



U. S. DEPARTMENT OF ENERGY
NEW ORLEANS, LA

**STRATEGIC PETROLEUM RESERVE
PROJECT MANAGEMENT OFFICE**

**Annual Site
Environmental Report
for
Calendar Year 2023**

October 2024

A handwritten signature in black ink, appearing to read "S. Reese", written over a horizontal line.

Stephen Reese
Director, Environmental Safety and Health Division
Office of Technical Assurance
Strategic Petroleum Reserve

9/24/24
Date

SPRPMO 0467-1



U.S. DEPARTMENT OF ENERGY

Strategic Petroleum Reserve
Project Management Office
New Orleans, Louisiana

Site Environmental Report Calendar Year 2023



Cover

Bald Eagle (*Haliaeetus Leucocephalus*) at Bayou Choctaw
Photo credit: Steve Allen, Pipe Supervisor, Richard Construction

Once a common sight in much of the continent, the bald eagle was severely affected in the mid-20th century by a variety of factors, among them the thinning of eggshells attributed to use of the pesticide DDT. DDT itself was not lethal to the adult bird, but it interfered with their calcium metabolism, making them either sterile or unable to lay healthy eggs; many of their eggs were too brittle to withstand the weight of a brooding adult, making it nearly impossible for them to hatch. It is estimated that in the early 18th century the bald eagle population was 300,000–500,000, but by the 1950s there were only 412 nesting pairs in US. The bald eagle was declared an endangered species in 1967 and DDT was banned from usage in 1972. Since these efforts the population has rebounded greatly to an estimated 316,000.

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Distribution

The Strategic Petroleum Reserve Calendar Year (CY) 2023 Site Environmental Report is a public document that is available to the public on the internet at <https://www.spr.doe.gov/esh/default.html>

QUESTIONNAIRE/READER COMMENT FORM

Please submit your questions/comments via email to Environmental@SPR.DOE.GOV or photocopy this page and forward it to the following address:

Fluor Federal Petroleum Operations, LLC
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:

(Attach other sheets as needed)

+++++

(Below for originator's use only)

Subject Matter Expert (SME): _____ Date: _____

SME's Response: _____

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Abbreviations and Acronyms	
AFFF	Aqueous Film Forming Foam
ANAB	ANSI-ASQ National Accreditation Board
ANSI	American National Standards Institute
ASER	Annual Site Environmental Report
ASQ	American Society for Quality
bbl	Barrel (1 bbl = 42 gallons)
BC	Bayou Choctaw
BDL	Below Detection Limit
BH	Big Hill
bls	Below Land Surface
BM	Bryan Mound
BOD	Biochemical Oxygen Demand
°C	Degrees Celsius
CAA	Clean Air Act
CAP	Corrective Action Plan
CB	Certification Board
C&D	Construction & Demolition
CESQG	Conditionally Exempt Small Quantity Generator
CLR	Calculated Leak Rate
CO	Carbon Monoxide
COE	United States Army Corps of Engineers
CWA	Clean Water Act
CY	Calendar Year
DBP	Disinfection by-products
DENR	Louisiana Department of Energy and Natural Resources
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
DOE	United States Department of Energy
E&P	Exploration and Production
EAC	Environmental Advisory Committee
EMP	Environmental Monitoring Plan
EMS	Environmental Management System
EO	Executive Order
EPA	Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
EPCRA	Emergency Planning and Community Right-to-Know Act

Abbreviations and Acronyms	
ESA	Endangered Species Act
ES&H	Environmental Safety and Health
ESPC	Energy Savings Performance Contract
FFPO	Fluor Federal Petroleum Operations
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
F&WS	Fish and Wildlife Service
GALCOE	U.S. Army Corps of Engineers, Galveston District
GHG	Greenhouse gas
GIWW	Gulf Coast Intracoastal Waterway
GLO	General Land Office
HEMSF	High energy mission specific facilities
ILA	Industrial, Landscaping and Agricultural
ISM	Integrated Safety Management System
ISO	International Organization for Standardization
LA	Louisiana
LDEQ	Louisiana Department of Environmental Quality
LDWF	Louisiana Department of Wildlife and Fisheries
LPDES	Louisiana Pollutant Discharge Elimination System
MCL	Maximum Contaminant Levels
MDEQ	Mississippi Department of Environmental Quality
MDLR	Minimum Detectable Leak Rate
MMbbl	Million Barrels
M&O	Management and Operations
msl	Mean Sea Level
MSGP	Multi-Sector General Permit
MW	Monitoring well
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIMS	National Incident Management System
NO	New Orleans
NODCOE	U.S. Army Corps of Engineers, New Orleans District
NOV	Notice of violation
NOx	Nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
OCC	Operations Control Center
OFI	Opportunities for Improvement
O&G	Oil and Grease
OPA	Oil Pollution Act of 1990
OSPRA	Oil Spill Prevention and Response Act
OVA	Organic Vapor Analyzer
PCB	Polychlorinated Biphenyl
pH	Negative Logarithm of the Hydrogen Ion Concentration
PHR	Preliminary Hazard Review
PI	Process Improvement

Abbreviations and Acronyms	
PM ₁₀	Particulate Matter (less than 10 microns)
PMCC	Power monitoring control & communication
ppt	Parts per Thousand
PREP	Preparedness for Response Exercise Program
PW	Periphery Well
QA	Quality Assurance
QC	Quality Control
QPL	Qualified Products List
RRC	Railroad Commission of Texas
RWIS	Raw Water Intake Structure
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SOC	Security Operations Center
SPCC	Spill Prevention Control and Countermeasures
SPR	Strategic Petroleum Reserve
SPRPMO	Strategic Petroleum Reserve Project Management Office
SSP	Site Sustainability Plan
SWPPP	Storm Water Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
TGLO	Texas General Land Office
TOC	Total Organic Carbon
TPWD	Texas Parks and Wildlife Department
TRI	Toxic Chemical Release Inventory
TSCA	Toxic Substance Control Act
TSS	Total Suspended Solids
TX	Texas
UIC	Underground Injection Control
UNO	University of New Orleans
VOC	Volatile Organic Compound
VSQG	Very Small Quantity Generator
WAD	Work Authorization Directive
WH	West Hackberry
YOY	Year on Year

Executive Summary

The U.S. Department of Energy (DOE) Annual Site Environmental Report (ASER) is a DOE-wide submittal provided by each DOE Project Office. The ASER outlines by calendar year, site environmental management performance, confirms compliance with environmental statutes, standards and requirements, and highlights significant environmental successes. Additionally, the ASER serves the public by summarizing monitoring data collected to assess Strategic Petroleum Reserve (SPR) impacts on the environment. This report and previous SPR ASERs are found at <https://www.spr.doe.gov/esh/default.html>.

The SPR Project Management Office (SPRPMO) is in New Orleans, LA. The Project Management Office oversees the operation and maintenance of four crude oil storage facilities in Louisiana and Texas. The primary mission of the SPR is to maintain a constant state of operational readiness to draw down the reserve and supply oil to the country when an emergency is declared by the President of the United States.



Chapters within the ASER provide a more detailed overview of the environmental activities at the SPR, including:

Chapter 1: Introduction

Chapter 2: Compliance Summary

Chapter 3: ISO 14001 Environmental Management System and Sustainability Program

Chapter 4: Environmental Radiological Program Information

Chapter 5: Environmental Permits and Programs

Chapter 6: Site Hydrology, Groundwater Monitoring, and Public Drinking Water Protection

Chapter 7: Quality Assurance

During the CY 2023, the Management and Operations (M&O) Contractor, Fluor Federal Petroleum Operations (FFPO), coordinated its activities with the SPRPMO, subcontractors, and regulatory agencies to ensure compliance with federal, state, and local requirements along with meeting established environmental and sustainability goals. The narrative of this document illustrates the performance of these achievements.

Notable Environmental Activity at the SPR in 2023 are summarized below:

- Zero (0) Notices of Violation
- Two (2) reportable releases
- Achieved 100% affirmative procurement target

- Maintained ISO 14001 Certification

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

1 Introduction

This Strategic Petroleum Reserve (SPR) Annual Site Environmental Report (ASER) for the calendar year 2023 was prepared to inform the U.S. Department of Energy (DOE), environmental agencies and the public about environmental management performance and data gathered at or near SPR sites. It also summarizes compliance with environmental standards and requirements as well as highlights significant programs and efforts.

1.1 Background Information

The Energy Policy and Conservation Act (EPCA) established the SPR in 1975. The goal of the EPCA is to ensure the U.S. has sufficient petroleum reserves to mitigate the effects of a significant oil supply interruption. The mission of the SPR is to maintain a constant state of operational readiness to draw down the reserve and supply oil to the country when an emergency is declared by the President of the United States.

SPR MISSION

The mission is to maintain a constant state of operational readiness to draw down the reserve and supply oil to the country in an emergency.

The SPR stores emergency crude oil supplies in salt caverns. The caverns were created through solution mining deep within the massive salt deposits that underlie most of the Texas and Louisiana coastline. The utilization of the caverns avoids hazards associated with aboveground storage, offers security, and is an economic means of storage.

The U.S. Government selected the Gulf Coast as the location for the SPR due to its large concentration of underground salt domes and its large number of refineries, and crude oil distribution capabilities. These attributes provide the flexibility needed to respond to a wide range of supply disruptions.

The Secretary of Energy has the authority to acquire oil to fill the reserve or exchange current holdings to alter the mix of oil, to test the SPR's capabilities through test sales, or to "loan" oil to refineries during temporary oil supply disruptions. Also, starting in 2017, the SPR has released crude oil to the marketplace as required by the Bipartisan Budget Act of 2015 (Sections 403 and 404) and the 21st Century Cures Act, Fixing America's Surface Transportation Act of 2015, Tax Cuts and Jobs Act of 2017, Bipartisan Budget Act of 2018, Consolidated Appropriations Act of 2018, America's Water Infrastructure Act of 2018, and Infrastructure Investment and Jobs Act of 2021.

The DOE Office of Deputy Assistant Secretary of Petroleum Reserves has overall programmatic responsibility for establishing SPR objectives. The SPRPMO is responsible for implementing these goals and objectives, including articulating an environmental policy (SPRPMO P 451.1H, included as Appendix B) responsive to DOE requirements. The M&O Contractor applies this policy to SPR operations.

The SPR entered CY 2023 with 394.1 MMbbl of crude oil, and at the end of CY 2023 (as of December 31, 2023), the SPR held 376.2 MMbbl. The net decrease of crude oil is a result of a congressionally mandated crude oil sale, the FY 2022 Winter Exchange in CY 2022, the Presidentially mandated 180 MMbbl drawdown (in response to rising crude oil prices which was attributed to the war in Ukraine), drawdown of crude oil held for the Government of Australia (GOA), and a series of exchanges collectively called the Keystone Exchange.

1.2 Locations, Facilities and Operations

The SPR utilizes underground salt dome formations to store crude oil. It comprises four facilities located along the Gulf Coast (Bryan Mound, Big Hill, West Hackberry, and Bayou Choctaw), a project management facility in New Orleans, and the Stennis Warehouse facility. Figure 1-1 shows the SPR locations. DOE leased the St. James Marine Terminal (located southeast of Bayou Choctaw) to Shell Pipeline in January 1997 and subsequently to ExxonMobil in January 2020. Although the St. James Marine Terminal is not an active SPR storage facility, it remains a SPR property. This report will contain a narrative description about the St. James Marine Terminal where applicable. Table 1-1 below summarizes information about the four active storage facilities.

Figure 1-1 SPR Locations



Table 1-1 SPR Storage Facilities

	City, State	No. of Caverns	Crude Oil Storage Inventory*
Bayou Choctaw	Plaquemine, LA	6	48.9 million barrels
Big Hill	Winnie, TX	14	76.7 million barrels
Bryan Mound	Freeport, TX	20	176.5 million barrels
West Hackberry	Hackberry, LA	22	74.1 million barrels

*As of December 31, 2023

1.2.1 Bayou Choctaw

Iberville Parish, LA, serves as the location of the Bayou Choctaw site. This storage facility occupies 356 acres above the Bayou Choctaw salt dome, including off-site satellite brine disposal wells and associated brine piping.

The U.S. Government selected the Bayou Choctaw salt dome as a storage site early in the SPR program because of the potential to convert its existing brine caverns to oil storage and its proximity to commercial marine and pipeline crude oil distribution facilities. Development of the site was initiated in 1977 and completed in 1991. One additional cavern was acquired, modified, and completed in 2012.



The area surrounding the site is a freshwater swamp, which includes substantial stands of bottomland hardwoods with interconnecting waterways. Small canals and bayous flow through the site area and join larger bodies of water off site. The site is usually dry and protected from spring flooding by the flood control levees and pumps. The forest and swamp provide habitat for a diverse wildlife population, including many bird species, mammals, and reptiles, including the American alligator.

1.2.2 Big Hill

Jefferson County, TX, serves as the location of the Big Hill site that covers approximately 270 acres above the Big Hill salt dome. Off-site facilities include an intake structure that provides raw (brackish) water for cavern development and fluid movements, a brine line for brine disposal, and a crude oil pipeline for receiving and distributing oil in commerce.



Big Hill is the newest SPR storage facility. Its proximity to commercial marine and pipeline crude oil distribution facilities is advantageous to the

overall function of the SPR mission. Development of the site was initiated in 1982 and completed in 1991.

Most of the site is upland habitat, consisting of tall grass with a few 150-year-old live oak trees. The nearby ponds and marsh provide an excellent habitat for a diverse population of wildlife, including the American alligator, over-wintering waterfowl, and various species of birds and mammals.

1.2.3 Bryan Mound

The Bryan Mound site is in Brazoria County, TX, and occupies 500 acres above the Bryan Mound salt dome. Off-site facilities include an intake structure that provides raw water for cavern development and fluid movements, brine pipeline for brine disposal, and crude oil pipelines for receiving and distributing oil in commerce.

The U.S. Government selected Bryan Mound as a storage site early in the SPR program because of the potential to convert its existing brine caverns for oil storage. 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 the Texas Gulf Coast region. Brackish marshland dominates the low-lying portions of the site. The coastal prairie has abundant tall grass forming cover and feeding grounds for wildlife. Marshes and tidal pools provide diverse habitats for a variety of birds, aquatic life, and mammals.

1.2.4 West Hackberry

Located in Cameron Parish, LA, the West Hackberry site occupies 565 acres over the West Hackberry salt dome. Off-site facilities include an intake structure that provides raw (brackish) water for cavern development and fluid movements, brine disposal wells with associated brine piping, and crude oil pipelines for receiving and distributing oil in commerce.

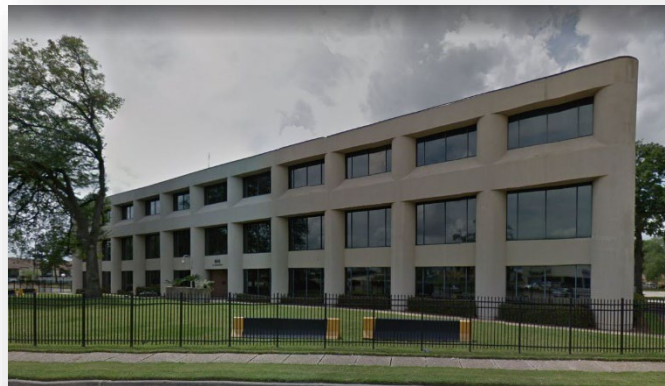
The U.S. Government selected West Hackberry as a storage site due to the potential to readily convert its existing brine caverns to oil storage. Development of the site was initiated in 1977 and completed in 1988.

Numerous canals and natural waterways bisect the area. The surrounding area consists of marshland with natural ridges that support grass, trees and affect water flow through the marshes. These marshlands provide a habitat for a variety of wetland and wildlife species.



1.2.5 New Orleans

The SPRPMO is within the New Orleans, LA, metropolitan area. Located in Jefferson Parish, the SPRPMO exists in three adjacent leased office buildings with a nearby leased warehouse. This facility functions as the management headquarters of the SPR. Activities conducted at the New Orleans office complex are predominantly administrative.



1.2.6 Stennis

DOE leased the Stennis Warehouse located in Hancock County, MS, from the U.S. Army from 2004 to 2011 and since 2011, from the National Aeronautics and Space Administration (NASA). The warehouse, adjacent concrete aprons, and parking lot occupy approximately 3.4 acres within the John C. Stennis Space Center. It is used to maintain and store heavy 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 New Orleans SPRPMO personnel.



1.2.7 St. James Marine Terminal

The St. James Marine Terminal, located along the Mississippi River in St. James Parish, LA, consists of a 173-acre site that includes a central facility and two satellite docks on the west Mississippi River batture. DOE leased this facility to Shell Pipeline from 1997 to December 31, 2019. Effective January 1, 2020, ExxonMobil entered a 20-year long-term leasing arrangement to use the site.



2 Compliance Summary

COMPLIANCE DURING 2023

The SPR did not have any:

- *Compliance or cleanup agreements*
- *Environmental violations cited by regulators*
- *Notices of violation*
- *Notices of deficiency*
- *Notices of intent to sue*
- *Other types of enforcement actions issued at any of the sites*

There were three permit exceedances regarding water, and none regarding air.

There were two reportable releases.

2.1 Regulatory Compliance Summary

Operational activity at the SPR is subject to numerous federal and state regulations, Executive Orders (EO), and DOE Orders. A list of applicable environmental standards is provided in Appendix A1, and a list of SPRPMO Environmental Safety and Health (ES&H) Directives is included in Appendix A2. Following these regulations, orders, standards, and directives, the SPR successfully operates in an environmentally compliant manner. Table 2-1 summarizes major applicable environmental regulations and orders. It also summarizes how compliance requirements were met during 2023 and, where appropriate, references report sections that contain more detailed information. The principal agencies responsible for enforcing environmental regulations at SPR facilities are:

- Environmental Protection Agency (EPA)
- New Orleans and Galveston Districts of the United States Army Corps of Engineers (NODCOE & GALCOE)
- United States Fish and Wildlife Service (F&WS)
- Louisiana Department of Environmental Quality (LDEQ)
- Louisiana Department of Energy and Natural Resources (DENR)
- Louisiana Department of Wildlife and Fisheries (LDWF)
- Railroad Commission of Texas (RRC)
- Texas Commission on Environmental Quality (TCEQ)
- Texas General Land Office (TGLO)
- Texas Parks and Wildlife Department (TPWD)
- Mississippi Department of Environmental Quality (MDEQ)
- John C. Stennis Space Center- National Aeronautics and Space Administration (NASA)

These agencies issue permits, review compliance reports, inspect site operations, and oversee compliance with regulations.

Table 2-1 Environmental Regulations Applicable to the SPR

Regulation	Compliance Status	Report Section
National Environmental Policy Act (NEPA) — requires federal agencies to follow a prescribed process to anticipate the environment impacts of proposed major federal actions and alternatives.	All design reviews, engineering change proposals, deviations, waivers, and purchase requisitions were evaluated for NEPA review in 2023. Of these documents, 8 required NEPA categorical exclusion documentation. Projects did not have the potential to adversely affect environmentally or culturally sensitive resources, such as structures of historical, archeological, or architectural significance, nor did they adversely affect, threaten, or endanger species or their habitat.	3
EO 11988 — “Floodplain Management,” EO 11990 — “Protection of Wetlands,” NODCOE, GALCOE, LDEQ, and RRC	The SPR ensures compliance with EOs 11988 and 11990 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.	3
EO 14057 — “Catalyzing Clean Energy Industries and Jobs through Federal Sustainability.” The goal is to maintain Federal Leadership in sustainability and greenhouse gas emission reductions. EO 14007 - “Tackling the Climate Crisis at Home and Abroad”	Each year the SPR Energy Efficiency and Pollution Prevention Committee oversees the identification, selection, scheduling, budgeting and implementation of projects and activities that support the sustainability program. In December of each year, a Site Sustainability Plan is submitted to DOE.	3
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 is demonstrated by following state implementing agency radiation control regulations.	4

Table 2-1 Environmental Regulations Applicable to the SPR

Regulation	Compliance Status	Report Section
<p>Safe Drinking Water Act (SDWA)</p> <p>TCEQ enforces the SDWA in Texas by regulating Public Water Systems for health-based violations to ensure potable water provided is safe to drink.</p> <p>Louisiana Department of Energy and Natural Resources and Texas Underground Injection Control (UIC) programs regulate underground hydrocarbon storage, related brine disposal, and oil field wastes.</p>	<p>SPR sites comply with the SDWA through permitting under the Louisiana and Texas UIC programs.</p> <p>The 2023 Annual Report Form OR-1 for underground injection was completed and submitted on schedule to the DENR.</p> <p>Local public water systems supply drinking water to all storage sites, New Orleans headquarters, and the New Orleans and Stennis warehouses. Potable water systems at Bryan Mound and Big Hill are classified by state regulations as “non-transient, non-community” public water distribution systems. These sites are required to have potable water monitoring programs. The West Hackberry and Bayou Choctaw facilities are not required to have potable water monitoring programs and are recognized as water purchasers only.</p> <p>In 2023, potable water samples were taken monthly at Bryan Mound and Big Hill for coliform monitoring, and weekly samples were collected and analyzed for residual chloramine (disinfectant). Average disinfectant levels were reported to TCEQ on a Disinfectant Level Quarterly Operating Report. Calculated results at both sites did not exceed the regulatory maximum contaminant levels (MCL) for disinfectants. All coliform results were also below the MCL.</p> <p>Potable water is sampled and tested for lead and copper tri-annually at Big Hill and Bryan Mound. In 2023, testing for disinfection by-products (DBP) Trihalomethanes and Haloacetic Acids was conducted through TCEQ at Bryan Mound and Big Hill. Test results for DBPs were below the MCL at the Big Hill and Bryan Mound sites. Other potable water parameters monitored for compliance include asbestos, nitrite, and nitrate with varied monitoring schedules. Samples were collected by a TCEQ contractor and tested for nitrate and nitrite at Big Hill and Bryan Mound in 2023. All results were below their MCLs.</p> <p>Groundwater monitoring of the uppermost aquifer at the SPR storage sites is mandated via DOE orders for surveillance assessment and is coordinated through the Environmental Monitoring Plan (EMP). Details of groundwater monitoring are presented in Section 6.</p> <p>Historical groundwater evaluations have indicated shallow groundwater impacts from saltwater at the Bryan Mound and West Hackberry sites. As part of the site’s overall groundwater surveillance, the post-closure monitoring near the Bryan Mound brine storage pond is provided through this report to the RRC as requested.</p> <p>The West Hackberry site completed the closure of its brine ponds in 1999 under a corrective action plan (CAP) negotiated with DENR. Remedial recovery pumping was completed in 2001. Post-closure monitoring for 30 years is currently met by quarterly monitoring, and annual reporting in the ASER shared with DENR.</p>	<p>5.1, 6</p>

Table 2-1 Environmental Regulations Applicable to the SPR

Regulation	Compliance Status	Report Section
<p>Clean Air Act (CAA) — LDEQ and TCEQ regulate the release of air pollutants through permits and air quality limits.</p>	<p>SPR sites comply with provisions of the CAA and State Implementation Plans (SIP) through permitting and following applicable regulations. All SPR facilities operate in accordance with the provisions of the applicable state air permits.</p> <p>An air permit was issued by LDEQ on 7/6/2022 for BC and then reissued on 5/10/2023 removing the Degas Plant. BH and WH had no air permits issued or renewed. These sites’ existing air permits are current. An air permit application was submitted to TCEQ on 11/15/2022 to renew the BM air permit and remove a proposed Degas Plant on a previous permit application. As of July 2024, the renewal is still pending.</p> <p>Annual fugitive monitoring of piping components for volatile organic compound (VOC) leaks was performed at the Louisiana and Texas SPR sites in 2023.</p>	<p>5.2</p>
<p>Clean Water Act (CWA) — EPA Region VI, RRC, LDEQ and MDEQ establish standards and issue permits to improve water quality. LDEQ has primary enforcement responsibility for the National Pollutant Discharge Elimination System (NPDES) in Louisiana. EPA issues NPDES permits in Texas.</p>	<p>SPR sites comply with the CWA through permitting under the NPDES program, following SPCC regulations, and complying with the wetlands’ usage program.</p> <p><u>NPDES</u> In 2023, permit renewals were submitted to EPA and TCEQ for the Big Hill and Bryan Mound water discharge permits.</p> <p><u>Spill Prevention Control and Countermeasure (SPCC)</u> Each SPR storage site and the Stennis warehouse comply with SPCC regulations by following a plan that addresses the prevention and containment of petroleum and hazardous substance spills. SPCC plans are current with Title 40 CFR 112 and corresponding state regulations.</p> <p><u>Wetlands</u> The SPR sites obtain permits from the COE and Coastal Zone Management representatives of the responsible state agencies whenever projects have a fill, discharge, or dredging occurring in wetlands. The SPR had no Wetland Permits issued in 2023. Three Construction Authorizations issued in 2023: one for Big Hill and two for Bayou Choctaw. Construction Authorizations allow construction in wetlands based on the guidance given in the COE’s Nationwide Permit.</p>	<p>5.3, 5.4</p>
<p>Pollution Prevention Act of 1990 — EPA Region VI, LDEQ, and RRC focus on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials usage.</p>	<p>Each SPR site operates in accordance with a Storm Water Pollution Prevention Plan (SWPPP). This is prepared in accordance with EPA multi-sector general storm water discharge authority for storm water associated with industrial activity. It also follows Louisiana and Mississippi state requirements, using Pollution Prevention Program principles as the basis for limiting or precluding storm water contamination.</p>	<p>5.5</p>

Table 2-1 Environmental Regulations Applicable to the SPR

Regulation	Compliance Status	Report Section
<p>Resource Conservation and Recovery Act (RCRA) — EPA Region VI, LDEQ, and RRC govern the generation, storage, handling, and disposal of hazardous wastes.</p>	<p>SPR facilities continued to operate as Very Small Quantity Generators (VSQG) in 2023. Hazardous wastes are not treated, stored, or disposed of at any SPR sites. Therefore, the sites are not RCRA-permitted.</p> <p>Each SPR site has an EPA generator number used to track the manifesting of hazardous waste for off-site treatment or disposal.</p>	<p>5.5</p>
<p>Toxic Substances Control Act (TSCA) — regulates the manufacture, use, and distribution of all chemicals.</p>	<p>Procedures are in place to prohibit purchasing equipment containing either friable asbestos or polychlorinated biphenyls (PCBs).</p> <p>Small amounts of non-friable asbestos, usually in the form of seals or gaskets, are disposed of as they are taken out of service in accordance with applicable solid waste regulations. Non-asbestos replacement components are used. No liquid-filled electrical equipment or hydraulic equipment currently used on the SPR has been identified as containing PCBs.</p>	<p>5.6</p>
<p>Superfund Amendments and Reauthorization Act (SARA) — EPA, LDEQ, DENR, and TCEQ — SARA Title III specifies many responsibilities and reporting obligations for facilities with hazardous chemicals.</p> <p>Emergency Planning and Community Right to Know Act (EPCRA) — establishes requirements for federal, state, and local governments, Indian tribes, and industry regarding emergency planning and “Community Right-to-Know” reporting on hazardous and toxic chemicals.</p>	<p>SARA Title III Tier Two reports, also known as EPCRA Section 312 reports, were prepared, and distributed as required by March 1, 2024, to state and local emergency planning committees and local fire departments.</p> <p>The submittal of a TRI Form R (EPCRA Section 313) was required for Big Hill and West Hackberry sites in 2023 because the 2023 crude oil sales introduced crude oil into commerce. The TRI reports were prepared and submitted to EPA as required by July 1, 2023.</p>	<p>5.6</p>

Table 2-1 Environmental Regulations Applicable to the SPR

Regulation	Compliance Status	Report Section
<p>Endangered Species Act — F&WS, LDWF, and TPWD prohibit activities that would jeopardize the existence of an endangered or threatened species or cause an adverse modification to critical habitat.</p>	<p>The F&WS is consulted about the appropriate actions taken regarding threatened and endangered species. The SPR does not perform activities that would jeopardize the existence of endangered or threatened species. Additionally, there are no critical habitats at any of the SPR sites.</p> <p>Consideration of potential impacts to threatened or endangered species at the SPR was included as part of the original conditional coverage through the re-issued MSGP. The MSGP coverage has since been migrated to either the individual or general permits issued to each site.</p>	<p>5.7</p>
<p>EO 13186 — “Responsibilities of Federal Agencies to Protect Migratory Birds” and Migratory Bird Act</p>	<p>In a continuing effort to minimize disruption and provide suitable habitat to migratory birds at SPR sites, bird-nesting areas are closed or otherwise protected during critical periods to prevent disturbance from site operations.</p> <p>SPR storage facilities are located on migratory pathways along the Texas and Louisiana Gulf Coast. Many species of waterfowl and songbirds use SPR sites for resting and refueling during spring and fall migration. Environmental awareness of migratory bird issues commences at the site level. Mowing is discontinued in selected fields from early fall through spring at all sites to provide food and shelter for migrating birds as well as nesting and brooding locations for resident birds. When discovered, nesting areas are flagged (e.g., ground-nesting terns and killdeer) and equipment is designated for limited/restricted use (e.g., for Northern Mockingbird, Mourning Dove, and Loggerhead Shrike).</p>	<p>5.7</p>
<p>National Historic Preservation Act (NHPA) — identifies, evaluates, and protects historic properties eligible for listing in the National Register of Historic Places. NHPA is administered by State Historic Preservation Offices.</p>	<p>In 2023, there were no submittals to the State Historic Preservation Offices. In 2020, four LE-2 projects were certified by the State Historic Preservation Offices. The certification was done by site. Two went to the Texas State Historic Preservation Office, and two went to the Louisiana State Historic Preservation Office. All four certifications indicated that no historic properties are present or affected by the project as proposed. No identified historic properties, archeological sites, or other cultural resources are present or affected.</p>	

Table 2-1 Environmental Regulations Applicable to the SPR

Regulation	Compliance Status	Report Section
<p>Oil Pollution Act (OPA) of 1990 — OPA and TGLO improved the nation's ability to prevent and respond to oil spills and provided requirements for contingency planning both by government and industry.</p>	<p>SPR emergency programs, planning, and management are guided by the OPA standards for onshore storage facilities, pipelines, and marine terminal facilities. Facility Response Plans have been combined with site emergency response procedures according to the EPA “One Plan” scheme and meet or exceed the requirements of OPA and related state acts such as the Oil Spill Prevention and Response Act (OSPR) in Texas. The plans are approved by the appropriate federal and state regulatory agencies. The Texas sites maintain their OSPRA certifications in accordance with state requirements.</p> <p>The SPR conducts quarterly emergency drills or hands-on training at its sites in accordance with the National Preparedness for Response Exercise Program (PREP). The exercises (announced or unannounced) are conducted at each site annually and include the deployment of equipment. Emergency management personnel from New Orleans coordinate these drills and include the participation of public and regulatory agencies.</p> <p>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. A team of selected New Orleans personnel is available to support extended site emergency operations when needed.</p>	
<p>Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) — LDEQ and TCEQ regulate the manufacture, use, storage and disposal of pesticides and herbicides.</p>	<p>State licensed pesticide applicators apply pesticides and herbicides using only products that have been reviewed and listed on the SPR Qualified Products List (QPL).</p> <p>The SPR uses pesticides and herbicides to control pests in buildings and around work areas and control vegetation on well pads, under pipe racks, and along security zone areas. Although pesticide use is necessary, a concerted effort is made to use the safest products for the environment.</p>	

2.2 Preventing and Reporting Releases

The SPR oil storage sites are located adjacent to or near marshes, wetlands, and water bodies. The SPR is committed to the protection of the surrounding environment through oil spill prevention and control. Verbal notification and associated written reports to the appropriate regulatory agencies (e.g., National Response Center) are made if a release meets reportable criteria. Each SPR site has structures to contain or divert any harmful release that could impact surrounding waterways or land areas. On-site spill control equipment, detailed emergency plans and extensive training are used to ensure that the environment is safeguarded.

Site Emergency Response Procedures address release reporting requirements of the SPR M&O, DOE, and appropriate regulatory agencies. Specific reporting procedures depend on the quantity and type of material released, immediate and potential impacts of the spill, and spill location (e.g., wetland or water body). Spills of hazardous substances are verbally reported to site management and then to M&O and DOE management in New Orleans. Releases are documented using the Operations Control Center (OCC) Non-Routine and Occurrence Report form. The form is completed at the site and forwarded to the New Orleans OCC. Corrective action/cleanup reports are also submitted unless otherwise directed by the DOE or appropriate regulatory agency.

2.2.1 Reportable Releases

Federal and state regulations require notification to authorities in the event of a release of a reportable quantity of designated materials. Historically, most reportable releases at the SPR have resulted from brine and crude oil operational activities. For reference, reportable quantities for Louisiana, Texas, and Mississippi (MS) (MS follows federal guidelines), are as follows in Table 2-2.

Table 2-2 Reportable Quantities				
Material	Media	Federal and MS	Louisiana LA 33.I.3915	Texas 30 TAC 327.3
Crude Oil	Land		1 Barrel	5 Barrels
	Water	sheen	1 Barrel	sheen
	Air		5000 pounds	5000 pounds
Petroleum Product	Land		1 Barrel	5 Barrels
	Water	sheen	1 Barrel	sheen
	Air		5000 pounds	5000 pounds
Brine	Land		1 Barrel	N/A
	Water	sheen	1 Barrel	100 pounds

During CY 2023, 75 releases occurred at the SPR storage sites. They are listed in Table 2-3 and represented graphically (per material, site, and month) in Figure 2-1. As shown in Figure 2-1, crude was most often released. The increase in spills is due to the major construction work being conducted for LE2. Of the 75 releases, two were above its reportable quantity. They are highlighted in yellow in Table 2-3. The first release consisted of 25 BBL of brine from aged underground pipeline infrastructure at Bayou Choctaw on 01/27/2023. The second release consisted of 100 BBL of brine from a 3” hose that came uncoupled from its fitting at Bayou Choctaw on 2/2/23. Each of the reportable releases were cleaned-up and outside agency notifications were completed in accordance with prescribed regulatory requirements.

Table 2-3 CY 2023 Releases					
Date	Site	Location within Site	Material	Total Released	Reportable?
1/4/2023	BH	BHT-51	Diesel Fuel	3 – 4 gallons	NO
1/6/2023	BH	SW of Cavern 109	Crude Oil	3.5 gallons	NO

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1/10/2023	BM	Pig Trap Area	Crude Oil	Residual	NO
1/12/2023	BH	Cavern 106	Crude Oil	5 gallons	NO
1/27/2023	BC	Underground South of Cavern 17	Brine	25 BBL	YES
2/1/2023	BH	Front Gate	Antifreeze	0.5 gallons	NO
2/2/2023	BC	East of Bldg. 402; South of East/West Road Walkway/Limestone Area	Brine	100 BBL	YES
2/2/2023	BH	Cavern 107	Crude Oil	15 gallons	NO
2/6/2023	BM	South of BMT4, in the fab area.	Hydraulic Oil	5 gallons	NO
2/28/2023	BM	South of BMT4, in the fab area.	Hydraulic Oil	5 gallons	NO
3/2/2023	BC	Brine Road	Hydraulic Oil/Crude Oil	< 1 gallon	NO
3/3/2023	BM	Between north road and the heat exchangers	Hydraulic Oil	32 oz	NO
3/6/2023	BH	Cavern 105	Crude Oil	1 qt	NO
3/12/2023	BH	Cavern 111	Crude Oil	2 gallons	NO
3/12/2023	BM	BMT-2	Crude Oil	½ gallon	NO
3/13/2023	BM	SW of RWIJ	Brine	500 BBL	NO
3/14/2023	BM	Cavern 5	Crude Oil	1 qt	NO
3/19/2023	BM	Cavern 111	Crude Oil	1 gallon	NO
3/27/2023	BM	S. of Bldg. 284	Hydraulic Oil	3 oz	NO
3/29/2023	BM	N. of BMT-4	Hydraulic Oil	1 oz	NO
3/30/2023	BM	N. of Crude Oil Injection Bldg.	Hydraulic Oil	1 oz	NO
3/31/2023	BM	N. of Crude Oil Injection Bldg.	Hydraulic Oil	2 oz	NO
3/31/2023	BM	Near Cavern 108	Hydraulic Oil	16 oz	NO
4/4/2023	BM	Cavern 116	Crude Oil	5 gallons	NO
4/9/2023	WH	Cavern 116	Crude Oil	5 gallons	NO
4/12/2023	BH	Cavern 109	Crude Oil	5 gallons	NO
4/15/2023	BM	RWIS	Motor Oil	8 oz	NO
4/19/2023	BM	North Road Portable Light Plant NW of BMT-2	Diesel Fuel	0.5 gallons	NO
4/20/2023	BM	Southwest Gate/Subcontractor Parking Lot	Steering Fluid	8 oz	NO
4/24/2023	BM	BMT-3	AFFF/Water	500 gallons	NO
4/28/2023	BM	East Comm Tower	Crude Oil	1.3 BBL	NO

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4/28/2023	BM	BMT-4 North Tank Road	Motor Oil	1 oz	NO
4/28/2023	BM	Laydown Yard #1	Motor Oil	3 qt	NO
5/2/2023	BM	BMT-4 North Road	Lubrication Oil	1.5 oz	NO
5/17/2023	BM	South Tank Road AFFF Building	Motor Oil	32 oz	NO
5/18/2023	BM	S&B Tent Area	Hydraulic Fluid	5 oz	NO
5/19/2023	BM	Removed Valve Near Washout Pit	Crude Oil Residual	4 oz	NO
5/19/2023	BM	Vac-Truck	Motor Oil	3 oz	NO
5/21/2023	BH	Cavern 113	Crude Oil	2 qt	NO
5/23/2023	BM	Excavator Near Cavern 113	Hydraulic Fluid	2 qt	NO
5/25/2023	BM	Crude Oil Injection Pump Pad	Crude Oil	1 qt	NO
5/31/2023	BM	Near Cavern 105	Hydraulic Fluid	3 oz	NO
6/2/2023	BM	Pig Launcher and Receiver	Crude Oil	75 gallons	NO
6/8/2023	BM	Corner of Levee Road and Laydown Yard 1	Hydraulic Fluid	32 oz	NO
6/14/2023	BM	East of Crude Oil Injection Pump Pad	Crude Oil	6 oz	NO
6/20/2023	BM	Roll Off Tank behind the Maintenance Shop	Crude Oil Sludge	3 oz	NO
6/22/2023	BM	BMT1 Entrance	Diesel Fuel	2 oz	NO
6/22/2023	BM	RWIS Paved Area	Hydraulic Fluid	32 oz	NO
6/25/2023	BH	Cavern 109	Crude Oil	2 gallons	NO
7/5/2023	BM	Levee Road and Control Road Intersection	Crude Oil	10 oz	NO
7/6/2023	BM	East Side of Meter Skid	Crude Oil	2 gallons	NO
7/10/2023	WH	Bldg. 314 AFFF Foam Tank	AFFF	½ gallon	NO
8/3/2023	BM	South of Launch Receiver Area	Crude Oil	15 gallons	NO
8/11/2023	BH	North Road	Hydraulic Fluid	1 gallon	NO
8/17/2023	BM	Past Main gate Entrance	Oily Sludge	1 gallon	NO
9/5/2023	BM	Laydown Yard 2	Crude Oil	3 gallons	NO

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9/11/2023	BM	Northside of BMT-1 at the HEX outlet header #2	Crude Oil	2 oz	NO
9/13/2023	BM	Surge Relief Area	Crude Oil	4 oz	NO
9/13/2023	BH	West of cavern 109	Crude oil	1 Cup	NO
10/4/2023	BM	West of cavern 110	Crude oil	1.8 BBL	NO
10/4/2023	BM	South of Property Yard B	Crude oil	1.9 BBL	NO
10/10/2023	BM	East Meter Skid Area	Hydraulic Fluid	1 oz	NO
10/11/2023	BM	South of "B" yard / West of Cav-1 / North of Levee Road	Crude oil	3 qt	NO
10/15/2023	BM	Excavation West of Cavern 110	Crude oil	39 Gallons	NO
10/16/2023	BM	Crude Oil Header Piping North of BMT-3	Crude oil	25 Gallons	NO
10/18/2023	BM	Near MCCK and Cavern 005	Diesel Fuel	1 oz	NO
10/19/2023	BM	BMT-4 Dike Area	Crude Oil	< 1 oz	NO
11/3/2023	BM	Raw Water HPPP	Hydraulic Fluid	TBD	NO
11/9/2023	WH	Meter Station	Crude Oil	1.2 BBL	NO*
11/13/2023	BH	Cavern 106	Crude Oil	1 pt.	NO
11/17/2023	BM	Excavation West of Cavern 113	Crude Oil	5 Gallons	NO
11/29/2023	BM	S&B wash-out area	Crude Oil	5 Gallons	NO
11/29/2023	BM	Rd N of Cavern 109	Hydraulic Fluid	Several Quarts	NO
12/6/2023	BM	Excavation West of Cavern 113	Crude Oil	1 oz	NO
12/7/2023	BH	LE-2 Laydown Area	Hydraulic Fluid	2 qt.	NO

* Notification was made to outside agency. Release was later determined not reportable because it was contained by a clay lined secondary containment.

Figure 2-1 CY 2023 SPR Releases by Month, Site, and Material

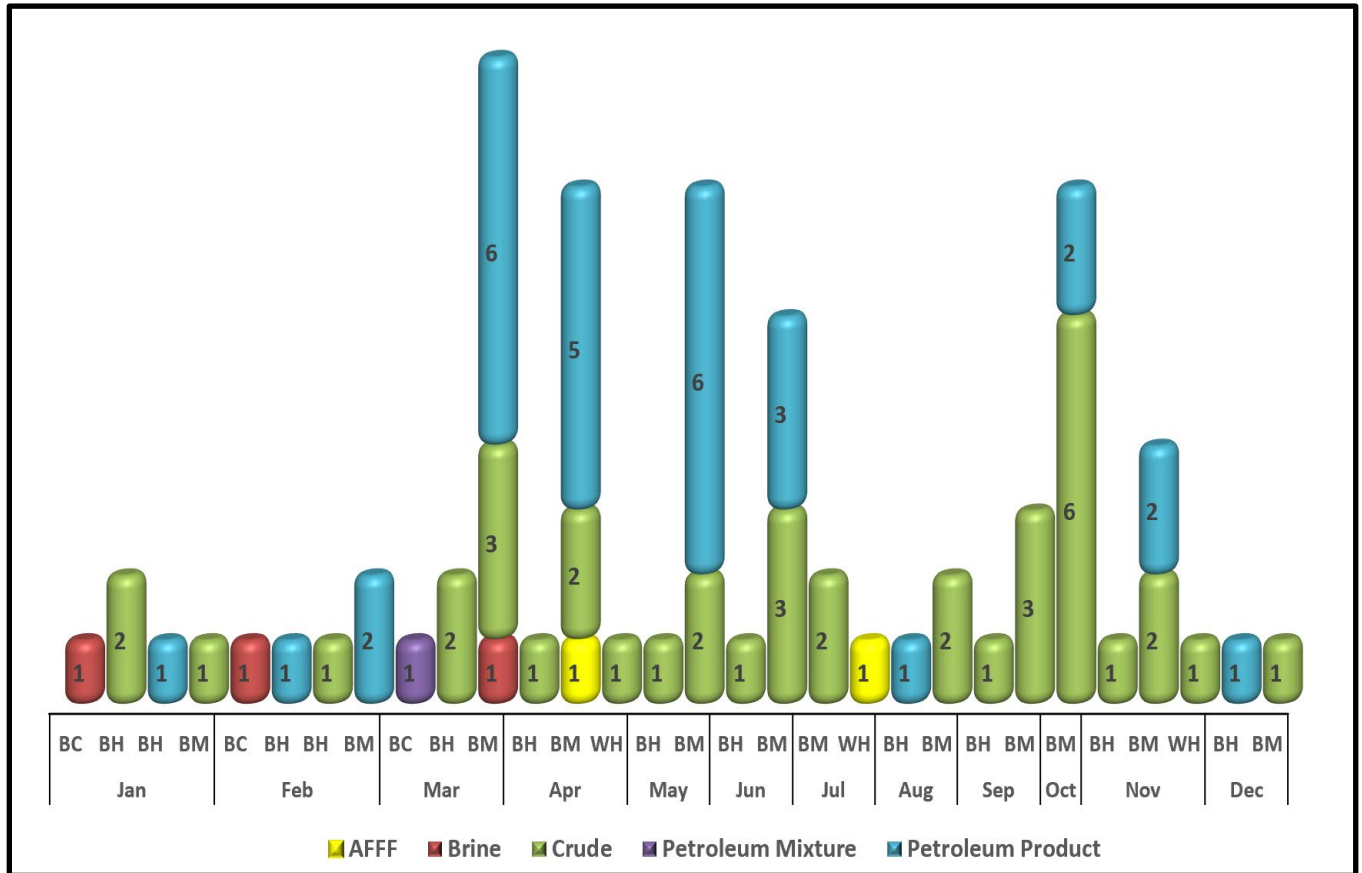


Table 2-4 provides a eight-year summary of reportable releases. This is graphically represented in Figure 2-2. Due to the number of reportable spills that occurred in CY 2017, the M&O Senior Management initiated communication with site management to focus on preventative measures to reduce the likelihood of reportable releases. Additionally, a work instruction titled “SPR Unplanned Release, Estimation, Notification, and Reporting for Non-Emergency Situations” was published in 2019 to promote the consistent identification of reportable spills. The FFPO Environmental Department provided training to site personnel who handle oil, brine, and other chemicals to increase awareness. Because of the focus and support, combined with Environmental oversight, project design review input, and usage of the new work instruction, reportable releases have been significantly reduced.

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Table 2-4 SPR Reportable Releases CY 2018-2023

Date	Site	Material	Volume	Summary
03/04/2020	WH	Oil	7 Barrels (5 within containment and 2 outside)	During a routine drill, the wellhead valve at Cavern 110 was left open unintentionally, and the frac tank overflowed. Five barrels of oil spilled within the containment area. Windy conditions blew two gallons of oil from the top of the tank over the levee and into a ditch. M&O personnel notified outside agencies as required and initiated clean-up and recovery operations.
10/07/2020	BC	Oil	< 1 Gallon	While performing a readiness test of BCP-79 in preparation for Hurricane Delta, site personnel noticed a sheen near the pump discharge in the East/West Canal. M&O personnel notified outside agencies as required and initiated clean-up and recovery operations. The release was contained using an absorbent boom. The U.S. Coast Guard arrived that day to investigate the reported discharge.
12/16/2022	BC	Brine	1 Barrel	In the process of pressurizing Cavern 102 with brine from the brine pond, the 12-inch brine line ruptured. The brine transfer pumps were shut down, cavern master valves were blocked, and the brine line was isolated. Ditch culverts were blocked with plywood and tarps to contain the brine in one area. A vacuum truck was used to recover the released brine.
1/27/2023	BC	Brine	25 Barrels	While brine disposal was in progress a technician in the field noticed water and air bubbling at a crack in the East/West Road near BLDG 402. The Brine Pumps were shut down, the area was diked, and drains were isolated on both sides of the road to prevent runoff. The area was flushed with water and brine/water was sent to the BDW. Rapid Response Contractor installed an above ground jumper 3-inch rubber piping to bypass the faulty brine line section.
2/2/2023	BC	Brine	100 Barrels	The release consisted of 100 BBL of brine from a 3" hose that came uncoupled from its fitting. Site dammed off low lying areas, made collection points, and utilized vac truck to clean up spill. The area was flushed with water and brine/water was sent to the BDW. Rapid Response Contractor replaced above ground jumper 3-inch rubber piping to bypass the faulty brine line section with 3-inch welded hard steel piping that was pressure and leaked tested.

Figure 2-2 SPR Reportable Releases for Calendar Years 2016 – 2023

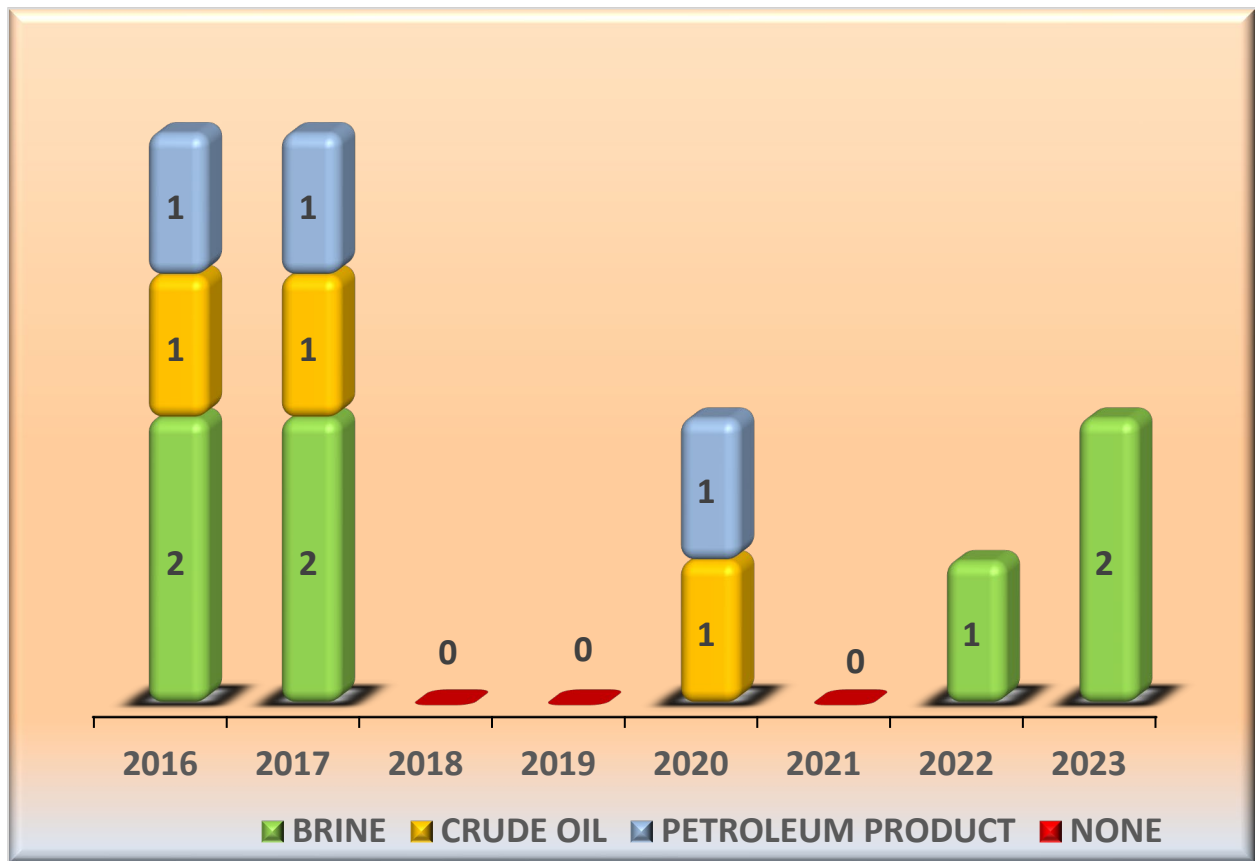
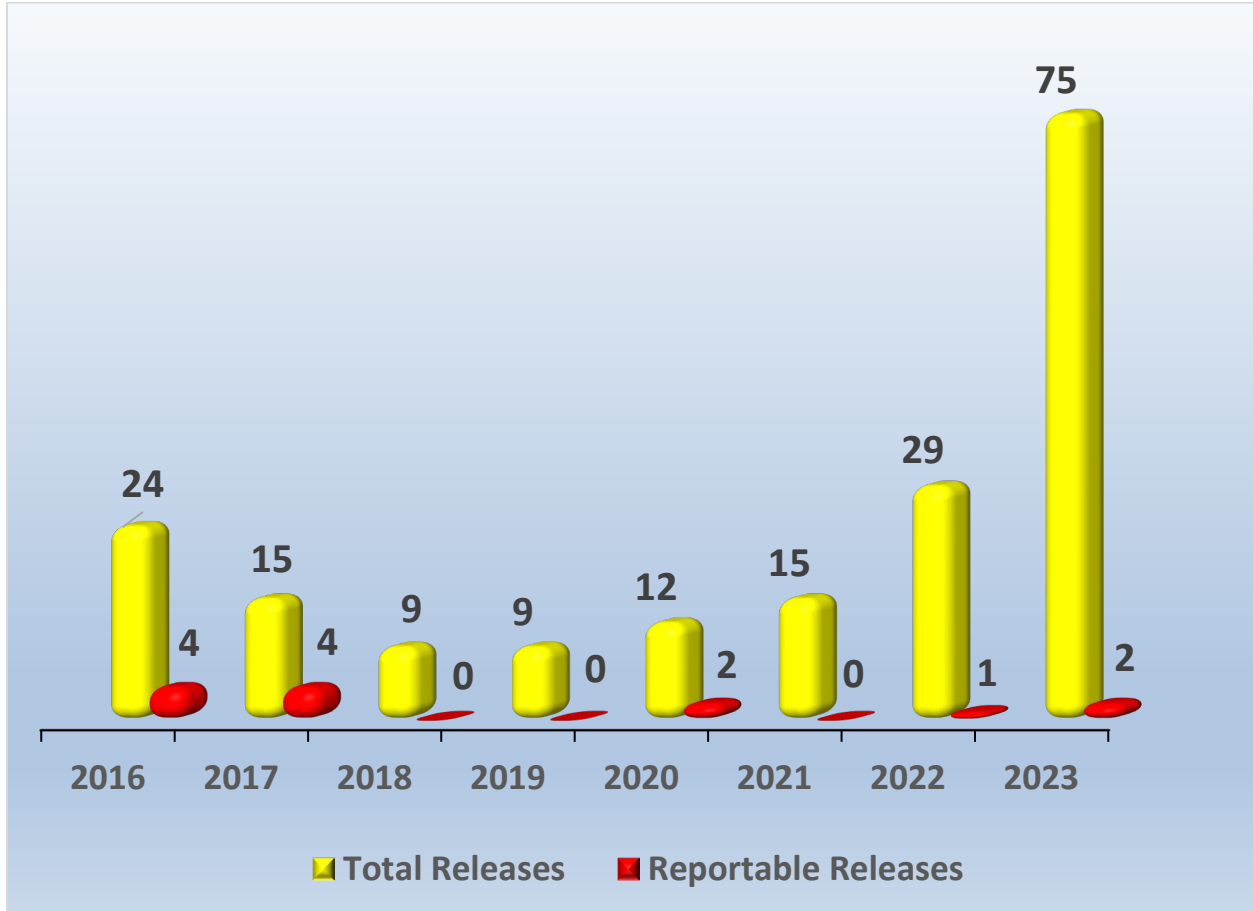


Figure 2-3 provides an eight-year summary of total releases as compared to reportable releases. As reflected in the figure, with the performance of LE2 activities at the sites, the number of releases increased in CY 2023 as compared to previous years. Two of the 75 releases were reportable.

Figure 2-3 SPR Releases vs. Reportable Releases for Calendar Years 2016– 2023

2.3 Environmental Concerns

2.3.1 Gassy Oil

Air emissions may be of concern when retrieving crude oil from salt dome storage. During retrieval, methane and ethane gases (non-regulated) that have migrated into the salt cavern are released, stripping regulated pollutants (VOCs) from crude oil into the atmosphere. Also, geothermal processes raise the crude oil temperature and vapor pressure. This elevated vapor pressure may exceed regulatory limits for storage in floating roof tanks, potentially affecting some SPR sites and receiving commercial terminals (customers).

This environmental issue has been addressed by performing “degassing” operations. In 1995, the SPR commenced degassing processes to separate and remove gas from stored oil and employed heat exchangers to cool oil before transporting it off-site. Gases from degassing operations were recovered and incinerated. All emissions from degassing operations were included in the SPR emission inventories. Degassing was performed on an alternating schedule. Recent history is as follows:

- Big Hill, April 2004 - October 2006
- Bryan Mound, September 2007 - February 2011
- West Hackberry, August 2014 - October 2018

In 2022, the design of a modern degassing unit was included as part of the Modernization Program's Life Extension Phase 2 Project. It is to be built at Bryan Mound and is currently on hold. Existing SPR site air permits will be revised to add the emissions from degassing operations prior to construction.

The SPR is also in the design review process to install mechanical refrigeration chillers at each SPR site to mitigate vapor pressure and increase the availability of caverns for oil sales and exchanges. Project requirements and funding sources are currently being identified for this task.

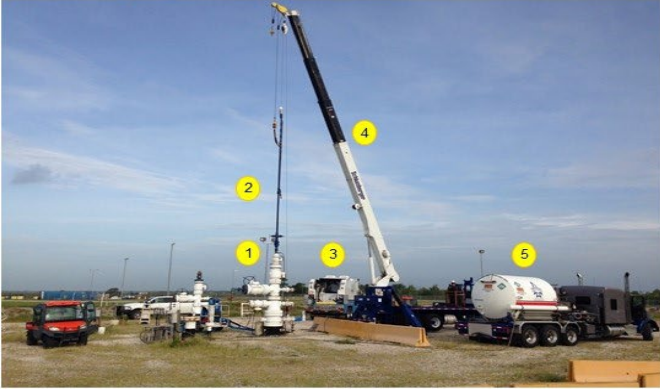


2.3.2 Cavern Integrity

SPR caverns and wells are operated and maintained in accordance with various DOE policies and the regulatory requirements of the DENR at LAC 43:XVII, Subpart 3, Statewide Order 29-M, and the RRC at 16 TAC §3.95.

To ensure compliance, the SPR conducts a comprehensive monitoring and inspection program, including continuous measurement and recordation of fluid pressures in the caverns to maintain the prescribed operating pressure ranges and check for any loss of containment. Mechanical integrity tests (refer to Figure 2-4) are performed every five years, at a minimum, using pressurized nitrogen gas to test fluid containment. A variety of wireline well logging tools, such as multi-arm calipers and sonars, are used to measure subsurface conditions. On the surface, wellheads are inspected periodically for corrosion and loss of integrity, and each storage site is surveyed for ground subsidence as an indicator of salt dome movement and possible cavern-scale movement. When necessary, diagnostic workovers are performed to remove brine strings to be logged and inspected. Well remediation is performed when a well loses mechanical integrity or shows severe deformation.

During 2023, FFPO oversaw a total of 17 diagnostic workovers at the Big Hill, West Hackberry, and Bayou Choctaw sites and no well remediations. No violations were issued by either Louisiana or Texas state environmental regulators.

Figure 2-4 Mechanical Integrity Test (MIT)

Discussion	MIT Equipment on Location for SPR Well Test
<ul style="list-style-type: none"> ◆ Nitrogen is inert and can flow through smaller spaces than crude oil ◆ Gas is injected at high pressure (1,800 psi) and allowed to stabilize ◆ Nitrogen pressures, temperatures, and volumes are measured plus 2 sequential levels of the nitrogen/oil interface ◆ Minimum detectable leak rate (MDLR) is calculated to account for accuracy limits of instruments ◆ Calculated leak rate (CLR) calculated from test data ◆ If CLR>MDLR, test is considered failed ◆ MIT required every 5 years with results reported to state regulators ◆ Wells that fail MIT must be taken out of service and remediated 	
	

2.3.3 Contaminants of Emerging Concern

The EPA has identified two “contaminants of emerging concern” used at SPR sites. These contaminants, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), are part of a larger group of chemicals (per- and polyfluoroalkyl substances) which are generally referred to by their plural acronym, PFAS. PFAS are manufactured chemicals not naturally found in the environment and have many different uses. They are extremely persistent and are sometimes referred to as “forever chemicals.” They are known to bioaccumulate in wildlife. At the SPR, PFAS-containing products are used to extinguish fires fueled by liquid hydrocarbons (e.g., petroleum). These fire-fighting compounds are commonly referred to as aqueous film-forming foam (AFFF).

