tested during every site drill.
20.	Successfully complete Preparedness for Response Exercise Program (PREP) drills/exercises.	Formally implemented emergency fire, spill, and security exercises test communications, organizational abilities, strategies, and physical competence of personnel and equipment. Response by DM personnel and emergency response contractors is observed and evaluated by a team composed of DM and DOE personnel and outside interested parties such as state and federal regulators and environmental advisory team members. Exercises allow responders to apply their abilities and knowledge, test their equipment, and learn ways to improve their response.
21.	Train Protective Force to assist in Support Response.	The site protective force is an excellent 24-hour resource for initial emergency response and for assisting the Emergency Response Team (ERT). They are trained to look for incidents and support response in the safe, "cold" response zone of the emergency where special personal protective gear is not needed. The protective force is trained annually on site by DM emergency response personnel.

Environmental Objective		Implementation
22.	Ensure fire protection capabilities at each site though prompt Priority One and Two fire protection system repairs.	Work orders to repair fire protection equipment are routinely reviewed by the site fire and emergency management specialist to assure that they receive sufficient attention for prompt resolution. The site fire and emergency management specialist champions work orders for fire system repair. The level of response to repair fire equipment is gauged against the average time to complete fire equipment work orders for the past fiscal year.
23.	Plan and administer an effective community outreach program. Complete community outreach activities using the Annual DOE SPR Public Outreach Plan as a baseline.	A Public Outreach Plan is developed with DOE and implemented each year by the DM director, Property and Facilities. The plan addresses 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.
24.	Reduce VOC emissions by at least 15% from the cavern workover process.	Effort has been made to find ways to prevent or reduce workover related VOC emissions through operational and equipment changes. This includes the continued use of permanent floating roof tanks for depressurization at Big Hill and Bryan Mound when possible, and new technologies evaluated for implementation primarily at West Hackberry, and possibly Big Hill and Bryan Mound if their floating roof tanks are not available. This is a three year (2007-2009) commitment to the Performance Track and Clean Texas programs.
25.	Reduce waste to air (VOC) through degassing crude oil at Bryan Mound to avoid emissions off-site when oil is moved into Commerce.	Methane was removed from "gassy" crude oil through a degasification plant on site. The vapor pressure of oil in selected caverns was lowered through degasification, thereby lowering future emissions when the oil is transferred to an off-site terminal or refinery. This is a three year (2007-2009) commitment to the Performance Track and Clean Texas programs.
26.	Provide habitat on site to protect wildlife.	On-site areas are designated and protected when and where possible as refuge for wildlife. Grassy acreage at Bryan Mound is left undisturbed from late summer through early spring for use by resident and migratory birds for food and shelter. Mowing is restricted / reduced on acreage around a site pond at Big Hill and atop closed brine ponds and insolubles pits at West Hackberry. In the fall, grassy areas at Bayou Choctaw are seeded to provide winter food for deer and other wildlife. At all sites, active bird nesting locations are noted and marked as needed to warn personnel not to disturb them. This is a three year (2007-2009) commitment to the Performance Track and Clean Texas programs.
27.	Maintain a high Maintenance Performance Appraisal Report (MPAR) score for the maintenance program.	A well-maintained facility should equate to fewer environmental impacts. MPAR is a weighted average that is, on a monthly basis, calculated, published in a detailed report, and reported to DOE. 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.

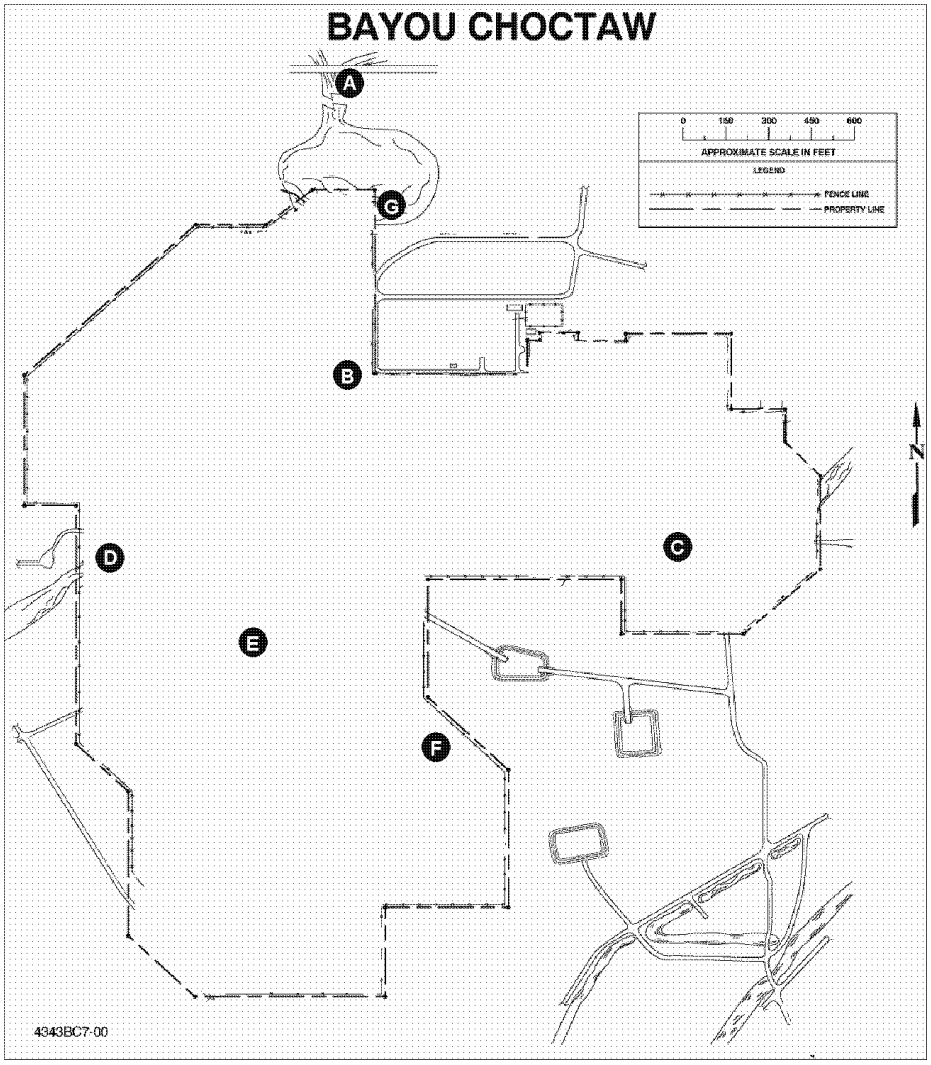
Environmental Objective		Implementation
28.	Conduct a predictive maintenance program (PdM) that will identify potential equipment failures.	Data are systematically collected and analyzed on equipment essential for drawdown and fill operations to prevent failure and possible resultant environmental impact. 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.
29.	Review and revise all applicable building standard specifications to include green building materials, methods, and strategies. Begin implementing the specifications.	All appropriate DOE building standard specifications are being examined and revised to incorporate U.S. Green Building Standards where applicable. The revised standards were implemented in four site building projects. This is a three year (2007-2009) commitment to the Performance Track and Clean Texas programs.
30.	Replace top three cleaning products used that contain the following four harmful non-biobased constituents: alcohol glycol diethanolamine solvents…with environmentally preferable biobased products, reducing the amount of harmful constituents used by 50% per year.	The top three categories of cleaners used at the field sites were determined by examining the number of gallons of different cleaning products purchased that contain non-biobased ingredients. The categories are all-purpose cleaners, window cleaners, and liquid hand soap. These products are being replaced with environmentally preferable biobased products. Purchasing specifications will be modified to assure purchasing of the biobased cleaning products. This is a three year (2007-2009) commitment to the Performance Track and Clean Texas programs.

End of Appendix

Appendix D

SURFACE WATER QUALITY SURVEILLANCE MONITORING

DURING 2008



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 D-1. Bayou Choctaw Environmental Monitoring Stations

Table D-1. 2008 Data Summary for Bayou Choctaw Monitoring Stations

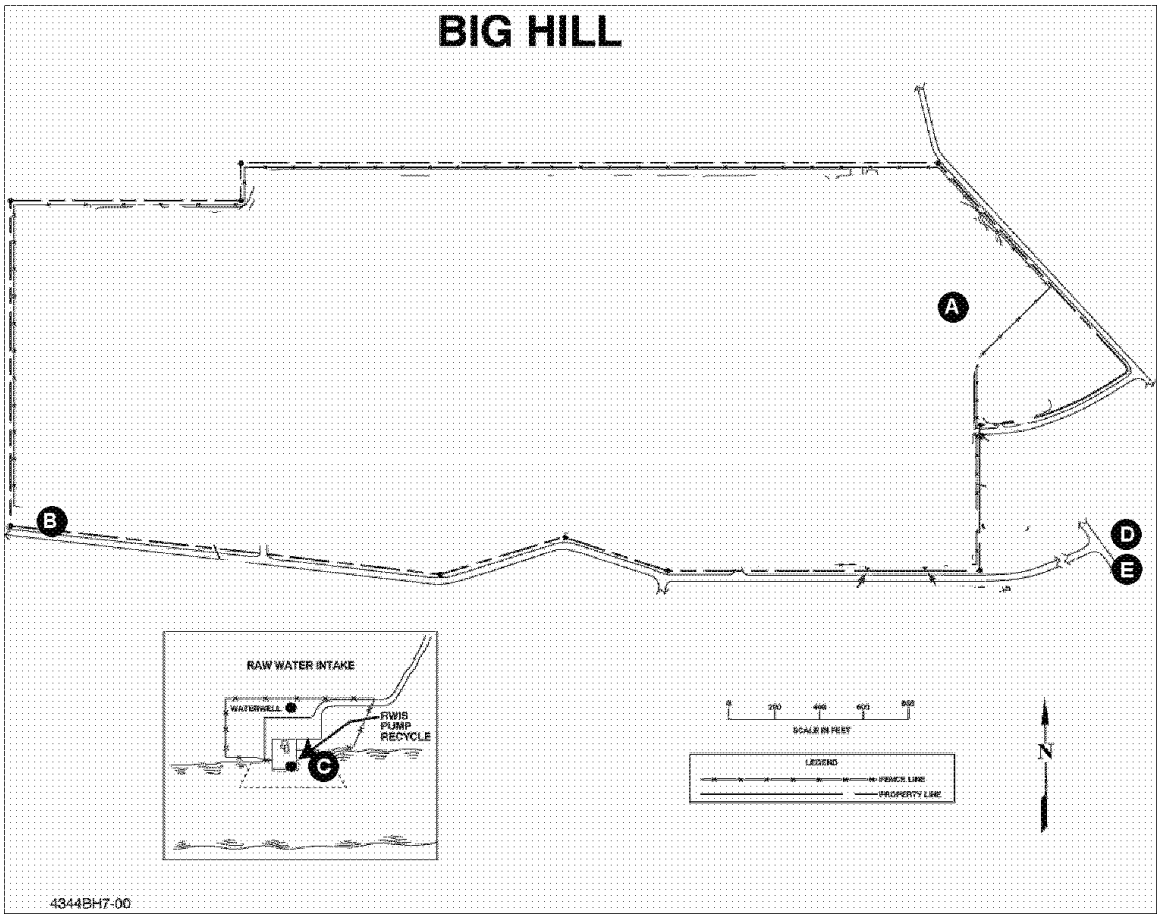
Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	Sample Size	11	4	11	11	11	11
	Number of BDL	0	4	NV	11	NV	0
	Maximum	6.2	2.5	8.0	0.5	28.6	30.0
	Minimum	0.4	2.5	6.9	0.5	12.6	1.9
	Mean	2.9	2.5	NV	0.5	21.1	10.3
	Median	2.7	2.5	7.2	0.5	23.7	9.9
	Standard Deviation	1.6	0.0	NV	0.0	5.5	8.0
	Coefficient of Variation	53.5	0.0	NV	0.0	25.8	77.8
B	Sample Size	11	4	11	11	11	11
	Number of BDL	0	4	NV	11	NV	0
	Maximum	5.2	2.5	7.7	0.5	28.2	11.8
	Minimum	2.0	2.5	7.0	0.5	13.3	2.7
	Mean	3.2	2.5	NV	0.5	21.2	7.0
	Median	3.1	2.5	7.3	0.5	22.6	6.8
	Standard Deviation	1.0	0.0	NV	0.0	5.6	3.1
	Coefficient of Variation	31.5	0.0	NV	0.0	26.6	45.1
C	Sample Size	11	4	11	11	11	11
	Number of BDL	0	4	NV	11	NV	0
	Maximum	4.9	2.5	7.5	0.5	28.9	12.0
	Minimum	0.4	2.5	7.1	0.5	12.5	3.7
	Mean	3.0	2.5	NV	0.5	21.4	7.5
	Median	2.9	2.5	7.3	0.5	24.5	7.2
	Standard Deviation	1.4	0.0	NV	0.0	6.0	2.4
	Coefficient of Variation	46.0	0.0	NV	0.0	28.1	32.2
D	Sample Size	11	4	11	11	11	11
	Number of BDL	0	4	NV	11	NV	0
	Maximum	5.0	2.5	7.8	0.5	27.6	15.4
	Minimum	1.4	2.5	7.1	0.5	13.1	3.8
	Mean	3.2	2.5	NV	0.5	21.2	9.5
	Median	3.1	2.5	7.2	0.5	23.5	9.1
	Standard Deviation	1.1	0.0	NV	0.0	5.4	3.6
	Coefficient of Variation	35.9	0.0	NV	0.0	25.5	38.5
E	Sample Size	11	4	11	11	11	11
	Number of BDL	0	4	NV	11	NV	0
	Maximum	5.3	2.5	8.0	0.5	28.4	15.9
	Minimum	1.4	2.5	7.1	0.5	12.2	4.3
	Mean	3.2	2.5	NV	0.5	21.5	8.6
	Median	3.0	2.5	7.3	0.5	24.6	6.4
	Standard Deviation	1.2	0.0	NV	0.0	5.9	3.9
	Coefficient of Variation	37.6	0.0	NV	0.0	27.4	45.7

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

Table D-1. 2008 Data Summary for Bayou Choctaw Monitoring Stations (continued)

Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
F	Sample Size	11	4	11	11	11	11
	Number of BDL	0	4	NV	10	NV	1
	Maximum	5.2	2.5	9.1	1.3	27.4	23.0
	Minimum	2.2	2.5	7.0	0.5	12.8	0.5
	Mean	3.2	2.5	NV	0.6	21.3	8.8
	Median	3.1	2.5	7.2	0.5	24.9	9.5
	Standard Deviation	0.8	0.0	NV	0.2	5.6	5.8
	Coefficient of Variation	25.7	0.0	NV	42.1	26.1	66.2
G	Sample Size	11	4	11	11	11	11
	Number of BDL	0	4	NV	11	NV	1
	Maximum	6.6	2.5	8.1	0.5	27.0	29.0
	Minimum	0.3	2.5	7.0	0.5	13.0	3.2
	Mean	4.0	2.5	NV	0.5	21.0	11.4
	Median	4.1	2.5	7.4	0.5	23.1	10.5
	Standard Deviation	1.8	0.0	NV	0.0	5.4	6.8
	Coefficient of Variation	46.3	0.0	NV	0.0	25.9	59.8

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



Water Quality Monitoring Stations

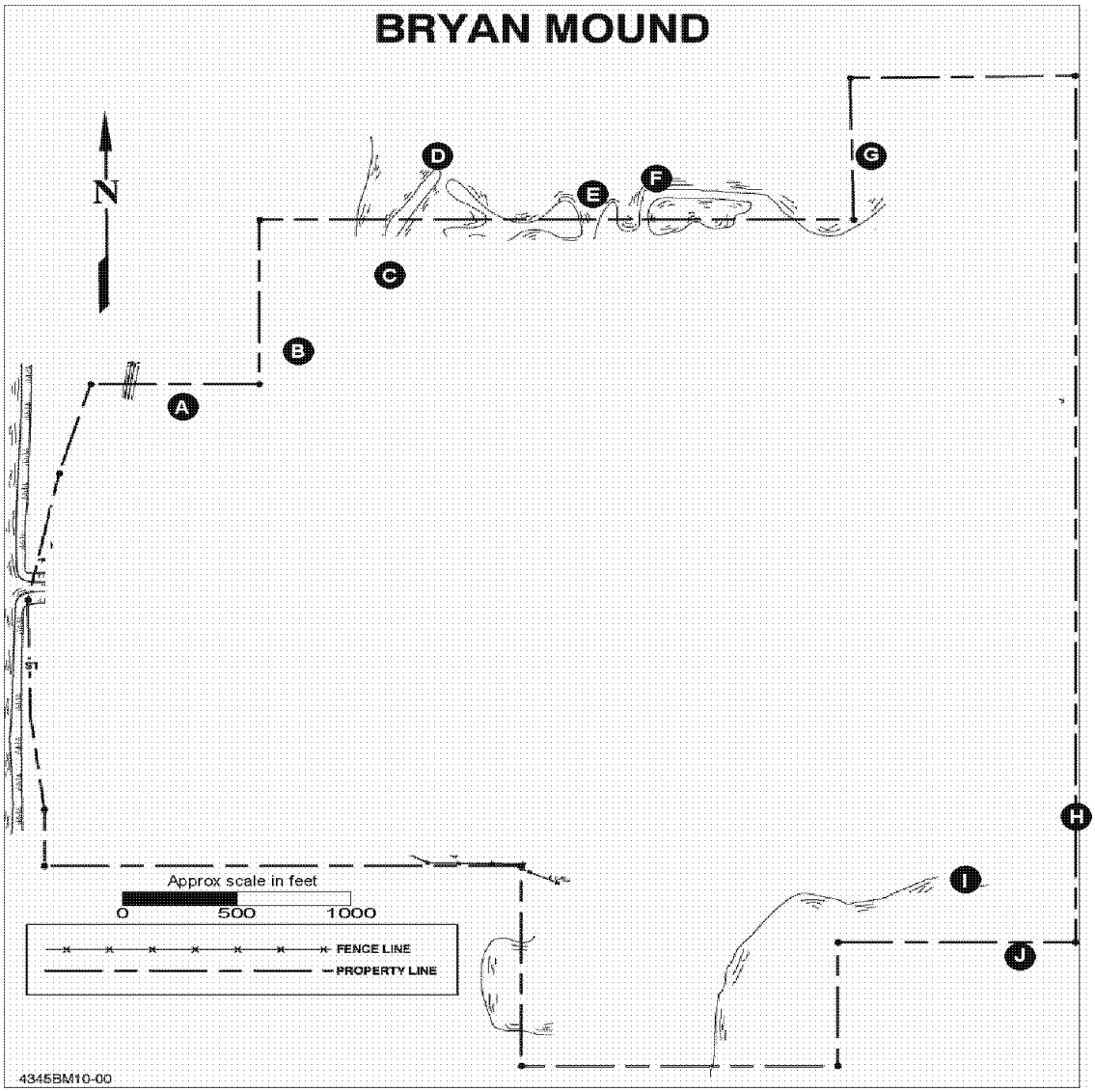
A Pond receiving effluent from site sewage treatment plant (STP)
B Wilbur Road ditch – southwest of site
C RWIS at Intracoastal Waterway
D Pipkin Reservoir – (1.8 Miles from map location)
E Gator Hole – (3.1 Miles from map location)

