State of Louisiana
Department of Energy and Natural Resources
Office of Conservation
Injection and Mining Division

Environmental Analysis Guidance
May 16, 2024

Answer the following questions regarding the proposed permit activity as part of the environmental analysis required by La R.S. 30:1104.1.

- Have the potential and real adverse environmental effects of the proposed permit activity been avoided to the maximum extent possible?
- Does a cost-benefit analysis of the environmental impact costs versus the social and economic benefits of the proposed activities demonstrate that the latter outweighs the former?
- Are there alternative activities which would offer more protection to the environment than the proposed activity without unduly curtailing nonenvironmental benefits?
- Are there alternative sites which would offer more protection to the environment than the proposed site without unduly curtailing nonenvironmental benefits?
- Are there mitigating measures which would offer more protection to the environment than the proposed activity without unduly curtailing nonenvironmental benefits?

The above environmental analysis questions are based on the IT Decision/IT Analysis Questions that are required for other types of DENR and LDEQ permitting decisions. Please see the attached examples of previously accepted IT Decision related material that DENR has received for non-Class VI applications.

Also attached is a suggested rubric of sub-questions that may be considered as part of an applicant's response to the IT Decision Questions. Some of the material in the rubric may be more relevant to a facility under LDEQ jurisdiction than a Class VI project, but the framework demonstrates how the complexity of analysis will vary from permit to permit and makes it clear that simple yes/no answers are inadequate.

Please bear in mind that these documents are merely a starting point. The environmental analysis should be fully contextualized for the unique considerations of this particular project and Class VI operations as a whole.

Attachments:

- Constitutional Considerations: "IT Decision" Questions
- Responses to "IT Questions" for PA Prospect Commercial SWD Facility
- Pine Prairie Energy Center LLC Response to Revised Expanded "IT Decision" Questions

Constitutional Considerations: "IT Decision" Questions Rubric

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The following list of questions are those prepared by the Louisiana Department of Environmental Quality (LDEQ) and should be used as guidance when preparing a response to the "IT Decision". Please restate the questions before providing your response. The five questions in bold-face type labeled **A, B, C, D, and E** are the primary questions for which you must provide a response. The Sub-question within each group of primary questions are provided as a guide to assist you in formulating a response to those primary questions. You do not have to provide a specific answer to the sub-questions.

A. Have the potential and real adverse environmental effects of the proposed facility been avoided to the maximum extent possible?

1. What are the potential environmental impacts of the permittee's proposed facility?
    a. What wastes will be handled?
        i. Classes of chemicals
        ii. Quantities (hazardous and non-hazardous)
        iii. Physical and chemical characteristics
        iv. Hazardous waste classification (listed, characteristic, etc.)
    b. How will they be handled?
        i. Treatment
        ii. Storage
        iii. Disposal
    c. Sources of waste
        i. On-site generation (type and percentage of total handled)
        ii. Off-site generation (type and percentage of total handled)
    d. Where will the wastes be shipped if not handled at this site?
    e. What wastes will remain on-site permanently?

2. By which of the following potential pathways could releases of hazardous materials from the proposed facility endanger local residents or other living organisms?
    a. Air
    b. Water
    c. Soil
    d. Food

3. What is the likelihood or risk potential of such releases?

4. What are the real adverse environmental impacts of the permittee's proposed facility?
    a. Short term effects
        i. Land area taken out of system
    b. Long term effects

B. Does a cost benefit analysis of the environmental impact costs balanced against the social and economic benefits of the proposed facility demonstrate that the latter outweighs the former?

1. How was it determined that this facility was needed?
    a. Local or regional survey
        i. On-site or off-site needs
        ii. Regional solid waste management benefit
        iii. Generic survey of solid waste needs (compatibility with master plan)

2. What will be the positive economic effects on the local community?
    a. How many permanent jobs will be created?
    b. What is the expected annual payroll?
    c. What is the expected economic multiplier from item B2?
    d. What is the expected tax base and who will receive benefits?

3. What will be the potential negative economic effects on the local community?
    a. What are the possible effects on property values?
    b. Will public costs rise for:
        i. Police protection
        ii. Fire protection
        iii. Medical facilities
        iv. Schools
        v. Roads (also see below)
    c. Does the prospective site have the potential for precluding economic development of the area by business or industries because of risk associated with establishing such operations adjacent to the proposed facility?

4. Was transportation a factor in choosing the proposed site?
    a. What mode(s) of transportation will be used for the site?
        i. Truck
        ii. Rail
        iii. Barge
        iv. Other – Pipeline
    b. What geographical area will it serve?
    c. By how much will local road traffic volume increase?
        i. Can local roads handle the traffic volume expected?
        ii. Can local roads handle the weight of trucks?
    d. What are the long-term expectations of the proposed site?
        i. Longevity of the facility
        ii. Who owns the facility?
        iii. Are the owners financially backed by others?
        iv. When is closure anticipated?
        v. Who is responsible for the site after closure?
        vi. What assurances will there be that the site will be closed in accordance with the plan?
        vii. What financial assurances will be established to demonstrate the ability to handle problems after closure?
        viii. Who certifies that the site is properly closed?
        ix. How are people protected from unwittingly buying land after closure?
            a. Is the closed facility recorded in the deed?
            b. What future use is possible?

C. Are there alternative projects, which would offer more protection to the environment than the proposed facility without unduly curtailing non-environmental benefits?

1. Why was this technology chosen (e.g., incineration over landfills?)
   a. Are other technologies available?
   b. Describe the engineering design and operating techniques used to compensate for any site deficiencies.

2. Is the proposed technology an improvement over that presently available?

3. Describe the reliability of technology chosen.
   a. Past experiences
   b. Environmental Impacts

4. Describe the sequence of technology used from arrival of wastes to the end process at the facility (flow chart).
   a. Analysis of waste
   b. Unloading
   c. Storage
   d. Treatment
   e. Monitoring
   f. Closure
   g. Post-closure
   h. Disposal
   i. Any residuals requiring further handling

5. Will this facility replace an outmoded/worse polluting one?

6. What consumer products are generating the waste to be disposed? Are there alternative products that would entail less hazardous waste generation?

D. Are there alternative sites that would offer more protection to the environment than the proposed facility site without unduly curtailing non-environmental benefits?

1. Why was this site chosen?
   a. Specific advantages of the site:
   b. Were other sites considered and rejected?
   c. Is the location of the site irrevocable; i.e., would denial of permit based on site preclude the project?

2. Is the chosen site in or near environmentally sensitive areas?
   a. Wetlands
   b. Estuaries
   c. Critical habitat
   d. Historic or culturally significant areas
      i. Indian mounds
      ii. Antebellum houses
      iii. Tourist attractions or facilities (e.g., bed and breakfast inns)

iv. Campgrounds or parks

3. What is the zoning and existing land use of the prospective site and nearby area?
   a. Is the site located near existing heavy industrial, chemical process or refinery operations?
   b. Is there a precedent for chemical contamination near the site or is the soil and water pristine?
   c. Is the area particularly noted for its esthetic beauty?

4. Is the site flood prone?
   a. Is the site in a flood plain?
      i. How current are the maps used to make flood plain determinations?
      ii. What is the elevation of the site?
      iii. Is diking required or desired to provide flood protection?
         a. What is the design height of the dike?
         b. How is the dike protected from erosion?
         c. What frequency and design storm was used?
         d. Is the access to the site over or through dikes?
   b. Is the site hurricane vulnerable?
      i. Is the site in an area subject to storm surge?
      ii. What are the design storm specifications?
      iii. Should damage from wave action be considered?
      iv. For what levels of wind speed is the facility designed?

5. Is groundwater protected?
   a. Are aquifers or recharge area underlying the site used for drinking water?
   b. What is the relationship of the site to the water table?
   c. What wells exist in the area?
   d. What is the flow rate and direction of the groundwater flow?
   e. What is the groundwater quality in the underlying aquifers?
   f. Is there a hydraulic connection between the aquifers?

6. Does prospective site pose potential health risks as defined by proximity to:
   a. Prime agricultural area (crop or pasture land)
   b. Residential area
   c. Schools or daycare centers
   d. Hospitals or prisons
   e. Public buildings or entertainment facilities
   f. Food storage area
   g. Existing community health problems that may be aggravated by operation of additional hazardous waste disposal capacity

7. Is air quality protected?
   a. Is the site within an ozone or non-attainment area?
   b. What contaminants are likely to be generated at the site?
   c. What protection is afforded from each contaminant generated by the site?
   d. What is the potential for unregulated emissions?
   e. What plans are implemented to provide for odor control?
   f. Who will be affected by emissions?

i. What is the direction of the prevailing winds?
ii. Describe the expected frequency of "bad air" conditions.

g. Describe the control of vapors at various stage of process.

8. Have physical site characteristics been studied; what has been done in terms of a geotechnical
   a. Site geology
   b. Hydrology
   c. Topography
   d. Soil properties
   e. Aquifer location
   f. Subsidence problems
   g. Climatic conditions

E. Are there mitigating measures that would offer more protection to the environment than the facility as proposed without unduly curtailing non-environmental benefits?

1. Is this facility part of a master plan to provide waste management? Whose plan?
   a. How does it fit into the plan?
   b. What geographical area is served by the plan?

2. Does this facility fit into an integrated waste management system? (Reduction, recovery, recycling, sales tax, exchange, storage, treatment, disposal)
   a. On-site
   b. Regional

3. Can waste be disposed by some other means?
   a. Technology limitations
   b. Cost factors
   c. Other reasons

4. What quality assurance control will be utilized to protect the environment?
   a. Plans for lab work
   b. How are out-of-spec wastes handled?
   c. What happens to rejected wastes?
   d. Treatment stabilization
   e. Segregation of non-compatible wastes
   f. Handling of containerized wastes

5. Innovative techniques used to control release of waste or waste constituents into the environment.
   a. Surface impoundment
   b. Land application treatment
   c. Landfill (burial)
   d. Incinerator
   e. Container storage
   f. Tanks

APPENDIX Z – RESPONSES TO "IT QUESTIONS"
Responses to "IT Questions"

I. Have the potential and real adverse environmental effects of the proposed facility been avoided to the maximum extent possible?

Yes. The potential and real adverse environmental effects of the proposed facility have been avoided to the maximum extent possible.

PA Prospect Corporation (PA Prospect Corporation) proposes to construct and operate the proposed commercial SWD facility using the best engineering and operational practices to avoid both potential and real adverse environmental effects, such as the release of approved Exploration and Production (E and P) liquid wastes. The proposed facility will be used to properly dispose of approved E and P waste fluids in an environmentally safe manner.

The residual solids that accumulate in tank bottoms will be periodically cleaned from the tanks, separated from the fluids, measured, manifested and transported to a facility authorized to accept solid waste. Skim oil will be separated from the approved E and P waste fluids and sold according to the regulatory provisions of DNR as they accumulate. The approved E and P waste fluids will be disposed of in proposed deep well injection wells, Riemer Calhoun SWD No. 001 and Riemer Calhoun SWD No. 002. "Approximately 92 percent of produced water is managed through Class II well injection into subsurface reservoirs, and is generally considered the safest and most effective method for handling these type fluids" *(Overview of Exploration and Production Waste Volumes and Waste Management Practices in the United States, May 2000 API report, section 2.4.2.)*. Based on an Argonne National Laboratory, "Offsite Commercial Disposal of E and P Wastes" presentation in 2005, it was shown that commercial disposal costs for produced water was far more economical than by any other method, except land spreading (a less environmentally safe means of disposal). Oil field practices across the United States have established underground injection as a viable alternative method for the disposal of these types of industrial wastes *(Offsite Commercial Disposal of Oil and Gas Exploration and Production Waste: Availability, Options, & Costs, USDOE, August 2006)*. The same report found that injection was almost exclusively used to manage produced water. Disposal fees for injection of approved E and P waste fluids range between $0.30/bbl and $10.00/bbl across the United States. The majority of the facilities surveyed reported disposal fees under $1.00/bbl. Because transportation costs typically increase proportionately with distance or time from well site to disposal site, economic incentives exist for operators to send their wastes to disposal facilities located within a reasonably short distance from the oil and gas E and P site.

The proposed PA Prospect Corporation Commercial Facility (The Facility) is to be located approximately Eleven (11) miles northwest of the town of Coushatta, Louisiana, just to the south of U.S. Highway 84, and east of Interstate 49. The Facility is in the Northern part of the Red River – Bull Bayou Field and will serve many operators of oil and gas wells in De Soto, Red River, Natchitoches, Bienville, Bossier, Caddo, and Sabine Parishes of Louisiana.

The E and P waste fluids to be transported to and from The Facility by trucks (primarily vacuum trucks) will abide by the following control procedures to prevent approved E and P waste fluids from entering the environment:

- Only approved E and P waste fluids as defined in LDNR's rules at LAC 43:XIX.501 and listed on pages 1 and 2 of the WMOP (Appendix K) from approved generators of record will be received at this commercial saltwater disposal well facility. Other generators of approved E and P waste fluids will have to receive written approval from the Office of

Conservation in order to dispose of approved E and P waste fluids at this commercial facility.

- Before offloading at this commercial facility, each shipment of approved E and P waste fluids will be sampled and analyzed by PA Prospect Corporation personnel for pH, conductivity, and chloride content and documented on the UIC-28 manifest as required by regulations. Samples will be reviewed for percent solids. Records of these tests will be kept on file at The Facility for a period of three (3) years and will be available for review by an inspector employed by the Office of Conservation.

- A minimum of one (1) eight (8) ounce sample will be collected from each load and will be labeled with the date, operator, and manifest number. These samples will be retained at The Facility location for a minimum of thirty (30) days.

- E and P Waste Shipping Control Tickets (Form UIC-28) will be stored on-site for at least three (3) years for review by the Louisiana Department of Natural Resources.

- The Facility will comply with all regulations according to LAC 33: XV regarding NORM materials.

- A Waste Management Operations Plan (WMOP) and an Emergency Response Plan (ERP) have been developed for The Facility, which establishes procedures for responding to and cleaning up any spill and provides information to allow the operator of The Facility to immediately notify the appropriate agencies. Dry-chemical fire extinguishers will be maintained on-site.

- The unloading pad and tank containment area will be constructed with seamless/sealed concrete to prevent the release of approved E and P waste fluids into the environment and surrounding soils. The concrete unloading pad is bermed on four sides with 6-in. roll over berms and sloped to prevent run-off of approved E and P waste fluids and run-on of rainwater. The unloading area will be sloped toward an integrated seamless/sealed concrete sump so any spills can be properly captured and immediately pumped back through the flow process. This is shown on the detailed facility diagram, provided as Attachment 3 through-out this application. Approved E and P waste fluids from the trucks will be pumped to the desander through a closed loop system and through the flow process. Specific unloading procedures will be followed by the employees to minimize errors and prevent spills and releases to the environment.

- Only approved liquid E and P waste fluids, as noted in the WMOP (Appendix K) will be accepted at The Facility. The liquid E and P waste fluids, primarily produced saltwater, will be pumped from the truck unloading area. A 4-in. flexible hose is connected to the tail end of the tank truck to allow the contents to be pumped by centrifugal pumps through screen baskets to a manifold where it is directed through one (1) 750-barrel desander tank. The fluids will then be sent through one (1) of three (3) 1,000-barrel fiberglass surge tanks for solids separation and some minimal hydrocarbon separation. The fluids will then by transferred via centrifuge pumps through one (1) of two (2) 1,000-barrel fiberglass gun barrels for separating hydrocarbons from the water. The separated hydrocarbons are skimmed from the tops of the 1,000-barrel surge tanks and siphoned from the gun barrels and transferred to two (2) 500-barrel fiberglass oil tanks. Fluid from the gun barrels is directed to one (1) of two (2) series of two (2) 750-barrel fiberglass saltwater tanks for solids separation and some minimal, additional hydrocarbon separation prior to being disposed of in the approved injection wells. There is spacing left for two (2) additional 750-barrel fiberglass saltwater tanks to be placed in the future if the

need arises. Fluid from the four (4) 750-barrel saltwater tanks are then transferred via charging pumps to one (1) of the two (2) H-pumps which will be outside of the tank battery and have a 27'x19'3"x4" containment, then transferred to one (1) of the two (2) approved SWD wells. The hydrocarbons are temporarily stored until sold in accordance with DNR regulations. The tanks, offloading area, pumps and ancillary equipment will all be placed in bermed seamless/sealed concrete containment areas to prevent releases of approved E and P waste fluids to the surface soils, groundwater and recharge areas of aquifers.

- Monitoring of the tanks, valves, piping, containment areas, pumps, and other associated equipment will include daily inspections. Inspections of The Facility will be documented and recorded in accordance with an approved SPCC Plan. This plan will be developed by a professional engineer specifically for this facility upon approval in accordance with 40 CFR112 and LAC33.IX. The Facility will maintain onsite absorbent materials, such as pads, booms, and oil dry in the event of spills or releases of liquid approved E and P waste fluids. Emergency numbers will be posted in the event of a significant spill of approved E and P waste fluids.
- This commercial facility will be adequately manned during the hours of operation and shall receive approved E and P waste fluids by truck only.
- The Facility, offloading area, gun barrels, tanks, injection pumps, and office/lab, locations will be secured by a 6-ft. chain-link fence with lockable gates. The two (2) SWD wells will be surrounded by post and chain enclosures and any access roads to the well will have lockable gates that will remain locked at all times.

A. What are the potential environmental impacts of the permittee's proposed facility?

1. What wastes will be handled?

Only approved E and P waste fluids Types 01, 04, 08, 09, 10, 11, 14, 15, 16, and 99, as defined in §501 from approved generators of record, will be received at this commercial saltwater disposal well facility. Other generators of approved E and P waste fluids will have to receive written approval from the Office of Conservation in order to dispose of approved E and P waste fluids at this commercial facility.

a. Classes of chemicals

Only approved E and P waste fluids Types 01, 04, 08, 09, 10, 11, 14, 15, 16, and 99, as defined in §501 from approved generators of record, will be received at this commercial saltwater disposal well facility.

b. Quantities (hazardous and non-hazardous)

There will be no hazardous waste transported, treated, stored, or disposed at this facility. The average anticipated amount of approved E and P waste fluids to be disposed of is 15,000 barrels per day, and the maximum anticipated amount of E and P waste fluids to be disposed in the proposed injection wells is 25,000 barrels per day. A seamless/sealed concrete containment area measuring approximately 186' x 101', having

4 ft. high concrete walls, will have a total containment capacity of approximately 13,000 barrels. The tanks within the containment will have a maximum storage of 11,250 barrels of approved E and P waste fluids, consisting primarily of produced saltwater. The approved E and P waste fluids, primarily produced saltwater, will be pumped from the truck unloading area through a closed loop system by centrifugal pumps and transferred to the one (1) 750-barrel desander tank. The fluids will then be sent through one (1) of three (3) 1,000-barrel fiberglass surge tanks for solids separation and some minimal hydrocarbon separation. The fluids will then by transferred via centrifuge pumps through one (1) of two (2) 1,000-barrel fiberglass gun barrels for separating hydrocarbons from the water. The separated hydrocarbons are skimmed from the tops of the 1,000-barrel surge tanks and siphoned from the gun barrels and transferred to two (2) 500-barrel fiberglass oil tanks. Fluid from the gun barrels is directed to one (1) of two (2) series of two (2) 750-barrel fiberglass saltwater tanks for solids separation and some minimal, additional hydrocarbon separation prior to being disposed of in the approved injection wells. There is spacing left for two (2) additional 750-barrel fiberglass saltwater tanks to be placed in the future if the need arises. Fluid from the four (4) 750-barrel saltwater tanks are then transferred via charging pumps to one (1) of the two (2) H-pumps which will be outside of the tank battery and have a 27'x19'3"x4" containment, then transferred to one (1) of the two (2) approved SWD wells. See the attached facility diagram (Attachment 3).

c. Physical and chemical characteristics

E and P waste as defined in LAC 43:XIX.501: Such wastes include the following E and P waste fluids:

1. **Type 01** – Defined as: Salt water (produced brine or produced water), except for salt water whose intended and actual use is in drilling, workover, or completion fluids or in enhanced mineral recovery operations, processed fluids generated by approved salvage oil operators who only receive oil (BS&W) from oil and gas leases, and non-hazardous natural gas plant processing waste fluid which is or may be commingled with produced formation water;
2. **Type 04** – Defined as: Completion, workover, and stimulation fluids;
3. **Type 08** – Defined as: Produced formation fresh water;
4. **Type 09** – Defined as: Rainwater from firewalls, ring levees and pits at drilling and production facilities;
5. **Type 10** – Defined as: Washout water and residual solids generated from the cleaning of containers that transport E and P Waste and are not contaminated by hazardous waste or material; washout water and solids (E and P Waste Type 10) is or may be generated at a commercial facility or transfer station by the cleaning of a container holding a residual amount of E and P Waste;

6. **Type 11** – Defined as: Washout pit water and residual solids from oil field related carriers and service companies that are not permitted to haul hazardous waste or material;

7. **Type 14** – Defined as: Pipeline test water which does not meet discharge limitations established by the appropriate state agency, or pipeline pigging waste, i.e., waste fluids/waste generated from cleaning of the pipeline;

8. **Type 15** – Defined as: E and P Wastes that are transported from the permitted commercial facilities and transfer stations to permitted commercial treatment and disposal facilities, except those E and P Waste defined as Waste Types 01 and 06;

9. **Type 16** – Defined as: Crude oil spill clean-up waste;

10. **Type 99** – Defined as: Other E and P Waste not described above (shipment to a commercial facility or transfer station must be pre-approved prior to transport).

PA Prospect Corporation intends to receive only the liquid portions of approved E and P waste Types 15, 16, and 99 at The Facility.

d. Hazardous waste classification (listed, characteristic, etc.)

While approved E and P waste fluids are not regulated under the Louisiana Department of Environmental Quality regulations, it contains constituents that are common to fuel or oil. As the material typically contains less than one percent (1%) fuels, the material is still flammable and may contain toxic compounds associated with fuels. The low percentage of fuel and condensate associated with the produced water limits the explosiveness of approved E and P waste fluids. The fluids are not highly corrosive. The slightly corrosive nature of the saltwater will be managed with the use of minor amounts of corrosion inhibitor as indicated in the WMOP section of the permit application.

2. How will they be handled?

Approved E and P waste fluids will arrive through a security gate to the facility by truck transport. These trucks may be vacuum trucks, tanker trucks, and portable tanks. A PA Prospect Corporation employee trained in unloading procedures will witness the entry, then accept and process the entry of waste into the facility. To limit unauthorized access, The Facility has a secured gate at the entrance, and a 6 ft. chain link fence around the treatment and storage areas. A trained employee of PA Prospect Corporation will be at The Facility during the hours of operation to monitor facility operations and treatment/pumping of approved E and P waste fluids.

A minimum of one (1) eight (8) ounce sample will be collected from each incoming load. These samples will be monitored before offloading for the presence of NORMs as required by the applicable DEQ regulations and requirements. The eight (8) ounce sample of each load will be collected, dated, and labeled with the manifest number and operator identification. The samples will be analyzed in accordance with LAC 43:XIX.543.B.1 (pH, conductivity &

Cl-) prior to being accepted for unloading. The collected samples will be stored in an area with minimum exposure to individuals at The Facility. Trucks will be directed to the unloading area where they will connect to a closed loop system to begin the treatment process.

a. Treatment

The approved E and P waste fluids, or primarily produced saltwater, will be pumped from the truck unloading area through a closed loop system. A 4-in. flexible hose connected to the tail end of the tank truck will allow the contents to be transferred by centrifugal pumps through screen baskets to a manifold where it is directed through one (1) 750-barrel desander tank. The fluids will then be sent through one (1) of three (3) 1,000-barrel fiberglass surge tanks for solids separation and some minimal hydrocarbon separation. The fluids will then by transferred via centrifuge pumps through one (1) of two (2) 1,000-barrel fiberglass gun barrels for separating hydrocarbons from the water. The separated hydrocarbons are skimmed from the tops of the 1,000-barrel surge tanks and siphoned from the gun barrels and transferred to two (2) 500-barrel fiberglass oil tanks. Fluid from the gun barrels is directed to one (1) of two (2) series of two (2) 750-barrel fiberglass saltwater tanks for solids separation and some minimal, additional hydrocarbon separation prior to being disposed of in the approved injection wells. There is spacing left for two (2) additional 750-barrel fiberglass saltwater tanks to be placed in the future if the need arises. Fluid from the four (4) 750-barrel saltwater tanks are then transferred via charging pumps to one (1) of the two (2) H-pumps which will be outside of the tank battery and have a 27'x19'3"x4" containment, then transferred to one (1) of the two (2) approved SWD wells. The residual solids from the saltwater tanks will be periodically removed during tank cleaning operations and placed in a lined steel roll-off container temporarily located at The Facility during tank cleaning operations. Solids will not be allowed to accumulate or be stored at The Facility. These solids will be sampled and profiled for disposal at an approved facility. The solids will be transported by an authorized transporter to an approved facility.

b. Storage

Approved E and P waste fluids, primarily produced saltwater, will be pumped from the truck unloading area through a closed loop system to the inlet of one (1) 750-barrel desander tank. The fluids will then be sent through one (1) of three (3) 1,000-barrel fiberglass surge tanks for solids separation and some minimal hydrocarbon separation. The fluids will then by transferred via centrifuge pumps through one (1) of two (2) 1,000-barrel fiberglass gun barrels for separating hydrocarbons from the water. The separated hydrocarbons are skimmed from the tops of the 1,000-barrel surge tanks and siphoned from the gun barrels and transferred to two (2) 500-barrel fiberglass oil tanks. Fluid from the gun barrels is directed to one (1) of two (2) series of two (2) 750-barrel fiberglass saltwater tanks for solids separation and some minimal, additional hydrocarbon separation prior to being disposed of in the

approved injection wells. There is spacing left for two (2) additional 750-barrel fiberglass saltwater tanks to be placed in the future if the need arises. Fluid from the four (4) 750-barrel saltwater tanks are then transferred via charging pumps to one (1) of the two (2) H-pumps which will be outside of the tank battery and have a 27'x19'3"x4" containment, then transferred to one (1) of the two (2) approved SWD wells.