During CY 2023, the SPR continued to maintain its inventory of AFFF while performing research to identify a replacement fluorine free foam (FFF). As measures to prevent releases of AFFF, Environmental personnel are present on-site to provide oversight during AFFF activities. Any AFFF or foamy water release during activities is pumped into vacuum trucks or bulk containers for transportation off-site. Hose connections are wrapped with absorbent material, taped, and placed on an impervious barrier. All waste accumulation containers are placed in secondary containment. Any release of AFFF, no matter the quantity, is documented and captured in Table 2-3. There were 2 AFFF releases in 2023: 500 gallons AFFF/water at BM and a ½ gallon at WH.

2.3.4 Hurricanes

Hurricanes Laura and Delta severely impacted the West Hackberry facility during CY 2020 with landfalls on August 27 and October 9, respectively. Restoration of the site has proceeded through CY 2023. As of December 31, 2023, the West Hackberry site (including main site, Raw Water Intake Structure and Lake Charles Meter Station) runs on commercial power and continues to make daily oil movements, while progressing with hurricane restoration. Hurricane restoration is expected to be complete in 2024.

2.3.5 SPR Modernization Program – Life Extension Phase 2 Project

In 2015, the SPR commenced a program to replace or upgrade equipment and facilities approaching or already exceeding their projected 25-year life span. The program included 87 work packages, which include, but are not limited to, the following work:

- improvement of site road access.
- replacement of brine disposal line, crude oil pipeline, pigging water pipeline, brine disposal wells, building and equipment instrumentation.
- subsidence and inundation mitigation.
- modifications to pumps and piping.
- routine maintenance; and
- installation or relocation of machinery and equipment.

In CY2023, LE2 efforts continued with the completion of the following:

Bayou Choctaw:

- Site Outage began
- The Contractor Security Screening Checkpoint (CSSC) was set in place in 2023. Commissioning on the CSSC is ongoing
- Completed installation of InSAR Piles and Reflectors
- Completed Installation of the Microseismic Well Pad
- Completed Helical Pile installation

Big Hill:

- Contractor Security Screening Checkpoint
- Contractor parking lot and laydown yard

Bryan Mound:

- Site outage began
- Completed 2 on-site levee crossings

Additionally, a significant scope of work will also be performed at the West Hackberry site should requested additional funding become available. While initially included within the LE2 Project, this work has been deferred due to the 2022 Presidentially directed emergency oil sales, as well as the significant impact of the COVID-19 Pandemic (significant supply chain and cost impacts due to commodity price increases) that escalated the forecasted Total Project Cost (TPC) beyond the approved \$1.42B budget.

2.3.6 Site Conservation Plans

The White House issued EO 14008, *Tackling the Climate Crisis at Home and Abroad* (January 2021), which set a goal of conserving 30 percent of U.S. land and water by 2030. The White House Council on Environmental Quality (CEQ) named this initiative *America the Beautiful*

and asked Federal agencies, including DOE, to prepare Conservation Action Plans (CAPs) detailing programs and projects across several discrete areas of early focus. The areas include:

- Create more parks and safe outdoor opportunities in nature-deprived communities.
- Support tribally led conservation and restoration priorities.
- Expand collaborative conservation of fish and wildlife habitats and corridors.
- Increase access for outdoor recreation.
- Incentivize and reward the voluntary conservation efforts of fishers, ranchers, farmers, and forest owners.
- Create jobs by investing in restoration and resilience; and
- Other activities supportive of the *America the Beautiful* initiative.

Locally, the SPR conservation efforts have been focused on the maintenance of critical habitat for migratory birds.

2.4 DOE On-site Appraisals and M&O Organizational Assessments

SPRPMO management appraisal teams and the New Orleans M&O Environmental group conduct annual visits to the sites to audit compliance with environmental programs and EMS practices. Assessors are independent and specific topics are chosen based on current management concerns and prior audit results. In 2023, topics included chemical and waste management, air and water quality, sustainability, EMS, and pollution prevention. There were four environmental findings associated with the DOE On-site Appraisals, observations and surveillance. The M&O identified four findings and corrective action plans were developed and implemented. All audit findings are tracked to completion in the SPR’s Assessment Tracking System.

2.5 Regulatory and ISO 14001 Registrar Inspections/Visits

There were 16 inspections or visits by, or on behalf of, regulatory agencies and the ISO 14001 certification body. These visits are summarized in Table 2-5. The visits are conducted on a routine basis by the regulatory agencies to ensure compliance or to address concerns. The ISO 14001 certification was recertified. The M&O maintains ISO14001 registration.

Table 2-5 Summary of Regulatory and Third-Party Inspections/Visits in 2023

Site	Organization	Remarks
Bayou Choctaw	DENR	Review of Brine Release – no issues
Big Hill	Jefferson County Emergency Management	ERT Prep Exercise – no issues
	RRC	RRC Annual Inspection – no issues

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	TCEQ	5-Year Potable Water Inspection, 1 Alleged Violation, 1 Potential Violation (Both Resolved)
	TGLO	ERT Prep Exercise – no issues
	TGLO	Annual Emergency Response Review – no issues
	USCG	Big Hill RWIS (Release Investigation) – no issues
Bryan Mound	TCEQ	Potable Water Samples – no issues
	TCEQ Third Party (Third Coast Environmental)	Potable Water Samples – no issues
	TCEQ Third Party (Third Coast Environmental)	Potable Water Samples – no issues
	TGLO	BM Brine Release Response, Annual Audit – no issues
New Orleans	ISO 14001 Certification Body (CB)	Surveillance audit – certification remains in effect.
	LDEQ	Old SPR Hazardous Waste Permit Review – no issues
Stennis	ISO 14001 Certification Body (CB)	Surveillance audit – certification remains in effect.
West Hackberry	ISO 14001 Certification Body (CB)	Recertification Audit – certification remains in effect
	USCG	Investigate Sheen on Black Lake (Not caused by SPR – no issues)

2.6 Community Outreach Programs

SPR sites attempt to be good stewards of the environment and good neighbors. Community outreach programs were established to promote healthy public relations, and donations are given to SPR neighbors in need. FFPO designated \$75,000 in 2023 to support numerous worthy charitable organizations in Louisiana and Texas.

Community organizations that received FFPO donations include:

- Food banks including Second Harvest Food Bank and Zachary Food Pantry.
- Schools including The University of New Orleans, Destrehan High School, Martin Luther King Charter School, McDonough 35 High School, New Sarpy Elementary, Southern University- Bayou Chapter, Xavier University of Louisiana, Zachary High School, George Washington Carver School, and Homer Plessy Community School;
- Community non-profit organizations including The Humane Society of Southeast TX, Court Appointed Special Advocates of Southeast TX, Inc., Anayat House for patients at local Beaumont, TX hospitals, TX Junior Bradford Association, Suits for Sons, New Orleans Mission, Salvation Army of Baton Rouge, and Zulu Social Aid and Pleasure Club; and
- Area volunteer fire departments and local police departments.

2.7 Awards

During CY 2023, SPR was announced as a leader in sustainable electronics procurement and was rewarded an EPEAT Purchaser Award. The award comes from the Global Electronics Council. EPEAT allows the SPR to efficiently address the lifecycle impacts of the electronics purchased, including computers, displays, printers, network equipment, etc.

The SPR was also rewarded the OSHA Region VI “Star Among Stars” award for performance at Bryan Mound.

The Stars Program is an award program for agencies qualified as a Voluntary Protection Program (VPP) site. The Stars Program is a way to encourage continuous improvement among all the VPP sites in Region VI. It awards stars per the following performance criteria:

- A facility with a single-year injury incident rate at least 50 percent below the industry average- “Star Among Stars,”
- A facility with a single-year injury incident rate at least 75 percent below the industry average- “Super- Star Among Stars,” and
- A facility with a single-year injury incident rate at least 90 percent below the industry average- “Star of Excellence.”

2.8 EPA’s Enforcement & Compliance History Online (ECHO)

The US EPA requires all facilities that fall under its regulation to report violations. This includes drinking water, air emissions, surface water discharges and hazardous waste. Information is compiled into the agency’s ECHO database. The four SPR oil storage sites are included in EPA’s ECHO database. Information within the database for each site is shown in Table 2-6.

Table 2-6 SPR ECHO Database Information			
Site	Site (as listed in ECHO)	City, State (as listed in ECHO)	Facility Registry Service ID
Bayou Choctaw	Bayou Choctaw Strategic Reserve	LA	110051775478
Big Hill	Big Hill Strategic Petroleum Reserve	Winnie, TX	110040883808
Bryan Mound	U.S. Department of Energy	County Rd 242A, Freeport, TX 77541	110001148954
West Hackberry	USDOE	Hackberry, LA	110022459196

3 Environmental Management System (EMS) and Sustainability

DOE Order 436.1A requires DOE sites to have an EMS. The EMS must be certified to, or in conformance with, the ISO 14001 standard. On May 19, 2000, the SPR's EMS was first evaluated by an independent certification body accredited by the American National Standards Institute/ American Society for Quality (ANSI-ASQ), National Accreditation Board (ANAB), and certified in conformance with the ISO 14001 standard. The EMS was recertified in 2003, 2006, 2009, 2012, 2015 and 2018, and 2024. The certification in 2018 was to change from ISO 14001:2004 standard to the ISO 14001:2015 standard. Between certification and recertification activities, surveillance audits are conducted by the certification body. The current certification is valid through December 11, 2026.

The scope of the EMS is the operation and management of the SPR under the M&O, its personnel, and on-site subcontractors. The SPR sites encompass roughly 1700 acres, 160 buildings or structures, and 170 miles of off-site pipeline (crude oil, fresh/brackish water, and brine). Sites are directly supported by approximately 630 M&O contracted and subcontracted full-time personnel. Site personnel receive computer-based ISO 14001 EMS training annually. The training provides an overview of the ISO 14001 standard and the importance of conformity with the SPR's environmental policy and procedures.

DOE delegates responsibility and authority for the environmental component of the Integrated Safety Management (ISM) system to the M&O to ensure that environmental, safety, and health requirements are an integrated but discernible part of the performance of all work from the initial planning stage through feedback and improvement. The SPR EMS Manual formalizes the environmental portion of ISM and defines the scope of the EMS regarding the elements of the ISO 14001:2015 standard. Although compliance with ISM does not ensure compliance with the ISO 14001:2015 standard, the M&O has tailored the EMS to comply with both requirements.

The EMS is implemented to protect the environment and manage SPR environmental obligations safely and effectively. It establishes the necessary organizational structure, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing, achieving, and maintaining the "SPR Environmental Policy." Conformance of the EMS to the ISO 14001 standard is illustrated through the SPR EMS Manual. The manual provides descriptions and references to SPR policies, plans, procedures, environmental aspects and impacts, and objectives, and targets that form the foundation of the EMS. Table 3-1 is a summary of the EMS objectives and targets with progress. Note, targets are tracked on a fiscal year basis.

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Table 3-1 FY 2023 Institutional Objectives and Targets with Performance

Aspect	Objective	Status 2023	Performance
1) Continual Improvement	Communication between NO Environmental personnel and Site ES&H Managers <ul style="list-style-type: none"> • EIM concurrence • Recurrent mtgs &/or Summit 	Improvement made	Environmental Compliance Status Meetings are conducted monthly. The summit took place 4/4-5/2023.
2) Continual Improvement	Develop computer- based training for waste and spill training	Improvements made	Completed
3) Continual Improvement	Develop a waste stream management work instruction for 50% of the SPR waste streams	N/A	Not Completed
4) Spill, Air Emissions, Monitoring, Wetlands Disturbance, Drainage, Navigation, Public Exposure	Avoid Clean Water Act, Clean Air Act, and RCRA (waste) enforcement actions (Notices of Violation – NOVs) Minimum & Target: 0/year	Zero	Meets target – Zero since FY 2000
5) Spills	Reduce reportable occurrences of releases from operational facilities <i>Target: <u>No more than 6 reportable spills/ FY</u></i> <i>Stretch: <u>No more than 4 reportable spills/ FY</u></i>	Two in CY23	Meets target and stretch
6) Water	Ensure Monthly SPCC inspections are being conducted <i>Target: <u>100%</u></i>	Complete	Meets target
7) Waste	Divert at least 50% Construction and Demolition Debris <i>SPR-Wide Minimum: 50%</i>	87%	Meets target
8) Waste	Divert at least 50% Construction and Demolition Debris (LE2) <i>SPR-Wide Minimum: 50%</i>	87%	Meets target
9) Waste	Divert at least 50% of Non-Hazardous Solid Waste <i>SPR-Wide Minimum: 50%</i>	87%	Meets target

Table 3-1 FY 2023 Institutional Objectives and Targets with Performance

Aspect	Objective	Status 2023	Performance
10) Air Emissions	Assure monthly site air emissions data for all permitted sources are provided monthly. <i>Target: 100%</i>	100%	Meets Target
11) Spill, Fire	Ensure Emergency Preparedness/Response are meeting the requirements for equipment availability, training, and PREP drills/exercises <i>Minimum: 95% ERT trained/site Target: 100% ERT trained/site</i>	100%	Meets Target
12) Water	Permit exceedances on DMRs Target: ≤8 /FY <i>Target: 100%</i>	8	Meets Target
13) Water, Air Emissions	Submit remaining LE2 permit applications- Permits are listed in the projected month of submittal. <i>Target: 100%</i>	100%	Meets Target

EMS Performance Metrics

The information provided below is from the SPR’s 2023 EMS Compliance Report. The EMS received a “Green” score based on the metrics listed below.

The EMS implementation team annually reviews activities, products, and services. Activities include but are not limited to maintenance, workovers, drawdowns, painting, and pipe integrity. Their associated environmental aspects (i.e., possible air impact, fire results, production of waste, etc.) are evaluated. The severity, frequency (likelihood) and rank are determined using the SPR Risk Coding Matrix. Severity rating descriptions range from negligible to marginal, moderate, significant, and severe. Frequency ratings range from very low to very high. Ranks are determined by using the severity and frequency ratings. The Significant Aspect List is provided in Table 3-2. Significant Aspect List rating descriptions range from marginal to moderate, significant, and severe. Frequency (likelihood) ratings range from medium to very high, and risks are determined. The Significant Aspect List also includes an unmitigated severity, likelihood, and risk. Review results are documented, and changes are made when deemed necessary. The updated list of environmental aspects is published internally and is available outside DOE if requested.

In 2023, operational controls associated with identified significant environmental aspects were established, implemented, controlled, and maintained in accordance with operating criteria.

In 2023, an environmental compliance audit program was in place. Audits were completed according to schedule, findings were documented, and corrective and preventive actions were recorded and either completed or placed on a schedule for completion. More information about the SPR audit program is in Section 2.4.

The EMS Compliance Report requires reporting by DOE facilities about whether the eight sustainability goals outlined in Executive Order 14057 are applicable and addressed in the EMS of the reporting facility. In FY 2023, all thirteen of the sustainability goals were applicable and addressed in the SPR EMS. More information on the sustainability goals is contained in Table 3-3, FY 2023 Sustainability Goals, Performance, and Planned Actions.

Table 3-2 Significant Aspect- Impact List

Aspect	Activity	Impact	Aspect ID (Refer to ES&H Standards List)
Air Emissions	Maintain site structures and equipment	Air Quality	1AE
	Workover-crude movement		
	*Degas crude		
	Drawdown-crude to ships		
Fire	Respond to upset conditions	Air Quality, Land, Water Quality	7F
Waste	Sample/Test crude (receipt & storage)	Disposal Impact (Haz or Non-Haz)	14W
	Construction activities		
	Painting		
	*Sample/Test (degassing crude)		
	Sample/test (workovers and inter-cavern movements)		
	Chemical use-non-QPL		
	Maintain site structures		
Reportable Spills/ Releases	Workover- crude/brine movement	Water Quality	11SR
	Crude storage tanks (before moving to caverns)	Air Quality, Land, Water Quality	
	Respond to upset conditions		
	Monitor onsite piping integrity		
	Monitor offsite pipeline integrity		
	Cathodic protection survey of crude oil pipelines		
	Drawdown – move crude via piping		
	Basic Ordering Agreements (establish/maintain for spill response/ clean up) (failure)	Land and Water Quality	
	Leach caverns with raw water during drawdown		
	Pig pipelines to perform maintenance		
Natural Resource Preservation	Maintain site structure	Water Quality	9NRP
	Maintain site structures	Wildlife	
	Work in wildlife habitat areas		
Cavern Integrity	Leach caverns with raw water during drawdown	Cavern Integrity	16CI
	Cavern (drill wells)		
	Store crude in caverns	Environment	
Discharges	Maintain site structures	Water Quality	3D
Energy Use	*Degas crude oil	Energy/Material Consumption	1AE
Per-and Polyfluoroalkyl Substances (PFAS)	Fire Fighting	Land, Water Quality	14W
	Waste		
	Spill		

* Degas Plant was not constructed.

EMS and Mission Effectiveness

Since its inception, the EMS has contributed to the effectiveness of the SPR mission. The EMS has reduced risk to the organizational mission, contributed to an improved fiscal efficiency/cost avoidance, provided greater understanding and recognition of environmental issues at all levels, and improved community relations. Below are specific examples of how the EMS has contributed to mission effectiveness.

- The SPR operates more efficiently during congressionally mandated oil sales due to strong control of significant environmental aspects.
- Improves the SPR's relationship with neighbors and regulators.
- Saves taxpayer money otherwise spent to correct environmental upsets such as crude oil spills and discharges that exceed permit limitations.
- Provides a management system to ensure compliance with compliance obligations.
- Provides a system to reduce environmental liability and risk.
- Formalizes the environmental portion of the ISM.

EMS Best Practices

In 2023, there were several EMS best practices implemented. Every year a strategy is developed with recommendations for reaching the sustainability goals of EO 14057. Based on the strategy developed, DOE chooses which objectives to fund. This process is conducted annually to confirm choices for the following year and provide an opportunity to evaluate new strategies or programs. Quarterly sustainability meetings were held to evaluate progress in achieving EO 14057 goals. Progress is discussed at management review team meetings.

2023 EMS best practices included:

1. Updated objectives and targets to reflect site-specific data;
2. Created an ISO 14001 "Review Guide;"
3. Created an OA compliance table;
4. Tied EMS significant environmental aspects to the enterprise risk matrix; and
5. Developed an EMS handout for visitors.

EMS Implementation Challenges

In 2023, there were four EMS implementation challenges identified:

1. Setting appropriate and achievable goals for the SPR in support of overall DOE sustainability goals;
2. Ensuring compliance with, and effectiveness of, the management system;
3. Implementing effective training for existing and new site personnel; and
4. Consistent EMS implementation at all sites.

3.1 Sustainability

EO 14057 focused on reducing GHG emissions through the increased use of Carbon Pollution-Free Energy (CFE) and preventing pollution of air and water from waste and chemicals. The sustainability program is planned, implemented, monitored, measured, evaluated, reported, and improved through the SPR EMS. Official implementation instructions for EO 14057 were issued in August 2022. As goals and targets are made official, the SPR will incorporate them into the EMS.

Many SPR sustainability goals – identified as “objectives” in the EMS – were created during the initial development of the SPR EMS, after evaluating SPR activities and recognizing environmental aspects which required controls. These are referred to as SPR-specific “institutional” objectives (see Table 3-1.) Other sustainability goals identified and mandated by the EOs were included in the EMS in 2007, 2009 and 2015. All objectives and corresponding targets are called “performance measures” (see Table 3-3).

Twenty-three performance measures were tracked by the SPR EMS in FY23 (8 sustainability goals/sub-goals and 15 institutional performance measures). Targets were established for each measure, with some measures having more than one target. Measures with more than one target had a minimal goal and a more challenging goal, called a stretch target.

Each fiscal year, performance measures are agreed upon by DOE and the M&O and are tracked for success. Some focus on specific disciplines such as the Environmental or Emergency Management departments, while others involve all disciplines. All performance measures were related to significant environmental aspects or interests of top management.

Refer to Tables 3-1 and 3-3 for a synopsis of performance measures. Institutional performance measures have been monitored and measured annually for more than 12 years. They are based strictly on SPR-specific environmental aspects.

SPR sustainability goals, performance, and plans are reported and tracked by the DOE Sustainability Dashboard (Dashboard). A screenshot of a portion of the Dashboard input window is included in Figure 3-1. Table 3-3 provides an overview of the SPR performance toward meeting the goals. Sustainability data and progress for the SPR is entered into the Dashboard annually. The Site Sustainability Plan (SSP) is included in the Dashboard. The SSP reflects the SPR progress (Table 3-3) toward meeting the goals of the executive orders.

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
<p>Sec. 203. Transitioning to 100 Percent Carbon Pollution-Free Electricity.</p>	Clean Energy	Each agency shall increase its percentage use of carbon pollution-free electricity (CFE), so that it constitutes 100 percent of facility electrical energy use on an annual basis, and seek to match use on an hourly basis to achieve	SPRPMO and SPR M&O Contractor working with electricity vendor to purchase CFE when available	Continuing to communicate with vendors to be ready to take advantage of CFE when it becomes available
	Facility Energy Efficiency	50 percent 24/7 carbon pollution-free electricity, by fiscal year 2030	<p>PMCC Enhancement Project (PMCC is a consulting company)</p> <hr/> <p>Replace current lighting with LED</p> <hr/> <p>Site Building Enhancement Projects</p>	<p>PMCC Enhancement Project - Working to complete CMP at all 4 sites and QA/QC to check validity of data during FY24</p> <hr/> <p>Replace current lighting with LED- Sites are replacing lights inside buildings as budget allows</p> <hr/> <p>Site Building Enhancement Projects- Projects being designed and scheduled under the Major Maintenance Program or Life Extension 2</p>

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
	Facility Energy Efficiency	Benchmarking	PMCC Enhancement Project; Data entry in Portfolio Manager	PMCC Enhancement Project- see above Data entry in Portfolio Manager- after completion of all 4 sites and collection of a full 12 months of quality data, data to be entered into Portfolio Manager
	Facility Energy Efficiency	Meter all individual buildings for electricity, natural gas, and steam, where cost-effective and appropriate	PMCC - SPR Metering Plan	Ongoing activity- periodic review of Plan underway to be completed during FY24. DOE via FEMP published Federal Metering Guidance in October 2022
	Renewable Energy		Monitor for new technology	Ongoing activity
	Renewable Energy	Requires that renewable electric energy account for not less than 7.5% of a total agency electric consumption by FY 2013 and each year thereafter	Purchase Wind Renewable Energy Credits (RECs) at 7.5% of consumption; purchase renewable electricity; Solar Panels; Efficient electronics	Budget and schedule on time to purchase required Wind RECs. Waiting to see if there is an increase in the amount to be purchased (higher % of consumption)

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
	Renewable Energy	The buildings (25,000 GSF or more) shall be designed so that the fossil fuel-generated energy consumption of the buildings is reduced, as compared with such energy consumption by a similar building in fiscal year 2003, by 100% in 2030. If lifecycle cost-effective, as compared to other reasonably available technologies, not less than 30 percent of the hot water demand for each new Federal building or Federal building undergoing a major renovation be met through the installation and use of solar hot water heaters	Building design process, design review process to include Life Cycle Cost Methods and increases in energy efficiency	Ongoing activity
Sec. 206. Increasing Energy and Water Efficiency.	Water Efficiency	If water is used to achieve energy efficiency, water conservation technologies shall be applied to the extent that the technologies are life-cycle cost-effective	Project design and design review process to include increased water efficiency; Potable Water Meters	Ongoing activity Statement of work under development to install in FY 2024. Additional funding most likely will be needed
	Water Efficiency	Storm water runoff requirements for Federal development projects	Project design and design review process to include increased water efficiency and storm water run improvements	Ongoing activity

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
<p>Sec. 205. Achieving Net-Zero Emissions Buildings, Campuses, and Installations.</p>	<p>Efficiency Measures, Investment, & Performance Contracting</p>	<p>(a) Agency shall achieve net-zero emissions for all buildings 2045 & reduce GHG emissions by 50% from buildings and installations by 2032 from 2008 levels, prioritizing improvement of energy efficiency and the elimination of onsite fossil fuel use. (b) To prioritize reductions in scope 1 GHG emissions, as defined by the Fed GHG Accounting and Reporting Guidance (Sect. 510 of this order). (c) To reduce scope 1 and 2 GHG emissions, as defined by the Fed GHG Accounting and Reporting Guidance, to achieve net-zero emissions buildings, agencies shall: utilize whole-building commissioning, energy & water conservation measures, & space reduction & consolidation; (ii) ensure new construction & modernization projects over 25,000GSF are net-zero emissions by 2030; (iii) implement CEQ’s Guiding Principles for Sustainable Fed Buildings in all buildings built & operated; & (iv) use ESPCs to improve efficiency & resilience of Fed facilities, use clean & innovative technologies, & reduce GHG emissions from building ops</p>	<p>SPR is all electric across the building portfolio. Monitor buildings for any potential means to increase their efficiency</p>	<p>Ongoing activity</p>

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
	Efficiency Measures, Investment, & Performance Contracting	Performance contracting	Periodic evaluation of the SPR by ESCO (ESCO is a consulting company)	Possible ESCO visit during FY24
	Efficiency Measures, Investment, & Performance Contracting	Every four years, conduct a comprehensive energy and water evaluation of 25% of facilities that consume 75% of the energy use. (Each such facility is completed at least once every 4 years)	Conduct Type 1 (Desk Audit until LE 2 complete) energy and water audit at one site per year, all 4 sites in the 4-year cycle, covering at a minimum 75% of electricity consumption at the sites; Results of EISA Audits implemented at the sites	BH in 2023, and WH in 2024 to complete current cycle. Desk Audits to be used on advice of DOE SPD until LE 2 construction is complete. Site visits would pick back up at that time.
	Green Buildings/High Performance Sustainable Buildings	High-performance green Federal buildings	Building design process, design review process to include Life Cycle Cost Methods and increases in energy efficiency	Ongoing activity
	Green Buildings/High Performance Sustainable Buildings	High-performance green Federal buildings	E2P2 Projects Tracking	Ongoing activity
	Green Buildings/High Performance Sustainable Buildings	High-performance green Federal buildings	DOE initiates all new leases and changes to leases	Ongoing activity

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
	Green Buildings/High Performance Sustainable Buildings	High-performance green Federal buildings	Include energy efficiency measures in buildings- new or renovated	Ongoing activity
	Green Buildings/High Performance Sustainable Buildings	High-performance green Federal buildings	Building design process, design review process to include Life Cycle Cost Methods and increases in energy efficiency	Ongoing activity
	Green Buildings/High Performance Sustainable Buildings	The buildings shall be designed so that the fossil fuel-generated energy consumption of the buildings is reduced, as compared with such energy consumption by a similar building in fiscal year 2003 (as measured by Commercial Buildings Energy Consumption Survey or Residential Energy Consumption Survey data from the Energy Information Agency), by 100% by 2030	Building design process, design review process to include Life Cycle Cost Methods and increases in energy efficiency	Ongoing activity
	Green Buildings/High Performance Sustainable Buildings	Increase regional and local planning coordination and involvement	Continue communication and interaction with state and local governments and agencies to include concerns in SPR projects and initiatives	Ongoing activity

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
<p>Sec. 207. Reducing Waste and Pollution.</p>	<p>Waste Management & Diversion</p>	<p>Each agency shall minimize waste, including the generation of wastes requiring treatment and disposal; advance pollution prevention;</p>	<p>Continue SPR Policy, Process, and Procedure of managing waste generation to eliminate or reduce the generation of hazardous waste, and any hazardous waste generated is handled and disposed of in the best way possible</p>	<p>Ongoing activity</p>
	<p>Waste Management & Diversion</p>	<p>Support markets for recycled products; and promote a transition to a circular economy, as defined in section 2 of the Save Our Seas 2.0 Act (Public Law 116–224), by annually diverting from landfills at least 50 percent of non-hazardous solid waste, including food and compostable material, and construction and demolition waste and debris by fiscal year 2025; and 75 percent by fiscal year 2030</p>	<p>Attain and maintain goals at the SPR - non-hazardous solid waste and C&D and Diversion Rates</p>	<p>Ongoing activity (see page 5-20 for recycling figures)</p>
	<p>Waste Management & Diversion</p>	<p>Emergency planning and community right to know</p>	<p>Qualified Products List (QPL)</p>	<p>Ongoing activity</p>
	<p>Waste Management & Diversion</p>	<p>The Congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment</p>	<p>SPR policies and procedures take advantage of opportunities to meet requirements</p>	<p>Ongoing activity</p>

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
Sec. 208. Sustainable Acquisition and Procurement.	Sustainable Acquisition/Procurement	Federal procurement of biobased products	Continue Environmental review process to approve purchases and contracts and use of QPL	Ongoing activity
	Sustainable Acquisition/Procurement	Products with recycled content	Continue Environmental review process to approve purchases and contracts and use of QPL	Ongoing activity
	Sustainable Acquisition/Procurement	Energy efficient products	Continue Environmental review process to approve purchases and contracts for Energy Star, EPEAT, and FEMP designated items	Ongoing activity
	Sustainable Acquisition/Procurement	Products with low standby power	Continue Environmental review process to approve purchases and contracts for Energy Star, EPEAT, and FEMP designated items	Ongoing activity
	Electronic Stewardship	To meet the requirements of an agency for an energy consuming product in a product category covered by the Energy Star program or the Federal Energy Management Program for designated products, the head of the agency shall, except as provided in paragraph (2), procure- (A) an Energy Star product; or (B) a FEMP designated product.	Continue Environmental review process to approve purchases and contracts for Energy Star, EPEAT, and FEMP designated items	Ongoing activity
	Electronic Stewardship	Dispose of excess property as promptly as possible	SPR policies and procedures take advantage of opportunities to meet requirements	All electronic waste was sent for recycling

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
	Electronic Stewardship	Management and Oversight of Federal Information Technology	SPR policies and procedures take advantage of opportunities to meet requirements	Ongoing activity
<p>Sec. 202. Reducing Agency Greenhouse Gas Emissions. Each agency shall reduce its scope 1, 2, and 3 greenhouse gas emissions, as defined by the Federal Greenhouse Gas Accounting and Reporting Guidance, by setting and meeting targets for fiscal year 2030 measured from a fiscal year 2008 baseline.</p>	Agency-Specific Priorities	OMB Government efficiency reports and scorecards	SPR Reporting via the SSP and DOE Dashboard	Ongoing activity
	Agency-Specific Priorities	Reporting	SPR Reporting via the SSP and DOE Dashboard	Completed 5 days behind schedule
	Greenhouse Gas Emissions	The status of the implementation by the agency of initiatives to improve energy efficiency, reduce energy costs, and reduce emissions of greenhouse gases	SPR Reporting via the SSP and DOE Dashboard	Completed 5 days behind schedule

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
<p>Sec. 204. Transitioning to a Zero-Emission Fleet.</p>	<p>Transportation /Fleet Management</p>	<p>Each agency’s light-duty vehicle acquisitions shall be zero-emission vehicles by the end of fiscal year 2027</p>	<p>SPR requested funding for FY 2025 for a pilot program across all sites</p>	<p>Activity waiting on funding to implement pilot program</p>
	<p>Transportation /Fleet Management</p>	<p>Each agency with a fleet comprising at least 20 vehicles shall develop and annually update a zero-emission fleet strategy that shall include optimizing fleet size and composition; deploying zero-emission vehicle re- fueling infrastructure; and maximizing acquisition and deployment of zero- emission light-, medium-, and heavy-duty vehicles where the General Services Administration (GSA) offers one or more zero-emission vehicle options for that vehicle class</p>	<p>SPR plan to acquire Zero Emission Vehicle’s (ZEVs) across the SPR to follow a successful pilot program</p>	<p>SPR will, with budget allowing, and GSA availability, procure ZEVs that meet the SPR's form fit and function</p>
<p>Sec. 209. Adapting the Federal Government to the Impacts of Climate Change. Consistent with its mission.</p>		<p>(a) develop or revise polices and processes to promote climate resilient investment that advances adaptation to climate change and protects public health and the environment;</p>	<p>2017 SPR Climate Change Risk and Resilience Assessment and FY 2022 Vulnerability Assessment and Resilience Plan (VARP)</p>	<p>Ongoing activity</p>
		<p>(b) conduct climate adaptation analysis and planning for climate-informed financial and management decisions and program implementation;</p>	<p>2017 SPR Climate Change Risk and Resilience Assessment and FY 2022 VARP (update to VARP due FY 2026)</p>	<p>Ongoing activity- perform Supplemental Assessment to VARP if trigger event (hurricane, tropical storm, flood, etc.) involves one of the sites</p>

Table 3-3 FY 2023 Sustainability, Goals, Performance, and Planned Actions

E.O. 14057 Goal	Goal Category	Statutory Requirement	Activity	Status
		(c) reform agency policies and funding programs that are maladaptive to climate change and increase the vulnerability of communities, natural or built systems, economic sectors, and natural resources to climate impacts, or related risks; and	2017 SPR Climate Change Risk and Resilience Assessment and FY 2022 VARP (update to VARP due FY 2026)	Ongoing activity- perform Supplemental Assessment to VARP if trigger event (hurricane, tropical storm, flood, etc.) involves one of the sites
		(d) develop and enhance tools that assess climate change impacts and support climate adaptation planning and implementation.	2017 SPR Climate Change Risk and Resilience Assessment and FY 2022 VARP (update to VARP due FY 2026)	Ongoing activity- perform Supplemental Assessment to VARP if trigger event (hurricane, tropical storm, flood, etc.) involves one of the sites

Figure 3-1 Dashboard Input Screenshot

The screenshot displays the DOE Sustainability Dashboard interface. At the top left is the DOE logo with the text 'SUSTAINABLE DEPARTMENT OF ENERGY'. To its right is the main title 'DOE Sustainability Dashboard' and the subtitle 'Managed by DOE's Sustainability Performance Office'. Below this is a navigation bar with a home icon and dropdown menus for 'Data', 'Reports', 'Resources', and 'Administration'. The main content area is titled 'Data Entry Home' and includes the instruction 'Select your site to get started:'. A table lists various facility categories with corresponding action icons (edit, download, upload, view, delete).

Facilities	
Energy	[edit] [download] [upload]
Water	[edit] [download] [upload]
Clean & Renewable Energy	[edit] [download] [upload]
Facility Goal Category	[edit] [delete] [delete]
Green Buildings	[edit] [delete] [delete]
Facility Metering Status	[edit] [delete] [delete]
EISA S432 - Benchmarking	[view] [delete] [upload]
EISA S432 - Evaluations	[edit] [download] [upload]
Building Inventory Change & Design	[edit] [delete] [delete]
Site-Level Policy Tracker	[edit] [delete] [delete]

3.2 Environmental and Energy Justice Community Outreach

Three Executive Orders that issue direction relevant to site ASERs are as follow:

1. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, Section 1-1.
2. EO 14008, *Tackling the Climate Crisis at Home and Abroad*, Section 219 and,
3. EO 14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*, Section 402.

Using the [White House Council on Environmental Quality’s Climate and Economic Justice Screening Tool](#) (CEJST), areas near each of the SPR storage sites were investigated to determine whether they are categorized as a disadvantaged community. Disadvantaged communities are defined by the Office of Management and Budget’s [Interim Justice40 Implementation Guidance M-21-28](#) and [addendum M-23-09](#). The following was determined:

Name of Location	Street	City	State	Zip +4	Disadvantaged Community Status (Yes/No)
Bayou Choctaw	60825-B Highway 1148	Plaquemine	LA	70764-5331	Yes
Big Hill	24784 Big Hill Road	Winnie	TX	77665-8746	No
Bryan Mound	1900 County Road 242 A	Freeport	TX	77541-8200	Yes
West Hackberry	1450 Black Lake Road	Hackberry	LA	70645-3820	Yes

The tool uses datasets as indicators of burdens. The burdens are organized into categories. A community is disadvantaged if it is in a census tract that is:

- (1) At or above the threshold for one or more environmental, climate, or other burdens, and
- (2) At or above the threshold for an associated socioeconomic burden.

The eight (8) categories of burdens are: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. Bayou Choctaw, Bryan Mound, and West Hackberry meet one or more burden thresholds and its associated socioeconomic threshold and are thus determined to be “disadvantaged.”

To promote the communities surrounding the SPR storage sites, the SPR performs community outreach programs. A list of them are included in Section 2.6. Additionally, the SPR promotes surrounding communities via mutual aid agreements (such as fire and spill emergency response) and local employment.

4 Environmental Radiological Program Information

Ionizing radiation hazards at the SPR consist of electrically generated X-rays that are used in laboratory and security scanning equipment or other sealed sources brought on-site for performing radiography and cavern wire-line type logging operations. Procedures are in place to protect personnel from exposure during these operations. The SPR is subject to inspections by the nuclear regulatory agencies (Nuclear Regulatory Commission and National Nuclear Security Administration). Required notices to employees are posted on each X-ray scanning device and entry points to rooms containing this equipment.

4.1 Sealed Sources

Sealed radiation sources are used at the SPR for monitoring activities related to the physical properties of storage caverns and pipeline integrity. Permitting and leak testing of sealed sources are performed by the providing contracted company. There were no site leaks of sealed sources and no sealed sources lost down-line during CY 2023.

5 Environmental Permits and Programs

5.1 Environmental Permits

Environmental permits required to construct, operate, and maintain the four SPR storage sites are discussed in the following subsections.

The SPRPMO negotiated a 20-year long-term leasing arrangement, effective January 1, 2020, for continued use of the St. James Marine Terminal by ExxonMobil. ExxonMobil is responsible for maintaining necessary permits concurrent with the operations of the lease.

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 storm water, was approved by the MDEQ instead of operating under a multi-sector general permit. The Certificate of No Exposure to storm water was renewed in October 2019 and is valid for five years. Air emissions from DOE's Stennis Warehouse operations are *de minimus*, requiring no permitting or reporting activity.

5.1.1 Bayou Choctaw Permits

Bayou Choctaw permits are listed in Table 5-1. Individual work permits are received from the Louisiana Underground Injection Control Division of DENR for each well workover 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.

An air permit application was submitted to LDEQ on 1/19/2022 to renew the BC air permit and add the DEGAS Plant. The permit was issued on 7/6/2022. Air permit (1280-00015-05) was modified on 12/25/2022 to take the DEGAS Plant off and it was issued 5/10/2023.

Table 5-1 Bayou Choctaw Environmental Permits

Permit Type	Permit Description	Issuing Agency	Permit Number	Effective Date	Expiration Date
Air	BC Air Emissions	LDEQ	1280-00015-05	5/10/23	5/10/33
Water	LPDES Water Discharge	LDEQ	LAG480540	12/16/20	12/15/25
Water	LPDES Hydrostatic Test Water Discharge	LDEQ	LAG679016	6/1/23	6/1/28

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Table 5-1 Bayou Choctaw Environmental Permits

Permit Type	Permit Description	Issuing Agency	Permit Number	Effective Date	Expiration Date
Injection Wells	Letter of financial responsibility to plug and abandon BC injection wells	DENR	None	1/11/83	Open
Construct & Maintain	Bull Bay 24" brine disposal pipeline	COE	LMNOD-SP (Bull Bay) 3	1/30/79	*
Construct & Maintain	BC brine disposal well pads	COE	LMNOD-SP (Iberville Parish Wetlands) 7	9/26/77	*
Construct & Maintain	BC brine disposal well pads and access roads	COE	LMNOD-SP (Iberville Parish Wetlands) 10	6/12/78	*
Construct & Maintain	Access roads to BC brine disposal well area	COE	LMNOD-SP (Iberville Parish Wetlands) 17	11/6/78	*
Construct & Maintain	Well pad, levees, access road, and equipment - BC Cavern 102	COE	LMNOD-SP (Iberville Parish Wetlands) 31	5/27/80	*
Construct & Maintain	Ring levee, drill site, and equipment – BC Cavern 101	COE	LMNOD-SP (Iberville Parish Wetlands) 102	9/26/77	*
Construct & Maintain	36" petroleum products pipeline under and across Bayou Plaquemine	COE	LMNOD-SP (Bayou Plaquemine)	9/26/77	*
Construct & Maintain	Fill with culverts for parking	COE	WN-20-020-0168	4/2/02	*
Construct & Maintain	Culverts and fill for minor roadway crossings	COE	WT-20-020-2654	8/20/02	*
Construct & Maintain	Security fence with a concrete footing and curbing	COE	WT-20-020-3621	9/17/02	*

Table 5-1 Bayou Choctaw Environmental Permits

Permit Type	Permit Description	Issuing Agency	Permit Number	Effective Date	Expiration Date
Construct & Maintain	Replacement N-S bridge	COE	CT-20-030-1379-0	3/12/03	*
Construct & Maintain	Replacement brine disposal access road bridge	COE	CT-20-030-1501-0	3/28/03	*
Construct & Maintain	Bulkhead and fill for bank stabilization in N-S Canal	COE	CT-20-030-3087-0	7/25/03	*
Construct & Maintain	Refurbished Bailey bridge crossing over Wilbert's Canal	COE	MVN-2004-4453-CT	10/14/04	*
Construct & Maintain	Expanded clear sight security perimeter zone	COE	MVN-2003-2234-CT	2/2/06, 10/4/11	*
Construct & Maintain	LE2 Laydown Areas	COE	MVN-2019-00240-WII	03/17/2021	03/31/2026
Construct & Maintain	LE2 Laydown Areas	COE	MVN-2019-00240-WII	05/24/2022	06/30/2027

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

5.1.2 Big Hill Permits

Big Hill permits are listed in Table 5-2.

In 2023, Big Hill appropriated 631.79 million gallons of water from the Gulf Coast Intracoastal Waterway (GIWW), excluding fire protection water. This action represents three percent of the annual water usage authorized. The certified annual report of water usage was forwarded to the TCEQ as required in 2023.

The M&O is registered with TCEQ as a Public Water System Operations Company (registration #WC0000183) since Big Hill provides sanitary control of their purchased water distribution system on site. The M&O contractor is also registered as a Wastewater Operations Company (registration #OC0000202).

Required annual reporting for 2023 involved the performance of a brine line integrity test, raw water usage to TCEQ, Water Conservation Plan implementation reporting to the Texas Water Development Board, and crude oil pipeline system operations renewal to the RRC.

Table 5-2 Big Hill Environmental Permits

Permit Type	Permit Description	Issuing Agency	Permit Number	Effective Date	Expiration Date
Air	BH Air Emissions	TCEQ	9256	3/19/18	3/19/28
Air	BH Leaching Emissions	TCEQ	PBR 100485	1/24/12	Open
Air	BH Frac Tank Emissions	TCEQ	PBR 107009	2/20/13	Open
Water	NPDES Water Discharge	EPA	GM0000009	2/7/24	2/29/29
Water	Water Discharge	TCEQ	WQ0005360000/ TX0092827	2/1/20	1/31/24 *Renewal is with TCEQ
Water	Water Use	TCEQ	4045A	11/14/83	Open
Caverns	Operate & Construct & Maintain Big Hill caverns	RRC	02939	11/28/83	Open
Construct & Maintain	RWIS, 48" raw water pipeline, 48" brine disposal pipeline, and 36" crude oil pipeline.	COE	SWGCO-RP 16536 (01,02,03,04,05)	1/11/84	Dredging clause to 12/2008 (Renew dredging clause when needed.)
Construct & Maintain	48" brine pipeline	F&WS	P-7	7/31/86	6/30/36
Construct & Maintain	Hillebrandt Bayou-NWP 3 Authorization	COE	SWG-1997- 01648	8/16/2021	*

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

5.1.3 Bryan Mound Permits

Bryan Mound permits are listed in Table 5-3.

An air permit application was submitted to TCEQ on 11/15/2022 to renew the BM air permit and add the Degas Plant. As of July 2024, the renewal is still pending.

Bryan Mound has a permit from TCEQ for the appropriation of state waters for the cavern leaching program, site utility, and fire protection systems that are under the jurisdiction of the Brazos River Water Master Program. The permit requires a monthly tally and forecasting as well as an annual tally to be provided to the agency for the assessment of the fee. In 2023, the site used a total of 69.10 million gallons of water from the Brazos River Diversion Channel, representing four percent of the annual water usage authorized.

The M&O contractor is registered with TCEQ as a Public Water System Operations Company (registration #WC0000183) since Bryan Mound provides sanitary control of their purchased water distribution system on site. The M&O contractor is also registered as a Wastewater Operations Company (registration #OC0000202).

Required annual reporting for 2023 included the successful brine line integrity test, raw water usage to TCEQ, Water Conservation Plan implementation reporting to the Texas Water Department Board, and crude oil pipeline system operations renewal (T4C) to the RCC.

Table 5-3 Bryan Mound Environmental Permits

Permit Type	Permit Description	Issuing Agency	Permit Number	Effective Date	Expiration Date
Air	BM Air Emissions	TCEQ	6176B	5/31/13	5/31/23 (renewal pending)
Air	BM Frac Tank Emissions	TCEQ	PBR Regulation	5/13/13	Open
Air	BMT-2 Air Emissions	TCEQ	PBR 142987	10/27/16	Open
Air	BMT-4 Air Emissions	TCEQ	PBR 161866	7/24/20	Open
Air	BM Leaching Emissions	TCEQ	PBR 100484	1/24/12	Open
Water	NPDES Water Discharge	EPA	GM0000010	2/1/24	1/31/29
Water	Water Discharge	TCEQ	WQ0005356000/ TX0074012	2/1/20	1/31/24 *Renewal is with TCEQ
Water	Water Use	TCEQ	5332A	7/20/81	Open

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Table 5-3 Bryan Mound Environmental Permits

Permit Type	Permit Description	Issuing Agency	Permit Number	Effective Date	Expiration Date
Pipelines	Operate BM Crude Oil Pipelines	RRC	04994	8/1/00	Open
Construct & Maintain	Maintenance dredging of BM Raw Water Intake Structure	COE	SWGCO-RP-12347 (03), SWG-2006-2568	2/22/78	12/31/2028
Construct & Maintain	30" crude oil pipeline to 3 miles SW from Freeport	COE	SWGCO-RP-11666	10/15/77	*
Construct & Maintain	30" crude oil pipeline to 2 miles S from Freeport	COE	SWGCO-RP-12112	7/25/77	*
Construct & Maintain	36" brine disposal pipeline and diffuser	COE	SWGCO-RP-12062 (03)	10/10/78	*
Construct & Maintain	General permit for pipeline crossings by directional drilling in navigable waters	COE	SWGCO-RP-14114 (01)	5/18/85	*
Construct & Maintain	6" PVC potable water line	COE TDH&PT	SWGCO-RP-16177, 82-8475	9/7/82 1/1/83	*
Construct & Maintain	BM cavern pads 101, 102, 103, 111, and 113.	COE	SWGCO-RP-13435 (01)	5/21/79	*
Construct & Maintain	Boat ramp & dock	COE	SWG-1995-01780	8/20/20	12/31/25
Construct & Maintain	Section 408 Request for levee	COE	408-SWG-2020-0052	11/29/2021	11/29/2026

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

5.1.4 West Hackberry Permits

West Hackberry permits are listed in Table 5-4.

An air permit was issued by LDEQ on 3/2/2022 for WH.

Table 5-4 West Hackberry Environmental Permits

Permit Type	Permit Description	Issuing Agency	Permit Number	Effective Date	Expiration Date
Air	WH Air Emissions	LDEQ	0560-00019-05	3/2/2022	3/2/32
Water	LPDES Water Light Commercial Discharge	LDEQ	LAG481153	5/6/21	12/15/25
Water	LPDES Hydrostatic Test Water Discharge	LDEQ	LAG679016	6/1/23	6/1/28
Injection Wells	Letter of financial responsibility to close all WH injection wells	DENR	None	1/11/83	Open
Injection Wells	Construct and Operate WH wells 117A and 117B	DENR	971198-9	9/27/83	Open
Construct & Maintain	RWIS and 42" raw water pipeline	COE	LMNOD-SP (LTCS) 26	2/8/79	*
Construct & Maintain	Maintenance dredging for firewater canal and extended boat slip access	COE	LMNOD-SP (Black Lake) 31	10/26/82	*
Construct & Maintain	Erosion control dike and riprap	COE	LMNOD-SP (Black Lake) 43	7/26/84	*
Construct & Maintain	Parallel pipeline. Offshore brine line and diffuser remain inactive.	COE	LMNOD-SP (Gulf of Mexico) 2574	8/11/80	*
Construct & Maintain	36" crude oil pipeline from WH to Texoma/Lake Charles Meter Station	COE	LMNOD-SE (LTCS) 40	5/25/88	*
Construct & Maintain	42" crude oil pipeline	COE	LMNOD-SP (Cameron Parish Wetlands) 162	3/9/78	*
Construct & Maintain	42" crude oil pipeline crossings of waters and waterways in Texas	COE	SWGCO-RP-12342	3/28/78	*

Table 5-4 West Hackberry Environmental Permits

Permit Type	Permit Description	Issuing Agency	Permit Number	Effective Date	Expiration Date
Construct & Maintain	Brine disposal wells, well pads, and brine disposal pipelines (12", 20" and 24")	COE	LMNOD-SP (Cameron Parish Wetlands) 152	3/16/78	*
Construct & Maintain	Well pads, levees, and access roads (Wells 110, 111, 112, 113, 114 and 115)	COE	LMNOD-SP (Cameron Parish Wetlands) 276	2/11/80	*
Construct & Maintain	Repair of exposed 42" crude oil pipeline	COE	WN20-000-3972-0	8/31/00	*
Construct & Maintain	Restored riprap along north perimeter dike adjacent to Cavern 6 and Black Lake	COE	WO-20-020-1136	1/25/02, 2/19/02	*
Construct & Maintain	Deposited fill in fire ditch	COE	WO-20-020-3607	10/23/02	*
Construct & Maintain	Boat ramp modifications and erosion control breakwater in Black Lake along the north side of the site	COE	WW-20-030-3748	10/22/03	*
Construct & Maintain	Brine Disposal Pipeline	COE	MVN-2016-01237-WQQ	09/05/19	09/05/24
Construct	Expansion of existing brine disposal well	COE	MVN-2016-01237-WQQ	10/14/20	10/14/25
Construct & Maintain	Maintenance dredging of RWIS	COE	MVN-1997-00068-WQQ	12/13/21	12/13/2031

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

5.2 Air Quality Program

Air quality is maintained at the SPR via compliance with applicable provisions of the Clean Air Act and State Implementation Plans. The SPR sites operate in accordance with the provisions of the applicable state air permits.

The SPR sites are permitted by the LDEQ and TCEQ as minor sources for non-methane/non-ethane volatile organic compounds (VOC), nitrogen oxides (NO_x), sulfur dioxides (SO₂), carbon monoxide (CO), and particulate matter less than 10 microns (PM₁₀). The Bayou Choctaw and West Hackberry air permits also include emission rates for benzene, ethylbenzene, n-hexane, toluene, and xylene.

The SPR sites are in attainment areas for all National Ambient Air Quality Standards. However, Bryan Mound is currently in an ozone non-attainment area, while Bayou Choctaw, Big Hill, and West Hackberry are in ozone attainment areas.

The SPR ensures compliance with air permit limits by monitoring usage of emergency generators and pumps, volumes of crude oil, brine, diesel, and gasoline in the site tanks, and volume of paint used.

Fugitive monitoring of piping components (valves and pump seals) in crude oil service are inspected for VOC leaks by outside contractors (annually in Louisiana and biennially in Texas) using an organic vapor analyzer (OVA). Flanges are also inspected weekly by site operators in Texas. Annual fugitive monitoring was performed at Bayou Choctaw in October 2023 and West Hackberry in September 2023. There were no leaks detected at any sites.

The Big Hill and Bryan Mound external floating roof tanks require inspection of the primary seal (every five years) and the secondary seal (semi-annually) for visible tears, holes, or cumulative gaps exceeding regulatory limits. The BHT-7 semi-annual secondary seal inspections were performed in March and October 2023. The BMT-2 and BMT-3 semi-annual secondary seal inspections were performed in June and December 2023. The secondary seals on the tanks had no visible holes, tears, or other openings. There were no gaps exceeding 0.5 inches, and the total gap area was less than 1.0 square inch per tank diameter for the tanks inspected.

Annual air emissions were reported to TCEQ by Bryan Mound and Big Hill in 2023. Bayou Choctaw was required to submit annual air emissions due to the DEGAS being added to the permit. BC air permit was modified to take the DEGAS off in 2023 and will no longer have to submit annual emissions. West Hackberry did not require reporting because it was below the required emission limit for reporting in Louisiana.

Table 5-5 summarizes SPR Site Air Emissions in Tons/Year (Metric Tons/Year) from 2015-2023. SPR emissions complied with permit limits for all years, except for the 2015 Bryan Mound VOC emissions caused by roof failure of the BMT-4 crude oil tank.

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Table 5-5 SPR Site Air Emissions in Tons/Year (Metric Tons/Year)

BC SPR Site	Volatile Organic Compounds	Nitrogen Oxides	Carbon Monoxide	Sulfur Dioxide	Particulates (less than 10 microns)
2014	0.54 (0.49)	0.47 (0.43)	0.10 (0.09)	0.00 (0.00)	0.03 (0.03)
2015	0.37 (0.34)	0.91 (0.83)	0.21 (0.19)	0.00 (0.00)	0.03 (0.03)
2016	0.65 (0.59)	0.21 (0.19)	0.05 (0.05)	0.00 (0.00)	0.01 (0.01)
2017	2.51 (2.28)	0.72 (0.65)	0.16 (0.15)	0.00 (0.00)	0.03 (0.03)
2018	0.56 (0.51)	0.47 (0.43)	0.10 (0.09)	0.00 (0.00)	0.02 (0.02)
2019	0.54 (0.49)	0.69 (0.63)	0.16 (0.15)	0.00 (0.00)	0.03 (0.03)
2020	1.65 (1.50)	0.63 (0.57)	0.14 (0.13)	0.00 (0.00)	0.02 (0.02)
2021	0.82 (0.74)	0.66 (0.60)	0.15 (0.14)	0.00 (0.00)	0.02 (0.02)
2022	0.55 (0.50)	0.27 (0.25)	0.06 (0.05)	0.01 (0.01)	0.01 (0.01)
2023	0.67 (0.61)	1.03 (0.93)	0.23 (0.21)	0.01 (0.01)	0.04 (0.03)
BH SPR Site	Volatile Organic Compounds	Nitrogen Oxides	Carbon Monoxide	Sulfur Dioxide	Particulates (less than 10 microns)
2014	2.57 (2.33)	0.22 (0.20)	0.05 (0.05)	0.01 (0.01)	0.01 (0.01)
2015	2.56 (2.32)	1.85 (1.68)	0.41 (0.37)	0.06 (0.05)	0.09 (0.08)
2016	2.77 (2.51)	0.42 (0.38)	0.09 (0.08)	0.02 (0.02)	0.02 (0.02)
2017	1.36 (1.23)	1.32 (1.20)	0.30 (0.27)	0.02 (0.02)	0.05 (0.05)
2018	5.96 (5.41)	0.25 (0.23)	0.06 (0.05)	0.01 (0.01)	0.01 (0.01)
2019	1.23 (1.12)	0.55 (0.50)	0.12 (0.11)	0.02 (0.02)	0.03 (0.03)
2020	10.30 (9.37)	0.34 (0.31)	0.08 (0.07)	0.02 (0.01)	0.02 (0.02)
2021	4.84 (4.40)	0.20 (0.18)	0.04 (0.04)	0.00 (0.00)	0.01 (0.01)
2022	6.81 (6.19)	0.20 (0.18)	0.04 (0.04)	0.01 (0.01)	0.01 (0.01)
2023	16.81 (15.25)	0.27 (0.25)	0.06 (0.05)	0.01 (0.01)	0.01(0.01)
BM SPR Site	Volatile Organic Compounds	Nitrogen Oxides	Carbon Monoxide	Sulfur Dioxide	Particulates (less than 10 microns)
2014	4.55 (4.13)	9.56 (8.67)	2.19 (1.99)	0.03 (0.03)	0.29 (0.26)
2015	⁽³⁾ 54.97 (49.87)	4.00 (3.63)	0.95 (0.86)	0.03 (0.03)	0.13 (0.12)
2016	⁽⁴⁾ 15.90 (14.42)	15.94 (14.46)	3.65 (3.31)	0.04 (0.04)	0.48 (0.44)
2017	⁽⁴⁾ 16.77 (15.21)	0.63 (0.57)	0.14 (0.13)	0.01 (0.01)	0.03 (0.03)
2018	^{(2), (4)} 20.20 (18.33)	⁽²⁾ 2.69 (2.44)	⁽²⁾ 0.62 (0.56)	⁽²⁾ 0.02 (0.02)	⁽²⁾ 0.08 (0.07)
2019	⁽⁴⁾ 18.00 (16.36)	0.46 (0.42)	0.10 (0.09)	0.01 (0.01)	0.02 (0.02)
2020	⁽⁴⁾ 22.61 (20.55)	0.69 (0.63)	0.16 (0.14)	0.02 (0.02)	0.03 (0.03)
2021	5.35 (4.86)	0.38 (0.35)	0.09 (0.08)	0.01 (0.01)	0.02 (0.02)
2022	4.25 (3.86)	0.30 (0.27)	0.07 (0.06)	0.00 (0.00)	0.01 (0.01)
2023	3.36 (3.05)	1.54 (1.40)	0.35 (0.32)	0.01 (0.01)	0.04 (0.36)
WH SPR Site	Volatile Organic Compounds	Nitrogen Oxides	Carbon Monoxide	Sulfur Dioxide	Particulates (less than 10 microns)
2014	6.52 (5.91)	2.01 (1.82)	1.93 (1.75)	0.03 (0.03)	0.12 (0.11)
2015	8.69 (7.88)	5.13 (4.65)	5.00 (4.54)	0.02 (0.02)	0.36 (0.33)
2016	7.90 (7.17)	5.96 (5.41)	5.85 (5.31)	0.03 (0.03)	0.42 (0.38)
2017	11.35 (10.30)	5.05 (4.58)	6.08 (5.52)	0.02 (0.02)	0.42 (0.38)
2018	8.91 (8.08)	4.60 (4.17)	4.47 (4.06)	0.02 (0.02)	0.32 (0.29)
2019	9.72 (8.84)	0.47 (0.43)	0.11 (0.10)	0.00 (0.00)	0.01 (0.01)
2020	9.85 (8.96)	⁽⁵⁾ 26.96 (24.51)	6.18 (5.62)	0.04 (0.03)	0.79 (0.71)
2021	2.95 (2.68)	0.27 (0.25)	0.06 (0.05)	0.00 (0.00)	0.01 (0.01)
2022	21.90 (19.91)	2.78 (2.53)	0.64 (0.58)	0.00 (0.00)	0.08 (0.07)
2023	3.87 (3.51)	6.29 (5.71)	1.44 (1.31)	0.03 (0.03)	0.18 (0.16)

5.3 Water Discharge Effluent Monitoring Program

The water discharge permit-monitoring program fulfills the requirements of the EPA NPDES and Louisiana 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 four storage sites in 2023. These discharges are grouped as follows:

1. Brine discharged to the Gulf of Mexico (from Big Hill and Bryan Mound sites)
2. Storm water runoff from tank, well, and pump pads
3. Rinse water from vehicles to permitted outfalls
4. Effluent from packaged sewage treatment plants
5. Hydrostatic test water from piping or tanks

COMPLIANCE DURING 2023

The SPR had three non-compliances from site analyzed discharges.