Figure D-2. Big Hill Environmental Monitoring Stations

Table D-2. 2008 Data Summary for Big Hill Monitoring Stations

Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	Sample Size	3	1	4	4	4	4
	Number of BDL	0	1	NV	1	NV	0
	Maximum	9.3	2.5	8.4	8.3	22.0	23.3
	Minimum	5.5	2.5	7.0	0.5	13.0	7.0
	Mean	8.0	2.5	NV	2.5	17.0	11.4
	Median	9.3	2.5	7.8	0.5	16.5	7.6
	Standard Deviation	2.2	0.0	NV	3.9	4.2	8.0
	Coefficient of Variation	27.1	0.0	NV	159.2	25.0	70.2
B	Sample Size	11	4	12	12	12	12
	Number of BDL	0	4	NV	3	NV	0
	Maximum	8.4	2.5	7.9	21.7	30.0	29.5
	Minimum	0.7	2.5	7.0	0.5	11.0	7.3
	Mean	4.8	2.5	NV	5.0	21.2	15.2
	Median	5.9	2.5	7.6	2.1	22.5	14.1
	Standard Deviation	2.5	0.0	NV	6.5	6.5	6.4
	Coefficient of Variation	53.3	0.0	NV	130.2	30.5	41.9
C	Sample Size	11	4	12	12	12	12
	Number of BDL	0	4	NV	5	NV	0
	Maximum	6.4	2.5	7.9	23.4	31.0	11.9
	Minimum	0.7	2.5	7.4	1.2	11.0	5.6
	Mean	3.9	2.5	NV	10.3	21.5	8.4
	Median	3.9	2.5	7.7	8.4	20.5	8.0
	Standard Deviation	1.7	0.0	NV	7.0	6.4	2.0
	Coefficient of Variation	42.9	0.0	NV	68.3	29.6	23.4
D	Sample Size	11	4	12	12	12	12
	Number of BDL	0	4	NV	5	NV	0
	Maximum	6.9	2.5	8.2	24.4	31.0	43.5
	Minimum	1.2	2.5	7.1	0.5	12.0	12.4
	Mean	4.6	2.5	NV	8.4	21.2	23.6
	Median	6.0	2.5	7.6	1.4	22.5	22.3
	Standard Deviation	2.2	0.0	NV	10.3	7.1	9.3
	Coefficient of Variation	48.4	0.0	NV	122.3	33.5	39.4
E	Sample Size	11	4	12	12	12	12
	Number of BDL	0	4	NV	1	NV	0
	Maximum	9.0	2.5	8.4	23.8	31.0	40.6
	Minimum	2.2	2.5	6.6	0.5	12.0	11.1
	Mean	4.7	2.5	NV	7.5	20.8	17.1
	Median	4.4	2.5	7.7	2.6	22.0	14.4
	Standard Deviation	2.1	0.0	NV	8.6	6.7	8.2
	Coefficient of Variation	45.2	0.0	NV	114.4	32.1	48.3

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



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 D-3. Bryan Mound Environmental Monitoring Stations

Table D-3. 2008 Data Summary for Bryan Mound Monitoring Stations

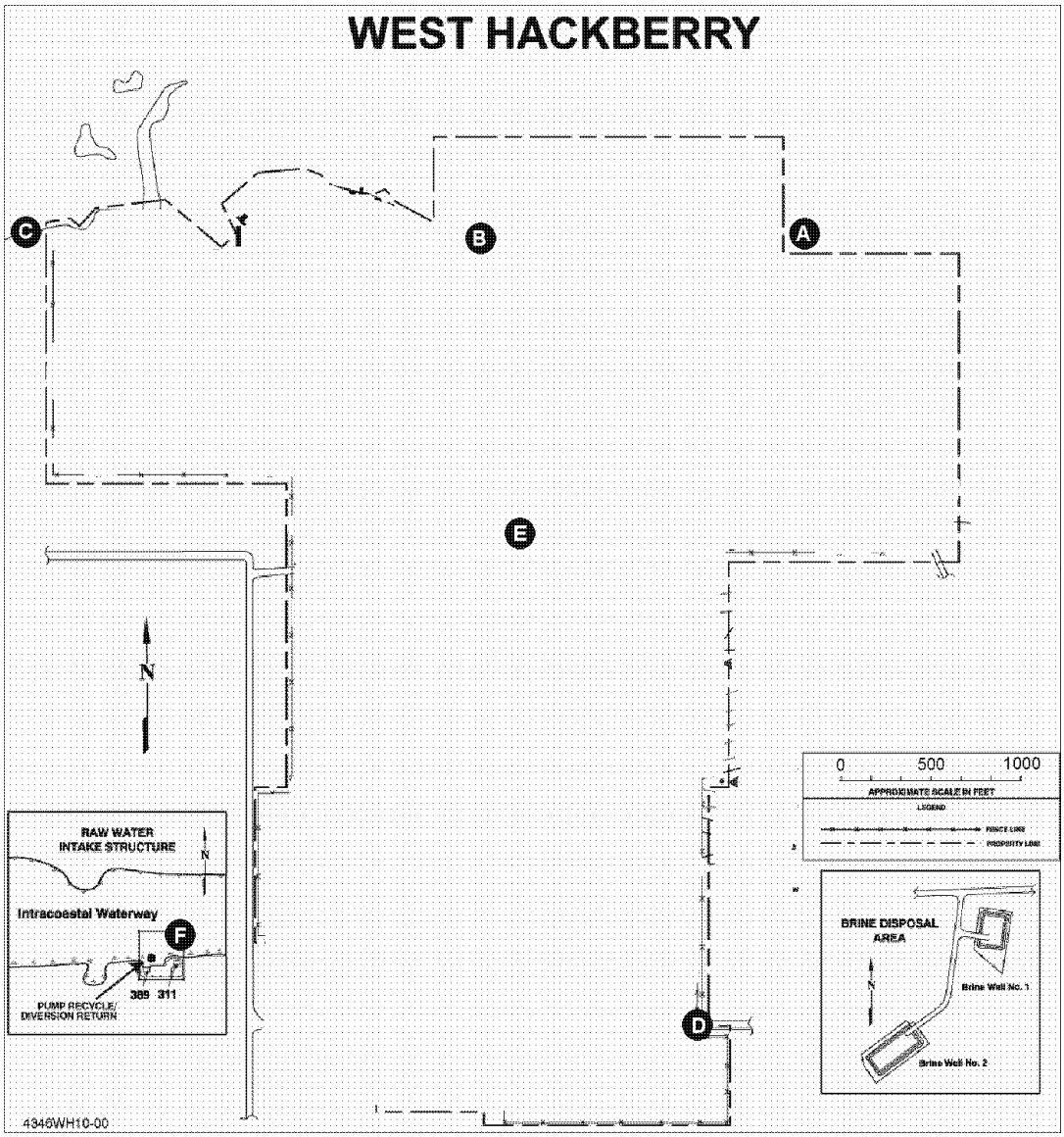
Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	Sample Size	11	5	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	19.5	2.5	8.4	2.9	29.4	49.5
	Minimum	6.4	2.5	7.0	1.7	9.8	31.4
	Mean	12.1	2.5	NV	2.4	21.6	43.4
	Median	10.8	2.5	7.6	2.5	24.4	44.9
	Standard Deviation	4.4	0.0	NV	0.4	6.5	5.8
	Coefficient of Variation	36.5	0.0	NV	18.8	30.2	13.4
B	Sample Size	11	5	12	12	12	12
	Number of BDL	0	5	NV	0	NV	0
	Maximum	19.5	2.5	8.4	2.9	29.8	49.7
	Minimum	6.3	2.5	7.4	1.7	9.4	28.5
	Mean	12.3	2.5	NV	2.3	21.6	44.6
	Median	12.0	2.5	7.7	2.4	24.5	47.1
	Standard Deviation	4.1	0.0	NV	0.5	6.5	6.9
	Coefficient of Variation	33.8	0.0	NV	19.6	30.0	15.4
C	Sample Size	11	5	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	19.1	16.0	8.3	2.9	29.7	48.9
	Minimum	7.7	2.5	7.4	1.7	9.3	27.7
	Mean	11.7	5.2	NV	2.4	22.5	44.0
	Median	11.0	2.5	7.8	2.5	25.3	46.3
	Standard Deviation	3.2	6.0	NV	0.4	6.5	6.8
	Coefficient of Variation	27.3	116.1	NV	17.8	29.0	15.4
D	Sample Size	11	5	12	12	12	12
	Number of BDL	0	5	NV	0	NV	0
	Maximum	19.0	2.5	8.4	2.9	30.0	47.3
	Minimum	6.8	2.5	7.3	1.7	9.6	27.5
	Mean	12.0	2.5	NV	2.4	22.8	41.5
	Median	11.7	2.5	7.7	2.5	25.7	43.6
	Standard Deviation	3.9	0.0	NV	0.4	6.5	6.5
	Coefficient of Variation	33.0	0.0	NV	18.4	28.6	15.6
E	Sample Size	11	5	12	12	12	12
	Number of BDL	0	5	NV	0	NV	0
	Maximum	19.6	2.5	8.4	2.9	30.3	47.0
	Minimum	8.0	2.5	7.3	1.7	10.0	26.2
	Mean	12.2	2.5	NV	2.4	22.8	41.3
	Median	12.3	2.5	7.8	2.5	24.5	44.8
	Standard Deviation	3.8	0.0	NV	0.4	6.6	6.9
	Coefficient of Variation	30.9	0.0	NV	17.6	28.9	16.7

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

Table D-3. 2008 Data Summary for Bryan Mound Monitoring Stations (continued)

Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
F	Sample Size	11	5	12	12	12	12
	Number of BDL	0	5	NV	0	NV	0
	Maximum	17.9	2.5	8.5	2.9	30.4	46.3
	Minimum	4.9	2.5	7.4	1.7	10.0	25.8
	Mean	11.5	2.5	NV	2.4	22.6	39.5
	Median	10.8	2.5	7.9	2.5	24.0	42.4
	Standard Deviation	4.2	0.0	NV	0.4	6.4	6.9
	Coefficient of Variation	36.0	0.0	NV	17.4	28.5	17.5
G	Sample Size	10	5	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	18.7	11.6	8.6	2.9	30.2	47.0
	Minimum	7.5	2.5	7.4	1.7	9.6	25.5
	Mean	12.4	4.3	NV	2.4	22.7	39.8
	Median	12.0	2.5	7.9	2.5	25.6	42.9
	Standard Deviation	3.6	4.1	NV	0.4	6.6	7.0
	Coefficient of Variation	29.1	94.0	NV	17.7	29.2	17.6
H	Sample Size	10	5	10	10	10	10
	Number of BDL	0	5	NV	0	NV	0
	Maximum	18.2	2.5	7.4	29.4	30.1	32.9
	Minimum	6.6	2.5	6.6	7.0	11.7	15.2
	Mean	11.3	2.5	NV	18.3	23.5	20.4
	Median	10.9	2.5	7.0	17.2	24.2	19.0
	Standard Deviation	3.4	0.0	NV	6.6	5.7	4.9
	Coefficient of Variation	29.9	0.0	NV	36.2	24.1	23.9
I	Sample Size	10	5	10	10	10	10
	Number of BDL	0	5	NV	0	NV	0
	Maximum	14.9	2.5	7.5	29.6	29.4	33.5
	Minimum	6.1	2.5	6.5	6.9	11.7	14.4
	Mean	11.3	2.5	NV	18.4	23.5	20.0
	Median	11.4	2.5	7.1	17.4	24.5	19.3
	Standard Deviation	2.5	0.0	NV	6.7	5.4	5.1
	Coefficient of Variation	22.5	0.0	NV	36.4	23.1	25.7
J	Sample Size	10	5	10	10	10	10
	Number of BDL	0	5	NV	0	NV	0
	Maximum	15.9	2.5	7.8	29.9	31.0	32.3
	Minimum	6.5	2.5	6.8	7.8	11.8	13.7
	Mean	11.0	2.5	NV	18.5	23.3	19.3
	Median	10.9	2.5	7.3	17.5	23.7	18.5
	Standard Deviation	2.8	0.0	NV	6.7	5.6	5.2
	Coefficient of Variation	25.7	0.0	NV	36.3	24.0	26.7

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



Water Quality Monitoring Stations

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 D-4. West Hackberry Environmental Monitoring Stations

Table D-4. 2008 Data Summary for West Hackberry Monitoring Stations

Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	11.0	2.5	8.3	16.5	30.0	11.1
	Minimum	4.6	2.5	6.6	4.5	13.0	7.5
	Mean	7.7	2.5	NV	10.2	21.8	8.9
	Median	8.0	2.5	7.6	8.7	22.5	9.0
	Standard Deviation	2.4	0.0	NV	4.3	6.8	1.2
	Coefficient of Variation	30.8	0.0	NV	42.5	31.1	13.4
B	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	10.4	2.5	8.2	16.6	31.0	12.2
	Minimum	5.1	2.5	7.0	4.3	13.0	7.5
	Mean	7.8	2.5	NV	10.2	21.9	9.3
	Median	8.2	2.5	7.7	8.8	22.5	9.5
	Standard Deviation	2.0	0.0	NV	4.3	6.9	1.4
	Coefficient of Variation	25.9	0.0	NV	42.3	31.5	14.7
C	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	10.1	2.5	8.2	16.5	30.0	16.6
	Minimum	5.0	2.5	7.0	4.3	13.0	7.7
	Mean	7.5	2.5	NV	10.1	21.7	9.8
	Median	7.7	2.5	7.5	8.6	21.5	8.9
	Standard Deviation	1.9	0.0	NV	4.3	6.8	2.4
	Coefficient of Variation	25.5	0.0	NV	42.1	31.3	24.7
D	Sample Size	12	4	12	12	12	6
	Number of BDL	0	4	NV	1	NV	0
	Maximum	10.5	2.5	8.7	1.0	30.0	12.0
	Minimum	4.4	2.5	7.0	0.5	11.0	7.0
	Mean	7.3	2.5	NV	0.5	20.9	9.1
	Median	7.1	2.5	7.7	0.5	21.5	9.2
	Standard Deviation	1.9	0.0	NV	0.1	7.2	1.9
	Coefficient of Variation	26.4	0.0	NV	26.6	34.3	21.4

Note: BDL = Number of samples that were below the detectable limit.
NV = Not a valid number or statistically meaningful.
* = No TOC tests made in 2007

Table D-4. 2008 Data Summary for West Hackberry Monitoring Stations (continued)

Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
E	Sample Size	12	4	12	12	12	12
	Number of BDL	0	3	NV	12	NV	0
	Maximum	16.1	10.0	8.4	0.5	32.0	22.8
	Minimum	4.9	2.5	7.1	0.5	11.0	2.8
	Mean	9.0	4.4	NV	0.5	21.5	7.8
	Median	8.3	2.5	8.0	0.5	22.5	5.6
	Standard Deviation	3.1	3.8	NV	0.0	7.6	5.9
	Coefficient of Variation	34.8	85.7	NV	0.0	35.3	75.0
F	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	4	NV	0
	Maximum	9.8	2.5	8.3	14.5	31.0	15.0
	Minimum	4.9	2.5	6.6	0.5	12.0	7.8
	Mean	6.9	2.5	NV	5.2	22.1	10.2
	Median	6.8	2.5	7.4	2.2	22.0	10.5
	Standard Deviation	1.4	0.0	NV	5.5	6.5	2.1
	Coefficient of Variation	20.7	0.0	NV	104.6	29.6	20.4