An SPCC Plan certified by a Professional Engineer will be implemented and maintained on-site. The Attachment 3 - Facility Diagram shows the layout of The Facility. The tanks, offloading pad, pumps and ancillary equipment will all be placed in bermed seamless/sealed concrete containment areas to prevent releases of approved E and P waste fluids to the surface soils, groundwater and recharge areas of aquifers.

c. Disposal

The approved E and P waste fluids, primarily produced saltwater, and pit water, will be injected in the permitted injection well(s). Injection pressures and the casing/tubing annulus pressure will be monitored according to the permit. The residual solids resulting from settling in the saltwater tanks will be periodically removed during tank cleaning operations and placed in a lined steel roll-off container during tank cleaning operations. These solids will be sampled, profiled and manifested for disposal at an approved facility. The solids generated are expected to be less than 0.1 percent of the total throughput handled at The Facility. The solids will be transported by an authorized transporter to an approved facility. Solids will not be stored at The Facility and will be removed as processed.

There will be no discharge of contact storm water at this facility. PA Prospect Corporation anticipates having to clean some of the tanks to remove solids approximately twice per year and estimates no more than twenty (20) cubic yards of solids will be removed from each tank cleaning event. Once in operation, PA Prospect Corporation will evaluate the previous estimations.

3. Sources of waste

a. On-site generation (type and percentage of total handled)

Solids that are generated from approved E and P waste fluids managed at the facility through accumulation in the bottom of the one (1) 750-barrel desander tank, three (3) 1000-barrel fiberglass surge tanks, two (2) 1000-barrel fiberglass gun barrels, two (2) 500-barrel oil stock tanks, and four (4) 750-barrel fiberglass saltwater tanks (spacing left to add two (2) additional 750-barrel fiberglass saltwater tanks if the need arises) will be removed by periodic cleanouts. During periodic cleaning of these tanks, solids will be removed and placed in a lined steel roll-off container temporarily located at The Facility only during tank cleaning operations. These solids will be sampled, profiled, and manifested for disposal at an approved facility. The solids generated will be less than 0.1 percent of

the total throughput handled at The Facility. The solids will be transported by an authorized transporter to an approved facility.

Normal solid waste will be generated at The Facility. A dumpster will be kept on-site for disposal of trash, debris, and garbage at the local permitted landfill.

b. Off-site generation (type and percentage of total handled)

Approved E and P waste fluid is generated off-site as waste generated by the drilling and production of oil and gas. This facility is not expected to generate any form of waste outside The Facility boundaries.

4. Where will the wastes be shipped if not handled at this site?

Approved E and P waste fluid not disposed of or treated at The Facility and waste products generated at The Facility from facility operations will be shipped from The Facility to a disposal facility permitted to receive approved E and P waste fluids. Solids from cleaning tanks will be temporarily stored in a steel roll-off container. The roll-off container will only be located at The Facility during temporary routine maintenance, such as cleaning tank bottoms from above-ground storage tanks. Normal solid waste from facility operations will be stored in an on-site dumpster prior to disposal at the local permitted landfill.

5. What wastes will remain on-site permanently?

No waste will remain on-site permanently. A closure bond will be obtained as required by LAC 43:XIX.567.

B. By which of the following potential pathways could releases of hazardous materials from the proposed facility endanger local residents or other living organisms?

1. Air

There is no potential exposure through the air pathway other than from vent lines on the oil/condensate storage tank, the separation tanks, and the temporary storage of solids in roll-off containers on the concrete pad during periodic tank cleaning operations. Preliminary modeling calculations have been done to determine if this facility will require a minor source air permit from DEQ. Based on the maximum anticipated throughput and tankage at this facility it was shown that the threshold for requiring such a permit will be reached and the permit is required (6.10 tons of VOC emissions/0.55 tons of TAP emissions per year). Since this is above the 5 tons per year criteria pollution limit and above the minimum emission rate for the TAPs, there is a need for an air permit at this facility. Altec's modeling results have been submitted to LDEQ for determination and LDEQ determination and/or response will be forwarded to the Environmental Division of DNR upon receipt. This type of facility will emit Volatile Organic Compounds (VOCs) exceeding an LDEQ minimum emission rate or a de minimis rate established pursuant to the Clean Air Act; therefore, an

air permit application was submitted to LDEQ. LDEQ issued Minor Source Air Permit No.: 2420-00657-00 on August 14, 2019. Facility personnel will be monitored for possible Hydrogen Sulfide (H_2S) exposure using H_2S personnel monitors.

2. Water

The water pathway is protected by a seamless/sealed concrete containment system around the tanks and off-loading areas. The storage tanks at the facility are enclosed by a 186' x 101' x 4' seamless/sealed concrete containment having a spill containment capacity of approximately 13,000 barrels. The tanks within the containment will have a maximum storage of 11,250 barrels of approved E and P waste fluids, consisting primarily of produced saltwater. The floor of the tank containment area will be constructed of seamless/sealed concrete and is sloped slightly towards the integrated concrete trough in the center of the containment floor which flows to a sump to collect any rainwater or spilled E and P Waste Liquids. Fluids collected in this sump will be pumped via an automated submersible pump back through the desander and on through the flow process.

The Facility will implement an approved SPCC Plan certified by a Professional Engineer to prevent and control spills of E and P waste or its recovered materials. The Facility will use secondary containment to ensure that contaminants will not enter the waters of the State of Louisiana. The offloading pad is contained by 6 in. concrete roll over berms and a seamless/sealed concrete floor that slopes to a sump that is automatically emptied by a submersible pump. Valves and hose connections associated with unloading of the skim oil tanks will be contained using 6.5 gallon polyethylene containment units with a cover and locking capabilities. The drinking water aquifers are protected by two (2) strings of steel casing and cement. A cement bond log will be run on the surface casing string and the long string casing string of the well to prove isolation of the Underground Source of Drinking Water (USDW). The injection of fluid will be through steel tubing and a packer, thereby offering a further layer of protection of the USDW. The casing/tubing annulus will be monitored to ensure there are no leaks in the tubing, packer or outer long string casing.

In addition, the surface water pathway is protected through collection of any precipitation that falls on any stored solids or in the contained areas throughout The Facility. These solids are from temporary tank clean outs and are only temporarily stored in a roll-off container until disposal at an authorized disposal facility. These waters will be handled as waste to be injected into the disposal well(s). Thus, there will be no surface discharge of contact storm water at this facility and no LPDES permit is necessary.

3. Soil

Contaminants from disposal of the approved E and P waste fluids in the proposed injection well(s) will not come in contact with the soil. The storage tanks at the facility are enclosed by a 186' x 101' x 4' seamless/sealed concrete containment having a spill containment capacity of approximately 13,000 barrels. The tanks within the containment will have a maximum storage of 11,250 barrels of approved E and P waste fluids, consisting primarily of produced saltwater. The

floor of the tank containment area will be constructed of seamless/sealed concrete and is sloped slightly towards the integrated concrete trough in the center of the containment floor which flows to a sump to collect any rainwater or spilled E and P Waste Liquids. Liquids collected in the sump are pumped to the inlet manifold and commingled with other approved E and P waste before being sent back through the flow process. The concrete unloading pad is bermed on four sides with 6-in. roll over berms to prevent runoff of approved E and P waste fluids or run-on of storm water. The E and P waste, primarily produced saltwater, will not come in contact with the soil. Possible minor spills and releases may occur during offloading of approved E and P waste fluids. The spills will be contained on concrete and run-on will be controlled by concrete roll over berms. The unloading pad is slightly sloped towards an integrated concrete sump equipped with a float actuated sump pump to prevent the accumulation of any fluids on the unloading pad. Any fluids from the sump are sent back to the tanks in the containment to be ultimately disposed of in the disposal well. Absorbent materials will be kept on site for further containment in the unlikely event a spill might take place in a place other than the concrete unloading pad.

4. Food

The Facility is located in a rural area of Red River Parish, Louisiana. No risk of significant release to the food chain is expected. The Facility will limit and minimize the risk of any contaminants to enter food or the food chain (i.e. animal, wildlife and related biology) by controlling and preventing air, water, and soil emissions. No emissions to the soil and water are expected because they will be controlled by concrete diked berms and concrete slabs with run-off controls, as noted above.

C. What is the likelihood or risk potential of such releases?

As noted above, no risk of significant emissions is expected. There is minimal risk, of potential exposure, to the water or soil through either leakage of containment areas, during the transfer of materials, or by way of the disposal well(s). All containment areas are adequately bermed to contain spills and include sump pumps to prevent accumulation or leakage offsite. Additional protection is being constructed in the form of a seamless/sealed concrete unloading pad with 6 in. roll over berms and a seamless/sealed concrete tank battery with 4' seamless/sealed concrete walls integrated into the seamless/sealed concrete containment floor. The WMOP establishes procedures for proper handling of materials and protection from releases. The Facility will have a SPCC Plan, developed by a professional engineer in accordance with 40 CFR Part 112 and LAC 33:IX.905.B to provide protection against releases as well as containment and regular inspections. In addition, The Facility will be designed and operated to prevent such releases and implement an Emergency Response/Contingency Plan that will help to ensure that any accident or unexpected event will be quickly and effectively controlled and reported, as required. The likelihood or risk potential of releases is minimal.

The likelihood or risk potential of a release from the injection well(s) is considered to be minimal when State imposed regulations are followed. Drinking water aquifers will be protected by two (2) strings of steel casing and cemented to ground surface, providing external cement isolation above and below the proposed injection zone as demonstrated

in Attachment 4A of the UIC-2 Com SWD application. A cement bond log will be ran on both casing strings, in accordance with the LDNR Injection and Mining Divisions (IMD) "Cement Bond Logging Guidelines" and sent to IMD in order to prove sufficient isolation and protection of the Underground Source of Drinking Water (USDW) has been met. Fluids will be injected through steel tubing and a packer, thereby offering a further layer of protection of the USDW. The casing/tubing annulus will be pressure tested, monitored, and recorded in accordance with LAC 43.XIX.Subpart 1. Statewide Order No. 29-B, to ensure there are no leaks in the tubing, packer or outer long string casing. The likelihood or risk potential of releases is minimal.

D. What are the real adverse environmental impacts of the permittee's proposed facility?

1. Short-term effects

Land area taken out of system

The land for the proposed facility is currently owned by PA Prospect Corporation. The total land area to be used is approximately 7 acres as shown on the plat at the end of Appendix H. The site is located Eleven (11) miles northwest of the town of Coushatta, Louisiana, just to the south of U.S. Highway 84, and east of Interstate 49. The Facility is in the northern part of the Red River – Bull Bayou Field. The present land use is for agricultural purposes. The Haynesville Shale Play extends more than 20 miles in all directions from the proposed facility. Other Fields to be served by this proposed facility include the Red River–Bull Bayou, Clear Lake, Grand Cane, Grand Cane North, Trenton, Trenton East, Mansfield, Buffalo Bayou, Ten Mile Bayou, Spider, Spider East, Kingston, Holly, Holly North, Catuna, Oxford, Brushy Bayou, Grogan, Chemard Lake, Ajax, Bayou Pierre, Gahagan, Red Oak Lake, Lake End, King Hill, Powhatan, Cannisnia Lake, Thorn Lake, Lachute, Chatman Bayou, Williams, Des Arc, Pleasant Hill, Benson, Benson West, Lillie Grove School, Lula, Hunter, Cypress Branch, Kickapoo, Caspiana, Canadian Bayou, Sutherlin, and Gay Island Fields.

2. Long-term effects

The Facility is designed and will be operated to minimize potential adverse effects to the environment. The Facility will implement an approved SPCC plan, provided by a Professional Engineer in accordance with 40 CFR Part 112 and LAC33:IX.905.B that will help prevent discharges to any drainage areas. The Facility will have the required closure financing in place to assure that the site is properly closed in accordance with LAC: XIX.567. The financial responsibility for any liability for damages will be in accordance with LAC 43:XIX.511 by obtaining and presenting a certificate of liability insurance in the amount set by the commissioner as documented in Appendix M.

In comparison to long-term waste storage facilities, such as, landfills or treatment systems that discharge to the waters of the State of Louisiana, this facility will not pose any threat for long-term environmental effects. Long-term

environmental impacts are not expected at The Facility. Class II well injection into subsurface reservoirs, is generally considered the safest and most effective method for handling these type fluids" *(Overview of Exploration and Production Waste Volumes and Waste Management Practices in the United States, May 2000 API report, section 2.4.2.)*. The process of deep well injection is the injection of approved E and P waste fluids, primarily produced saltwater, into porous and permeable formations that already contain saltwater. A simple explanation is: "saltwater will be injected in formations that already contain saltwater". Long term, the bottom hole pressure in the formations where fluid will be injected will dissipate and eventually reach a pressure not much higher than the original bottom hole pressure. The Closure Plan, included in Appendix N, details the method of plugging and abandoning the well(s) and closure of The Facility. Financial assurance in accordance with LAC: XIX.567, will be in place before construction and before approved E and P waste fluids are injected in any well(s). This closure funding helps to insure that the facility operator is responsible and cognizant of any potential contamination and the ensuing long-term effects. The well and facility will be constructed and operated in a manner that protects surface waters, recharge areas of aquifers, groundwater and drinking water aquifers. Permits and plans will be in place to provide further protection of the environment. All of the reasons above and, others contained in the permit application and elsewhere herein, provide levels of protection to ensure there will be no long term impact to human health and the environment.

II. Does a cost benefit analysis of the environmental impact costs balanced against the social and economic benefits of the proposed facility demonstrate that the latter outweighs the former?

Yes. A cost benefit analysis of the environmental impact costs balanced against the socio-economic benefit of the proposed facility indicates the latter outweighs the former.

A. How was it determined that this facility was needed?

PA Prospect and ALTEC Environmental Consulting, LLC, researched available information at the Department of Natural Resources and surveyed the need for commercial saltwater disposal well with oil and gas operators in the area. There are 90 wells currently permitted (2/2020) within a 20 mile radius of the proposed facility, and there are currently over 4,224 wells that are actively producing or shut-in waiting for completions or future utilization within a 20 mile radius of the proposed facility. There are currently only three (3) operational commercial E and P disposal facilities in Caddo Parish; one facility is operated by Key Energy Services, LLC (K087), the second is operated by Republic EES, LLC (R5445), and the third is the Woolworth Landfill (Site Code 0903) which is a LADEQ Landfill able to accept solid E and P waste only. There are currently four (4) operational commercial E and P disposal facilities in DeSoto Parish to serve the entire Haynesville Shale Play in this region; one facility is operated by Southern Water Disposal, LLC (S430), the second is operated by Pinnergy, LTD (P308), the third is operated by Bulldog Oilfield Services, Inc. (B3920), and the fourth is operated by Brumley Investments, LLC (B2920). There are also two (2) transfer stations

in DeSoto Parish; Heckman Transfer Station (Site Code 1603) which receives approved liquid E and P waste fluids generated in Louisiana, and transfers across state lines to Texas, and Pinnergy Transfer Station (Site Code 1607), which receives approved liquid E and P waste fluids generated in Louisiana, and transfers to the Pinnergy, LTD (P308, Site Code 1604) commercial E and P disposal facility next door. There are currently only two (2) operational commercial E and P disposal facilities in Bienville Parish; one facility is operated by Bear Creek Services, LLC (B320) and the second is operated by Sugar Creek Environmental, LLC (S2740). There are currently only two (2) operational commercial E and P disposal facilities in Webster Parish; one facility is operated by Nelson Energy, Inc (N054) and the second is operated by Bigfoot Energy Services, LLC (B2240). There is currently only one (1) operational commercial E and P disposal facility in Sabine Parish; operated by Basic Energy Services, L.P. (B272). There is currently only one (1) operational commercial E and P disposal facility in Bossier Parish; operated by R360 Environmental Solutions of LA, LLC (R244). There is currently only one (1) operational commercial E and P disposal facility in Claiborne Parish; operated by Key Energy Services, LLC (K087). There is currently only one (1) operational commercial E and P disposal facility in Red River Parish; operated by Pinnergy, LTD (P308).

There is currently only one commercial SWD facility in Red River Parish and no commercial SWD facilities in Natchitoches Parish and with further development of the Haynesville Shale Play, as well as additional plays in the Cotton Valley and Hosston formations, PA Prospect is of the opinion that a commercial E and P waste disposal facility will benefit the oil and gas operators in the Anticipated Market Range that surrounds the proposed Facility's location. In particular, it is known that horizontal wells in the Cotton Valley Formation and vertical wells in the Hosston, produce a large amount of water during production, and Haynesville Shale wells produce large amounts of water when drilled near faults or in highly fractured areas. Additionally, once a well is drilled it will continue to produce water for the life of the well. Further stated, PA Prospect has numerous contacts within the Oil & Gas Industry, Water Disposal Industry, and with numerous Producer/Operators in North Louisiana. This has provided them with insider knowledge of the relatively new and continuing exploration and production activities in Northwest Louisiana. With information provided by numerous Oil and Gas Producers within the anticipated market range, PA Prospect fully expects this facility will receive an average of 15,000 barrels to a maximum of 25,000 barrels of approved E and P waste fluids each day and with other commercial facility options and their locations to producing oil and gas fields, it would likely reduce the overall number of large trucks and travel distances for operators on U.S., State, and Parish roads, as well as the bridges that lay between these active fields and commercial disposal facilities on the east side of the Red River.

1. Local or regional survey

The Facility's chosen location is near the oil and gas drilling and production industry's major operations in Northwest Louisiana where E and P waste is created. The Facility is centrally located in North Louisiana approximately 5 miles east of Interstate 49 to provide a location in a rural area, but centralized to provide an environmentally safe means for disposal of produced fluids, primarily saltwater, from oil and gas wells in the region. The Facility is in the Red River - Bull Bayou Field. The proposed facility has easy access for truck traffic from U.S. Highway 84. There are currently no similar facilities within seven (7) road miles of the proposed facility location.

2. On-site or off-site needs

The Facility will be fenced and gated with access only by entrance through a locked gate. As mentioned above, the source of approved E and P waste fluids, primarily produced saltwater, is near the majority of oil and gas wells drilling and production operations in the eastern part of the Haynesville Shale play. The approved E and P waste fluids that meet the requirements and are accepted at the proposed facility will be disposed of in the proposed injection well(s). The solids that accumulate in the separation and holding tanks will be removed, sampled and analyzed, then disposed of at an approved E and P solid waste facility.

PA Prospect Corporation anticipates having to clean some of the tanks to remove solids approximately twice per year and estimates no more than twenty (20) cubic yards of solids will be removed from each cleaning event.

3. Regional solid waste management benefit

The Facility will not accept solid wastes for disposal. Small amounts of solid E and P waste will be generated at The Facility during tank cleaning operations. These solids will be properly sampled, profiled and disposed of at an approved solid waste facility. Therefore, there is no regional solid waste management benefit.

4. Generic survey of solid waste needs (compatibility with master plan)

The Facility will not accept solid wastes for disposal.

B. What will be the positive economic effects on the local community?

1. How many permanent jobs will be created?

The operation of The Facility will create approximately ten (10) positions at The Facility. Six (6) jobs will be created for operation of The Facility, plus two (2) positions for management, one (1) position for clerical assistance and quality control, and one (1) position for maintenance of The Facility. Additional positions will be created for truck drivers transporting approved E and P waste fluids to The Facility, and regulatory consultants to maintain regulatory requirements.

2. What is the expected annual payroll?

The expected annual payroll is estimated to be $500,000.00.

3. What is the expected economic multiplier from item B2?

The expected multiplier, i.e., increase in local business activity, is three (3). This multiplier has been previously accepted in prior similar commercial SWD applications at LADNR and is also supported by a 2011 report that indicates an average multiplier for value added, employment, and labor income of 3.18 (*Macroeconomic Impacts of the Domestic Oil & Gas Industry, Working*

Document of the NPC North American Resource Development Study, September 15, 2011).

4. What is the expected tax base and who will receive benefits?

The proposed facility would be subject to ad valorem taxes by Red River Parish. The ad valorem taxes will be based on the value of The Facility once it is in place, and will be assessed by the local tax assessor. Taxes will be paid on diesel fuel purchased to power the trucks transporting approved E and P waste fluids. The recipients of these taxes will be state and federal governing bodies.

C. What will be the potential negative economic effects on the local community?

1. What are the possible effects on property values?

There have been no formal impact studies done on nearby property values, but based on the current usage of the property and the rural location of the proposed facility, it is not expected that the proposed facility will have any adverse impact on local property values. The nearest residence to the subject facility is +/-2197 feet northeast of the northeast corner of the facility boundary. The nearest community is Grand Bayou, Louisiana, where the proposed facility is located. The proposed facility should have no adverse impact on adjacent or nearby property values.

2. Will public costs rise for:

a. Police protection

No significant increase in police protection cost should arise from the construction and operation of this facility. The proposed facility will operate 24 hours, seven days per week. The facility will be manned during these hours and any time injection of waste is occurring. When the subject facility is closed, a locked gate, and chain-link fencing, and a security system will secure the property. The proposed facility is to be located just off U. S. Highway 84.

b. Fire protection

The flammability of E and P waste at this facility is based mainly on the flammability of small amounts of fuel and oils within the E and P waste and the skimmed oil within the two (2) 500-barrel fiberglass oil tanks. The Facility will have fire protection equipment to handle less significant emergencies. The Facility will develop an Emergency Response Plan that will allow quick and effective action during emergency situations. The nearest Fire Station is located approximately 11.5 miles to the south in Coushatta, Louisiana. The Red River Parish Fire District, located at 205 Ringgold Avenue, Coushatta, Louisiana provides fire protection for the proposed facility. There will be no significant increase in public cost due to the subject facility being installed.

c. Medical facilities

Public costs for medical facilities will not increase due to the construction and operation of the proposed facility. The nearest medical facilities are located approximately 11.5 miles to the southeast in Coushatta, Louisiana. The medical facility is known as CHRISTUS Coushatta Health Care Center located at 1635 Marvel St, Coushatta, Louisiana. The materials handled at The Facility are in similar nature as the oil and condensate produced in oil fields in the area. The majority of the liquids handled at the proposed E and P waste facility will be produced saltwater, which is non-hazardous and non-flammable. There should be no new additional threats to human health.

d. Schools

Public costs for schools will not rise as a result of the construction and operation of the proposed facility. The nearest school is the Red River High School system located approximately 11.5 miles southeast of the proposed facility. No adverse effect to the local schools is expected, based on the limited potential of environmental concerns and the distance to the schools.

e. Roads

The public costs for roads are not anticipated to increase as a result of the proposed facility. The proposed development will service existing facilities by providing a centralized location for the area, and the overall impact and miles driven by E&P waste trucks is expected to be reduced. A Traffic Impact Analysis was performed for the service area to indicate whether or not this new facility would have any impact on the surrounding transportation network. Based on the traffic impact analysis it was determined that the new saltwater disposal facility would have minimal impact on the surrounding transportation network. See Attachment 12 – Traffic Impact Analysis.

- The proposed facility is located off U.S. Highway 84 approximately 5 road miles to the east of Interstate 49. The facility location does not have posted weight restrictions on U.S. Highway 84. The positioning of the proposed facility is anticipated to reduce the truck impact for roadways within the Anticipated Market Range as the existing truck traffic will utilize the proposed facility, reducing overall miles traveled on public roadways.