The SPR disposed of 741 million m³ of brine during 2023. Approximately 95 percent of the brine was disposed into the Gulf of Mexico via the Big Hill (85 percent of the total) and Bryan Mound (10 percent of the total) brine disposal pipelines. The remaining 5 percent was disposed in saline aquifers via injection wells at West Hackberry.

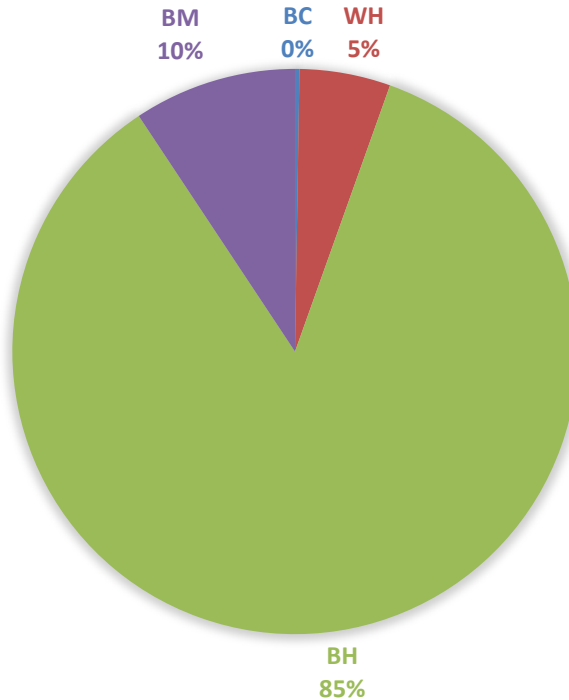


Figure 5-1 - SPR Brine Disposal 2023

Parameters monitored varied by site and point source discharge. Measurements and compliance rates observed during 2023 specific to each of the storage sites are discussed in the following subsections.

Discharge Monitoring Reports (DMRs) were 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, EPA, and TCEQ). Should a non-compliance or reportable bypass occur during the reporting period, root cause and corrective actions are included in the corresponding quarterly report. During 2023, the SPR had three non-compliances from analyzed discharges.

5.3.1 Bayou Choctaw

Table 5-6 includes permitted outfalls, required monitoring parameters, number of permit exceedances, samples collected, compliant samples, and percent of samples in compliance for the Bayou Choctaw outfalls.

Monitoring is related to water discharges regulated under the LDEQ Office of Water Resources LPDES permit. Discharges are from two packaged sewage treatment plants, a vehicle/equipment rinsing station, and storm water runoff from well pads, pump pads and containment areas. The LPDES MSGP provides storm water runoff limitations and monitoring requirements. A LPDES permit also exists for the discharge of hydrostatic test water. There were, however, no hydrostatic test water discharges during 2023.

There was **no** non-compliance during 2023. The site was 100 percent compliant.

Table 5-6 Bayou Choctaw Outfall Sampling Parameters

Permit	Outfall	Parameters	# of Permit Exceedances	# of Samples Taken	# of Compliant Samples	Permit Compliance	Date(s) Exceeded	Description/Solution
LAG480540	01A 01B Treated sanitary wastewater	Flow BOD ₅ TSS pH Fecal Coliform	0	4	4	100%	N/A	N/A
	002 Exterior vehicle and equipment wash water	Flow COD TSS O&G pH	0	0	0	100%	N/A	N/A
	009 Storm water runoff	Systematic Visual Observation	N/A	N/A	N/A	N/A	N/A	N/A
LAG679016	001 Hydrostatic test water	Flow, TSS TSS- NetO&G TOC, Benzene Total BenzeneTotal BTEX Lead, Total pH	N/A	0	N/A	N/A	N/A	N/A

5.3.2 Big Hill

Table 5-7 includes permitted outfalls, required monitoring parameters, number of permit exceedances, samples collected, compliant samples, and percent of samples in compliance for the Big Hill outfalls. There was **one** permit non-compliance during 2023. The site was 99.3 percent compliant. The one non-compliance was from an elevated brine density. The elevated density was due to the severe drought that affected Texas in 2023. There were two permit non-compliances in 2022 for missing two samples. There have been six permit non-compliances in previous years: two in 2021, one in 2015, two in 2014, and one in 2013.

Table 5-7 Big Hill Outfall Sampling Parameters

Permit	Outfall	Parameters	# of Permit Exceed-ances	# of Samples Taken	# of Compliant Samples	Permit Compliance	Date(s) Exceeded	Description/ Solution
TX0092827	001 Brine to the Gulf of Mexico	Flow Exit Velocity Density O&G TDS TSS pH Biomonitoring Integrity Tests	1	144	143	99.3%	10/2023	Elevated Brine Density. Site is adding raw water to the concentrated brine.
	002 Hydroclone Blowdown	Flow pH TSS	N/A	0	N/A	N/A	N/A	N/A
	Storm water: 003-14 cavern pads 005-electrical substation pump 006-Surge Tank area 007-Meter prover & crude oil meter skids 008-RWIS	pH Salinity O&G TOC	0	59	59	100%	N/A	N/A
	004 Treated sanitary wastewater	Flow TSS BOD ₅ pH	0	48	48	100%	N/A	N/A
	009 Recirc. water at RWIS	Flow pH	0	92	92	100%	N/A	N/A

Monitoring is related to water discharges regulated under the EPA NPDES permit program. Discharges are brine to the Gulf of Mexico, hydroclone blow-down into the Intracoastal Waterway, storm water from well pads and pump pads, effluent from the sewage treatment plant, and recirculated raw water at the RWIS. There were no discharges during 2023 from the hydroclone blow-down system.

5.3.3 Bryan Mound

Table 5-8 includes permitted outfalls, required monitoring parameters, number of permit exceedances, samples collected, compliant samples, and percent of samples in compliance for the Bryan Mound outfalls. There were **two** permit non-compliances during 2023. The site was 99.4 percent compliant. The BM site had one non-compliance for Outfall 002 from March 2023. This is the outfall for the site’s sewer treatment plant. The non-compliance was for biochemical oxygen demand (BOD). The other non-compliance is for Oil & Grease for the Outfall 001 discharge. The site believes that it was residual oil from lubricating the system. There have been five permit non-compliances in previous years: one in 2016 and four in 2014.

Monitoring is related to water discharges regulated under the EPA NPDES permit program. Discharges are brine to the Gulf of Mexico, storm water from well pads and pump pads, effluent from the sewage treatment plant, and recirculated raw water at the RWIS.

Table 5-8 Bryan Mound Outfall Sampling Parameters

Permit	Outfall	Parameters	# of Permit Exceedances	# of Samples Taken	# of Compliant Samples	Permit Compliance	Date(s) Exceeded	Description/ Solution
TX0074012	001 Brine to the Gulf of Mexico	Flow Exit Velocity Density O&G TDS TSS pH Biomonitoring Integrity Tests	1	156	155	99.4%	11/2023	Oil & Grease
	002 Treated sanitary wastewater	Flow pH TSS BOD ₅	1	48	47	97.9%	3/2023	BOD
	Storm water: 003- 20 cavern pads & other 004-HPPP 005- Tank farm	pH Salinity O&G TOC	0	24	24	100%	N/A	N/A
	006 Recirculated water at RWIS	Flow pH	0	47	47	100%	N/A	N/A

5.3.4 West Hackberry

Table 5-9 provides permitted outfalls, required monitoring parameters, number of permit exceedances, samples collected, compliant samples, and percent of samples in compliance for the West Hackberry outfalls. There were **no** permit non-compliances during 2023. The site was 100 percent compliant. There were four permit non-compliances in the previous five years two in 2022 for fecal coliform and BOD and two in 2021 for TSS and enterococci.

Monitoring is related to water discharges regulated under the LDEQ Office of Water Resources LPDES permit. Discharges are from a packaged sewage treatment plant, a vehicle/equipment rinsing station, non-contact cooling tower blow-down, and storm water runoff from the degasification plant. Although not listed as an outfall, storm water runoff from well pads, pump pads, and containment areas are visually inspected quarterly. The LPDES MSGP provides storm water runoff limitations and monitoring requirements. A LPDES permit also exists for the discharge of hydrostatic test water. There were, however, no hydrostatic test water discharges in 2023. There were no discharges in 2023 from the hydroclone blow-down system.

Table 5-9 West Hackberry Outfall Sampling Parameters

Permit	Outfall	Parameters	# of Permit Exceedances	# of Samples Taken	# of Compliant Samples	Permit Compliance	Date(s) Exceeded	Description/Solution
LAG481153	001 Treated sanitary wastewater	Flow BOD ₅ TSS pH Fecal Coliform Enterococci	0	14	14	100%	N/A	N/A.
	002 Exterior vehicle and equipment wash water	Flow COD TSS O&G pH	NA	0	N/A	N/A	N/A	N/A
	005 Non-contact cooling tower	Flow TOC pH Temperature	N/A	0	N/A	N/A	N/A	N/A
LAG679016	001 Hydrostatic test water	Flow TSS TSS-Net O&G TOC Benzene Total BTEX Lead, Total pH	N/A	0	N/A	N/A	N/A	N/A

5.4 Surface Water Quality Surveillance Monitoring Program

Surface waters at all sites are sampled monthly for general water quality according to the SPR EMP. Water quality monitoring is conducted to provide early detection of potential surface water quality degradation possibly resulting from SPR operations. It is in addition to the water discharge permit monitoring program.

pH, salinity, total organic carbon (TOC), dissolved oxygen (DO), oil and grease (O&G), and temperature are monitored.

- pH is a measure of the acidity/alkalinity of water. It ranges from 0 to 14, with 7 being neutral. Excessively high and low pH can be detrimental to water usage.
- Salinity is the measure of all the salts dissolved in water. The average ocean salinity is 35 ppt and the average river water salinity is 0.5 ppt or less.
- TOC is a measure of the total amount of carbon in organic compounds in water and can indicate contamination.
- DO refers to microscopic bubbles of gaseous oxygen (O₂) mixed in water and available to aquatic organisms for respiration. DO can be affected by natural influences such as temperature and salinity. DO concentration decreases as water temperature increases. DO concentration decreases as salinity increases. Thus, salinity and temperature are monitored to correlate with DO results.
- O&G can interfere with biological life in surface waters and create unsightly films.

Maps with locations of the surface water monitoring stations at each site are included in Appendix D, Figures D-1, D-3, D-5, and D-7. The number of surface water monitoring stations varies at each site. The locations are as follows:

- Bayou Choctaw-7
- Big Hill-5 (Includes Station A that is no longer sampled because it does not hold water and has been backfilled with vegetation over the years)
- Bryan Mound-10
- West Hackberry-6

Data from 2023 from each site is presented in Appendix D, Tables D-1, D-3, D-5, and D-7. Surface water at all sites exhibited neutral pH, and O&G readings were below the detectable limit of 5 mg/l. These values indicate no impacts from SPR activities during any of the 2023 sampling episodes.

Annual averages of parameters measured in the last five years at each site are included in Tables D-2, D-4, D-6, and D-8. Graphical representation of the data is included in Figures D-2, D-4, D-6, and D-8. The parameter results fluctuated slightly within the last five years.

The small fluctuations in the data are likely due to non-standardized time of sampling, differing meteorological conditions, and varying seasonal and environmental factors. The overall surface water data at the SPR sites has remained consistent, indicating no evident surface water quality impacts from SPR operations.

5.5 Waste Management and Pollution Prevention Programs

The Waste Management Program is responsible for managing hazardous and non-hazardous waste generated by SPR operations. Site and waste management personnel collaborate to ensure all waste generated is accumulated, characterized, and disposed of or recycled in accordance with federal, state, and local regulations.

SPR operations, maintenance, and construction activities generate a variety of waste streams. Common wastes and recyclable materials generated at the SPR include:

1. Hazardous waste such as crude oil contaminated material with a hazardous characteristic,
2. Non-hazardous waste such as office trash and industrial waste without a hazardous waste characteristic or code,
3. Recyclable materials such as paper, plastic, batteries, and used oil,
4. Construction and demolition (C&D) waste such as scrap metal and concrete, and
5. Exploration and production (E&P) waste such as brine or crude oil contaminated products without a hazardous waste characteristic.

The SPR characterizes all E&P wastes to determine whether it exhibits hazardous characteristics. Wastes that exhibit a hazardous characteristic are managed and disposed of as hazardous waste. Non-hazardous wastes generated by the E&P process are disposed of at state-approved E&P disposal facilities.

The quantities and percentages of SPR waste categories generated over the past five years are provided in Figure 5-2.

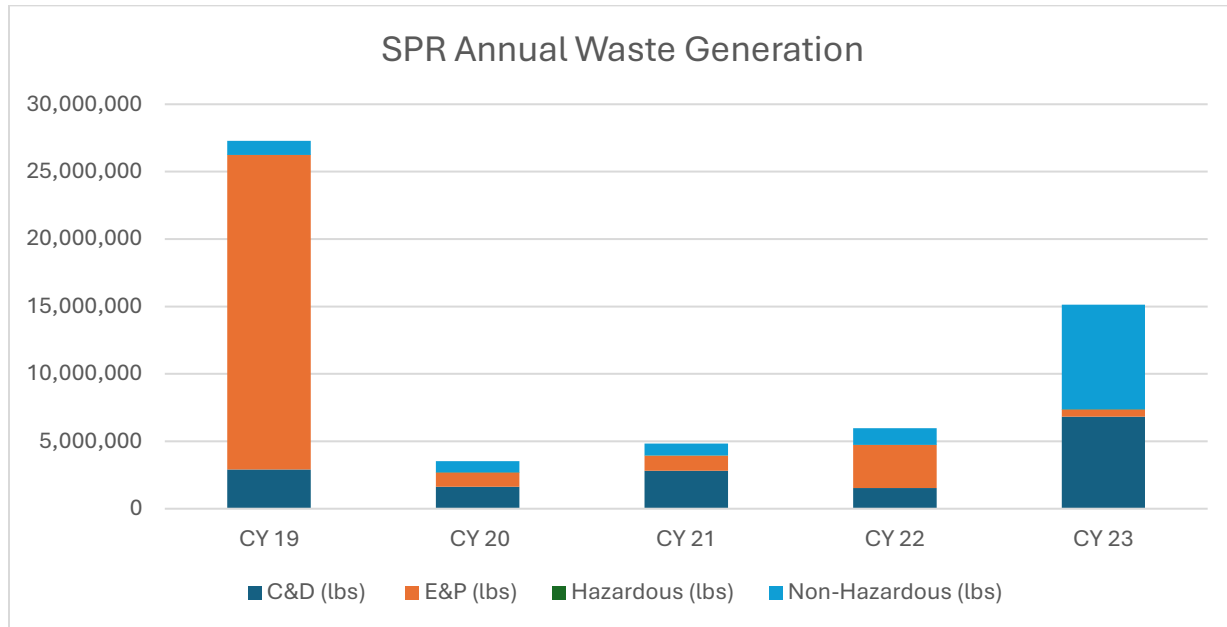
The SPR experienced an increase in C&D, hazardous, and non-hazardous waste in CY23 compared to the previous year. The SPR experienced a decrease in E&P waste generation.

The 346% increase in C&D waste generated in CY23 was primarily attributed to the large quantity of wastes generated from the demolition and construction phases of the LE2 projects across the SPR.

The 674% increase in hazardous waste generated in CY23 was attributed to the fact that waste was generated from workover activities.

The SPR experienced a 523% increase in nonhazardous waste in CY23 compared to the previous year. The generation of a large quantity of municipal solid waste from LE2 projects at three of the four SPR sites was responsible for the increase in nonhazardous waste generation in CY23.

The SPR experienced an 83% decrease in E&P waste generation. The significantly large quantities of wastes generated from the cleaning of tanks BMT-1 and BMT-4 at the Bryan Mound site in CY22 is the most significant reason for the decrease in E&P waste in CY23 compared to CY22.

Figure 5-2 SPR Annual Waste Generation

Some of the activities that SPR waste management personnel conducted or supported in 2023 include:

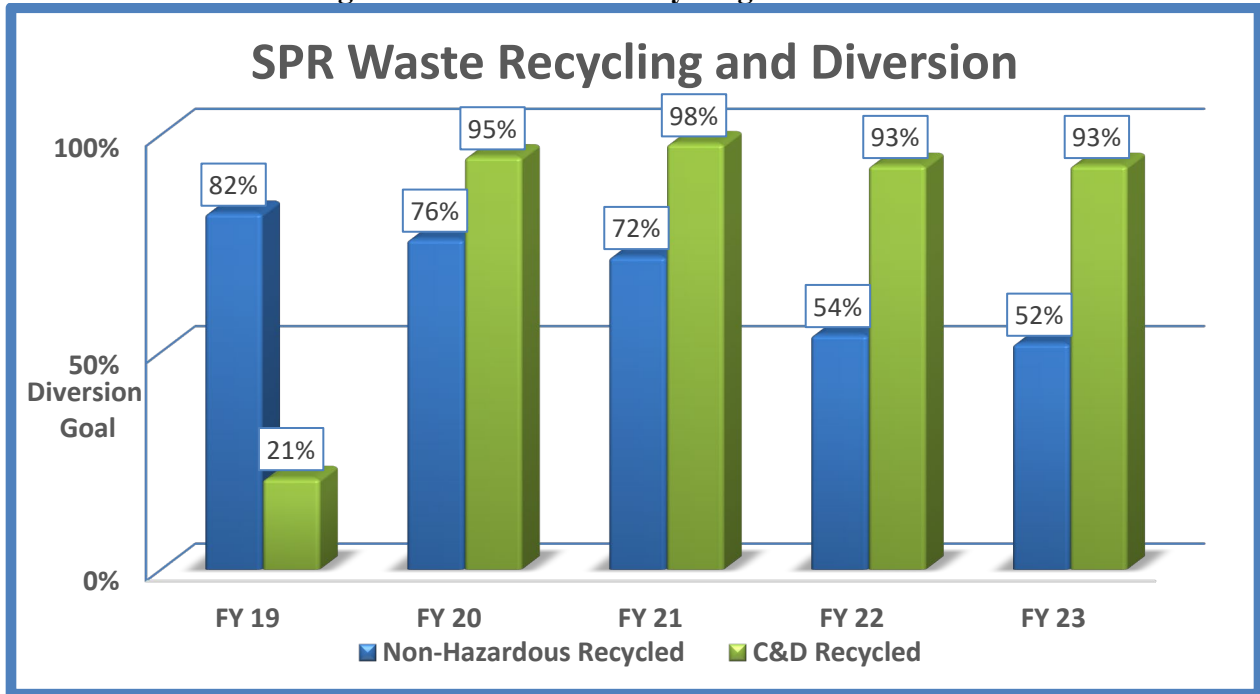
- Coordinated with LE2 Construction personnel to manage recycling of conduit and metal fence debris and reuse of clean soil/rock generated from construction of Contractor Security Screening Checkpoints at Bayou Choctaw and Big Hill (BC-LE-1723B and BH-LE-1767W),
- Coordinated with LE2 Construction personnel to recycle scrap metal and concrete and reuse of clean soil/rock generated from general contractor jobs at Bayou Choctaw, Big Hill, and Bryan Mound (BC-LE-1759, BH-LE-1767, and BM-LE-1768), as well as construction of a pigging waste settling pond at Big Hill,
- Coordinated with Engineering personnel to dispose of AFFF-impacted water generated at the Bryan Mound site.

The SPR places a high priority on protecting the environment. Since its creation in 1997, the SPR's Pollution Prevention Program has worked to minimize risks to the environment while supporting the SPR's mission. Waste minimization is a key component of the Pollution Prevention program. Waste minimization is considered in all levels of decision-making and is everyone's responsibility. Planned activities to minimize waste generation include reducing the amount of product needed, ensuring procurement packages are limited to only items that are necessary, and reusing products until they are completely used.

The SPR exceeded the DOE departmental goals to divert (recycle) 50 percent of non-hazardous waste and 50 percent of C&D waste over the previous five years, except for C&D waste generated in FY 2019. A combination of SPR employees following the waste minimization

planned activities and managing a rigorous recycling program contributed to exceeding the waste diversion goals. Figure 5-3 shows the percentage of non-hazardous and C&D waste recycled from FY 2019 through FY 2023.

Figure 5-3 SPR Waste Recycling and Diversion



Significant SPR projects that contributed a substantial amount of recyclable material in 2023 included:

- Scrap metal, concrete and soil generated when replacing infrastructure under the general contractor projects at the Bryan Mound, Big Hill and Bayou Choctaw sites,
- Soil generated when clearing and constructing the Big Hill Raw Water Pigging Settling Pond, and
- Concrete generated during the physical protection upgrades at the Big Hill site.

Materials recycled in 2023 are summarized in Table 5-10.

Category	Recycled (lbs.)	Recycled (kg.)
Abrasives	45,119	20,466
Aluminum-Plastic Comingled	985	447
Ballasts	28	13
Brine Or Crude Contaminated Tank Solids Or Sludge Mixture	135,137	61,297
Capacitors	55	25
Cardboard	10,535	4779
Concrete	1,188,643	539,159
Lamps, Hazardous	70	32
Lamps, Non-Hazardous	325	147
Oil Filters	93	42
Paper	54,679	24,802
Scrap Metal (C&D)	5,015,439	2,275,000
Soil Miscellaneous	4,944,938	2,243,000
Toner Cartridges	146	66
Treated Timber (C&D)	128,450	58,264
Used Oil	2804	1272

While waste minimization and recycling are key aspects of the SPR's Pollution Prevention program, several other elements are critical to the program's success. The other elements include:

- Toxic substance reduction/substitution,
- Resource conservation (water, energy),
- Sustainable acquisition, i.e., affirmative procurement, bio-based products, environmentally preferable products, and energy and water efficient products, and
- Greenhouse gas reduction.

These elements, except for sustainable acquisition, are discussed in other sections of this report as they pertain to either Sustainability (Section 3) or Chemical Management (Section 5.6).

The SPR achieved the 100% affirmative procurement target for FY23. All purchases qualified as recycled or biobased products or justified products. There were no unjustified purchases of virgin products in 2023.

Pollution prevention announcements and suggestions are communicated to SPR personnel through the SPR's newsletter "What's Happening" and routine email distributions, including pertinent local information and helpful web links. These communications are published on the M&O Contractor Environmental webpage, which is available to all SPR employees.

5.6 Chemical Management Program

5.6.1 Qualified Products List and SARA Title III Tier Two Reports

Chemical containing products used at the SPR must be on the Qualified Products List (QPL). The QPL is used to control and limit the quantity of toxic constituents found in chemical products and minimize hazardous waste generated.

Chemicals requested for QPL inclusion are reviewed for potential impacts to the environment, generation of wastes, adherence to the SPR building specifications and green requirements for paints, adhesives and sealants, recycled content in materials, and minimization or exclusion of constituents that contain EPA’s 17 High Priority Toxic Chemicals.

SARA Title III Tier Two reports, also known as Emergency Planning and Community Right-to-Know Act (EPCRA) Section 312 reports, were prepared, and submitted to state agencies as required by March 1, 2024. The SARA reports were also distributed to appropriate state and local emergency planning committees and local fire departments. Table 5-11 contains a summary of the inventory information that was submitted for 2023.

Table 5-11 2022 SARA Title III Tier Two Summary for the SPR

SPR Site	Chemical Name (Category)	*Inventory Amount (lbs.)	Location on Site
BC	Acrolon 218HS Polyurethane Gloss	999 – 4999	Maint. Paint Flammable Storage Building
	Aerokroil	1,000 - 4999	Maint. Paint Flammable Storage Building
	Buckeye 3% Mil Spec AFFF	15,000 -24,999	Foam Deluge Building
	Buckeye Platinum 3%-6% AR-AFFF	1,000 – 4,999	Foam Deluge Building
	Crude Oil, Petroleum	> 1 billion	Site Tanks, Piping, Underground Caverns
	Diesel #2	5,000 -9,999	Property Tank 2
	Diesel Fuel	1,000 – 4,999	Workover Rig
	Gasoline	5,000 – 9,999	Maint, Outside Flammable Locker
	Krylon Line-Up Water Based Pavement Striping Paint	0 – 999	Flammable Storage Building
	Nitrogen Balance Gas	0 – 499	Operations Building 401
	Non-Flammable Gas Mixture Methane	0 – 999	Operations Building 401
BH	Aer-O Water 3EM 3%	5,000 – 9,999	Operations BHSE, 834
	Chemguard 3% MS AFFF C301	10,000 – 24,999	Operations, BLDG 805
	Crude Oil, Petroleum	> 1 billion	Flammable Storage Building, Site Tanks, Piping, Underground Caverns
	Diesel Fuel	25,000 – 49,999	Operations, BHT-4, 11, and 50, BHSE-196 Trailer, and Property Annex BHT-51

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Table 5-11 2022 SARA Title III Tier Two Summary for the SPR

SPR Site	Chemical Name (Category)	*Inventory Amount (lbs.)	Location on Site
	Gasoline	5,000 – 9,999	BHT-52
	GMA Garnet – Australian Red Garnet	0 - 99	Maintenance, Lay Down Yard
	Hydrochloric Acid	0 – 99	Environmental Laboratory
	Hydrogen Sulfide	0 – 99	I&C Office
	Nitric Acid	0 – 99	Environmental Laboratory
	Non-Flammable Gas Mixture	0 – 99	I&C Office
	Potassium Chloride	0 – 99	Environmental Laboratory
	Sulfur in Petroleum Crude Oil	0 – 99	Environmental Laboratory
	Sulfuric Acid	0 – 99	Environmental Laboratory
	Xylene	0 – 99	Environmental Laboratory
BM	1-125 PPM Vol. Hydrogen Sulfide Balance Nitrogen – Cal. Gas	0 – 99	Warehouse
	Bituminous Mastic 50-HT	0 – 99	Building 243
	Buckeye 3% Mil Spec AFFF	10,000 – 24,999	Operations, Bldg 207
	Buckeye Platinum 3%-6% Low Temp AR-AFFF Alcohol Resistant	1,000 – 4,999	Operations, Bldg 207
	Chemguard 3% MS AFFF C301	50,000– 74,999	Operations Buildings 242, 206, 213, Foam Gen BMT-25 and Foam Tank BMT-16
	Crude Oil, Petroleum	> 1 billion	Site Tanks, Piping, Underground Caverns
	Diesel Fuel	25,000 – 49,999	Fuel Tank, BMT-20, 29 and 18
	Gasoline	10,000 – 24,999	Fuel Tank and Operations Building 242
	HS 80 Alcohol Antiseptic 80% Topical Solution	0 – 99	Warehouse
	Hydrochloric Acid	0 – 99	Environmental Lab Chemical Cabinet
	Oxivar TB, Virucide, Bactericide, Tuberculocide, Fungicide, Sanitizer	100 – 499	Warehouse
	Sealed Lead Acid Battery	100 – 499	Warehouse
	Solberg Artic 3% AFFF MS	1,000 – 4,999	Operations, Bldg 242
Valve Regulated Lead-Acid Battery	100 – 499	Warehouse	
Off-site Pipelines	Crude Oil, Petroleum	50,000,000 – 99,999,999	Pipelines in Calcasieu Parish, La (West Hackberry)
	Crude Oil, Petroleum	10,000,000 – 49,999,999	Pipelines in Cameron Parish, La (West Hackberry)
NO	Diesel Fuel	100 – 999	Tank, Building 850
	Diesel Fuel	1,000 – 4,999	Tank, Building 900
Stennis			
WH	2000 Bestolife Thread Compound	999 – 4,999	Workover Rig
	Amerlock 2 Cure	100 – 999	Paint Locker
	Ansulite 3% AFFF	5,000 – 9,999	Operations Foam Storage Building
	Buckeye 3% Mil Spec AFFF	9,999 – 24,999	Operations Building 303, 304, 305, 316

Table 5-11 2022 SARA Title III Tier Two Summary for the SPR

SPR Site	Chemical Name (Category)	*Inventory Amount (lbs.)	Location on Site
	Buckeye Platinum 3%-6% Low Temp AR-AFFF	4,999 – 9,999	Operations Building 305, 316
	Chemguard BC Dry Chemical Powder	999 – 4,999	Operations Building 305
	Crude Oil Petroleum	> 1 billion	LCMS Piping, Site Tanks, Piping, Underground Caverns
	Diesel Fuel	5,000 – 9,999	MTC, Fuel Pump Tank
	Diesel Fuel #2	1,000 – 4,999	Workover Rig
	Gasoline	24,999 – 49,999	Fuel Pump Tank, Laydown Yard and HPPP Flammable Cabinet
	Nitrogen	5,000 – 9,999	MTC Laydown Yard
	PSX 1001	500 – 4,999	Flammable Storage Building
	PSX 700 Custom Color Resin	500 – 4,999	Flammable Storage Building
	Propane	5,000 – 9,999	MTC, Laydown Yard
	Rotella T Multigrade SAE 15W-40	1,000 – 4,999	MTC, Flammable Storage Building, Workover Rig
	Synergy – Gear Oil – Royal Purple	499 – 999	Flammable Storage Building

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

5.6.2 Toxic Chemical Release Inventory (TRI) Form R

SPR sites are required to report under EPCRA Section 313 by submitting the Toxic Chemical Release Inventory (TRI) Form R when reporting thresholds from crude oil placed in commerce are exceeded. Specifically, when crude oil is placed in commerce, it repackages hazardous substances and must be reported. The (TRI) Form R must be submitted by July 1 for the reporting thresholds exceeded during the preceding calendar year. Reporting was required for Big Hill and West Hackberry in 2023 because crude oil was placed into commerce from the 2023 crude oil sales and emergency drawdowns.

5.7 Wildlife Program

The sites are located on the Central and Mississippi Flyways. The sites' coastal locations make them the last resting and feeding stop for migrating birds before they make the arduous trip across the Gulf of Mexico to the wintering areas in Central and South America, and the first stopover when they migrate back to North America in the spring. Without places which provide an adequate food supply to replenish fat reserves, water, and shelter from predators, many of these birds would not survive.

Selected habitats at all four sites are not mowed from early fall through spring to provide food, shelter, and nesting areas for migrating and resident birds. West Hackberry and Big Hill have Purple Martin houses to attract the mosquito-eating birds, and Eastern Bluebird nest boxes and Wood Duck nest boxes are installed at Bayou Choctaw. When nests are discovered for ground-nesting birds, such as terns, Black-necked Stilts, Killdeer, and Common Nighthawk, they are flagged until the chicks have fledged. Equipment harboring active bird nests are designated for limited/restricted use.

Each SPR site has several simultaneous LE2 tasks that include construction machinery and vehicle traffic actively traversing the sites. In the interest of safety, wildlife monitoring and conservation activities have been put on hold during LE2 tasks. However, the sites monitor all areas (including construction zones) for nesting activity, and if found, the nest areas are tagged and off limits.

The SPR's management of habitat for migrating and resident birds is good for the environment and indirectly contributes to the economy of Texas and Louisiana through hunting and various birding activities.

Purple Martin



Eastern Blue Bird



Fencing and signage to protect nesting, Black-necked Stilts



6 Site Hydrology, Groundwater Monitoring, and Public Drinking Water Protection

Groundwater monitoring is performed at the sites to protect water quality and comply with state and federal laws, regulations, and orders. Specifically, DOE Order 5400.1 requires a groundwater surveillance system/program for each site. Groundwater that is or could be impacted by DOE activities is monitored to determine and document the effects of operations on groundwater quality.

Monitoring has been performed at all sites since the 1980s. Historical records indicate there have been spills/leaks that have, or could have, impacted the shallow groundwater at each site. Monitoring results have confirmed or disproved impacts and have been included in the ASER.

Significant historical investigations performed include:

- 1991 — *Contamination Assessment Report and Corrective Action Plan for Bryan Mound*: No recovery action was advised for brine contamination due to soil characteristics.
- 1991— *Contamination Assessment Report and Remedial Alternatives Analysis for West Hackberry*: Additional recovery wells and brine pond repair or replacement were advised.
- 1992 — Phase I of II, non-invasive survey, *Final Report on Baseline Hydrogeological Screening Surveys, SPR Sites, Louisiana, and Texas*. Surveys were performed to identify subsurface contamination by brine via the electromagnetic terrains conductivity method, and crude oil via soil gas analysis.
- 1996 — Phase II of II, *Multi-Site Hydrogeological Investigation, SPR Sites, Louisiana, and Texas*: Also referred to as the Verification Well Study in which periphery wells were installed. A surveillance monitoring system was established after this study and includes a network of wells that encompasses brine pond/storage area and periphery areas.

Monitoring wells are present at each site, and shallow groundwater is analyzed to determine the presence of contaminants. The first and second (when present) encountered water-bearing strata are monitored at each site. Each site purchases potable water, and groundwater is not utilized as drinking water. Salinity is measured as an indicator of brine, and the potential presence of hydrocarbons is screened using the TOC test. Other parameters such as pH and temperature are also recorded. Depth to groundwater is collected to determine the groundwater flow direction.

Monitoring is required at West Hackberry in accordance with a monitoring plan agreed to by DOE and DENR. Monitoring data is included in each ASER and will be submitted to DENR. Monitoring is also required at Bryan Mound in accordance with the closure of a brine pond under the direction of the RRC. Monitoring data is included in each ASER and submitted to the RRC. Wells surrounding the former brine storage pond and operating disposal pond systems at Big Hill monitor groundwater as part of permit required leak detection.

Available groundwater salinity data collected at each site for the past six years are included and presented graphically in Appendix C. These data are discussed within each site-specific section.

The EPA has identified two “contaminants of emerging concern” used at SPR sites. These contaminants, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), are part of a larger group of chemicals (per- and polyfluoroalkyl substances) which are generally referred to by their plural acronym, PFAS. PFAS are manufactured chemicals not naturally found in the environment and have many different uses. They are extremely persistent and are sometimes referred to as “forever chemicals.” Groundwater is susceptible to PFAS contamination. While the EPA has issued interim recommendations for addressing PFAS in groundwater, surveillance for PFAS is not currently conducted at the SPR because the groundwater is not used for drinking purposes.

6.1 Bayou Choctaw

The Plaquemine Aquifer is the primary source of fresh water for the site and surrounding communities. This aquifer occurs at depths of 60 to 600 ft. below land surface (bls). Atchafalaya Clay is present from near ground surface to just above the aquifer. The site purchases its potable water from the Iberville Hwy. 1148 Water District and Louisiana regulations do not require a potable water monitoring program. Bayou Choctaw is recognized as a water purchaser only.

Four monitoring wells (BC MW1 through BC MW4) were installed in 1989/1990 near the brine storage pond (Figure C-1). These wells were drilled to approximately 30 ft. bls at three corners. One well was drilled farther southeast to monitor the potential impact from the brine storage pond and any other potential nearby shallow contamination sources.

Periphery wells (BC PW1, BC PW2, and BC PW4 through BC PW8) (Figure C-1) were installed in areas identified as possibly being impacted based on results of the 1991 Phase I non-intrusive survey. They are screened to capture the first encountered groundwater and are monitored to enhance the evaluation of groundwater flow direction and outlying salinity movements and variation.

Monitoring activities in 1996 provided evidence the water in the shallow zone moves in a generally radial direction away from the main site and underlying dome, loosely mimicking the topography. Water levels collected in March 2023 also indicate radial groundwater movement from a high point south of Cavern 15 (Figure C-2).

Groundwater salinity results from samples collected in 2023 indicated increased salinity at wells BC PW2, PW4, PW5, PW6, PW7 and PW8 in March. The increase was likely due to the extreme drought in Louisiana. However, salinity levels decreased in December 2023, and long-term brine impacts are not evident. For perspective, the average five-year salinity values for the BC wells are as follows:

**Table 6-1
5-Year Salinity Values in BC Wells**

BC Well	Salinity (ppt)
BC MW1	0.9
BC MW2	1.0
BC MW3	1.0
BC MW4	1.2
BC PW1	2.2
BC PW2	3.2
BC PW4	4.3
BC PW5	6.0
BC PW6	7.6
BC PW7	5.3
BC PW8	13.1

BC MW3, at the southeast downgradient corner of the brine pond, historically captured the most saline site groundwater. It now exhibits an essentially stable and decreasing trend. Impacts from a historical 1991 brine piping leak appear to have passed this well in an easterly downgradient direction.

BC PW2 is near an area with impacted groundwater from historically impacted surface soil. The salinity values at BC PW2 have shown a steady decrease of salinity to ambient values. All site PW wells indicate decreasing or flat five-year salinity trends.

6.2 Big Hill

The Evangeline and Chicot aquifers provide potable water to the Big Hill area. Near the Big Hill salt dome, the base of the Chicot aquifer is approximately 1,200 feet below mean sea level (msl). However, fresh water is reported to occur in the upper 100 feet of the Chicot aquifer on top of the dome. The town of Winnie, west of Big Hill, uses fresh water from the upper Chicot Aquifer. Beaumont and Port Arthur, north and northeast of the site (as well as most of Jefferson County), draw fresh water from the lower Chicot Aquifer.

The site purchases its potable water from the Trinity Bay Conservation District. It is classified by Texas regulations as a non-transient, non-community public water distribution system and is required to have a potable monitoring program. In 2023, potable water samples were collected monthly for coliform and weekly for residual chloramine (disinfectant). Average disinfectant levels were reported to TCEQ on a Disinfectant Level Quarterly Operating Report. Calculated results did not exceed the regulatory MCLs for disinfectants. Coliform results were also below their MCL.

Potable water is sampled and tested for lead and copper every three years. In 2023, testing for disinfection byproducts (trihalomethanes and haloacetic acids) was conducted through TCEQ. Results were below their MCLs. Other potable water parameters monitored for compliance include asbestos, nitrite, and nitrate with varied monitoring schedules. A TCEQ contractor tested for nitrate and nitrite in 2023. Results were below their MCLs.

Six monitoring wells (BH MW-1 through BH MW-6) were installed in 1987 around the brine disposal pond (Figure C-4). These wells were screened in the first water-bearing zone, approximately 15 to 20 ft. bls, consisting of silty sands and fine sands. Overlying this zone are near-surface organic silts, clays, and sandy clays. Silty organic clays underlie the zone.

Periphery wells (BH PW1 and BH PW3 through BH PW5) were installed in areas identified as possibly being impacted via the 1991 Phase I non-intrusive survey results. They are screened to capture the first encountered groundwater (Figure C-4).

Monitoring activities in 1996 provided evidence that the water in the shallow zone on the east side of the site flows to the southeast and on the west side flow to the southwest. Water levels collected in June 2023 indicate the same flow directions. The flow directions are generally consistent with surface topography at the Big Hill site (Figure C-5).

Groundwater salinity results from samples collected during 2023 at all wells are BDL (Figure C-6). One-half of the detection limit is recorded as results in Figure C-6. Brine impacts are not evident.

For perspective, the average five-year salinity values for the BH wells are as follows:

BH Well	Salinity (ppt)
BH MW1	0.6
BH MW2	0.6
BH MW3	0.6
BH MW4	0.6
BH MW5	0.6
BH MW6	0.6
BH PW1	0.6
BH PW3	0.5
BH PW4	0.5
BH PW5	0.5

Salinity data collected from wells surrounding the ponds and the verification wells have indicated complete and consistent results showing no groundwater effects.

6.3 Bryan Mound

The Evangeline and Chicot aquifers provide potable water to the Bryan Mound area and are fresh to slightly saline. Fresh water for Brazoria County is obtained from the upper portions of the Chicot aquifer upgradient of the Bryan Mound salt dome.

Bryan Mound purchases its potable water from Freeport Water Utilities. It is classified by Texas regulations as a non-transient, non-community public water distribution system and is required to

have a potable monitoring program. In 2023, potable water samples were collected monthly for coliform and weekly for residual chloramine (disinfectant). Average disinfectant levels were reported to TCEQ on a Disinfectant Level Quarterly Operating Report. Calculated results did not exceed the regulatory MCLs for disinfectants.

Potable water is also sampled and tested for lead and copper tri-annually. In 2023, testing for disinfection byproducts (trihalomethanes and haloacetic acids) was conducted through TCEQ. Results were below their MCLs. Other potable water parameters monitored for compliance include asbestos, nitrite, and nitrate with varied monitoring schedules. A TCEQ contractor tested for nitrate and nitrite in 2023. Results were below their MCLs.

Two water-bearing zones underlie the site. The shallow zone occurs at depths of 8-12 ft. bls and extends to 25-30 ft. bls and averages 15 feet in thickness. The deep zone occurs at depths of 40-50 ft. bls and averages 10 ft. in thickness. The water-bearing zones consist of fine and silty sands and clayey silts. A clay layer approximately 10 to 20 feet thick separates the two zones. There is not a useable quantity of fresh water in these zones.

Fifteen monitoring wells were installed between 1981 and 1990 in both the shallow (denoted as “S”) and deep (denoted as “D”) encountered water-bearing zones (Figure C-7). Three wells (BM BP1S, BM BP2S, and BM PZ2S) were removed from service due to casing damage. Five additional shallow wells and one additional deep well (BM PW1 through BM PW5 and BM PW2D) were installed during the 1996 Verification Well Study and were incorporated into the site monitoring network.

Water level data collected in May 2023 indicate the groundwater flow direction for the shallow zone in the northern portion of the site is to the north-northwest. Groundwater flow for the shallow zone in the southern portion of the site exhibits predominately a radial flow from BM PW2-S (Figure C-8). The direction of the ground-water flow in the deep zone is primarily to the north toward Blue Lake (Figure C-9).

Salinity values for 2023 and previous years from the 18 monitored wells (twelve shallow zone and six deep zone) and are included in Figure C-10.

Elevated salinity measured in shallow monitor wells since their installation (BM PZ1S, BM MW1S, and former BM BP1S) has speculatively been associated with the large brine storage pond. The large brine pond (with a Hypalon® (chlorosulfonated polyethylene) membrane) was initially constructed in 1978 and subsequently enlarged (height added) with the installation of a new Hypalon® liner and a concrete weight coat in 1982. It was removed from service in September 1998 and closed in early Spring 1999. The salinity measurements observed to the northeast (BM PW4) and east (BM MW1S and D of the closed pond area) could result from seepage occurring from before the 1982 renovations of the pond or its subsequent closure, or from operations preceding SPR ownership.

Brine effects are not evident in the northwest and southern portions of the site. Shallow zone wells BM MW3 and BM MW4S and deep well BM MW4D (west of the former brine pond) have historically remained stable in the 5 to 15 ppt range. Wells in the southern portion of the

site are consistently below or near 50 ppt. For perspective, the average five-year for salinity for most of the Bryan Mound wells are depicted in the table below:

BM Well	Salinity (ppt)
BM BP1D	6.6
BM MW1D	151.9
BM MW1S	72.7
BM MW2D	59
BM MW2S	9.3
BM MW3	7.1
BM MW4D	4.7
BM MW4S	8.0
BM MW5	47.8
BM PW1	23.7
BM PW2D	17.4
BM PW2S	6.4
BM PW3	54
BM PW4	118
BM PW5	48.3
BM PZ1D	16.9
BM PZ1S	43.5
BM PZ3	22

6.4 West Hackberry

The Chicot Aquifer provides potable water to the West Hackberry area. Much of the groundwater 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 regional southerly flow direction towards the north near the coast, south of Lake Charles. The fresh/saline water interface is approximately 700 ft. bls. The site purchases its potable water from the Cameron Parish Waterworks. Louisiana regulations do not require a potable water monitoring program, and West Hackberry is recognized as a water purchaser only.

Two water-bearing zones underlie the site. The shallow zone occurs at depths of 6-13 ft. bls, is 3- 12 ft. thick, and consists of fine and silty sands. The deep zone occurs at depths of 40-50 ft. bls, averages 10 ft. thick and consists of silty sand with increasing amounts of fines (silt and clay) to the west and north of the former brine pond area. A clay layer approximately 10 to 20 feet separates the two zones.

The 1991 *Contamination Assessment Report and Remedial Alternatives Analysis* identified the former brine pond as a source of groundwater 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 construction of storage caverns. The brine pond construction activity implemented per the state approved brine pond-decommissioning plan was concluded in November 1999.

Eleven monitoring wells and fifteen former recovery wells have been installed on the site in five phases from 1988-1990. These wells were used to either monitor or control brine movement beneath the brine pond system. The 1996 Verification Well Study added seven periphery wells (PW) screened in the shallow zone. The surveillance monitoring network is shown in Figure C-11. It consists of wells screened in the shallow zone (denoted as “S”) and deep zone (denoted as “D”).

Water level data collected during June 2023 from 18 of the site’s wells were used to determine groundwater flow directions in the shallow and deep water-bearing zones. Results are shown in Figures C-12 and C-13, respectively. Water in the shallow zone flows in a radial direction from a site high at WH PW6 (near Cavern 105 in the southwestern portion of the site). Water in the deep zone exhibits radial flow from most monitored wells, with the northwest portion monitored flowing toward the northwest (to Black Lake) and the southern portion flowing to the southeast.

Salinity data gathered over the past five years at all wells is depicted in Figure C-14. Four of the seven wells initially installed for the 1996 Verification Well Study were retained for additional water level measurement around the periphery of the main site.

Certain wells are analyzed for salinity only once per year per the 2002 site-wide monitoring proposal approved by DENR in early 2004, with the remainder analyzed quarterly.

The five-year salinity averages (2017-2023) for the WH wells are depicted in the table below:

WH Well	Salinity (ppt)
WH MW1D	1.3
WH P11	1.1
WH P12D	8.8
WH P12S	8.8
WH P13D	3.3
WH P13S	0.6
WH P1D	8.1
WH P1S	0.7
WH P2D	3.7
WH P2S	2.7
WH P3D	8.0
WH P3S	18.1
WH P4D	9.8
WH P4S	11.4
WH P5S	0.6
WH P6D	1.1

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WH P6S	0.5
WH P8	0.8
WH P9	0.8
WH PW2	7.2
WH PW4S	3.5
WH PW5	0.8
WH PW6	0.5
WH RW2S	0.6
WH RW3D	0.7
WH RW4D	3.8
WH RW5D	9.8

With the passage of time, the slug of impacted shallow water from the seepage of the former brine pond has dissipated. The brine pond source has been removed. The slug has changed shape, is smaller, and has moved towards the east while elongating northerly. In 2023, shallow impacted wells (WH P3S and WH P4S) exhibited lessening or consistent salinity values.

The groundwater salinity levels continue to improve and exhibit long-term gradual lessening trends. The improvement commenced shortly after the pond system was shut off in early 1999 for pond closure construction and resumed when recovery pumping ended in Spring 2001.

Wells west and south of the former brine pond system (shallow and deep) do not exhibit salinity impacts.

7

Quality Assurance (QA)

The primary policy, requirements, and responsibilities for ensuring Quality Assurance (QA) is performed at US DOE facilities are provided in:

- DOE Order 414.1D, Chg 2 (LtdChg), “Quality Assurance” (9-15-2020)
- 10 CFR 830, Subpart A, “Quality Assurance Requirements”

DOE Order 414.1D specifies ten criteria of a quality program:

1. Management/Program
2. Management/Personnel Training and Qualification
3. Management/Quality Improvement
4. Management/Documents and Records
5. Performance/Work Processes Performance
6. Performance/Standards for Design and Verification
7. Performance/Procurement Requirements
8. Performance/Inspection & Acceptance Testing
9. Assessment/Management Assessment
10. Assessment/Independent Assessment

FFPO follows a “Management and Operations Contractor, Quality Assurance Procedure” (AS15700.15) that incorporates the above criteria. QA is performed to provide confidence in the results of effluent monitoring and environmental surveillance programs conducted at the sites. Data of high quality is necessary to make appropriate assessments and decisions based on those data. Effluent is monitored at each site in accordance with state and federal discharge permits and environmental surveillance is performed via surface water and groundwater sampling. Results are used to identify the presence or absence of SPR impacts on the surrounding media.

The sites undergo biannual internal audits, as well as inspections by outside federal and state agencies. Site laboratories are internally audited using a laboratory checklist. Audits performed in 2023 at each site are included in Appendix E. Regarding environmental samples, all audit results were acceptable.

7.1 Field Quality Control

Effluent and surveillance monitoring activities are performed in accordance with procedures in the M&O Contractor Laboratory Programs and Procedures Manual (MSI7000.133), the Environmental Monitoring Plan (ASL5400.57), 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 data. All data generated by SPR laboratories are recorded and maintained in 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. This data is compiled, supports SPR assessments, and is utilized in various reports.

7.3 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 using solvent or standard and method blanks, check standards 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 ten percent frequency to determine precision and accuracy, respectively.



Analytical methodology is based on the procedures listed in Table 7-1. Sufficient quality assurance analyses were performed in 2023 to verify the continuing high quality of SPR laboratory data.

Table 7-1 SPR Wastewater Analytical Methodology

Parameter	Method	Source*	Description
Biochemical Oxygen Demand	5210(B) 405.1	SMEWW EPA-1	5 Day, 20 °C 5 Day, 20 °C
Chemical Oxygen Demand	D1252-88(B) 410.4 5220(D)	ASTM EPA-1 SMEWW	Micro Spectrophotometric Proc. Colorimetric, Manual Closed Reflux, Colorimetric
Fecal Coliform	Part III-C-2 9222(D)	EPA-2 SMEWW	Direct Membrane Filter Method Membrane Filter Procedure
Residual Chlorine	4500-C1(G) 330.5 8021	SMEWW EPA-1 Hach	DPD Colorimetric Spectrophotometric, DPD DPD Method

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Table 7-1 SPR Wastewater Analytical Methodology

Parameter	Method	Source*	Description
Oil & Grease (Total, Recoverable)	1664 Rev. A; 1664 Rev. B	EPA-1	Gravimetric, Separatory Funnel Extraction
Oil & Grease (Partition, Gravimetric)	5520-(B)	SMEWW	Gravimetric, Separatory Funnel Extraction
Total Organic Carbon	415.1 D4839-88 5310(C) D2579(A) 5310(B)	EPA-1 ASTM SMEWW ASTM SMEWW	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 SMEWW SMEWW	Membrane Electrode Membrane Electrode Modified Winkler Method Winkler Method with Azide Modification Membrane Electrode
Hydrogen Ion conc. (pH)	D1293-84(A&B) 150.1 4500-H ⁺ (B)	ASTM EPA-1 SMEWW	Electrometric Electrometric Electrometric
Total Dissolved Solids (Residual, Filterable)	160.1 2540(C)	EPA-1 APHA	Gravimetric, Dried at 180°C Gravimetric, Dried at 180°C
Total Suspended Solids (Residual, Non- Filterable)	160.2 2540(D)	EPA-1 SMEWW	Gravimetric, Dried at 103- 105°C Gravimetric, Dried at 103- 105°C
Salinity	D4542-85 (Sect. 7) 2520(B) 2510 (C)	ASTM SMEWW (16 th Ed.) SMEWW (16 th Ed.)	Refractometric Electrical Conductivity Density Method
Biomonitoring	1006.0 1007.0	EPA-3 EPA-3	<i>Menidia beryllina</i> 7-day survival <i>Mysidopsis bahia</i> 7-day survival

*Source:

SMEWW= American Public Health Association, et al., Standard Methods for the Examination of Water and Wastewater, most recent edition.
 EPA-1 = U.S. Environmental Protection Agency, Methods for Chemical Analysis of Water and Wastes, Document No. EPA - 600/4-79-020.
 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.

7.4 Control of Subcontractor Laboratory Quality

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, SPR personnel from the respective laboratory, M&O Contractor Quality Assurance, Operations and Maintenance and Environmental review laboratory procurement documents.

Only subcontractor laboratory service vendors that are state accredited under the National Environmental Laboratory Accreditation Program are approved for use on the SPR.

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- Emergency Response Procedures. All sites: BCI5500.3, Bayou Choctaw; BHI5500.4, Big Hill; BMI5500.5, Bryan Mound, WHI5500.9, West Hackberry, AAA9020.159 New Orleans and AAA9020.160 Stennis.
- ISO 14001 Environmental Management Systems Manual. ASI5400.55.
- Laboratory Programs and Procedures Manual, MSI7000.133.
- Pollution Prevention Plan, ASL5400.41.
- Spill Prevention Control and Countermeasures Plans. All sites: BCL5400.16, Bayou Choctaw; BHL5400.21, Big Hill; BML5400.17, Bryan Mound; WHL5400.20, West Hackberry.
- SPR Environmental Monitoring Plan, ASL5400.57.