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

End of Appendix

Appendix E

GROUND WATER SURVEILLANCE MONITORING

DURING 2008

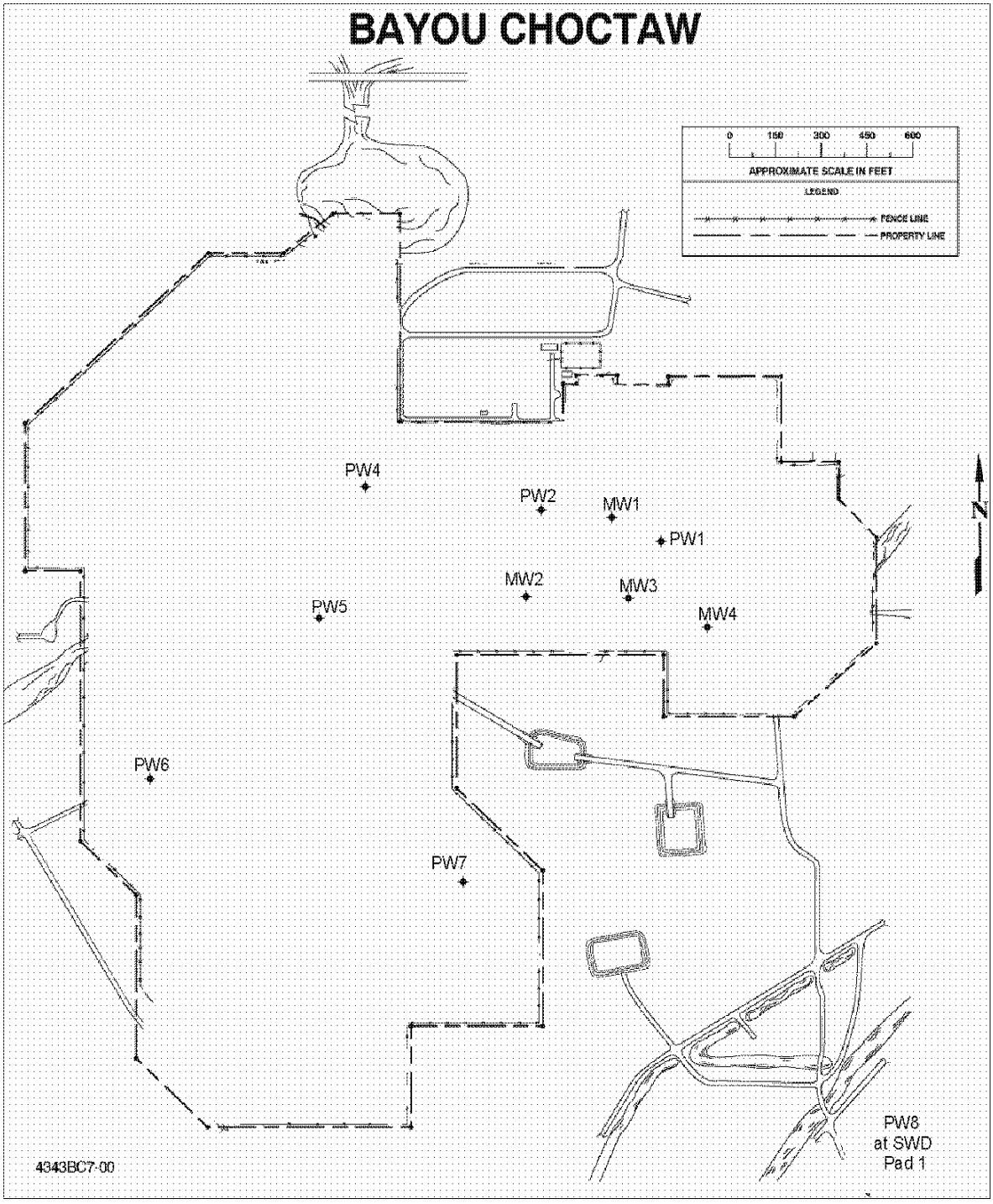


Figure E-1. Bayou Choctaw Ground Water Monitoring Stations

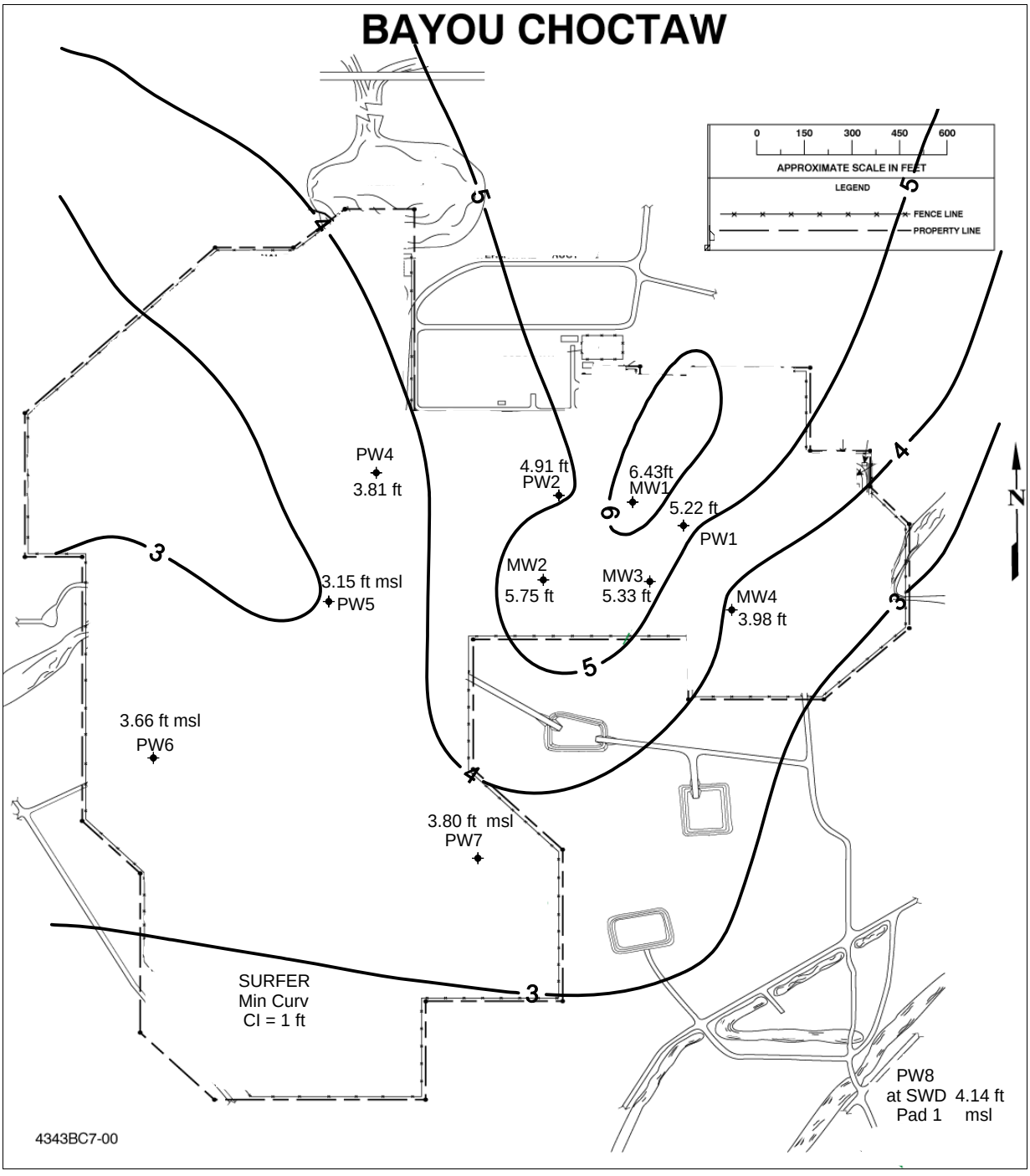


Figure E-2. Bayou Choctaw Ground Water Contoured Elevations Winter 2008

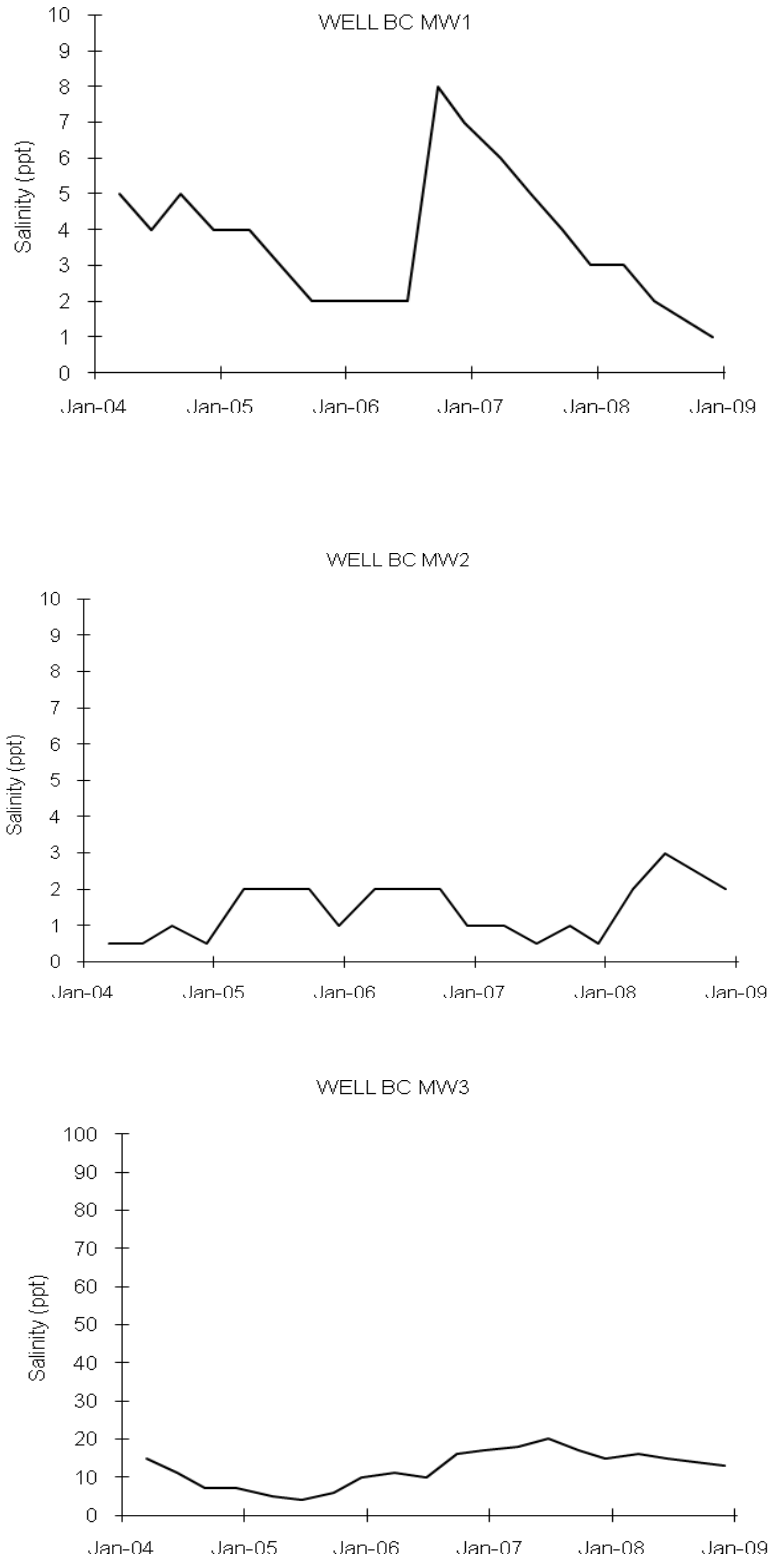
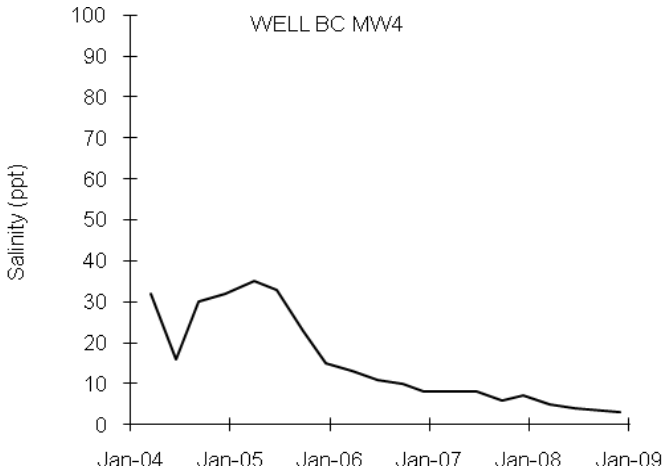
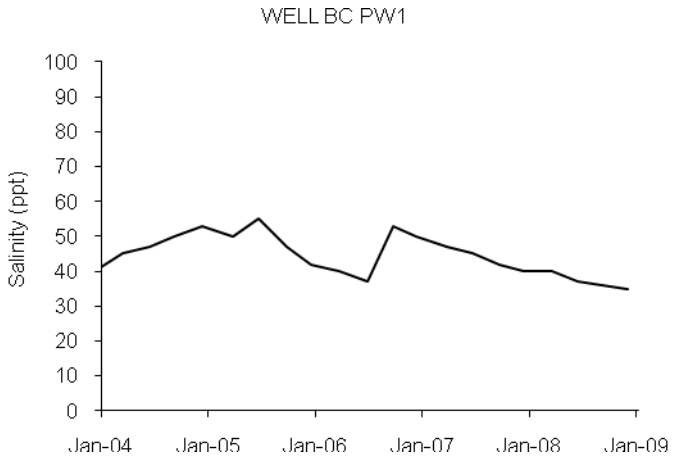


Figure E-3. Bayou Choctaw Ground Water Monitoring Well Salinities





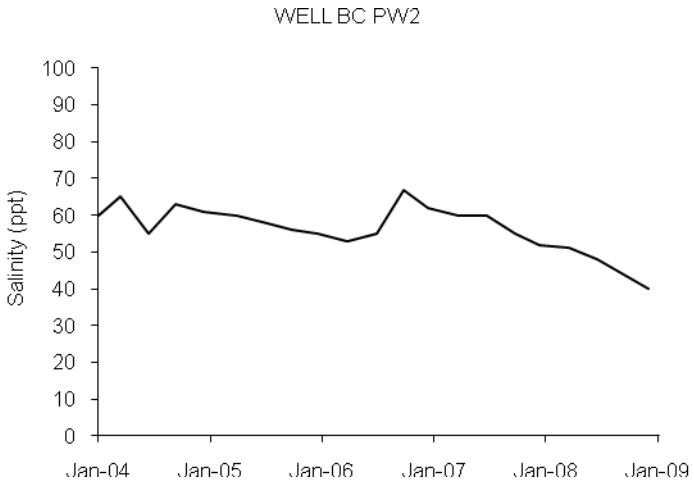


Figure E-3. Bayou Choctaw Ground Water Monitoring Well Salinities (continued)

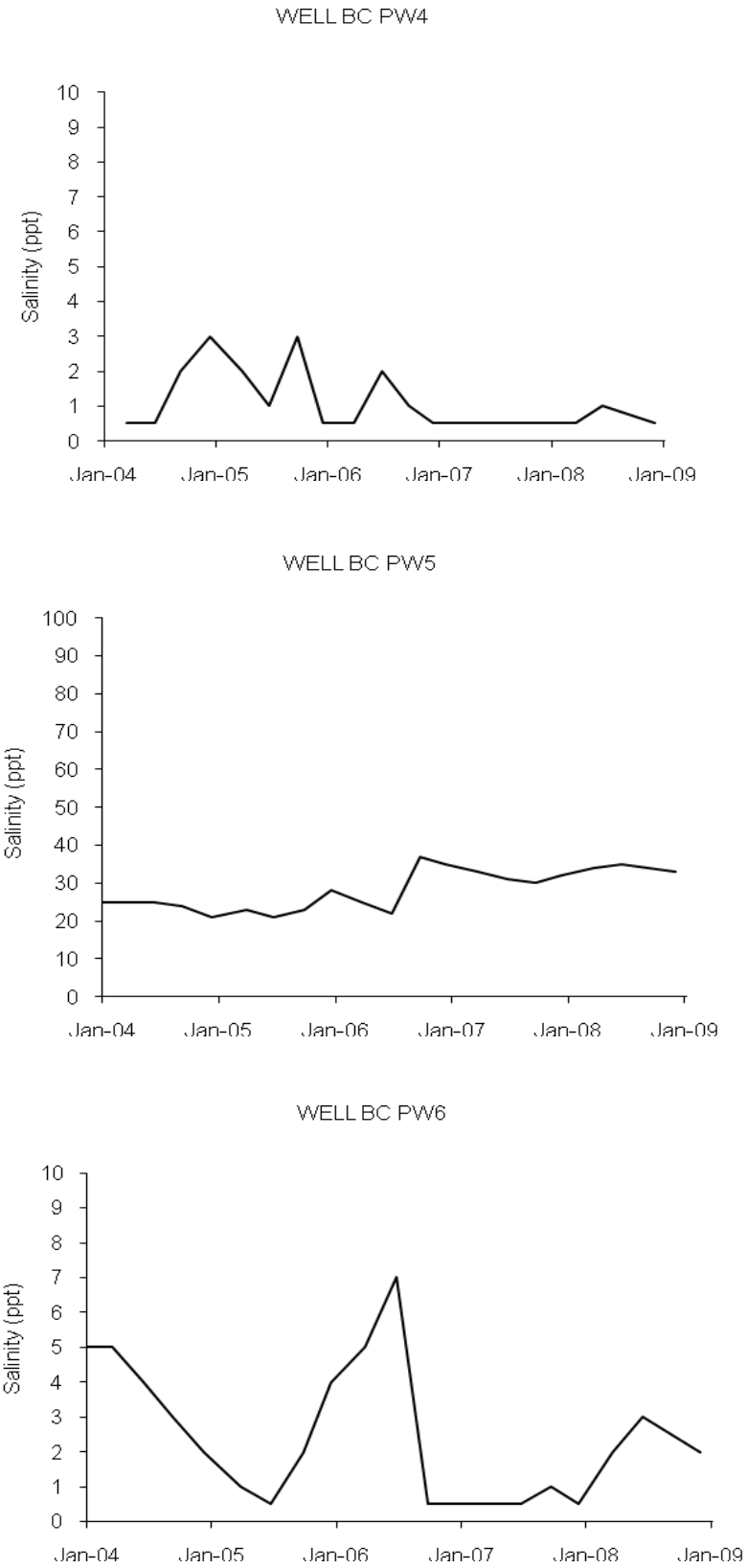


Figure E-3. Bayou Choctaw Ground Water Monitoring Well Salinities (continued)

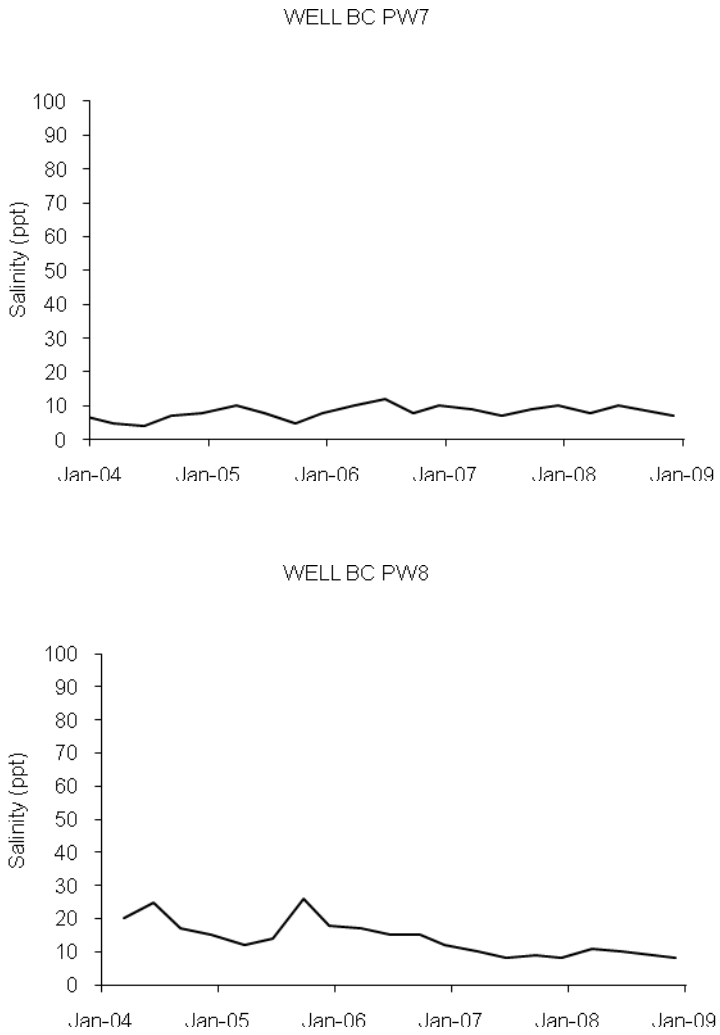


Figure E-3. Bayou Choctaw Ground Water Monitoring Well Salinities (continued)