- Heavy vehicles accessing the proposed site are already operating on Parish roadways; utilizing existing facilities located further from source locations. Operators currently have to transport E&P waste from well locations near the proposed facility to one of the following Commercial SWD Facilities; **1)** Southern Water Disposal, LLC SWD Commercial Facility, Site code 1606 approximately 31.5 miles to the west; **2)** Pinnergy, LTD SWD Commercial Facility, site code 1604 approximately 7 miles to the west; **3)** Basic Energy Services SWD Commercial Facility, site code 4304 approximately 34.5 miles to the south/southwest; **4)** Republic EES, LLC SWD Commercial Facility, site code 904 approximately 23 miles to the north; **5)** R360 Environmental Solutions of LA, LLC SWD Commercial facility, site code 801 approximately 43.5 miles to the north; **6)** Nelson Energy SWD Commercial Facility, site code 6006 approximately 52.7 miles to the north; **7)** Sugar Creek Environmental, LLC SWD Commercial Facility, site code 703, approximately 56.2 miles to the north; **8)**

Bear Creek Env. Systems, LLC SWD Commercial SWD Facility, site code 701 approximately 57.1 miles to the northeast; **9)** Key Energy Services – Oil City SWD Commercial Facility, site code 901 approximately 59.9 miles northwest; **10)** Key Energy Services – Athens SWD Commercial Facility, site code 1401 approximately 61.4 miles northeast; **11)** Bigfoot Energy Services, LLC SWD Commercial Facility, site code 6001 approximately 88 miles north; **12)** Brumley Commercial Facility, site code 1610 approximately 23 miles west; **13)** Bulldog Oilfield Services Commercial Facility, site code 1609 approximately 20 miles northwest; **14** Pinnergy, LTD SWD Commercial Facility, site code 4102 approximately 24 miles north. Providing a facility closer to sources will reduce the overall truck mileage for the existing E & P waste, see page 23 (II.D.3.a) for additional information.

- It is anticipated that heavy vehicle traffic of the Red River Bridge at Armistead-Coushatta and the Jimmie Davis Bridge at Shreveport-Bossier City will be reduced to a minimal impact. Based on PA Prospect's evaluation of current market conditions it is expected the waste generated west of the Red River will be received by the proposed facility. Waste generated to the east of the Red River will utilize one of the Commercial E & P waste facilities on that side of the river, this evaluation was performed considering all E & P Waste Hauling Companies.

- A Road Access Permit was applied for with the Louisiana Department of Transportation and Development (LA DOTD) for purposes of providing access to the Facility from U.S. Highway 84. The LA DOTD Road Access Permit was issued on March 19, 2020. Parish road permits will not be required, as PA Prospect only operates the disposal facility and does not operate any E and P waste hauling trucks or any heavy vehicles that will utilize parish roads. E and P Waste Haulers will meet Parish Road Permit requirements for the roads traveled in the parishes the PA Prospect facility will serve.

- Transporters that transport E & P waste to the proposed facility, prior to accepting the E & P waste, training will be provided regarding transportation, such as acceptable routes, bridge postings, parish road permit requirements, weight limits, and school zones.

Please refer to the Traffic Impact Analysis maps on pages 18-20 and the Attachment 12 - Traffic impact Analysis Report.

3. **Does the prospective site have the potential for precluding economic development of the area by business or industries because of risk associated with establishing such operations adjacent to the proposed facility?**

The proposed facility is located in a rural part of Red River Parish, which is one of the reasons why it was chosen. The property is currently used for agricultural purposes. It is not anticipated the prospective site will preclude economic development of the area by business or industry due to risks associated with the proposed facility. The operation of a commercial SWD facility at this location would generate a significant increase in local tax revenues to the parish as compared to the current use. Future drilling activity in the area, not only for Haynesville, but also other producing targets in the area would generate additional disposal requirements for this area. The risk associated with operations of the proposed facility is negligible to non-existent due to the WMOP and monitoring set in place to ensure there is no harm to human health and the environment. The injection well(s) are monitored daily for pressure variances in the casing/tubing annulus. The underground sources of drinking water are protected by two (2) strings of steel casing and cement. Cement bond logs are run to prove isolation of the injection interval and the underground source of drinking water.

The proposed facility poses no risk to prevent economic development in the area by other industries or businesses. The reason for this rationale is the risk associated with the proposed facility is mitigated by operating the facility in compliance with applicable rules and regulations, as discussed above on page 11 (I.D.2).

D. Was transportation a factor in choosing the proposed site?

Yes, access to transportation was a primary factor in choosing the proposed site. Transportation of the approved E and P waste fluids by truck and the close proximity of the proposed location to the source of the E and P waste being generated in the Haynesville Shale play, Red River–Bull Bayou, Clear Lake, Grand Cane, Grand Cane North, Trenton, Trenton East, Mansfield, Buffalo Bayou, Ten Mile Bayou, Spider, Spider East, Kingston, Holly, Holly North, Catuna, Oxford, Brushy Bayou, Grogan, Chemard Lake, Ajax, Bayou Pierre, Gahagan, Red Oak Lake, Lake End, King Hill, Powhatan, Cannisnia Lake, Thorn Lake, Lachute, Chatman Bayou, Williams, Des Arc, Pleasant Hill, Benson, Benson West, Lillie Grove School, Lula, Hunter, Cypress Branch, Kickapoo, Caspiana, Canadian Bayou, Sutherlin, and Gay Island Oil & Gas Fields provides the most practical and economical means of transportation and disposal of the approved E and P waste fluids from these fields. This location is located to take advantage of active development in the Hosston, Cotton Valley, and Haynesville plays, as well as help reduce truck traffic across state lines and bridges. Please refer to the Traffic Impact Analysis maps on pages 18-20, the Attachment 12 - Traffic impact Analysis Report, and page 23 (II.D.3.a) for additional information.

1. **What mode(s) of transportation will be used for the site?**

   a. **Truck**

Truck will be the only mode of transportation of approved E and P waste fluids to The Facility.

b. Rail

Rail transportation is not currently being considered at the subject location.

c. Barge

Barge transportation is not available to the subject location.

d. Other

Pipeline transportation is a future possibility for this site. PA Prospect would not utilize the pipeline until approved by LDNR and will comply with the requirements of LAC 43:XIX.571.

2. What geographical area will it serve?

This facility will serve the oil and gas production region in Northwest Louisiana, specifically Red River and surrounding parishes in Louisiana. If approved, and E and P waste fluids are received from out-of-state generators, the Manifest system shall be followed in accordance with LAC 43:XIX.545.

3. By how much will local road traffic volume increase?

The maximum expected operating capacity of the proposed PA Prospect facility is 25,000 barrels of saltwater, pit liquid, and other associated approved E and P waste fluids per day. Each truck servicing the facility can transport approximately 130 barrels which equates to 192 trucks per day at maximum capacity. See Attachment 12 – Traffic Impact Analysis for more figures on the traffic volume increase estimates. For the Generated Peak Hour Volume calculation it is assumed that the facility will accommodate the maximum of 192 trucks per day. While the facility is anticipated to operate 24 hours per day, it is assumed that the trucks will arrive within a 20 hour period; therefore a rate of ten (10) trucks per hour were used for the peak hour calculation. A summary of the generated peak hour trips is shown below.

Daily Peak Hour Trip Generation	AM Peak		PM Peak	
	Enter	Exit	Enter	Exit
Trucks per hour	10	10	10	10

It is anticipated that the actual operation of the facility will be around 70-80 trucks per day; however, the maximum rate is considered for purposes of this analysis. The majority of the heavy vehicle trips to and from the proposed facility currently exist on Parish roadways. The following table is an evaluation of the traffic volumes on existing major routes, also refer to pages 18 through 20 for Traffic Route Study maps and Attachment 12 – Traffic Impact Analysis.

Generated Peak Hour Volume			
Service Area	Route	AM	PM
East	LA 1 North to US 84 West	2	5
	LA 1 South to US 84 West	6	4
	US 84 West to Site	8	9
West	US 84 East to Site	2	1
Total Trucks Per Peak Hour (6:00-7:00 AM / 3:30-4:30 PM)		**10**	**10**

Route volumes are approximate estimations based on the existing facilities serviced. Routes are on a demand basis and regular hourly traffic will vary based on source sites being utilized. The existing processing facilities for the area is summarized in the Roads section on pages 16 and 17.

There are minor increases and decreases in the study area due to the re-routing of trips from existing facilities to the proposed facility. The main noticeable changes are the increases for the sections on LA 1 and US 84 West directly accessing the proposed development.

As mentioned previously the heavy vehicle trips are already present on Parish roadways and bridges servicing the existing E&P source sites. The proposed development provides a centralized location, reducing overall impact to Parish roadways that heavy vehicles are utilizing

a. Can local roads handle the traffic volume expected?

Local roads can handle the increased traffic without negatively affecting other users based on the following:

1) E and P Waste Haulers will meet Parish Road Permit requirements for the roads traveled in the parishes the PA Prospect facility will serve. Please refer to the following section B and Appendix P of the application for additional information.

2) A Road Access Permit was applied for with the Louisiana Department of Transportation and Development (LA DOTD) for purposes of providing access to the Facility from U.S. Highway 84. The LA DOTD Road Access Permit was issued on March 19, 2020.

3) A Traffic Impact Analysis was performed and showed that the facility would have minimal impact to the surrounding transportation infrastructure. See Attachment 12 – Traffic Impact Analysis.

4) LA DOTD average daily traffic count data along the anticipated traffic routes were reviewed at http://www.apps.dotd.la.gov/engineering/tatv/. Following is a summary of the data nearest the proposed facility.

LA DOTD Traffic Counts for Hwys Nearsest the Proposed Facility			
Vehicles Per Day			
	Station # 109020	Station # 109090	Station # 109080
YEAR	US Hwy 84 West of LA 1	LA 1 South of US Hwy 84	LA 1 North of US Hwy 84
2017	2113	3867	2015
2014	2984	5183	2675
2011	5104	7759	3323
2008	3645	6123	3376
2005	2842	4847	2283
2002	2453	4216	1870

b. Can local roads handle the weight of trucks?

The Facility is located immediately south of U.S. Highway 84, west of LA Highway 1 and is east of Interstate 49. A detailed evaluation of the roads and bridges along the anticipated routes was conducted using bridge data provided by the LA DOTD. The weight of the trucks will be no more than 80,000 pounds (40 Tons) and is dependent on many variables, such as how much E & P waste is being transported, the type of tires on the truck, and how much fuel is in the truck. These highways currently handle this kind of truck traffic with this kind of weight on a daily basis. The evaluation indicated the proposed routes are equipped with roads and bridges capable of handling the weight of the trucks, see pages 18-20 – Traffic Route Study Maps. It should be noted, that Bridge Postings on the Traffic Route Study Maps will be adhered to; routes are available that avoid these posted bridges and drivers that will be hauling to PA Prospect are trained to adhere to such restrictions. Additionally, a LA DOTD Road Access Permit has been applied for, for purposes of providing the facility access from U.S. Highway 84 and E and P waste haulers will meet parish road permits for the roads to be traveled in the parishes PA Prospect will serve. Prior to accepting the E & P waste, Transporters hauling E & P waste to the proposed PA Prospect facility, will be provided training regarding transportation, such as acceptable routes, bridge postings, parish road permit requirements, weight limits, and school zones. LA DOTD representatives have previously encouraged site development where the site is in close proximity to a major Interstate and a U.S. Highway. Please refer to the Traffic Impact Analysis maps on pages 18-20, the Attachment 12 - Traffic impact Analysis Report, and page 23 (II.D.3.a) for additional information.

4. What are the long-term expectations of the proposed site?

1. Longevity of the facility?

Based on the average life of similar facilities, this Facility is estimated to operate at this location for roughly twenty (20) years. The length of time The Facility operates is also based on the time frame in which oil and gas is produced in the area.

2. **Who owns the facility?**

The property is owned by PA Prospect Corporation

3. **Are the owners financially backed by others?**

The owners are not financially backed by others.

4. **When is closure anticipated?**

Closure is expected to be 20 years from the date noted on the approval of this application. (Anticipated closure to be in 2040).

5. **Who is responsible for the site after closure?**

PA Prospect Corporation is responsible for the site after closure of The Facility.

6. **What assurances will there be that the site will be closed in accordance with the plan?**

Financial assurances will be in place as noted in Appendix N of this application, according to regulations (LAC 43:XIX.567) to fund closure prior to issuance of the permit.

7. **What financial assurances will be established to demonstrate the ability to handle problems after closure?**

Financial assurances will be provided and in place according to regulations (LAC 43:XIX.567) to assure that proper closure is funded and attained.

A. PA Prospect Corporation will follow all applicable local, state, and federal financial assurance requirements. Closure bond and/or letter of credit will be in place as required by regulatory statutes, and reviewed annually. The requirements of the permit for the well and facility limit environmental concerns after The Facility is closed.

1. **Who certifies that the site is properly closed?**

The site will be closed according to LAC 43:XIX.567. The Department of Natural Resources (DNR) Office of Conservation will certify that the site is properly closed. Closure of the site will be performed under DNR's supervision.

2. **How are people protected from unwittingly buying land after closure?**

A deed recordation describing the operation to be located on the site along with the closure documents will be filed in the conveyance records at the Red River Parish Courthouse.

a. **Is the closed facility recorded in the deed?**

The closed facility will be recorded in the records of the Red River Parish Courthouse.

b. **What future uses are possible?**

The future uses of the property will most likely be agricultural or timberland.

III. **Are there alternative projects, which would offer more protection to the environment than the proposed facility without unduly curtailing non-environmental benefits?**

No. The facility is located in a remote area and provides limited exposure to the public. The proposed location is strategically located to serve the oil and gas industry in the area with a means of disposal of E and P waste that is protective to the environment and provides an economical means of disposal of the E and P waste. Other alternative projects are not believed to be economically viable for disposal of approved E and P waste fluids in this area. Costs, practicality, and suitability of various alternative means of disposal are noted in a *2006, Argonne National Laboratory report available through the US Department of Energy (Offsite Commercial Disposal of Oil and Gas Exploration and Production Waste; Availability, Options, and Costs).* Most other alternatives cannot handle the volumes required at an economically viable cost and as safely and effectively as disposal by deep well injection for the conditions found in Louisiana. A survey noted in this report indicates that injection was almost exclusively used to manage approved E and P waste fluids. The Facility is a closed loop system designed to minimize emissions and exposure of contaminates to the environment compared to other methods. It is located in a rural area and provides limited exposure to the public. Alternatives to deep well injection may be recycling, or the treatment of the produced saltwater to remove impurities. There is not a current need for additional sources of salt water in the area, so recycling is not a viable alternative. Land treatment of approved E and P waste fluids or gas plant waste fluids is not an acceptable means of disposal of E and P waste fluids per LAC 43:XIX.549.C.7.f. Land treatment is typically utilized for solids and sludges with relatively low levels of hydrocarbons and salts. Salt, unlike hydrocarbons cannot biodegrade, but may accumulate in soils. Treatment and discharge of the approved E and P waste fluids to the surface poses additional risk to the environment, including risk of contaminating surface or ground water. Regarding treatment and surface discharge, reliable technologies have not been developed to effectively treat large volumes of approved E and P waste fluids for discharge to the waters of the State of Louisiana. Thermal treatment is another option that has been tried in rare instances, but has the highest associated cost for disposal. No thermal treatment facilities for approved E and P waste fluids are believed to have been permitted in Louisiana. Burial in landfills for approved E and P waste fluids has been tried, but the requirement for solidification, which is generally required, drives up the costs.

The socio-environmental benefits of deep well injection far outweigh other methods of treatment and disposal of approved E and P waste fluids that includes land farming, land treatment, or incineration. Class II injection wells have been used to dispose of produced fluids since the 1930's and, today, there are over 170,000 such wells located in 31 states (Groundwater Protection Council, *Injection Wells: An Introduction to Their Use, Operation and Regulation, August 2005).* The Groundwater Protection Council and many others consider underground injection of produced fluids to be a safe technology. This method has been substantially improved, since the 1930's.

1. Waste water is injected into the ground between impermeable layers of rocks to avoid polluting fresh water supplies or adversely affecting quality of receiving waters. Injection wells are usually constructed of solid walled pipe cemented to a deep elevation in order to prevent injectate from mixing with the surrounding environment *(U.S. Environmental Protection Agency (EPA). Washington, DC. "Basic Information about Injection Wells." Updated 2010-01-22).*

   Injection wells are widely considered to be the best method for disposal of treated waste water. *(Argonne National Laboratory, Offsite Commercial Disposal of Oil and Gas Exploration and Production Waste", 2006).* Unlike outfalls or other direct disposal techniques, injection wells utilize the earth as a filter to further clean the treated wastewater before it reaches the receiving water. This method of waste water disposal also serves to spread the injectate over a wide area, further decreasing environmental impacts.

   Underground injection is a safe way to dispose of approved E and P waste fluids and LDNR regulations governing construction and operation of commercial SWDs, as well as The Facility's WMOP, help ensure protection of the environment *(Overview of Exploration and Production Waste Volumes and Waste management Practices in the United States, May 2001 API report).*

A. Why was this technology chosen (e.g., incineration over landfilling?)

Other technologies are available, such as landfilling, water treatment, and incineration, but none of the other alternatives are as protective of the environment as deep well injection. Deep well injection is also the most environmentally effective means of disposal of approved E and P waste fluids.

1. Are other technologies available?

Other technologies are available, water treatment and discharge, and incineration, but none of the other alternatives are as protective of the environment as deep well injection as an economically viable alternative as noted in the Argonne National Laboratory report noted previously in this appendix.

A 2000 API report *(Overview of Exploration and Production Waste Volumes and Waste Management Practices in the United States)* indicates that approximately 92% of approved E and P waste fluids is managed through Class II well injection into subsurface reservoirs, generally considered the safest and most effective method for handling these type fluids. Deep well injection is also noted as the most cost-effective means of disposal of approved E and P waste fluids in the previously referenced Argonne National Laboratory report. Deep well injection is a process of pumping approved E and P waste fluids into a well and injecting into porous, subsurface rock or sand formations bounded by impermeable bounding beds. Deep well injection is the primary method of disposal of

approved E and P waste fluids from oil and gas exploration. *(Statements in this section also supported by a presentation available online at http://www2.epa.gov/sites/production/ files/ documents/21_McCurdy_ _UIC_Disposal_508.pdf.)* The Operators will often own Class II disposal wells for their operations. There are a number of operator-owned Class II disposal wells in Red River Parish. When these operator-owned Class II disposal wells go down or require workover operations to remediate them, Operators need another means to dispose of approved E and P waste fluids.

Due to the continued development of the Haynesville Shale and Cotton Valley Play, the demand exists for a commercial SWD facility in the area. Only nine (9) active commercial liquid E and P waste disposal facilities and two (2) active E and P waste receiving and storage facilities are operating in the core areas of the Haynesville Shale and Cotton Valley Play. Three (3) of these commercial E & P disposal facilities just became operational this year, two (2) are in Desoto Parish; one facility (Site Code 1609) is operated by Bulldog Oilfield Services, Inc. (B3920) and the second facility (Site Code 1610) is operated by Brumley Investments, LLC (B2920). The other is located in Red River Parish; operated by Pinnergy, LTD (P308). Continued development of these formations will generate significant quantities of produced saltwater. Discussions with industry personnel, familiar with operations in the area, indicate that many of the current facilities available nearby for disposal of approved E and P waste fluids may be approaching disposal capacity. Approved E and P waste fluid from Northwest Louisiana is piped and trucked daily across the state line to Texas, damaging Louisiana roads, risking a spill or release in environmentally sensitive areas, and further justifying the need for this commercial SWD facility.

Deep well injection is one of the most effective and environmentally sound methods for disposal of approved E and P waste fluids. Approved E and P waste fluids generated from oil and gas production is injected in porous formations already containing saltwater. These beds are bounded above and below by confining impermeable beds to prevent the vertical migration of the injected fluids. Injection pressures are limited below the fracture pressure of the rocks, as stated in Policy No. IMD 1999-03.

Approved E and P waste fluids are injected through 4-1/2-in. tubing and a packer, which allows for the first layer of protection of the USDW. The packer is set in the longstring 7-in. casing, at a depth that is equal to or deeper than the cement in the wellbore that is bonded to the first isolating shale formation immediately above the approved injection zone, to ensure the approved E and P waste fluids are migrating via the perforations within the approved injection zone. These pressures are monitored for integrity of the tubing, casing, and packer, so that the well can be shut down immediately in event of failure. This provides the first layer of protection of the USDW.

The second layer of protection of the USDW is the tested 7-in. steel casing and the cement pumped between the 7-in. casing and the 8 3/4-in. open hole all the way to the surface. A cement bond log is then run to provide evidence of proper isolation of the injection interval for the protection of the USDW. Logs are submitted to the Injection and Mining Division for approval prior to injecting the approved E and P waste fluids.

The third layer of protection of the USDW is the 9 5/8-in. steel surface casing. The surface casing is set at a minimum of 100-ft. below the base of the USDW and cemented back to surface. A cement bond log is then run to provide evidence of cement between the outside of the 9 5/8-in. casing and the drilled 12 1/4-in open hole, for protection of the USDW.

The IMD limits injection pressure below the fracture gradients of the confining zones, thereby eliminating the risk of vertical migration of fluids. In addition, an area of review evaluation is performed as part of the application preparation to determine if any artificial penetrations exist, that could potentially allow for approved E and P waste fluids to escape from the permitted formations. There were no artificial penetrations within the area of review for the proposed well locations. The confining zones, shales, multiple strings of tubing, casing, cement, and monitoring of injection pressure ensures that the injected approved E and P waste fluids stay within the permitted formations.

Approved E and P waste fluids or gas plant waste fluids may not be disposed of by land treatment in accordance with LAC 43:XIX.549.C.7.f.

Treatment of approved E and P waste fluids at the surface or waste water treatment is an option, but because of the high chloride content of the produced water, treatment is very costly; and if treatment is not managed and controlled, then impacts to the surface water could occur via the discharge of the treated approved E and P waste fluids.

Evaporation and incineration are other options to dispose of approved E and P waste fluids. Evaporation can cost as much as $84.00 per barrel, while incineration of E and P waste liquids, which typically does not have high flammability characteristics, can be more expensive. Thermal treatment can range from $10.50 to $105.00 per barrel.

Ref: Technical Assessment of Produced Water Treatment Technologies, 1st Ed., RPSEA Project 07122-12, Colorado School of Mines, November 2009.

2. Describe the engineering design and operating techniques used to compensate for any site deficiencies.

The permitting procedures help ensure the integrity of the injection well, including casing and cement protection of the USDW and isolation of the injection interval. Procedures will be in place for monitoring the integrity of the casing strings, tubing strings, and packer. Injection pressures will be monitored and recorded daily to help ensure compliance with the permit. Each of these design and operational parameters and controls help ensure confinement of injected fluids to the authorized injection zone.

Secondary containment will be in place to help ensure containment of approved E and P waste fluids in the event of a spill, release, or rupture. A secondary defense against spills or release is the bermed, sealed/seamless concrete unloading pad, and the sealed/seamless concrete containment area. These areas will be constructed of sealed/seamless concrete with appropriately sized berms to assure appropriate containment in the event of a spill. There will be no

accumulation of fluids within the containment areas under normal operating conditions. Slightly sloped floors of the unloading and containment areas towards automated sump pumps are additional added measures to assure that no accumulation of fluids will occur in these areas. Facility personnel will supervise unloading and disposal operations and discontinue operations if any problems are noted until the problem is resolved. The offloading area will be contained to prevent run-on and run-off, and for containment of minor spills that might occur during offloading procedures. Absorbent pads will be available at the unloading and offloading areas in the event of minor spills.

Once the oil in the 500-barrel fiberglass oil tanks is deemed in condition to be sold, an approved transporter will be notified to pick up the oil. When the transporter arrives on-site he will be directed to the oil load out unloading area on the southwest side of the containment wall by a trained PA Prospect Employee, a sample of the oil will be collected and the water percentage will be determined. If the oil is deemed acceptable, the driver will gauge the tank to determine the volume of oil in the tank. The oil will be transferred from the two (2) 500-barrel oil tanks to the load out line. The load out line has a polypropylene containment around the unloading valve to prevent any spills during the unloading process. The driver will then connect the suction hose to the loading valve in the polypropylene containment. The loading valve will be opened, the tank valve will be opened and the valve at the truck will be opened with the vacuum pump running. The driver will monitor the truck compartment with the site gauge and the tank the driver is pulling from with the gauge line. The onsite personnel for PA Prospect will be monitoring all activities and assisting the driver. Once the tanker is near capacity the driver will slow the vacuum pump down reducing the vacuum being pulled to move oil. The tank valve will be closed then the loading valve in the polyethylene container will be closed. The valve at the truck will be closed and disconnected. A five (5) gallon bucket will be placed beneath the hose and truck connection. The hose will then be disconnected at the loading valve in the polypropylene containment. Any spilled product in the five (5) gallon bucket or the polypropylene containment at the loading valve will be returned to the oil storage tank. Absorbent pads will be in place to absorb any minor amounts of oil that may be spilled.

A Spill Prevention, Control, and Countermeasure Plan will be developed by a Professional Engineer and put in place in the event of a spill or release.

B. Is the proposed technology an improvement over that presently available?

The proposed technology is deep well injection of approved E and P waste fluids generated from the oil and gas industry. Improvements are made to the casing design to allow for increased volumes of fluid to be injected with less injection pressure at the surface. Improved separation and increased retention time at the surface will allow for "cleaner" approved E and P waste fluids to be injected that will not have an adverse effect on the formation where the fluid is injected. The injection of oils, sludges, mud, and freshwater often create a swelling effect on the clays in the formations and create impermeable barriers that eventually increase injection pressures. Improved monitoring of the types of fluids accepted, increased separation and retention time at the surface, and the mixing of freshwater with approved E and P waste fluids will help the

operations at The Facility, specifically the injection pressure at the wellhead, to stay within the guidelines of the permit.