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- Finding of No Significant Impact for Environmental Assessment of Oil Degasification at Four Strategic Petroleum Reserve Facilities in Texas and Louisiana. September 1994. U.S. Department of Energy.
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Appendix A

Appendix A1 — Environmental Standards List

Appendix A2 — Strategic Petroleum Reserve Project Management Office
Environmental Safety and Health Directives

Appendix A1 – Environmental Standards List

<u>DESCRIPTION</u>	<u>STANDARD</u>
National Environmental Policy Act Implementing Procedures	10 CFR 1021
Compliance with Flood Plain/Wetlands Environmental Review	10 CFR 1022
Occupational Radiation Protection - Applicable and Enforceable Portions	10 CFR 835
Storage, treatment, and disposal of nondefense toxic and hazardous materials	10 USC 2692
Boiler and Pressure Vessels - Degas Project Only	120 IAC
(Aviation) Operating Requirements: Domestic, Flag, and Supplemental Operations	14 CFR 121
(Aviation) Certifications and Operations	14 CFR 125
(Aviation) Certification and Operations of Scheduled Air Carriers with Helicopters	14 CFR 127
(Aviation) Rotorcraft External Load Operations	14 CFR 133
(Aviation) Operating Requirements: Commuter and On-Demand Operations	14 CFR 135
(Aviation) Agricultural Aircraft Operations	14 CFR 137
(Aviation) Certification and Operation: Land Airport Serving Certain Air Carriers	14 CFR 139
(Aviation) Repair Stations	14 CFR 145
(Aviation) Objects Affecting Navigable Airspace	14 CFR 77
(Aviation) Notification and Reporting - Accidents and Incidents	14 CFR 830
(Aviation) General Operating and Flight Rules	14 CFR 91
Oil and Gas Division	16 TAC 1.3
Environmental Recycling	16 TAC 1.4
Standards for Management of Hazardous Oil and Gas Waste	16 TAC 3.98
Fish and Wildlife Coordination Act	16 U.S.C. §§ 661-666c
Bald and Golden Eagle Protection Acts	16 U.S.C. §§ 668-668d
Migratory Bird Treaty Act	16 U.S.C. §§ 703-711
Endangered Species Act	16 USC Parts 1531-1544
Radiation Control	25 TAC 1.289
Commerce in Explosives (ATF)	27 CFR 55
Imminent Danger	29 CFR 1903.13
Posting of Notice: Availability of the Act, Regulations, and Applicable Standards	29 CFR 1903.2
Recordkeeping and Reporting Occupational Injuries and Illnesses	29 CFR 1904
General (1 through 8)	29 CFR 1910 SUBPART A
Adoption and Extension of Established Federal Standards (11 through 19)	29 CFR 1910 SUBPART B
Walking-Working Surfaces (21 through 30)	29 CFR 1910 SUBPART D
Means of Egress (35 through 38)	29 CFR 1910 SUBPART E
Powered Platforms, Manlifts, and Vehicle Mounted Work Platforms (66 through 68)	29 CFR 1910 SUBPART F
Occupational Health and Environmental Control (94 through 98)	29 CFR 1910 SUBPART G
Hazardous Materials (101 through 126)	29 CFR 1910 SUBPART H

<u>DESCRIPTION</u>	<u>STANDARD</u>
Personal Protective Equipment (132 through 139)	29 CFR 1910 SUBPART I
General Environmental Controls (141 through 147)	29 CFR 1910 SUBPART J
Medical and First Aid (151)	29 CFR 1910 SUBPART K
Fire Protection (155 through 165)	29 CFR 1910 SUBPART L
Compressed Gas and Compressed Air Equipment (169)	29 CFR 1910 SUBPART M
Materials Handling and Storage (176-179, 181, 183-184)	29 CFR 1910 SUBPART N
Machinery and Machine Guarding (211 through 213, 215, 219)	29 CFR 1910 SUBPART O
Hand/Portable Powered Tools and Other Handheld Equipment (241 through 244)	29 CFR 1910 SUBPART P
Welding, Cutting, and Brazing (251 through 255)	29 CFR 1910 SUBPART Q
Special Industries (269) Power generation, Transmission	29 CFR 1910 SUBPART R
Special Industries (268) Telecommunications	29 CFR 1910 SUBPART R
Electrical (301 through 306, 331-335, 399)	29 CFR 1910 SUBPART S
Commercial Diving Operations (401 through 402, 410, 420-427, 430, 440-441)	29 CFR 1910 SUBPART T
Toxic and Hazardous Substances (1000 through 1450 except 1029, 1043, 1045, 1047, 1050-1051)	29 CFR 1910 SUBPART Z
Designations for General Industry Standards Incorporated into Body of Construction Standards	29 CFR 1926 APP. A
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Cranes, Derricks, Hoists, Elevators, and Conveyors (550 through 555)	29 CFR 1926 SUBPART N
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Hazardous Materials Information Development, Preparedness and Response Act	30 LA RS 2361-2380 and 33 LAC V.101 and 191 SARA Title III
DELETED General Provisions - Document Filing Procedures	30 TAC 1.1.10 DELETED
General Air Quality Rules	30 TAC 1.101
Permits by Rule	30 TAC 1.106
Control of Air Pollution from Visible Emissions and Particulate Matter	30 TAC 1.111
Control of Air Pollution from Sulfur Compounds	30 TAC 1.112
Control of Air Pollution from Hazardous Air Pollutants	30 TAC 1.113
DELETED Control of Air Pollution from Motor Vehicles	30 TAC 1.114 DELETED
Control of Air Pollution from Volatile Organic Compounds	30 TAC 1.115
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Certain vehicles must stop at all railroad grade crossings (Explosives)	32 LA RS 173.1
Permission for operation; crossing railroad grade crossings; markings	32 LA RS 251 Subpart J. Vehicles Transporting Explosives or Inflammables
Equipment and inspection (Explosives)	32 LA RS 252
Handling Class I (Explosive) Materials or Other Dangerous Cargo	33 CFR 126
Control of Pollution by Oil and Hazardous Substances, Discharged Removed	33 CFR 153
Facilities Transferring Oil or Hazardous Material in Bulk	33 CFR 154
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Markings of Structures, Sunken Vessels and Other Obstructions	33 CFR 64
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Aids to Navigation on Artificial Islands and Fixed Structures	33 CFR 67
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Permit Procedures	33 LAC III.5
DELETED Comprehensive Toxic Air Pollutant Emission Control Program	33 LAC III.51 DELETED
DELETED Area Sources of Toxic Air Pollutants	33 LAC III.53 DELETED
Prevention of Air Pollution Emergency Episodes	33 LAC III.56
DELETED Chemical Accident Prevention and Minimization of Consequences	33 LAC III.59 DELETED
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Specific Decision-making Procedures Applicable to LPDES Permits	33 LAC IX.33
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Notices, Instructions, and Reports to Workers; Inspections	33 LAC XV.10
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Advisory Council on Historical Preservation	36 CFR 800
Pesticides	4 TAC I.7
Asbestos	40 CFR 763
Criteria for State, Local, and Regional Oil Removal Contingency Plans	40 CFR 109
Discharge of Oil	40 CFR 110
Oil Pollution Prevention	40 CFR 112
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Determination of Reportable Quantities for Hazardous Substances	40 CFR 117
State Certification of Activities Requiring a Federal License or Permit	40 CFR 121
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Underground Injection Control Program: Criteria and Standards	40 CFR 146
State Underground Injection Control Programs	40 CFR 147
Sole Source Aquifers	40 CFR 149
NEPA Purpose, Policy and Mandate	40 CFR 1500
NEPA and Agency Planning	40 CFR 1501
NEPA Environmental Impact Statement	40 CFR 1502
NEPA Commenting	40 CFR 1503
NEPA Pre-decision Referrals to the Council of Proposed Federal Actions Determined to be Environmentally Unsatisfactory	40 CFR 1504
NEPA and Agency Decision Making	40 CFR 1505
Other Requirements of NEPA	40 CFR 1506
NEPA Agency Compliance	40 CFR 1507
NEPA Terminology and Index	40 CFR 1508
Freedom of Information Act Procedures	40 CFR 1515
Privacy Act Implementation	40 CFR 1516
Pesticide Registration and Classification Procedures	40 CFR 152
Labeling Requirements for Pesticides and Devices	40 CFR 156
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Worker Protection Standards (Pesticides)	40 CFR 170
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Section 404 (b) (1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material	40 CFR 230
Guidelines for Storage and Collection of Residential, Commercial, and Institutional Solid Wastes	40 CFR 243
Comprehensive Procurement Guideline for Products Containing Recovered Materials	40 CFR 247
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Standards for Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities	40 CFR 266
Land Disposal Restrictions	40 CFR 268
Requirements for Authorization of State Hazardous Waste Programs	40 CFR 271
Approved State Hazardous Waste Management Programs	40 CFR 272
Standard for Universal Waste Management	40 CFR 273
Standards for Management of Used Oil	40 CFR 279
Technical Standards and Corrective Action Requirements for Owners and Operators of UST	40 CFR 280

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Approved Underground Storage Tank Programs	40 CFR 282
National Oil and Hazardous Substances Pollution Contingency Plans	40 CFR 300
Designation of Reportable Quantities and Notification	40 CFR 302
Emergency Planning and Notification	40 CFR 355
Hazardous Chemical Reporting: Community Right-to-Know	40 CFR 370
Toxic Chemical Release Reporting: Community Right-to-Know	40 CFR 372
Reporting Hazardous Substance Activity When Selling or Transferring Federal Real Property	40 CFR 373
General Provisions	40 CFR 401
General Pretreatment Regulations for Existing and New Sources of Pollution	40 CFR 403
Approval & Promulgation of Implementation Plans	40 CFR 52
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Standards of Performance for New Stationary Sources	40 CFR 60
Determination of Emissions from Volatile Compounds Leaks	40 CFR 60, Appendix A, Method 21
DELETED National Emission Standards for Hazardous Air Pollutants	40 CFR 61 DELETED
National Emission Standards for Hazardous Air Pollutant for Source Categories	40 CFR 63
Assessment and Collection of Noncompliance Penalties	40 CFR 66
State Operating Permit Programs	40 CFR 70
General	40 CFR 700
PCB Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions	40 CFR 761
Regulations of Fuels and Fuel Additives	40 CFR 80
EPA Regulations Designating Areas for Air Quality Planning	40 CFR 81
Protection of Stratospheric Ozone	40 CFR 82
Confiscation and disposal of explosives	40 LA RS 1472.11
Unlawful storage of explosives	40 LA RS 1472.12
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License; manufacturer-distributor, dealer, user, or blaster of explosives	40 LA RS 1472.3
Possession without license prohibited; exceptions (Explosives)	40 LA RS 1472.4
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Energy Policy Act of 2005	42 USC 15801
Energy Conservation Reauthorization 1998	42 USC 6201 et seq.
Energy Policy and Conservation Act 1975 and 1994	42 USC 6291-6309
RCRA and Affirmative Procurement	42 USC 6962
National Environmental Policy	42 USC Chapter 55
Air Pollution Prevention and Control	42 USC Chapter 85
National Energy Policy Act of 1992	42 USC Chapter 91
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<u>DESCRIPTION</u>	<u>STANDARD</u>
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Oil Spill Prevention and Response Plans	49 CFR 130
General Information, Regulations, and Definitions	49 CFR 171
Hazardous Material Tables, Hazardous Materials Communications Requirements and Emergency Response Information Requirements	49 CFR 172
Shippers - General Requirements for Shipments and Packaging	49 CFR 173
Carriage by Public Highway	49 CFR 177
DOT Response Plans for Onshore Pipelines	49 CFR 194
Transportation of Hazardous Liquids by Pipeline	49 CFR 195
Drug and Alcohol Testing	49 CFR 199
Commercial Driver's License Standards; Requirements and Penalties	49 CFR 383
Endangered and Threatened Wildlife and Plants and Migratory Bird Permits	50 CFR 10, 13, 17, 21, 22
General Provisions	50 CFR 450
Disposal of Birds or Quadrupeds Becoming a Nuisance	56 LA RS 112
US Department of Agriculture Federal Bio-based Products Preferred Procurement Program	7 CFR 3201-3202
Pesticide	7 LAC XXIII
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)	7 USC 136
Farm Security and Rural Investment Act (FSRIA) of 2002, Section 9002	7 USC 8102
Control of Nuisance Wild Quadrupeds	76 LAC V.1.25
Nuisance Wildlife Control Operator Program	76 LAC V.1.27
Stennis Warehouse Spill Prevention, Control, and Countermeasures Plan	AAA 4010.10
Property Management Manual	AAA 7003.7
Threshold Limit Values for Chemical Substances - Current Year & Applicable Substances	ACGIH TLV
Area Contingency Plan for Lake Charles	ACP USCG
Area Contingency Plan for Port Arthur	ACP USCG
Area Contingency Plan for New Orleans	ACP USCG

<u>DESCRIPTION</u>	<u>STANDARD</u>
Area Contingency Plan for Galveston	ACP USCG
Area Contingency Plan for EPA Region 6	ACP-EPA
Hazardous Materials Management Education Program Observations and Recommendations: Environmental Mgmt., Hazardous Waste Minimization, and Pollution Prevention for the SPR Operations	AIHMM
OBSOLETE- July 2014 Drill and Exercise Program Plan	AL 5500.11- OBSOLETE
Standard Methods for the Examination of Water and Wastewater	American Public Health Assoc.
OSHA Referenced Standards	ANSI Standards
Environmental Management Systems Specification with Guidance for Use	ANSI/ISO 14001:2004
Compilation of Air Pollutant Emission Factors	AP-42
Permit Regulations for the Construction and/or Operation of Air Emissions Equipment (Mississippi)	APC-S-2
Amer. Petroleum Institute - Recommended Practices and Guides	API
API Standard 653 for Tank Inspection, Repair, Alteration, and Reconstruction	API - Standard
Environmental Effects of Army Actions	AR 200-2
OBSOLETE - July 2014 Conduct of Training for the SPR M&O Contractor	ASI 3400.1 - OBSOLETE
Integrated Logistics Support Procedures	ASI 4000.10
SPR Plant Maintenance System	ASI 4330.16
Environmental Instructions Manual	ASI 5400.15
Conduct of Operations at the SPR	ASI 5480.19
Accident Prevention Manual	ASI 5480.22
Quality Assurance Instructions	ASI 5700.15
Design Review Procedure	ASI 6430.15
Configuration Management	ASL 4700.1
SPR Environmental Monitoring Plan	ASL 5400.57
Fire Protection Manual	ASL 5480.18
Emergency Readiness Assurance Plan	ASL 5500.10
Emergency Response Team Organization and Training Plan	ASL 5500.25
Emergency Management Plan and Implementing Procedures	ASL 5500.58
Drawdown Management Plan	ASL 6400.18
Cavern Inventory and Integrity Control Plan	ASL 6400.30
Drawdown Readiness Program Plan	ASL 7000.397
OSHA Referenced Standards	ASME Standards
Environmental Policy	ASP 5400.2
DELETED - July 2014 SPR Crosstalk Information Exchange Program	ASR 7000.2 - DELETED
Readiness Review Board	ASR 7000.7
Membership in BRAMA	BC BRAMA
Membership in Greater Baton Rouge Industry Alliance	BC Greater BR Industry Alliance
Membership in Iberville CAER	BC Iberville CAER

<u>DESCRIPTION</u>	<u>STANDARD</u>
Membership in the Iberville LEPC	BC Iberville LEPC
Membership in West Baton Rouge LEPC	BC West Baton Rouge LEPC
Bayou Choctaw Emergency Response Procedures	BCI 5500.3
Bayou Choctaw Spill Prevention, Control, and Countermeasures Plan	BCL 5400.16
Safety Agreement with NEWPARK	BH & NEWPARK
Membership in the LEPC	BH LEPC
Membership in the Local Law Enforcement Agency for BH	BH LLEA
Membership in Sabine-Neches Chiefs Mutual Aid	BH Sabine-Neches Chiefs Mutual Aid
Big Hill Emergency Response Procedures	BHI 5500.4
Big Hill Spill Prevention, Control, and Countermeasures Plan	BHL 5400.21
Membership in the BMAT for BM	BM BMAT
Membership in the Brazosport CAER	BM CAER
Membership in the LEPC	BM LEPC
Membership in the Local Law Enforcement Agency at BM	BM LLEA
Agreement between BM and VDD on restrictions to working on Hurricane Levees near BM	BM VDD
Bryan Mound Emergency Response Procedures	BMI 5500.5
Bryan Mound Spill Prevention, Control, and Countermeasures Plan	BML 5400.17
Seminar on Site Characterization for Subsurface Remediations	CERI-89-224
Fire Prevention and Protection; Emergency Services and Communication; and Hazardous Materials	Chapter 13 Jefferson Parish Code of Ordinances
County Regulation of Matters Relating to Explosives and Weapons Subchapter A. Explosives	Chapter 235 TX Statutes, Local Government, Title 7
Operation and Movement of Vehicles (Explosives)	Chapter 545 TX Statutes, Transportation, Title 7
Vehicle Equipment (Explosives)	Chapter 547 TX Statutes, Transportation, Title 7
Hoisting and Rigging Handbook	DOE HDBK, 1090-9
DOE Waste Minimization reporting Requirements, Nov. 1994	DOE Guideline
Waste Minimization Reporting System (Wmin) User's Guide	DOE Handbook
Pollution Prevention Handbook	DOE Handbook
Guidance for the Preparation of the Waste Minimization and Pollution Prevention Awareness Plan, Dec 1993	DOE Handbook
EPA's Interim Final Guidance to Hazardous Waste Generators on the Elements of a Waste Minimization Program	DOE Memorandum
For all applicable DOE Orders See Contract No. DE-FE0011020 Applicable Standards List	DOE Orders
Pollution Prevention Program Plan	DOE S-0118
Paint Repair of Exterior Metal Surfaces	DOE Standard Spec. 17900
Management of Polychlorinated Biphenyls (PCBs)	DOE/EH-0350
Performance Objectives and Criteria for Conducting DOE Environmental Audits	DOE/EH-0358

DESCRIPTION	STANDARD
Annual report on Waste Generation and Waste Minimization Progress	DOE/EM-0276
Standard for Fire Protection of DOE Electronic Computer/Data Processing Systems	DOE/EP-0108
Waste Minimization/Pollution Prevention Crosscut Plan 1994	DOE/FM-0145
Fire Protection	DOE-STD-1066-2012
Fire Protection for Relocatable Structures	DOE-STD-1088-95
All SPR Environmental Permits as listed in the Annual Site Environmental Report (SER)	Environmental Permits
Protection and Enhancement of Environmental Quality	EO 11514
Floodplain Management	EO 11988
Protection of Wetlands	EO 11990
Federal Compliance with Pollution Control Requirements	EO 12088
Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations	EO 12898
Marine Protected Area	EO 13158
Responsibilities of Federal Agencies to Protect Migratory Birds	EO 13186
Energy Efficient Standby Power Devices	EO 13221
Preserve America	EO 13287
REVOKED Strengthening Federal Environmental, Energy, and Transportation Management	EO 13423 REVOKED
REVOKED Federal Leadership in Environmental, Energy, and Economic Performance	EO 13514 REVOKED
REVOKED Planning for Sustainability in the Next Decade	EO 13693 REVOKED
Efficient Federal Operations	EO 13834
Protocol for Equipment Leak Emission Estimates, Jun 1993	EPA 453/R-93-026
Practical Guide for Groundwater Sampling	EPA 600/2-85/105
Handbook for Analytical Quality Control in Water and Wastewater Laboratories	EPA 600/4-79-019
Methods for Chemical Analysis of Water and Wastes	EPA 600/4-79-020
Handbook for Sampling and Sample Preservation of Water and Wastewater	EPA 600/4-82-029
Addendum to Handbook for Sampling and Sample Preservation, EPA 600/4-82-029	EPA 600/4-83-039
Microbiological Methods for Monitoring the Environment, Water and Wastes	EPA 600/8-78-017
Facility Pollution Prevention Guide	EPA 600/R-92/088
Short Term Methods for Measuring Acute Toxicity of Effluents to Aquatic Organisms	EPA 821-R-02-014
Water Measurement Manual	EPA 832B81102
Storm Water Management for Industrial Activities	EPA 833-R-92-002
Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, 4/1/86	EPA Region IV
Current National Water Quality Criteria	EPA Web Site
EPA Waste Minimization Opportunity Assessment Manual	EPA, ISBN:0-86587-752-1
Specification for 8' and 12' Unlighted and Externally Lighted Wind Cone Assembly	FAA AC 150/5345-27
Heliport Design, January 4, 1988	FAA AC 150/5390-2
Obstruction Marking and Lighting, October 1985	FAA AC 70/7460-1G
For all applicable FAR and DEAR Clauses see Contract DE-FE0011020, Applicable Clauses List	FAR and DEAR Clauses

<u>DESCRIPTION</u>	<u>STANDARD</u>
Factory Mutual - Approval Guide and Loss Prevention Data Sheets	FM
Hazardous Waste Management Regulations (Mississippi)	HW-1
Oil Cos. International. Marine Forum - International Oil Tanker & Terminal Safety Guide	ICIMF
OSHA Referenced Standards	IEEE Standards
OBSOLETE: Strategic Petroleum Reserve Management and Operating and Construction Management Services Contractors- Environmental	IWA: DOE-DM-AGSC OBSOLETE
OBSOLETE: Strategic Petroleum Reserve Management and Operating And Construction Management Services Contractors- Safety and Health	IWA: DOE-DM-AGSC OBSOLETE
Pollution Prevention Assessment Manual for Texas Businesses	LP 92-03
Surface Water and Ground Water Use and Protection (Mississippi)	LW-2
Regarding Implementation of the Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds"	MOU USFWS with DOE
MOU with ATFE for Louisiana Sites during Emergencies	MOU with ATFE in LA
MOU with ATFE for the Texas Sites during Emergencies	MOU with ATFE TX
MOU with the BCSO for BM during Emergencies	MOU with BCSO
MOU with Cameron Parish Sheriff's Office for WH during Emergencies	MOU with CamPSO
MOU with Calcasieu Parish Sheriff's Office for WH during Emergencies	MOU with CPSO
MOU with Entergy	MOU with Entergy
MOU with the FBI for Louisiana Sites during Emergencies	MOU with FBI in LA
MOU with the FBI for the Texas Sites during Emergencies	MOU with FBI TX
MOU with Ft. Polk for Louisiana Sites during Emergencies	MOU with Ft. Polk
MOU with JCSO for BH during Emergencies	MOU with JCSO
MOU with LA Homeland Security for Louisiana Sites during Emergencies	MOU with LA Homeland Security
MOU with LA State Police for Louisiana Sites during Emergencies	MOU with LA State Police
MOU with US Army 797th Explosive Ordinance Co. for the Texas Sites during Emergencies	MOU with US Army 797 EOC
SPR Gas and Geothermal Heat Effects on Crude Oil Vapor Pressure, Dec. 1994	MP 94W0000131
NASA/Stennis Animal Control Procedures	
Laboratory Programs & Procedures	MSL 7000.133
National Standards. The latest edition of the nationally recognized standards herein, in effect at the time of design contract award, shall be used during design and construction.	National Standards
SPR Qualified Products List	No number
SPRPMO Level III Design Criteria	No number
Earth Manual, 3rd Ed., U.S. Department of the Interior, Bureau of Reclamation	No number
Louisiana's Suggested Chemical Weed Control Guide current edition (LA Cooperative Extension Services)	No number
The Sterling Brine Handbook (Int'l Salt Co.)	No number
Technical Guidance Package for Chemical Sources, Storage Tanks, TCEQ, Feb 2001	No number
OBSOLETE: Membership in Louisiana Environmental Leadership Program (LaELP) http://www.deq.state.la.us/assistance/elp	No number
OBSOLETE - July 2014 Environmental, Safety, and Health Management Plan (FY 1998 - FY 2002)	No number - OBSOLETE

DESCRIPTION	STANDARD
OBSOLETE: DM/AGT cooling water discharge agreement	No Number OBSOLETE
OBSOLETE- Membership in Clean Texas Program http://www.cleantexas.org/index.cfm	No number OBSOLETE
Organizational and Management Assessments	NOI 1000.72
Pipkin Ranch Road use restrictions in emergencies	Pipkin Ranch Road
Louisiana Department of Environmental Quality Risk Evaluation/Corrective Action Program	RECAP (2003)
Pollution Prevention Assessment Manual	RG-133
SPR Standard Specifications. All SPR standard specifications listed as SPR Design Criteria Level III with Green Aspects	Standard Specifications
DOE Policy on Signatures of RCRA Permit Applications	SEN-22-90
Nonhazardous Solid Waste Management Regulations and Criteria (Mississippi)	SW-2
Nonmanufacturing Facilities Community Right-To-Know Act	TCEQ 507.001
Special Licenses and Permits	TPWC Chapter 43
Birds; Protection of Nongame Birds; Destroying Nests or Eggs	TPWC Chapter 64
Alligators	TPWC Chapter 65
Disposition of Protected Wildlife	TPWC Section 43.024
Alligators in Texas: Rules, regulations, and general information, most current information	TPWD
Texas Regulations for Control of Radiation - General provisions	TRCR part 11
Texas Regulations for Control of Radiation - Fees	TRCR part 12
Texas Regulations for Control of Radiation - Hearing and Enforcement Procedures	TRCR part 13
Standards for Protection Against Radiation - Permissible Doses, Precautionary Procedures, Waste Disposal	TRCR part 21
Notices, Instructions and Reports to Workers; Inspections	TRCR part 22
Radiation Safety Requirements and Licensing and Registration Procedures for Industrial Radiography	TRCR part 31
Licensing of Radioactive Material -Exemptions, Licenses, General Licenses, Specific Licenses, Reciprocity, Transport	TRCR part 41
State Fire Marshall (Explosives)	TX Statute Chapter 417 State Fire Marshall
Fire Protection Engineering for Facilities	UFC 3-600-01
International Conference of Building Officials - Uniform Building Code and Uniform Fire Code	UFC/UBC
Underwriter's Laboratory - Building Materials, Fire Resistance, Fire Prot. Equip., & Haz. Location Equip. Directories	UL
West Hackberry Emergency Response Procedures	WHI 5500.9
West Hackberry Spill Prevention, Control, and Countermeasures Plan	WHL 5400.20

Appendix A2 – SPR Project Management Office ES&H Directives

<u>DIRECTIVE</u>	<u>DESCRIPTION</u>
DOE O 151.1D Change 1	Comprehensive Emergency Management System
DOE O 225.1B	Accident Investigations
DOE O 231.1B Admin Chg. 1	Environment, Safety and Health Reporting
DOE O 420.1C Change 3	Facility Safety
DOE O 422.1 Admin Chg. 4	Conduct of Operations
DOE O 430.1B, 1C Change 2	Real Property Asset Management
DOE O 436.1A	Departmental Sustainability
DOE O 440.2C, Change 3 (LtdChg)	Aviation Management Safety
DOE O 450.2 Chg. 1 (MinChg)	Integrated Safety Management
DOE O 460.1D Chg 1 (LtdChg)	Hazardous Materials Packaging and Transportation Safety
DOE O 460.2B	Departmental Materials Transportation and Management
DOE P 450.4A Chg 1 (MinChg)	Integrated Safety Management Policy
SPRPMO O 232.1A	Occurrence Reporting and Processing System
SPRPMO O 420.1E	Conduct of Operations Requirements for SPR Facilities
SPRPMO O 436.1B	Site Sustainability
SPRPMO O 440.2	Aviation Implementation Plan
SPRPMO O 451.1D	National Environmental Policy Act Implementation Plan
SPRPMO P 451.1H	SPR Environmental Policy
SPRPMO N 450.15	Strategic Petroleum Reserve Environmental, Security, Safety & Health, and Emergency Preparedness Goals FY 2023
SPRPMO N 450.4A	Implementation of Environmental, Safety and Health and Fire Protection Contractor Requirements Documents

Appendix B

Strategic Petroleum Reserve Environmental Policy

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

POLICY

SPRPMO P 451.1H

APPROVED: 7/25/2023

SUBJECT: SPR ENVIRONMENTAL POLICY STATEMENT

1. **PURPOSE AND SCOPE.** This Environmental Policy applies to the facilities and pipelines that comprise the Strategic Petroleum Reserve (SPR). The mission of SPR is to store crude oil and maintain drawdown readiness. To achieve its mission, the Department of Energy (DOE) and SPR contractors will design, develop, construct, operate, and maintain SPR facilities and operations in a manner that shall be sustainable, resource-efficient, and will protect the quality of the environment consistent with all applicable environmental laws, regulations, and standards. Environmental protection will be integrated at all management levels and into all phases of activity.

This Environmental Policy is established, implemented, and maintained by SPR top management through an Environmental Management System (EMS) under the Integrated Safety Management (ISM) umbrella.

2. **CANCELLATION.** This Policy cancels SPRPMO P 451.1G, SPR Environmental Policy Statement, dated 03/25/20.
3. **POLICY STATEMENT.** *The SPR operates only in an environmentally responsible and sustainable manner.*

Environmentally responsible and sustainable manner means top management pledges that all functional areas will abide by the following:

- a. Comply with applicable Federal, State, and local environmental compliance obligations and regulatory requirements which relate to the environmental aspects of SPR activities;
- b. Prevent pollution by undertaking 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 SPR Project Management Office will take action to reduce their volume and toxicity and ensure proper disposal;

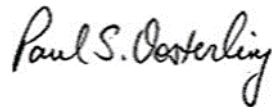
DISTRIBUTION: All SPR Employees

INITIATED BY: APM, Technical Assurance,
Environmental, Safety and Health Division

- c. Minimize or eliminate emissions of greenhouse gases and other pollutants, reduce energy and water use; increase adaptation and resilience to the impacts of climate change, address anticipated harm from emerging contaminants of concern; and
- d. Improve environmental performance, continually, via the EMS and by establishing and maintaining documented environmental objectives and targets.

This SPR Environmental Policy provides the framework for setting and reviewing environmental objectives and targets that assure excellence in environmental management. Management communicates the Policy to all persons working for, or on behalf of, the SPR. It is available on request at all SPR facilities and on-line at www.spr.doe.gov and www.fluorfpo.com.

The SPR Environmental, Safety, and Health Division of Technical Assurance is responsible for prompting DOE and Fluor Federal Petroleum Operations top management to periodically review and update this Policy.



Paul S. Oosterling
Project Manager
Strategic Petroleum Reserve

Appendix C

GROUND WATER SURVEILLANCE MONITORING

DURING 2023

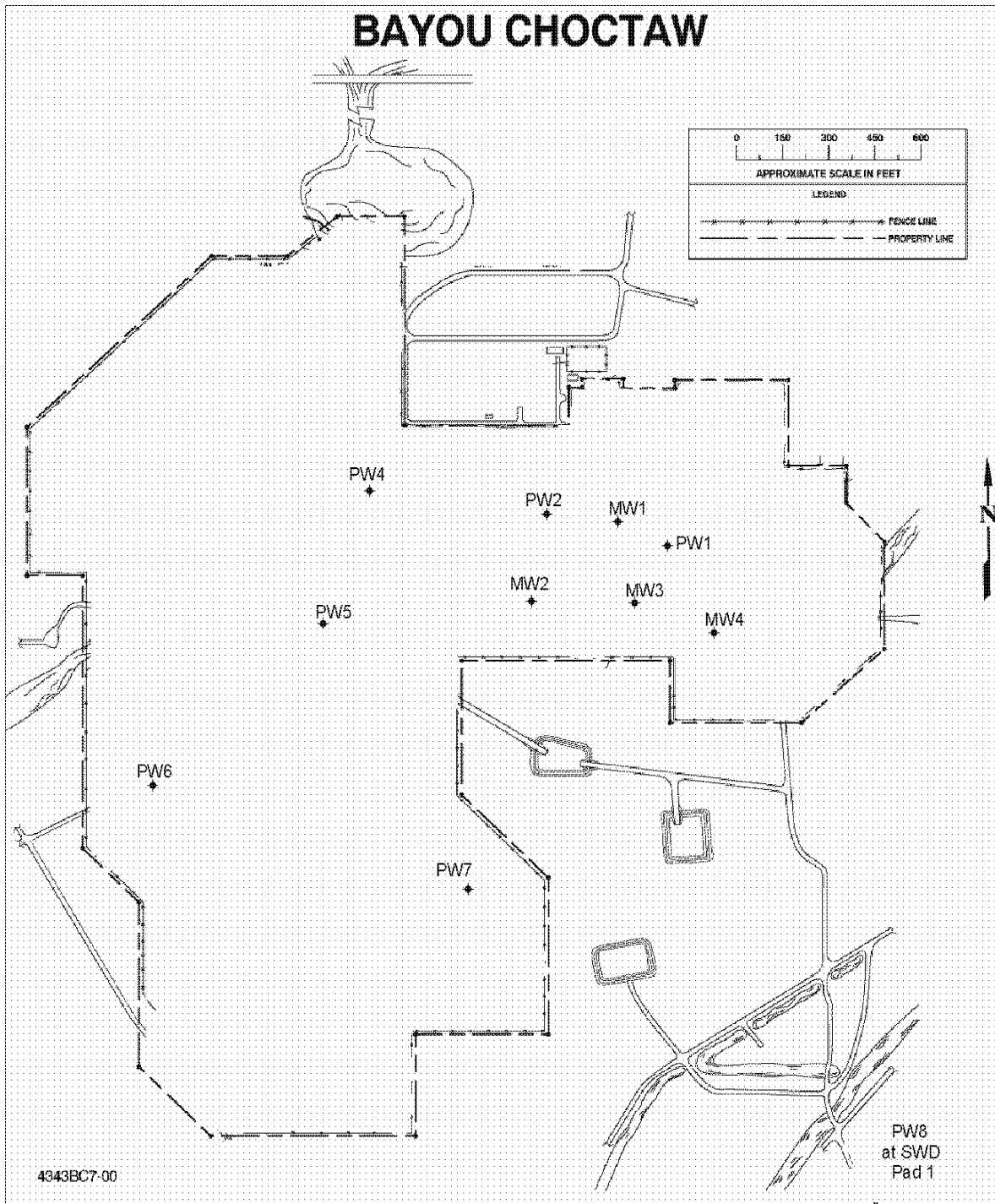


Figure C-1. Bayou Choctaw Ground Water Monitoring Stations

Bayou Choctaw 2023 Contour

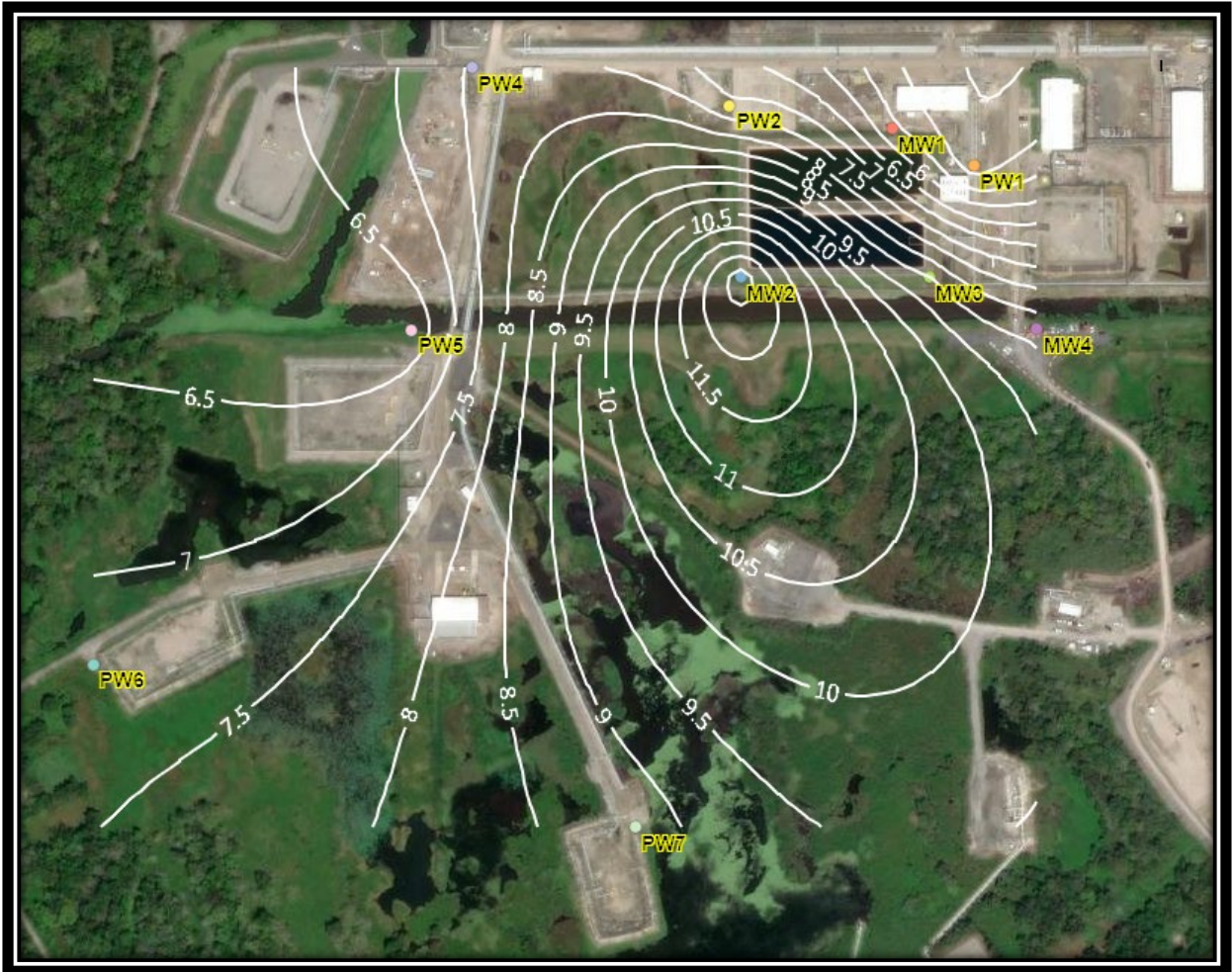
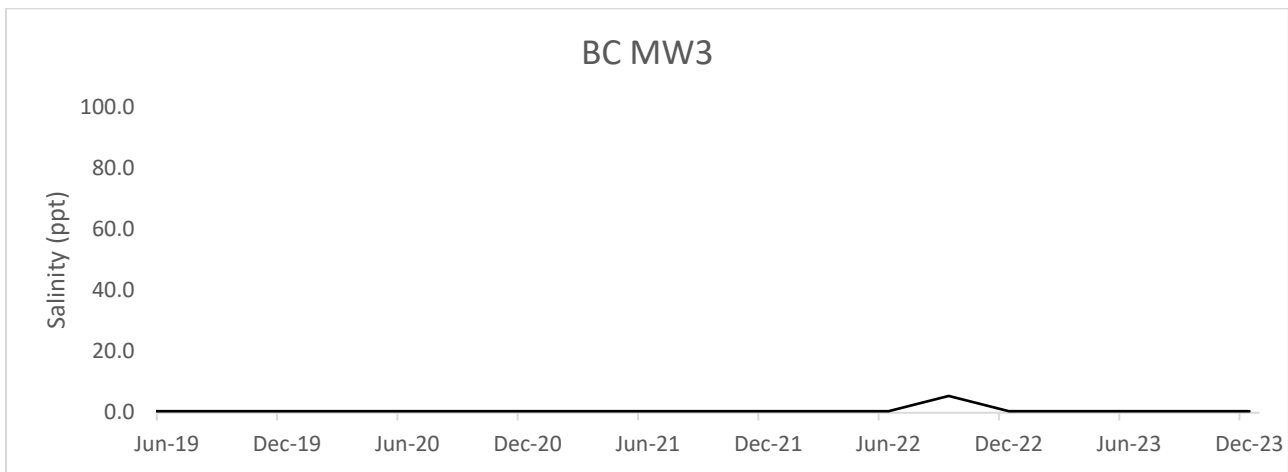
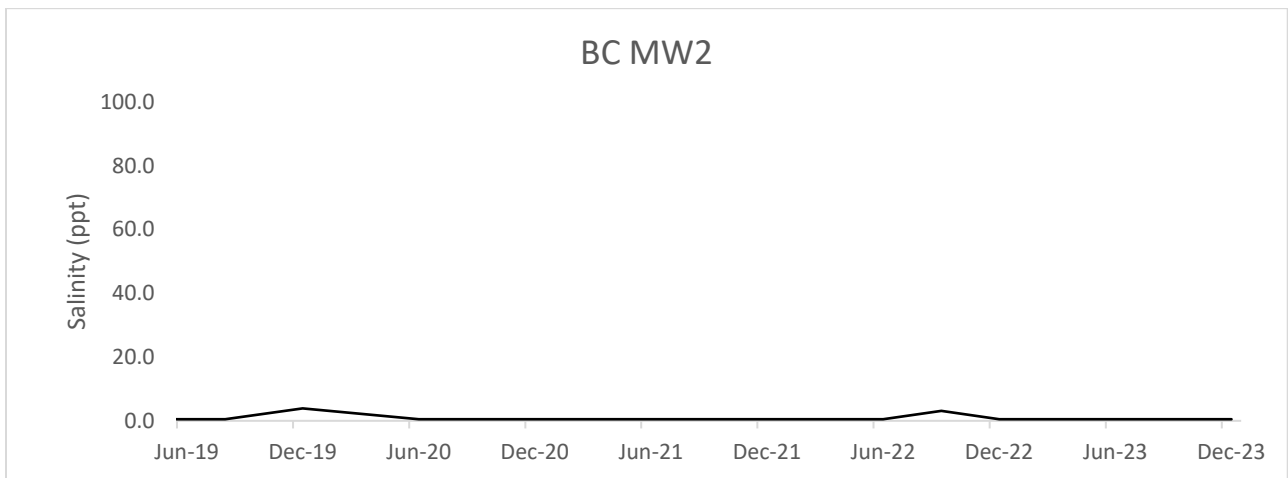
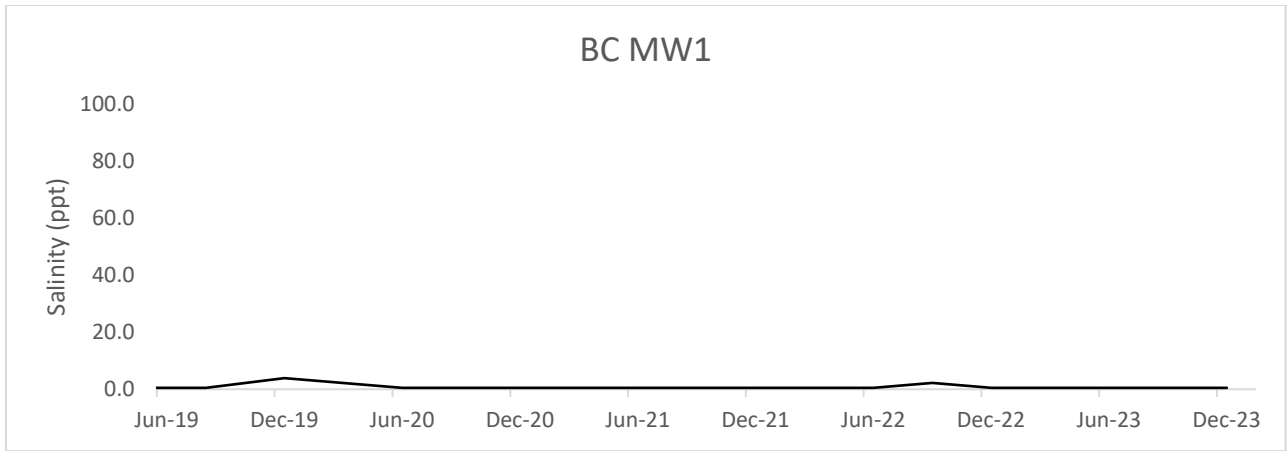
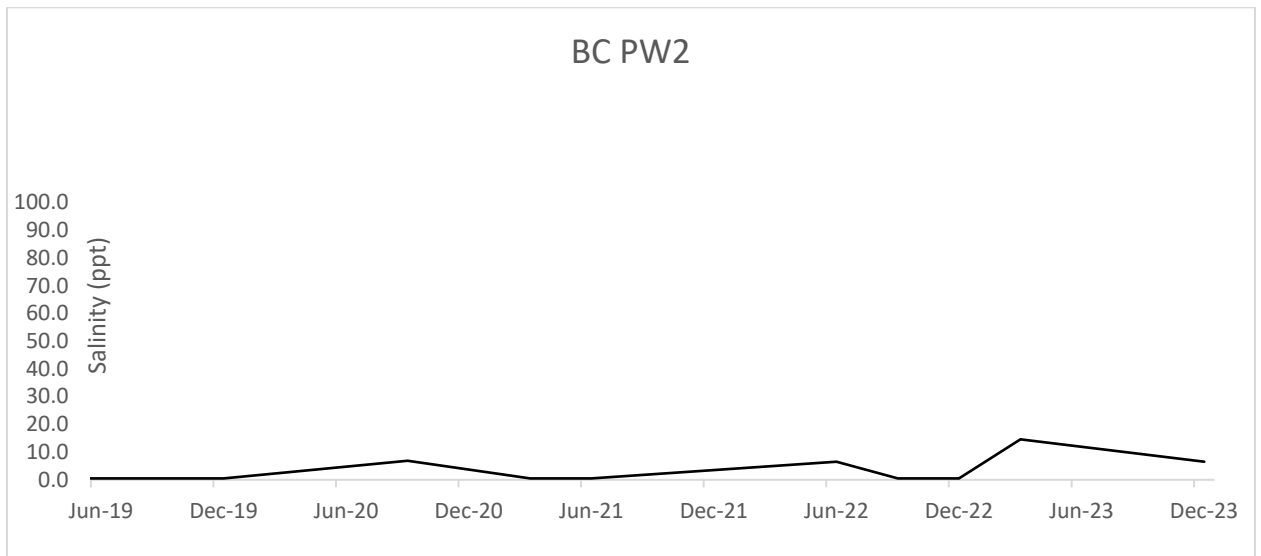
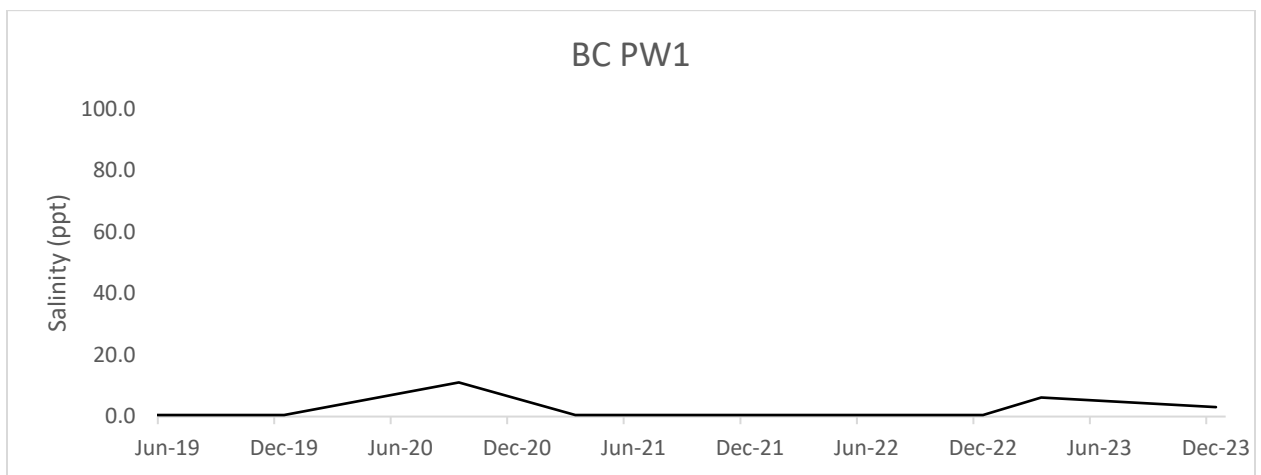
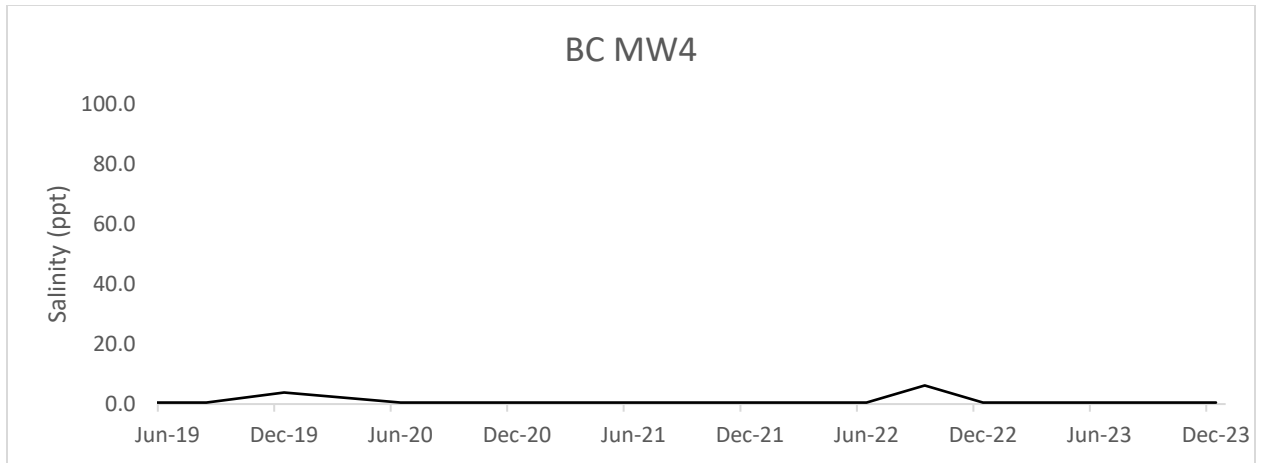
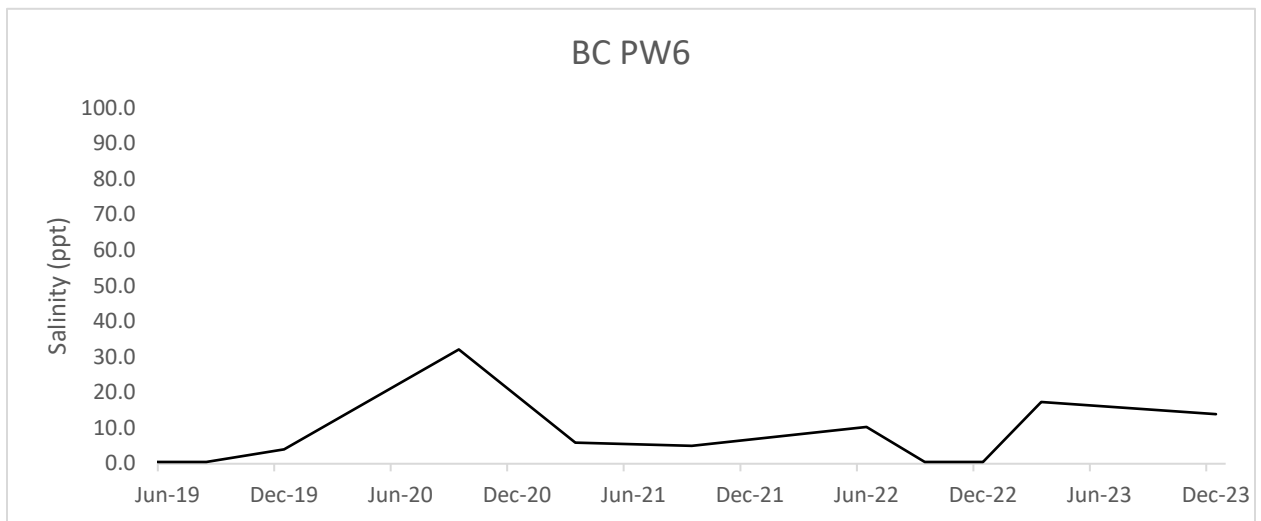
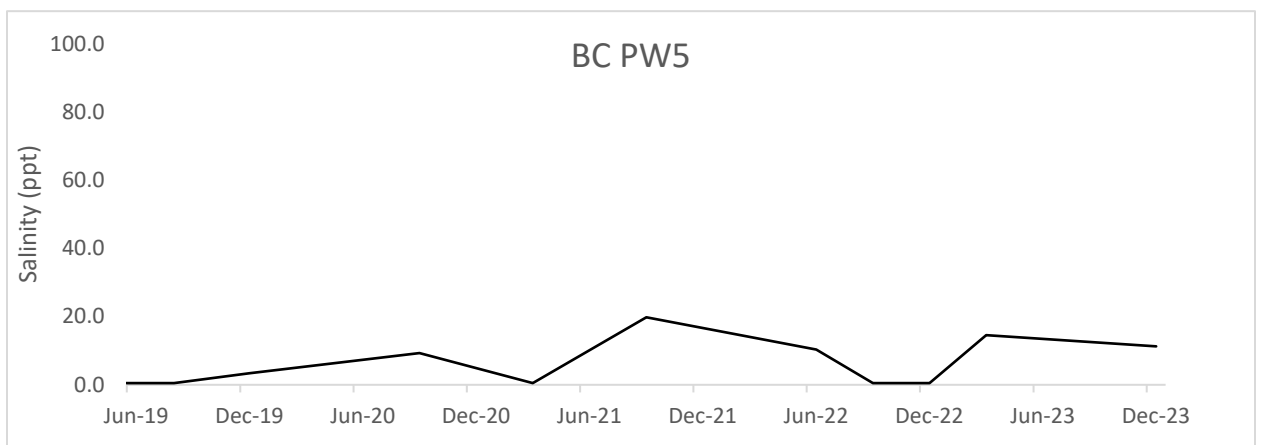
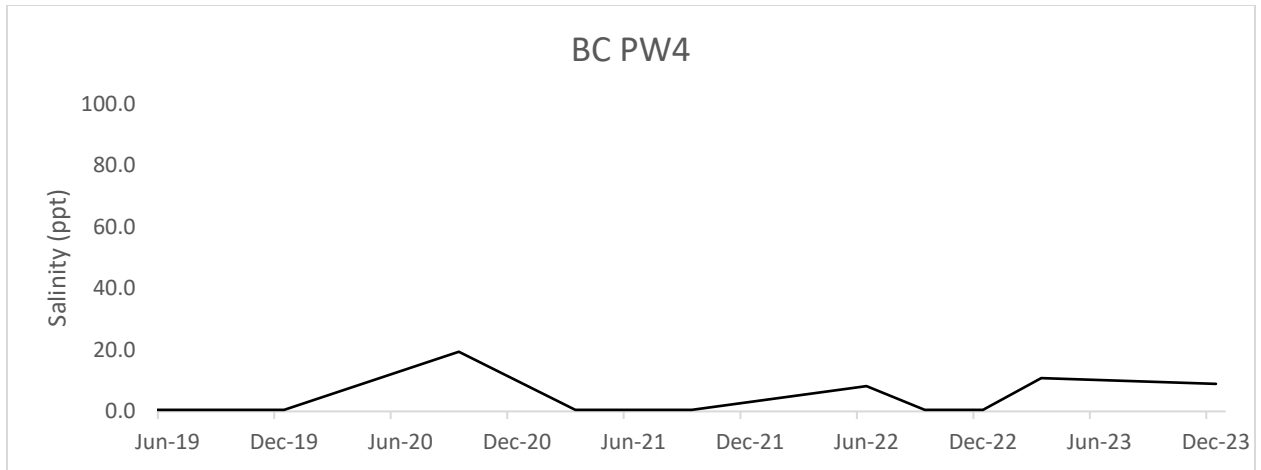


Figure C-2. Bayou Choctaw Ground Water Contoured Elevations March 2023







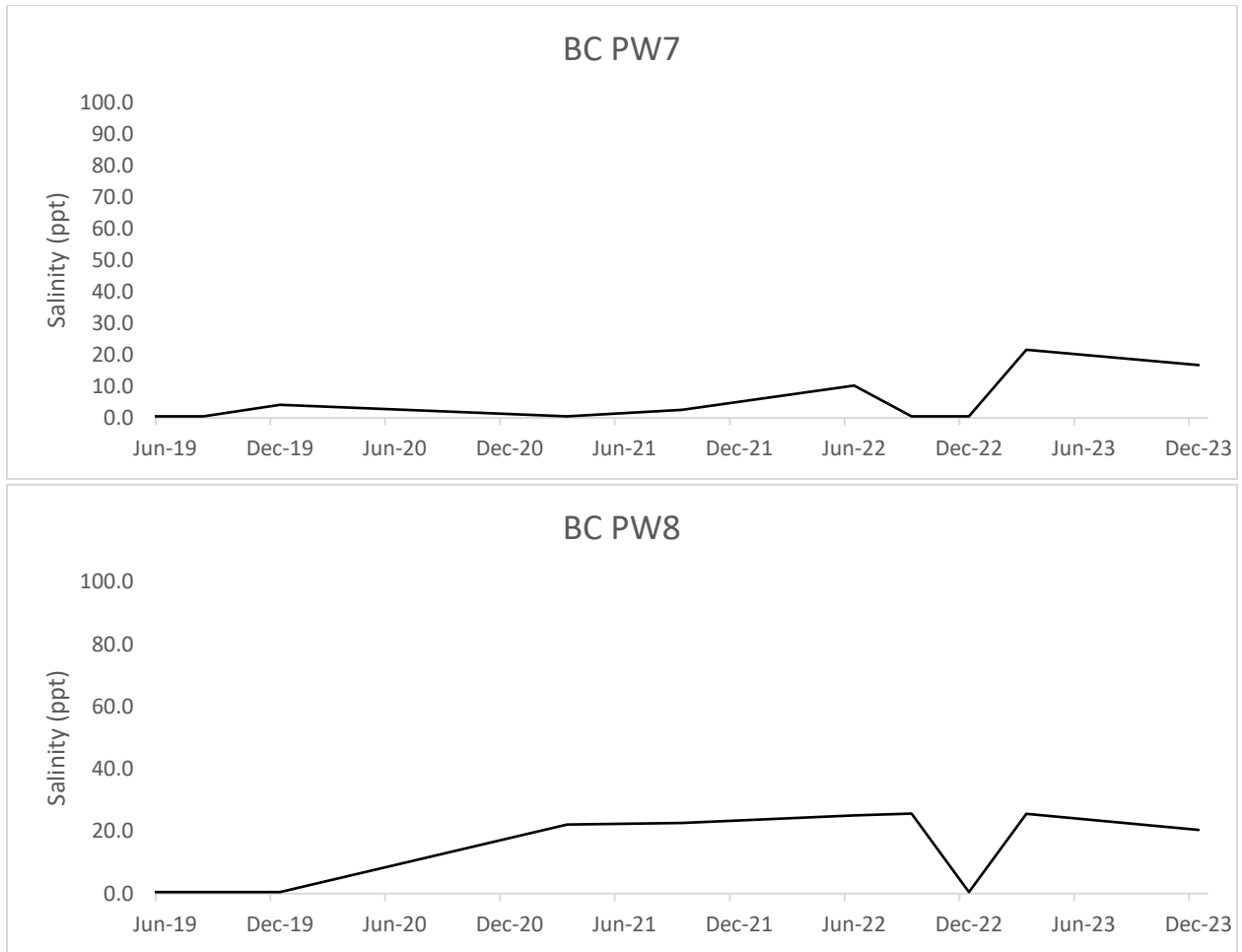


Figure C-3 Bayou Choctaw Well Salinity

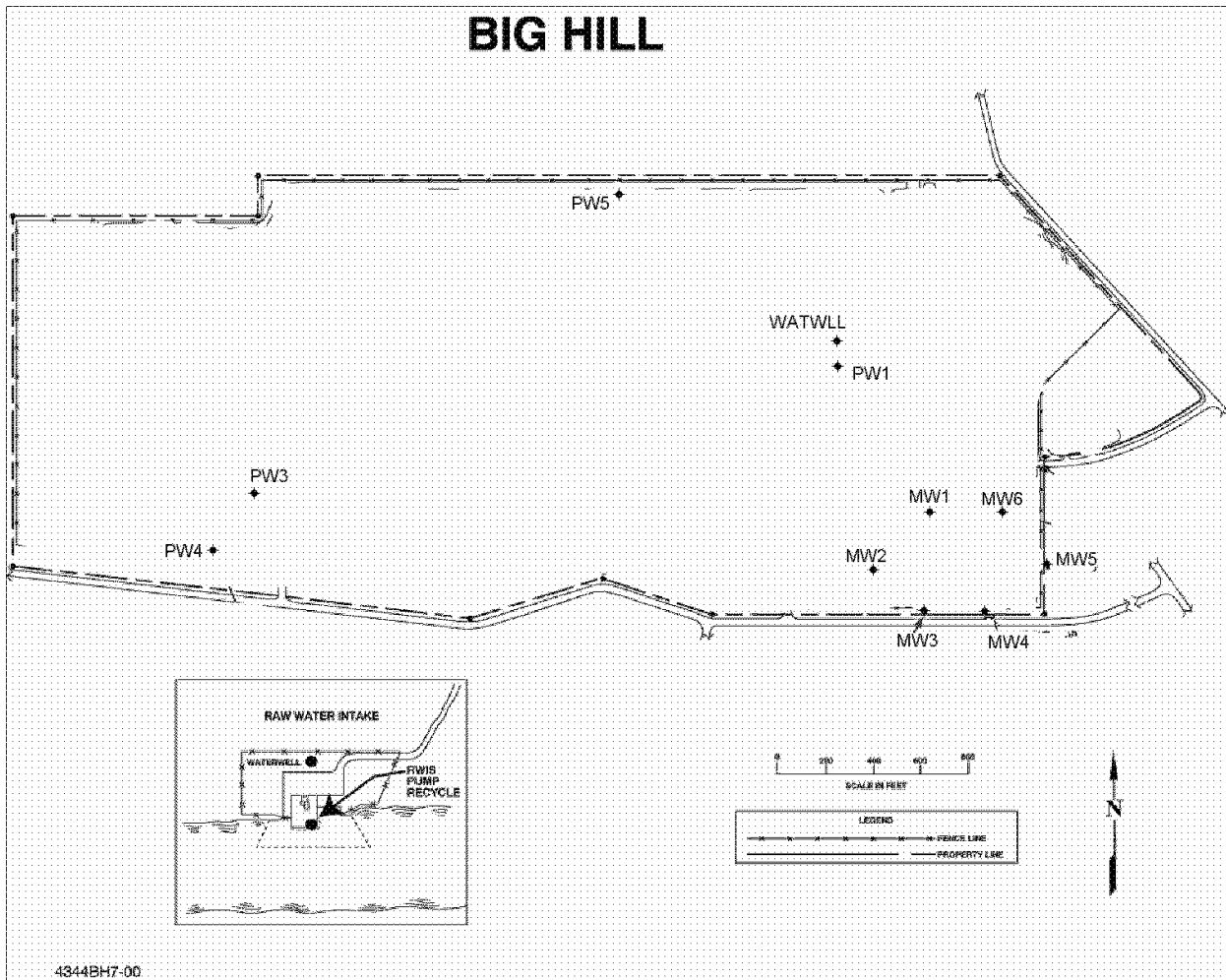
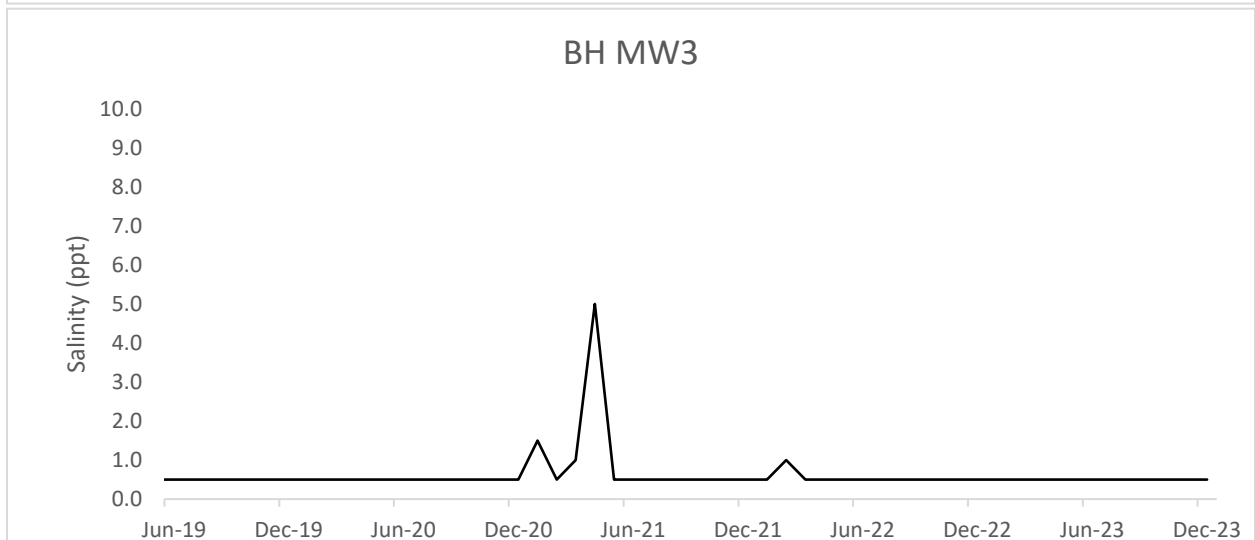
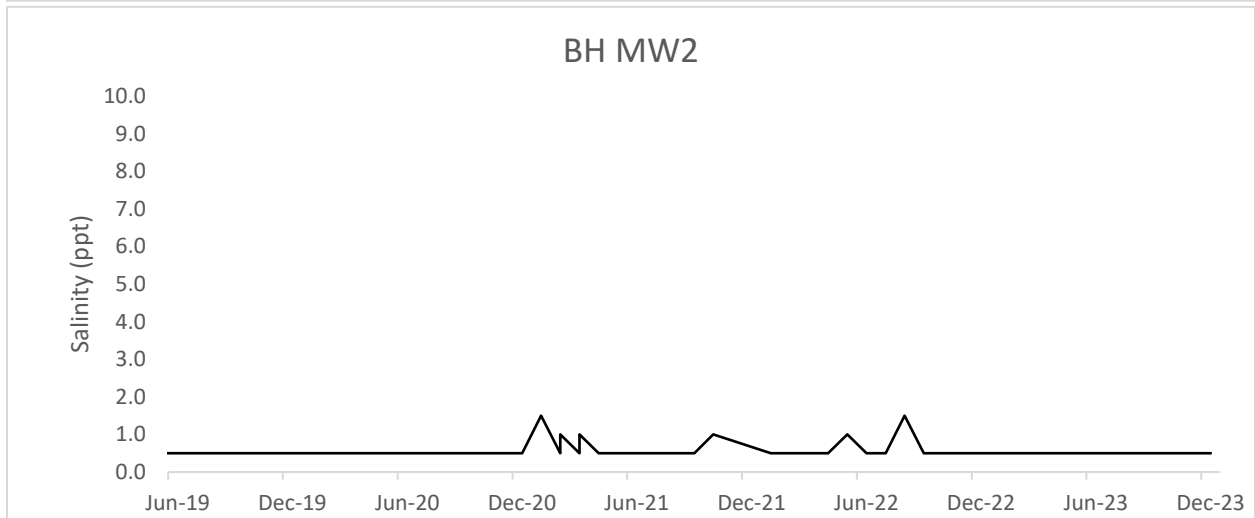
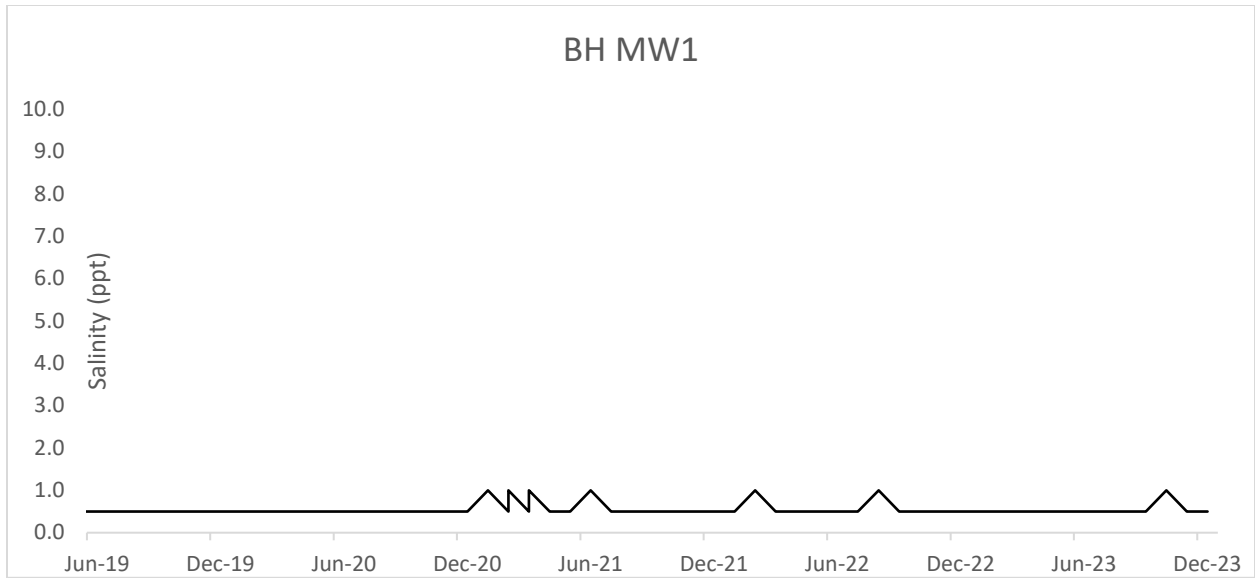