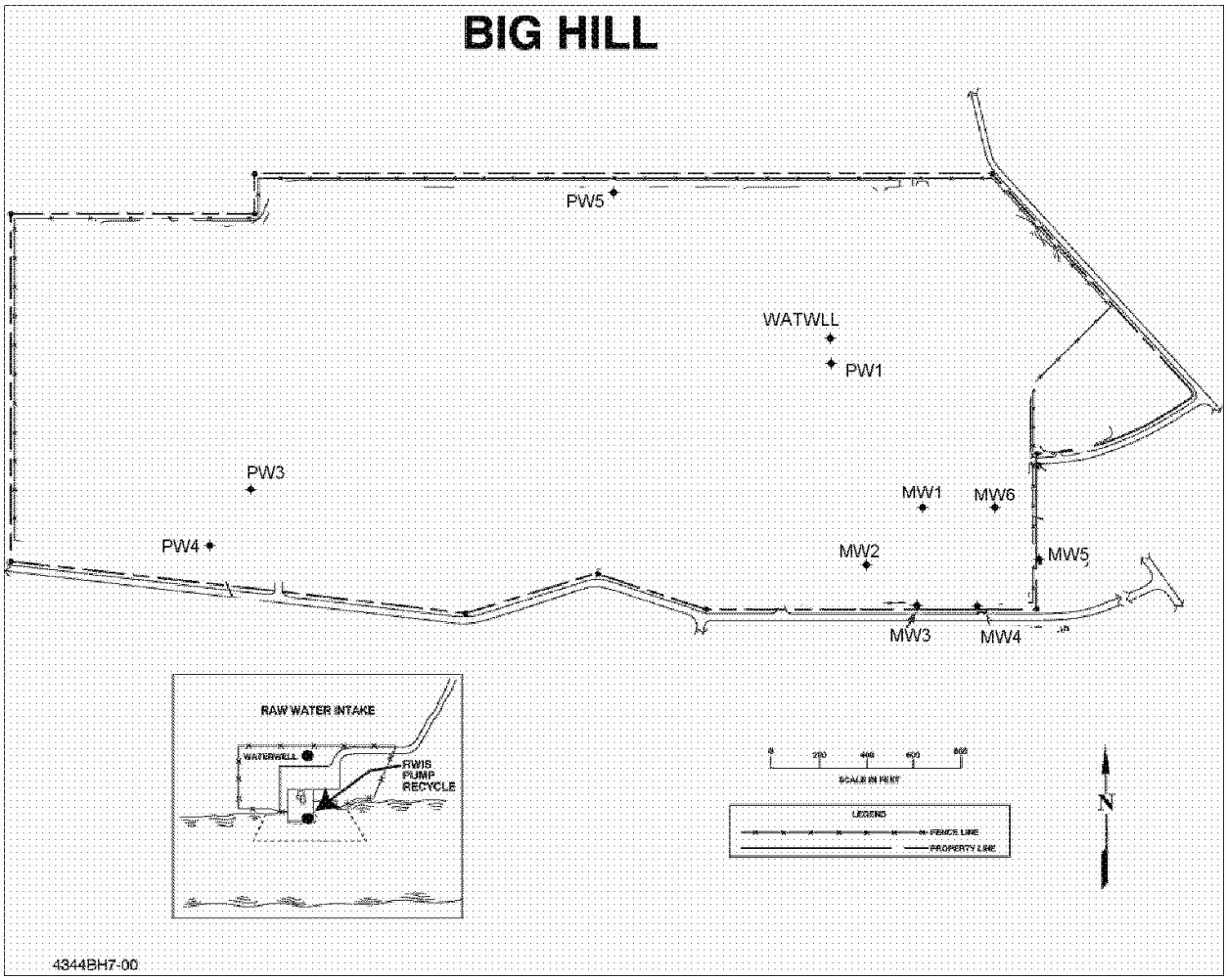


Figure E-4. Big Hill Ground Water Monitoring Stations

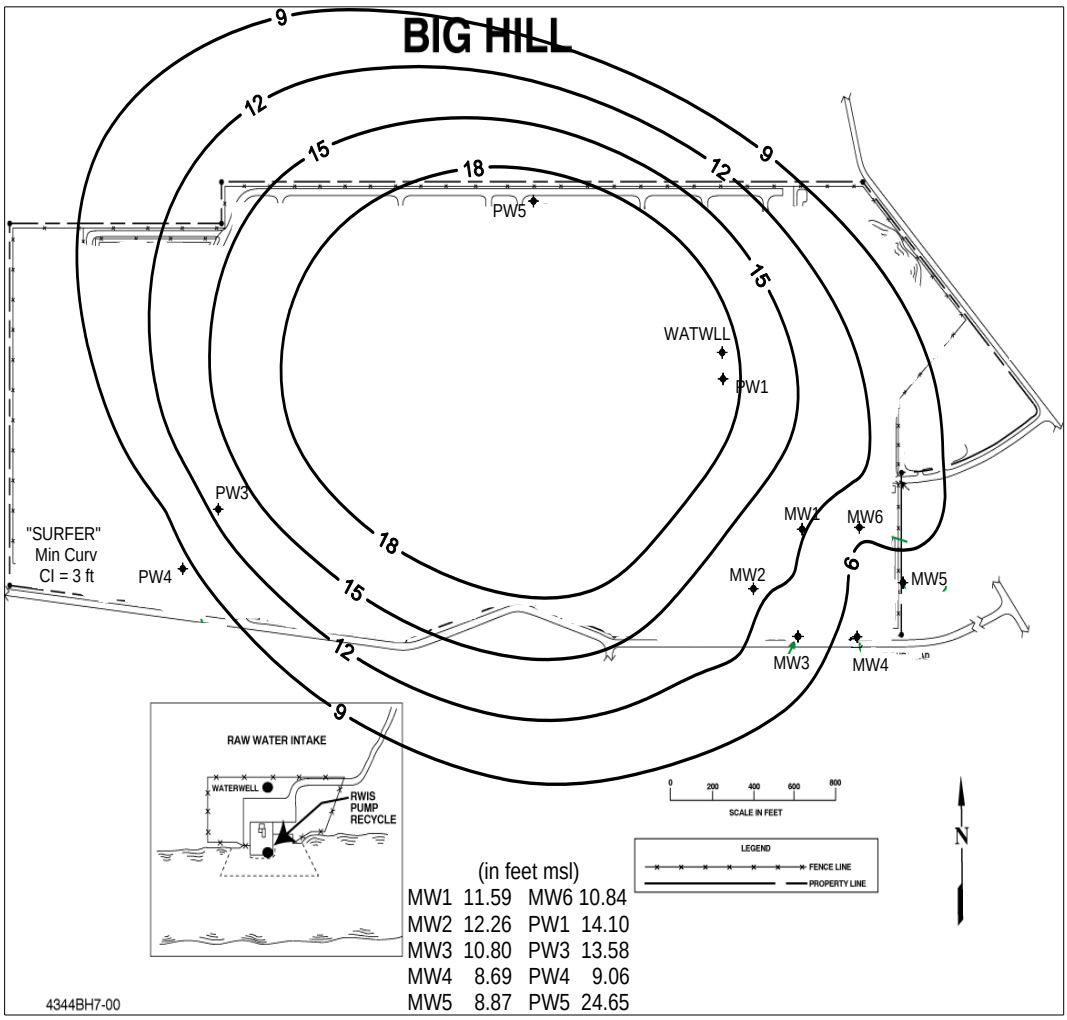


Figure E-5. Big Hill Ground Water Contoured Elevations Winter 2008

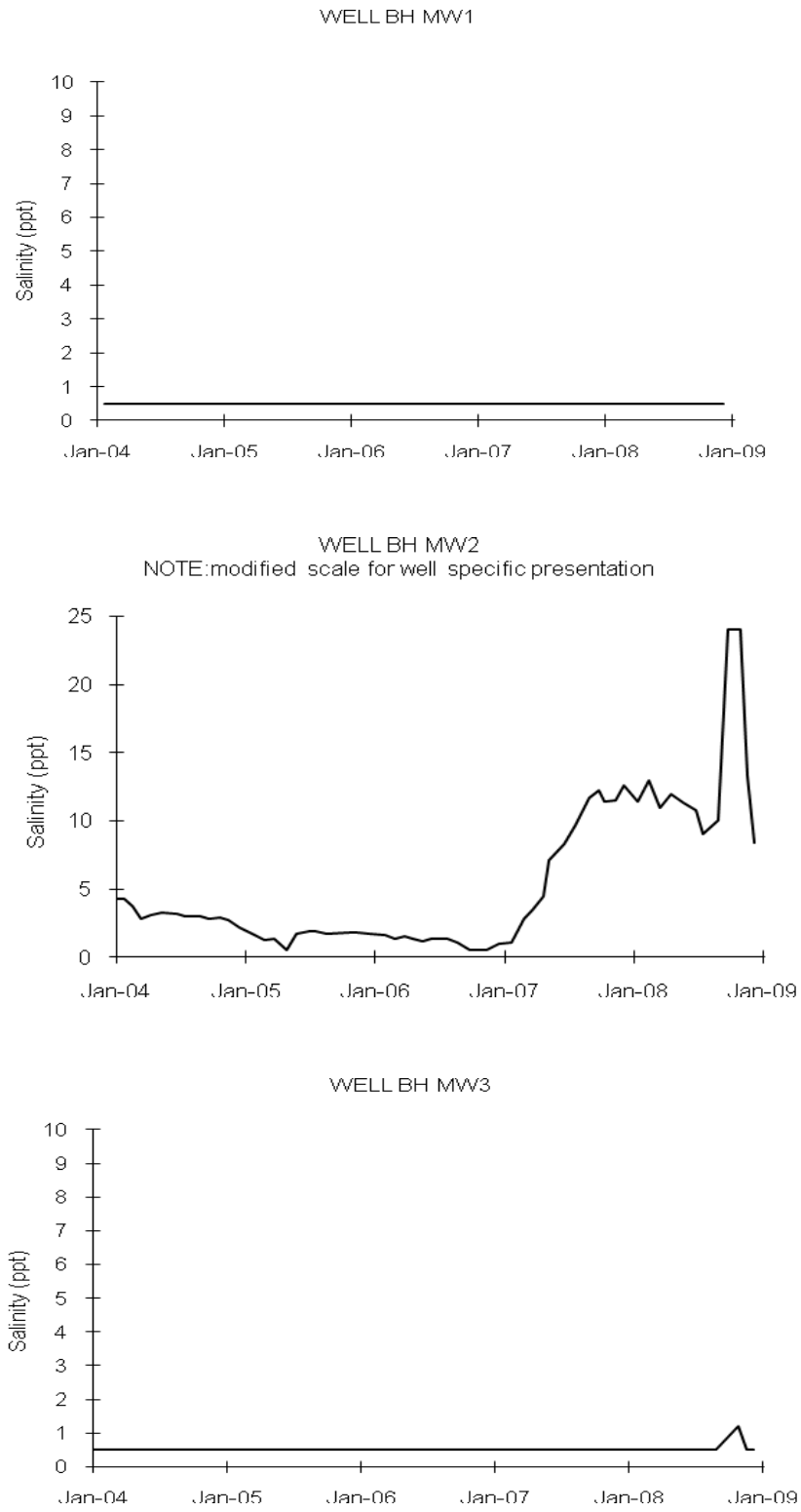


Figure E-6. Big Hill Ground Water Monitoring Well Salinities

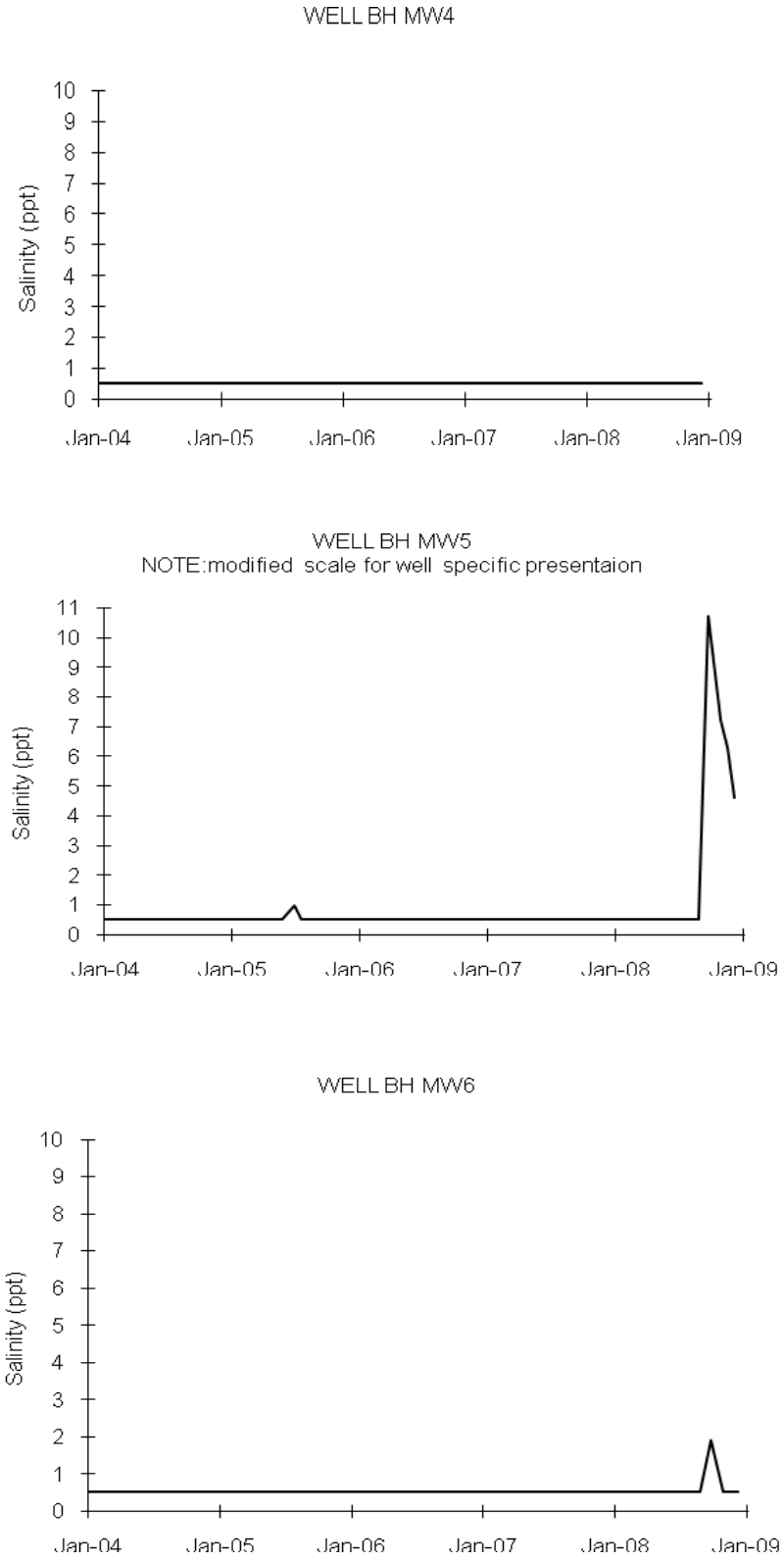


Figure E-6. Big Hill Ground Water Monitoring Well Salinities (continued)

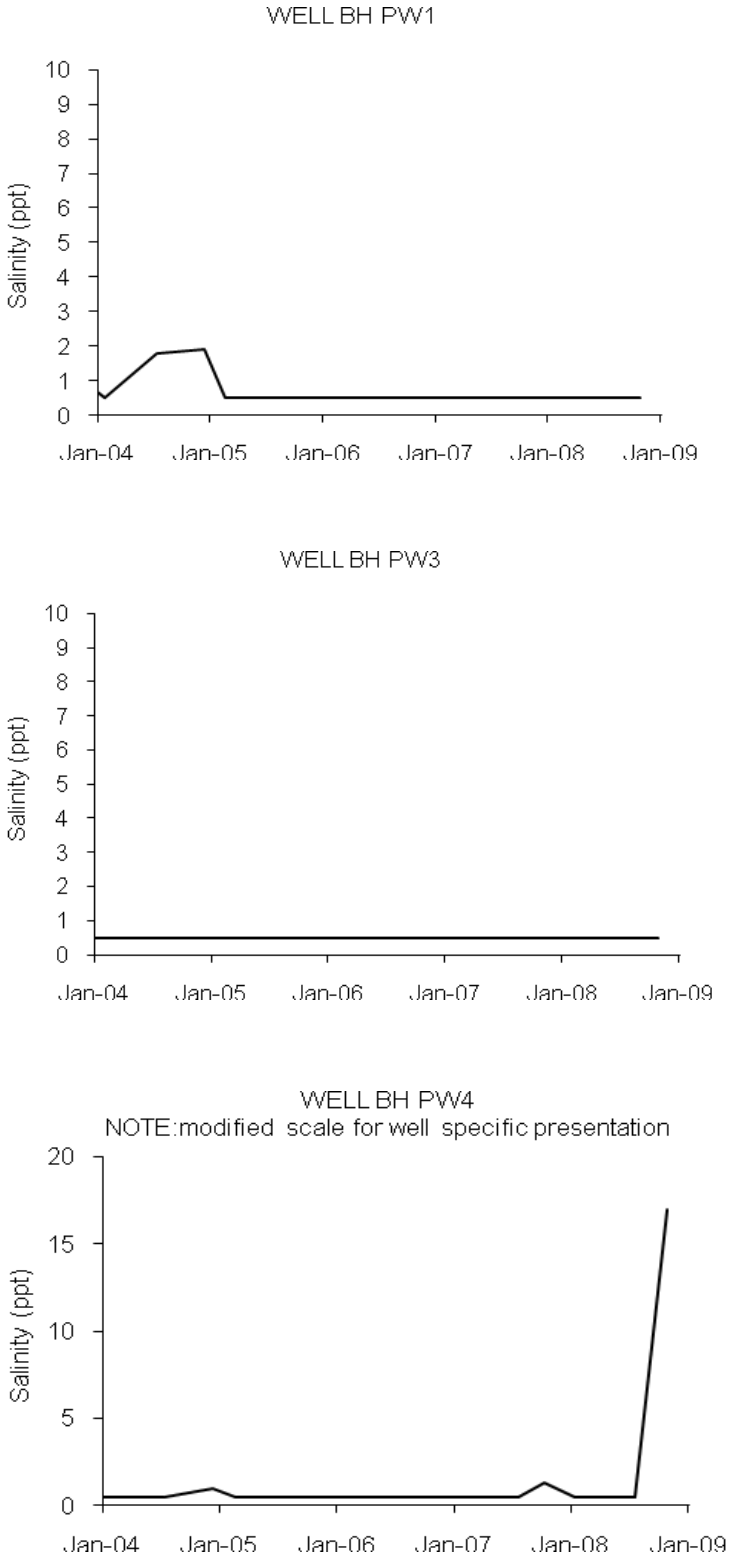


Figure E-6. Big Hill Ground Water Monitoring Well Salinities (continued)

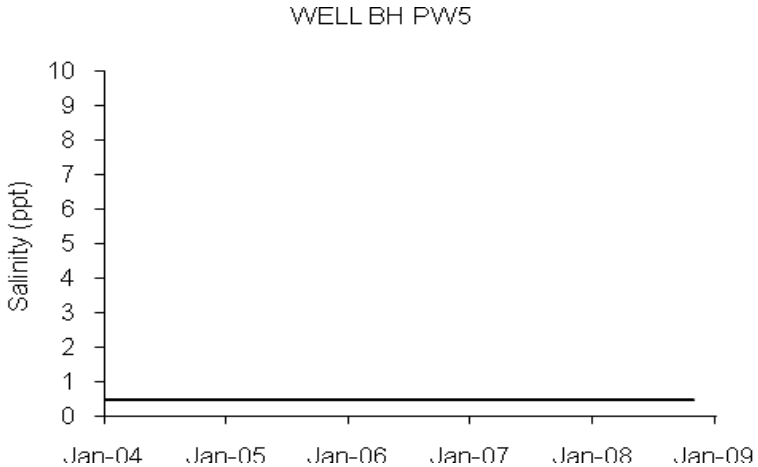


Figure E-6. Big Hill Ground Water Monitoring Well Salinities (continued)