C. Describe the reliability of technology chosen.

The technology chosen provides an environmentally safe and economical method of disposal of approved E and P waste fluids with little or no harm to human health and the environment.

1. Past experiences

Approved E and P waste fluids managed through Class II well injection into subsurface reservoirs is generally considered the safest and most effective method for handling these types of fluids *(Overview of Exploration and Production Waste Volumes and Waste Management Practices in the United States, API, May 2000)*. The approved E and P waste fluids are injected back in saltwater-bearing formations. Deep well injection has been proven effective in thousands of Class II injections wells across Louisiana. The surface facility designs, multiple casing and cement designs and tubing and packer designs provide multiple layers of protection to the surface environment and the USDW. By injecting the brine, Class II wells prevent surface contamination of soil and water. *(http://dnr.louisiana.gov/assets/OC/im_div/uic_sec/EPAposterofwells.pdf)*

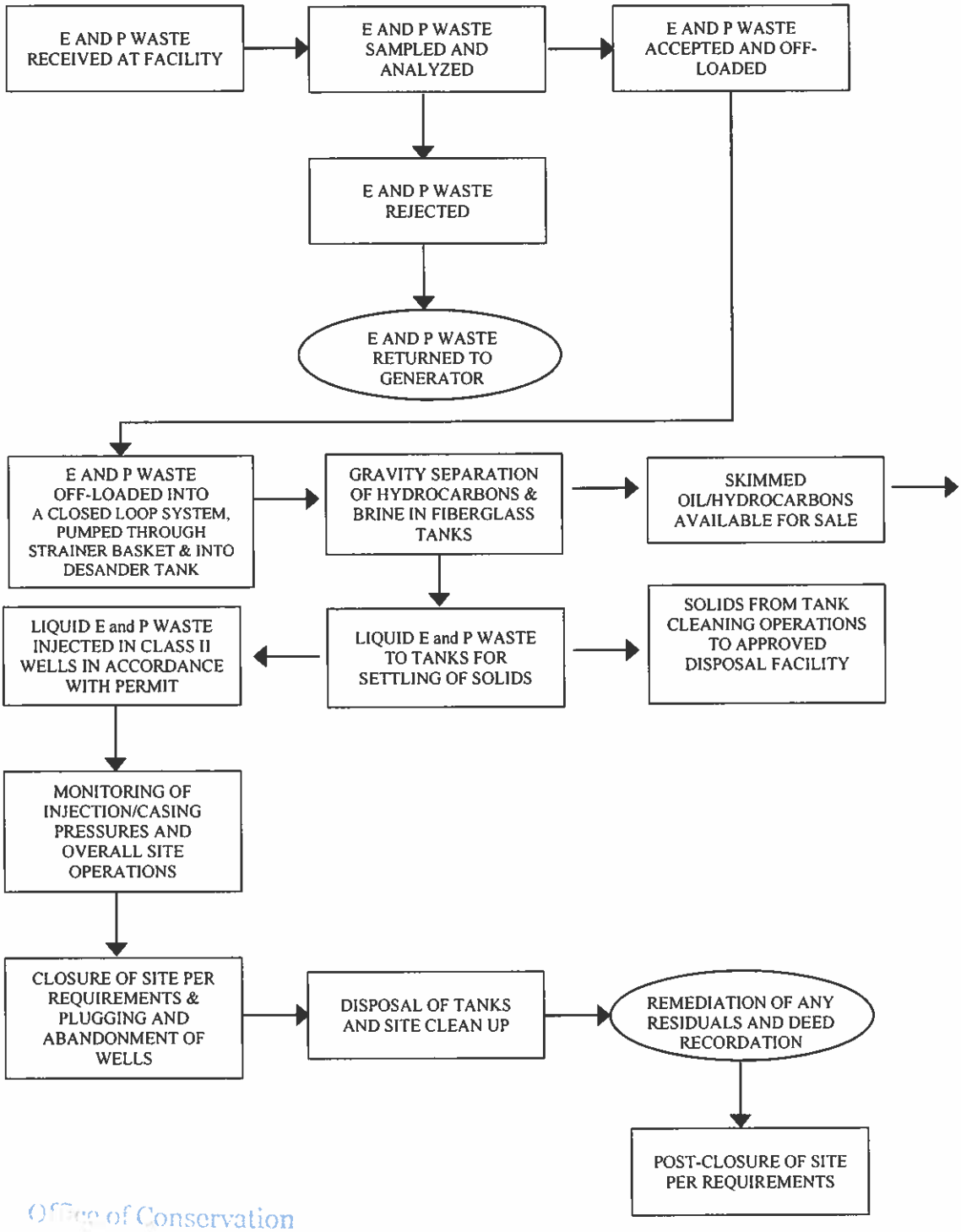
2. Environmental impacts

The environmental impacts to the community and the area are minimal to none. The secondary containment, also constructed of sealed/seamless concrete and the sealed/seamless concrete containment areas, will prevent spills, releases, and ruptures of approved E and P waste fluids from entering the environment. The casing, tubing, packer, and cement requirements established by the DNR protect the USDW. The monitoring programs established and issued along with the permit for the proposed facility ensure compliance during operations, and virtually eliminate any possible release to the environment. The socio-environmental benefits of deep well injection over other technologies, such as land farming, landfilling, or surface treatment, include the fact that Class II well injection into subsurface reservoirs is generally considered the safest and most effective method for handling these types of fluids (Overview of Exploration and Production Waste Volumes and Waste Management Practices in the United States, API, May 2000) and can virtually eliminate any contact or exposure to the communities such as Grand Bayou and Coushatta since environmental impacts are typically identified and remediated promptly. This is based on common industry information and EPA document, EPA816-H-10-001*(http://dnr.louisiana.gov/assets/OC/im_div/uic_sec/EPAposterofwells.pdf).*

D. Describe the sequence of technology used from arrival of wastes to the end process at The Facility (flow chart).

See flow chart on the following page.

PROCESS FOR THE ARRIVAL OF NEW WASTE



1. Analysis of waste

Upon the truck arriving at The Facility location, the site operator will take a sample of the fluid and inspect it for percent solids, and analyzed for pH, conductivity, chlorides and consistency with the waste type on the manifest. The E and P waste fluids will either be accepted or refused.

2. Unloading

Before unloading, the regulatory required testing will be performed and the reviewed manifest will be completed and given to the transporter. The approved E and P waste fluids will be unloaded from the tanker trucks through a closed loop system via hoses at the unloading rack. These hoses will pump the fluids through a strainer basket, into the inlet manifold, into the desander, and then on to the fiberglass surge tanks, gun barrels, and water tanks for separation.

3. Storage

A load of approved "Types" of E and P waste fluids enters The Facility through a security gate and is directed to an 8-in. thick cement unloading slab with 6-in. berms that is sloped towards an integrated concrete sump to prepare for the unloading procedures. After taking a sample of the tank truck's contents, a 4-in. hose will be connected to the tail end of the tank truck to allow the contents to be pumped via centrifugal pumps through a closed loop system to the inlet of one (1) 750-barrel desander tank. The fluids will then be sent through one (1) of three (3) 1,000-barrel fiberglass surge tanks for solids separation and some minimal hydrocarbon separation. The fluids will then by transferred via centrifuge pumps through one (1) of two (2) 1,000-barrel fiberglass gun barrels for separating hydrocarbons from the water. The separated hydrocarbons are skimmed from the tops of the 1,000-barrel surge tanks and siphoned from the gun barrels and transferred to two (2) 500-barrel fiberglass oil tanks. Fluid from the gun barrels is directed to one (1) of two (2) series of two (2) 750-barrel fiberglass saltwater tanks for solids separation and some minimal, additional hydrocarbon separation prior to being disposed of in the approved injection wells. There is spacing left for two (2) additional 750-barrel fiberglass saltwater tanks to be placed in the future if the need arises. Fluid from the four (4) 750-barrel saltwater tanks are then transferred via charging pumps to one (1) of the two (2) H-pumps which will be outside of the tank battery and have a 27'x19'3"x4" containment, then transferred to one (1) of the two (2) approved SWD wells.

The storage area will have a spill containment capacity, in accordance with the requirements of NFPA, EPA and LDEQ. A SPCC Plan, developed and certified by a Professional Engineer will be maintained on-site. Solids generated from the separation process in the tanks will be profiled and disposed at a permitted facility. No solid E and P waste will be stored on site. The Facility Diagram (Attachment 3) depicts the layout of The Facility.

4. Treatment

The approved E and P waste fluids are treated physically by gravity methods in the tanks on-site to separate the brine, hydrocarbons and settle solids.

5. Monitoring

Trained PA Prospect Corporation employees will be at The Facility during all operating hours and will monitor and assist during unloading operations. When The Facility is not open, the front gate will be locked and the security system activated. Inspections of the tanks and lines will be performed daily. The site will be maintained at all times to prevent approved E and P waste fluids from contacting surface soils and entering the environment. The injection pressures on the injection wells will be monitored and recorded on a daily basis and reported on Form UIC-21. The pressure on the casing/tubing annuluses will be monitored and recorded on a daily basis and reported on Form UIC-21. Unloading operations will be monitored so that appropriate action can be taken to prevent spills.

6. Closure

Closure of The Facility will be in accordance with the closure plan included in the permit application. The injection well will be plugged and abandoned according to the Department of Natural Resources requirements. The solids and sludge in the tanks will be sampled, manifested, and properly disposed at an E and P waste facility permitted and approved to handle these materials. The tanks will be cleaned and the metal recycled. The concrete will be removed from the site and recycled. The site will be returned as close as practicable to its original condition. In the event that future events or environmental concerns require closure confirmation samples, the cost of such sampling will be included in subsequent annual closure costs estimates and such samples will be collected to assure compliance and to ensure that remediation efforts are complete.

7. Post-closure

After closure of The Facility, inspections will be made to ensure that no contamination remains in place. There should be no reason for any post-closure after the well are properly plugged and abandoned and the site equipment and concrete are removed.

8. Disposal

Solids and sludges generated in the bottom of the tanks will be properly profiled (as required) and disposed at an E and P waste disposal facility. The concrete at the offloading area, berms and tank containment area will be removed and properly disposed or recycled.

9. Any residuals requiring further handling

Any residual materials will be characterized and properly disposed or recycled.

E. Will this facility replace an outmoded/worse polluting one?

No, the proposed facility is a new facility with all new equipment and two (2) new wells to be drilled. It is designed to provide a safe means of disposal of approved E and P waste fluids in accordance with the regulations stated in LAC 43, Chapters 4 & 5.

F. What consumer products are generating the waste to be disposed? Are there alternative products that would entail less hazardous waste generation?

Approved E and P activities associated with the production of oil and gas in North Louisiana generate the waste. This waste is a significant byproduct of area oil and gas production which necessitates additional disposal facilities be permitted to properly dispose of this E and P liquid waste product.

IV. Are there alternative sites that would offer more protection to the environment than the proposed facility site without unduly curtailing non-environmental benefits?

A. Why was this site chosen?

The primary reasons this site was chosen is because the site meets the criteria, including the environmental criteria, necessary for the construction and operation of injection wells for produced fluids. The more significant criteria this site meets are strategic location to oil and gas production, zoning, proper subsurface geology and surface conditions, avoidance of a floodplain, lack of groundwater contamination, avoidance of wetlands, availability of the site and the LDNR location criteria. The location also reduces the trucking time that is charged to the oil and gas operators that utilize local disposal means as opposed to trucking elsewhere in the state or across state lines, thereby reducing traffic on some Louisiana highways. The location is in a remote area of the parish and will have no adverse effect to the public.

1. Specific advantages of the site:

Based on oil & gas data available on the LDNR website SONRIS (Strategic Online Natural Resources Information System), the location of the site will provide a central location for oil and gas operators to properly dispose of approved E and P waste fluids.

The subsurface geology is appropriate for injection of approved E and P waste fluids. The subsurface geology is consistent and without any faulting within a two (2) mile radius.

Based on oil & gas production data available on SONRIS, The proposed injection formation is not productive in the area.

The site provides for avoidance of wetlands and floodplains, according to the Wetlands Study in Appendix G.

The rural area in which the site is located will not adversely affect the public.

The site is near the intersection of two primary roads, U.S. Hwy 84 and LA Hwy 1.

A U. S. highway is adjacent to The Facility. The location is 5 mile east of a major interstate.

There is a fire department within approximately 11.5 miles of The Facility in Coushatta, Louisiana.

The site is not located in a hurricane prone area.

2. Is the location of the site irrevocable; i.e., would denial of permit based on site preclude the project?

Denial of the permit based on the site location would prevent the project from being completed.

3. Were other sites considered and rejected?

Other sites were evaluated and considered. Each alternative site was evaluated based on the following criteria.

a. Strategic location near oil and gas operations generating non-hazardous oilfield waste, liquids, as previously defined
b. Zoning
c. Land Use
d. Proper Subsurface Geology and Surface Conditions
e. Avoidance of Floodplain
f. Ready Access
g. Lack of Groundwater Contamination
h. Greenfield
i. Wetlands
j. Infrastructure
k. Availability
l. Minimum Size and Configuration
m. Location criteria of the regulations.

Several criteria were evaluated for each site. Naturally, the location must be strategically located near oil and gas exploration and production activities. An injection well may also only be located where proper subsurface geology and surface conditions exist. Both local zoning and land uses should also suit the intended use. The preferred location avoids wetlands and floodplains or its size and shape allow for avoidance of wetlands and floodplains. The chosen site should be free of groundwater contamination. The site must meet the LDNR location criteria as defined in LAC 43:XIX.507 which states that a site cannot be located as follows:

(1.within 1/4 mile of a public water supply water well or within 1,000 feet of a private water supply well for facilities permitted after January 1, 2002;

2.where type A and B facilities and transfer stations, class II disposal wells, storage containers and E and P waste treatment systems and related equipment are located within 500 feet of a residential, commercial, or public building, church, school or hospital or for any proposed new commercial facility or transfer station where publication of the notice of intent or date of the permit application filed with the Office of Conservation is dated after the promulgation date of this rule, where type A and B facilities and transfer stations, class II disposal wells, storage containers and E and P waste treatment systems and related equipment are located within 1,250 feet of a school, hospital, or public park;)

It must also include the thickness and aerial extent of the proposed injection zone and adequate clay confining beds, avoidance of floodplains and wetlands, and be a location which does not pose a substantial, adverse threat to public health or safety. To ensure The Facility maximizes trucking use of established roadways, The Facility should have ready access to appropriate highways. All facilities require access to infrastructure as this facility does also. Infrastructure includes water, electrical and roadways. It is preferred to avoid Greenfields though often impossible. In addition, the property must be available. In very recent times, it has been quite difficult to purchase property suitable for injection wells or most uses in North Louisiana given that landowners have received lucrative lease revenues and the fear of losing minerals by prescription if a property is sold. Therefore PA Prospect Corporation had to diligently seek properties that were not on the market to finally locate a suitable site. This is further discussed below. Each of the sites considered are discussed below.

Site No. 1: This site is located in Section 41, Township 12 North, Range 10 West, Red River Parish, Louisiana. The site comprises approximately 1.5 acres. Site No. 1 is located on the north side of U.S. Highway 84/LA Highway 371, east of Coushatta, Louisiana.

a. Strategic location near oil and gas operations generating non-hazardous oilfield waste – liquids as previously defined: The location of the site was acceptable.
b. Zoning: Rural, no zoning.
c. Land Use: Rural, agricultural.
d. Subsurface Geological conditions exist for disposal of approved E and P waste fluids as previously defined.
e. Avoidance of Floodplain: This site falls with Zone C of the FEMA Flood Zone Map.
f. Ready Access: Access is available via Louisiana U.S. Highway 84/LA 371.
g. Lack of Groundwater Contamination: There is believed to be no groundwater contamination at the Site No. 1.
h. Greenfield: The site is a Greenfield Site, i.e., agricultural land that is undeveloped.
i. Wetlands: There are no wetlands on the property.
j. Infrastructure: Infrastructure is available including water, electrical power and a U.S./Louisiana State Highway located in close proximity to Interstate 20.

k. Availability: The property was available, but due to the size a purchase was not attempted.
l. Minimum Size and Configuration: The size and configuration of Site No. 1 is not adequate.
m. Location criteria of regulations: Portions of the site met the location criteria as required in the regulations.

Site No. 1 meets some of the criteria appropriate for the proposed project. The site was considered after reviewing geological characteristics of the area. The site is a Greenfield and contains both wetlands and floodplain. Though this site was not on the market, an effort was made to obtain the property. Ultimately, however, it was determined that the site was too small for a SWD facility. Therefore, the site was determined unsuitable.

Site No. 2: This site is located in Section 26 of Township 13 North, Range 11 West of Red River Parish, Louisiana. The site comprises approximately 2.837 acres. Site No. 2 is located on the west side of U.S. Highway 84/LA 1, between Coushatta, Louisiana and Mansfield, Louisiana.

a. Strategic location near oil and gas operations generating non-hazardous oilfield waste – liquids as previously defined: The location of site was acceptable.
b. Zoning: Rural, no zoning.
c. Land Use: Rural, Commercial/Agricultural.
d. Proper Subsurface Geology and Surface Conditions: Subsurface Geological conditions exist for disposal of E & P waste liquids as previously defined.
e. Avoidance of Floodplain: This site falls with Zone C of the FEMA Flood Zone Map.
f. Ready Access: Access via U. S. Highway 84/LA 1.
g. Lack of Groundwater Contamination: There is believed to be no groundwater contamination at the Site No. 2.
h. Greenfield: The site is a Greenfield Site, i.e., agricultural land that is undeveloped.
i. Wetlands: There is a .4 acre scrub-shrub wetland on the northwest side of the adjacent property, which will not be disturbed.
j. Infrastructure: Infrastructure is available including water, electrical power and U. S. Highway 84/LA 1, located in close proximity to Interstate 49.
k. Availability: A lease and disposal agreement has not been made with the landowner.
l. Minimum Size and Configuration: The size and configuration of Site No. 2 are inadequate.
m. Location criteria of regulations: Site No. 2 met the location criteria as required in the Office of Conservation regulations.

Site No. 2, was considered based on the proven and appropriate subsurface geology and surface conditions, ability to obtain an acceptable lease and disposal agreement with the landowner, and conformity with the Office of Conservation's commercial facility permit regulations and location criteria. In addition, and significantly, though the site lies within a Flood Zone C, it has a scrub-shrub wetland on the northwest side of the adjacent property, and it is surrounded by Flood Zone A. Site No. 2 is protected from Flood Zone A by U.S. Highway

84/LA 1 to the north and east and a Railroad bed to the west providing opportunity to protect and not affect either floodplain or wetlands. This site, like all of the remaining sites is a Greenfield, it contains a commercial building, i.e., an out of business store, which is not pristine in any manner. The site has good infrastructure, including direct access to U. S. Highway 84/LA 1 and is within approximately 6 miles of Interstate 49. Thus, the site has the benefit of good highways suitable for trucking while also being strategically located within an area of high levels of exploration and production. This close proximity of the site to the location of generation of the E&P fluids will equate to fewer truck miles driven, increased safety on the highways and savings in fuel consumption and costs and associated air emissions from the trucks. In addition, though the site is located within an area considered to contain the Red River Alluvial Aquifer, it is not located within a recharge zone. The casing and cement designed for the injection well and required by LDNR combined with the WMOP and LDNR requirements for operations will ensure no impact on the Red River Alluvial Aquifer. Given the protection of the floodplain and wetlands on site, as well as protection of the Red River Alluvial Aquifer, Site No. 2 offers the highest level of protection of the environment. Moreover, given its remote nature, no site offers greater protection of public health and welfare. Although Site No. 2 is a suitable site for the proposed project, it is not owned by PA Prospect Corporation. Ultimately, however, it was determined that the site was too small for a SWD facility. Therefore, the site was determined unsuitable.

Site No. 3, the Proposed Site: This site is located in Section 27 of Township 13 North, Range 11 West of Red River Parish, Louisiana. The site comprises approximately 7 acres. Site No.3 is located on the south side of U.S. Highway 84, between Coushatta, Louisiana and Mansfield, Louisiana.

n. Strategic location near oil and gas operations generating non-hazardous oilfield waste – liquids as previously defined: The location of site was acceptable.
o. Zoning: Rural, no zoning.
p. Land Use: Rural, Agricultural.
q. Proper Subsurface Geology and Surface Conditions: Subsurface Geological conditions exist for disposal of E & P waste liquids as previously defined.
r. Avoidance of Floodplain: This site falls with Zone A of the FEMA Flood Zone Map.
s. Ready Access: Access via U. S. Highway 84/LA 1.
t. Lack of Groundwater Contamination: There is believed to be no groundwater contamination at the Site No. 3.
u. Greenfield: The site is a Greenfield Site, i.e., agricultural land that is undeveloped.
v. Wetlands: There are no wetlands on the property.
w. Infrastructure: Infrastructure is available including water, electrical power, and U. S. Highway 84/LA 1, located in close proximity to Interstate 49.
x. Availability: A lease and disposal agreement has been made with the landowner.
y. Minimum Size and Configuration: The size and configuration of Site No. 3 are adequate.
z. Location criteria of regulations: Site No. 3 met the location criteria as required in the Office of Conservation regulations.

Site No. 3, the proposed site, was selected based on the proven and appropriate subsurface geology and surface conditions, ability to obtain an acceptable lease and disposal agreement with the landowner, and conformity with the Office of Conservation's commercial facility permit regulations and location criteria. In addition, and significantly, though the site lies within a Flood Zone A, it is in an area that base elevations and flood hazards factors have not been determined. If and when flood base elevations are determined, a levee will be built to protect and not affect either floodplain or wetlands. The site has good infrastructure, including direct access to U. S. Highway 84/LA 1 and is within approximately 5 miles of Interstate 49. Thus, the site has the benefit of good highways suitable for trucking while also being strategically located within an area of high levels of exploration and production. This close proximity of the site to the location of generation of the E&P fluids will equate to fewer truck miles driven, increased safety on the highways and savings in fuel consumption and costs and associated air emissions from the trucks. In addition, though the site is located within an area considered to contain the Red River Alluvial Aquifer, it is not located within a recharge zone. The casing and cement designed for the injection well and required by LDNR combined with the WMOP and LDNR requirements for operations will ensure no impact on the Red River Alluvial Aquifer. Given the protection of the floodplain and wetlands on site, as well as protection of the Red River Alluvial Aquifer, Site No. 3 offers the highest level of protection of the environment. Moreover, given its remote nature, no site offers greater protection of public health and welfare. Site No. 3 is the most suitable site for the proposed project and is owned by PA Prospect Corporation.

B. **Is the chosen site in or near environmentally sensitive areas?**

The subject property is not located in or near environmentally sensitive areas.

1. Wetlands

An onsite review of the property by a wetlands consultant was done during the fatal flaw process and was found not to have wetlands on the property the facility will be built on. The proposed construction of the commercial saltwater facility and disposal well will not impact any wetlands or pose an adverse impact to the wetlands in the area. The Army Corps of Engineers wetlands determination can be found in Appendix G – Flood Zone and Wetland Location Compliance.

2. Estuaries

The proposed facility is not located in an estuary.

3. Critical habitat

The proposed facility is not located in an area considered a critical habitat. This is supported by documents from a site assessment and review by Castilaw Environmental Services and the LNHP (Appendix G). The letter Dated December 27, 2018 from the Louisiana Department of Culture, Recreation & Tourism stated that they recommend a Phase 1 Cultural Resources Survey be performed. After talking with them on several occasions it was decided that since

no other permitting is required they will not require us to perform a Phase I Cultural Resources Survey.

4. Historic or culturally significant areas

The subject property is not located on property that is considered historic or culturally significant. This is supported by documents from a site assessment and review by Castilaw Environmental Services and the LNHP (Appendix G).

a. Indian mounds

There are no Indian mounds on or near the subject site.

b. Antebellum houses

There are no antebellum houses near the subject site.

c. Tourist attractions or facilities (e.g., bed and breakfast inns)

There are no tourist attractions near the subject property.

d. Campgrounds or parks

There are no campgrounds or parks on or near the proposed facility.

C. **What is the zoning and existing land use of the prospective site and nearby area?**

The property is not within the bounds of a zoning authority. And the existing land is used for agriculture.

1. Is the site located near existing heavy industrial, chemical process or refinery operations?

There are none, as defined in Appendix D – Location Criteria.

2. Is there a precedent for chemical contamination near the site or is the soil and water pristine?

There is no precedent for chemical contamination on or near the site. To the knowledge of the applicant, the soil at the site has no contamination.

3. Is the area particularly noted for its esthetic beauty?

The proposed location is in an open field, therefore it is not noted for its esthetic beauty.

D. Is the site flood prone?

According to FEMA Flood Maps in Appendix G - CES Wetlands Investigation Report the 7 acre tract is not flood prone, but the location of the permitted facility and the permitted injection well will be located in a Flood Zone A (Areas of 100-year flood: base elevations and flood hazards factors not determined) area. The Permitted Facility Boundary encompasses this 7 acre tract and includes the aboveground storage tanks, office/lab buildings, and injection well.