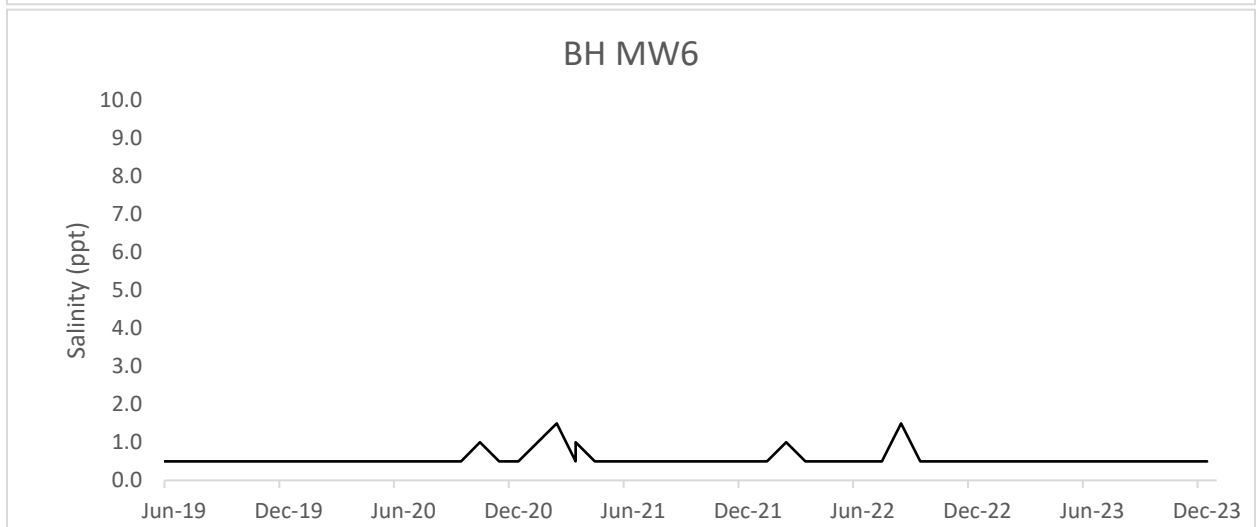
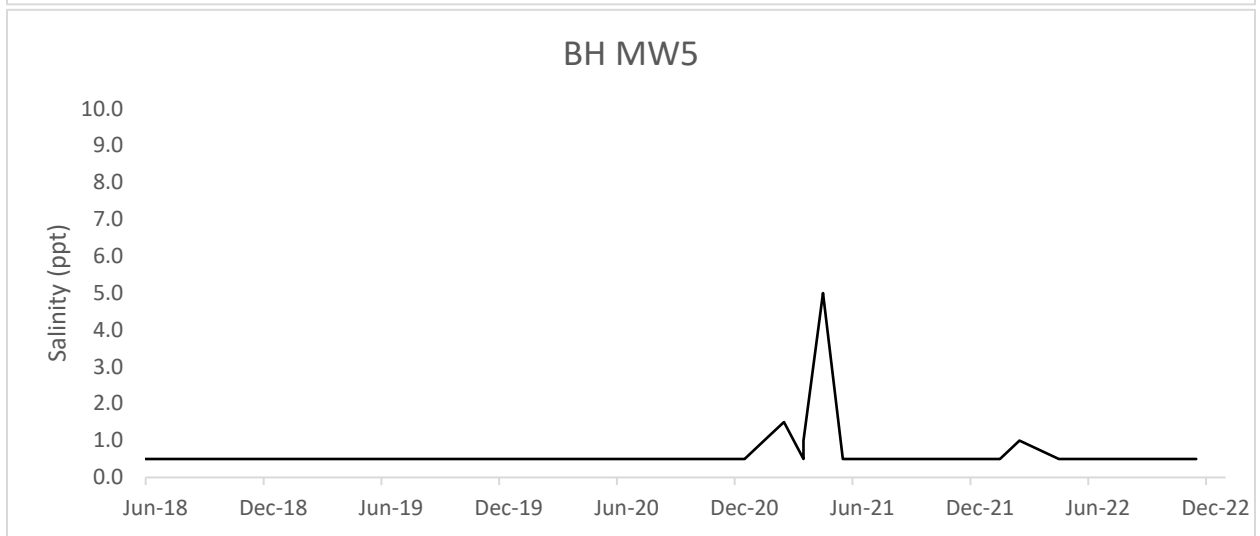
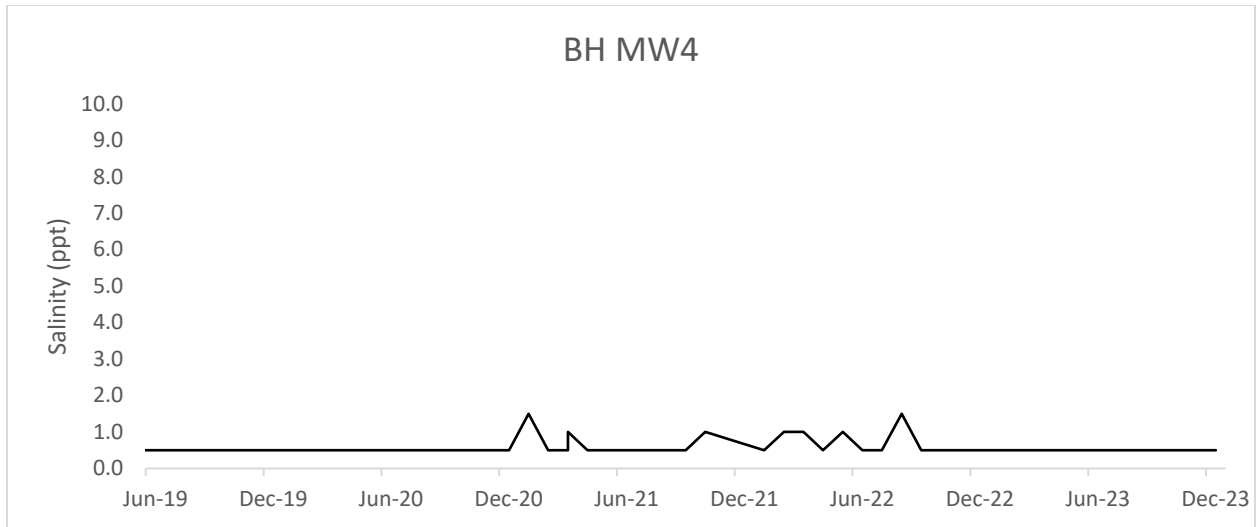
Figure C-4. Big Hill Ground Water Monitoring Stations

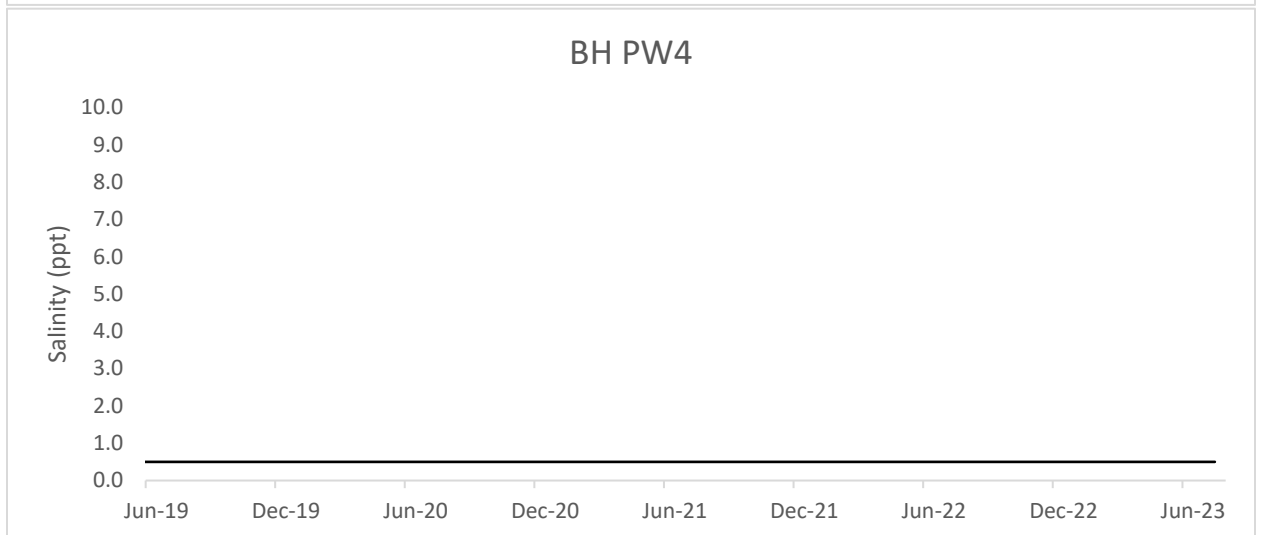
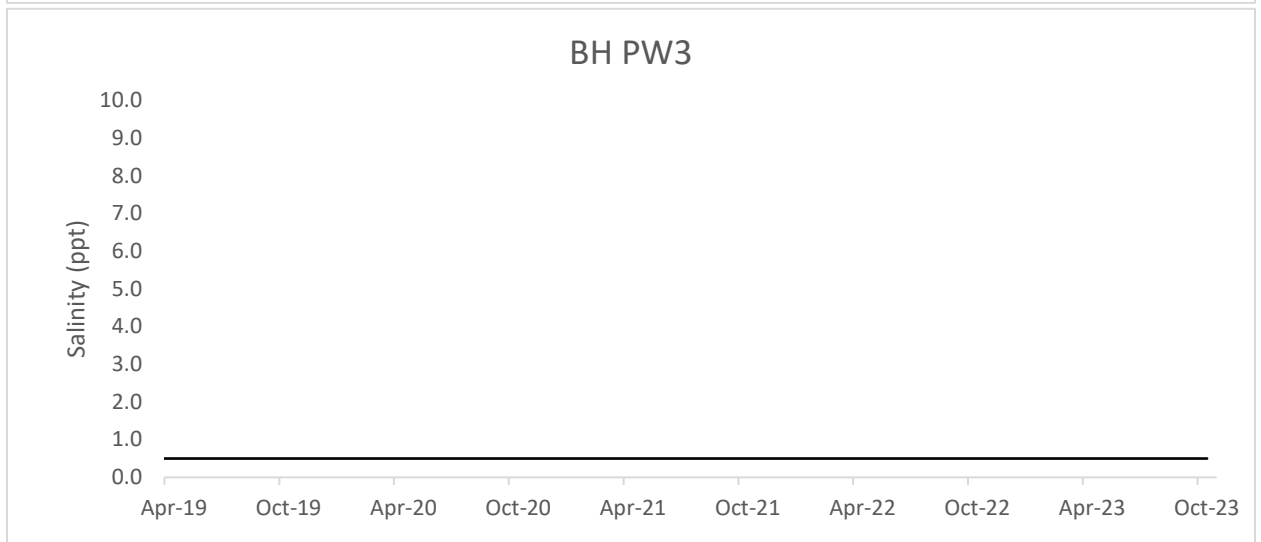
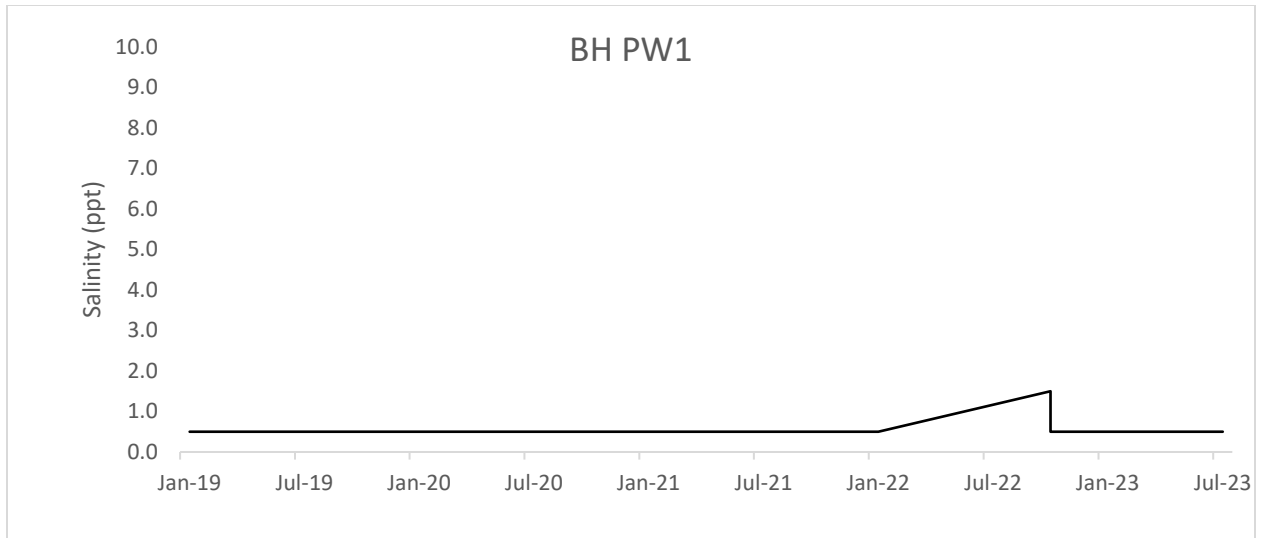
Big Hill 2023 Contour



Figure C-5. Big Hill Ground Water Contoured Elevations June 2023







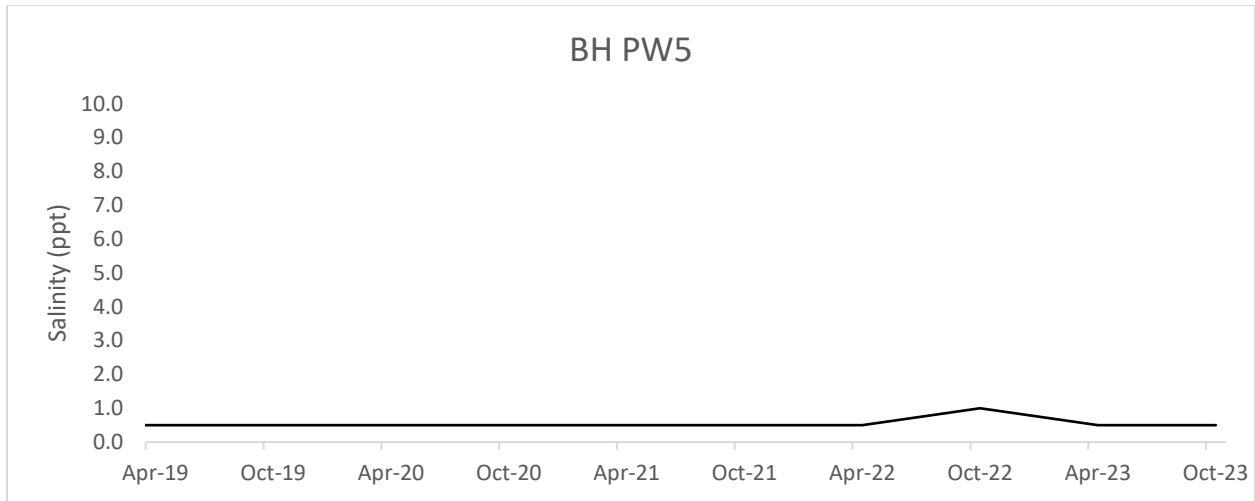


Figure C-6 Big Hill Salinity

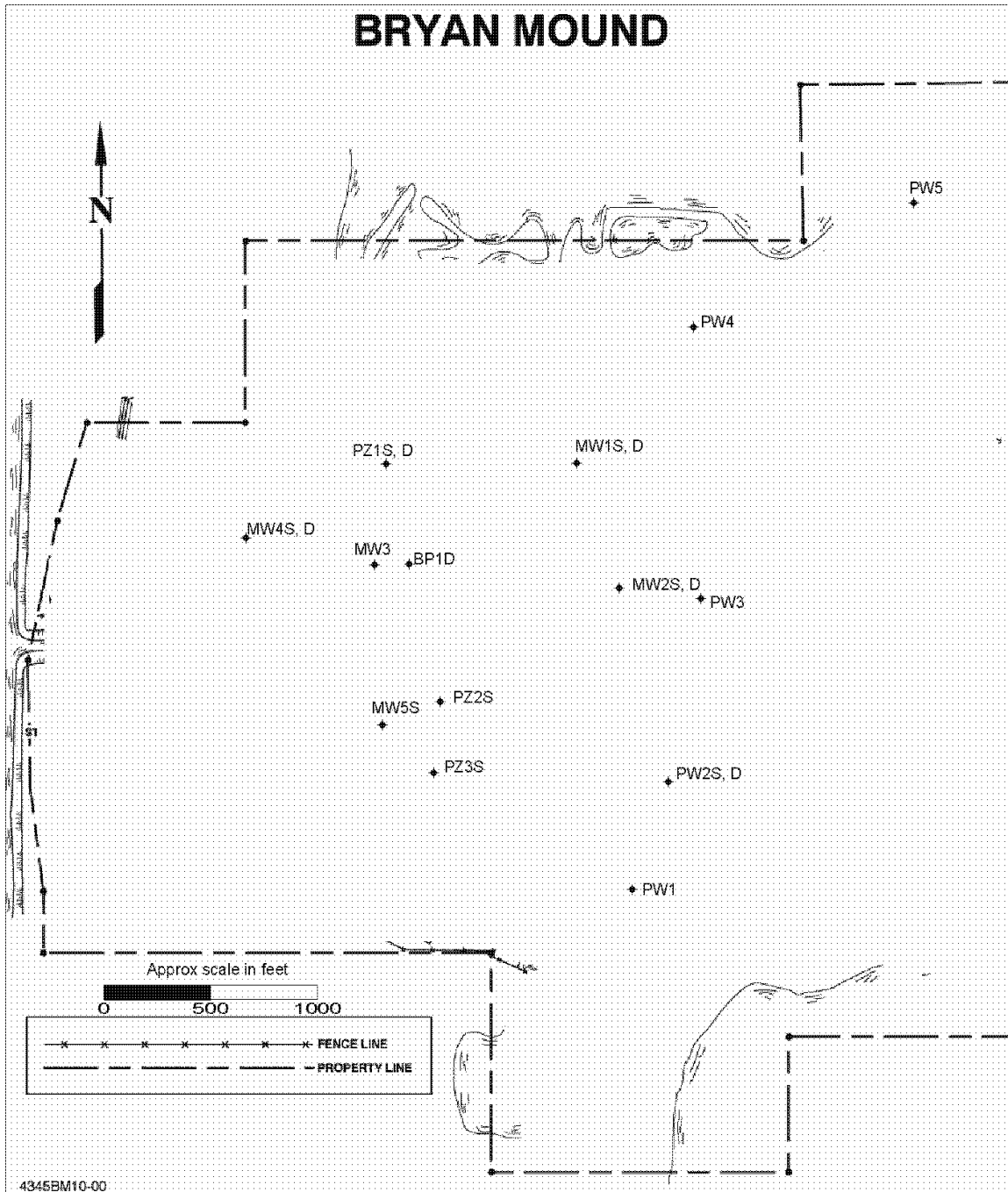


Figure C-7. Bryan Mound Ground Water Monitoring Stations, Deep and Shallow

Bryan Mound 2023 Contour-Shallow

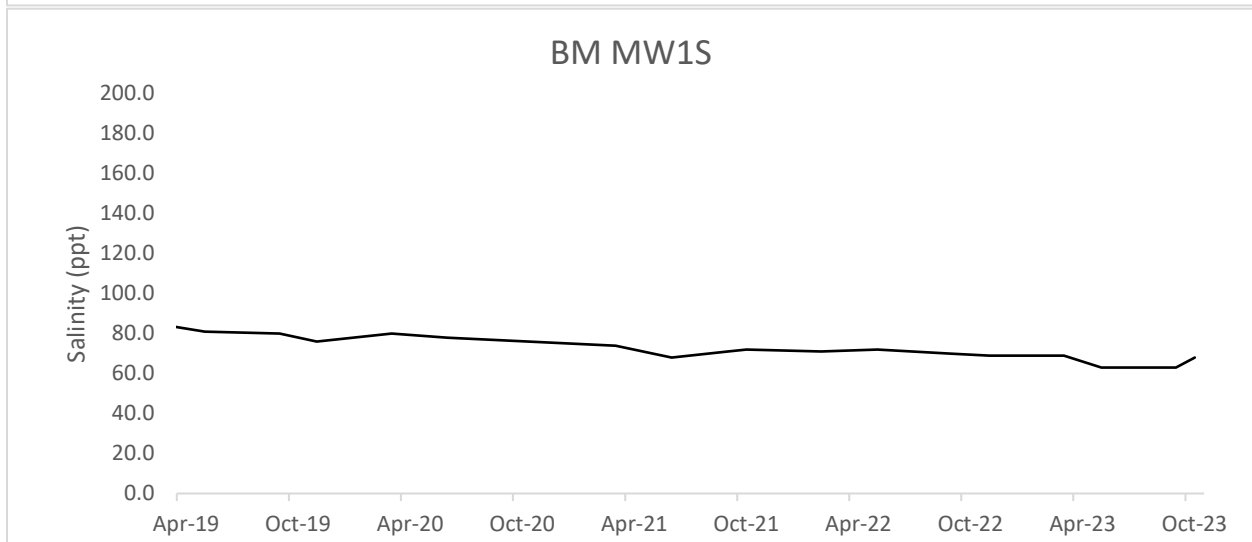
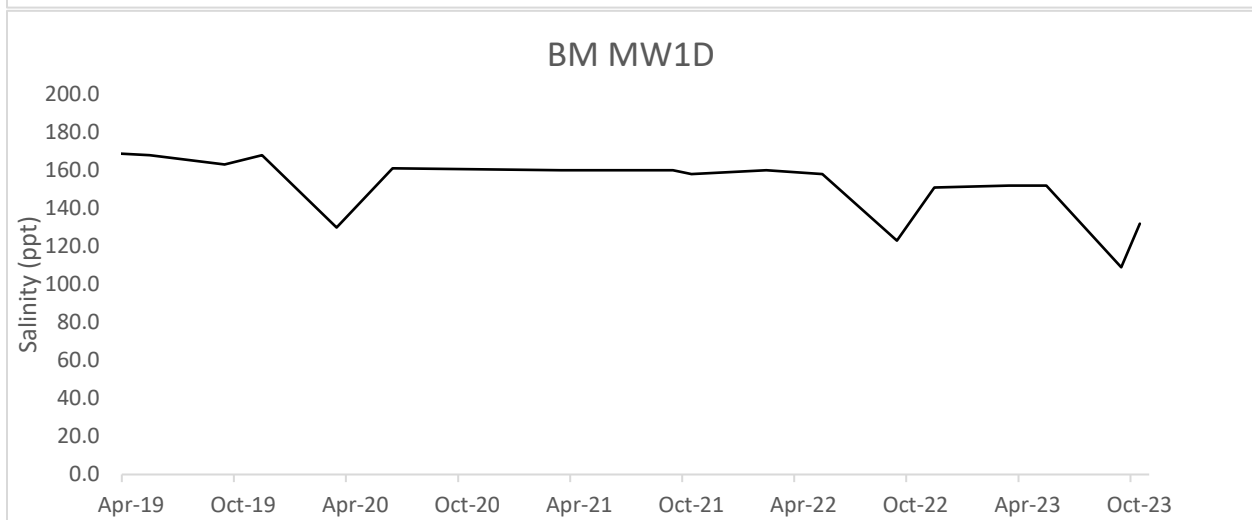
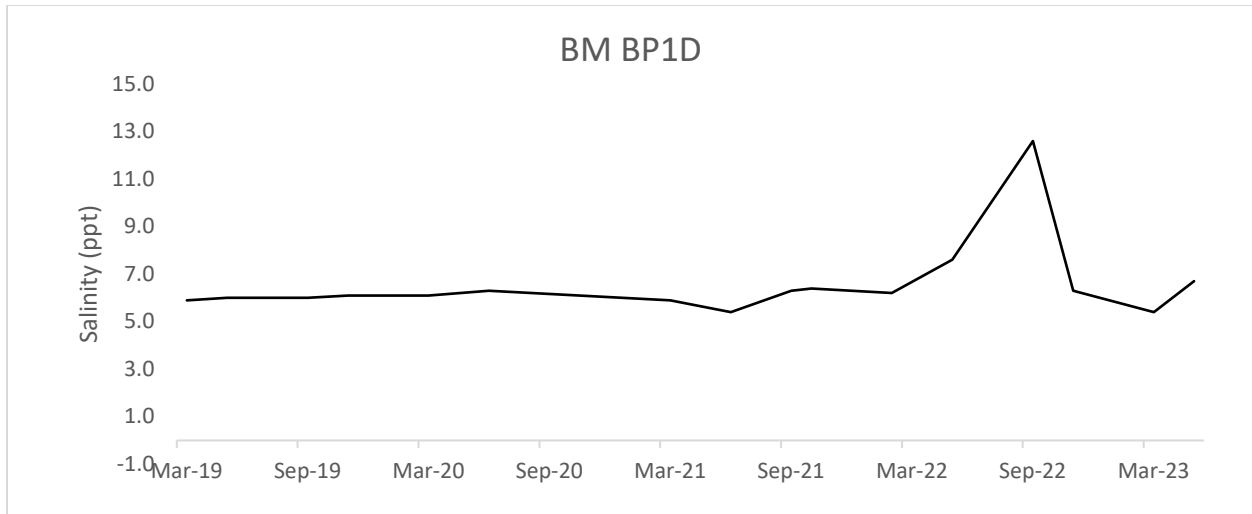


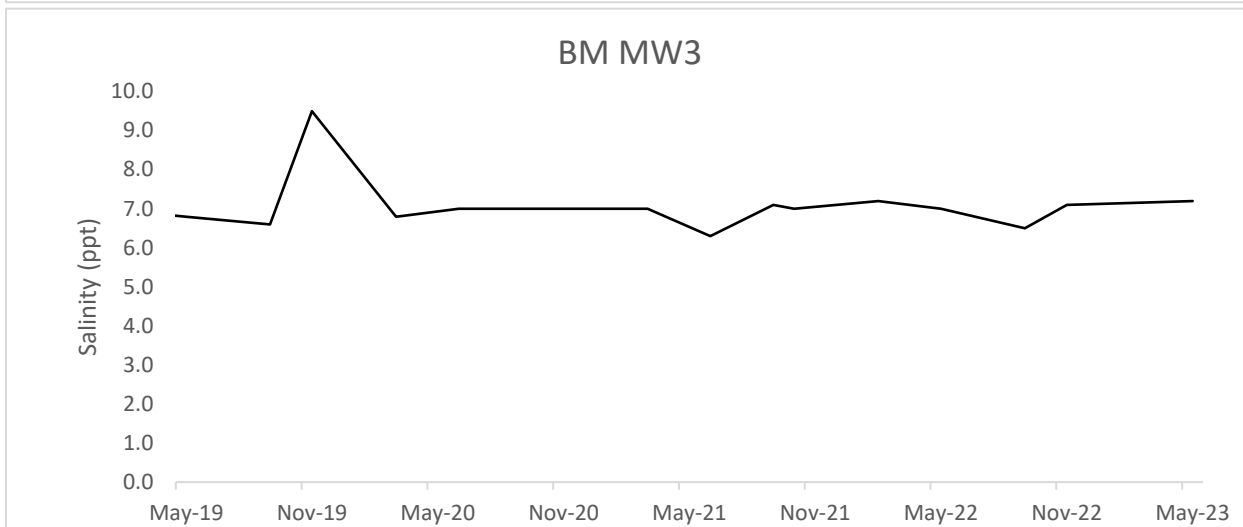
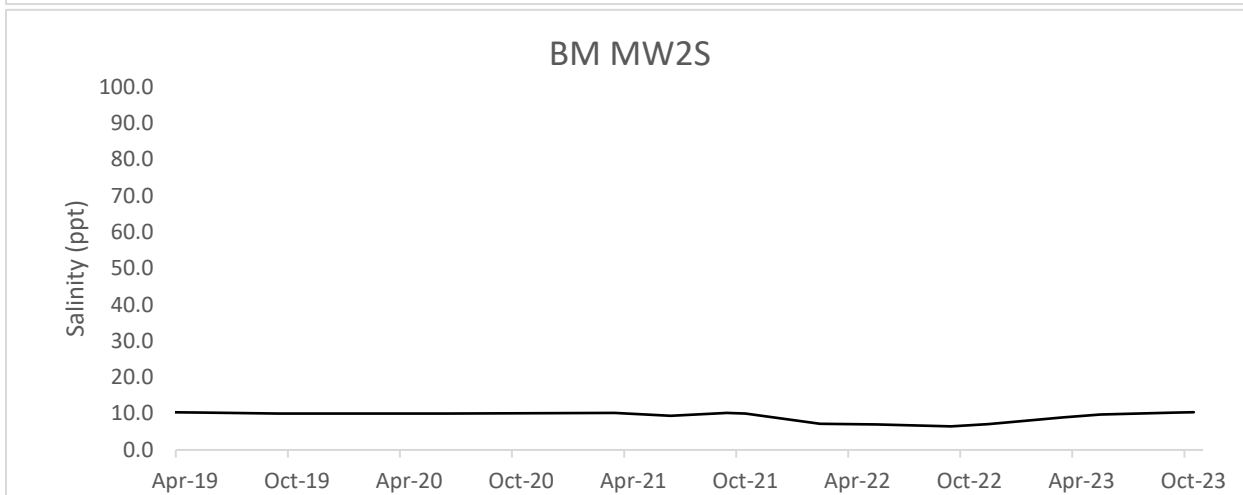
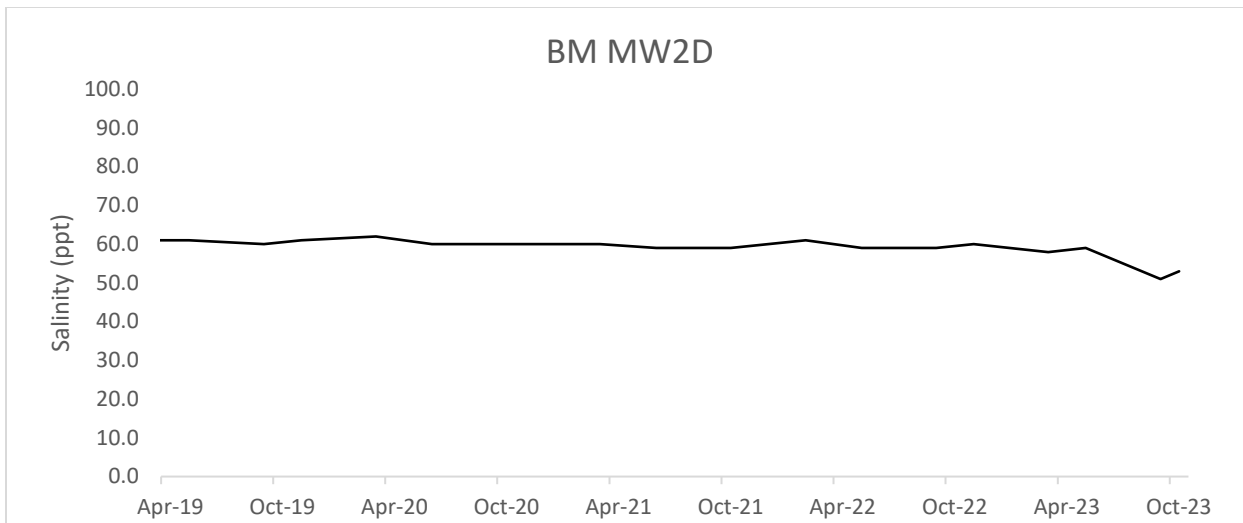
Figure C-8. Bryan Mound Shallow Ground Water Zone Contoured Elevations May 2023

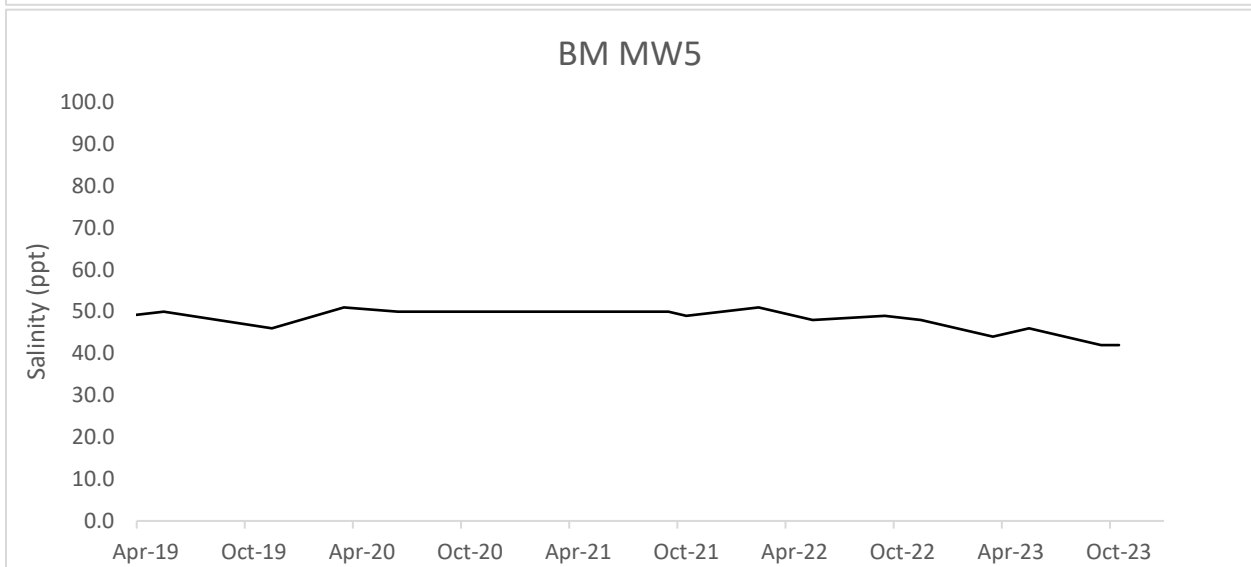
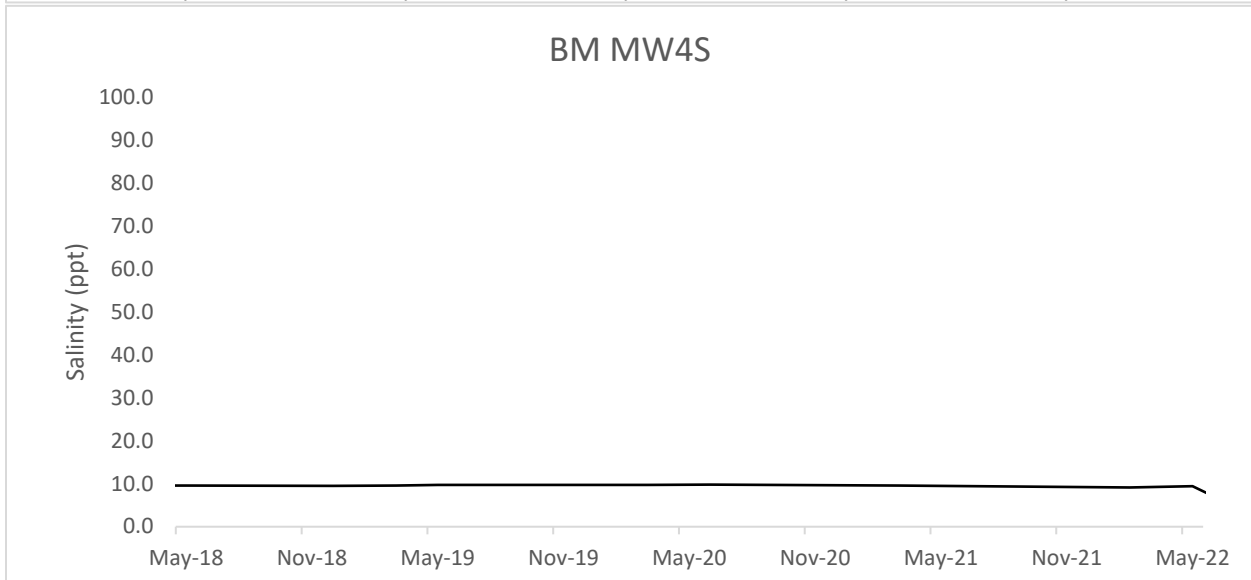
Bryan Mount 2023 Contour-Deep

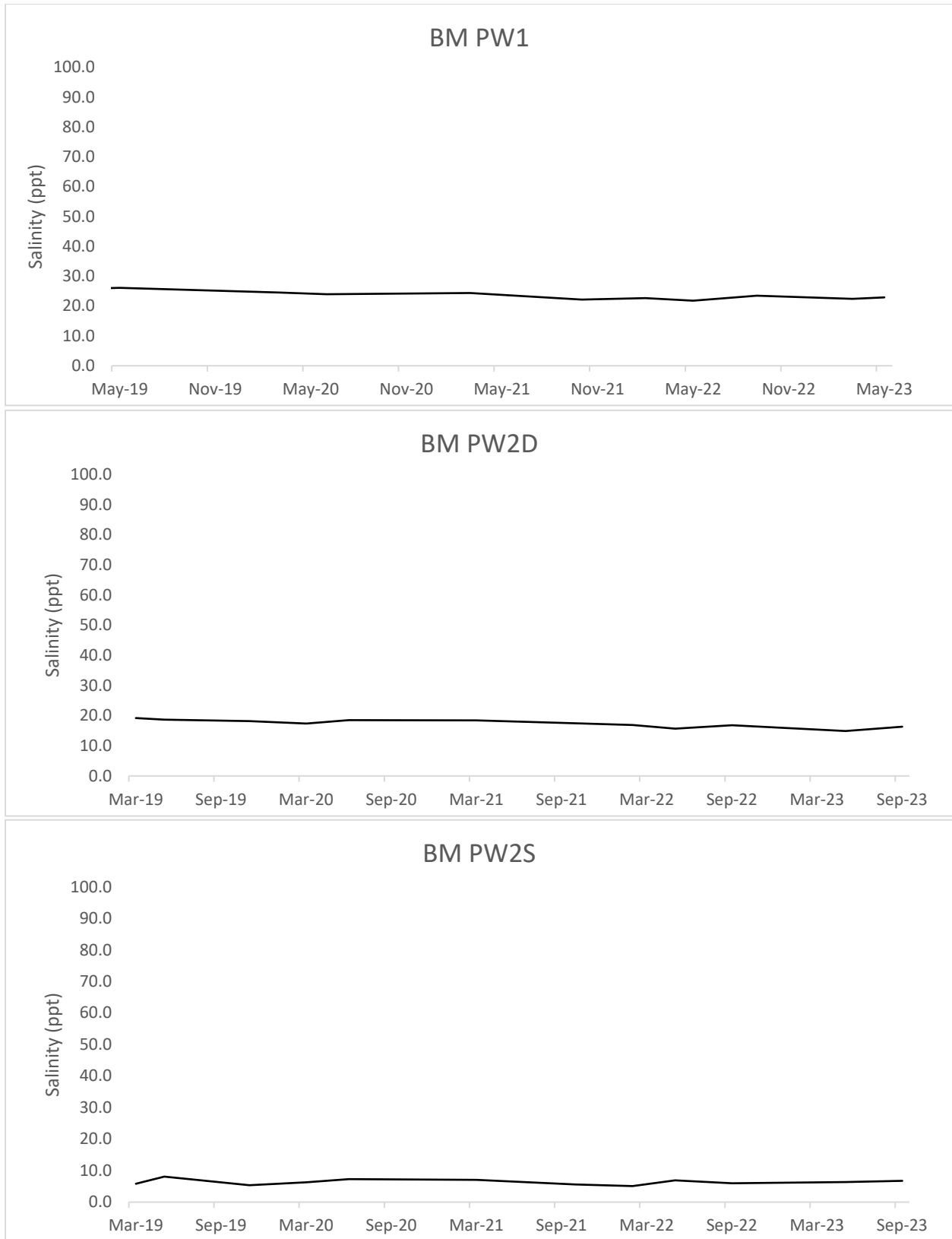


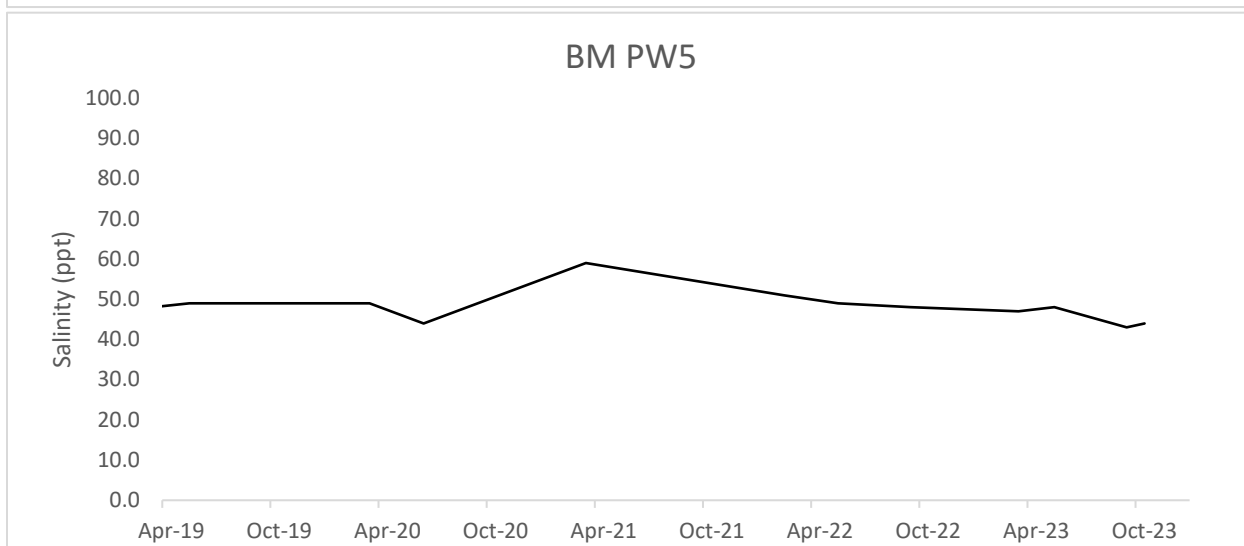
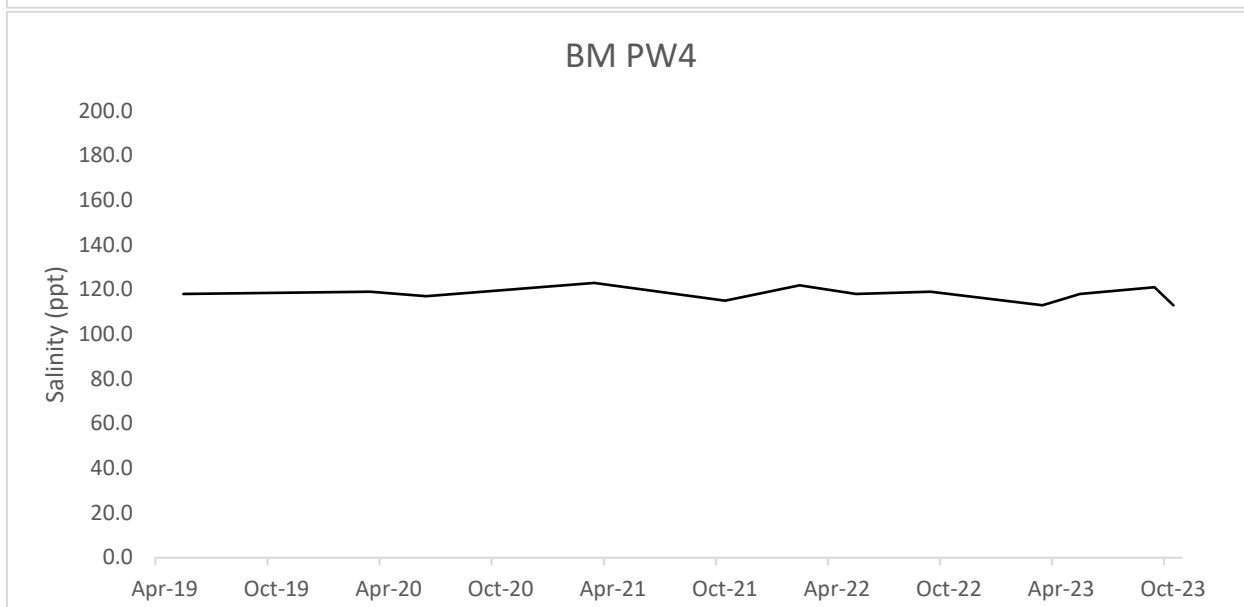
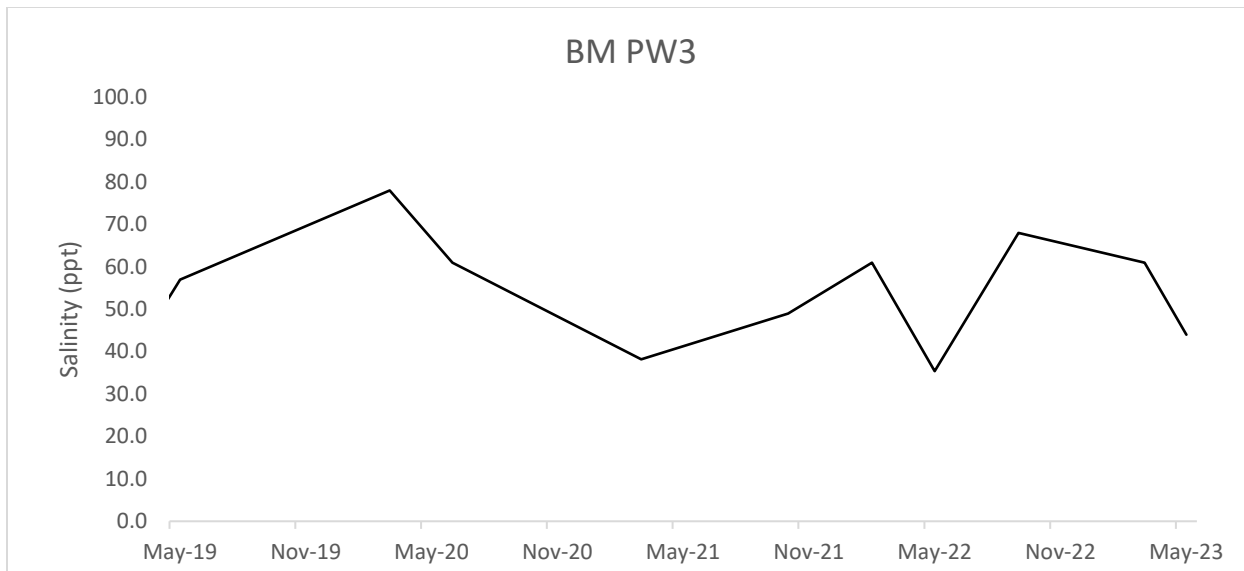
Figure C-9 Bryan Mound Deep Water Zone Contoured Elevations May 2023











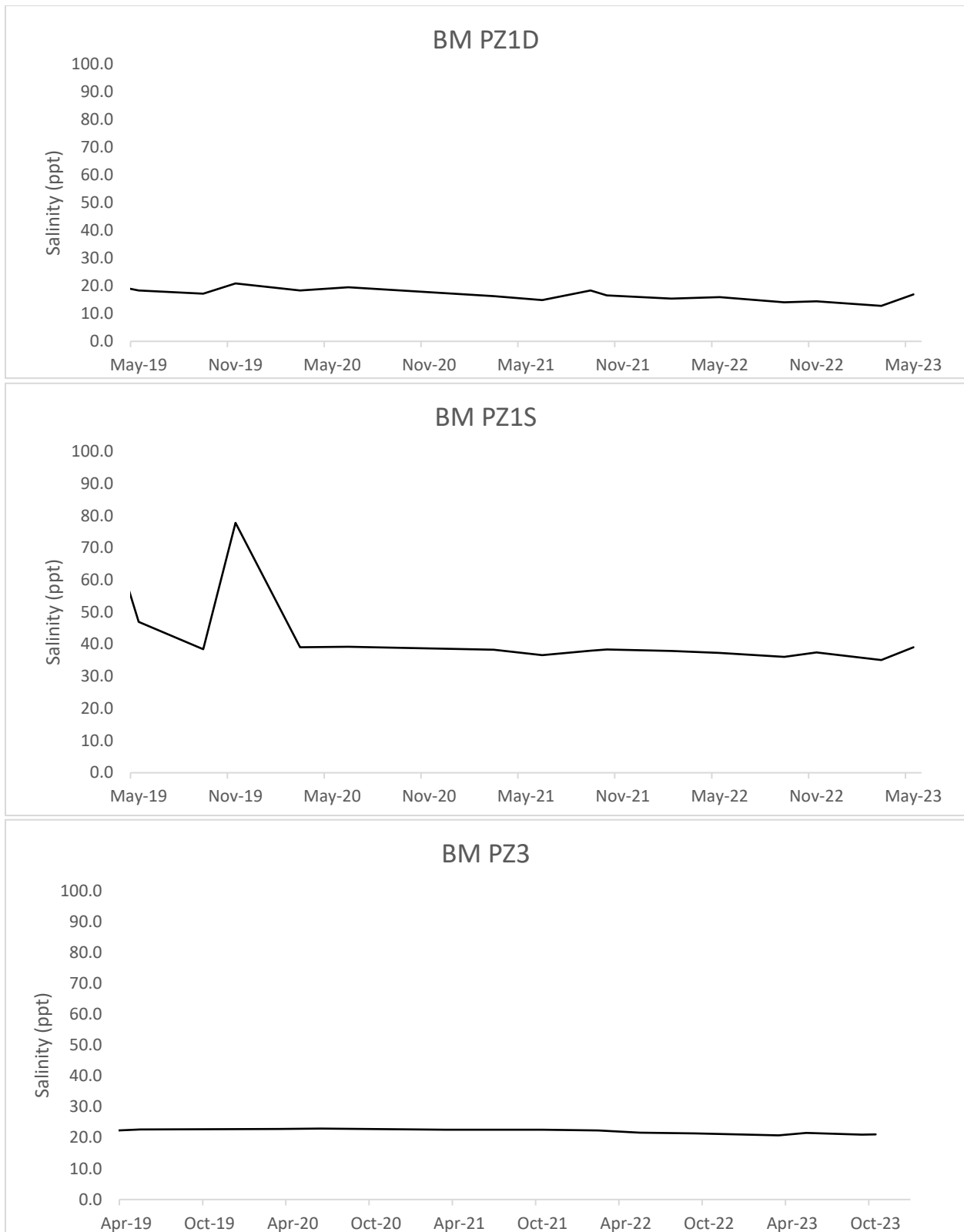


Figure C-10 Bryan Mound Salinity

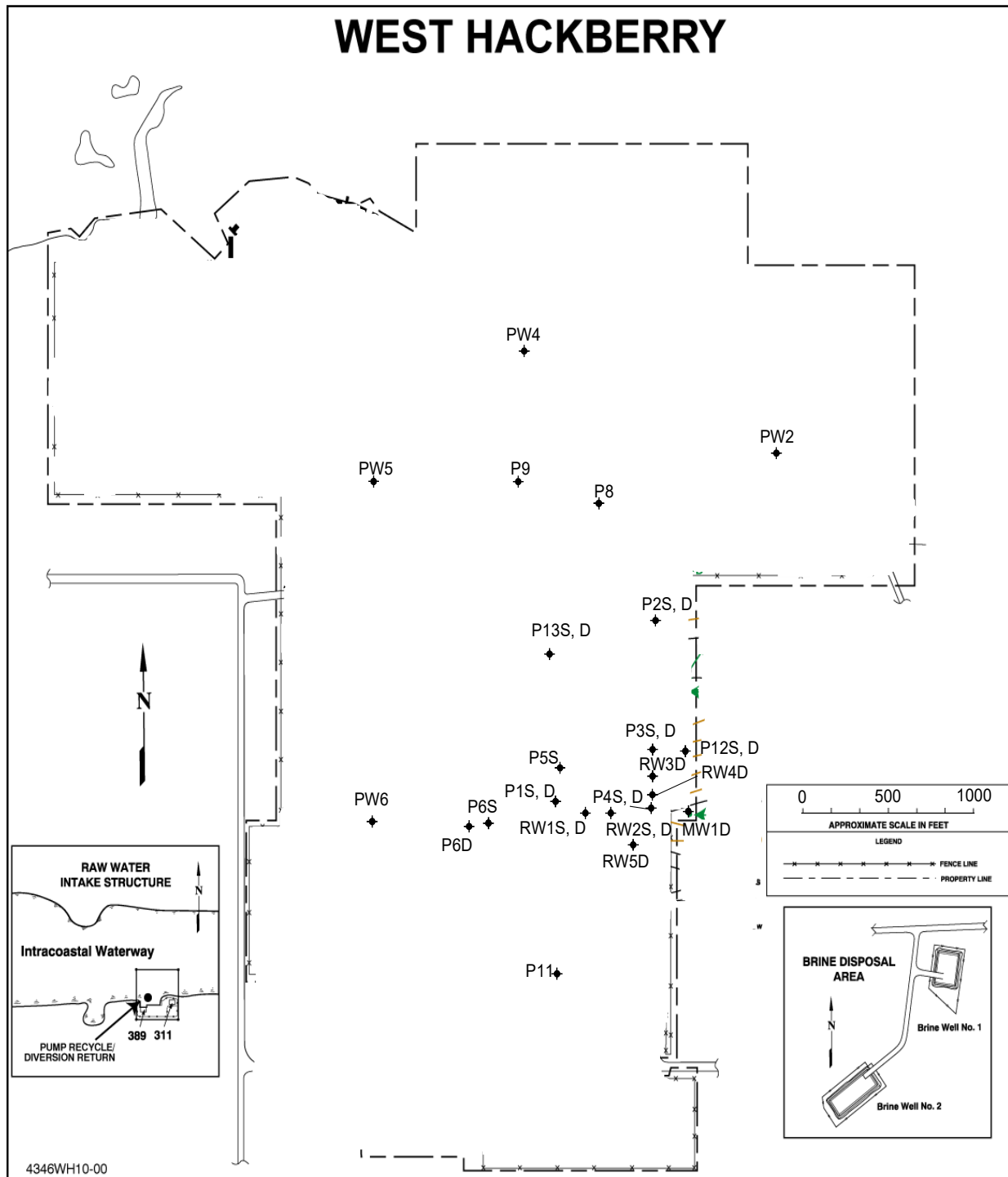


Figure C-11. West Hackberry Ground Water Monitoring Stations, Deep and Shallow

West Hackberry 2023 Contour-Shallow

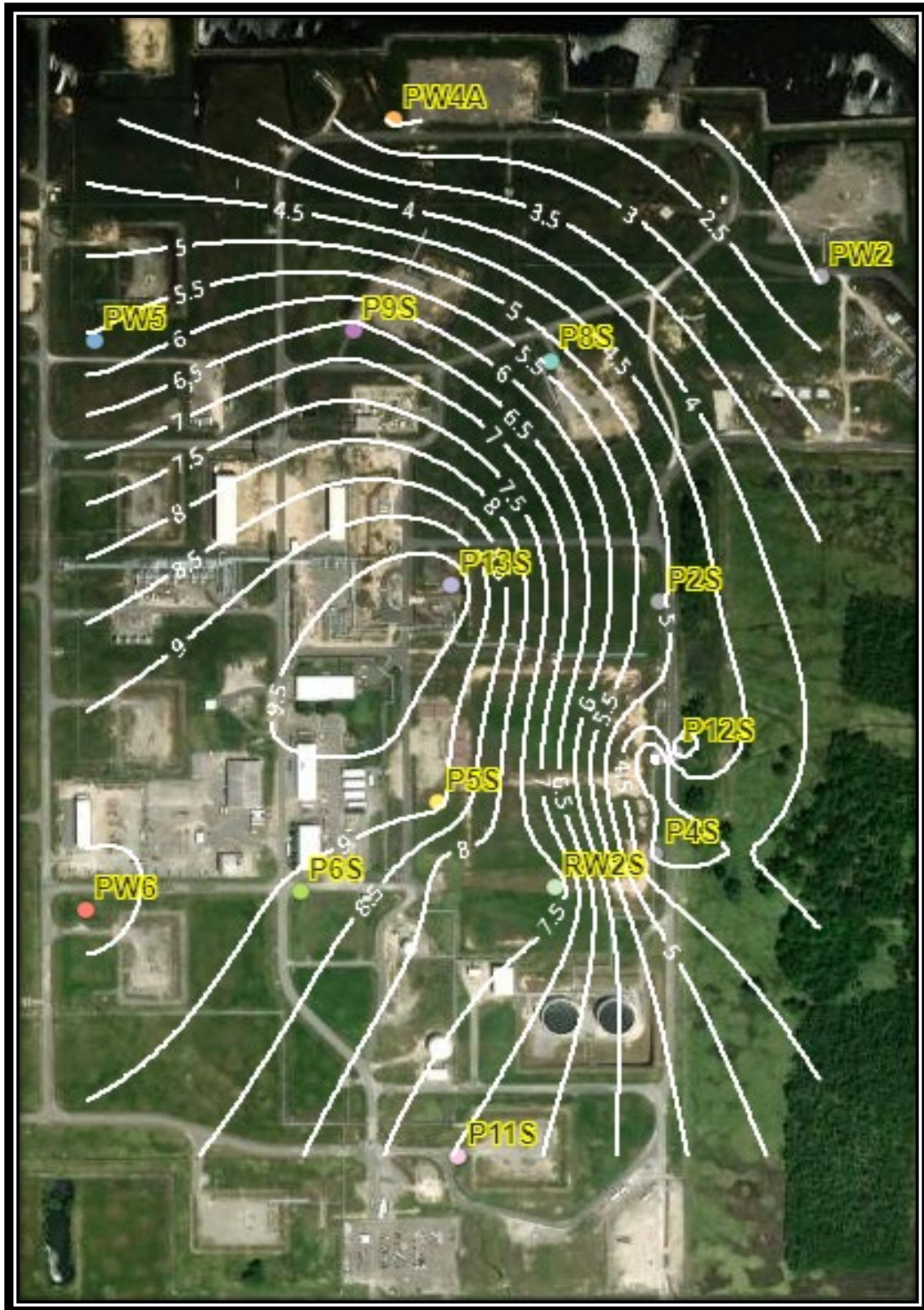
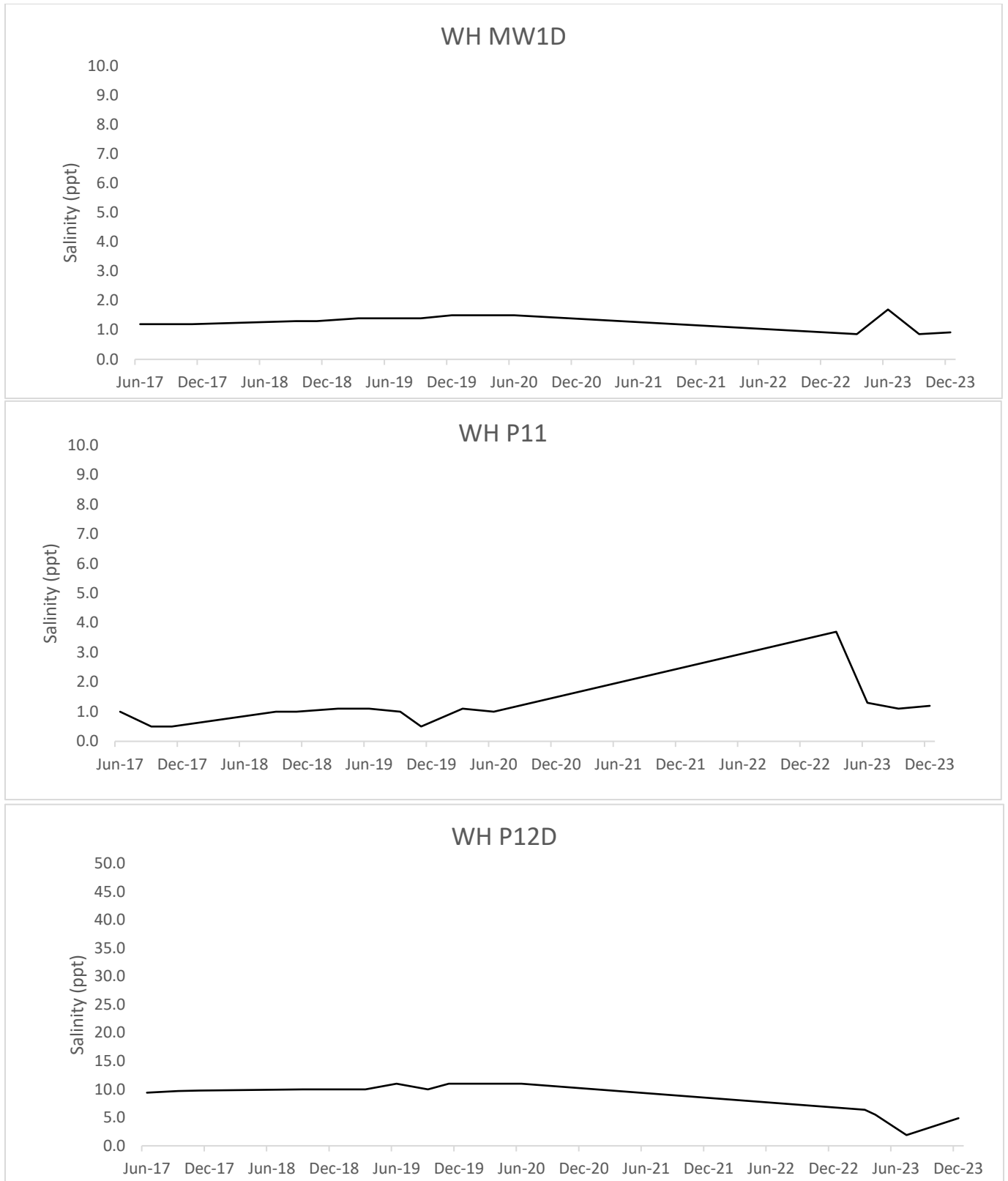