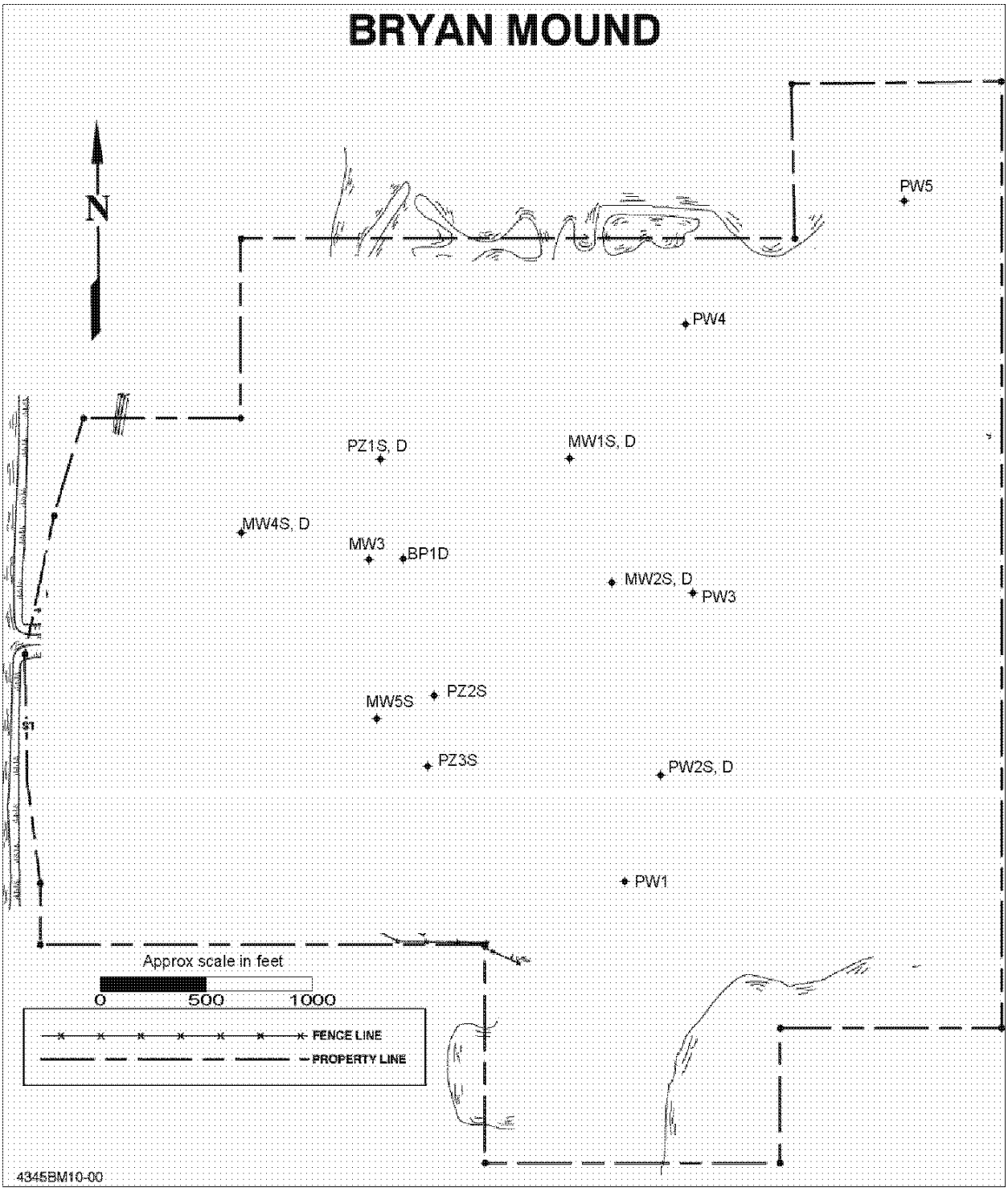


Figure E-7. Bryan Mound Ground Water Monitoring Stations, Deep and Shallow

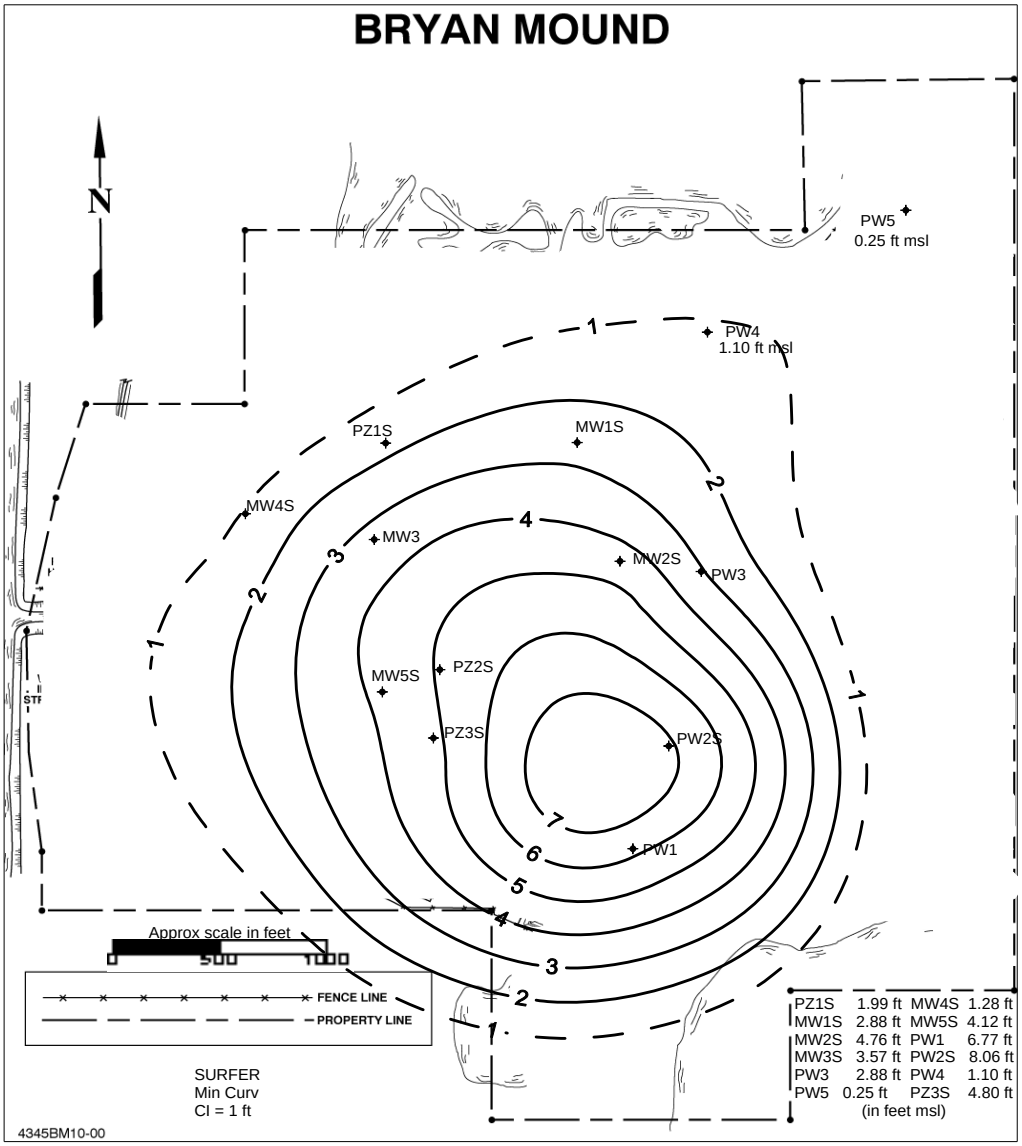


Figure E-8. Bryan Mound Shallow Ground Water Zone Contoured Elevations Winter 2008

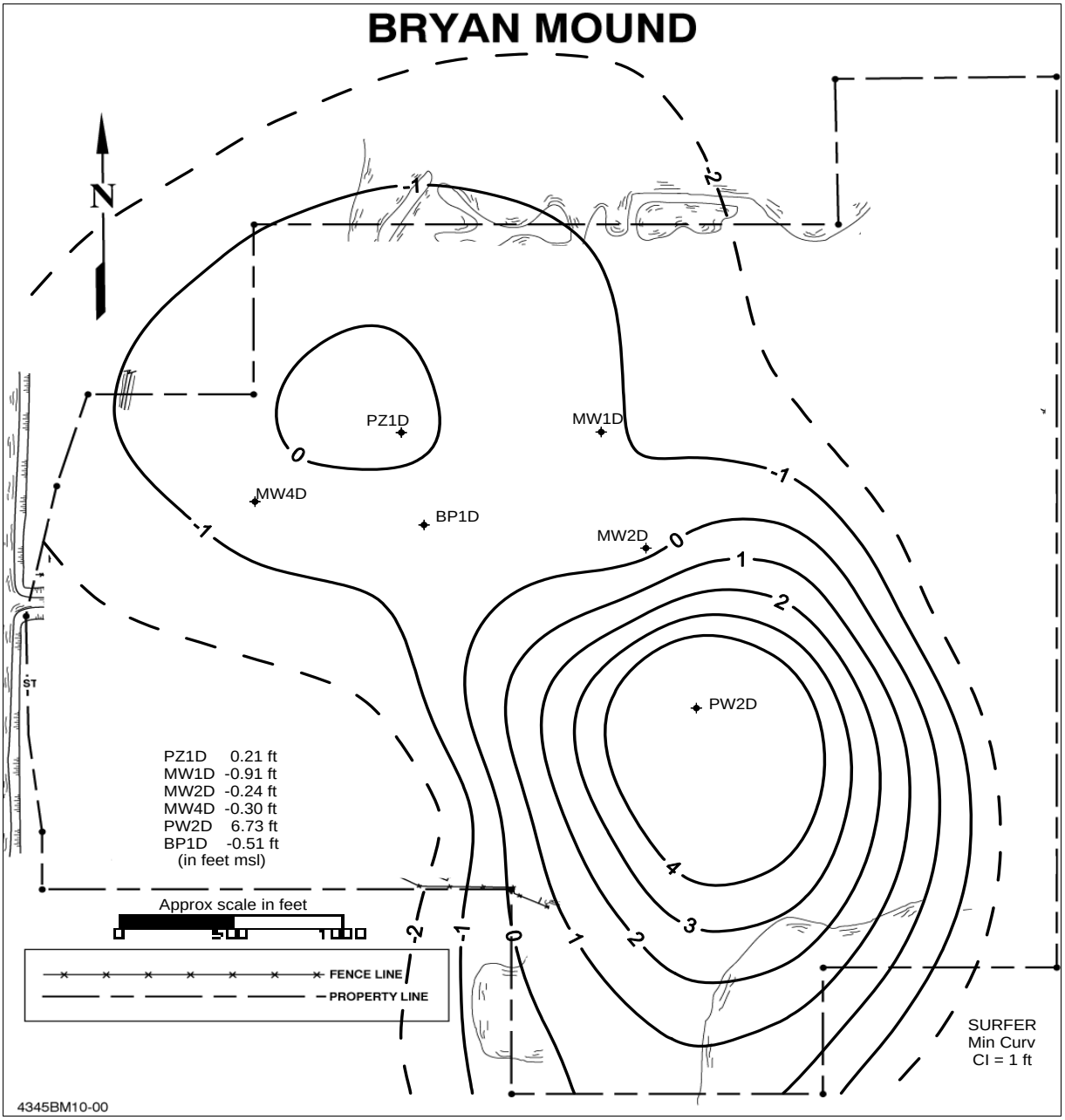


Figure E-9. Bryan Mound Deep Ground Water Zone Contoured Elevations Winter 2008

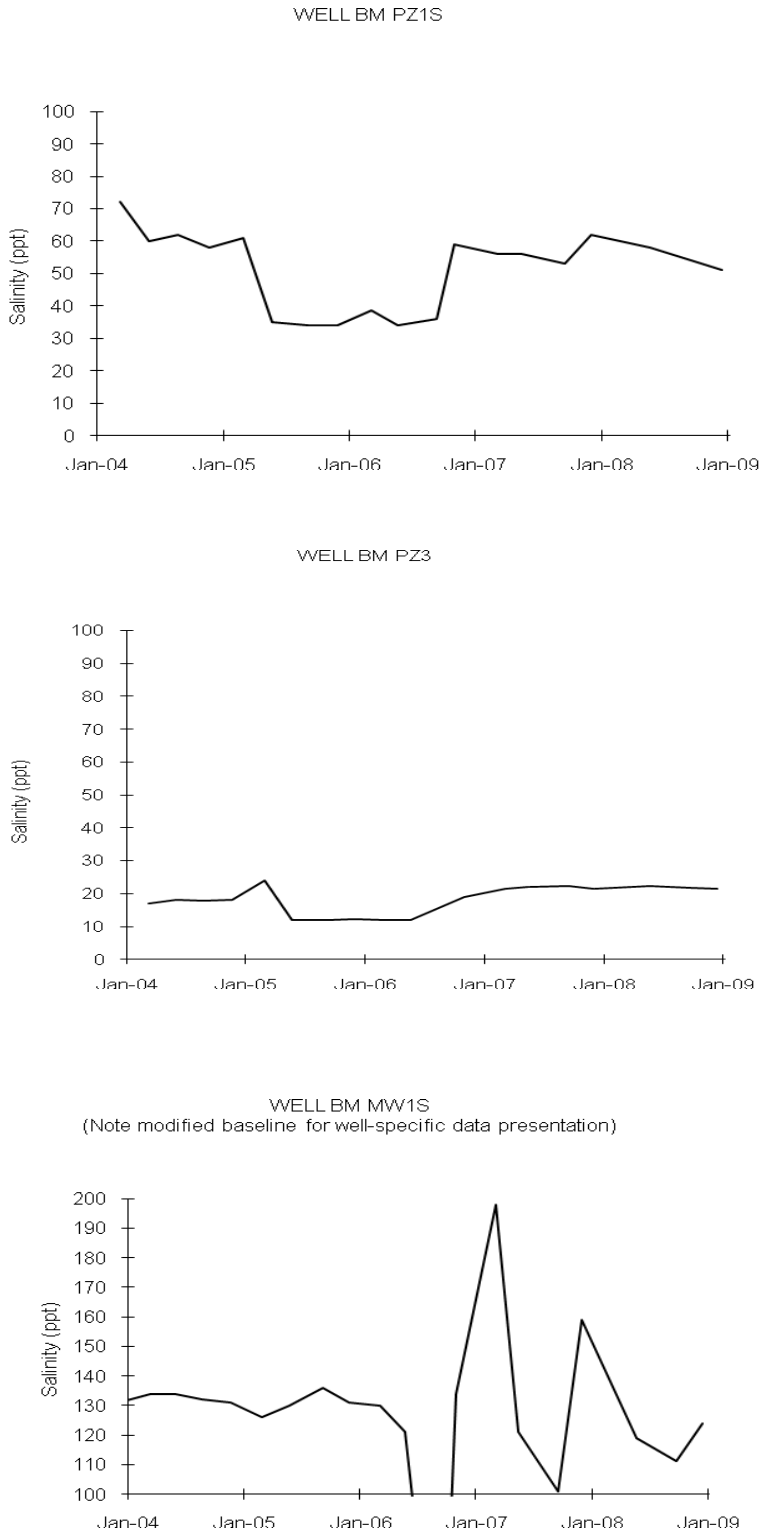


Figure E-10. Bryan Mound Ground Water Monitoring Well Salinities

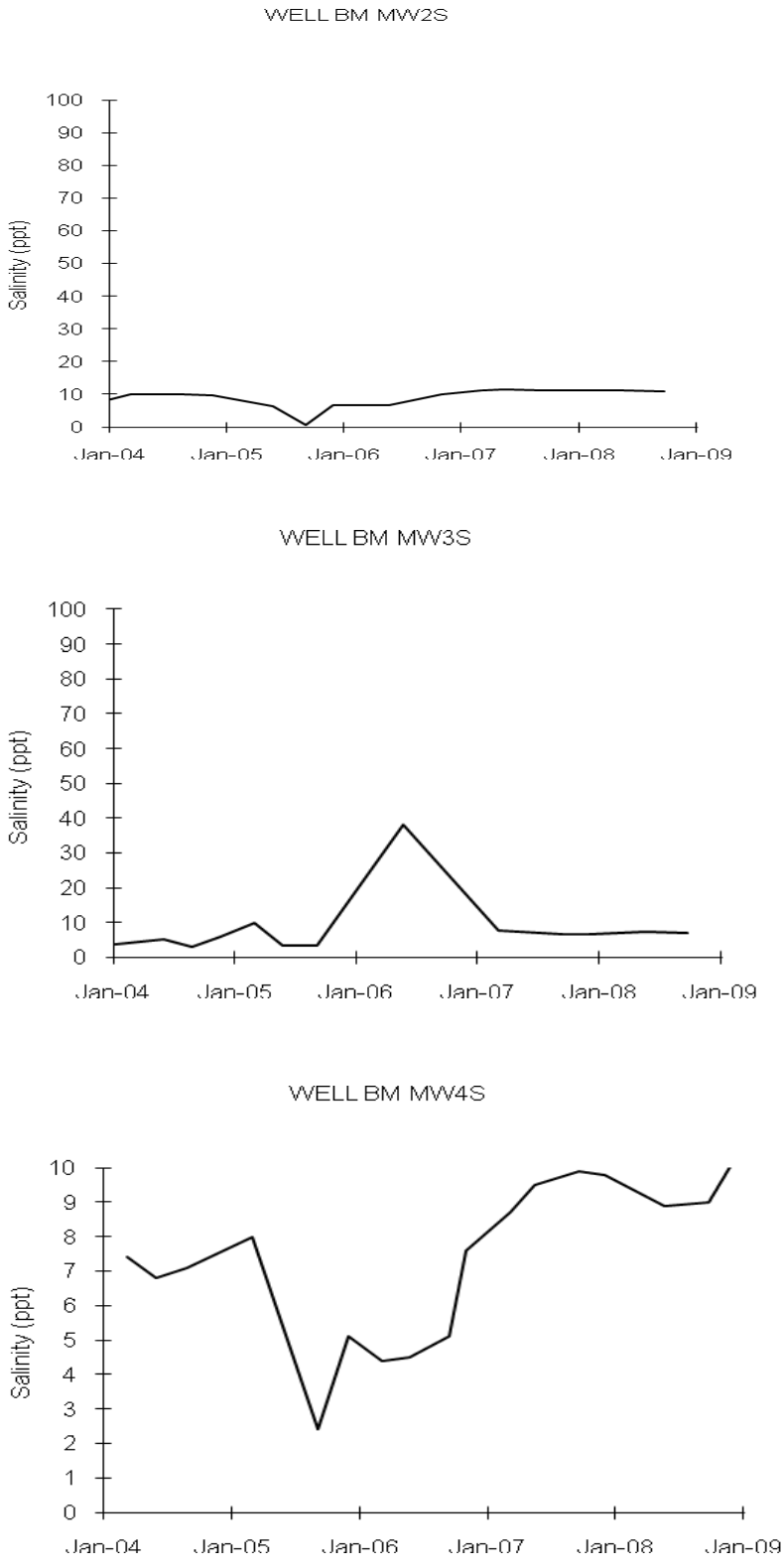
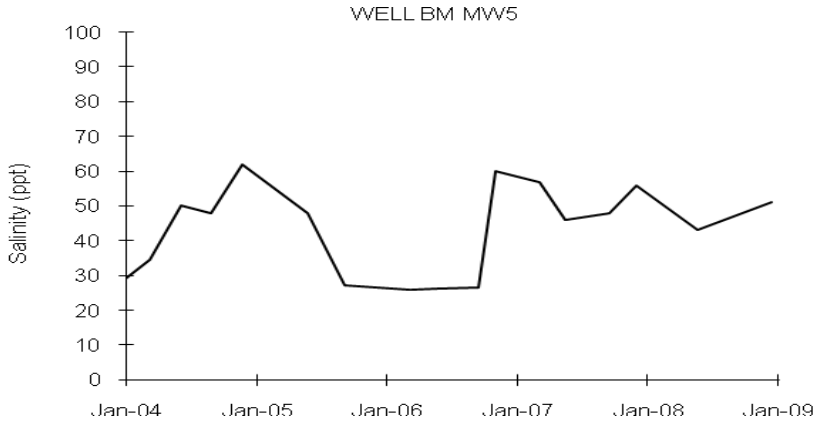
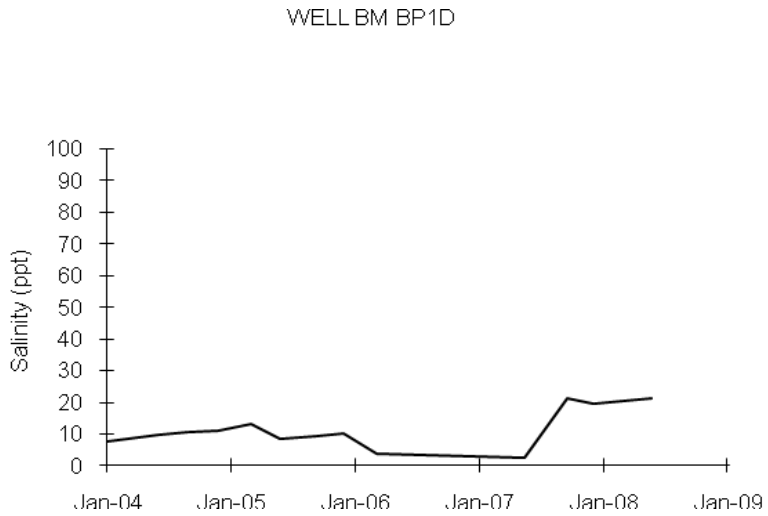


Figure E-10. Bryan Mound Ground Water Monitoring Well Salinities (continued)