1. Is the site in a flood plain?

Yes. It lies within Flood Zone A (Areas of 100-year flood: base elevations and flood hazards factors not determined)

a. How current are the maps used to make flood plain determinations?

Flood plains maps are available from the Federal Emergency Management Agency as recent as 1985.

b. What is the elevation of the site?

The elevation of the site ranges from approximately 135 feet to 141 feet above mean sea level.

c. Is diking required or desired to provide flood protection?

No diking will be required for flood protection.

a. What is the design height of the dike? N/A
b. How is the dike protected from erosion? N/A
c. What frequency and design storm was used? N/A
d. Is the access to the site over or through dikes? N/A

2. Is the site hurricane vulnerable?

The proposed site is located in North Louisiana and is not vulnerable to strong hurricanes as facilities closer to the gulf coast are.

a. Is the site in an area subject to storm surge? No
b. What are the design storm specifications? Weather conditions, such as wind and rain, were taken into account when designing the facility, as thunderstorms are common in the area. The tanks used in the facility will be constructed of fiberglass or steel, placed in a sealed/seamless concrete containment area and tanks that are wider than they are tall will be at least half filled with fluid and tanks that are taller than they are wide will be anchored with guide wires to minimize wind effects during storms.
c. Should damage from wave action be considered? No
d. For what levels of wind speed is the facility designed? 100 mph – This is the wind speed that offshore/onshore production facilities are designed

for utilizing the above method of keeping tanks at least half filled with fluid and anchoring tanks that are taller than they are wide.

E. Is groundwater protected?

Groundwater will be protected by the 6-in. drive over berms around the four sides of the concrete unloading pad, which is constructed of sealed/seamless concrete. The 4-ft. tank containment wall will be constructed of sealed/seamless concrete and will have a spill capacity of approximately 13,000 barrels within containment. The floor of the tank containment area will be constructed of sealed/seamless concrete and is sloped slightly towards the integrated concrete trough in the center of the containment floor which flows to a sump to collect any rainwater or spilled E and P waste liquids. Liquids collected in the sump are transferred to the inlet manifold and commingled with other approved E and P waste. Groundwater will also be protected by steel 9 5/8-in. surface casing set at a minimum of 100-ft. below the base of the USDW and cemented back to surface. A cement bond log will be run to verify cement behind the 9 5/8-in. surface casing. The steel 7-in. longstring casing will be set to total depth of the well and will be cemented back to the surface. A cement bond log will be run to verify cement bonding isolating the USDW from the injection zones. Inside the longstring casing will be an injection string which will be steel 4-1/2-in. tubing. The tubing will be set with a packer just above the injection zone. The tubing and the packer guarantees the injected fluids are going out only into the permitted zone or perforations. All of the casing strings mentioned ensures the protection of the USDW. Once the oil in the 500-barrel fiberglass oil tanks is deemed in condition to be sold, an approved transporter will be notified to pick up the oil. When the transporter arrives on-site he will be directed to the oil load out unloading area on the southwest side of the containment wall by a trained PA Prospect Employee, a sample of the oil will be collected and the water percentage will be determined. If the oil is deemed acceptable, the driver will gauge the tank to determine the volume of oil in the tank. The oil will be transferred from the two (2) 500-barrel oil tanks to the load out line. The load out line has a polypropylene containment around the unloading valve to prevent any spills during the unloading process. The driver will then connect the suction hose to the loading valve in the polypropylene containment. The loading valve will be opened, the tank valve will be opened and the valve at the truck will be opened with the vacuum pump running. The driver will monitor the truck compartment with the site gauge and the tank the driver is pulling from with the gauge line. The onsite personnel for PA Prospect will be monitoring all activities and assisting the driver. Once the tanker is near capacity the driver will slow the vacuum pump down reducing the vacuum being pulled to move oil. The tank valve will be closed then the loading valve in the polyethylene container will be closed. The valve at the truck will be closed and disconnected. A five (5) gallon bucket will be placed beneath the hose and truck connection. The hose will then be disconnected at the loading valve in the polypropylene containment. Any spilled product in the five (5) gallon bucket or the polypropylene containment at the loading valve will be returned to the oil storage tank. Absorbent pads will be in place to absorb any minor amounts of oil that may be spilled. Injection pressures will be below fracture pressure of the injection zone and confining zones to prevent vertical migration of injected fluids; each of these factors, along with the WMOP, help to ensure protection of the Red River Alluvial Aquifer formation.

1. Are aquifers or recharge areas underlying the site used for drinking water?

There are aquifers/recharge areas underlying the site that are used for drinking water. The Red River Alluvial Aquifer underlies the site and is the primary source of drinking water in the immediate area. The Red River Alluvial Aquifer is found below the Natural Levees that lie within the Red River Valley, which is where the proposed site is located. Surface sealed/seamless concrete containment of the tank area will help protect the Red River Alluvial Aquifer from coming in contact with approved E and P waste fluids. Steel casing and cement, as described above, will help protect the approved E and P waste fluids from coming in contact with underground sources of drinking water. Sealed/seamless concrete containment walls, berms, and floors around tanks and offloading areas will help prevent the E and P waste from coming in contact with surface soils.

2. **What is the relationship of the site to the water table?**

Shallower, perched groundwater aquifers are encountered from 4 to 6 feet below ground surface *(USDA, Soil Survey of Red River Parish, pg 13, Caspiana Soils)*. The first major aquifer is the Red River Alluvial Aquifer and is encountered at approximately 56 feet below ground surface and other aquifers extend to the base of the USDW (Wilcox Aquifer) at approximately 245 feet (Oil/Gas Well Serial No. 73726) below ground surface (review of DNR water well records and logs through the USDW).

3. **What wells exist in the area?**

There are no active freshwater wells within 1,000-ft. of The Proposed Facility.

4. **What is the flow rate and direction of the groundwater flow?**

The direction of groundwater flow generally follows topography, which would be to the west-southwest. The estimated average groundwater velocity (Flow Rate) for the Red River Alluvial Aquifer is 185.3 ft./yr., According to https://www.deq.louisiana.gov/assets/docs/Water/SWAPdocument.pdf .

5. **What is the groundwater quality in the underlying aquifers?**

The groundwater quality in the shallow aquifers is unknown. The water quality in the first drinking water aquifer (Red River Alluvial Aquifer) is generally considered good for irrigation in a nearby sampled unregistered well. The first good Red River Alluvial Aquifer sand is located approximately 50-56 ft. below ground surface with the Base of the USDW (Wilcox Aquifer) at approximately 245 feet (Oil/Gas Well Serial No. 73726) below ground surface in the immediate area. The Red River Alluvial Aquifer typically contains higher than normal levels of TDS, mainly due to iron content. (Review of area freshwater well data from USGS & DNR).

6. **Is there a hydraulic connection between the aquifers?**

Yes, the Red River Alluvial aquifer is hydraulically connected with the shallow perched groundwater aquifers and the Red River and its major streams. Recharge

is accomplished by direct infiltration of rainfall in the river valley, lateral and upward movement of water from adjacent and underlying aquifers (Upland Terrace and Wilcox aquifers), and overbank stream flooding. *(https://deq.louisiana.gov/assets/docs/Water/Triennial_reports/AquiferSummaries_2004-2006/03RedRiverAlluvialAquiferSummary06.pdf)*

According to the USGS, there is a hydraulic connection between the Upland Terrace water-bearing zones and the Wilcox Aquifer.

F. Does the prospective site pose potential health risks as defined by proximity to:

No. The proposed site does not pose a potential health risk as defined by proximity to:

1. Prime agricultural area (crop or pasture land)

The proposed location is currently used for agricultural purposes.

2. Residential area

The nearest residence to the subject facility is +/-2197 feet northeast of the northeast corner of the facility boundary. The nearest community is Grand Bayou, Louisiana, where the proposed facility is located.

3. Schools or daycare centers

There are no schools or daycare centers located within 1 mile of the subject facility. There are no known health risks posed to schools or daycare centers.

4. Hospitals or prisons

There are no hospitals or prisons located within 1 mile of the subject facility. There are no known health risks posed to hospitals or prisons.

5. Public buildings or entertainment facilities

There are no public buildings or entertainment facilities located within 500-ft. of the subject facility. There are no known health risks posed to public buildings or entertainment facilities. Oil and gas production facilities posing a far greater hazard are located within a shorter distance than the proposed commercial SWD facility.

6. Food storage area

There are no food storage areas located within 1-mile of the subject facility. There are no known health risks posed to food storage areas.

7. Existing community health problems that may be aggravated by operation of additional hazardous waste disposal capacity

There are no known existing community health problems that may be intensified by the operation of the proposed facility. This facility will not handle hazardous waste and no emissions or discharges are anticipated to occur from this facility into the environment, with the exception of an insignificant amount of emissions that may be released through the vent lines to the tanks. Air emission quantities were calculated based on the proposed tankage and the anticipated maximum throughput of the facility, indicating that such emissions will exceed the threshold that DEQ requires for a permit. Therefore a minor source air permit from LDEQ was applied for and obtained. See Appendix P for LDEQ Air Permit Number.

G. Is air quality protected?

This facility handles approved E and P waste fluids through a closed loop system. There is no potential exposure through the air pathway other than the vent lines on the oil/condensate storage tanks, the separation tanks, and the temporary storage of solids in rolloff containers on the concrete pad during periodic tank cleaning operations. Based on air emissions estimates that have been calculated for this facility the anticipated operations will require a Minor Source Oil and Gas General Air permit to be obtained from LDEQ, this permit was obtained in August 2019. See Appendix P for LDEQ Air Permit Number. Anticipated operations will emit more than 5 tons per year Volatile Organic Compounds (VOCs) exceeding an LDEQ minimum emission rate or a de minimis rate established pursuant to the Clean Air Act.

1. Is the site within an ozone or non-attainment area?

No. Red River Parish has been determined to be an attainment parish by LDEQ. https://www.epa.gov/sites/production/files/2016-11/documents/la-rec.pdf

2. What contaminants are likely to be generated at the site?

Common emissions occurring from venting storage tanks are minimal amounts of VOCs.

3. What protection is afforded from each contaminant generated by the site?

Other than the LDEQ Minor Source Air Permit, there will be no protection necessary based on the calculated emissions rates.

4. What is the potential for unregulated emissions?

There is no potential for unregulated emissions.

5. What plans are implemented to provide for odor control?

There is no need for odor control at the proposed facility based on the calculated emissions projected from the proposed facility. If odor becomes an issue or if applicable air regulations change, necessary steps will be taken to stay within compliance of applicable rules and regulations. Please refer to Appendix P to see the Minor Source Air Permit No.: 2420-00657-00 and calculations.

6. **Who will be affected by emissions?**

There will be no one affected by the emissions due to the rural location of The Facility.

a. **What is the direction of the prevailing winds?**

The direction of the prevailing winds varies throughout the year, but is generally southerly. This Information can be found at the following site *https://www.ncdc.noaa.gov/climatenormals/clim60/states/Clim_LA_01.pdf)*

b. **Describe the expected frequency of "bad air" conditions.**

There should be no "bad air" conditions caused from the operation of this facility. See statement above on page 46 (IV.G.5).

7. **Describe the control of vapors at various stage of process.**

Control of vapors is provided by keeping tanks closed. There should be no need for the control of vapors generated from this facility. This facility will operate a closed loop system (with the exception of vent lines on the tanks). Vent lines will exceed twenty feet above ground surface and will extend outside the tank containment walls.

H. Have physical site characteristics been studied; what has been done in terms of a geotechnical investigation?

There has been no geotechnical investigation at the subject property since there will be no land treatment of E and P waste at the proposed facility.

1. **Site geology**

The Site consists of rural pasture land currently being utilized for agricultural purposes. The Site is characterized by subtle hills and gently rolling topography. According to the USGS Topographic Map, Harmon Quadrangle (Figure 3) and a review of the available LiDAR data, the elevation of the Site ranges from approximately 135 feet to 141 feet above mean sea level. The Site is bordered to the north by U. S. Highway 84, to the east by Jenkins Lease Road, and to the west by the Boggy Bayou.

2. **Hydrology**

Natural surface drainage is generally to the west-southwest on the subject property. Boggy Bayou drains to the south on the west of the subject site. Local groundwater flow in the area of the site appears to follow surface topography primarily toward the west-southwest. Water levels are generally within 30 to 40 feet of the land surface and movement is downgradient and toward rivers and streams. Natural discharge occurs by seepage of water into the Red River and its streams, but some

water moves into the aquifer when stream stages are above aquifer water levels. (*LDEQ, Red River Alluvial Aquifer Summary, Baseline Monitoring Program, FY 2004, Appendix 3 of the triennial Summary report, 2006)*

3. Topography

According to the USGS Topographic Map, and a review of the available LiDAR data, the elevation of the Site ranges from approximately 135 feet to approximately 141 feet above mean sea level. The southwest corner of the site slopes southwest. Storm water run-off drains to unnamed tributaries to the south, southwest, and northwest.

4. Soil

According to the published NRCS Soil Survey data for Red River Parish, the soils mapped on the Site are of the Caspiana series. The Caspiana series Cn – silty clay loam – less than 1 percent slopes are present.

The soils on these uplands are identified as the Caspiana Series. The Caspiana series consists of well drained, moderately permeable soils that are loamy throughout. These soils formed in loamy alluvium sediment. These soils are on older natural levees on the Red River alluvial plain. Slopes are less than 1 percent.

TAXONOMIC CLASS:

Caspiana Series – Fine-silty, mixed, thermic, Typic Argiudolls, Mollisols.

According to the U. S. Department of Agriculture Natural Resources Conservation Service website (http://websoilsurvey.nrcs.usda.gov/, access date 11/20/2018, the underlying soils at the proposed facility consist of the Caspiana silty clay loam (Cn). The Caspiana (Cn) series have slopes of less than 1 percent.

Caspiana (Cn) silty clay loam, 0-1 percent slope. The Caspiana (Cn) component makes up approximately 100 percent of the PA Prospect Corporation property boundary and the majority of the well pad boundary. This component is found on older natural levees and has slopes that are typically less than 1 percent. Depth to a root restrictive layer is greater than 80 inches. The natural drainage class is well drained with moderately high to high water movement in the most restrictive layers. Available water storage in profile is high, about 11.1 inches. This soil is not flooded nor is it ponded. This soil does not meet hydric criteria.

5. Aquifer Location

The Red River Alluvial Aquifer underlies the site and is the main groundwater aquifer in the immediate area around the proposed facility according to LDNR - GIS Aquifer Information. Within a 2 mile radius of the proposed facility there are 28 water wells registered with LDNR. Of these 28 water wells, 21 are listed as being completed within the Red River Alluvial Aquifer, 1 is listed as being completed in the Wilcox Aquifer, 3 are listed as Aquifer To Be Determined

(Depths correlate to the Red River Alluvial Aquifer), and 2 are listed as No Well Made. According to LDNR water well information the wells completed within the Red River Alluvial Aquifer have Well Depths ranging from 32 feet to 100 feet. Of the 21 water wells listed as being completed within the Red River Alluvial Aquifer 9 are active water wells, 6 are plugged and abandoned, 5 are inactive, and 2 are destroyed. The first major drinking water zone is encountered at approximately 60 feet below ground surface (Water Well No. 081-5799Z) in the immediate area and multiple sands can be found to the base of the USDW (Wilcox Aquifer) at approximately 245 feet (Oil/Gas Well Serial No. 73726) below ground surface in the immediate area. Other shallow perched groundwater aquifers may exist above the Red River Alluvial sands. A seasonal high water table is typically below a depth of 6 feet, but in places it is at a depth of 4 to 6 feet from December to April *(USDA, Soil Survey of Red River Parish, pg 13, Caspiana Series Soils) (Review of electrical logs in the area, DNR groundwater information & USGS groundwater information)*. The bermed seamless/sealed concrete unloading area and seamless/sealed concrete containment wall and floor will protect the surface soils and shallow groundwater aquifers from spills and releases of saltwater. Surface casing and cement, longstring casing and cement and the injection tubing and packer will protect the Red River Alluvial Aquifer.

6. Subsidence problems

There is no known surface evidence or historical evidence of subsidence problems in this area (web search review of historical data from authenticated sources).

7. Climatic conditions

Climatic conditions include annual average air temperature of 66 degrees Fahrenheit. The average annual precipitation is 52.5 in. (U.S. Climate Data, 2017). *https://www.usclimatedata.com/climate/shreveport/louisiana/united-states/usla0426*

V. Are there mitigating measures that would offer more protection to the environment than the facility as proposed without unduly curtailing non environmental benefits?

No. There are no mitigating measures that would offer more protection to the environment than The Facility as proposed without unduly curtailing non environmental benefits.

A. Is this facility part of a master plan to provide waste management? Whose plan?

The Facility is part of a master plan or objective by PA Prospect Corporation to provide environmental services to the oil and gas industry in Northwest Louisiana. PA Prospect Corporation will invest over three (3) million dollars in permitting, equipment, land acquisition, tanks and pumps, facility construction and drilling and completion of injection well in order to inject approved E and P waste fluids at this site. Licenses are being obtained to operate the equipment. In order to meet the needs of the oil and gas operators in North Louisiana, the proposed site was selected to provide an environmentally safe means of disposal of approved E and P waste fluids. The proposed

facility will provide an economical alternative that will not adversely impact the environment. The proposed facility will provide a cost saving alternative to oil and gas operators and reduce traffic of Louisiana highways.

PA Prospect Corporation developed this plan and is pursuing the permit for this facility to continue the plan.

1. **How does it fit into the plan?**

   The proposed injection wells and associated facility is a portion of the plan. This facility compliments trucking operations, and provides the oil and gas operators a one-stop location for disposal of approved E and P waste fluids.

2. **What geographical area is served by the plan?**

   The Facility will serve the oil and gas production region in North Louisiana, specifically the parishes shown within the Anticipated Market Range on pages 18-20. At this time it is not anticipated that any waste will be received from outside of the market range. Circumstances in which the E & P waste fluids would come from outside of the anticipated market range would be if an in-state or out-of-state Commercial Facility was shut down or unable to receive waste and this facility was the only one open to receive waste. In this case it is anticipated that 98% of E&P Waste will come from within the Anticipated Market Range and 2% will come from outside of the Anticipated Market Range. If approved, and E and P waste fluids are received from out-of-state generators, the Manifest system shall be followed in accordance with LAC 43:XIX.545.

B. Does this facility fit into an integrated waste management system? (reduction, recovery, recycling, sales tax, exchange, storage, treatment, disposal).

The Facility is considered a disposal facility by deep well injection.

1. **On-site**

   The deep well injection will occur on-site at the proposed location. There will be no off-site disposal, except when tanks are cleaned and solid E and P waste is generated.

2. **Regional**

   The Facility will serve the oil and gas operators in Northwest Louisiana.

C. Can E and P Waste fluids be disposed by some other means?

The waste can be disposed of in other methods. A 2000 API report on the Overview of Exploration and Production Waste Volumes and Waste Management Practices in the United States indicates that Class II well injection is generally considered the safest and most effective method for handling these types of fluids.

1. **Technology limitations**

The E and P waste fluids accepted at this facility will be limited to approved E and P waste fluids associated with the drilling and production of oil and gas. These liquids will be primarily produced saltwater and pit fluids. Fluids with high contents of solids, such as drilling mud and tank bottoms, cannot be accepted at this facility.

2. Cost factors

Deep well injection is one of the most economical methods of disposal of approved E and P waste fluids *(Argonne National Laboratory/USDOE Report: Offsite Commercial Disposal of Oil and Gas Exploration and Production Waste: Availability, Options, and costs, 2006)*. Other methods would not be cost-effective for oil and gas operators, and eventually would not allow a certain portion of the oil and gas reserves to be economically produced.

3. Other reasons

Class II well injection into subsurface reservoirs, is generally considered the safest and most effective method for handling these type fluids" *(Overview of Exploration and Production Waste Volumes and Waste Management Practices in the United States, May 2000 API report, section 2.4.2.)*. In actuality, produced saltwater is being injected in a saltwater-bearing formation, and not adversely impacting the environment.

D. What quality assurance control will be utilized to protect the environment?

1. Plans for lab work

A sample of each load of approved E and P waste fluids will be inspected for percent solids and analyzed prior to acceptance. The sample will be analyzed for pH, conductivity, and chloride.

2. How are out-of-spec E and P waste fluids handled?

Out-of-spec E and P waste fluids will be rejected.

3. What happens to rejected E and P waste fluids?

The rejected E and P waste fluids are the responsibility of the owner or generator. However, PA Prospect Corporation will follow the rejection regulations on documentation and notification according to LAC Title 43, Part XIX, Subpart 1, Chapter 5 Statewide Order 29-B. Should the facility refuse to accept a load of unauthorized E and P waste fluids, the Office of Conservation shall be notified immediately by electronic submission with the completed Form UIC-26, the manifest that accompanied the shipment, and identification of the generator and transporter of the shipment.

4. Treatment stabilization

The only stabilization expected at this facility will be of the settled solids periodically cleaned from the settling tanks of The Facility. These solids will be profiled, manifested and transported to a facility permitted and approved to accept this type of waste.

5. Segregation of non-compatible E and P waste fluids

There will be no non-compatible E and P waste fluids accepted at the proposed facility.

6. Handling of containerized wastes

There will be no containerized E and P waste fluids handled at this facility.

E. Innovative techniques used to control release of E and P waste fluids or waste constituents into the environment.

The entire facility will be constructed with concrete pads, with concrete walls providing containment in the unloading and tank battery areas of The Facility and will prevent releases to the environment. Unloading takes place directly from the incoming trucks through a closed loop system to the tanks. All tanks, piping, pumps, well, and other related equipment will be checked daily for leaks and corrosion.

1. Surface impoundment

There will be no surface impoundments at this facility.

2. Land application treatment

There will be no land treatment at the subject facility.

3. Landfill (burial)

There will be no burial or landfilling of E and P waste at the subject facility.

4. Incinerator

There will be no incineration of materials at the subject facility.

5. Container storage

There will be no means of container storage at the subject facility.

6. Tanks

The approved E and P waste fluids will be offloaded from the trucks using a 4-in. flexible hose that is connected to the tail end of the tank truck to allow the

contents to be pumped by centrifugal pumps through screen baskets to a manifold where it is directed through the inlet of one (1) 750-barrel desander tank. The fluids will then be sent through one (1) of three (3) 1,000-barrel fiberglass surge tanks for solids separation and some minimal hydrocarbon separation. The fluids will then by transferred via centrifuge pumps through one (1) of two (2) 1,000-barrel fiberglass gun barrels for separating hydrocarbons from the water. The separated hydrocarbons are skimmed from the tops of the 1,000-barrel surge tanks and siphoned from the gun barrels and transferred to two (2) 500-barrel fiberglass oil tanks. Fluid from the gun barrels is directed to one (1) of two (2) series of two (2) 750-barrel fiberglass saltwater tanks for solids separation and some minimal, additional hydrocarbon separation prior to being disposed of in the approved injection wells. There is spacing left for two (2) additional 750-barrel fiberglass saltwater tanks to be placed in the future if the need arises. Fluid from the four (4) 750-barrel saltwater tanks are then transferred via charging pumps to one (1) of the two (2) H-pumps which will be outside of the tank battery and have a 27'x19'3"x4" containment, then transferred to one (1) of the two (2) approved SWD wells. The tanks storage area will have a spill containment capacity exceeding requirements and guidelines of the NFPA, EPA and LDEQ. A SPCC Plan, developed and certified by a Professional Engineer will be maintained on-site. Solids generated from the separation process in the settling and cleaning tanks will be profiled and disposed at a permitted facility.

Pine Prairie Energy Center LLC
Response to
Revised Expanded "IT Decision" Questions

Pine Prairie Energy Center, LLC. (PPEC) is applying to the Louisiana Department of Natural Resources to construct PP-CW-006 to as a brine extraction well. PPEC is a high deliverability, salt dome natural gas storage facility located in Evangeline Parish, southwestern Louisiana. This project is ongoing in that PP-CW-001, PP-CW-002, PP-CW-003, PP-CW-004 and PP-CW-005 are in Gas Storage Service. The compression facility has been completed. The cavern well sites are part of PPEC's facilities but are not emission sources. PPEC holds the land upon which the Gas Storage Facility is built, and fixtures and improvements thereon pursuant to a lease with the Evangeline Parish Industrial Board that will extend for 15 years commencing on the date the Gas Storage Facility first accepts for storage third party natural gas. PPEC has the option to purchase the land.

The purpose of this document is to address the revised expanded "IT Decision" Questions. For ease of discussion, PPEC's response is italicized and follows the comment/question.

d. Have the potential and real adverse environmental effects of the proposed facility been avoided to the maximum extent possible?

(This question requires the permittee to identify adverse environmental effects, both potential and real.)

d. What are the potential environmental impacts of the permittee's proposed facility?

1. What wastes will be handled?

a. Classes of chemicals

b. Quantities (hazardous and non hazardous)

c. Physical and chemical characteristics

d. Hazardous waste classification (listed, characteristic, etc.)