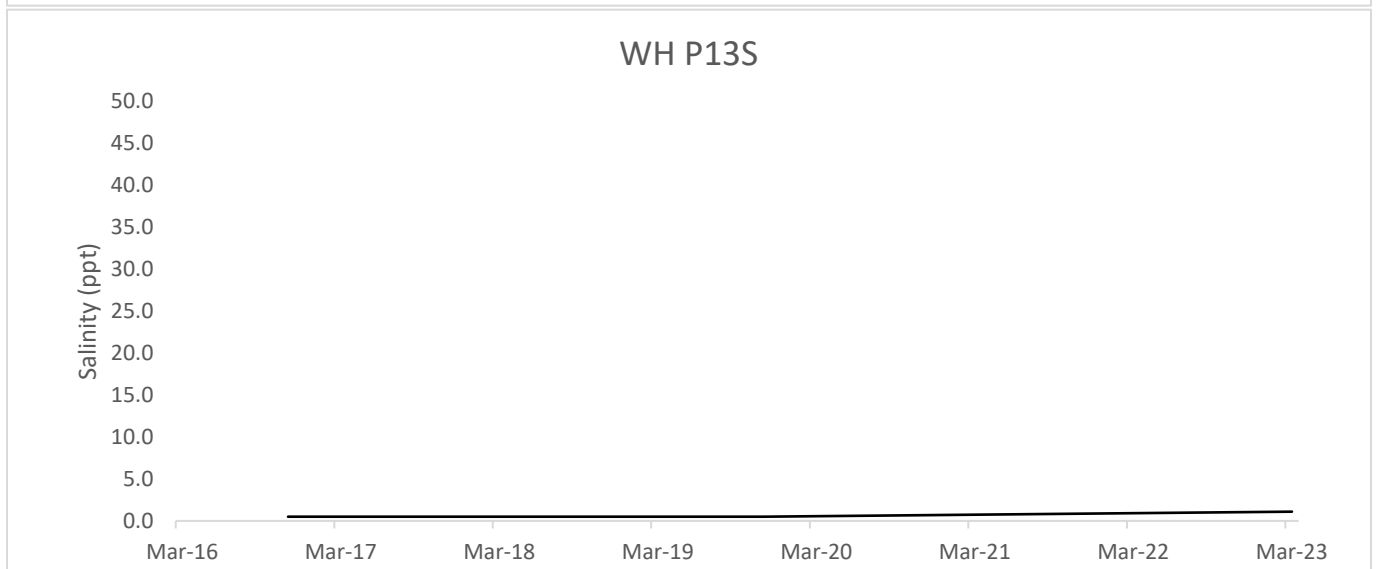
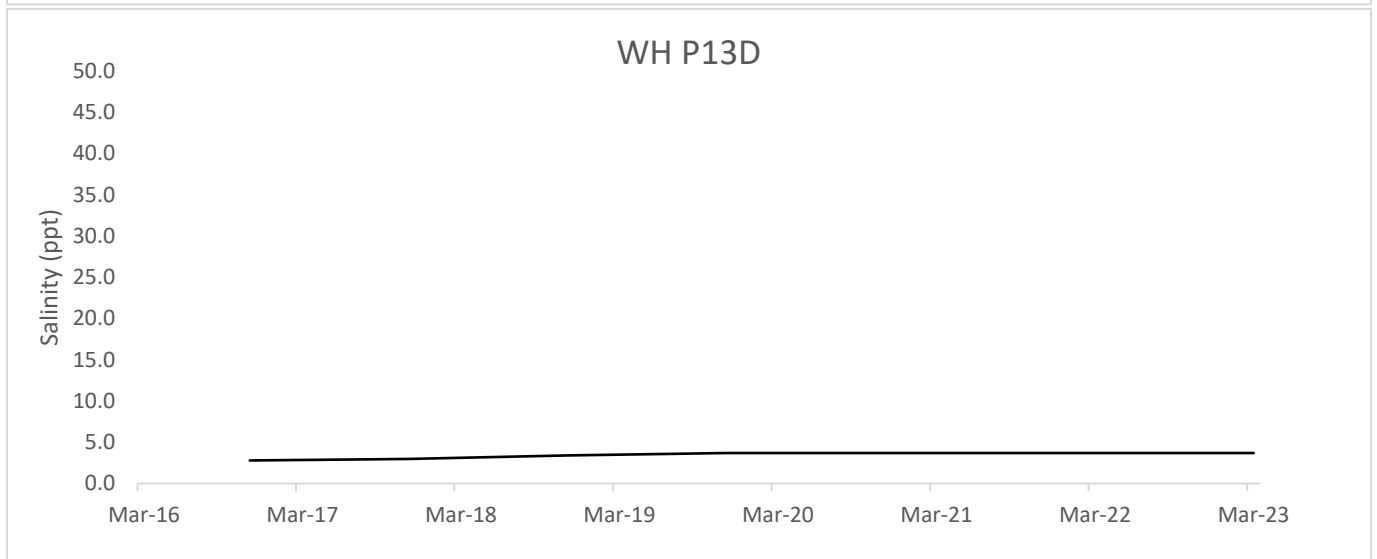
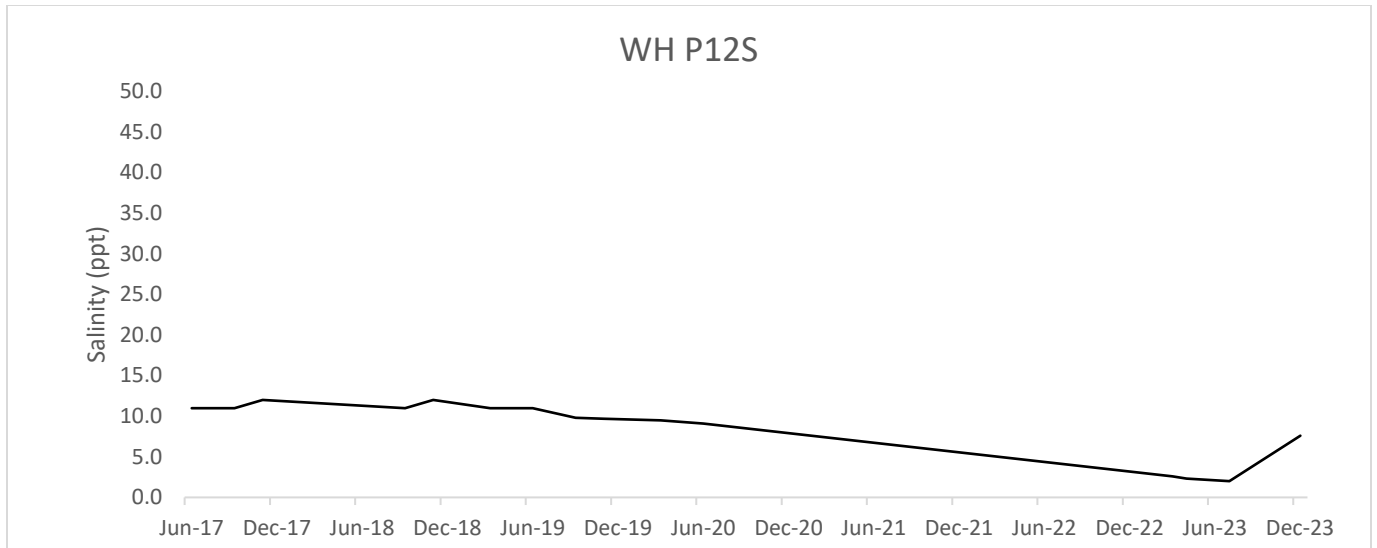
Figure C-12. West Hackberry Shallow Ground Water Zone Contoured Elevations June 2023

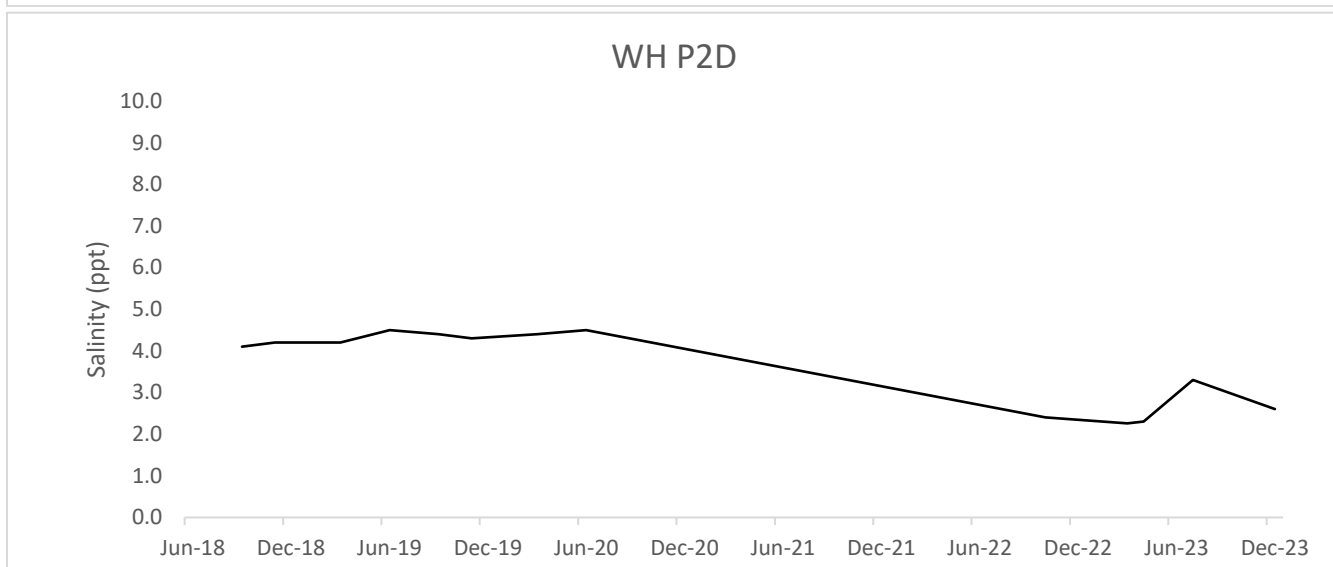
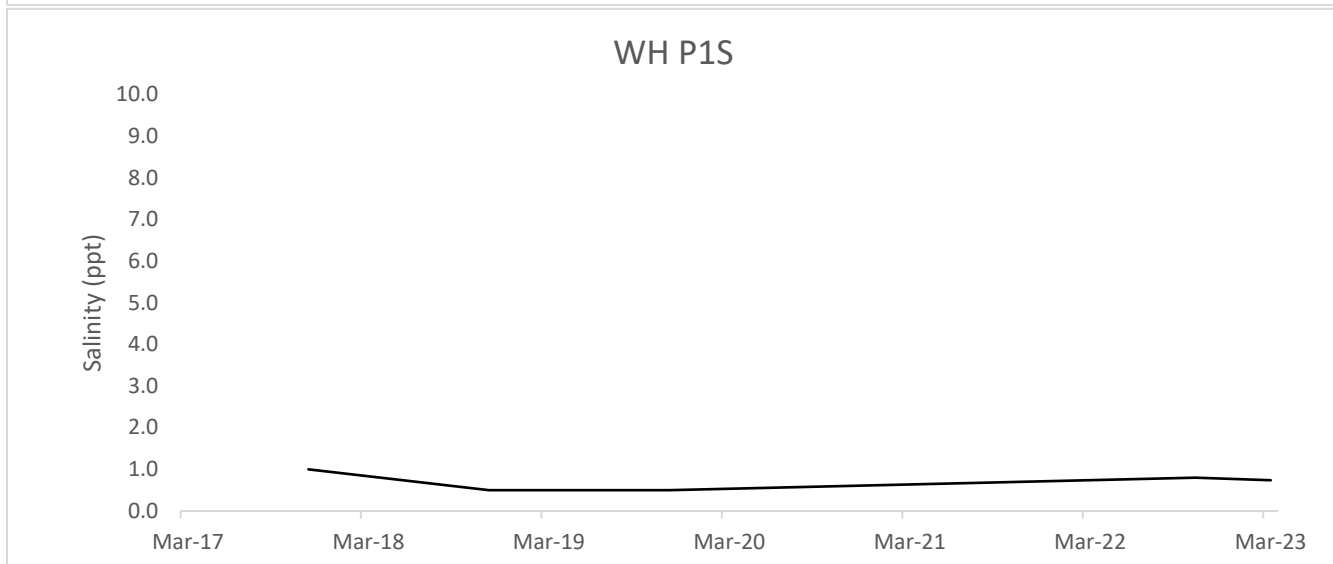
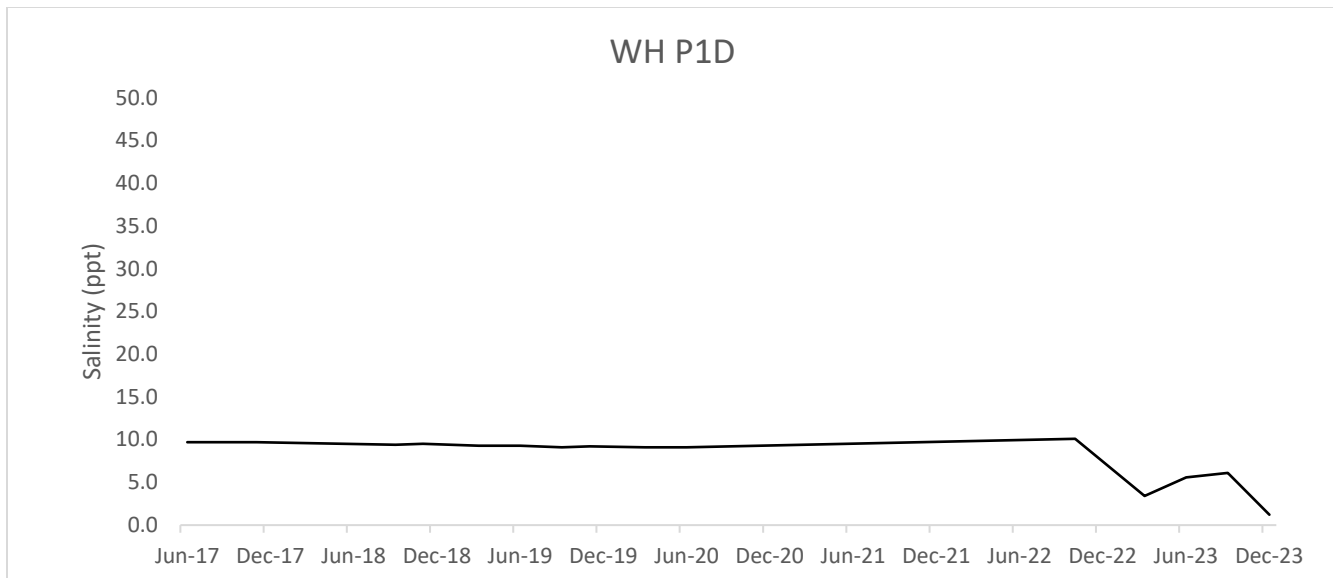
West Hackberry 2023 Contour-Deep

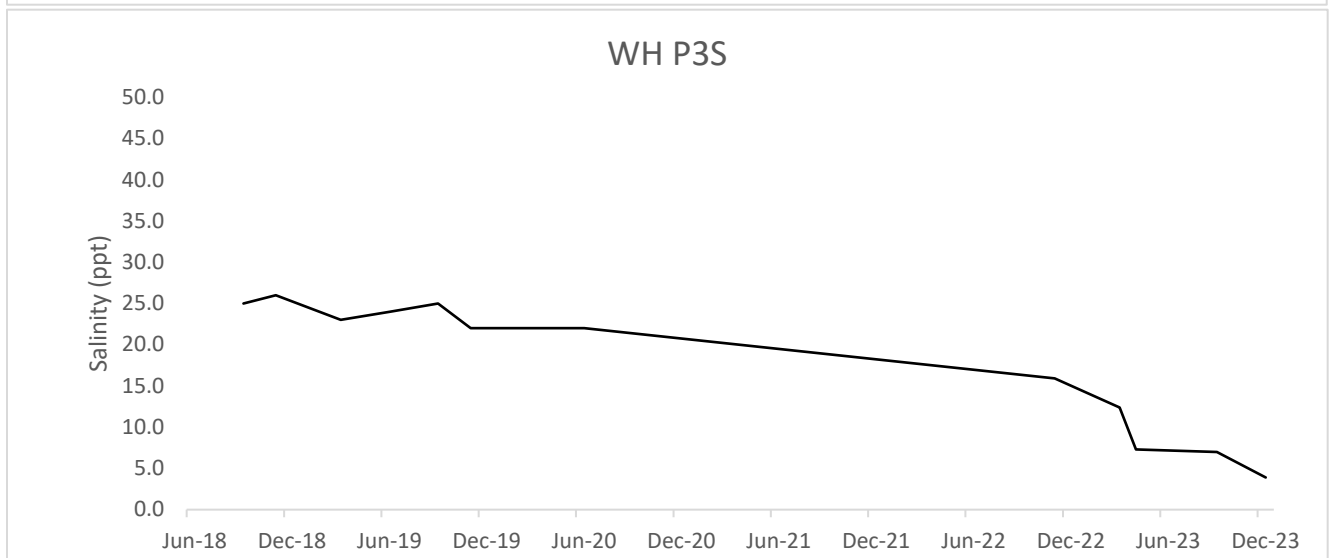
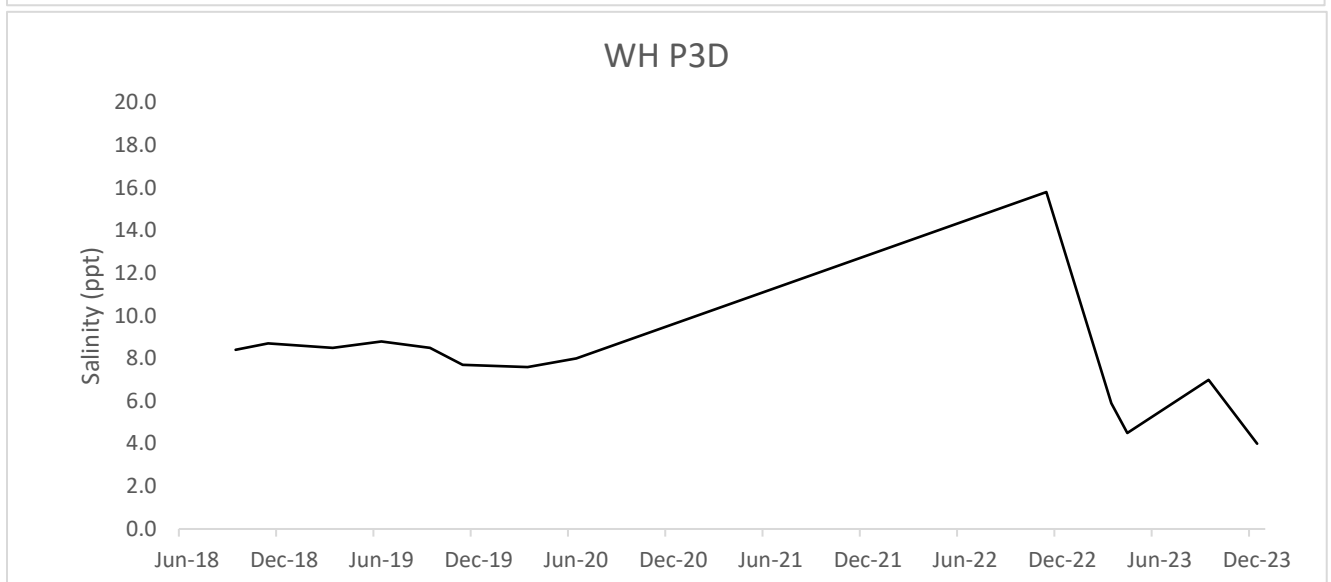
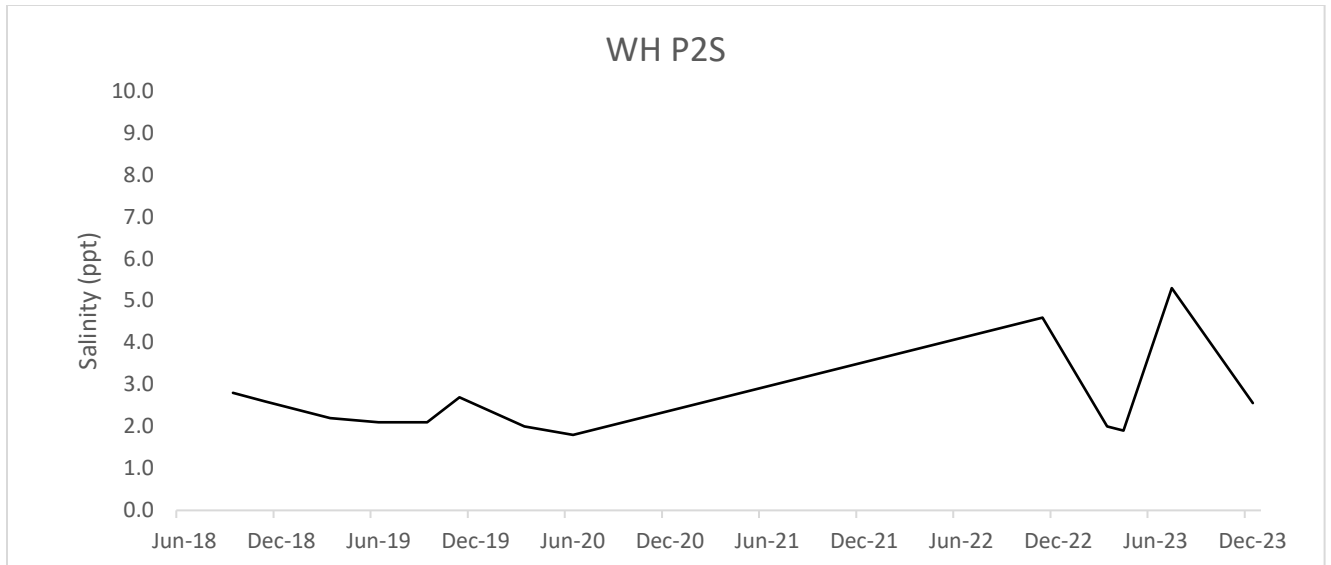


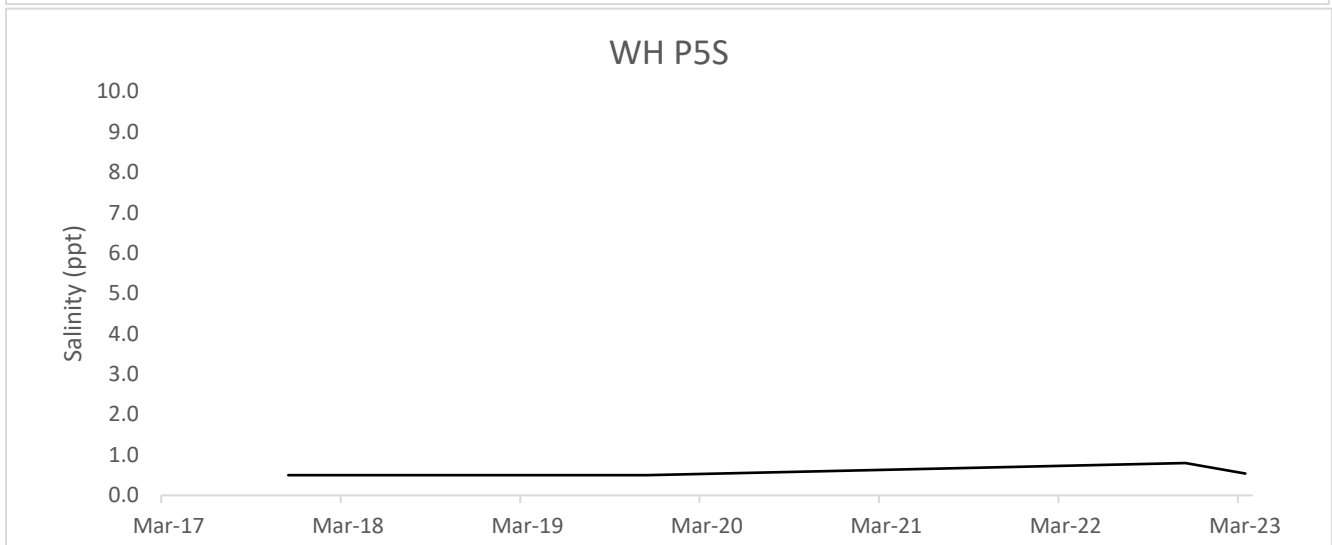
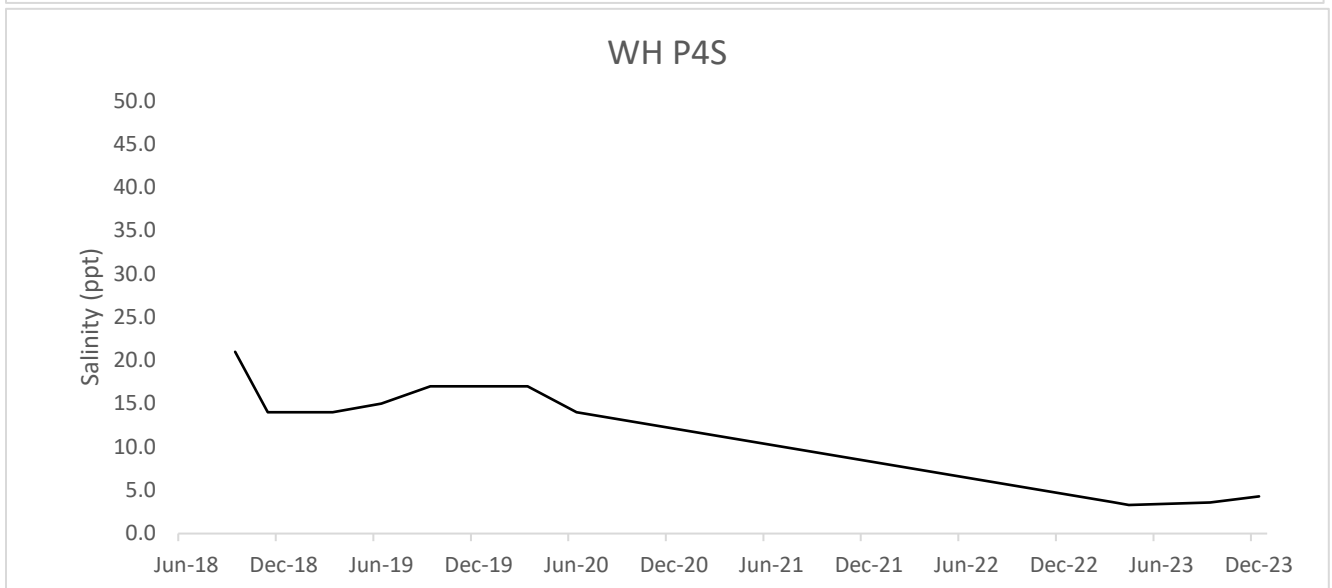
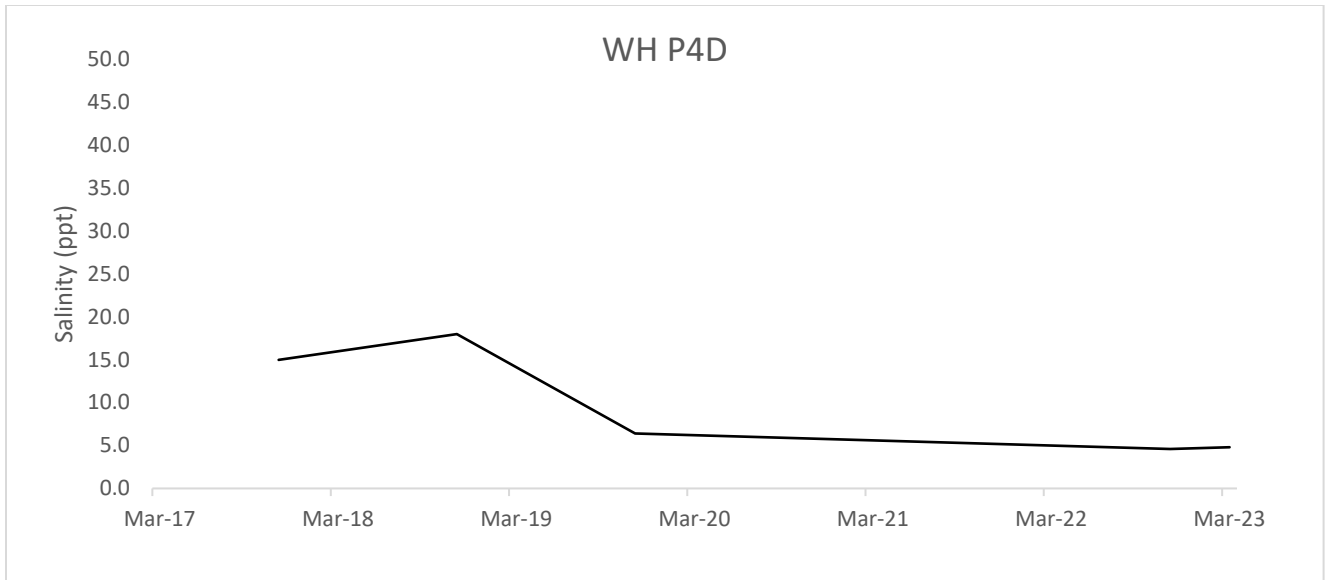
Figure C-13 West Hackberry Deep Ground Water Zone Contoured Elevations June 2023

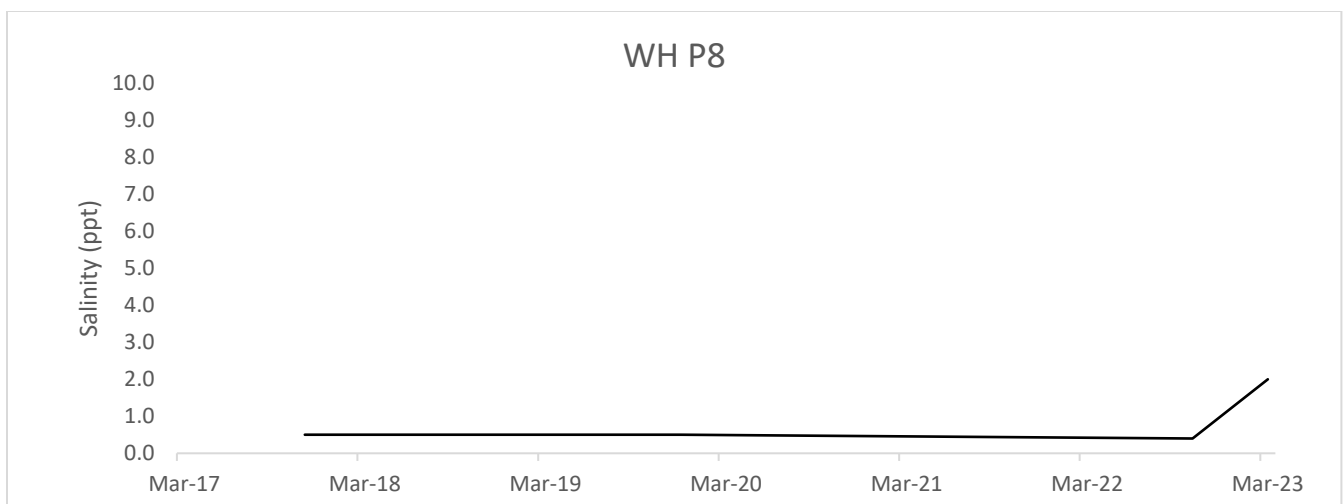
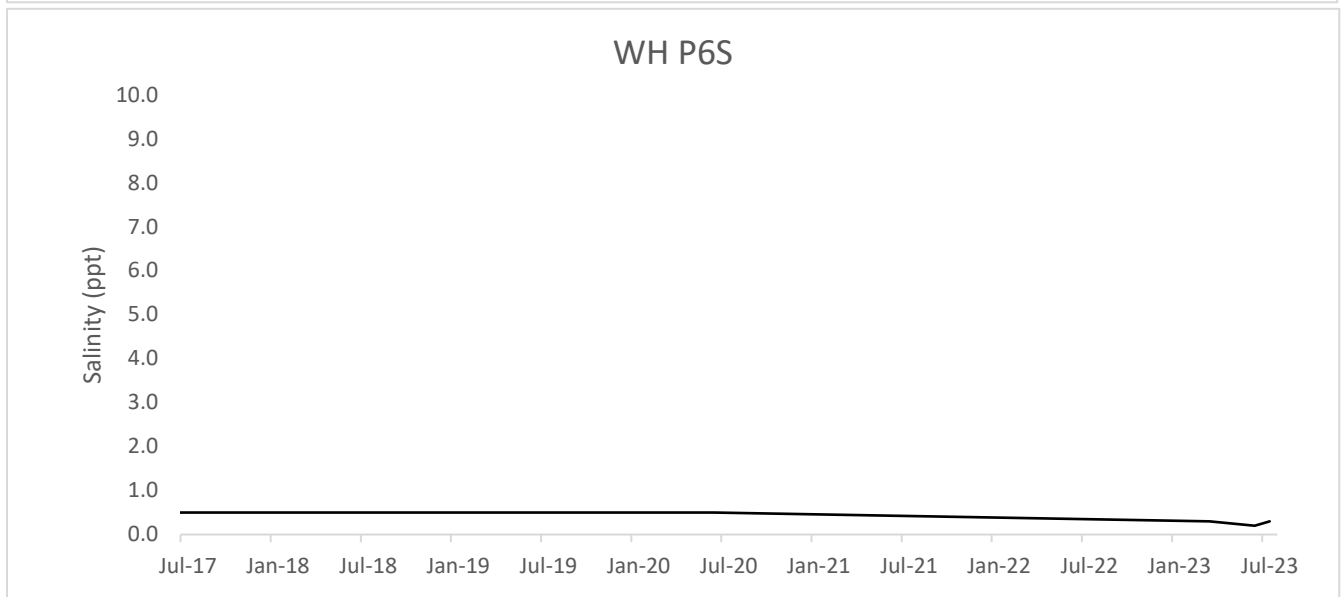
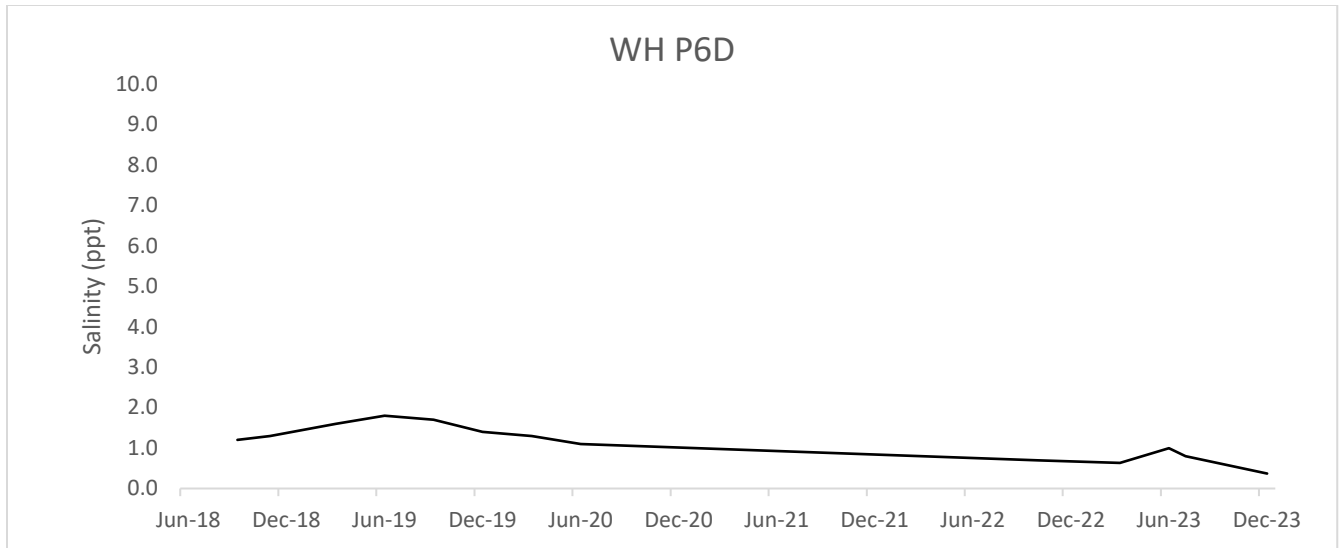


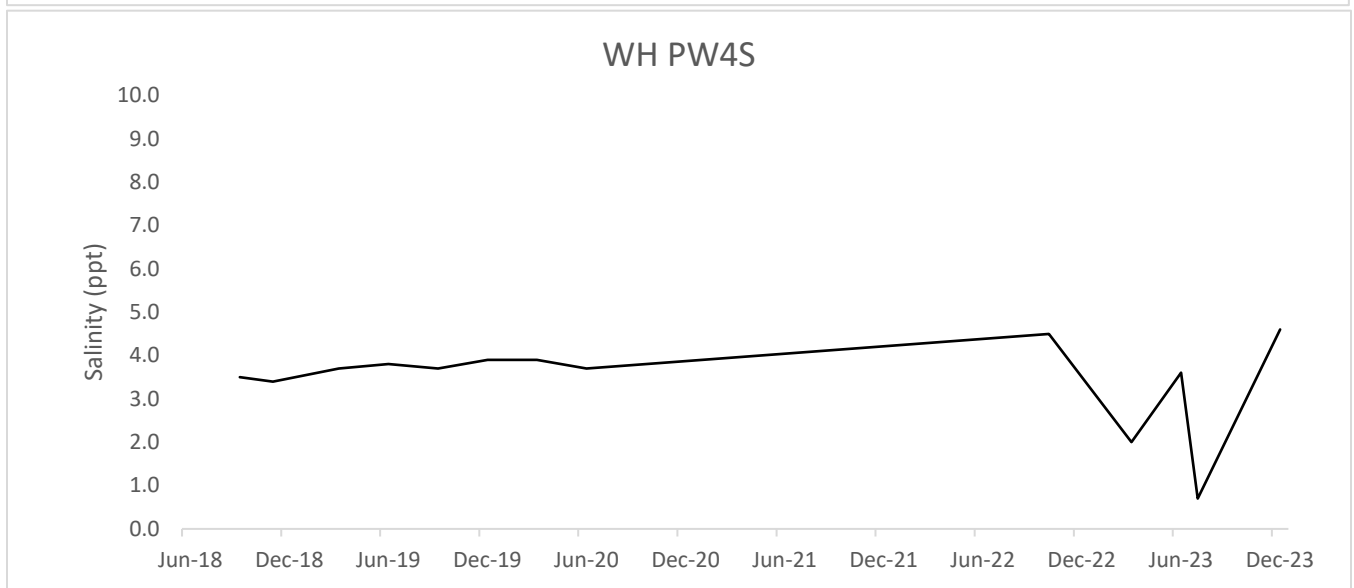
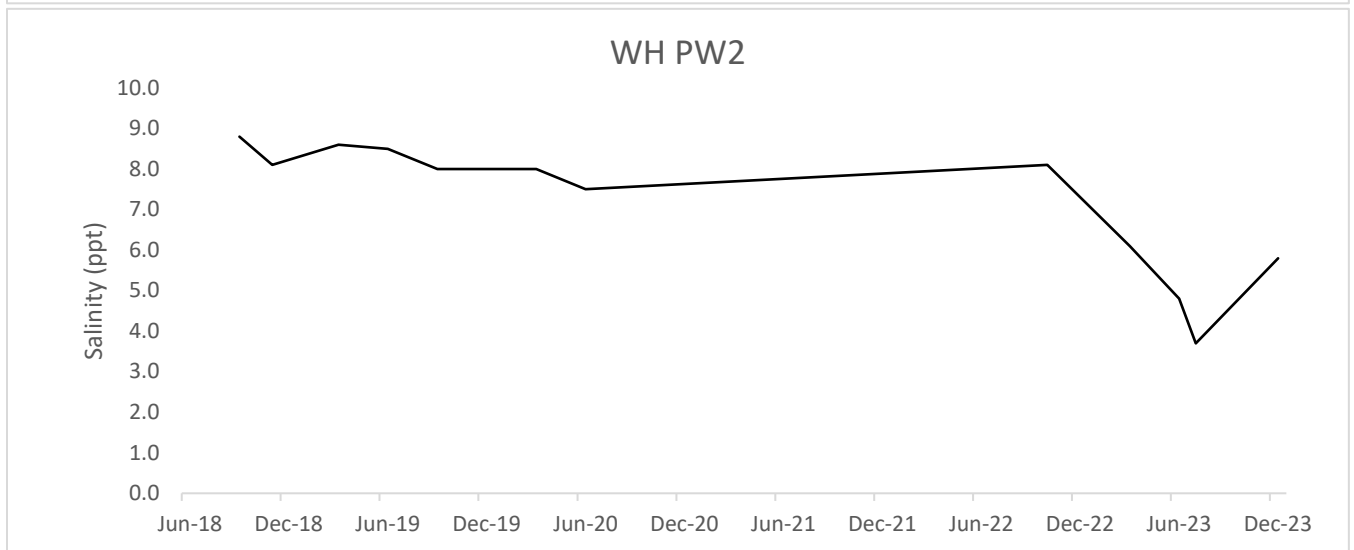
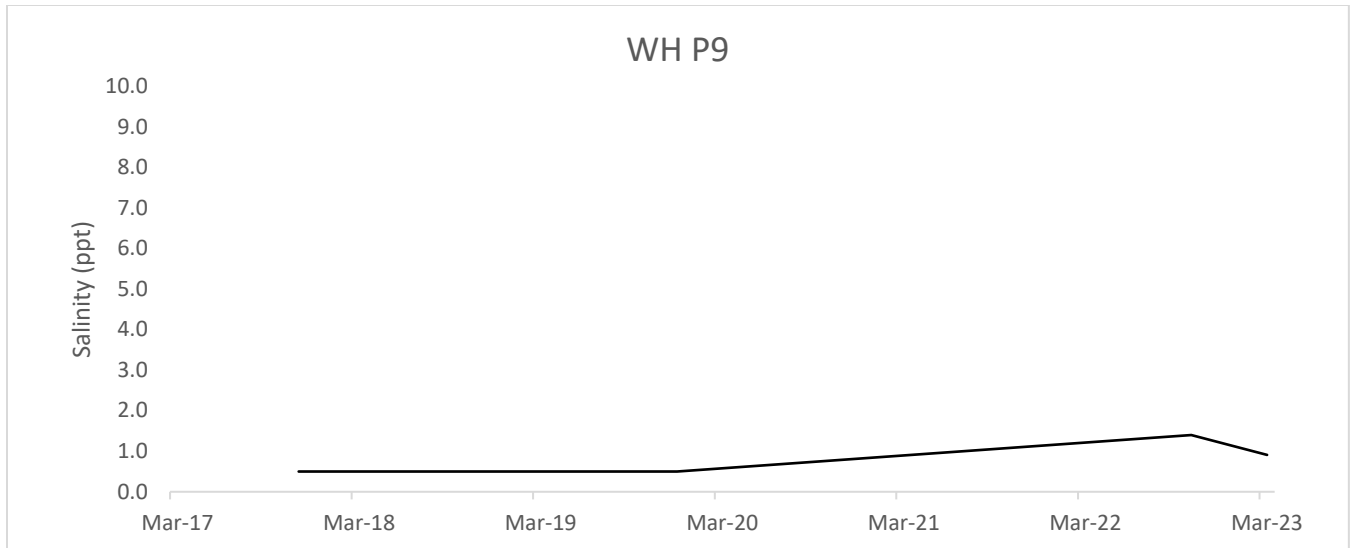


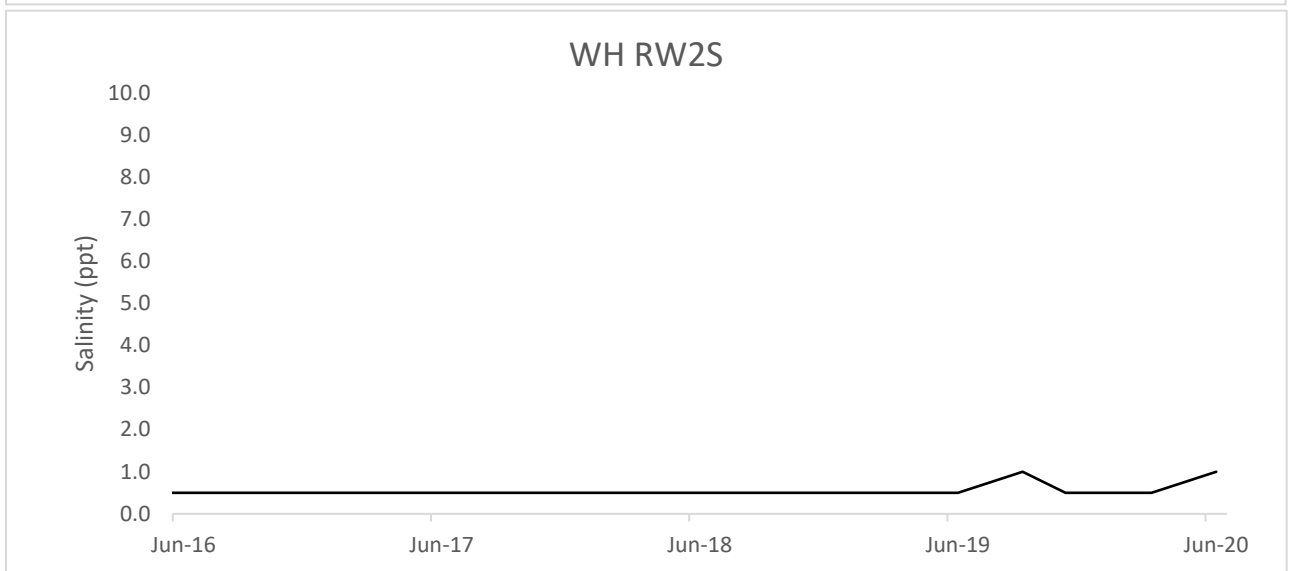
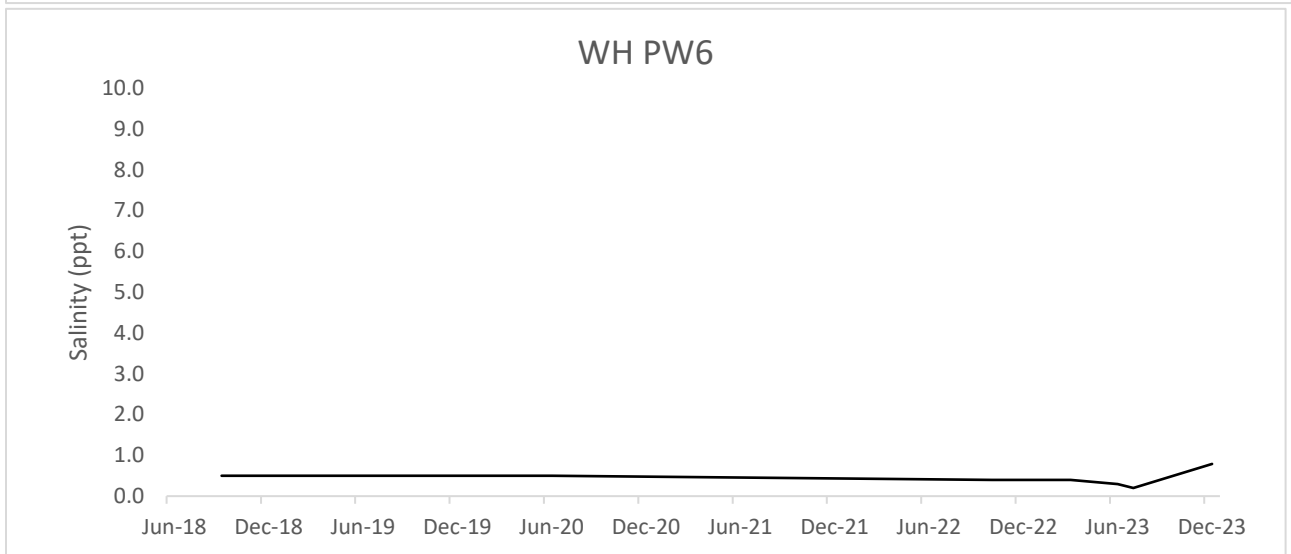
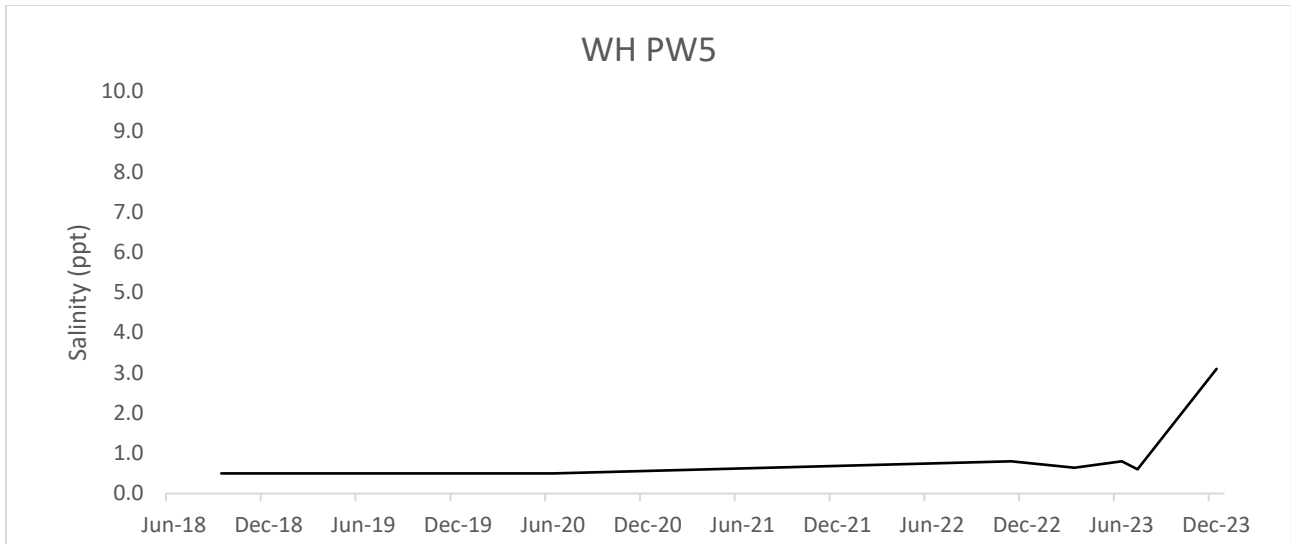