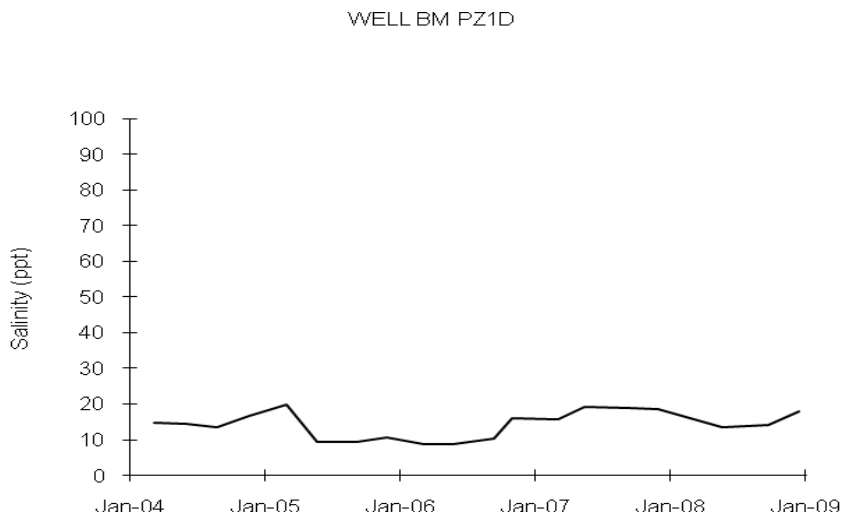
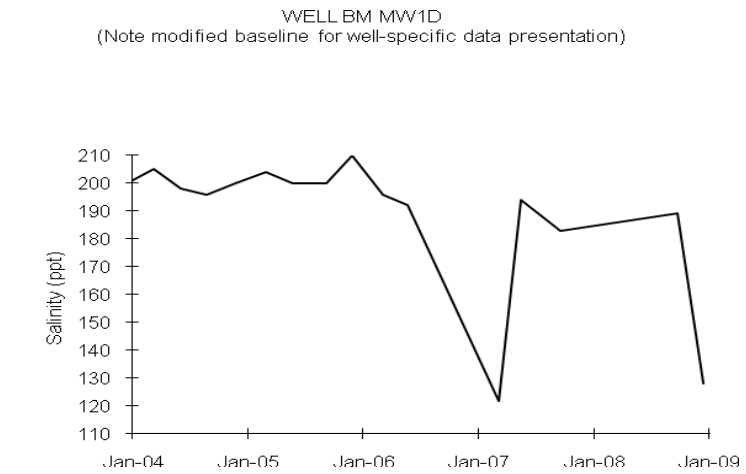
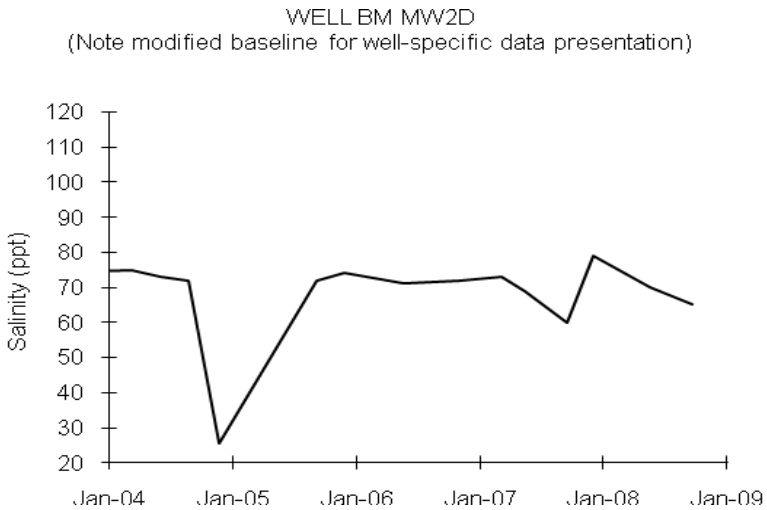


Figure E-10. Bryan Mound Ground Water Monitoring Well Salinities (continued)





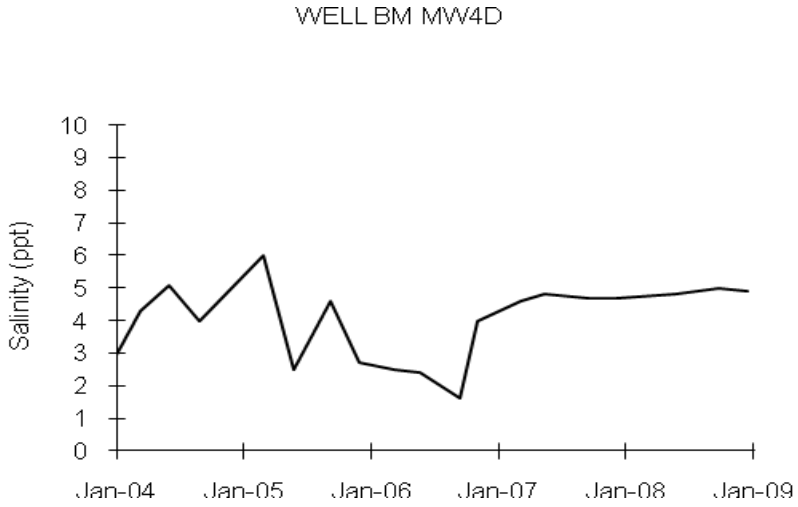
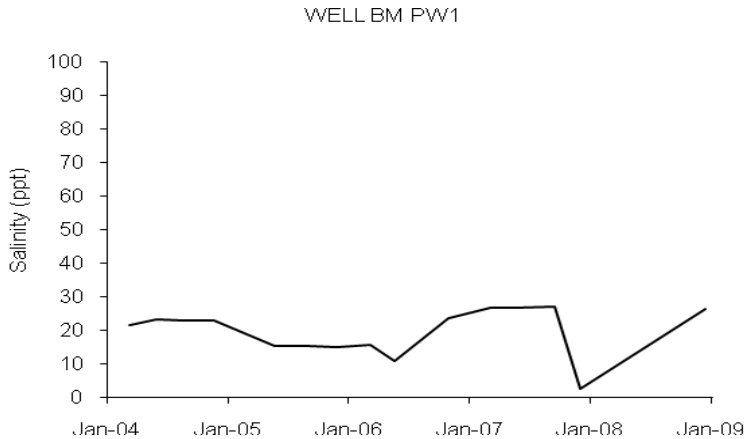
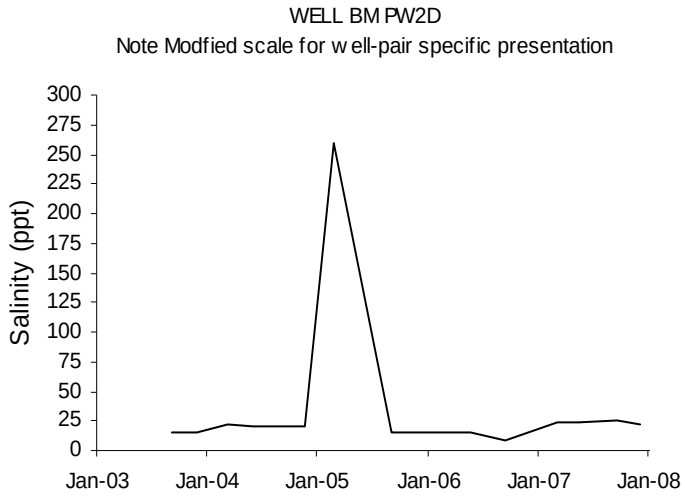


Figure E-10. Bryan Mound Ground Water Monitoring Well Salinities (continued)





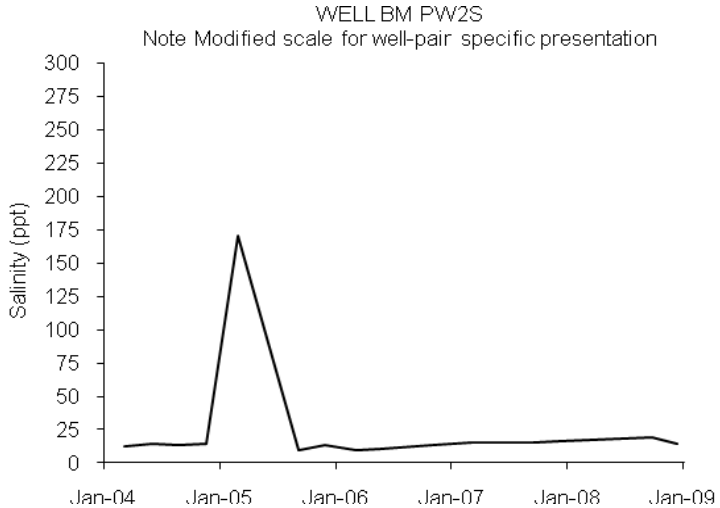


Figure E-10. Bryan Mound Ground Water Monitoring Well Salinities (continued)

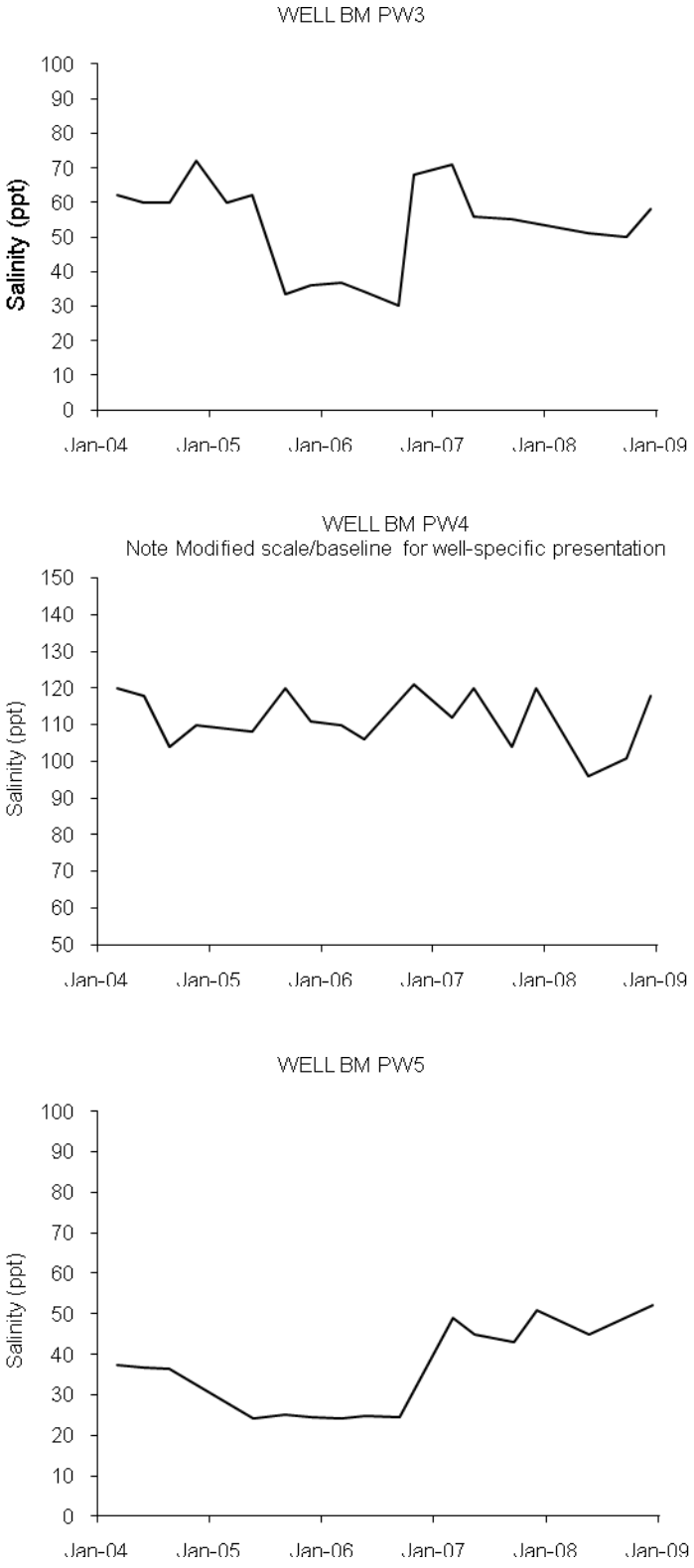


Figure E-10. Bryan Mound Ground Water Monitoring Well Salinities (continued)

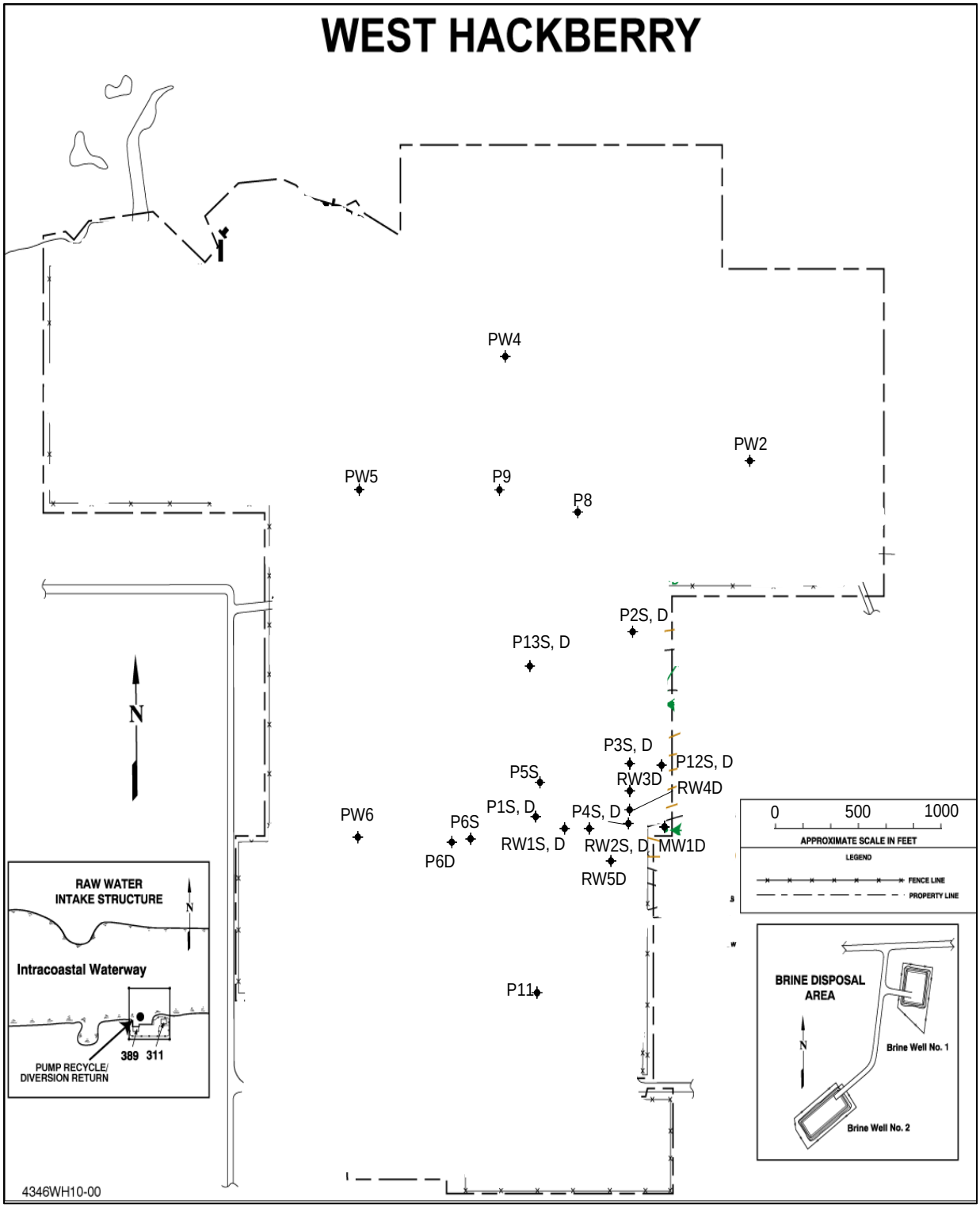


Figure E-11. West Hackberry Ground Water Monitoring Stations, Deep and Shallow

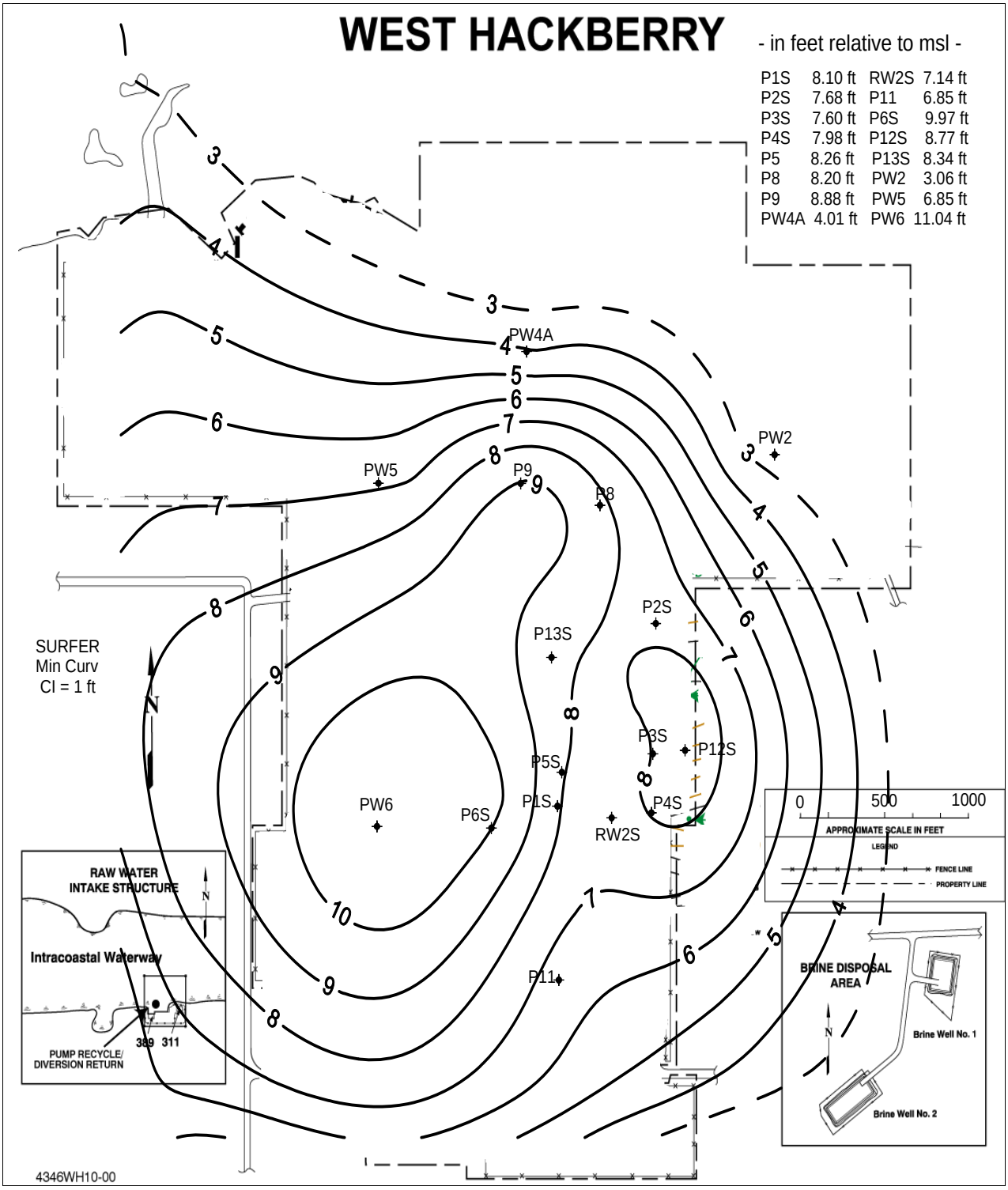


Figure E-12. West Hackberry Shallow Ground Water Zone Contoured Elevations Winter 2008