All the waste generated at the facility will be non-hazardous oil field waste (NOW) or non hazardous waste. There will be no hazardous waste generation associated with the facility or its operations. All the waste handled on-site will be generated at the Gas Storage Facility.

The brine, which will be generated as a result of solution mining the caverns will be sent to the brine storage tanks at the Gas Storage Facility prior to being routed via a 16-inch pipeline to the Class II brine disposal wells at the Brine Disposal and Raw Water Withdrawal Site. Permits for the Class II UIC wells were obtained from the Louisiana Department of Natural resources (LDNR) prior to well development. Application Numbers and Permit to Inject authorization dates are in the table below.

The brine is a non-hazardous liquid consisting of a super-saturated salt solution with trace amounts of other minerals. It is estimated that a total of approximately 60 to 65 million barrels of brine will be generated for each of the authorized caverns during the solution mining process.

The LDNR Permitted wells:

				NAD 27 Coordinates			Permit to Inject	
Well Name	Section	Township	Range	X	Y	Serial No.	App. No.	Auth. Date
PPEC-CW-001	36	3S	1W	1,651,033.16	759,462.45	973316	28940	11/24/08
PPEC-CW-002	36	3S	1W	1,650,455.15	758,951.08	973317	30189	3/3/09
PPEC-CW-003	36	3S	1W	1,649,706.70	758,764.17	973318	30485	4/30/10
PPEC-CW-004	35	3S	1W	1,648,936.37	758,679.27	973724	32183	6/23/11
PPEC-CW-005	35	3S	1W	1,649,152.15	757,672.67	973725	33644	6/22/12
PPEC-CW-006	35	3S	1W	1,648,173.65	758,742.68		32182	
PPEC-CW-007	35	3S	1W	1,649,251.08	759,359.95		32601	
PPEC SWD 001	4	4S	1W	1,643,759.73	755,752.55	973291	24569	10/18/06
PPEC SWD 002	4	4S	1W	1,643,738.05	755,413.44	973292	24570	10/18/06
PPEC SWD 003	3	4S	1W	1,644,069.91	755,747.00	973293	24571	10/18/06
PPEC SWD 004	4	4S	1W	1,643,778.17	754,700.15	973294	24572	10/18/06
PPEC SWD 005	4	4S	1W	1,642,765.44	754,728.43	973392	26470	3/13/08
PPEC SWD 006	4	4S	1W	1,644,012.06	754,264.27	973393	26471	3/13/08
PPEC SWD 007	Permit	Expired						
PPEC-RW-01	4	4S	1W	1,643,775.73	755,673.38	20-0034		
PPEC-RW-02	4	4S	1W	1,643,778.80	755,340.61	20-0033		
PPEC-RW-03	3	4S	1W	1,744,032.84	755,655.59	20-0032		
PPEC-RW-04	4	4S	1W	1,643,705.32	754,627.94	20-0044		
PPEC-RW-05	4	4S	1W	1,642,685.00	754,693.00	20-0045		
PPEC-RW-06	3	4S	1W	1,644,055.91	755,342.56	20-0046		
PPEC-RW-07	FERC	Permitted,	Not	Drilled		20-0047		

The other wastes that will be generated at the site include:

- *used oil and used filters from the compressor engines – Non-hazardous wastes - <3,000 gallons/yr; 1-5 drums/yr*
- *used filters from the TEG Dehydrators – NOW – 1-5 drums/year*
- *trash – non-hazardous – 5-10 cubic yards/year*
- *used batteries – Universal Waste (less than 10 per year)*

2. How will they be handled?

a. Treatment

b. Storage

c. Disposal

The brine will be stored in aboveground storage tanks prior to routing via pipeline for disposal in a PPEC's non-commercial, permitted Class II disposal well. The used filters will be drained into containers and then will be shipped off-site for recycling. The used oil will be stored in above ground storage tanks prior to shipment off-site for recycling. The used batteries will be stored inside the maintenance building prior to being returned to the vendor for recycling. The trash will be sent to the local landfill.

3. Sources of waste

a. On-site generation (type and percentage of total handled)
b. Off-site generation (type and percentage of total handled)

All the waste will be generated on-site. Used oil, used filters, spent batteries and trash will make up 100% of the waste generated. There will be zero off-site waste generation.

4. Where will the wastes be shipped if not handled at this site?

Wastes will be shipped to licensed disposal/recycling facilities. The exact facilities have not yet been identified. The trash will be disposed of at the local landfill.

5. What wastes will remain on-site permanently?

There will be no waste that will remain on-site permanently.

B. By which of the following potential pathways could releases of hazardous materials from the proposed facility endanger local residents or other living organisms?

1. Air
2. Water
3. Soil
4. Food

There will be no hazardous materials generated on-site.

C. What is the likelihood or risk potential of such releases?

There is no likelihood or risk potential.

D. What are the real adverse environmental impacts of the permittee's proposed facility?

1. Short term effects
a. Land area taken out of system
2. Long term effects

There are few real environmental impacts that are associated with PPEC. The facility has been designed to minimize the amount of land that will be used. For example, the amount of land that will be disturbed during the construction of the Gas Storage Facility is just over 20 acres. The final amount of land that will be used will be 10-12 acres. This area will be fenced and will contain the compressor building, associated equipment and office building. The fenced area will therefore be permanently taken out of its current use (silviculture). Short-term effects included an increase in traffic during construction. Long-term effects include a slight noise increase, above background. However, the compressors are housed and high grade mufflers will be used. The noise level at the nearest residence is projected to be <55 dBA.

II. Does a cost benefit analysis of the environmental impact costs balanced against the social and economic benefits of the proposed facility demonstrate that the latter outweighs the former?

(This question requires the permittee to perform a cost-benefit analysis, or at least a quantitative indication of the economic benefits and a qualitative description of the negative impacts expected from the permittee's operation. The latter should come from the answer to question I.).

PPEC is located in Evangeline Parish, LA. Louisiana is unique in that it has 64 parishes that are governed, in most cases, by police juries. Parishes correspond to counties and police juries to county boards of commissioners or similar local governing bodies in other states. The police jury performs the legislative functions of enacting ordinances, establishing programs and setting policy. The jury also serves as an administrative body by preparing the budget, hiring and firing personnel, spending funds, negotiating contracts and in general, directing the activities under its supervision.

Evangeline Parish is comprised of 680 square miles of land area and 15.34 square miles of water area. Overall, the parish is rather sparsely populated (53 people/square mile) relative to the rest of Louisiana (103 people/square mile). Table 1 lists the largest villages, towns and cities of Evangeline Parish, and Table 2 summarizes the parish's population characteristics.

Table 1 Population Centers in Evangeline Parish

LOCATION	*POPULATION*	*MEDIAN HOUSEHOLD INCOME ($)*
City of Ville Platte	*8,226*	*12,917*
Town of Mamou	*3,568*	*12,988*
Town of Basile	*1,687*	*18,922*
Town of Pine Prairie	*915*	*21,167*
Village of Chataignier	*413*	*18,438*
Village of Turkey Creek	*354*	*25,625*

PER CAPITA INCOME AND UNEMPLOYMENT

In 2001, Evangeline Parish had a per capita personal income (PCPI) of $17,695.[1] This PCPI ranked 52nd in the State, and was 72 % of the State average ($24,454) and 58% of the national average ($30,413). The 2001 PCPI reflected an increase of 9.4% from 2000. The 2000-2001 state change was 5.5% and the national change was 2.2%. Parish unemployment statistics for the past decade are summarized in Table 3. Evangeline Parish's estimated unemployment rate for March 2004 was 5.6%.[2]

[1] Regional Economic Information System Bureau of Economic Analysis
[2] Louisiana Department of Labor May 7, 2004 Monthly Release

Table 2 Summary of Evangeline Parish Population Characteristics[3]

POPULATION CHARACTERISTICS	EVANGELINE PARISH	LOUISIANA
Population, 2002 Estimate	35,442	4,482,646
Population, 2000	35,434	4,468,976
Population, percent change, 1990 to 2000	6.5%	5.9%
Persons under 5 years old, percent, 2000	7.9%	7.1%
Persons under 18 years old, percent, 2000	29.6%	27.3%
Persons 65 years old and over, percent, 2000	12.8%	11.6%
White persons, percent, 2000	70.4%	63.9%
Black or African American persons, percent, 2000	28.6%	32.5%
American Indian, Alaska Native persons, percent, 2000	0.2%	0.6%
Asian persons, percent, 2000	0.1%	1.2%
High school graduates, persons 25 years and over, 2000	55.5%	74.8%
College graduates, persons 25 years and over, 2000	9.5%	18.7%
Housing Units, 2002	14,505	1,880,122
Homeownership rate, 2000	69.4%	67.9%
Households, 2000	12,736	1,656,053
Median household money income, 1999	$20,532	$32,566
Persons below poverty, percent, 1999	32.2%	19.6%

Table 3 Evangeline Parish Unemployment Statistics

	EMPLOYED	UNEMPLOYED	UMEMPLOYMENT RATE (%)
1992	11,150	1,410	11.3
1993	11,000	1,030	8.6
1994	11,100	1,040	8.6
1995	10,870	940	8.0
1996	11,170	820	6.8
1997	11,420	730	6.0
1998	11,640	690	5.6
1999	11,630	720	5.8
2000	11,340	690	5.7
2001	11,030	750	6.4
2002	11,080	840	7.0

[3] U.S. Census Bureau, Census 2000 Summary Facts

COMPOSITION OF LABOR FORCE[4]

Table 4 Evangeline Parish Labor Force Status and Employment Characteristics

	Number	*Percent*
LABOR FORCE STATUS		
Population 16 And Over	***26,147***	***100.0***
In labor force	*12,022*	*46.0*
Civilian labor force	*12,021*	*46.0*
Employed	*11,149*	*42.6*
Unemployed	*872*	*3.3*
Percent of labor force	*7.3*	*NA*
Not in labor force	*14,125*	*54.0*
OCCUPATION		
Employed Population 16 And Over	***11,149***	***100.0***
Management, professional and related occupations	*2,890*	*25.9*
Service occupations	*2,010*	*18.0*
Sales and office occupations	*2,481*	*22.3*
Farming, fishing and forestry occupations	*266*	*2.4*
Construction, extraction and maintenance occupations	*1,721*	*15.4*
Production, transport and material moving occupations	*1,781*	*16.0*
CLASS OF WORKER		
Private wage and salary workers	*7,792*	*69.9*
Government workers	*2,239*	*20.1*
Self-employed workers in own not incorporated business	*1,053*	*9.4*
Unpaid family workers	*65*	*0.6*

BUSINESS CHARACTERISTICS[5]

Table 5 Evangeline Parish Business Characteristics

BUSINESS CHARACTERISTICS	*EVANGELINE PARISH*	*LOUISIANA*
Private nonfarm establishments with paid employees,	*552*	*100,780*
Private nonfarm employment, 2001	*5,717*	*1,599,482*
Private nonfarm employment, percent change 2000-2001	*-4.8%*	*0.4%*
Retail sales, 1997 ($1000)	*144,491*	*35,807,894*
Retail sales per capita, 1997	*$4,239*	*$8,229*
Federal funds and grants, 2002 ($1000)	*280,615*	*29,987,664*

[4] U.S. Census Bureau, Census 2000 Summary Facts
[5] U.S. Census Bureau, Census 2000 Summary Facts

PUBLIC EDUCATION[6]

Evangeline Parish has 14 schools and a student population of approximately 6,379.

Table 6 Evangeline Parish Public Schools

School Name	Street	City	Students	Teachers
Basile High School	P O Box 666	Basile	470	28
Bayou Chicot High School	4576 US Highway 167 N.	Ville Platte	482	27
Carver Elem. School	P O Box 219	Chataignier	185	13
Chataignier High School	P O Box 189	Chataignier	287	17
Hester Heath Elementary School	4810 US Highway 167 N.	Ville Platte	245	16
James Stephens Elem. School	1500 Martin Luther King Dr.	Ville Platte	664	40
Mamou High School	1008 Seventh St.	Mamou	297	20
Mamou Lower Elem. School	912 Seventh St.	Mamou	529	32
Mamou Upper Elem. School	1205 Fourth St.	Mamou	377	22
Pine Prairie High School	P O Box 200	Pine Prairie	730	40
Vidrine High School	5094 Vidrine Road	Ville Platte	635	38
Ville Platte High School	210 W. Cotton St.	Ville Platte	714	42
Ville Platte Lower Elem. School	708 High School Dr.	Ville Platte	529	36
W. W. Stewart Elem. School	2312 Guillory St.	Basile	235	17

MEDICAL SERVICES

Although a majority of the parishes in Louisiana are "medically underserved,"[7] *Figure 1 shows that Evangeline Parish has one of the lowest health provider-to-population ratios in the state. The Ville Platte Medical Center, which is approximately 11 miles from the Pine Prairie Energy Center, is an accredited, acute care facility with 116 beds.*

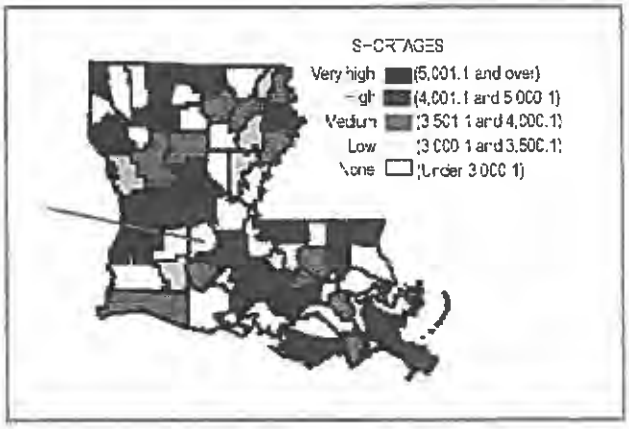


Figure 1
Primary Health Professional Shortage Areas

[6] Nat'l Center for Education Statistics (NCES) Public School Data 2001-2003 school year

[7] DHH Research and Development, 1998

POLICE AND FIRE PROTECTION

Every parish in Louisiana has a sheriff's office that is funded by the local parish police jury. The Evangeline Parish Sheriff's Department is located at the Ville Platte Courthouse. Evangeline Parish's Fire Protection Team is also located in Ville Platte.

HOUSING

Table 7 summarizes Census 2000 housing figures for Evangeline Parish.

Table 7 Evangeline Parish Housing Characteristics

	UNITS	*PERCENT*	*POPULATION*
Total Housing Units	***14,258***	***100.0***	***33,662***
Occupied	*12,736*	*89.3*	*33,662*
Owner	*8,834*	*69.4*	*23,649*
Renter	*3,902*	*20.6*	*10,013*
Vacant	*1,522*	*10.7*	
Seasonal, recreational,	*472*	*31.0*	
Homeowner vacancy rate (percent)		*1.7*	
Rental vacancy rate (percent)		*6.4*	

LOCAL TAX REVENUES AND SOURCES OF FUNDING

Evangeline Parish revenue sources include local taxes, federal grants, state funds and other miscellaneous fees and charges. The Evangeline Police Jury Treasurer provided the Parish Statement of Revenues (see Table 8) and the Louisiana Department of Education provided the information of education revenues shown in Table 9.

Table 8 Evangeline Parish Police Jury Statement of Revenues

	2002 ($)	*2003 ($)*
Ad Valorum	*2,105,157*	*1,997,159*
Sales	*1,710,117*	*1,504,426*
Federal	*1,367,690*	*530,150*
State	*2,372,791*	*1,635,738*
Other	*708,349*	*904,269*
Total Revenues	***8,264,104***	***6,571,741***

Table 9 Evangeline Parish Education Revenues

	2002 ($)	*2003 ($)*
Ad Valorum	*3,731,864*	*3,680,593*
Sales	*4,791,650*	*4,432,912*
Federal	*7,124,075*	*5,887,661*
State	*28,431,717*	*24,078,201*
Other	*837,901*	*1,056,830*
Total Revenues	***44,917,207***	***39,136,097***

PROJECT CONSTRUCTION AND OPERATION IMPACTS

The socioeconomic impacts associated with construction include temporary changes in population, availability of housing, transportation, local infrastructure, merchant sales and sales tax revenues. Overall, adverse effects related to a temporary increase in the number of workers in the area have been short term and localized. Favorable longer term socioeconomic effects to the local community include increased sales by local merchants and a significant increase in tax receipts in Evangeline Parish.

ESTIMATED MANPOWER REQUIREMENTS

PPEC is projected to generate an average of around 130 temporary construction jobs over a three-year period, with an estimated average annual payroll exceeding $8.25 million.

Table 10 PPEC Workforce

DRILLING	*FACILITIES CONSTRUCTION*	*PIPELINE CONSTRUCTION*	*PLANT OPERATIONS*
♦ *WellSite Supervision* ♦ *Mud Engineer* ♦ *Tool Pushers* ♦ *Roustabouts*	♦ *Construction Engineer* ♦ *Construction Superintendent* ♦ *Materials Manager* ♦ *Carpenters* ♦ *Crane & Back-hoe Operators* ♦ *Welders & Welders' Helpers* ♦ *Fitters* ♦ *Millwrights* ♦ *Laborers* ♦ *Environmental & Safety Inspectors* ♦ *Trade Inspectors*	♦ *Construction Engineer* ♦ *Construction Superintendent* ♦ *Materials Manager* ♦ *Laborers* ♦ *Back-hoe and Dozer Operators* ♦ *Welders & Welders' Helpers* ♦ *Fitters* ♦ *Coating Inspectors* ♦ *Welding Inspectors* ♦ *Environmental & Safety Inspectors*	♦ *Plant Superintendent* ♦ *Plant Administration* ♦ *Mechanics* ♦ *Electrical Technicians* ♦ *Instrument Technicians* ♦ *Plant Operators*

A review of the manpower breakdown, by trade, indicates that within the Parish, the availability of qualified personnel possessing heavy construction experience of this type limited. Throughout the construction phase, PPEC has and will continue to encourage its subcontractors to utilize available qualified personnel from within the Parish's existing population. Workforce shortages for specific trades are in many cases filled from surrounding parishes. As necessary, specialists have been called in for short periods of time from outside the immediate area.

Approximately 20 permanent jobs have been created by the "24/7" operation of the facility, with an estimated annual payroll for PPEC's operating employees, including allocated costs of the corporate office of $2.0 million. Substantially all of these staff positions have been filled by residents from surrounding communities. Additionally, a core group of local contract service personnel performs routine maintenance at PPEC's facilities.

PROJECT IMPACT ON LOCAL GOVERNMENT SERVICES

Necessary community services are in adequate supply in the vicinity and have been able to absorb any increase in demand by the temporary construction workforce; consequently, PPEC is not aware of significant adverse impacts to the parish infrastructure. PPEC has and will maintain liaison with appropriate fire, police and public officials pursuant to DOT requirements.

PROJECT IMPACT ON TRANSPORTATION

During times of peak construction, movements of temporary construction personnel at shift changes caused brief congestion in the immediate area on a few occasions. Delays arising from trucks delivering pipe or heavy equipment were minimal. PPEC exercises its best efforts to require required delivery trucks and its temporary construction workers to utilize local roadways mainly used by vehicles servicing oil production facilities scattered throughout the area; consequently, any incremental impacts have been relatively minor and of short duration. PPEC has spent in excess of $750,000 to improve and maintain public roadways providing access to the facilities. Additionally, PPEC requires that project-related vehicles adhere to local weight restrictions and limitations.

PROJECT IMPACT ON LOCAL HOUSING[8]

Temporary construction personnel typically rely on RV housing for living quarters and adequate RV hook-ups exist near the project site. Consequently; there was no significant or lasting increase in local housing demand. Previous pipeline and plant construction experience shows that some non-local construction workers will select various forms of temporary housing, including motels and rented rooms/houses, however, the majority provide their own housing units (trailers, campers, etc.). Additionally, there are over 20 motels within a 50-mile radius of the project site.

[8] U.S. Census Bureau, Census 2000 Summary File 1

ECONOMIC VALUE OF REMOVAL OF AGRICULTURAL / PASTURE LAND FROM PRODUCTION

Approximately 20 acres will be temporarily disturbed during construction. Once construction is completed, work areas will be returned to their former state as practicable. Only 10-12 acres will be permanently affected by the Project. The temporary or permanent loss of production has not had a significant impact on the local or regional economy. In the event that any other land is impacted, a third party appraiser will be used to review each claim and determine the appropriate level of compensation. The actual compensation will depend on the point within the production cycle that the loss occurs.

DISPLACEMENT OF RESIDENCES OR BUSINESSES

PPEC has not caused and does not anticipate displacement of any businesses or residences. PPEC holds the lands upon which the Gas Storage Facility is built, and fixtures and improvements thereon pursuant to a lease with the Evangeline Parish Industrial Development Board that will extend for 15 years commencing on the date the Gas Storage Facility first accepts for storage third party natural gas. PPEC has the option to purchase the land. Prior to entering this lease arrangement, PPEC negotiated with various landowners to acquire the tracts on which the Gas Storage Facility is located. The land on which Gas Storage Facility is located was unoccupied and no relocation assistance payments have been required.

TAX REVENUES

PPEC's construction program is projected to generate near term sales tax revenues to Evangeline Parish from equipment and material purchases, and subsequent property tax revenues will benefit Evangeline Parish for many years into the future, and these tax revenue benefits to the local economy and its communities are substantial. Projections of Evangeline Parish sales tax receipts directly arising from PPEC's purchases of the major equipment and material components alone are projected to exceed $6.0 million. At such time as PPEC's storage caverns are developed to a working gas capacity of 24 Bcf, annual property tax revenues for the gas are projected to be at least $2.0 million annually and $40 million over its 20 year plus lifetime, yielding an aggregate tax benefit of approximately $46.0 million.

ENVIRONMENTAL JUSTICE STATEMENT

PPEC has and will continue to have a positive impact on the residents and communities of Evangeline Parish by generating a substantial increase in annual tax revenues and by creating new jobs that PPEC has filled, to the extent possible, with local hires. PPEC will have no direct impact on any Native American social programs or land. The positive economic impacts of the Project should be the same for Native Americans as for all Parish residents.

A. How was it determined that this facility was needed?

1. Local or regional survey
2. On-site or off-site needs
3. Regional solid waste management benefit
4. Generic survey of solid waste needs (compatibility with master plan)

Historically, gas storage has been an essential component of an efficient and reliable interstate natural gas transmission and distribution network. By retrofitting depleted oil and gas reservoirs, gas transmission companies have used gas storage to supplement customer requirements since the 1920s. There is a growing interest, however, in supply balancing, no-notice delivery and price hedging by utilities, pipelines and energy traders. Because these services require significantly more operational flexibility than provided by traditional reservoir storage, many companies are turning to salt caverns storage for their high deliverability needs.

PPEC has been constructed in response to this expanding market for high-deliverability, multi-cycle natural gas storage services. Three Gas Storage Caverns will initially be developed through solution mining and will be further developed using the fill / de-water and / or Solution Mining Under Gas (SMUG) technique. The tops of the caverns will be approximately 3,900 ft below the ground surface, with the caverns extending down to approximately 5,700 feet.

The Caverns will be developed in the following manner:

- *Gas Storage Cavern 1, PP-CW-001 has been developed to a working gas capacity of approximately 5.0 BCF. PPEC plans to expand PP-CW-001 to its full certificated capacity of 8.0 BCF through fill/de-water or Solution Mining Under Gas (SMUG) operations.*
- *Gas Storage Cavern 2, PP-CW-002 has been developed to a working gas storage capacity of approximately 8.0 BCF. PPEC plans to expand PP-CW-002 to its proposed capacity of 10.0 BCF through fill/de-water or SMUG operations.*
- *Gas Storage Cavern 3, PP-CW-003 has been developed to a working gas storage capacity of approximately 9.0 BCF. PPEC plans to expand PP-CW-003 to its proposed capacity of 10.0 BCF through fill/de-water or SMUG operations.*
- *Gas Storage Cavern 4, PP-CW-004 has been developed to a working gas storage capacity of approximately 8.0 BCF. PPEC plans to expand PP-CW-004 to its proposed capacity of 10.0 BCF through fill/de-water or SMUG operations.*
- *Gas Storage Cavern 5, PP-CW-005 has been developed to a working gas storage capacity of approximately 8.0 BCF. PPEC plans to expand PP-CW-005 to its proposed capacity of 10.0 BCF through fill/de-water or SMUG operations.*
- *The addition of the applicant cavern well PP-CW-006 and with a developed working gas storage capacity of 10 BCF, will increase PPEC's total working gas capacity to 58 BCF.*

The facility will provide 3.2 Bcf/day of withdrawal and 2.4 Bcf/day of injection capability.

By enabling rapid injections and withdrawals of gas over essentially the full range of working gas inventory levels, the Project will permit market participants to establish physical natural gas positions in order to reduce their exposure to gas pricing volatility and to respond to favorable natural gas price movements. The Project will also contribute to the reliability of gas supplies during periods of production and transportation interruptions, which is of particular value to electric generators, local distribution companies, gas marketers and operators of liquefied

natural gas (LNG) import terminal and regasification facilities.