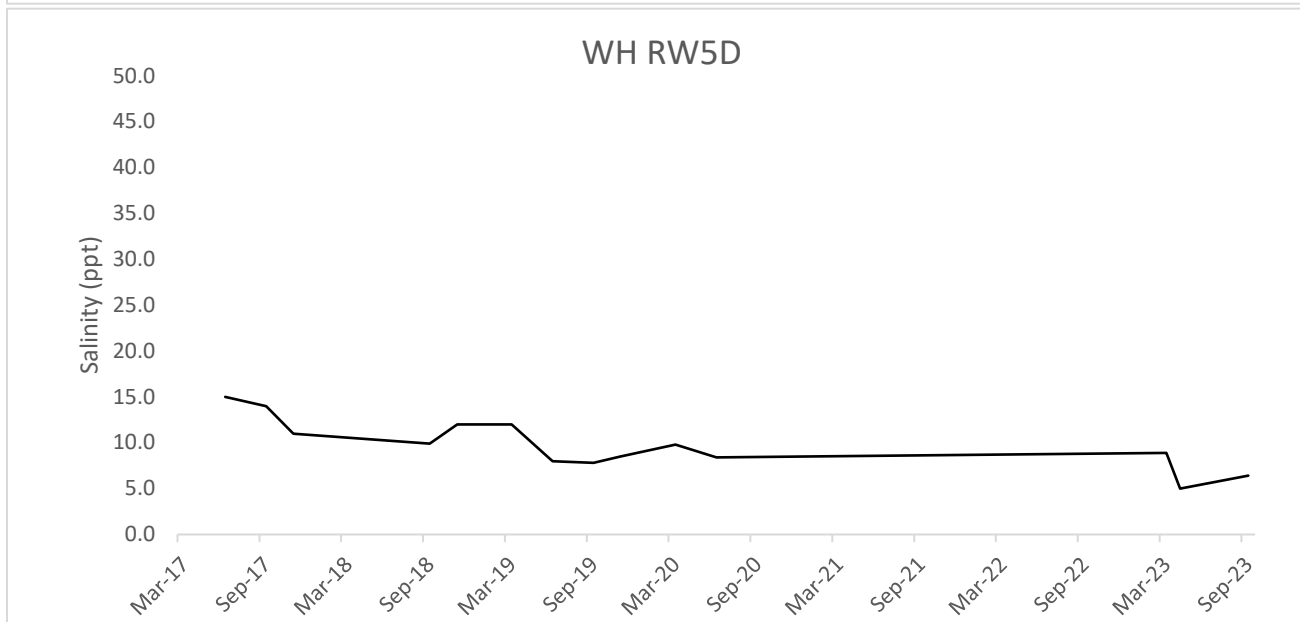
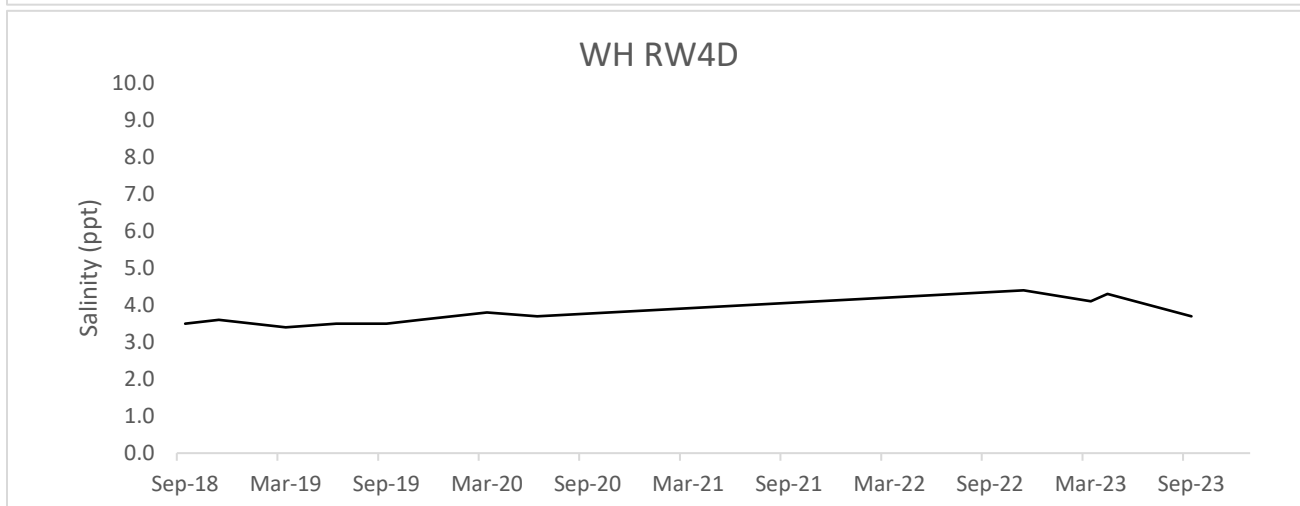
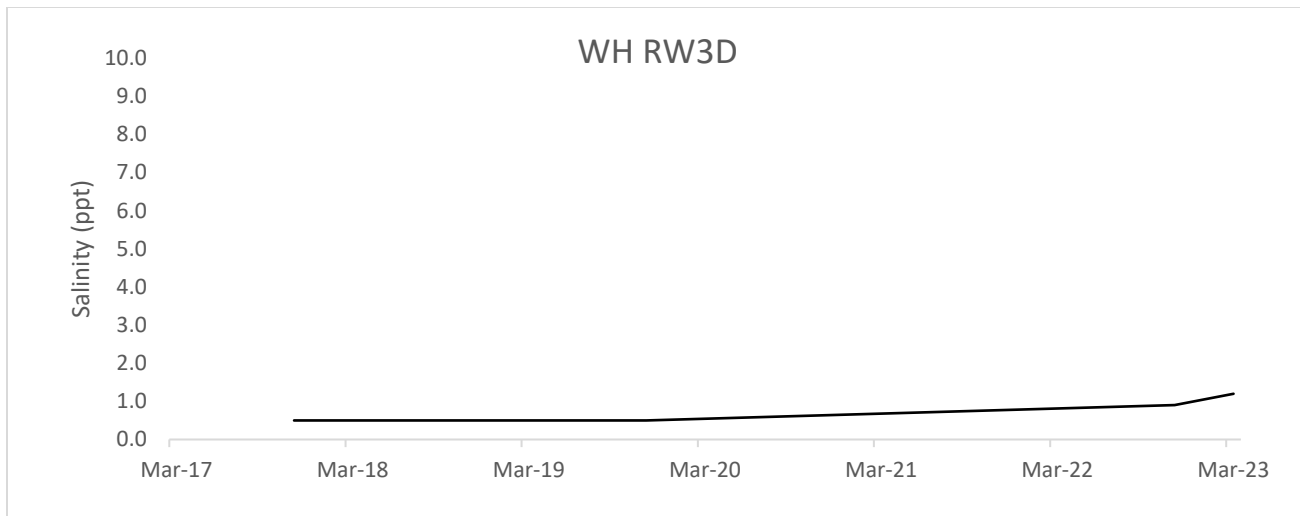


Figure C-14 West Hackberry Salinity

Appendix D

SURFACE WATER QUALITY SURVEILLANCE MONITORING
DURING 2023

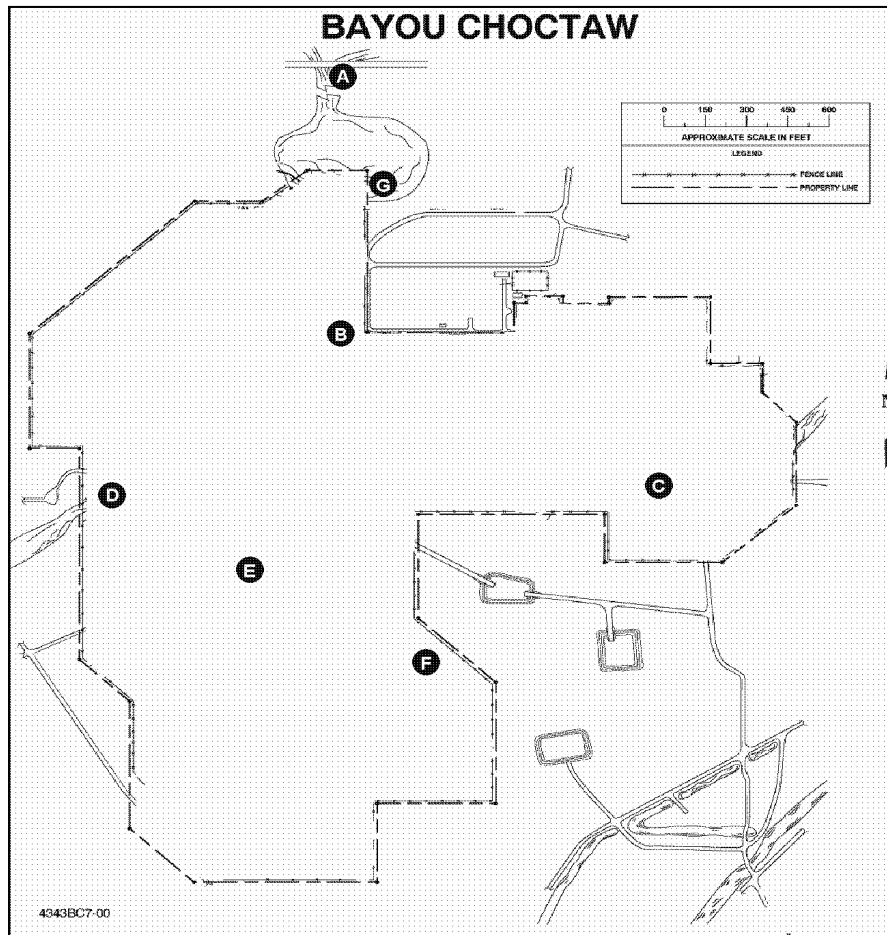


Figure D-1 Bayou Choctaw Environmental Monitoring Stations

Water Quality Monitoring Stations

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

Table D-1 2023 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	7	2	7	7	7	7
	Number of BDL	0	2	NV	7	NV	0
	Maximum	6.8	2.5	8.3	0.5	27.6	12.8
	Minimum	4.5	2.5	7.2	0.5	13.5	3.5
	Mean	5.6	2.5	7.7	0.5	20.4	8.1
	Median	5.3	2.5	7.7	0.5	20.0	8.0
	Standard Deviation	0.8	0.0	NV	0.0	5.3	3.8
	Coefficient of Variation	14.3	0.0	NV	0.0	26.0	46.9
B	Sample Size	7	2	7	7	7	7
	Number of BDL	0	2	NV	7	NV	0
	Maximum	13.2	2.5	8.6	0.5	27.2	10.5
	Minimum	4.2	2.5	7.4	0.5	11.9	3.9
	Mean	6.9	2.5	7.9	0.5	19.9	7.6
	Median	5.6	2.5	7.7	0.5	19.9	8.0
	Standard Deviation	3.1	0.0	NV	0.0	6.2	2.3
	Coefficient of Variation	44.9	0.0	NV	0.0	31.2	30.3
C	Sample Size	7	2	7	7	7	7
	Number of BDL	0	2	NV	7	NV	0
	Maximum	12.8	2.5	8.4	0.5	28.7	11.5
	Minimum	5.1	2.5	7.4	0.5	12.0	3.6
	Mean	8.1	2.5	7.7	0.5	20.2	8.7
	Median	7.5	2.5	7.6	0.5	20.9	9.1
	Standard Deviation	3.0	0.0	NV	0.0	6.1	2.6
	Coefficient of Variation	37.0	0.0	NV	0.0	30.2	29.9
D	Sample Size	7	2	7	7	7	7
	Number of BDL	0	2	NV	7	NV	0
	Maximum	12.8	2.5	8.1	0.5	29.6	10.2
	Minimum	5.1	2.5	7.5	0.5	11.4	4.8
	Mean	8.1	2.5	7.8	0.5	20.6	8.0
	Median	7.5	2.5	7.7	0.5	19.6	8.9
	Standard Deviation	3.0	0.0	NV	0.0	7.2	2.1
	Coefficient of Variation	37.0	0.0	NV	0.0	35.0	26.3
E	Sample Size	7	2	7	7	7	7
	Number of BDL	0	2	NV	7	NV	0
	Maximum	13.0	2.5	8.4	0.5	28.5	10.3
	Minimum	0.0	2.5	0.0	0.5	0.0	0.0
	Mean	7.4	2.5	6.7	0.5	16.4	6.3
	Median	6.5	2.5	7.7	0.5	18.0	6.7
	Standard Deviation	4.6	0.0	NV	0.0	9.1	3.7
	Coefficient of Variation	62.2	0.0	NV	0.0	55.5	58.7

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	7	2	7	7	7	7
	Number of BDL	0	2	NV	7	NV	0
	Maximum	12.2	2.5	8.4	0.5	28.2	10.0
	Minimum	0.0	2.5	0.0	0.5	0.0	0.0
	Mean	7.3	2.5	6.8	0.5	16.6	6.6
	Median	7.5	2.5	8.0	0.5	18.6	7.7
	Standard Deviation	4.4	0.0	NV	0.0	9.1	3.7
	Coefficient of Variation	60.3	0.0	NV	0.0	54.8	56.1
G	Sample Size	7	2	7	7	7	7
	Number of BDL	0	2	NV	7	NV	0
	Maximum	9.9	2.5	8.4	0.5	27.6	12.7
	Minimum	3.9	2.5	7.1	0.5	13.0	3.5
	Mean	6.1	2.5	7.7	0.5	20.1	8.0
	Median	5.0	2.5	7.6	0.5	20.0	8.8
	Standard Deviation	2.4	0.0	NV	0.0	5.5	3.8
	Coefficient of Variation	39.3	0.0	NV	0.0	27.4	47.5

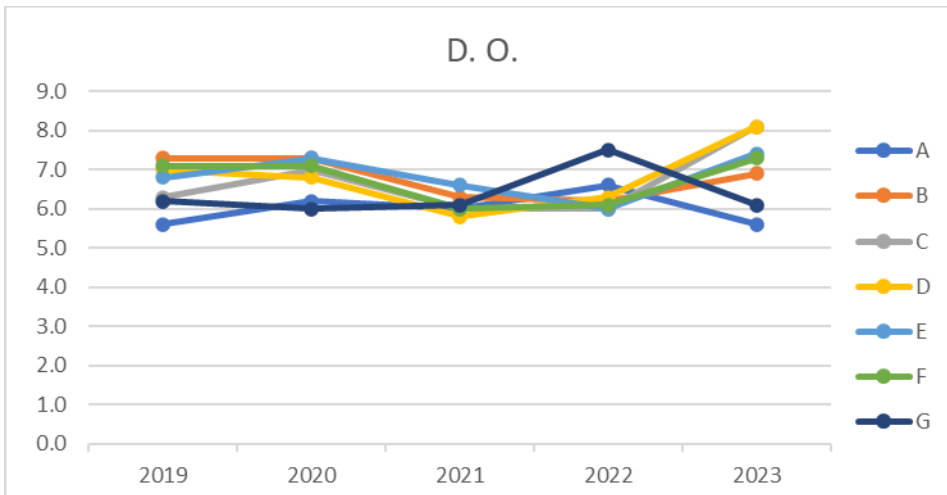
Note: BDL = Number of samples that were below the detectable limit.
 NV = Not a valid number or statistically meaningful.

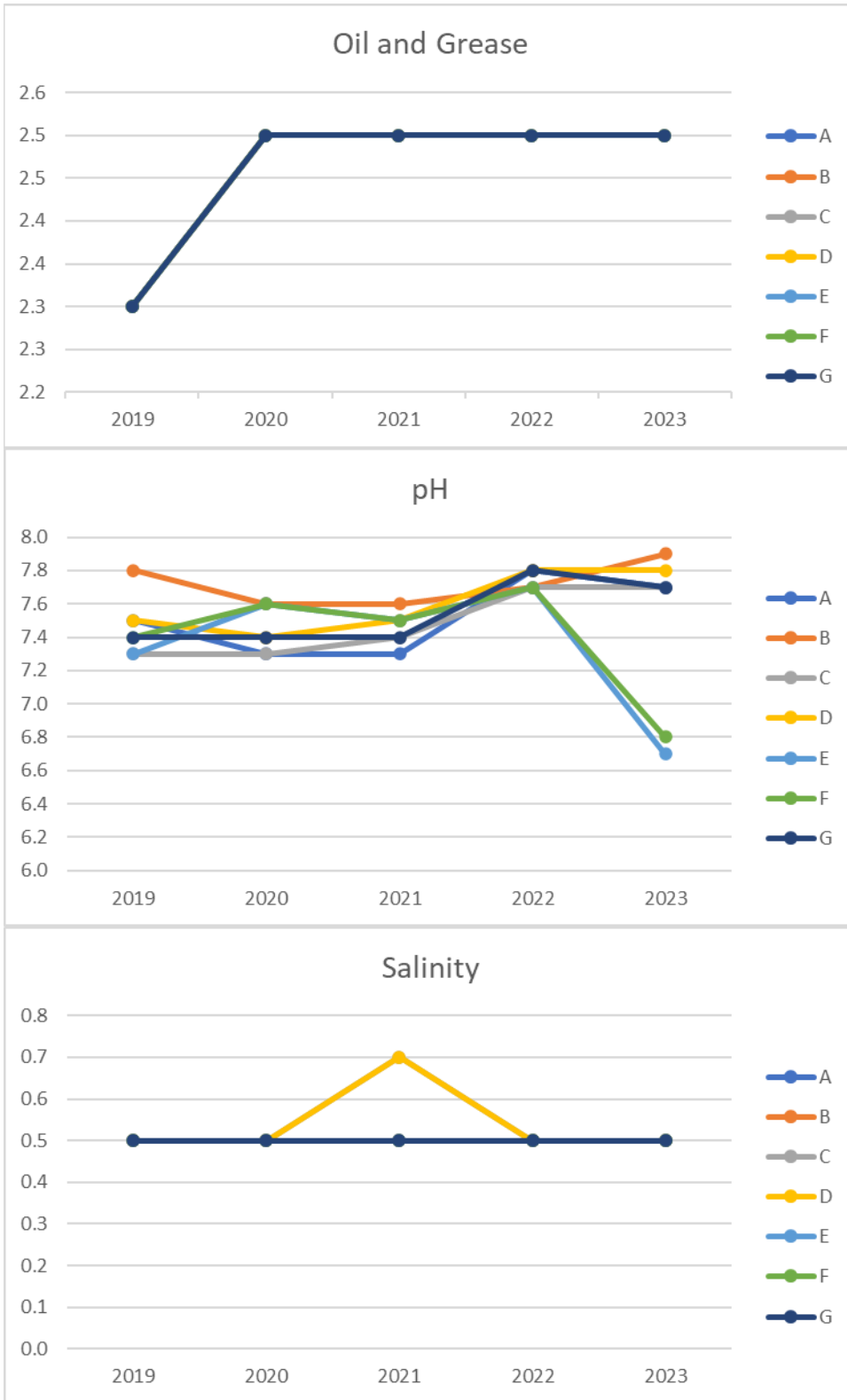
Table D-2 5-Year Trending Data for Bayou Choctaw Monitoring Stations

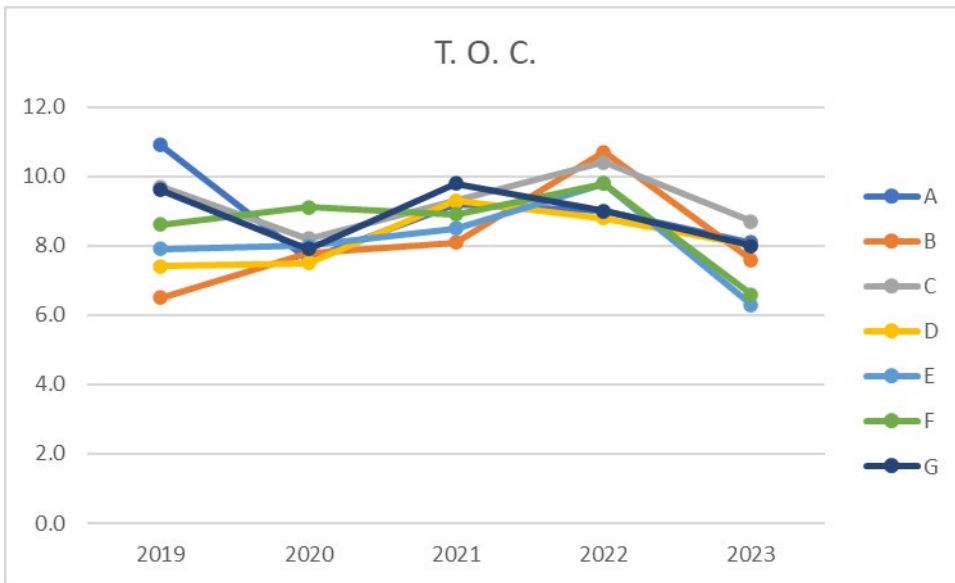
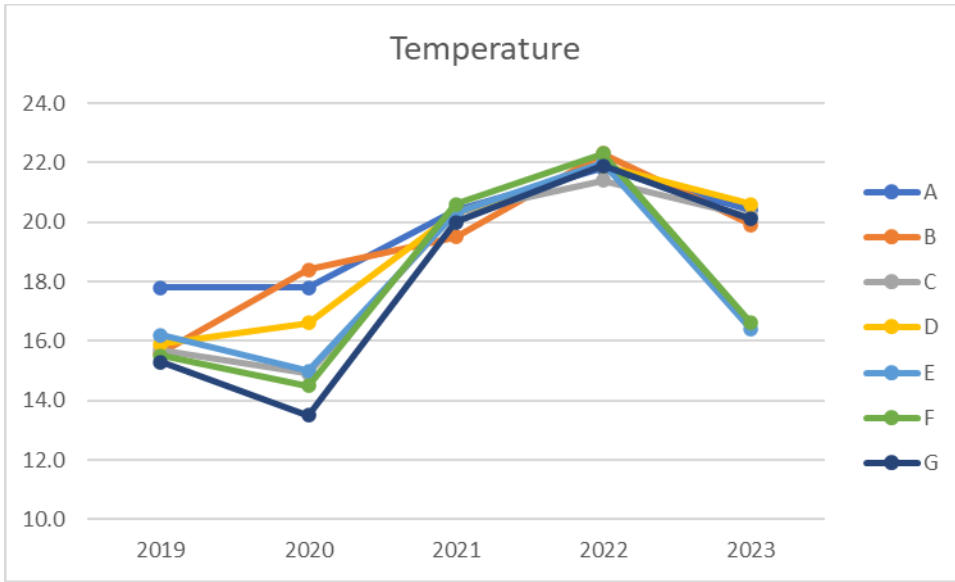
Station	Year	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	2019	5.6	2.3	7.5	0.5	17.8	10.9
	2020	6.2	2.5	7.3	0.5	17.8	7.6
	2021	6.0	2.5	7.3	0.5	20.4	9.2
	2022	6.6	2.5	7.8	0.5	21.8	9.0
	2023	5.6	2.5	7.7	0.5	20.4	8.1
B	2019	7.3	2.3	7.8	0.5	15.6	6.5
	2020	7.3	2.5	7.6	0.5	18.4	7.8
	2021	6.3	2.5	7.6	0.5	19.5	8.1
	2022	6.2	2.5	7.7	0.5	22.3	10.7
	2023	6.9	2.5	7.9	0.5	19.9	7.6
C	2019	6.3	2.3	7.3	0.5	15.7	9.7
	2020	7.0	2.5	7.3	0.5	14.9	8.2
	2021	6.0	2.5	7.4	0.7	20.3	9.3
	2022	6.0	2.5	7.7	0.5	21.4	10.4
	2023	8.1	2.5	7.7	0.5	20.2	8.7
D	2019	7.0	2.3	7.5	0.5	15.9	7.4
	2020	6.8	2.5	7.4	0.5	16.6	7.5

	2021	5.8	2.5	7.5	0.7	20.3	9.3
	2022	6.3	2.5	7.8	0.5	21.9	8.8
	2023	8.1	2.5	7.8	0.5	20.6	8.0
E	2019	6.8	2.3	7.3	0.5	16.2	7.9
	2020	7.3	2.5	7.6	0.5	15.0	8.0
	2021	6.6	2.5	7.5	0.5	20.3	8.5
	2022	6.0	2.5	7.7	0.5	22.0	9.8
	2023	7.4	2.5	6.7	0.5	16.4	6.3
F	2019	7.1	2.3	7.4	0.5	15.5	8.6
	2020	7.1	2.5	7.6	0.5	14.5	9.1
	2021	6.0	2.5	7.5	0.5	20.6	8.9
	2022	6.1	2.5	7.7	0.5	22.3	9.8
	2023	7.3	2.5	6.8	0.5	16.6	6.6
G	2019	6.2	2.3	7.4	0.5	15.3	9.6
	2020	6.0	2.5	7.4	0.5	13.5	7.9
	2021	6.1	2.5	7.4	0.5	20	9.8
	2022	7.5	2.5	7.8	0.5	21.9	9.0
	2023	6.1	2.5	7.7	0.5	20.1	8

Figure D-2 5-Year Trending Data for Bayou Choctaw Environmental Monitoring Stations







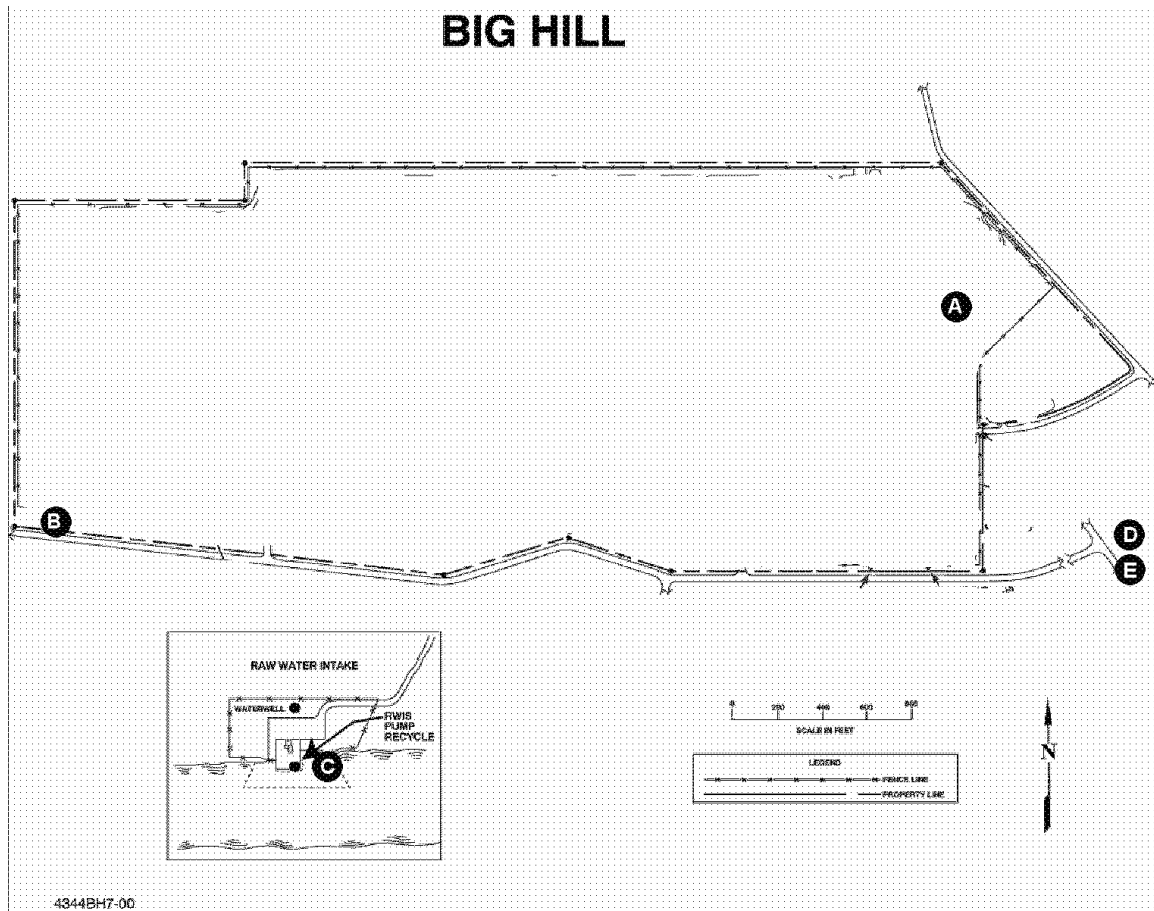


Figure D-3 Big Hill Environmental Monitoring Stations

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)

Table D-3 2023 Data Summary for Big Hill Monitoring Stations

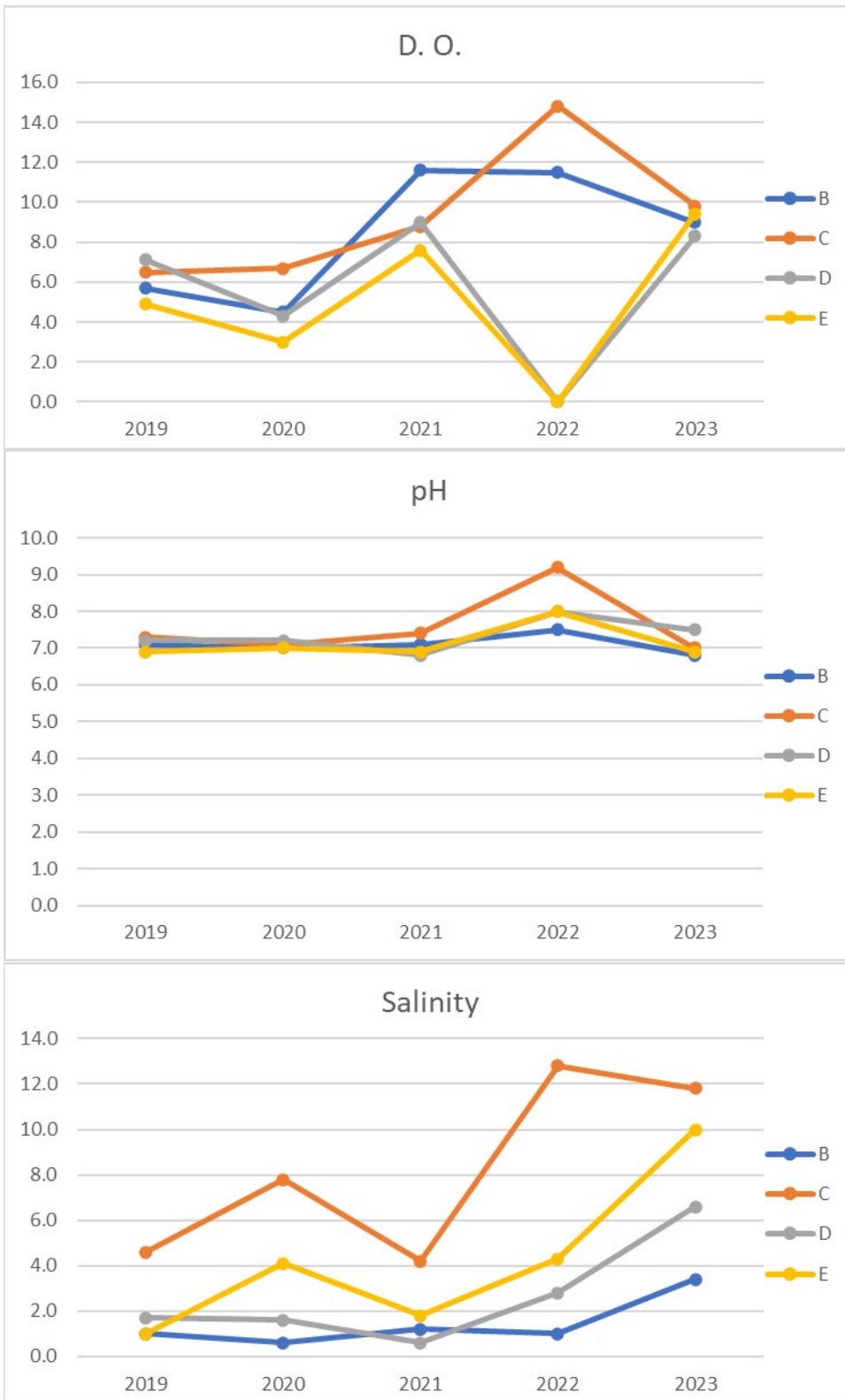
Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
B	Sample Size	11	4	12	12	12	12
	Number of BDL	0	3	NV	8	NV	0
	Maximum	18.5	5.7	7.8	30.0	31.0	27.4
	Minimum	3.8	1.1	5.9	0.5	13.0	4.8
	Mean	9.0	2.6	6.8	3.4	23.3	17.7
	Median	8.5	1.8	7.0	0.5	24.5	18.5
	Standard Deviation	4.2	2.2	NV	8.4	6.5	6.4
	Coefficient of Variation	46.7	84.6	NV	247.1	27.9	36.2
Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
C	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	19.6	1.2	7.6	27.0	32.0	14.2
	Minimum	2.9	1.1	6.4	1.4	14.0	2.6
	Mean	9.8	1.1	7.0	11.8	23.3	7.5
	Median	10.3	1.1	7.0	8.2	22.5	7.2
	Standard Deviation	4.6	0.0	NV	9.0	6.2	4.1
	Coefficient of Variation	46.9	0.0	NV	76.3	26.6	54.7
Station	Statistical Parameters	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
D	Sample Size	11	4	12	12	12	12
	Number of BDL	0	3	NV	4	NV	0
	Maximum	17.1	2.2	14.4	22.0	30.0	63.0
	Minimum	3.1	1.1	6.3	0.5	14.0	13.9
	Mean	8.3	1.4	7.5	6.6	23.2	27.3
	Median	6.9	1.2	6.9	1.6	24.0	24.0
	Standard Deviation	4.2	0.5	NV	8.5	5.6	12.9
	Coefficient of Variation	50.6	35.7	NV	128.8	24.1	47.3
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	4	NV	0	NV	0
	Maximum	16.8	1.2	7.6	26.0	30.0	29.6
	Minimum	3.8	1.1	6.1	1.0	12.0	4.9
	Mean	9.4	1.1	6.9	10.0	22.4	18.2
	Median	9.3	1.1	7.1	4.2	22.5	18.4
	Standard Deviation	3.7	0.0	NV	9.9	6.3	7.7
	Coefficient of Variation	39.4	0.0	NV	99.0	28.1	42.3

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

Table D-4 5- Year Trending Data for Big Hill Monitoring Stations

Station	Year	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	2019	N/A	N/A	N/A	N/A	N/A	N/A
	2020	N/A	N/A	N/A	N/A	N/A	N/A
	2021	N/A	N/A	N/A	N/A	N/A	N/A
	2022	N/A	N/A	N/A	N/A	N/A	N/A
	2023	N/A	N/A	N/A	N/A	N/A	N/A
B	2019	5.7	2.5	7.1	1.0	22.8	14.2
	2020	4.5	2.5	7.0	0.6	24.5	11.1
	2021	11.6	3.2	7.1	1.2	22.7	9.7
	2022	11.5	1.5	7.5	1	79.6	8.2
	2023	9	2.6	6.8	3.4	23.3	17.7
C	2019	6.5	2.5	7.3	4.6	23.0	8.5
	2020	6.7	2.5	7.1	7.8	24.1	10.1
	2021	8.8	1.8	7.4	4.2	21.6	7.1
	2022	14.8	3.5	9.2	12.8	95.8	5.2
	2023	9.8	1.1	7	11.8	23.3	7.5
D	2019	7.1	2.5	7.2	1.7	23.6	11.5
	2020	4.3	2.5	7.2	1.6	24.3	11.7
	2021	9.0	1.8	6.8	0.6	20.3	14.1
	2022	N/A	1.5	8	2.8	88	10.5
	2023	8.3	1.4	7.5	6.6	23.2	27.3
E	2019	4.9	2.5	6.9	1	22.5	15.0
	2020	3.0	2.5	7.0	4.1	23.8	11.7
	2021	7.6	1.8	6.9	1.8	22.5	12.6
	2022	N/A	1.6	8	4.3	78.8	10.9
	2023	9.4	1.1	6.9	10	22.4	18.2

Figure D-4 5- Year Trending Data for Big Hill Environmental Monitoring Stations



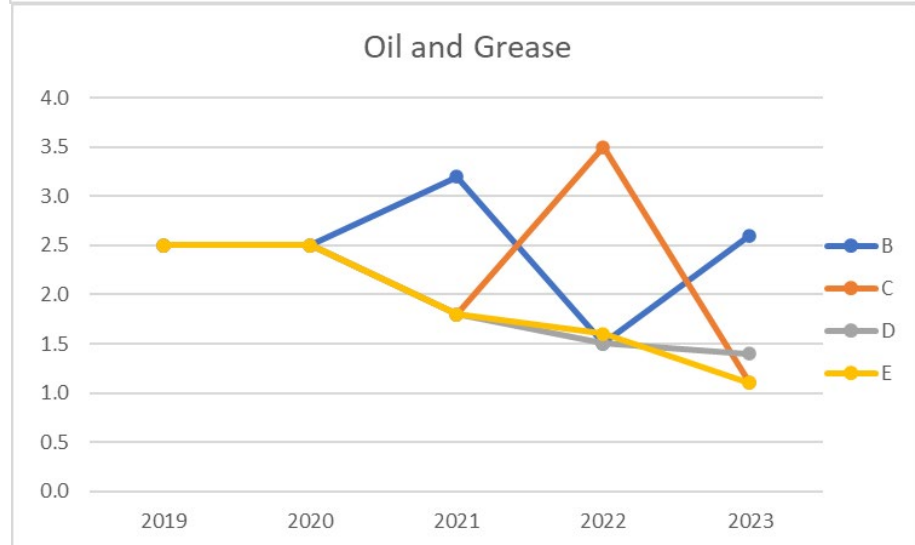
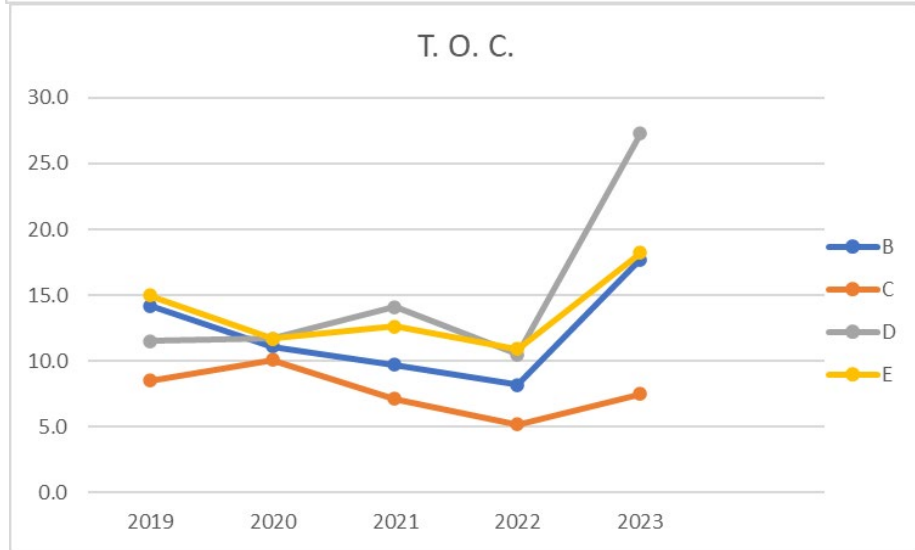
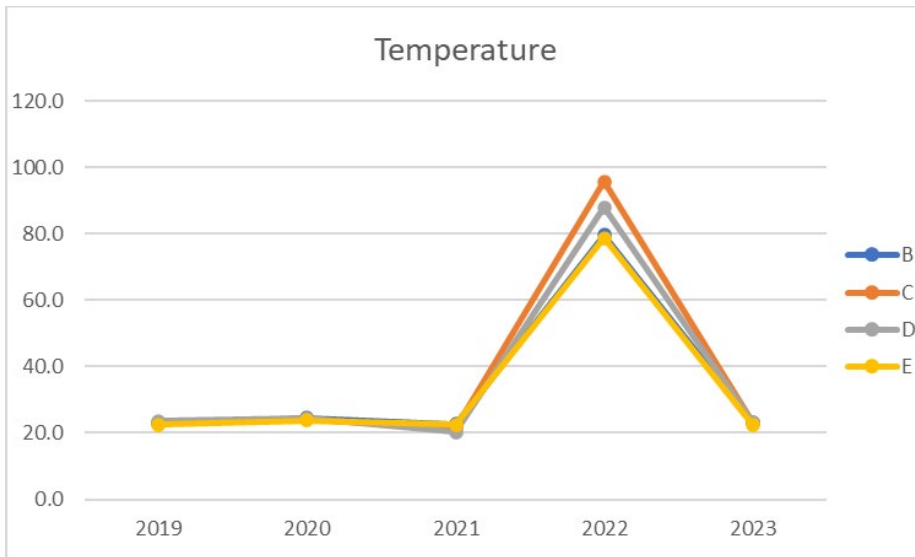


Table D-5 2022 Data Summary for Bryan Mound Monitoring Stations

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	4	2	4	4	4	4
	Number of BDL	0	2	NV	0	NV	0
	Maximum	10.0	2.5	7.8	5.6	22.8	29.0
	Minimum	8.2	2.4	7.4	4.0	21.3	4.2
	Mean	9.1	2.5	7.5	4.6	22.0	18.1
	Median	9.1	2.5	7.4	4.5	22.0	19.5
	Standard Deviation	1.0	0.1	NV	0.7	0.8	11.9
	Coefficient of Variation	11.0	4.0	NV	15.2	3.6	65.7
B	Sample Size	4	2	4	4	4	4
	Number of BDL	0	1	NV	0	NV	0
	Maximum	9.7	4.0	7.8	5.6	22.9	30.5
	Minimum	8.6	2.5	7.1	4.0	21.3	4.2
	Mean	9.1	3.3	7.3	4.6	22.0	18.8
	Median	9.1	3.3	7.2	4.5	22.0	20.3
	Standard Deviation	0.5	1.1	NV	0.7	0.8	12.5
	Coefficient of Variation	5.5	33.3	NV	15.2	3.6	66.5
C	Sample Size	4	2	4	4	4	4
	Number of BDL	0	1	NV	0	NV	0
	Maximum	9.9	2.8	7.6	5.6	22.9	29.6
	Minimum	8.5	2.4	7.3	4.0	21.3	4.2
	Mean	9.0	2.6	7.4	4.6	22.0	18.6
	Median	8.8	2.6	7.4	4.5	22.0	20.3
	Standard Deviation	0.6	0.3	NV	0.7	0.8	12.3
	Coefficient of Variation	6.7	11.5	NV	15.2	3.6	66.1
D	Sample Size	4	2	4	4	4	4
	Number of BDL	0	2	NV	0	NV	0
	Maximum	9.4	2.5	7.9	5.5	22.9	26.6
	Minimum	8.2	2.5	7.2	4.0	21.3	4.2
	Mean	8.9	2.5	7.5	4.5	22.2	14.3
	Median	9.2	2.5	7.4	4.1	22.5	12.1
	Standard Deviation	0.6	#DIV/0!	NV	0.8	0.8	11.4
	Coefficient of Variation	6.7	#DIV/0!	NV	17.8	3.6	79.7
E	Sample Size	4	2	4	4	4	4
	Number of BDL	0	2	NV	0	NV	0
	Maximum	9.5	2.5	7.9	5.6	22.8	28.7
	Minimum	8.1	2.5	7.2	4.1	21.3	4.6
	Mean	8.8	2.5	7.5	4.7	22.0	18.3
	Median	8.8	2.5	7.5	4.5	22.0	19.9
	Standard Deviation	0.7	0.0	NV	0.7	0.8	11.7
	Coefficient of Variation	8.0	0.0	NV	14.9	3.6	63.9

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	4	2	4	4	4	4
	Number of BDL	0	1	NV	0	NV	0
	Maximum	9.9	2.8	7.5	5.5	22.8	27.2
	Minimum	8.2	2.5	7.1	4.0	21.3	4.2
	Mean	9.1	2.7	7.2	4.6	22.0	17.6
	Median	9.2	2.7	7.2	4.4	22.0	19.5
	Standard Deviation	0.9	0.2	NV	0.7	0.8	11.3
	Coefficient of Variation	9.9	7.4	NV	15.2	3.6	64.2
G	Sample Size	4	2	4	4	4	4
	Number of BDL	0	2	NV	0	NV	0
	Maximum	9.9	2.5	7.8	5.5	22.9	26.5
	Minimum	8.3	2.4	7.3	4.1	21.4	4.2
	Mean	9.2	2.5	7.5	4.6	22.1	17.2
	Median	9.2	2.5	7.5	4.5	22.0	19.1
	Standard Deviation	0.8	0.1	NV	0.6	0.7	10.9
	Coefficient of Variation	8.7	4.0	NV	13.0	3.2	63.4
H	Sample Size	12	4	12	12	12	12
	Number of BDL	0	3	NV	0	NV	0
	Maximum	9.4	3.3	8.0	39.4	28.1	37.4
	Minimum	1.8	2.0	7.1	3.9	21.1	2.0
	Mean	6.8	2.6	7.6	22.6	23.7	10.8
	Median	7.0	2.5	7.6	23.4	23.0	5.0
	Standard Deviation	2.0	0.6	NV	10.4	2.3	11.7
	Coefficient of Variation	29.4	23.1	NV	46.0	9.7	108.3
I	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	9.7	2.5	7.9	39.5	28.2	32.6
	Minimum	1.5	2.5	7.1	3.9	21.2	2.0
	Mean	6.8	2.5	7.5	22.6	23.7	10.1
	Median	6.9	2.5	7.5	23.5	23.0	4.9
	Standard Deviation	2.2	0.0	NV	10.4	2.3	10.9
	Coefficient of Variation	32.4	0.0	NV	46.0	9.7	107.9
J	Sample Size	12	4	12	12	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	9.5	2.5	8.0	39.5	28.1	31.7
	Minimum	1.3	2.5	7.2	3.8	21.2	2.0
	Mean	6.7	2.5	7.6	22.6	23.7	10.0
	Median	6.7	2.5	7.6	23.5	23.1	4.8
	Standard Deviation	2.2	0.0	NV	10.4	2.3	10.4
	Coefficient of Variation	32.8	0.0	NV	46.0	9.7	104.0

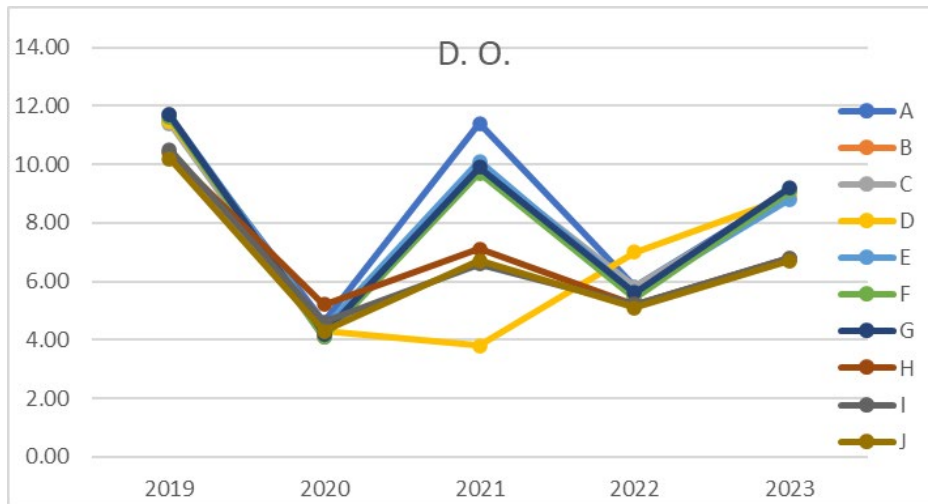
Note: BDL = Number of samples that were below the detectable limit.
 NV = Not a valid number or statistically meaningful.

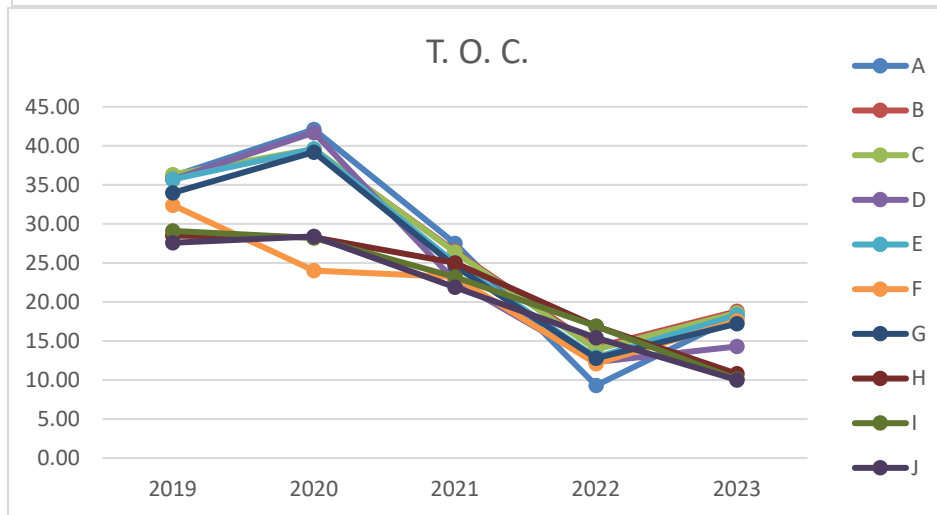
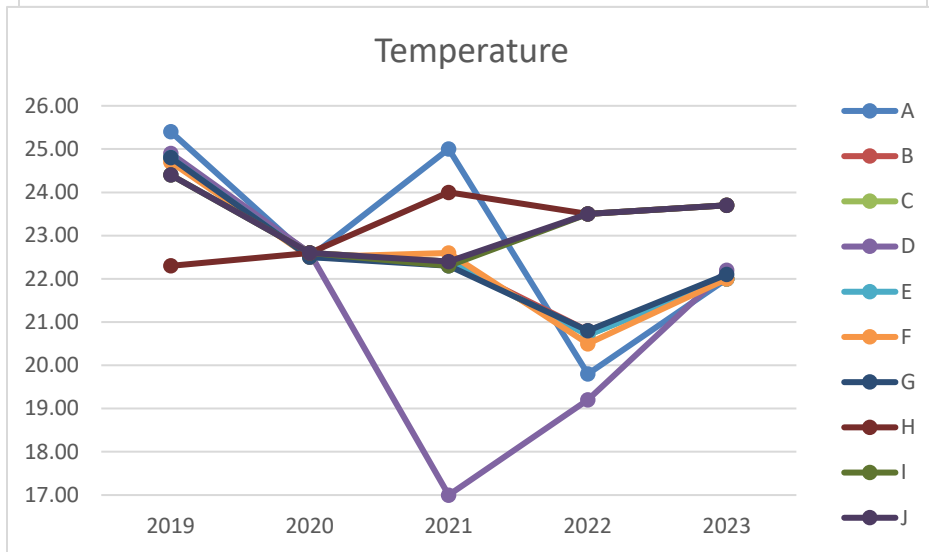
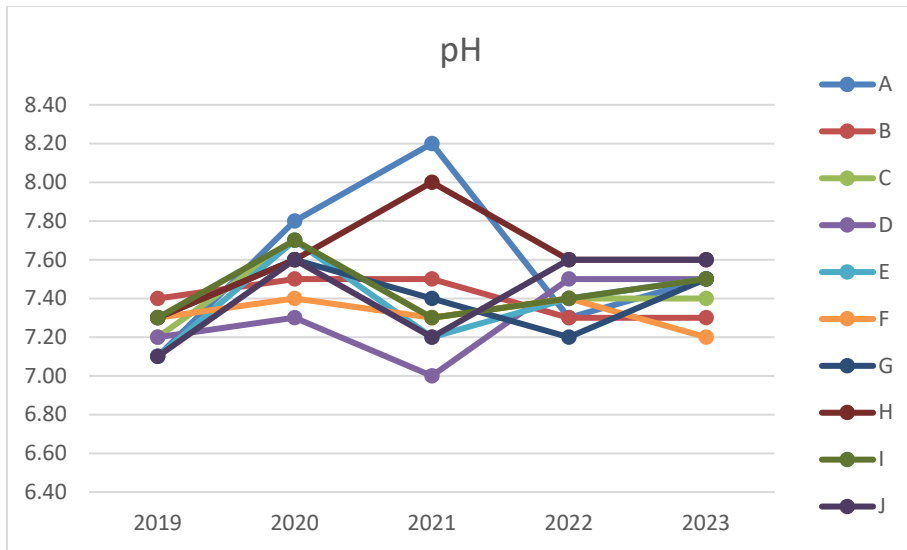
Table D-6 5-Year Trending Data for Bryan Mound Monitoring Stations

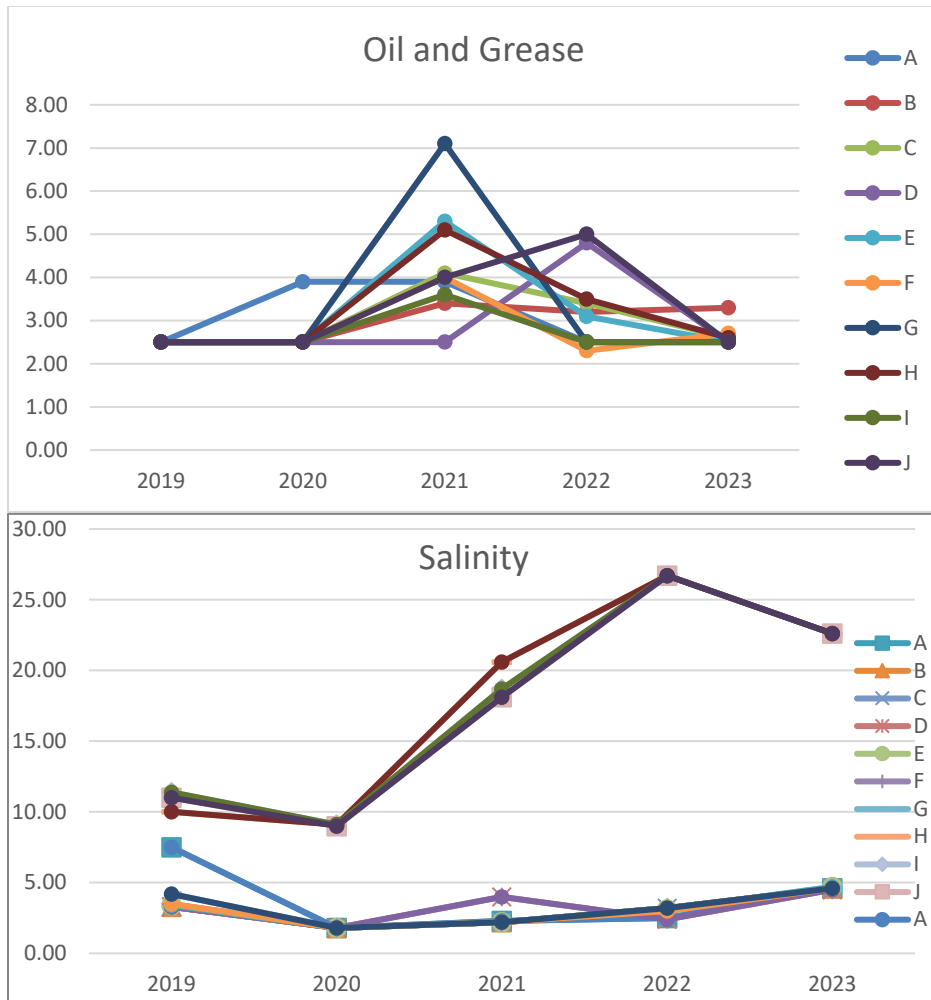
Station	Year	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	2019	11.50	2.50	7.10	7.50	25.40	36.10
	2020	4.6	3.9	7.8	1.8	22.5	42.1
	2021	11.4	3.9	8.2	2.3	25.0	27.5
	2022	5.8	2.5	7.3	2.5	19.8	9.3
	2023	9.1	2.5	7.5	4.6	22	18.1
B	2019	11.7	2.5	7.4	3.3	24.8	35.9
	2020	4.1	2.5	7.5	1.8	22.6	39.5
	2021	10.0	3.4	7.5	2.2	22.4	26.5
	2022	5.5	3.2	7.3	3.2	20.8	14.2
	2023	9.1	3.3	7.3	4.6	22	18.8
C	2019	11.4	2.5	7.2	3.3	24.8	36.3
	2020	4.1	2.5	7.7	1.8	22.6	39.6
	2021	10.0	4.1	7.3	2.2	22.4	26.4
	2022	5.8	3.4	7.4	3.2	20.7	13.9
	2023	9	2.6	7.4	4.6	22	18.6
D	2019	11.5	2.5	7.2	3.3	24.9	35.7
	2020	4.3	2.5	7.3	1.8	22.6	41.7
	2021	3.8	2.5	7.0	4.0	17.0	22.7
	2022	7	4.8	7.5	2.4	19.2	12.3
	2023	8.9	2.5	7.5	4.5	22.2	14.3
E	2019	11.7	2.5	7.1	3.4	24.8	35.7
	2020	4.4	2.5	7.7	1.8	22.5	39.6
	2021	10.1	5.3	7.2	2.2	22.4	25.0
	2022	5.6	3.1	7.4	3.1	20.7	12.9
	2023	8.8	2.5	7.5	4.7	22	18.3
F	2019	11.6	2.5	7.3	3.5	24.7	32.4
	2020	4.1	2.5	7.4	1.8	22.5	24.0
	2021	9.7	4.0	7.3	2.2	22.6	23.2
	2022	5.4	2.3	7.4	3	20.5	12.1
	2023	9.1	2.7	7.2	4.6	22	17.6
G	2019	11.7	2.5	7.3	4.2	24.8	34.0
	2020	4.2	2.5	7.6	1.8	22.5	39.2
	2021	9.9	7.1	7.4	2.2	22.3	24.6
	2022	5.6	2.5	7.2	3.2	20.8	12.8
	2023	9.2	2.5	7.5	4.6	22.1	17.2
H	2019	10.4	2.5	7.3	10.0	22.3	28.5

	2020	5.2	2.5	7.6	9.1	22.6	28.3
	2021	7.1	5.1	8.0	20.6	24.0	25.0
	2022	5.2	3.5	7.6	26.7	23.5	16.9
	2023	6.8	2.6	7.6	22.6	23.7	10.8
I	2019	10.5	2.5	7.3	11.4	24.4	29.1
	2020	4.6	2.5	7.7	9.1	22.6	28.2
	2021	6.6	3.6	7.3	18.7	22.3	23.2
	2022	5.2	2.5	7.4	26.7	23.5	16.9
	2023	6.8	2.5	7.5	22.6	23.7	10.1
J	2019	10.2	2.5	7.1	11.0	24.4	27.6
	2020	4.3	2.5	7.6	9.0	22.6	28.4
	2021	6.7	4	7.2	18.1	22.4	21.9
	2022	5.1	5	7.6	26.7	23.5	15.4
	2023	6.7	2.5	7.6	22.6	23.7	10

Figure D-6 5- Year Trending Data for Bryan Mound Environmental Monitoring Stations







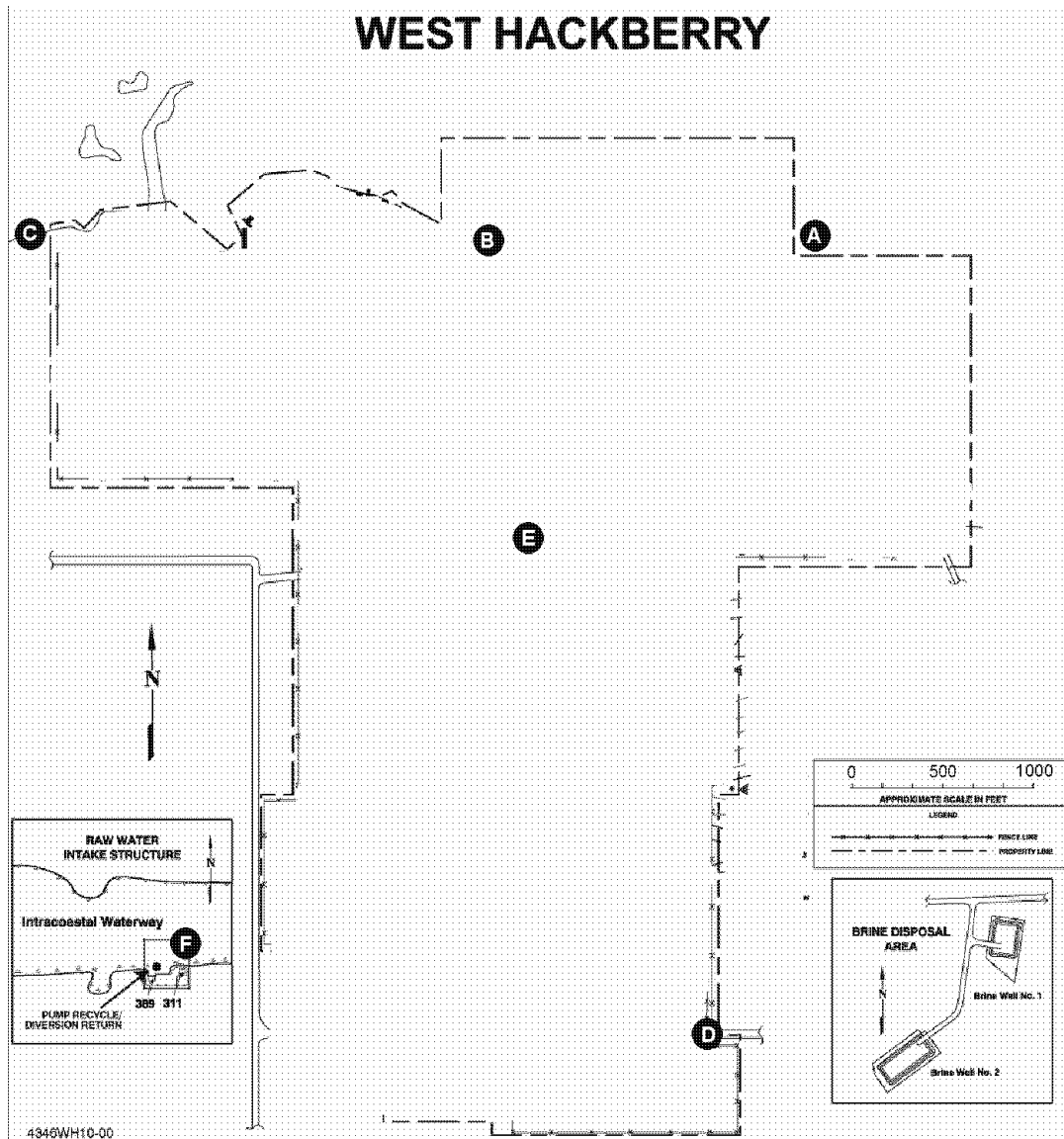


Figure D-7 West Hackberry Environmental Monitoring Stations

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)

Table D-7 2023 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	10	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	13.6	2.5	8.0	10.8	31.0	9.0
	Minimum	8.1	2.5	6.8	4.7	15.0	6.2
	Mean	11.0	2.5	7.7	7.2	24.1	7.4
	Median	11.0	2.5	7.7	7.2	25.5	7.4
	Standard Deviation	1.7	0.0	NV	2.0	6.0	0.9
	Coefficient of Variation	15.5	0.0	NV	27.8	24.9	12.2
B	Sample Size	12	4	12	10	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	13.8	2.5	8.1	18.1	31.0	9.0
	Minimum	7.0	2.5	7.2	4.1	15.0	6.1
	Mean	10.8	2.5	7.7	8.3	23.9	7.2
	Median	10.5	2.5	7.7	8.0	27.0	7.0
	Standard Deviation	2.0	0.0	NV	4.4	5.8	1.0
	Coefficient of Variation	18.5	0.0	NV	53.0	24.3	13.9
C	Sample Size	12	4	12	10	12	12
	Number of BDL	0	4	NV	0	NV	0
	Maximum	13.8	2.5	8.3	17.1	31.0	11.6
	Minimum	8.5	2.5	7.5	0.2	15.0	3.6
	Mean	11.1	2.5	7.8	5.7	25.5	7.6
	Median	11.5	2.5	7.8	3.0	27.0	7.4
	Standard Deviation	1.8	0.0	NV	6.2	5.1	2.2
	Coefficient of Variation	16.2	0.0	NV	108.8	20.0	28.9
D	Sample Size	11	4	11	9	11	11
	Number of BDL	0	4	NV	8	NV	0
	Maximum	13.4	2.5	7.8	1.5	26.0	44.7
	Minimum	13.1	2.5	7.3	0.7	14.0	3.4
	Mean	13.2	2.5	7.6	1.0	21.3	17.4
	Median	13.2	2.5	7.6	0.8	24.0	4.0
	Standard Deviation	0.1	0.0	NV	0.4	6.4	23.7
	Coefficient of Variation	0.8	0.0	NV	40.0	30.0	136.2
E	Sample Size	7	3	7	5	7	7
	Number of BDL	0	3	NV	5	NV	1
	Maximum	13.2	2.5	7.8	16.8	31.0	10.7
	Minimum	8.4	2.5	7.0	0.4	13.0	5.5
	Mean	10.9	2.5	7.4	2.8	23.8	7.3
	Median	10.9	2.5	7.4	1.0	25.5	6.8
	Standard Deviation	1.8	0.0	NV	5.0	6.0	1.6
	Coefficient of Variation	16.5	0.0	NV	178.6	25.2	21.9

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	12	4	12	10	12	12
	Number of BDL	0	4	NV	6	NV	0
	Maximum	0.0	0.0	0.0	0.0	0.0	0.0
	Minimum	0.0	0.0	0.0	0.0	0.0	0.0
	Mean	10.9	2.5	7.4	2.8	23.8	7.3
	Median	10.9	2.5	7.4	1.0	25.5	6.8
	Standard Deviation	1.8	0.0	NV	5.0	6.0	1.6
	Coefficient of Variation	16.5	0.0	NV	178.6	25.2	21.9

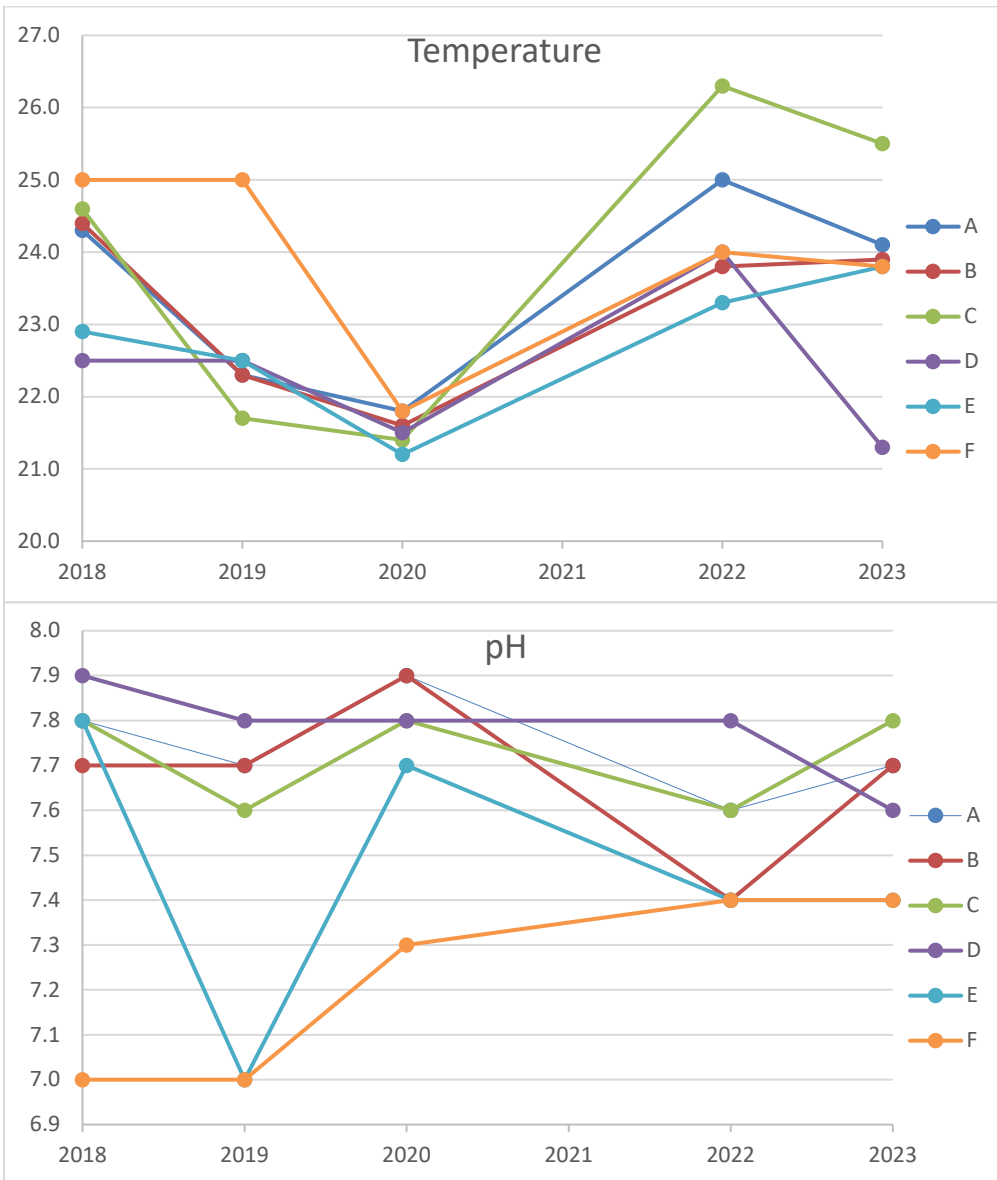
Note: BDL = Number of samples that were below the detectable limit.
 NV = Not a valid number or statistically meaningful.