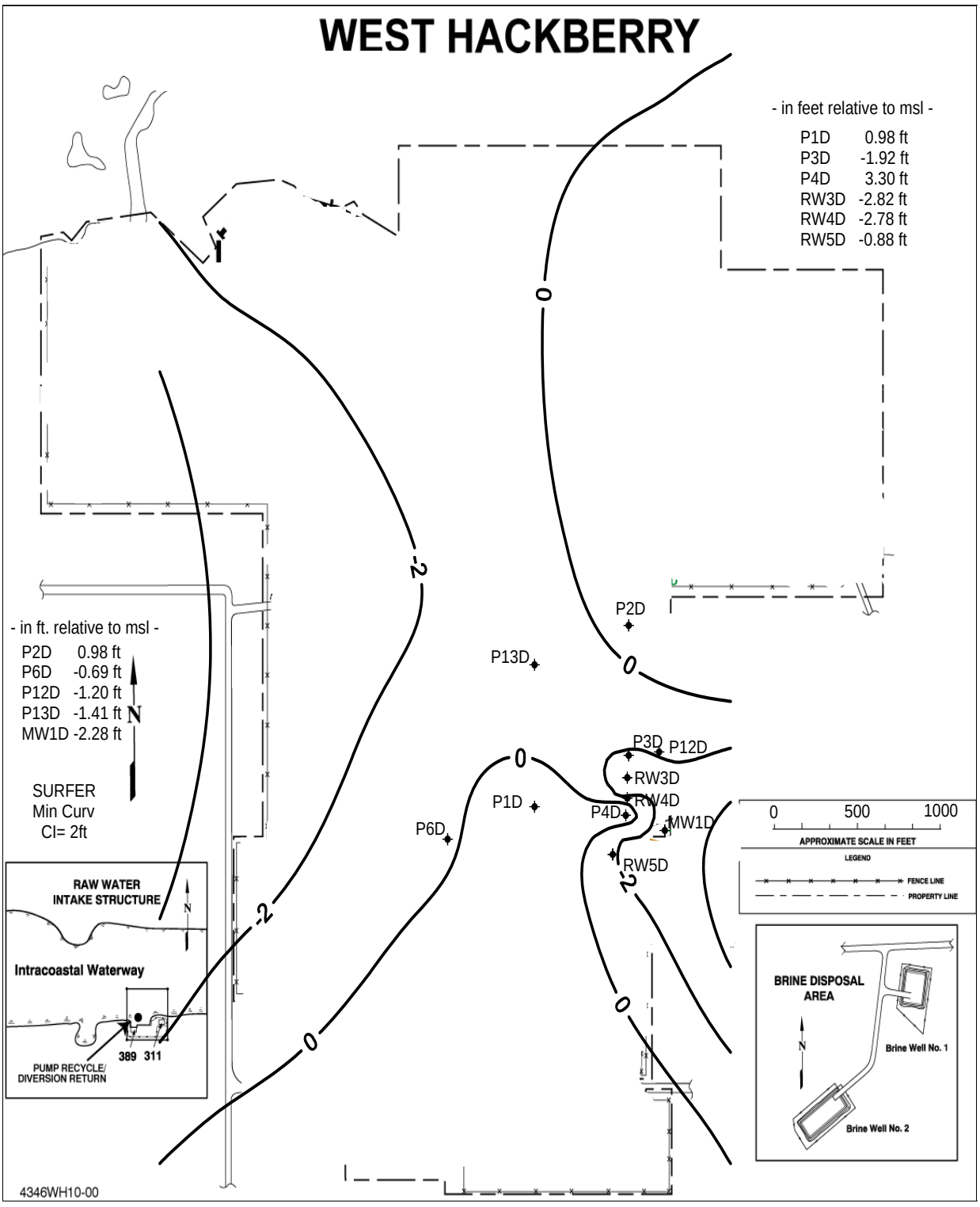


Figure E-13. West Hackberry Deep Ground Water Zone Contoured Elevations Winter 2008

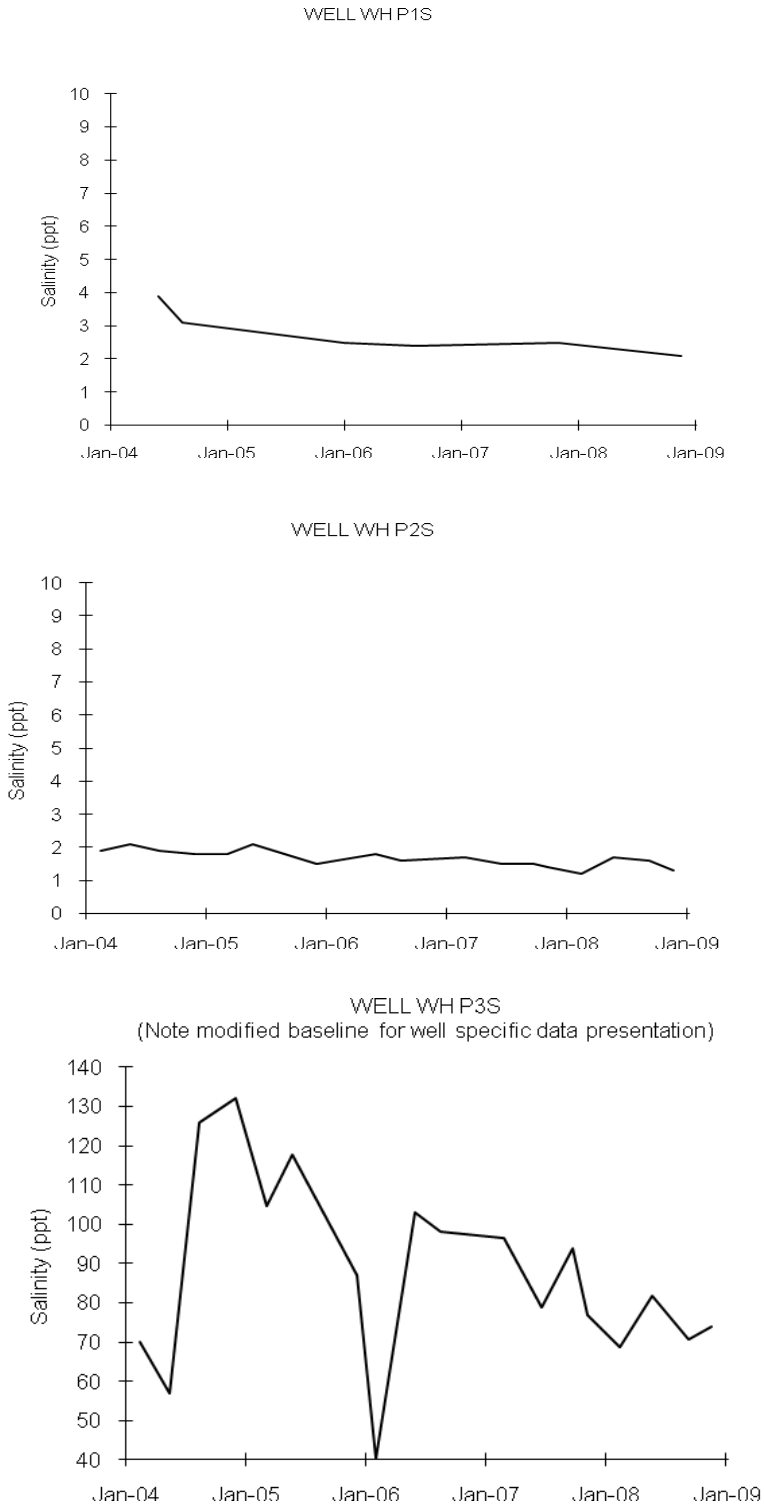


Figure E-14. West Hackberry Ground Water Monitoring Well Salinities

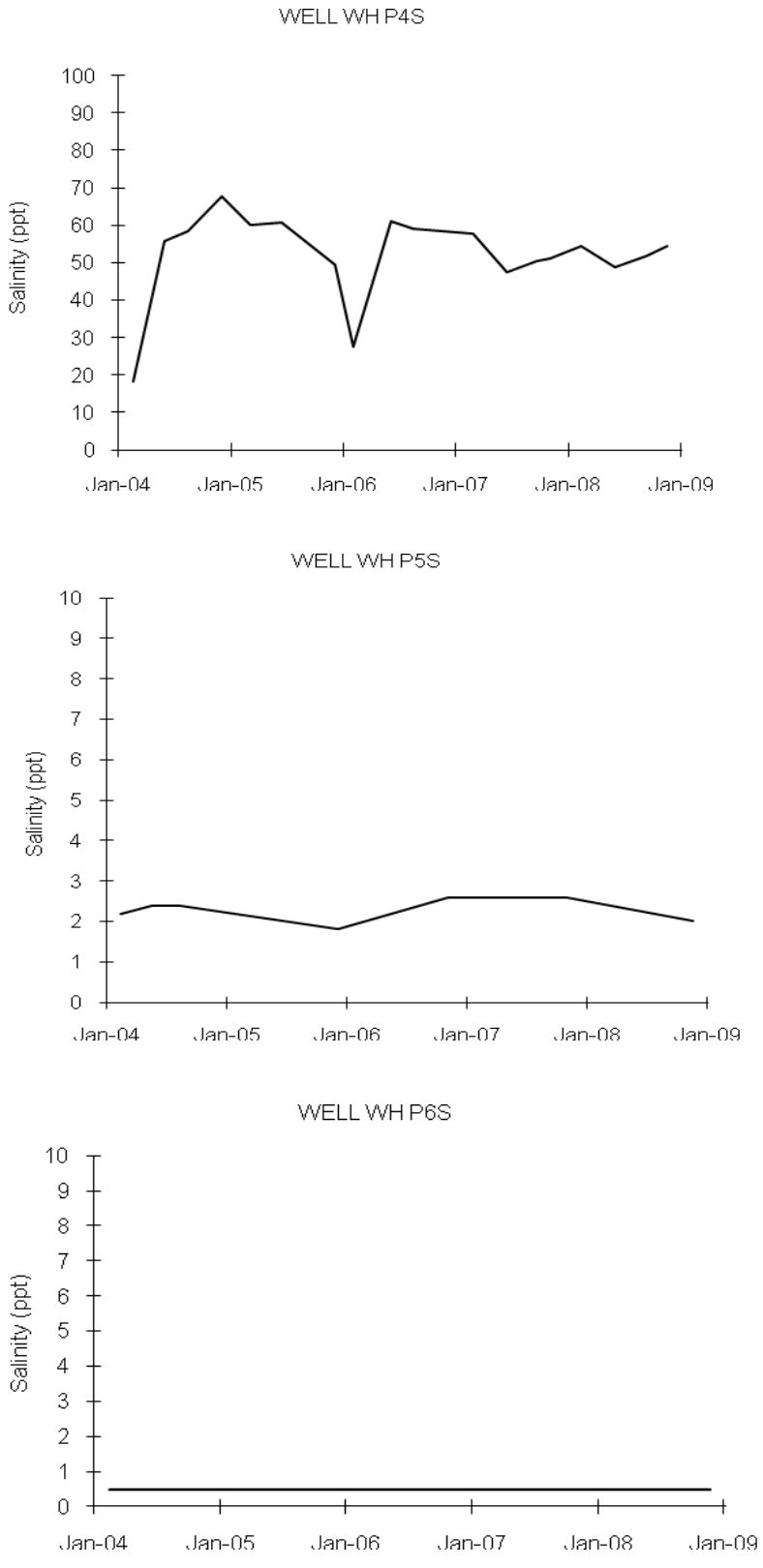


Figure E-14. West Hackberry Ground Water Well Salinities (continued)

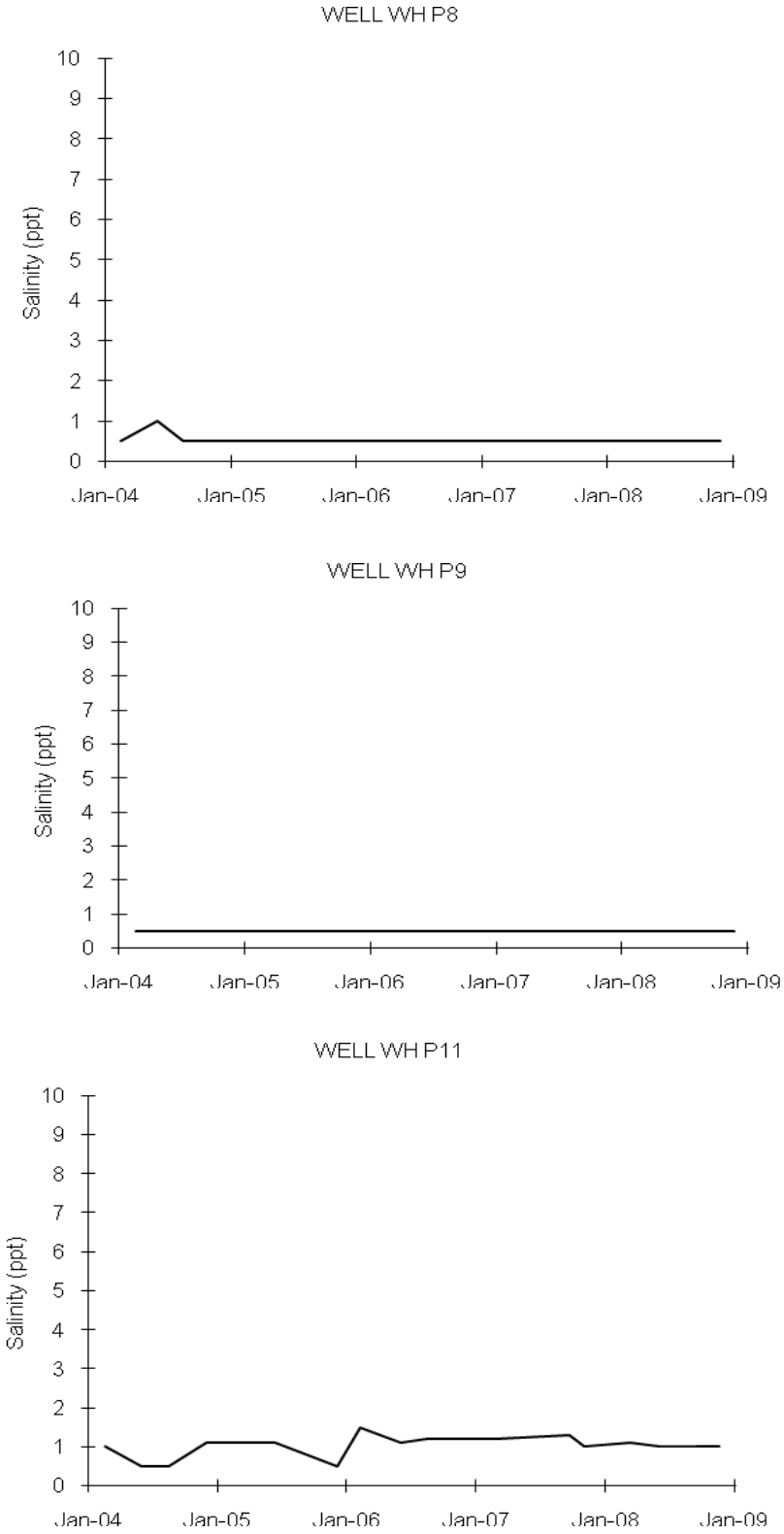


Figure E-14. West Hackberry Ground Water Well Salinities (continued)

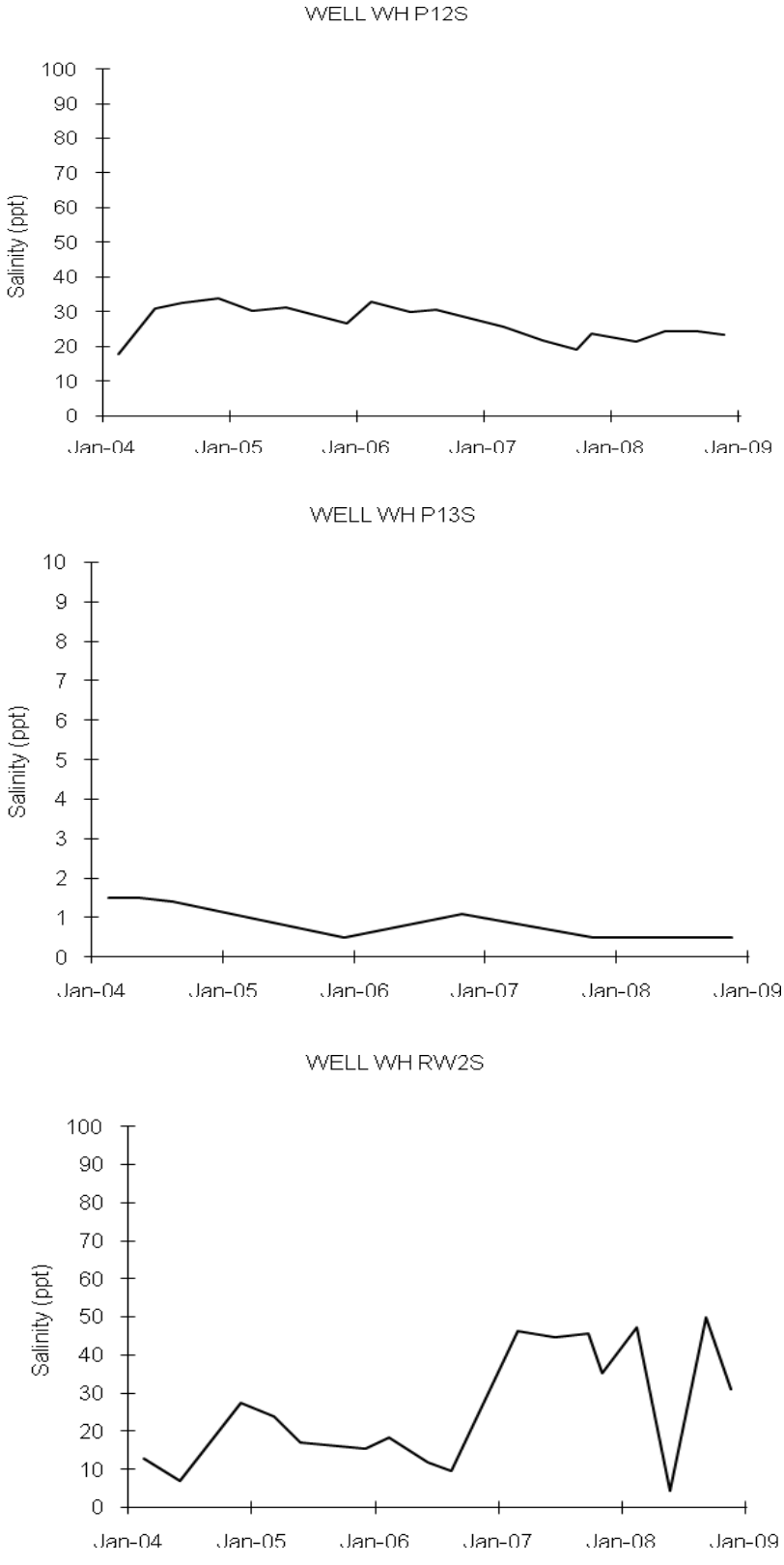
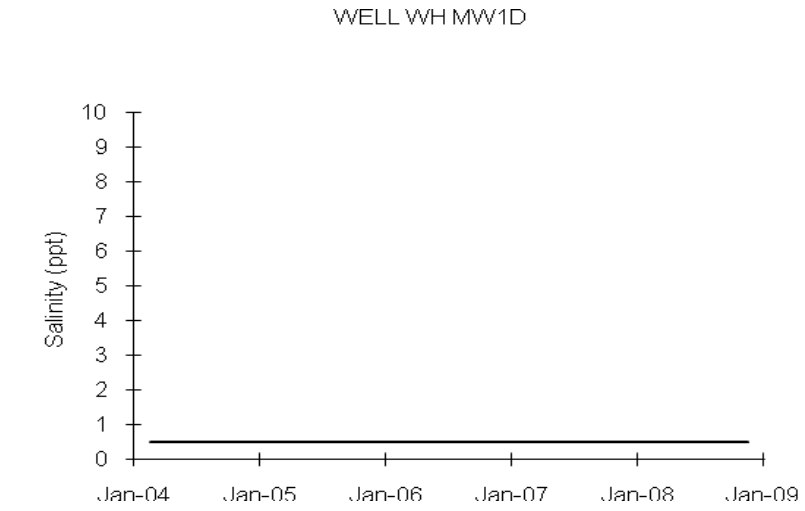
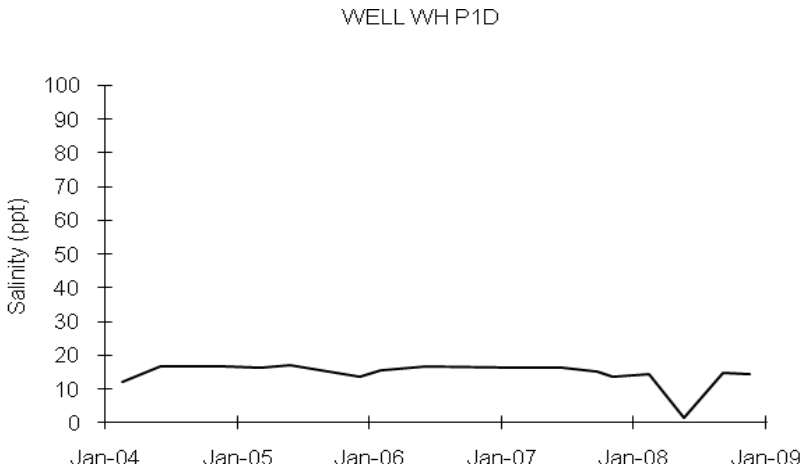