PPEC's operations also complement several LNG terminals currently under construction or likely to be constructed in the Gulf Coast region. It is generally recognized that LNG will be a critically important component of the U.S. gas supply mix in the coming years, and as a consequence a number of new LNG receiving terminals have been proposed for locations in Louisiana, Texas, Alabama and offshore in the Gulf (FERC 2004). As LNG becomes an integral part of the natural gas supply chain in the U.S., there will be a growing need for investment in assets such as high-deliverability gas storage that can permit the gas delivery infrastructure to accommodate inevitable mismatches between batch deliveries of LNG and market demands. Underground storage is an important adjunct to new LNG import facilities because it can facilitate maintenance of LNG tanker offloading schedules and intermediate between LNG deliveries and fluctuating market demand.

The facility will generate no hazardous waste and will generate only small volumes of NOW and non-hazardous waste. The brine will only be generated during the solution mining process that is anticipated to be substantially completed around the end of 2010. The brine is injected into PPEC's non-commercial permitted Class II Disposal Wells. PPEC is therefore compatible with the Generic Solid Waste Master Plan.

B. What will be the positive economic effects on the local community?

1. How many permanent jobs will be created?
2. What is the expected annual payroll?
3. What is the expected economic multiplier from item B2?
4. What is the expected tax base and who will receive benefits?

Approximately 20 permanent jobs will be created for the "24/7" operation of the facility, with an estimated annual payroll for PPEC's operating employees, including allocated costs of the corporate office, of $2.0 million. These staff positions have been filled by residents from surrounding communities.

Inasmuch as the construction of the Gas Storage Facility has generated near term sales tax revenues for Evangeline Parish from equipment and material purchases, and subsequent property tax revenues will benefit Evangeline Parish for many years into the future, PPEC's tax revenue benefits to the local economy and its communities are substantial. Projections of Evangeline Parish sales tax receipts directly arising from PPEC's purchases of the major equipment and material components alone are projected to exceed $6.0 million. At such time as PPEC's storage caverns are developed to a working gas capacity of 24 Bcf, annual property tax revenues for the gas are projected to be at least $2.0 million annually and $40 million over its 20 year plus lifetime.

A reasonable estimate of the economic multiplier arising from incremental $'s PPEC injects into the local economy is that each $ will rolls over 7 times. This turnover stimulates merchant sales, employment and tax revenues. Accordingly, it is reasonable to conclude the economic benefit to the community meaningfully exceeds the projected $46.0 million direct tax benefit.

C. What will be the potential negative economic effects on the local community?

1. What are the possible effects on property values?

Property values for land in the area of the project have increased slightly since the inception of the Project.

2. Will public costs rise for:

a. Police protection
b. Fire protection
c. Medical facilities
d. Schools
e. Roads (also see below)?

Costs for public services, such as police protection, fire protection, medical facilities, schools and roads should not experience an increase. The income from the facility should more than make up for any increase in services that are necessary.

Necessary community services are in adequate supply in the vicinity of the Project area and should be able to absorb any increase in demand by the temporary construction workforce; consequently, no significant adverse impacts on the parish infrastructure are anticipated. PPEC will maintain liaison with appropriate fire, police and public officials pursuant to DOT requirements. See the answer to Question II above for additional details.

3. Does the prospective site have the potential for precluding economic development of the area by business or industries because of risk associated with establishing such operations adjacent to the proposed facility?

Salt cavern gas storage is a safe and environmentally preferred method alternative. Due to the increased tax base and employment opportunities created by PPEC, the potential for economic development is increased by the proposed facility.

D. Was transportation a factor in choosing the proposed site?

1. What mode(s) of transportation will be used for the site?

a. Truck
b. Rail
c. Barge
d. Other

Proximity and access to existing natural gas pipelines was a primary factor in choosing the site. Natural gas stored by the Gas Storage Facility will be transported to markets via natural gas pipelines.

2. What geographical area will it serve?

Strategically located in southwestern Louisiana, PPEC has interconnections with seven (7) key interstate gas transmission pipelines - ANR Pipeline Company, Columbia Gulf Transmission, Florida Gas Transmission Company, Tennessee Gas Pipeline Company, Texas Eastern

Transmission, LP, Texas Gas Transmission, LLC, Transcontinental Gas Pipe Line Corporation. The backbone of PPEC's gas pipeline interconnection system is its dual 24-inch bi-directional header system. Potentially the entire nation could be served by the facility. Initially it will serve primarily the eastern portion of the U.S.

3. By how much will local road traffic volume increase?
a. Can local roads handle the traffic volume expected?
b. Can local roads handle the weight of trucks?

During Project construction, trucks delivering pipe or heavy equipment to the site have at times caused minor traffic delays in the immediate area. The major construction phase has been completed and no meaningful congestion is occurring or expected to occur in the future. Consequently, any incremental impacts are projected to be minor and of short duration.

PPEC has improved the structural integrity, width and elevation of the access roads; therefore the roads utilized by PPEC can handle the weight of trucks.

4. What are the long-term expectations of the proposed site?

1. Longevity of the facility

The longevity of the facility is expected to be 20-50 years.

2. Who owns the facility?

PAA Natural Gas Storage, LLC, which holds 100% Membership Interest in Pine Prairie Holding, LLC, which holds 100% of the Membership Interest in PPEC, currently owns the land upon which Cavern Well No. 3 (PP-CW-003) is constructed. The land will be leased or conveyed to PPEC prior to construction.

3. Are the owners financially backed by others?

Funding for the project has been provided from proceeds of a credit facility and from capital contributions from Pine Prairie Holding, LLC.

B. When is closure anticipated?

Based on a 20 to 50 year life expectance for the facility, closure is anticipated between 2024 and 2054.

C. Who is responsible for the site after closure?

PPEC or the successor owner, if applicable, will be responsible for the site after closure.

6. What assurances will there be that the site will be closed in accordance with the plan?

PPEC is committed to following the closure plan. PPEC will provide the state with appropriate

documentation that the site has been closed in accordance with the plan. In addition, this will be a Federal Energy Regulatory Commission (FERC) jurisdictional facility and so PPEC will also have to satisfy the FERC that the facility has been properly closed.

7. What financial assurances will be established to demonstrate the ability to handle problems after closure?

PPEC will follow all applicable local, state and federal financial assurance requirements.

8. Who certifies that the site is properly closed?

The State and FERC will certify that the site is properly closed.

9. How are people protected from unwittingly buying land after closure?

Prior uses of the property will be recorded in the property deeds to protect people from unwittingly buying land after closure.

a. Is the closed facility recorded in the deed?

There is currently no closed facility. After the facility is closed, the prior uses of the property will be recorded in the property deed.

b. What future uses are possible?

The use of the land as the Gas Storage Facility should not restrict property use, except to possibly make it unacceptable for residential use. The property can still be used for silviculture, oil and gas exploration, commercial and industrial operations.

III. Are there alternative projects which would offer more protection to the environment than the proposed facility without unduly curtailing nonenvironmental benefits?

(This question requires the permittee to demonstrate having considered alternate technologies.)

A. Why was this technology chosen (e.g., incineration over landfilling?)

1. **Are other technologies available?**
2. **Describe the engineering design and operating techniques used to compensate for any site deficiencies.**

The technology chosen allows for the safe and environmental benign storage of natural gas in a

salt cavern. Previously, gas would have been either flared or occasionally stored in a traditional reservoir. Salt cavern storage is the preferred technology to either of those two options. There are no site deficiencies. Design and operating techniques have been used to ensure that the caverns and the facilities will be operated in as safe and environmentally sound way as possible.

B. Is the proposed technology an improvement over that presently available?

The technology of using salt caverns to store natural gas is an improvement over conventional available storage solutions, such as tanks and traditional reservoir storage. Additionally, PPEC's compressor engines are quipped with state-of-the art emission controls.

C. Describe the reliability of technology chosen.

1. **Past experiences.**
2. **Environmental Impacts**

The technology of properly constructed and operated salt cavern storage facilities has been shown over the years to be a safe, effective and environmentally sound technology. Environmental impacts are minimal.

D. Describe the sequence of technology used from arrival of wastes to the end process at the facility.

1. **Analysis of waste**
2. **Unloading**
3. **Storage**
4. **Treatment**
5. **Monitoring**
6. **Closure**
7. **Post-closure**
8. **Disposal**
9. **Any residuals requiring further handling**

*PPEC is **NOT** a waste Treatment, Storage, Disposal Facility (TSDF). The sweet natural gas stored by PPEC will be delivered via pipeline and this gas will be routed through filter/separators and compressed for injection into solution mined salt dome storage caverns. During periods of higher demand, natural gas will be withdrawn from the caverns for delivery to the sales pipeline. The majority of compression is required during the injection phase of the storage cycle. During periods of high market demand, a limited amount of compression could be required during the withdrawal phase.*

During withdrawal, the pressure of the sweet natural gas is reduced from cavern pressure to the operating pressures of the surface facility. Following pressure reduction and filtration, the gas is processed through the Tri-ethylene Glycol (TEG) dehydration plant. Wet gas flows to a TEG contactor, where a counter flowing stream of lean TEG absorbs entrained water vapor. Dry natural gas leaves the dehydration unit for metering into the sales pipeline. Water laden TEG (rich TEG) is sent to a distillation unit for regeneration. Depending on the water vapor content of the

withdrawn cavern gas, a portion of the gas may by-pass the dehydration system to be blended with dry dehydrated gas downstream of the TEG contactor.

E. Will this facility replace an outmoded/worse polluting one?

The project is a new site that does not replace any existing facility. However it does allow for the storage of sweet natural gas.

F. What consumer products are generating the waste to be disposed? Are there alternative products that would entail less hazardous waste generation?

There is no hazardous waste generation; therefore, there are no alternative products that would entail less hazardous waste generation.

IV. Are there alternative sites which would offer more protection to the environment than the proposed facility site without unduly curtailing non-environmental benefits?

(This is the question that deals directly with siting criteria.)

A. Why was this site chosen?

1. **Specific advantages of the site;**

The site was chosen based on the location of the salt dome and its proximity to interstate pipelines.

2. **Were other sites considered and rejected?**

The location of the Gas Handling facilities and gas storage caverns was controlled by the uniquely favorable proximity of the Pine Prairie Salt Dome relative to a regional network of natural gas transmission pipelines. The location of the Brine Disposal and Raw Water Withdrawal Site was chosen to close to the facilities and gas caverns, while still being off its flank. This then lead to the identification of three alternative mid-continent pipeline routes to interconnect with the PPEC existing line (Alternatives 1, 2 and 3).

A team that included a wetland expert and cultural resources specialist then looked at the surface facility locations and the alternative pipeline routes to determine which, if any met the objective of minimizing environmental impact. This initial review identified significant wetland issues at the original proposed Brine Disposal and Raw Water Withdrawal Site, and along Alternative Route Number 2. There were also some wetland issues associated with the western end of Alternative Route Number 1.

Based on this initial review it was determined that an alternative Brine Disposal and Raw Water

Withdrawal Site and some variations to the pipeline routes needed to be found. Some potential options were identified based on a review of the soil that is mapped in the Soil Survey of Evangeline Parish, Louisiana, Soils Survey of Acadia Parish, Louisiana and Soil Survey of Rapides Parish, Louisiana, and studying the USGS 7.5 minute topographical map. These options were again surveyed to identify any potential environmental issues (e.g. wetlands) or cultural resources. An alternate Brine Disposal and Raw Water Disposal site was identified that was on higher ground with non-hydric soils and hence had no wetland issues. However, when this proposed location was reviewed by the project geologist, he determined that it was too close to the dome and so would not be suitable for brine disposal. A third Brine Disposal and Raw Water Withdrawal Site location was chosen to the west of the first alternative. The geologist then reviewed and approved this location. PPEC originally considered putting the disposal facility on the north side of the site. However, when the detailed wetland survey was completed, it was found that a wetland ran down the center of the site. The layout of the well sites was then changed to run north south along the eastern edge of the property to avoid the wetlands. Subsequently slight adjustments to the site have been made to address land acquisition issues.

The Gas Handling Facility Site was surveyed. There are some wetlands in the north western corner of the site. However, there were no wetlands or cultural resource issues associated with the area identified to locate the surface facilities, and therefore no additional options were considered.

3. Is the location of the site irrevocable; i.e., would denial of permit based on site preclude the project?

The denial of a permit based on the location of the site would terminate the project and its benefits to the local economy would be lost.

B. Is the chosen site in or near environmentally sensitive areas?

1. Wetlands
2. Estuaries
3. Critical habitat
4. Historic or culturally significant areas
- **a. Indian mounds**
- **b. Antebellum houses**
- **c. Tourist attractions or facilities (e.g., bed and breakfast inns)**
- **d. Campgrounds or parks**

The site and the surrounding areas have been inspected by Drs. Dana Sanders, a wetland expert, and Jon Gibson, a cultural resources specialist, Wendell Neal an endangered species and critical habitat specialist, and Jack Herring a fisheries and flora specialist. Dr. Sanders' conclusions indicate that there are no wetlands located at the Gas Storage Facility. The project will not impact estuaries or critical habitats. Dr. Jon Gibson of Carved Trowel Archaeology surveyed the site and surrounding area for historical or culturally significant areas. No Indian mounds were observed. In addition, there are no antebellum houses, tourist attractions or facilities, campgrounds or parks in the area of the site.

C. What is the zoning and existing land use of the prospective site and nearby area?

1. **Is the site located near existing heavy industrial, chemical process or refinery operations?**
2. **Is there a precedent for chemical contamination near the site or is the soil and water pristine?**
3. **Is the area particularly noted for its esthetic beauty?**

The Gas Storage Facility is located in a sparsely populated, rural area with scattered farm and non-farm residences. *The site is not located near existing heavy industrial, chemical processing or refinery operations. The area surrounding the site, however, has been used for oil and gas exploration for almost 100 years. Based on knowledge of the activities on and surrounding the site, it would not be classified as pristine. There is no evidence to indicate that the site been chemically contaminated. Surrounding areas may have been minimally impacted by exploration and production activities.*

D. Is the site flood prone?

1. **Is the site in a flood plain?**

The site is not in a flood plain.

a. How current are the maps used to make flood plain determinations?

Maps used to determine the flood plain designation were those posted on the FEMA website.

b. What is the elevation of the site?

The elevation of the site is between 95-110 feet above sea level.

2. **Is diking required or desired to provide flood protection?**

Diking is not required or desired to provide flood protection

1. **What is the design height of the dike?** – *Not applicable*
2. **How is the dike protected from erosion?** – *Not applicable*
3. **What frequency and design storm was used?** – *Not applicable*
4. **Is the access to the site over or through dikes?** – *Not applicable*

3. **Is the site hurricane vulnerable?**

The site is located approximately 70 miles from the closest coastal area. In September/October 2002, the area was hit by Tropical Storm Isidore and Hurricane Lili. Hurricane Lili spawned tornadoes which touched down in Evangeline County. Evangeline County was declared a state disaster area. In September 2008, the area was hit by Hurricane Gustav. Hurricane Gustav spawned tornadoes which touched down in Evangeline County.

a. Is the site in an area subject to storm surge?

Based on the distance from a coastal area, the subject site is not subject to storm surges.

b. What are the design storm specifications?

Not applicable.

c. Should damage from wave action be considered?

Based on the distance from a coastal area, the damage from wave action should not be considered.

d. For what levels of wind speed is the facility designed?

The facility is designed to comply with local, state and federal requirements.

E. Is groundwater protected?

1. Are aquifers or recharge area underlying the site used for drinking water?
2. What is the relationship of the site to the water table?
3. What wells exist in the area?
4. What is the flow rate and direction of the groundwater flow?
5. What is the groundwater quality in the underlying aquifers?
6. Is there a hydraulic connection between the aquifers?

The Chicot aquifer system and the Evangeline aquifer both underlie Evangeline Parish. The Chicot aquifer system is a thick sequence of interbedded clays, silts, sands and gravel that underlies about 9,000 square miles in Louisiana (see Figure 2 below). It is a stratigraphic sequence of aquifers supported by a large recharge area. The shallower sections of the Chicot, which are used for irrigation and industrial purposes are of lesser quality than some of the lower sections where municipal supplies are often obtained. The Project has one water supply well completed in the less desirable shallow Chicot and five water supply wells completed in the Evangeline aquifer. The completion intervals of these water supply wells exclude the intervals relied upon by municipal supply wells.

Figure 2 Louisiana Aquifers and Aquifer Systems

As the most heavily pumped aquifer system in the state, the Chicot system accounted for more than half of all groundwater withdrawals in 2000. In recognition of the Chicot system's regional importance, it was declared a sole source aquifer by the EPA in 1988.

The Chicot aquifer system is currently experiencing significant water-level declines as a result of 90 years of increasingly large withdrawals of water. Results of a 2000-2001 U.S. Geological Survey (USGS) study confirm that water levels in areas underlying Acadia, Calcasieu and Evangeline Parishes have declined from 10-25 feet above sea level to 50 feet or more below sea level. (Lovelace and others, 2001) The lowest water levels, more than 70 feet below sea level, extend over a 60-square mile area in southern Evangeline Parish, an area that coincides with the proposed Project location (Lovelace and others, 2001).

In choosing a zone from which to withdraw the raw water for solution mining, PPEC looked for an aquifer that could provide the quantity of water needed while minimizing any environmental impacts. In view of the Chicot aquifer system's designation as a sole source aquifer and the fact that it has been experiencing significant drawdowns, PPEC has decided to use water from the underlying Evangeline aquifer as it's primary water supply source for Project requirements. The Evangeline is designated as a minor aquifer and is not widely used. It is anticipated that ongoing hydrogeological studies will confirm that the Evangeline aquifer can provide the volume of water needed without causing significant drawdowns.

The following sections describe the Chicot aquifer system and the underlying Evangeline aquifer.

CHICOT AQUIFER SYSTEM

Water Use

The Chicot aquifer's primary use is for agriculture, mainly rice irrigation and crawfish farming in Acadia, Jefferson Davis, and Evangeline Parishes. In 2000, approximately 537 Mgal/d of groundwater was used for rice farming, which is the principal crop grown in this largely agricultural area. In the Lake Charles industrial district, where petroleum refineries and petrochemical industries use large amounts of water, 62 Mgal/d were withdrawn from the aquifer for processing and cooling in 2000 (Sargent, 2002). A graph displaying water withdrawals by use from the Chicot aquifer system is presented in Figure3 below.

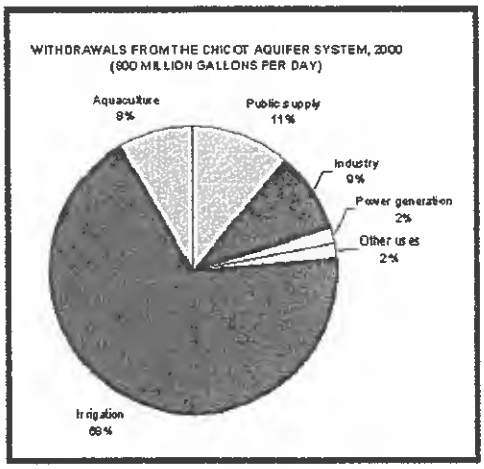


Figure 3
Withdrawals from Chicot Aquifer System

General Geology

The Chicot aquifer system is characterized by massive beds of coarse sand and gravel that are generally several hundred feet thick. These water-bearing sand beds are separated by thick discontinuous clays. (Nyman and others, 1990) The aquifer outcrops in southern Vernon and Rapides Parishes and northern Beauregard, Allen, and Evangeline Parishes. South of the outcrop area, the aquifer system dips and thickens towards the coast, ranging from 10 to 1,050 feet thick, but averaging about 700 feet thick in most areas. The aquifer is overlain by a layer of clay (ranging from 50 to 100 feet thick) that forms a surficial confining unit.

Groundwater Levels

The USGS has been monitoring groundwater levels in Louisiana since the early 1900's, when records show that the water-level surface in the Chicot aquifer system was highest in the northern outcrop area and decreased toward the coast and the Atchafalaya River Basin. The water-level surface throughout most of the aquifer system has been strongly influenced by withdrawals for rice irrigation. In the Lake Charles area, withdrawals for industry and public supply also affect water levels.

Prior to ground-water development, the water-level surface in the Chicot aquifer system generally was highest in the northern outcrop area and decreased toward the coast and the Atchafalaya River Basin (Nyman and others, 1990, fig.17). In central parts of the aquifer system (Acadia, Jefferson Davis, and Calcasieu Parishes) water levels were about 10 to 25 ft above sea level. By the early 1950's, an extensive cone of depression in the aquifer system extended from the Lake Charles area in Calcasieu Parish into the Eunice area in St. Landry Parish (Fader, 1954, pl. 2).

In 2000, the USGS established a study to monitor and evaluate water-level changes in the Chicot aquifer system (Tollet and others, 2003). Water levels of 120 wells completed in the Chicot aquifer system were measured during June, when the levels typically decline to their yearly low because of seasonal withdrawals. A potentiometric surface map was then constructed using the water-level data (see Figure 4 below).

Results of the USGS study showed that decades of increasingly large water withdrawals from the Chicot aquifer system have resulted in significant water-level declines. The highest water level, about 167 feet above sea level, was measured in the outcrop area of the Chicot aquifer system in northwestern Beauregard Parish. Water levels in areas underlying Acadia, Calcasieu and Evangeline Parishes declined from 10-25 feet above sea level to 50 feet or more below sea level. (Lovelace and others, 2001) This represents a decline of about 80 feet from pre-pumping levels, or approximately 0.8 ft/yr since the early 1900s.

The lowest water levels, more than 70 feet below sea level, extended over a 60-square mile area in southern Evangeline Parish (Tomaszewski and others, 2002). The study also revealed that in the rice growing areas of Evangeline Parish, water levels have fluctuated 20 to 30 feet per year in response to seasonal stresses from irrigation pumpage (see Figure 5 below). In the southern part of the parish, water levels declined about 1.1 ft/yr (1990-2000) at well Ev-229 in response to withdrawals for irrigation use.