Table D-8 5-Year Trending Data for West Hackberry Monitoring Stations

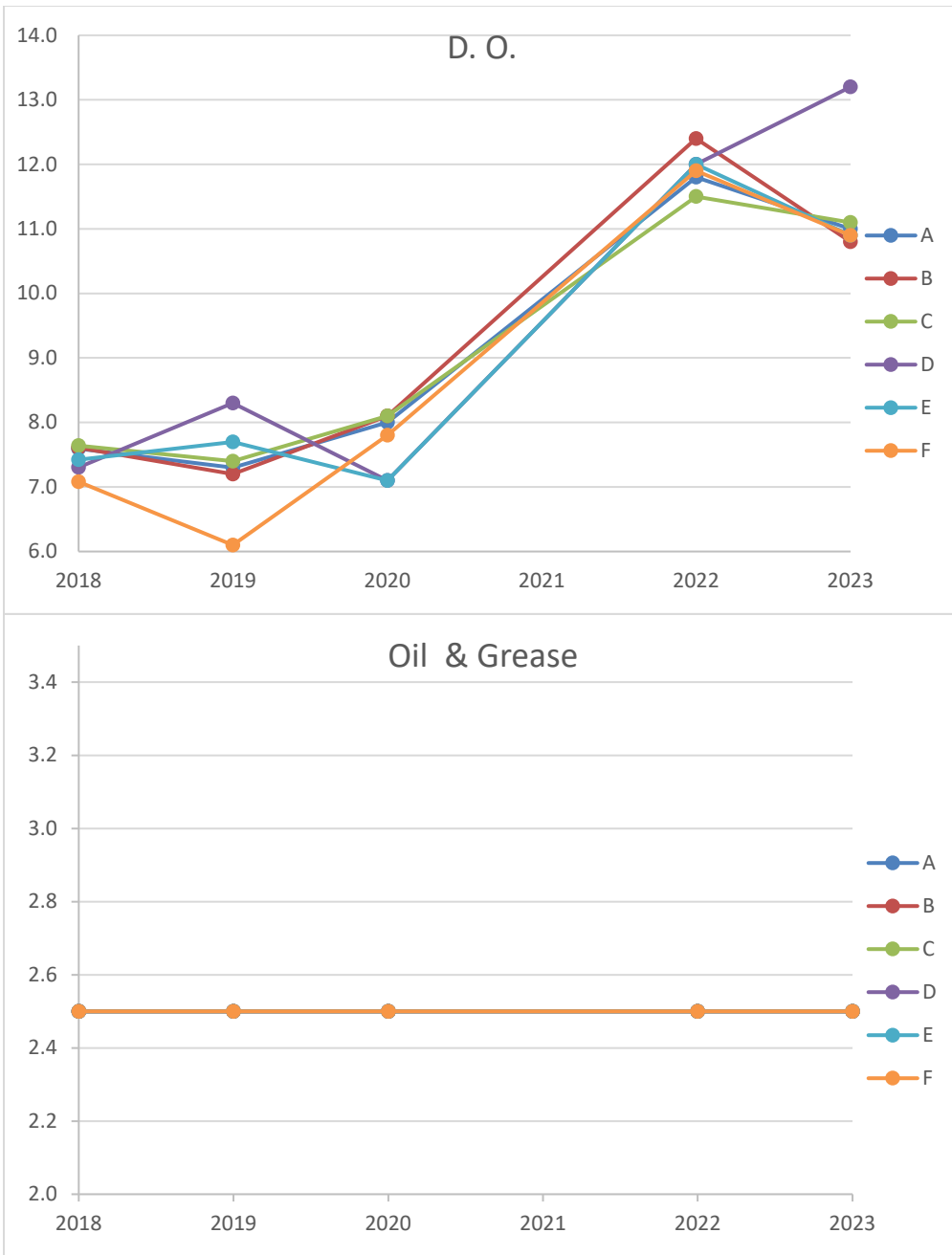
Station	Year	Dissolved Oxygen (mg/L)	Oil & Grease (mg/L)	pH (s.u.)	Salinity (ppt)	Temperature (°C)	Total Organic Carbon (mg/L)
A	2018	7.6	2.5	7.8	5.0	24.3	6.8
	2019	7.3	2.5	7.7	7.6	22.3	7.7
	2020	8.0	2.5	7.9	6.8	21.8	7.1
	2022	11.8	2.5	7.6	16.1	25.0	7.9
	2023	11.0	2.5	7.7	7.2	24.1	7.4
B	2018	7.6	2.5	7.7	5.0	24.4	6.7
	2019	7.2	2.5	7.7	7.5	22.3	7.9
	2020	8.1	2.5	7.9	6.6	21.6	7.1
	2022	12.4	2.5	7.4	15.5	23.8	7.6
	2023	10.8	2.5	7.7	8.3	23.9	7.2
C	2018	7.6	2.5	7.8	4.9	24.6	7.0
	2019	7.4	2.5	7.6	0.5	21.7	6.0
	2020	8.1	2.5	7.8	6.5	21.4	7.2
	2022	11.5	2.5	7.6	10.1	26.3	9.5
	2023	11.1	2.5	7.8	5.7	25.5	7.6
D	2018	7.3	2.5	7.9	0.6	22.5	5.1
	2019	8.3	2.5	7.8	0.5	22.5	4.1
	2020	7.1	2.5	7.8	0.5	21.5	6.8
	2022	12.0	2.5	7.8	0.4	24.0	12.3
	2023	13.2	2.5	7.6	1.0	21.3	17.4
E	2018	7.4	2.5	7.8	0.5	22.9	3.1
	2019	7.7	2.5	7.0	3.4	22.5	7.8
	2020	7.1	2.5	7.7	0.6	21.2	2.6
	2022	12.0	2.5	7.4	9.7	23.3	6.9

F	2023	10.9	2.5	7.4	2.8	23.8	7.3
	2018	7.1	2.5	7	2.1	25	7.6
	2019	6.1	2.5	7.0	2.1	25.0	7.6
	2020	7.8	2.5	7.3	3.1	21.8	7.7
	2022	11.9	2.5	7.4	10.7	24.0	7.1
	2023	10.9	2.5	7.4	2.8	23.8	7.3

Figure D-8 5-Year Trending Data for West Hackberry Monitoring Stations







Appendix E
QUALITY ASSURANCE
AUDITS DURING 2023

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-23-2023
	AUDITOR: Angela Coale

	CRITERIA	DOCUMENT NO.	ACC	
1.	<u>Environmental Samples</u> At a minimum sample bottle labels should contain the following: Unique sample identifier (Sample Number) <ul style="list-style-type: none"> a. Unique laboratory identifier (sample #) b. Sample point name /location or description c. Date and time of sample collection d. Name and initial of the person who collected the sample d. Type of analysis to be performed 	MSI700.133 version 5.0 section 5.2.1.1.1	<input checked="" type="checkbox"/>	Reviewed master log book. Sample bottles labeled. Dates and times were on the label and employees' initials. Also stated location from where sample was taken and for what reason.
2.	<u>Environmental Samples</u> Sample labels should meet the following conditions: <ul style="list-style-type: none"> a. Waterproof pen or marker must be used b. Labels and their adhesive must be made of material that does not dissolve or peel when exposed to moist conditions for an extended period. Clear plastic tape is suitable for this purpose. 	MSI700.133 version 5.0 section 5.2.1.1.2	<input checked="" type="checkbox"/>	Sharpies were used and clear labels on all samples

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-23-2023
	AUDITOR: Angela Coale

			<input type="checkbox"/>	Click here to enter text.
	CRITERIA	DOCUMENT NO.	ACC	FINDING
3.	<u>Environmental Media Chain of Custody Documentation: Ensure the following actions are take:</u> <ul style="list-style-type: none"> • 2.3.1 Record the Chain of Custody Record number in the Master Sample Log according to 6.2.3. • 2.3.2 Ensure that the original (white copy) of the form stays with the sample. The original (white copy) will be returned to the custodian once the analysis is complete. If not, then an electronic copy of the form should be received from the responsible party. • 2.3.3 If necessary, inform succeeding custodians to keep the sample and form together. • 2.3.4 Maintain a file of all Chain of Custody Record 	ASR7000.115 version 4.0, Section 2.3.1-2.3.4	<input checked="" type="checkbox"/>	Witnessed COC of water samples 3/17-3/20-3/27-4/04-4/18-5/2 COC matched the Master log book# All copies were retained in the file-verified Bio-Monitoring: 1/04-1/10-1/12/23

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-23-2023
	AUDITOR: Angela Coale

	yellow copies until the return of the original; then file the original and the yellow copy may either be maintained or discarded.			
4.	Calibration <ul style="list-style-type: none"> Are calibration data maintained in laboratory logbooks? Are calibration certifications kept in designated file? 	MSI700.133 version 5.0, Section 6	<input checked="" type="checkbox"/>	PH all calibrated in the log book documented
5.	Are routine calibration checks, in the range of interest using a set of class “1” weights, performed daily when an Analytical Balance is being used?	MSI700.133 version 5.0, Section 6.1	<input checked="" type="checkbox"/>	Saw Salinity check in log book
6.	Is the “true weight” and “observed weight” noted and documented in the laboratory’s balance log book?	MSI700.133 version 5.0, Section 6.1	<input checked="" type="checkbox"/>	Balance log book inputted
7.	Are Automatic <u>Pipettors</u> calibrated and checked every 6 months and recorded in the laboratory’s maintenance log book?	MSI700.133 version 5.0, Section 6.2	<input checked="" type="checkbox"/>	

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-23-2023
	AUDITOR: Angela Coale

8.	Are <u>ovens and refrigerators</u> monitored by using NIST traceable certified thermometers and temperatures documented daily in the laboratory appliance log?	MSI700.133 version 5.0, Section 6.3	<input checked="" type="checkbox"/>	Lab log book inputted daily
9.	Are <u>Hydrometers</u> examined for damage and verified by comparison to a primary standard NIST certified hydrometer before initial use?	MSI700.133 version 5.0, Section 6.4	<input checked="" type="checkbox"/>	compliance certificate , good condition; and she had paperwork on each one
10.	Are <u>Thermometers</u> certified against a NIST traceable primary standard before initial use and annually thereafter?	MSI700.133 version 5.0, Section 6.6	<input checked="" type="checkbox"/>	Yes they were calibrated 3/2023
11..	Are <u>Volumetric Ware</u> used for volumetric measurements rated as Class A or conform to Class A standards (NBC Circular 434 or ATM Special Publication 148-H)	MSI700.133 version 5.0, Section 6.7	<input checked="" type="checkbox"/>	Showed me all the information from the log book
12.	All Instruments and equipment calibration activities are recorded in the appropriate records in accordance with the current work instruction MSW7000.700?	MSI700.133 version 5.0, Section 6.9	<input checked="" type="checkbox"/>	Yes they were and other equipment’s calibration sheets were in the file folders for reference
13.	<u>STANDARDS, REAGENTS AND CHEMICALS</u> When standards, chemicals, materials, or reagents are received into the laboratory are the following actions accomplished:	MSI700.133 version 5.0, Section 9.3	<input checked="" type="checkbox"/>	Received date and opened dates written on bottle

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-23-2023
	AUDITOR: Angela Coale

	<ul style="list-style-type: none"> • Date of receipt written on the bottle or container label and documented into the appropriate log book? • Is the material name, manufacture, lot number, and expiration date recorded in the appropriate logbook? • Once the container is opened and placed into service the date and expiration date is recorded on the container label and in the appropriate logbook? 			
14.	DOCUMENTATION Is laboratory data recorded in ink in a bound notebook with sequentially numbered pages, initialed and dated by the applicable analysts?	MSI700.133 version 5.0, Section 10.1.1	<input checked="" type="checkbox"/>	Yes- blue/black
15.	Are erroneous entries crossed through once, initialed and dated in a manner that permits the incorrect entry to remain legible?	MSI700.133 version 5.0, Section 10.1.1	<input checked="" type="checkbox"/>	Yes I was shown some examples
16.	Is a chemical inventory (listing all chemicals stored and or used in or by the laboratory that “belongs” to the laboratory) completed quarterly?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	Yes, showed me copies and were signed- they were current
17.	Does the chemical inventory list the quantities, container type and location?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	Yes it does

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-23-2023
	AUDITOR: Angela Coale

18.	Is the chemical inventory provided to the site ES&H department and a copy printed and filed with laboratory SDS file, and is the copy updated on a quarterly basis within the SDS file?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	All copies were in the lab SDS book and updated quarterly.
19.	Is there evidence of monthly waste inventory being conducted?	MSI700.133 version 5.0, Section 10.3.4	<input checked="" type="checkbox"/>	Showed evidence in log book and put in ESS. I was shown logs in ESS
20.	<u>LABORATORY SAFETY AND SECURITY</u> Is the following Protective Equipment used as identified in section 13.2?	MSI700.133 version 5.0, Section 13.2	<input checked="" type="checkbox"/>	
21.	<u>Laboratory Training</u> Have laboratory personnel received the specific training activities as identified in table 11.1-1 Typical training requirements for laboratory personnel?	MSI700.133 version 5.0, Section 14	<input checked="" type="checkbox"/>	Showed me all her training in her log book. All training was current
22.	Are the following Chemical Hygiene Plan general rules followed: <ul style="list-style-type: none"> • No eating, drinking, smoking or applying cosmetics in the laboratory and in chemical storage or use areas? 	MSI700.133 version 5.0, Appendix A Section 3	<input checked="" type="checkbox"/>	Floor marked for the correct sections with tape. No food in the refrigerator. Fire extinguishers were on location and had current tags punched. She does work alone in the lab but her coworker from safety checks on her and so does her supervisor. Showed me where her chemicals were stored and were stored properly.

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-23-2023
	AUDITOR: Angela Coale

	<ul style="list-style-type: none"> • No storing, handling, or consuming food or beverages in storage areas, refrigerators, glassware, or utensils that are used for lab operations? • Do not use mouth suction for pipetting or starting a siphon? • Confine long hair and loose clothing? • Know the location of fire extinguishers, showers, exits, and eyewash fountains/stations? • Do not use or handle any chemical until you have read and understood the label and SDS for that chemical? • Wash areas of exposed skin with soap and water upon any instance of chemical contact. Do not wash with solvents? • Limit chemicals stored at the lab bench or other work areas to those amounts necessary for daily operation. The container size shall be the minimum convenient? • Avoid skin contact with all chemicals. 			
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<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-23-2023
	AUDITOR: Angela Coale

<ul style="list-style-type: none"> • Avoid inhalation of chemicals; do not perform “sniff” tests? • Use all laboratory equipment only for its intended purpose? • Floors, aisles, and exits shall be kept clean, dry, and free of obstructions. • Fire extinguishing equipment, eyewashes, showers, electrical disconnects, and other emergency equipment shall remain unobstructed • Never work alone in a laboratory or chemical storage area if possible If not possible, arrange to have someone check on you on a periodic and frequent basis. • When working with flammable chemicals, arrange the work area such that no sources of ignition are near enough to cause a fire or explosion, in case of a vapor release or liquid spill? 				
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<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-29-2023
	AUDITOR: Angela Coale

	CRITERIA	DOCUMENT NO.	ACC	
1.	<p><u>Environmental Samples</u> At a minimum sample bottle labels should contain the following: Unique sample identifier (Sample Number)</p> <ul style="list-style-type: none"> a. Unique laboratory identifier (sample #) b. Sample point name /location or description c. Date and time of sample collection d. Name and initial of the person who collected the sample d. Type of analysis to be performed 	MSI700.133 version 5.0 section 5.2.1.1.1	<input checked="" type="checkbox"/>	Reviewed master log book. Sample bottles labeled with dates and times were on the label and employees’ initials. Also stated location from where sample was taken and for what reason. Initialed in log book
2.	<p><u>Environmental Samples</u> Sample labels should meet the following conditions:</p> <ul style="list-style-type: none"> a. Waterproof pen or marker must be used b. Labels and their adhesive must be made of material that does not dissolve or peel when exposed to moist conditions for an extended period. Clear plastic tape is suitable for this purpose. 	MSI700.133 version 5.0 section 5.2.1.1.2	<input checked="" type="checkbox"/>	Sharpies were used and clear labels on all samples

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-29-2023
	AUDITOR: Angela Coale

			<input type="checkbox"/>	Click here to enter text.
	CRITERIA	DOCUMENT NO.	ACC	FINDING
3.	<u>Environmental Media Chain of Custody Documentation: Ensure the following actions are take:</u> <ul style="list-style-type: none"> • 2.3.1 Record the Chain of Custody Record number in the Master Sample Log according to 6.2.3. • 2.3.2 Ensure that the original (white copy) of the form stays with the sample. The original (white copy) will be returned to the custodian once the analysis is complete. If not, then an electronic copy of the form should be received from the responsible party. • 2.3.3 If necessary, inform succeeding custodians to keep the sample and form together. • 2.3.4 Maintain a file of all Chain of Custody Record 	ASR7000.115 version 4.0, Section 2.3.1-2.3.4	<input checked="" type="checkbox"/>	Witnessed COC of water samples COC matched the Master log book# All copies were retained in the file-verified Bio-Monitoring: #008047 11/23/23 **Was stopped per DOE due to complications with BMT1 and process to get rid of water from tank. COC: #008045/#008046/ #00847/ #00849 10/23-10/16-11/7

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-29-2023
	AUDITOR: Angela Coale

	yellow copies until the return of the original; then file the original and the yellow copy may either be maintained or discarded.			
4.	Calibration <ul style="list-style-type: none"> Are calibration data maintained in laboratory logbooks? Are calibration certifications kept in designated file? 	MSI700.133 version 5.0, Section 6	<input checked="" type="checkbox"/>	PH all calibrated in the log book documented- Visual inspection of calibration certs on file 10/24-11/7-11/20/2023
5.	Are routine calibration checks, in the range of interest using a set of class “1” weights, performed daily when an Analytical Balance is being used?	MSI700.133 version 5.0, Section 6.1	<input checked="" type="checkbox"/>	Saw routine Salinity checks in log book 10/9-11/20/23
6.	Is the “true weight” and “observed weight” noted and documented in the laboratory’s balance log book?	MSI700.133 version 5.0, Section 6.1	<input checked="" type="checkbox"/>	Balance log book inputted 10/9
7.	Are Automatic <u>Pipettors</u> calibrated and checked every 6 months and recorded in the laboratory’s maintenance log book?	MSI700.133 version 5.0, Section 6.2	<input checked="" type="checkbox"/>	Witnessed log book entries 6/1-7/10-9/5-11/7/23

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-29-2023
	AUDITOR: Angela Coale

8.	Are <u>ovens and refrigerators</u> monitored by using NIST traceable certified thermometers and temperatures documented daily in the laboratory appliance log?	MSI700.133 version 5.0, Section 6.3	<input checked="" type="checkbox"/>	Lab log book inputted daily
9.	Are <u>Hydrometers</u> examined for damage and verified by comparison to a primary standard NIST certified hydrometer before initial use?	MSI700.133 version 5.0, Section 6.4	<input checked="" type="checkbox"/>	compliance certificate , good condition; and she had paperwork on each one
10.	Are <u>Thermometers</u> certified against a NIST traceable primary standard before initial use and annually thereafter?	MSI700.133 version 5.0, Section 6.6	<input checked="" type="checkbox"/>	Yes they were calibrated 3/2023
11..	Are <u>Volumetric Ware</u> used for volumetric measurements rated as Class A or conform to Class A standards (NBC Circular 434 or ATM Special Publication 148-H)	MSI700.133 version 5.0, Section 6.7	<input checked="" type="checkbox"/>	Showed me all the information from the log book
12.	All Instruments and equipment calibration activities are recorded in the appropriate records in accordance with the current work instruction MSW7000.700?	MSI700.133 version 5.0, Section 6.9	<input checked="" type="checkbox"/>	Yes they were and all equipment’s calibration sheets were in the file folders for reference
13.	<u>STANDARDS, REAGENTS AND CHEMICALS</u> When standards, chemicals, materials, or reagents are received into the laboratory are the following actions accomplished:	MSI700.133 version 5.0, Section 9.3	<input checked="" type="checkbox"/>	Received date and opened dates written on each bottle 8/22/22

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-29-2023
	AUDITOR: Angela Coale

	<ul style="list-style-type: none"> • Date of receipt written on the bottle or container label and documented into the appropriate log book? • Is the material name, manufacture, lot number, and expiration date recorded in the appropriate logbook? • Once the container is opened and placed into service the date and expiration date is recorded on the container label and in the appropriate logbook? 			
14.	DOCUMENTATION Is laboratory data recorded in ink in a bound notebook with sequentially numbered pages, initialed and dated by the applicable analysts?	MSI700.133 version 5.0, Section 10.1.1	<input checked="" type="checkbox"/>	Yes- blue/black ink
15.	Are erroneous entries crossed through once, initialed and dated in a manner that permits the incorrect entry to remain legible?	MSI700.133 version 5.0, Section 10.1.1	<input checked="" type="checkbox"/>	Yes I was shown some examples
16.	Is a chemical inventory (listing all chemicals stored and or used in or by the laboratory that “belongs” to the laboratory) completed quarterly?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	Yes, saw all copies and were signed- they were current and dated
17.	Does the chemical inventory list the quantities, container type and location?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	Yes

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-29-2023
	AUDITOR: Angela Coale

18.	Is the chemical inventory provided to the site ES&H department and a copy printed and filed with laboratory SDS file, and is the copy updated on a quarterly basis within the SDS file?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	All copies were in the lab SDS book and updated quarterly. Verified by dates
19.	Is there evidence of monthly waste inventory being conducted?	MSI700.133 version 5.0, Section 10.3.4	<input checked="" type="checkbox"/>	Showed evidence in log book and put in ESS. I was shown logs in ESS
20.	<u>LABORATORY SAFETY AND SECURITY</u> Is the following Protective Equipment used as identified in section 13.2?	MSI700.133 version 5.0, Section 13.2	<input checked="" type="checkbox"/>	
21.	<u>Laboratory Training</u> Have laboratory personnel received the specific training activities as identified in table 11.1-1 Typical training requirements for laboratory personnel?	MSI700.133 version 5.0, Section 14	<input checked="" type="checkbox"/>	Showed me all her training in her log book. All training was current. Very well documented
22.	Are the following Chemical Hygiene Plan general rules followed: <ul style="list-style-type: none"> • No eating, drinking, smoking or applying cosmetics in the laboratory and in chemical storage or use areas? 	MSI700.133 version 5.0, Appendix A Section 3	<input checked="" type="checkbox"/>	Floor marked for the correct sections with tape. No food in the refrigerator. Fire extinguishers were on location and had current tags punched. She does work alone in the lab but her coworker from safety checks on her and so does her supervisor. Showed me where her chemicals were stored and were stored properly.

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-29-2023
	AUDITOR: Angela Coale

	<ul style="list-style-type: none"> • No storing, handling, or consuming food or beverages in storage areas, refrigerators, glassware, or utensils that are used for lab operations? • Do not use mouth suction for pipetting or starting a siphon? • Confine long hair and loose clothing? • Know the location of fire extinguishers, showers, exits, and eyewash fountains/stations? • Do not use or handle any chemical until you have read and understood the label and SDS for that chemical? • Wash areas of exposed skin with soap and water upon any instance of chemical contact. Do not wash with solvents? • Limit chemicals stored at the lab bench or other work areas to those amounts necessary for daily operation. The container size shall be the minimum convenient? • Avoid skin contact with all chemicals. 			
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<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input checked="" type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-29-2023
	AUDITOR: Angela Coale

<ul style="list-style-type: none"> • Avoid inhalation of chemicals; do not perform “sniff” tests? • Use all laboratory equipment only for its intended purpose? • Floors, aisles, and exits shall be kept clean, dry, and free of obstructions. • Fire extinguishing equipment, eyewashes, showers, electrical disconnects, and other emergency equipment shall remain unobstructed • Never work alone in a laboratory or chemical storage area if possible If not possible, arrange to have someone check on you on a periodic and frequent basis. • When working with flammable chemicals, arrange the work area such that no sources of ignition are near enough to cause a fire or explosion, in case of a vapor release or liquid spill? 				
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<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-24-2023
	AUDITOR: Alex Lewis

	CRITERIA	DOCUMENT NO.	ACC	
1.	<u>Environmental Samples</u> At a minimum sample bottle labels should contain the following: Unique sample identifier (Sample Number) <ul style="list-style-type: none"> a. Unique laboratory identifier (sample #) b. Sample point name /location or description c. Date and time of sample collection d. Name and initial of the person who collected the sample d. Type of analysis to be performed 	MSI700.133 version 5.0 section 5.2.1.1.1	<input checked="" type="checkbox"/>	All labels are adhesive provide by vendor Earth Analytical
2.	<u>Environmental Samples</u> Sample labels should meet the following conditions: <ul style="list-style-type: none"> a. Waterproof pen or marker must be used b. Labels and their adhesive must be made of material that does not dissolve or peel when exposed to moist conditions for an extended period. Clear plastic tape is suitable for this purpose. 	MSI700.133 version 5.0 section 5.2.1.1.2	<input checked="" type="checkbox"/>	

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-24-2023
	AUDITOR: Alex Lewis

	CRITERIA	DOCUMENT NO.	ACC
3.	<u>Environmental Media Chain of Custody Documentation: Ensure the following actions are take:</u> <ul style="list-style-type: none"> • 2.3.1 Record the Chain of Custody Record number in the Master Sample Log according to 6.2.3. • 2.3.2 Ensure that the original (white copy) of the form stays with the sample. The original (white copy) will be returned to the custodian once the analysis is complete. If not, then an electronic copy of the form should be received from the responsible party. • 2.3.3 If necessary, inform succeeding custodians to keep the sample and form together. • 2.3.4 Maintain a file of all Chain of Custody Record 	ASR7000.115 version 4.0, Section 2.3.1-2.3.4	<input checked="" type="checkbox"/>

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-24-2023
	AUDITOR: Alex Lewis

	yellow copies until the return of the original; then file the original and the yellow copy may either be maintained or discarded.			
4.	Calibration <ul style="list-style-type: none"> Are calibration data maintained in laboratory logbooks? Are calibration certifications kept in designated file? 	MSI700.133 version 5.0, Section 6	<input checked="" type="checkbox"/>	
5.	Are routine calibration checks, in the range of interest using a set of class “1” weights, performed daily when an Analytical Balance is being used?	MSI700.133 version 5.0, Section 6.1	<input checked="" type="checkbox"/>	
6.	Is the “true weight” and “observed weight” noted and documented in the laboratory’s balance log book?	MSI700.133 version 5.0, Section 6.1	<input checked="" type="checkbox"/>	
7.	Are Automatic <u>Pipettors</u> calibrated and checked every 6 months and recorded in the laboratory’s maintenance log book?	MSI700.133 version 5.0, Section 6.2	<input type="checkbox"/>	Not used due to Total Organic Carbon machine not in use

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
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	AUDITOR: Alex Lewis

8.	Are <u>ovens and refrigerators</u> monitored by using NIST traceable certified thermometers and temperatures documented daily in the laboratory appliance log?	MSI700.133 version 5.0, Section 6.3	<input checked="" type="checkbox"/>	
9.	Are <u>Hydrometers</u> examined for damage and verified by comparison to a primary standard NIST certified hydrometer before initial use?	MSI700.133 version 5.0, Section 6.4	<input type="checkbox"/>	BH Hydrometers are purchased NIST certified & inspected for damage before each use
10.	Are <u>Thermometers</u> certified against a NIST traceable primary standard before initial use and annually thereafter?	MSI700.133 version 5.0, Section 6.6	<input checked="" type="checkbox"/>	
11..	Are <u>Volumetric Ware</u> used for volumetric measurements rated as Class A or conform to Class A standards (NBC Circular 434 or ATM Special Publication 148-H)	MSI700.133 version 5.0, Section 6.7	<input checked="" type="checkbox"/>	
12.	All Instruments and equipment calibration activities are recorded in the appropriate records in accordance with the current work instruction MSW7000.700?	MSI700.133 version 5.0, Section 6.9	<input checked="" type="checkbox"/>	
13.	<u>STANDARDS, REAGENTS AND CHEMICALS</u> When standards, chemicals, materials, or reagents are received into the laboratory are the following actions accomplished:	MSI700.133 version 5.0, Section 9.3	<input checked="" type="checkbox"/>	

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-24-2023
	AUDITOR: Alex Lewis

	<ul style="list-style-type: none"> • Date of receipt written on the bottle or container label and documented into the appropriate log book? • Is the material name, manufacture, lot number, and expiration date recorded in the appropriate logbook? • Once the container is opened and placed into service the date and expiration date is recorded on the container label and in the appropriate logbook? 			
14.	DOCUMENTATION Is laboratory data recorded in ink in a bound notebook with sequentially numbered pages, initialed and dated by the applicable analysts?	MSI700.133 version 5.0, Section 10.1.1	<input checked="" type="checkbox"/>	
15.	Are erroneous entries crossed through once, initialed and dated in a manner that permits the incorrect entry to remain legible?	MSI700.133 version 5.0, Section 10.1.1	<input checked="" type="checkbox"/>	
16.	Is a chemical inventory (listing all chemicals stored and or used in or by the laboratory that “belongs” to the laboratory) completed quarterly?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	
17.	Does the chemical inventory list the quantities, container type and location?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-24-2023
	AUDITOR: Alex Lewis

18.	Is the chemical inventory provided to the site ES&H department and a copy printed and filed with laboratory SDS file, and is the copy updated on a quarterly basis within the SDS file?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	
19.	Is there evidence of monthly waste inventory being conducted?	MSI700.133 version 5.0, Section 10.3.4	<input checked="" type="checkbox"/>	No monthly waste due to 3 rd Party Vendor Analysis
20.	<u>LABORATORY SAFETY AND SECURITY</u> Is the following Protective Equipment used as identified in section 13.2?	MSI700.133 version 5.0, Section 13.2	<input checked="" type="checkbox"/>	
21.	<u>Laboratory Training</u> Have laboratory personnel received the specific training activities as identified in table 11.1-1 Typical training requirements for laboratory personnel?	MSI700.133 version 5.0, Section 14	<input checked="" type="checkbox"/>	
22.	Are the following Chemical Hygiene Plan general rules followed: <ul style="list-style-type: none"> • No eating, drinking, smoking or applying cosmetics in the laboratory and in chemical storage or use areas? 	MSI700.133 version 5.0, Appendix A Section 3	<input checked="" type="checkbox"/>	

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
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	AUDITOR: Alex Lewis

	<ul style="list-style-type: none"> • No storing, handling, or consuming food or beverages in storage areas, refrigerators, glassware, or utensils that are used for lab operations? • Do not use mouth suction for pipetting or starting a siphon? • Confine long hair and loose clothing? • Know the location of fire extinguishers, showers, exits, and eyewash fountains/stations? • Do not use or handle any chemical until you have read and understood the label and SDS for that chemical? • Wash areas of exposed skin with soap and water upon any instance of chemical contact. Do not wash with solvents? • Limit chemicals stored at the lab bench or other work areas to those amounts necessary for daily operation. The container size shall be the minimum convenient? • Avoid skin contact with all chemicals. 			
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<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 05-24-2023
	AUDITOR: Alex Lewis

<ul style="list-style-type: none"> • Avoid inhalation of chemicals; do not perform “sniff” tests? • Use all laboratory equipment only for its intended purpose? • Floors, aisles, and exits shall be kept clean, dry, and free of obstructions. • Fire extinguishing equipment, eyewashes, showers, electrical disconnects, and other emergency equipment shall remain unobstructed • Never work alone in a laboratory or chemical storage area if possible If not possible, arrange to have someone check on you on a periodic and frequent basis. • When working with flammable chemicals, arrange the work area such that no sources of ignition are near enough to cause a fire or explosion, in case of a vapor release or liquid spill? 				
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<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12/20/23
	AUDITOR: Alex Lewis

	CRITERIA	DOCUMENT NO.	ACC	
1.	<p><u>Environmental Samples</u> At a minimum sample bottle labels should contain the following: Unique sample identifier (Sample Number)</p> <ul style="list-style-type: none"> a. Unique laboratory identifier (sample #) b. Sample point name /location or description c. Date and time of sample collection d. Name and initial of the person who collected the sample d. Type of analysis to be performed 	MSI700.133 version 5.0 section 5.2.1.1.1	<input type="checkbox"/>	Click here to enter text. RECEIVE SAMPLE BOTTLES FROM EARTH ANALYTICAL LABS WITH SAMPLE LABELS ATTACHED. ALL LABELS ARE FILLED OUT PRIOR TO SHIPPING SAMPLE.
2.	<p><u>Environmental Samples</u> Sample labels should meet the following conditions:</p> <ul style="list-style-type: none"> a. Waterproof pen or marker must be used b. Labels and their adhesive must be made of material that does not dissolve or peel when exposed to moist conditions for an extended period. Clear plastic tape is suitable for this purpose. 	MSI700.133 version 5.0 section 5.2.1.1.2	<input type="checkbox"/>	SHARPIE MARKER USED TO WRITE ON THE LABELS

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12/20/23
	AUDITOR: Alex Lewis

			<input type="checkbox"/>	Click here to enter text.
	CRITERIA	DOCUMENT NO.	ACC	FINDING
3.	<u>Environmental Media Chain of Custody Documentation: Ensure the following actions are take:</u> <ul style="list-style-type: none"> • 2.3.1 Record the Chain of Custody Record number in the Master Sample Log according to 6.2.3. • 2.3.2 Ensure that the original (white copy) of the form stays with the sample. The original (white copy) will be returned to the custodian once the analysis is complete. If not, then an electronic copy of the form should be received from the responsible party. • 2.3.3 If necessary, inform succeeding custodians to keep the sample and form together. 	ASR7000.115 version 4.0, Section 2.3.1-2.3.4	<input type="checkbox"/>	<p style="text-align: center;">TASK IS COMPLETE WHEN LOGGING IN SAMPLES AND FILLING OUT CHAIN OF CUSTODY.</p> <p style="text-align: center;">EXAMPLE: WHEN SHIPPING BIO-MONITORING SAMPLES, SAMPLE IS FIRST GIVEN A UNIQUE LAB ID FROM THE MASTER LOGBOOK. THE CHAIN WILL HAVE AN IDENTIFYING NUMBER ON IT AND THAT NUMBER IS COPIED TO THE ID NUMBER GIVEN IN THE MASTER LOGBOOK. WHEN VENDOR ARRIVES TO PICK UP SAMPLE, ALL CHAINS ARE SIGNED WITH NAME, DATE, TIME. SHIPPER WILL KEEP A COPY AND THE REST WILL REMAIN WITH VENDOR.</p>

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12/20/23
	AUDITOR: Alex Lewis

	<ul style="list-style-type: none"> 2.3.4 Maintain a file of all Chain of Custody Record yellow copies until the return of the original; then file the original and the yellow copy may either be maintained or discarded. 			
4.	<u>Calibration</u> <ul style="list-style-type: none"> Are calibration data maintained in laboratory logbooks? Are calibration certifications_kept in designated file? 	MSI700.133 version 5.0, Section 6	<input type="checkbox"/>	PRIOR TO RUNNING ANALYSIS ALL EQUIPMENT/INSTRUMENTS ARE CALIBRATED. ANY INSTRUMENTS SENT OUT FOR CALIBRATION WILL RETURN WITH CERTIFICATE TO BE FILED.
5.	Are routine calibration checks, in the range of interest using a set of class “1” weights, performed daily when an Analytical Balance is being used?	MSI700.133 version 5.0, Section 6.1	<input type="checkbox"/>	Click here to enter text. 2 WEIGHT SETS ARE ON SITE . CALIBRATED DAILY WHEN USED.
6.	Is the “true weight” and “observed weight” noted and documented in the laboratory’s balance log book?	MSI700.133 version 5.0, Section 6.1	<input type="checkbox"/>	A 1.0 GRAM WEIGHT AND AN 80 GRAM WEIGHT WILL BE PLACED ON SCALE , WEIGHTS RECORDED IN LOGBOOK.

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12/20/23
	AUDITOR: Alex Lewis

7.	Are Automatic <u>Pipettors</u> calibrated and checked every 6 months and recorded in the laboratory’s maintenance log book?	MSI700.133 version 5.0, Section 6.2	<input checked="" type="checkbox"/>	NO PIPETTS ARE IN USE CURRENTLY. USED FOR TOC INSTRUMENT. TOC ANALYSIS CONTRACTED TO 3RD PARTY VENDOR.
8.	Are <u>ovens and refrigerators</u> monitored by using NIST traceable certified thermometers and temperatures documented daily in the laboratory appliance log?	MSI700.133 version 5.0, Section 6.3	<input checked="" type="checkbox"/>	FLUKE INSTRUMENT USED TO CHECK TEMPS ON OVENS AND FRIGERATORS WHEN IN USE. FLUKE IS CALIBRATED BY JM VENDOR ON SITE.
9.	Are <u>Hydrometers</u> examined for damage and verified by comparison to a primary standard NIST certified hydrometer before initial use?	MSI700.133 version 5.0, Section 6.4	<input checked="" type="checkbox"/>	HYDROMETERS COME WITH A CALIBRATION ICATE WHEN PURCHASED. WHEN IN USE IT IS EXAMINED FOR CRACKS AND DAMAGE.
10.	Are <u>Thermometers</u> certified against a NIST traceable primary standard before initial use and annually thereafter?	MSI700.133 version 5.0, Section 6.6	<input checked="" type="checkbox"/>	NO MERCURY THERMOMETERS ARE BEING USED CURRENTLY.
11..	Are <u>Volumetric Ware</u> used for volumetric measurements rated as Class A or conform to Class A standards (NBC Circular 434 or ATM Special Publication 148-H)	MSI700.133 version 5.0, Section 6.7	<input checked="" type="checkbox"/>	YES
12.	All Instruments and equipment calibration activities are recorded in the appropriate records in accordance with the current work instruction ASW7000.700	MSI700.133 version 5.0, Section 6.9	<input checked="" type="checkbox"/>	HARD COPY CALIBRATION RECORD MAINTAINED
13.	<u>STANDARDS, REAGENTS AND CHEMICALS</u>	MSI700.133 version 5.0, Section 9.3	<input checked="" type="checkbox"/>	

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12/20/23
	AUDITOR: Alex Lewis

	When standards, chemicals, materials, or reagents are received into the laboratory are the following actions accomplished: <ul style="list-style-type: none"> • Date of receipt written on the bottle or container label and documented into the appropriate log book? • Is the material name, manufacture, lot number, and expiration date recorded in the appropriate logbook? • Once the container is opened and placed into service the date and expiration date is recorded on the container label and in the appropriate logbook? 	YES		
14.	DOCUMENTATION Is laboratory data recorded in ink in a bound notebook with sequentially numbered pages, initialed and dated by the applicable analysts?	MSI700.133 version 5.0, Section 10.1.1	<input checked="" type="checkbox"/>	YES
15.	Are erroneous entries crossed through once, initialed and dated in a manner that permits the incorrect entry to remain legible?	MSI700.133 version 5.0, Section 10.1.1	<input checked="" type="checkbox"/>	YES
16.	Is a chemical inventory (listing all chemicals stored and or used in or by	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	YES

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12/20/23
	AUDITOR: Alex Lewis

	the laboratory that “belongs” to the laboratory) completed quarterly?			
17.	Does the chemical inventory list the quantities, container type and location?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	YES
18.	Is the chemical inventory provided to the site ES&H department and a copy printed and filed with laboratory SDS file, and is the copy updated on a quarterly basis within the SDS file?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	Click here to enter text. YES. COMPLETED BY B. BUCKLEY
19.	Is there evidence of monthly waste inventory being conducted?	MSI700.133 version 5.0, Section 10.3.4	<input checked="" type="checkbox"/>	YES. COLLECTED FROM DEPARTMENTS ON SITE AND ENTERED INTO ESS DATA SYSTEM
20.	<u>LABORATORY SAFETY AND SECURITY</u> Is the following Protective Equipment used as identified in section 13.2?	MSI700.133 version 5.0, Section 13.2	<input checked="" type="checkbox"/>	
21.	<u>Laboratory Training</u> Have laboratory personnel received the specific training activities as identified in table 11.1-1 Typical training requirements for laboratory personnel?	MSI700.133 version 5.0, Section 14	<input checked="" type="checkbox"/>	YES
22.	Are the following Chemical Hygiene Plan general rules followed:	MSI700.133 version 5.0, Appendix A Section 3	<input checked="" type="checkbox"/>	YES

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12/20/23
	AUDITOR: Alex Lewis

	<ul style="list-style-type: none"> • No eating, drinking, smoking or applying cosmetics in the laboratory and in chemical storage or use areas? • No storing, handling, or consuming food or beverages in storage areas, refrigerators, glassware, or utensils that are used for lab operations? • Do not use mouth suction for pipetting or starting a siphon? • Confine long hair and loose clothing? • Know the location of fire extinguishers, showers, exits, and eyewash fountains/stations? • Do not use or handle any chemical until you have read and understood the label and SDS for that chemical? • Wash areas of exposed skin with soap and water upon any instance of chemical contact. Do not wash with solvents? • Limit chemicals stored at the lab bench or other work areas to those amounts necessary for daily 			
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<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12/20/23
	AUDITOR: Alex Lewis

	<p>operation. The container size shall be the minimum convenient?</p> <ul style="list-style-type: none"> • Avoid skin contact with all chemicals. • Avoid inhalation of chemicals; do not perform “sniff” tests? • Use all laboratory equipment only for its intended purpose? • Floors, aisles, and exits shall be kept clean, dry, and free of obstructions. • Fire extinguishing equipment, eyewashes, showers, electrical disconnects, and other emergency equipment shall remain unobstructed • Never work alone in a laboratory or chemical storage area if possible. If not possible, arrange to have someone check on you on a periodic and frequent basis. • When working with flammable chemicals, arrange the work area such that no sources of ignition are near enough to cause a fire or explosion, in case of a vapor release or liquid spill? 			
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<p align="center"><i>Laboratory Programs and Procedures Manual</i></p>	<p>SITE: BC <input type="checkbox"/> BH <input checked="" type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/></p>
<p>Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures, are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i></p>	<p>DATE: 12/20/23</p>
	<p>AUDITOR: Alex Lewis</p>

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input checked="" type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-28-2023
	AUDITOR: Paul Veillon

	CRITERIA	DOCUMENT NO.	ACC	
1.	<u>Environmental Samples</u> At a minimum sample bottle labels should contain the following: Unique sample identifier (Sample Number) <ul style="list-style-type: none"> a. Unique laboratory identifier (sample #) b. Sample point name /location or description c. Date and time of sample collection d. Name and initial of the person who collected the sample d. Type of analysis to be performed 	MSI700.133 version 5.0 section 5.2.1.1.1	<input checked="" type="checkbox"/>	Witnessed Sample Bottles 12-28-2023 Meets Requirement
2.	<u>Environmental Samples</u> Sample labels should meet the following conditions: <ul style="list-style-type: none"> a. Waterproof pen or marker must be used b. Labels and their adhesive must be made of material that does not dissolve or peel when exposed to moist conditions for an extended period. Clear plastic tape is suitable for this purpose. 	MSI700.133 version 5.0 section 5.2.1.1.2	<input checked="" type="checkbox"/>	Meets requirement

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			<input type="checkbox"/>	Click here to enter text.
	CRITERIA	DOCUMENT NO.	ACC	FINDING
3.	<u>Environmental Media Chain of Custody Documentation: Ensure the following actions are take:</u> <ul style="list-style-type: none"> • 2.3.1 Record the Chain of Custody Record number in the Master Sample Log according to 6.2.3. • 2.3.2 Ensure that the original (white copy) of the form stays with the sample. The original (white copy) will be returned to the custodian once the analysis is complete. If not, then an electronic copy of the form should be received from the responsible party. • 2.3.3 If necessary, inform succeeding custodians to keep the sample and form together. • 2.3.4 Maintain a file of all Chain of Custody Record 	ASR7000.115 version 4.0, Section 2.3.1-2.3.4	<input checked="" type="checkbox"/>	Witnessed COC surface water for 12-28-2023 Master Sample Log is in sharepoint Hard copy on hand. Site Chemist delivers samples and COC to lab. Lab tech. sign and date then copy is given to Site Chemist. NO YELLOW COPY

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input checked="" type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-28-2023
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	yellow copies until the return of the original; then file the original and the yellow copy may either be maintained or discarded.			
4.	Calibration <ul style="list-style-type: none"> Are calibration data maintained in laboratory logbooks? Are calibration certifications kept in designated file? 	MSI700.133 version 5.0, Section 6	<input checked="" type="checkbox"/>	Hard copies and Electronic
5.	Are routine calibration checks, in the range of interest using a set of class “1” weights, performed daily when an Analytical Balance is being used?	MSI700.133 version 5.0, Section 6.1	<input checked="" type="checkbox"/>	Per usage
6.	Is the “true weight” and “observed weight” noted and documented in the laboratory’s balance log book?	MSI700.133 version 5.0, Section 6.1	<input checked="" type="checkbox"/>	Entered into Sharepoint
7.	Are Automatic <u>Pipettors</u> calibrated and checked every 6 months and recorded in the laboratory’s maintenance log book?	MSI700.133 version 5.0, Section 6.2	<input type="checkbox"/>	NO LONGER USED

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input checked="" type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-28-2023
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8.	Are <u>ovens and refrigerators</u> monitored by using NIST traceable certified thermometers and temperatures documented daily in the laboratory appliance log?	MSI700.133 version 5.0, Section 6.3	<input checked="" type="checkbox"/>	Witnessed J.M Calibrated Thermometer Calibration kept in Sharepoint
9.	Are <u>Hydrometers</u> examined for damage and verified by comparison to a primary standard NIST certified hydrometer before initial use?	MSI700.133 version 5.0, Section 6.4	<input checked="" type="checkbox"/>	Witnessed compliance certificate , no cracks in glass
10.	Are <u>Thermometers</u> certified against a NIST traceable primary standard before initial use and annually thereafter?	MSI700.133 version 5.0, Section 6.6	<input checked="" type="checkbox"/>	
11..	Are <u>Volumetric Ware</u> used for volumetric measurements rated as Class A or conform to Class A standards (NBC Circular 434 or ATM Special Publication 148-H)	MSI700.133 version 5.0, Section 6.7	<input checked="" type="checkbox"/>	
12.	All Instruments and equipment calibration activities are recorded in the appropriate records in accordance with the current work instruction MSW7000.700?	MSI700.133 version 5.0, Section 6.9	<input checked="" type="checkbox"/>	Compliance log book
13.	<u>STANDARDS, REAGENTS AND CHEMICALS</u> When standards, chemicals, materials, or reagents are received into the laboratory are the following actions accomplished:	MSI700.133 version 5.0, Section 9.3	<input checked="" type="checkbox"/>	Received date and opened dates written on bottle PH buffers are out of Date. These buffers are for field testing only. Data from Lab is used, not field data.

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	<ul style="list-style-type: none"> • Date of receipt written on the bottle or container label and documented into the appropriate log book? • Is the material name, manufacture, lot number, and expiration date recorded in the appropriate logbook? • Once the container is opened and placed into service the date and expiration date is recorded on the container label and in the appropriate logbook? 			
14.	DOCUMENTATION Is laboratory data recorded in ink in a bound notebook with sequentially numbered pages, initialed and dated by the applicable analysts?	MSI700.133 version 5.0, Section 10.1.1	<input checked="" type="checkbox"/>	Printed off of printer
15.	Are erroneous entries crossed through once, initialed and dated in a manner that permits the incorrect entry to remain legible?	MSI700.133 version 5.0, Section 10.1.1	<input checked="" type="checkbox"/>	Click here to enter text.
16.	Is a chemical inventory (listing all chemicals stored and or used in or by the laboratory that “belongs” to the laboratory) completed quarterly?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	Click here to enter text.
17.	Does the chemical inventory list the quantities, container type and location?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	Click here to enter text.

<i>Laboratory Programs and Procedures Manual</i>	SITE: BC <input checked="" type="checkbox"/> BH <input type="checkbox"/> WH <input type="checkbox"/> BM <input type="checkbox"/>
Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-28-2023
	AUDITOR: Paul Veillon

18.	Is the chemical inventory provided to the site ES&H department and a copy printed and filed with laboratory SDS file, and is the copy updated on a quarterly basis within the SDS file?	MSI700.133 version 5.0, Section 10.3.1	<input checked="" type="checkbox"/>	In Library
19.	Is there evidence of monthly waste inventory being conducted?	MSI700.133 version 5.0, Section 10.3.4	<input checked="" type="checkbox"/>	Witnessed on hand from Operations
20.	<u>LABORATORY SAFETY AND SECURITY</u> Is the following Protective Equipment used as identified in section 13.2?	MSI700.133 version 5.0, Section 13.2	<input checked="" type="checkbox"/>	
21.	<u>Laboratory Training</u> Have laboratory personnel received the specific training activities as identified in table 11.1-1 Typical training requirements for laboratory personnel?	MSI700.133 version 5.0, Section 14	<input checked="" type="checkbox"/>	ALPPM trained
22.	Are the following Chemical Hygiene Plan general rules followed: <ul style="list-style-type: none"> No eating, drinking, smoking or applying cosmetics in the laboratory and in chemical storage or use areas? 	MSI700.133 version 5.0, Appendix A Section 3	<input checked="" type="checkbox"/>	All within compliance

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	AUDITOR: Paul Veillon

	<ul style="list-style-type: none"> • No storing, handling, or consuming food or beverages in storage areas, refrigerators, glassware, or utensils that are used for lab operations? • Do not use mouth suction for pipetting or starting a siphon? • Confine long hair and loose clothing? • Know the location of fire extinguishers, showers, exits, and eyewash fountains/stations? • Do not use or handle any chemical until you have read and understood the label and SDS for that chemical? • Wash areas of exposed skin with soap and water upon any instance of chemical contact. Do not wash with solvents? • Limit chemicals stored at the lab bench or other work areas to those amounts necessary for daily operation. The container size shall be the minimum convenient? • Avoid skin contact with all chemicals. 			
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Performance Objective: <i>Ensure that requirements of MSI7000.133 Version 5.0 “Laboratory Programs and Procedures Manual” and ASI7000.12 Version 5.0, Crude Oil Quality and Quantity Control Procedures,” are being implemented and ensures compliance with permits. DOE Orders or other imposed requirements.</i>	DATE: 12-28-2023
	AUDITOR: Paul Veillon

<ul style="list-style-type: none"> • Avoid inhalation of chemicals; do not perform “sniff” tests? • Use all laboratory equipment only for its intended purpose? • Floors, aisles, and exits shall be kept clean, dry, and free of obstructions. • Fire extinguishing equipment, eyewashes, showers, electrical disconnects, and other emergency equipment shall remain unobstructed • Never work alone in a laboratory or chemical storage area if possible If not possible, arrange to have someone check on you on a periodic and frequent basis. • When working with flammable chemicals, arrange the work area such that no sources of ignition are near enough to cause a fire or explosion, in case of a vapor release or liquid spill? 				
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