Figure E-14 West Hackberry Ground Water Well Salinities (continued)





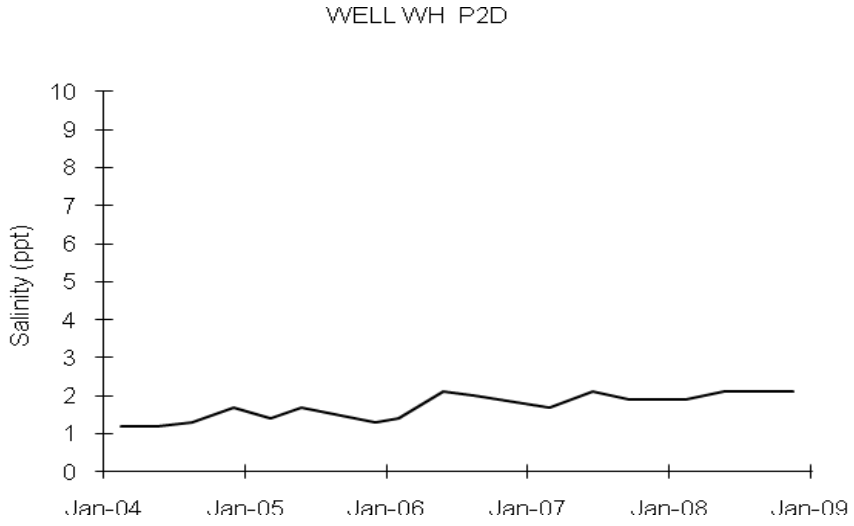
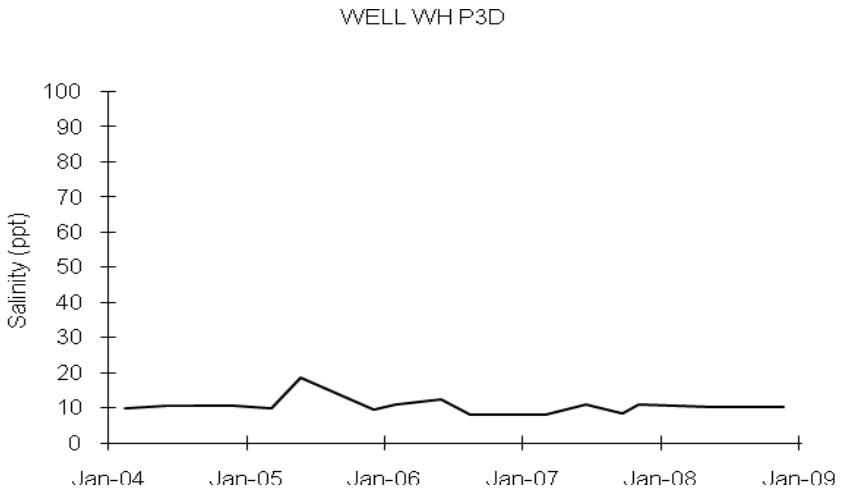
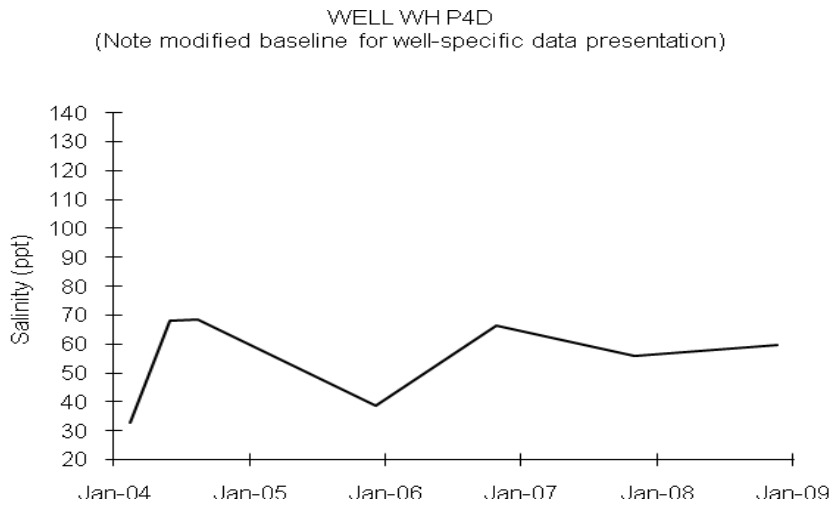


Figure E-14. West Hackberry Ground Water Well Salinities (continued)





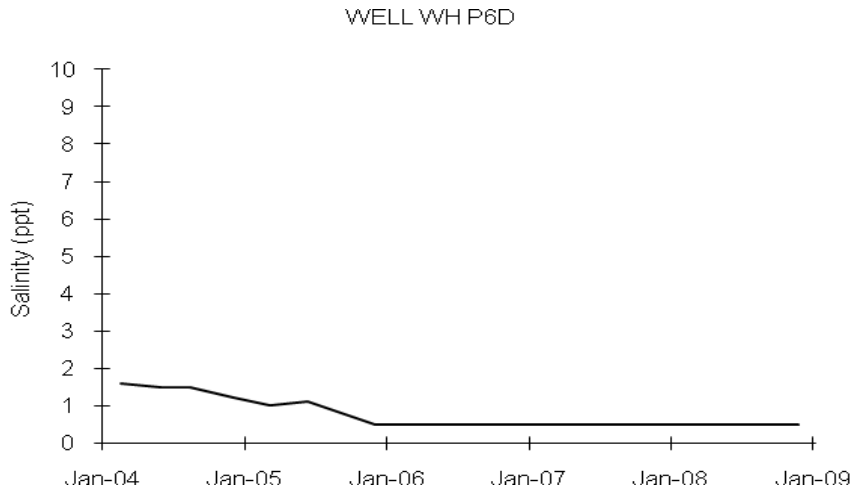
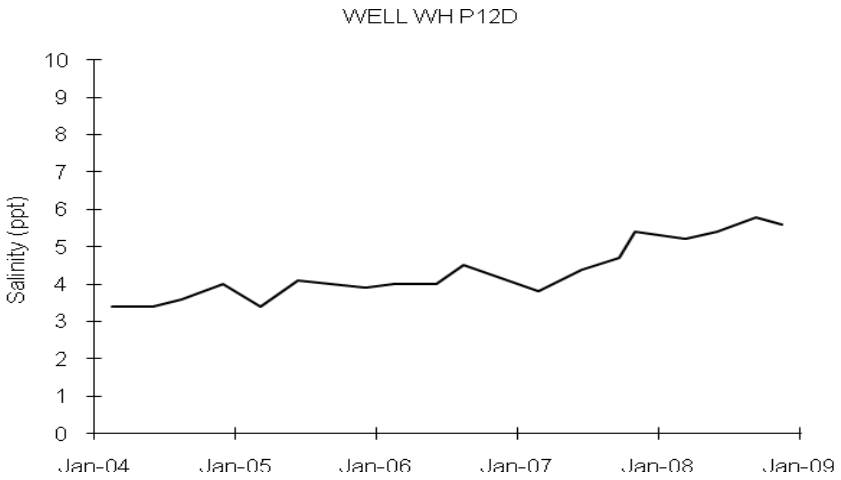
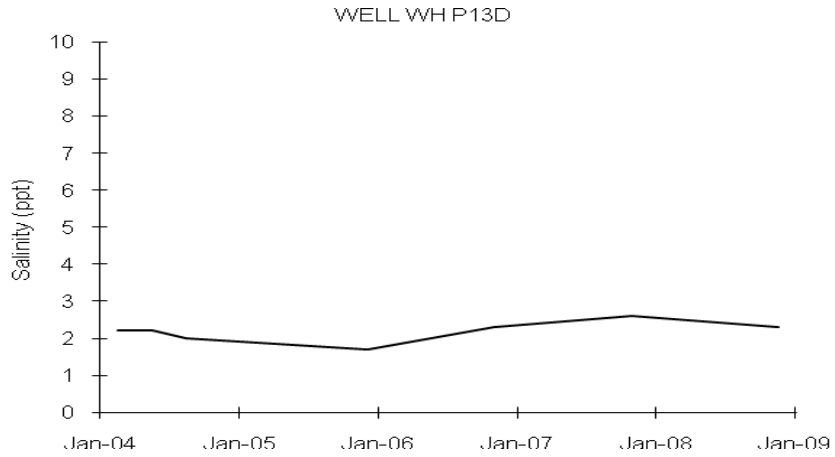


Figure E-14. West Hackberry Ground Water Well Salinities (continued)





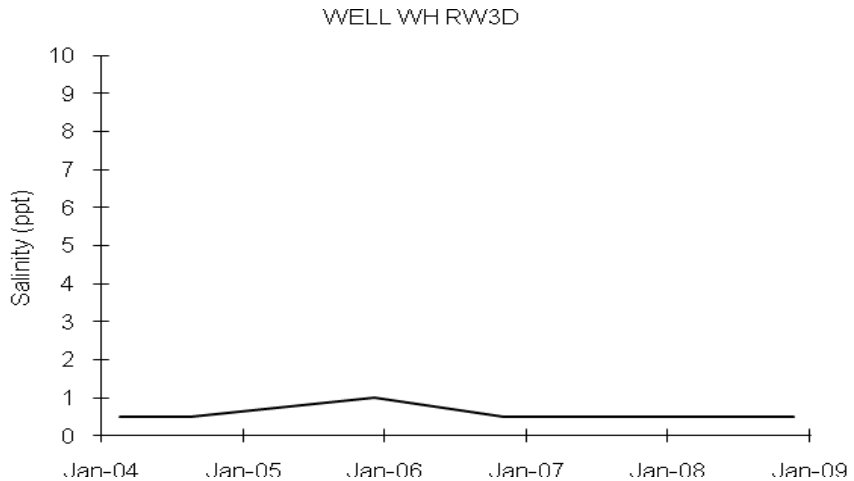


Figure E-14. West Hackberry Ground Water Well Salinities (continued)

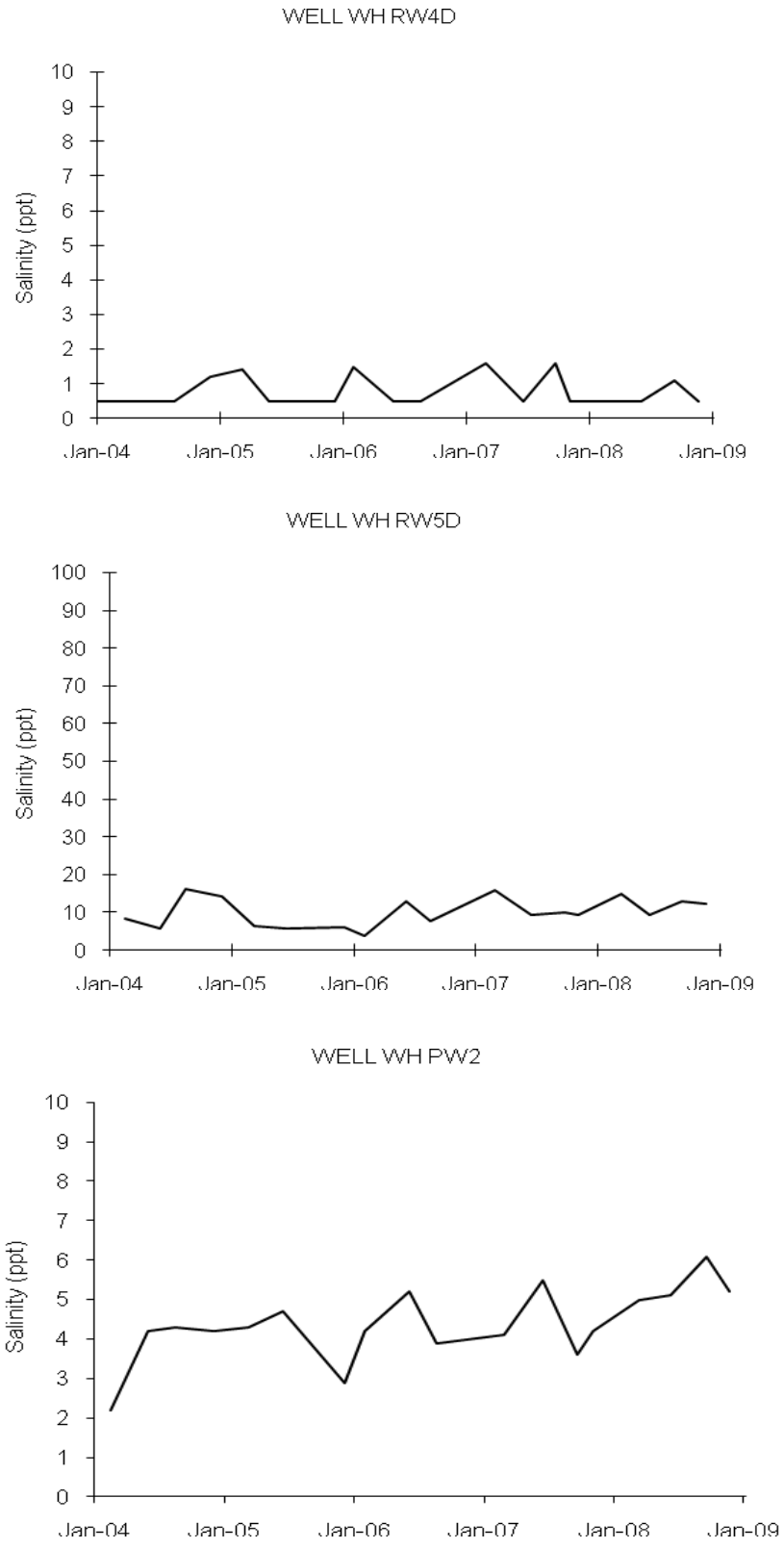


Figure E-14. West Hackberry Ground Water Well Salinities (continued)

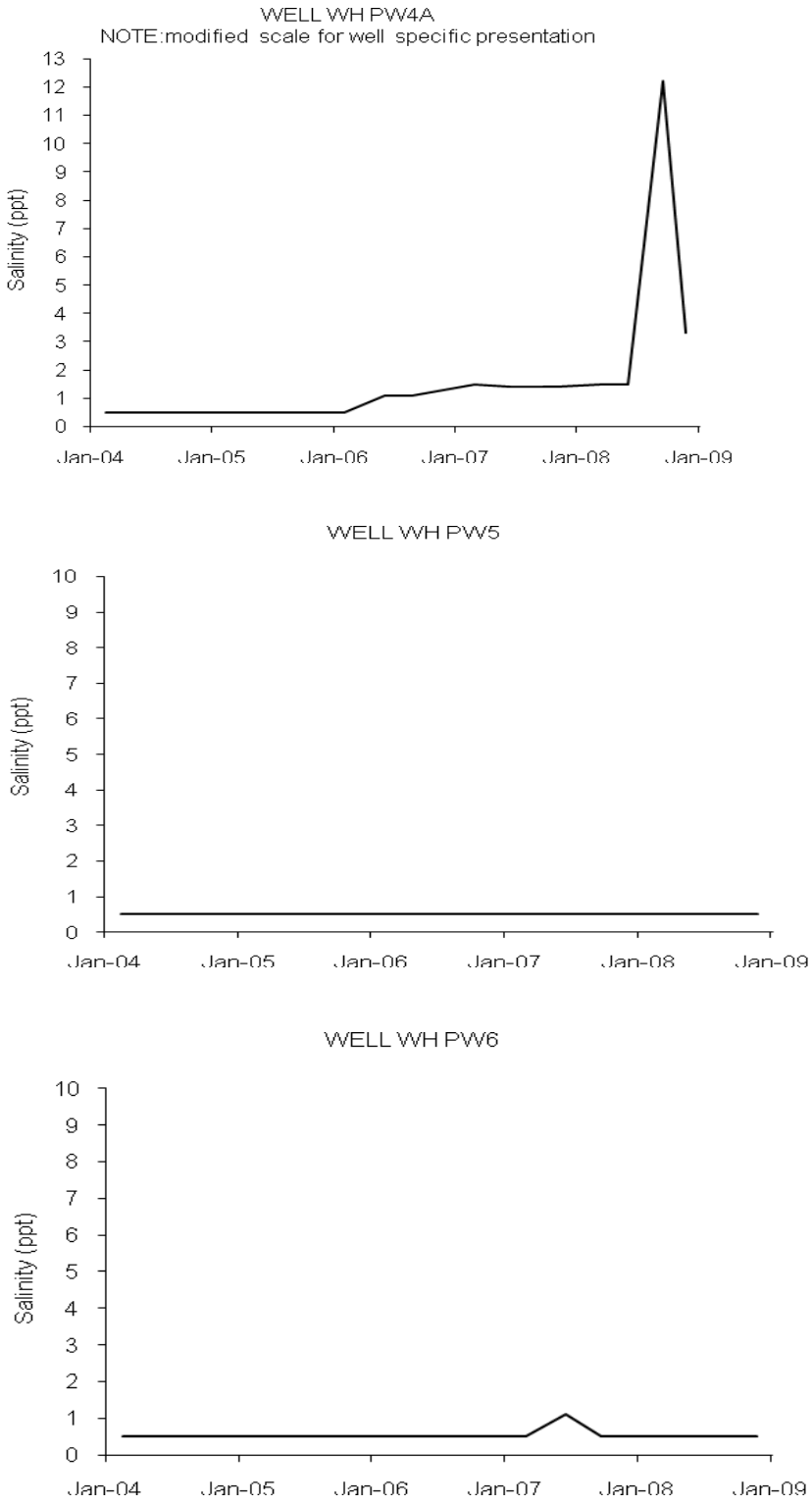


Figure E-14. West Hackberry Ground Water Well Salinities (continued)

End of Appendix

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End of Site Environmental Report