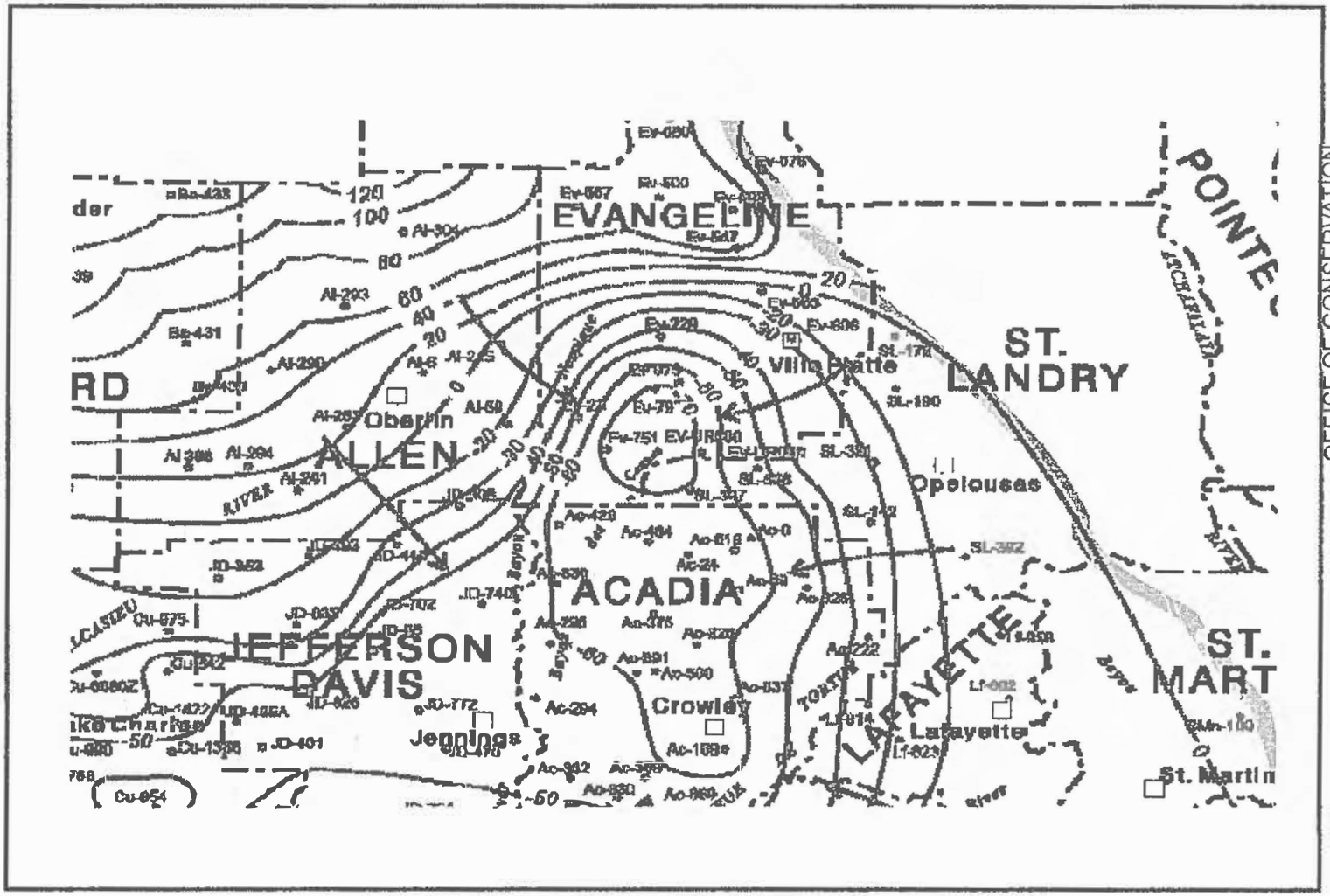


Figure 4 Potentiometric Surface Map of Chico Aquifer System

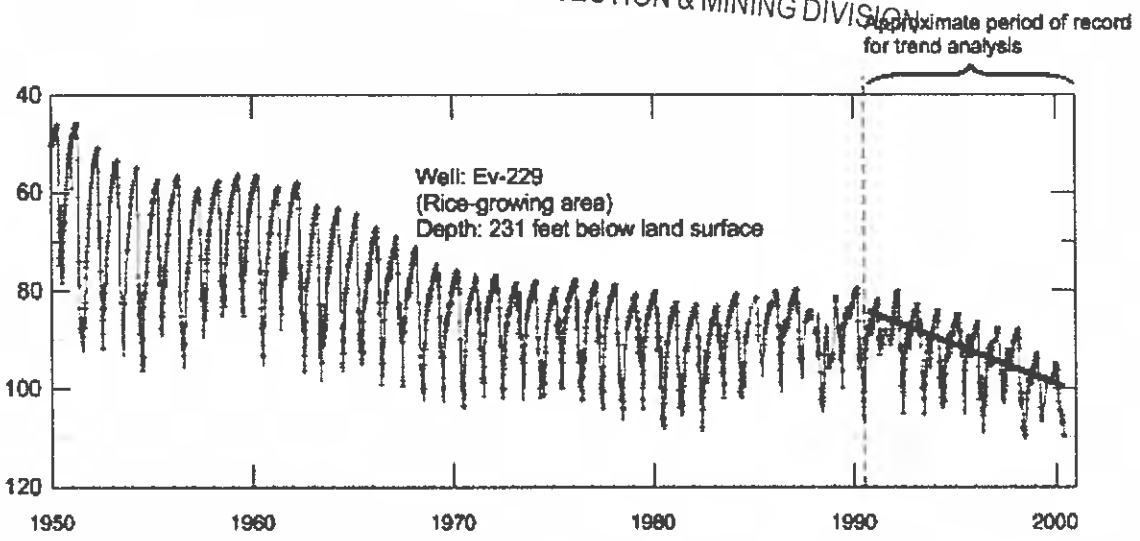


Figure 5 Water Levels (In Ft Below Land Surface) at Well Ev-229 in the Chicot Aquifer

Groundwater Flow Patterns

The 2000-2001 USGS study also showed that the flow of water in the Chicot aquifer system has been dramatically affected by intensive groundwater pumping for rice irrigation in the central part of southwestern Louisiana and for industrial use in the Lake Charles area. When the USGS first started monitoring, the regional groundwater flow was predominantly south-southeast to the coast, but some flow was east towards the Atchafalaya River Basin and west toward the Sabine River. However, heavy pumpage has resulted in an extensive cone of depression in the aquifer system that extends from the Lake Charles area into the Eunice area in St. Landry Parish (Fader, 1954, pl. 2). As a result, the groundwater flow has changed from a southern direction towards the Gulf Coast to a northern direction, pulling salt water from the Gulf inland.

Recharge

Recharge occurs in the areas where the massive sands crop out in southern Rapides and Vernon Parishes, and in northern Evangeline, Allen and Beauregard Parishes. Recharge in this area primarily occurs from the infiltration of precipitation and losses of stream flow. Recharge also occurs by water movement from the Atchafalaya alluvium, downward infiltration through the clays south of the primary recharge outcrop area, upward movement from the underlying Evangeline aquifer, and inflow from the Vermilion and Calcasieu Rivers (Martin and Others). The hydraulic conductivity (groundwater flow velocity) varies between 40-220 feet/day.

Although it was once thought that the surficial confining unit covering the aquifer was impermeable, it is now estimated that as much as 6 inches per year of surface water recharges the Chicot aquifer systems near major pumping centers (Nyman and others). Rice cultivation during the past 100 years has apparently caused salts and fine clays to leach downward, forming a low permeability horizon, or hardpan, in sediments underlying the fields (Lovelace, 1999).

Groundwater Quality

The LDEQ conducts a baseline water-monitoring project (BMP) of the major and minor aquifers in Louisiana (Tollett and others, 2004). Analytical data show that the groundwater from the Chicot system is of good quality when considering short-term or long-term risks. The quality of water in the Chicot aquifer is most suitable for irrigation, although saltwater is present in the basal part of the aquifer in coastal areas.

EVANGELINE AQUIFER

The Evangeline aquifer, which also underlies the project area, is one of eight minor aquifers in Louisiana (see Figure 6 below).

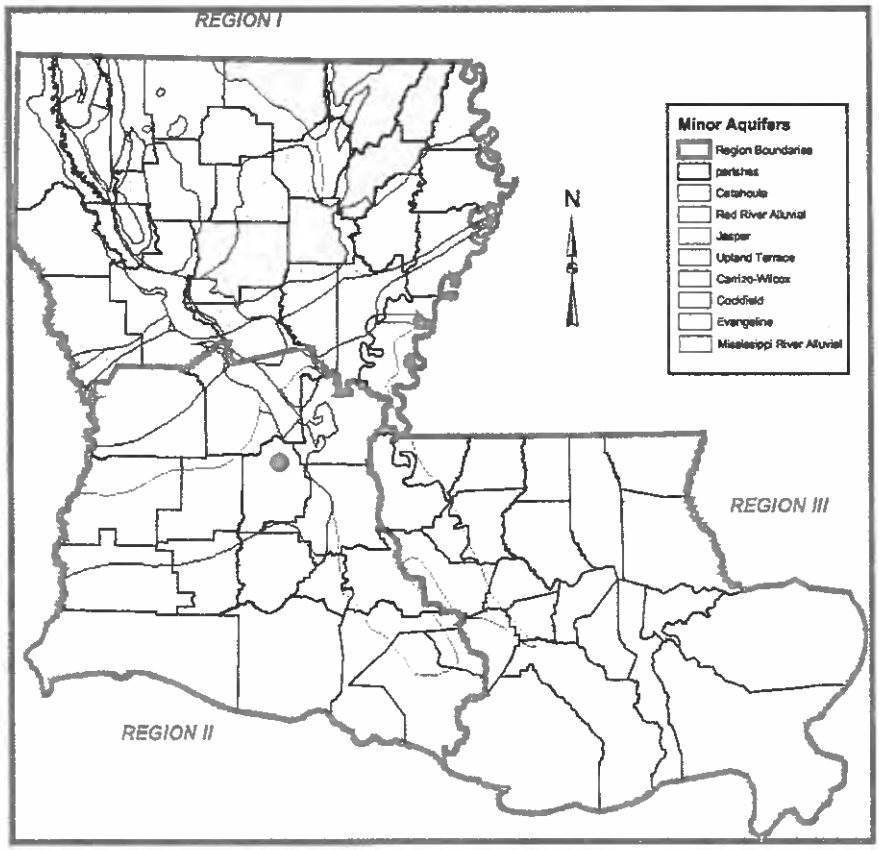


Figure 6 Minor Aquifers in Louisiana

Water Use

Only 22 Mgal/d of groundwater are withdrawn from the Evangeline aquifer in southwestern Louisiana, compared to 798 Mgal pumped daily from the Chicot aquifer system. Approximately 15 Mgal/d of groundwater is used for public water supply and 5.80 Mgal/d is used for industrial purposes (Sargent, 2002).

General Geology

The Evangeline aquifer is comprised of unnamed Pliocene sands and the Pliocene-Miocene Blounts Creek member of the Fleming Formation. The Blounts Creek consists of sands, silts, and silty clays, with some gravel and lignite. The sands are generally fine to medium grained, with interbedded coarse sand, silt and clay. The mapped outcrop corresponds to the outcrop of the Blounts Creek member, but downdip, the aquifer thickens and includes Pliocene sand beds that do not outcrop. The confining clays of the Castor Creek member (Burkeville aquiclude) retard the movement of water between the Evangeline and the underlying Miocene aquifer systems.

Freshwater in the aquifer system ranges in thickness of around 50 feet to 1,900 feet, increasing in thickness to the south and southeast (Nyman, 1989). The Evangeline aquifer is separated in most areas from the overlying Chicot aquifer by clay beds; in some areas the clays are missing and the upper sands of the Evangeline are in direct contact with the lower sands and gravels of the Chicot.

Hydrogeology

The hydraulic conductivity of the Evangeline aquifer system ranges from 30-100 ft/d, with well yields of up to 1,000 gpm. Specific capacities of 2-38 gal/min/ft of drawdown can be expected (LDEQ, 1996). The thickness of the freshwater ranges from 50-1,900 feet, with typical well depths less than 300 feet (Stuart, et al, 1994).

Recharge

The Evangeline aquifer system is recharged by rainfall on the upland terraces in south-central Louisiana (Nyman, 1989). Water that is not discharged locally into streams moves down into the Evangeline aquifer. In southwestern Louisiana, Vernon, Rapides, and Avoyelles Parishes contain recharge areas for the aquifer, with leakage from the overlying Chicot aquifer and from underlying aquifers also providing recharge.

Groundwater Levels and Flow Patterns

The potentiometric surface of the Evangeline aquifer system has developed cones of depression in the rice growing areas of Evangeline Parish. Otherwise, the direction of ground water flow is generally to the south and southeast. Water levels have generally declined since the early 1970's, with fluctuations of 10 to 15 feet noticed in the water levels since the mid 1990's.

Groundwater Quality

Data from the 2000-2001 USGS study show that the groundwater produced from this aquifer is generally soft and is of good quality when considering short-term or long-term health risk guidelines (Tollett and others, 2004.) The data also show that this aquifer is of good quality when considering taste, odor, or appearance guidelines. A comparison to historical data show that while there are some general fluctuations, the characteristics of the ground water produced from the Evangeline aquifer has not changed significantly since the FY 1995 sampling.

DRINKING WATER SUPPLY WELLS AND NATURAL SPRINGS

The Gas Storage Site, Brine Disposal and Raw Water Withdrawal Site are well isolated from area residences.

AREAS OF CONTAMINATED GROUNDWATER

No areas of contaminated groundwater have been identified on or adjacent to the Gas Storage Area. A soil and ground water study was conducted at the site. There was no evidence of soil or ground water contamination.

PROTECTION OF USDW, WELL COMPLETION, CASING AND CEMENTING

The cavern wells have been drilled and completed in accordance with applicable statewide rules and regulations of the commissioner (LAC 43: XVII, §§ 101-303).

The casing program includes two cemented casings from surface into the salt dome. In PP-CW-005 a 26-inch intermediate casing was set at approximately 828 feet BGL and a 20-inch production casing was set at approximately 4,009 BGL. The salt interval between the top of salt and the production casing seat is around 3,482 feet.

All casings have been designed in accordance with applicable regulations and good engineering practice. In particular, the tubulars were welded to ascertain gas tightness and were cemented back to surface. Cement slurries were compatible with the salt formation and cement was placed by the plug and displacement method. All casing cement jobs were documented by an affidavit from the cementing company showing the amount and type of cementing materials and the method of placement. All cementing and service reports were filed with the Commissioner of Conservation within 30 days. As the casing string was installed by welding, it was of a weldable grade such as API SL Grade B or an ASTM weldable grade.

Casing string welders were qualified under either Section 3 of API 1104 specification or Section IX of the ASTM Boiler and Pressure Vessel Code for the thickness to be welded. In addition to a visual inspection of the completed weld an x-ray or ultrasonic inspection was run on at least 10% of the string. Defective welds were ground, re-welded and re-inspected.

The production casing was pressure tested in accordance with the requirements of LAC 43: XVII. § 301(D)(3)(e). The hydraulic test was done before drilling out the plug. The test pressure calculated at the casing seat was equal to the maximum operating pressure at that point. The test pressure was maintained for a minimum of one-half hour to verify casing integrity.

The casing seat and cement of the final cemented casing string was hydrostatically tested after drilling out the plug. At least 10 feet of salt below the casing was penetrated prior to this test. The test pressure calculated at the casing seat was equal to the maximum operating pressure at that point. However, the test pressure did not exceed 0.9 psi per foot of depth. The test pressure was maintained for a minimum of one-half hour.

The production casing, casing seat and cement were successfully tested via the Mechanical Integrity Test, included as Attachment B to the Technical Report, Attachment 10 of the UIC-2 HSW Permit Application.

The test was prepared and supervised by a qualified engineer and a report of these test results was filed with the Commissioner of Conservation within 30 days of completion.

MONITORING OF OLD WELLS

Oil and gas activities have been conducted or are currently being conducted on the immediately adjacent properties to the south, east, and north. The Strategic Online Natural Resources Information System (SONRIS) database operated by the Louisiana Department of Natural Resources (LDNR) was queried to determine current or past existence of oil, natural gas, injection wells, or other mineral activities in the facility area and an adjoining property. Although LDNR's records indicate that drilling activity began in the vicinity in the early 1900s, the first well drilled onsite did not occur until 1949. The results of the query indicate that at least one (1) well has been identified and registered with the LDNR in the facility area, and at least five (5) wells have been registered with the LDNR on adjoining property. The onsite registered well (41997 at Latitude 30^{0} 44' 53.52" & Longitude 92^{0} 2' 35.04") appears to be located in a swale area in the southern portion of the facility area. The registered wells (41883, 38355, 197959, 37722, and 37580) are located on the adjacent property to the west and two unregistered additional wells were located along the mid east edge of that property. According to LDNR records, all eight wells were reported to have been plugged and abandoned or dry and plugged. Additionally, several visible petroleum pipeline markers / signs and a short section of what appears to be 3-inch flowline have been observed along the eastern and southeastern portions of the adjoining property to the east.

The results of the area of review query and the available public records reveal wells located in the area of review (1/4 mile radius) which penetrate the salt are properly completed or plugged and abandoned and should not endanger USDWs. This well review ascertains that there will be no communication between old wells and the cavern wells. Furthermore, each cavern well has, and future wells will have, two casing strings cemented to the surface and completed into the salt mass. The second intermediate casing will be completed at least 200 feet into the salt and the production easing will be completed approximately 3400 feet into the salt mass. This dual protection will alleviate potential communication between the cavern and any overlying strata containing old wells. A contingency plan is in place to address leakage should it occur.

F. Does prospective site pose potential health risks as defined by proximity to:

1. Prime agricultural area (crop or pasture land)

PPEC is located in a sparsely populated area where silviculture is the predominant use of the land. Approximately 20 acres of silviculture land will be temporarily disturbed during construction. Once construction is completed, only about 10-12 acres will be permanently affected by the Project. There are no pasture lands or perennial crop areas adjacent to the Gas Storage Facility.

2. Residential area

The Gas Storage Area is located in a sparsely populated, rural area with scattered farm and non-farm residences. The nearest residence is 2,300 ft to the northeast of the Gas Handling Facility. There are no proposed planned residential or commercial properties nearby.

3. Schools or day care centers

There are no schools or day care facilities near the Gas Storage Facility.

4. Hospitals or prisons

There are no hospitals or prisons near the Gas Storage Facility.

5. Public buildings or entertainment facilities

There are no public buildings or entertainment facilities near the Gas Storage Facility.

6. Food storage area

There are no food storage areas near the Gas Storage Facility.

7. Existing community health problems that may be aggravated by operation of additional hazardous waste disposal capacity

The Gas Storage Facility does not include the operation of additional hazardous waste disposal facilities, or the generation of hazardous waste. Therefore, existing community health problems will not be aggravated by additional hazardous waste operation capacity.

G. Is air quality protected?

The gas storage cavern is not a source of emissions.

1. Is the site within an ozone or non-attainment area?

The facility is located in Evangeline County, an attainment area.

2. What contaminants are likely to be generated at the site?

The gas storage cavern is not a source of emissions

3. What protection is afforded from each contaminant generated by the site?

The gas storage cavern is not a source of emissions.

4. **What is the potential for unregulated emissions?**

The potential for large unregulated emissions is minimal.

5. **What plans are implemented to provide for odor control?**

There should be no odors to be controlled.

6. **Who will be affected by emissions?**
   a. **What is the direction of the prevailing winds?**
   b. **Describe the expected frequency of "bad air" conditions.**

The prevailing wind is to the northeast. Based on air modeling, the emissions from the facility should not adversely impact any of the surrounding residents. The frequency of "bad air" conditions will be very infrequent.

7. **Describe the control of vapors at various stage of process.**

The gas storage cavern is not a source of emissions.

H. Have physical site characteristics been studied; what has been done?

Physical site characteristics have been studied. Details are discussed below.

1. **Site geology**

Surface Geologic Setting

The Pine Prairie salt diapir and associated structure is located in central Evangeline Parish, Louisiana. More specifically, the dome occurs in sections 23, 25-27, 35-37, Township 3 South, Range 1 West and sections 1-3, Township 4 South, Range 1 West (New Orleans Geological Society, 1962).

The project area is on the Pine Prairie salt dome located in central Evangeline Parish, Louisiana. The Pine Prairie dome is one of the northern most salt domes of the South Louisiana salt basin and it is situated on Pleistocene terrace surficial deposits. The resulting topography is rather flat with stream entrenchment being the main element of surface relief. This position is "dry" as compared to many of the salt domes in the South Louisiana salt basin that are surrounded by marshes or swamps (wetlands). Fisk (1944) described the extensive fluvial terraces along the Mississippi River and some of its tributaries such as the Arkansas and Red Rivers. Four major terrace systems are recognized. These systems from oldest to youngest are the Williams, Bentley, Montgomery, and Prairie Terraces (Bryant et al., 1991).

A generalized geologic map of Louisiana from the Louisiana Geological Survey shows two prominent physiographic provinces in Evangeline Parish. A narrow strip of lower elevation in the northeast corner of the parish consists of alluvial valley fill. Most of the Parish is to the west of the alluvial valley fill, which consists of Pleistocene uplands or terrace upland deposits

(Varvaro, 1957). These Pleistocene terrace deposits occupy ~ 25% of the state's surface and consist of sand, gravel, and mud (Louisiana Geologic Survey-Generalized Geology of Louisiana). These terrace surfaces are remnants of preexisting flood plains, and exhibit trends along the major rivers in north Louisiana and in parallel to the coast belts in south Louisiana. The terrace deposits were raised as the coastal plain tilted in response to downwarping of the Gulf of Mexico basin. Varvaro (1957) describes two terrace systems in Evangeline Parish. The older Montgomery terrace, which is more elevated, steeply tilted, and dissected which occurs in the north-northwesterly part of the parish and the younger, lower and less tilted Prairie terrace.

The Pine Prairie dome is located on the southern edge of the Montgomery terrace system where Pleistocene terrace sediments of the Montgomery Formation generally outcrop at the surface. Stream entrenchment of the terrace deposits is generally the main element contributing to surface relief, however ~ 15-20 feet of surface elevation is associated with the Pine Prairie salt dome (Barton, 1926). The younger terrace sediments of the Prairie Formation outcrop in areas of lower topographic relief such as the northwestern portion of section 35, southeastern section 27 and most of section 26. Recent alluvium is found in the local stream valleys. The following description of the Montgomery and Prairie Formations is primarily derived from Varvaro (1957).

Montgomery Formation

The Montgomery terrace deposits are generally thought to represent much of Pleistocene time (Bryant et al., 1991). In Evangeline Parish, this formation outcrops topographically higher and north of the Prairie Formation. It dips more steeply southward and occurs under the Prairie Formation. At the outcrop, the Formation is mainly red, brown or buff clays containing numerous calcareous, phosphatic, and limonitic nodules of pea gravel size with occasional streaks of manganese dioxide. The clays vary in thickness from 15 to 50 feet and borings show an increase in grainsize from clay to sand & gravel at depth (Varvaro (1957).

Prairie Formation

Surface outcrops in Evangeline Parish are mainly clays, silty clays, and silt. Clay predominates and completely blankets the outcrop area. This clay has an average thickness of 30 feet (Varvaro, 1957). Beneath the clay layer, which contains calcareous, limonite, and manganese nodules, occur coarser sediments that grade downwards from silt to sands and gravels at about 100 feet. The fluvial sediments equivalent with the terrace deposits are typically sandy and gypsiferous at the outcrop (Varvaro, 1957).

Subsurface Geologic Setting

Methods

A suite of geologic maps and cross-sections were constructed to characterize the geology of the Pine Prairie salt dome and the flank sediments around most of the dome.

Caprock/Salt Map

The data for the caprock/salt maps was obtained directly from well logs, completion history cards, and published sources. Indirect (sometimes referred to a negative) well control was used in constructing the caprock/salt map. Indirect control consists of using the total depth of those wells that did not penetrate caprock or salt in the placement of contours. Only those wells in which a well log was available were used as indirect control. Because of the lack of data separating the caprock from the top of salt, the first occurrence of either the caprock or salt was use for mapping. The map therefore, depicts the geometry of the combined salt diapir and the associated caprock. With the information to be obtained from the proposed cavern wells, an attempt to map the caprock thickness and its attributes as well as the top of salt can be made.

It was early recognized that the area overlying the Pine Prairie salt dome was 15 to 20 feet higher in elevation than the adjacent areas of the Pleistocene terrace (Barton, 1926). Surface exposures of limestone in the area had been known and exploited for lime since before the Civil War. However, subsurface exploration was not begun until 1908 when Myles Mineral Company began a drilling program for limestone and salt (Barton, 1926). The first well on the dome to encounter salt was the Myles Mineral Co. Fee #1 well drilled in 1908 (New Orleans Geological Society, 1962). The top of the caprock at Pine Prairie actually is exposed at the surface over small areas of section 35 and was quarried for lime in the mid-1800s as reported by Barton (1926). The incorporation of this information into the caprock/salt map (Figure 6.1-3) could not be accomplished in detail. The -500 foot contour is the shallowest definable depth shown on the map. From about -1000 feet to -4000 feet the salt diapir flanks are almost vertical. Between –4000 feet and –6000 feet, the salt flares gently outward. This part of the salt diapir is generally well established by well control, both direct and indirect. Between –6000 feet and –7000 feet the salt develops a very pronounced overhang all the way around the diapir with the salt surface now sloping inward to a depth of at least 12,000 feet. This overhang is documented by the oil and gas wells drilled for the deep Wilcox below the overhang. However, these wells provide mainly indirect control on the salt, so that part of the salt below the overhang is not well controlled.

Structure Maps of Flank Sediments Adjacent to the Dome

The correlation of the well logs for Pine Prairie showed basically good correlations over substantial areas of the dome. Correlations for the Cibicides hazzardi (Cib hazz) and deeper sections (Vicksburg, Cockfield, Sparta, and Wilcox Formations) were previously established in the field by oil and gas activity. The section above the Cib hazz was informally subdivided and designated by letter for this study. This section comprises an undifferentiated section of sands and shales of Pleistocene to Lower Miocene age. Mapped horizons are (from youngest to oldest): "O", "J", Cib hazz, and Vicksburg. Production was associated with the deeper Cockfield, Sparta, and Wilcox Formations except for some very shallow Miocene production in section 36.

The east flank is more extensive and is associated with more faulting than the west flank. There are areas adjacent to the salt on the maps in which the structure has not been resolved in certain areas located high on the flanks of the dome because of correlation or structural complexities. These areas do not affect the general characterization of the dome's flanks. The faulting for the most part appears to be radial faulting associated with the extension of the strata produced by

continued movement of the salt relative to the surrounding strata. The radial faults seldom extend to or beyond the rim syncline as seen on the mapped flanks of the dome. Faulting shown on the various structure maps is inferred by contour pattern and not documented by related fault cuts in the well logs. An attempt was made to track individual faults from one horizon to the next.

2. Hydrology

The hydrology is described in detail in Section IV E.

3. Topography

The elevation of the site is between 95-110 feet above sea level.

4. Soil properties

Soil Associations and Series

The soil association and soil series descriptions were compiled from information presented in the Soil Survey of Evangeline Parish, Louisiana, Soils Survey of Acadia Parish, Louisiana and Soil Survey of Rapides Parish, Louisiana. The soil associations and soil series underlying each Project component, as identified in the Parish soil surveys, are described below.

All soil series occurring within the project footprint have a texture of silt loam. Therefore, landscape position as it affects the frequency and duration of flooding and/or soil saturation is the primary determinant of whether the soils meet the criteria for hydric soils.

Most of the soils in the upland areas and in lower areas having a convex surface are not hydric soils, including the Duralde silt loam (DuB). Soils occurring on flat or concave surfaces, as well as moderately fine- to fine textured soils found in areas that are frequently flooded, typically have indicators of hydric soils.

The Muskogee-McKamie complex and Duralde silt loams comprise the majority of the soils affected by the Gas Storage Site. These complexes consist of silt or very fine-grained sand loams.

The Muskogee-McKamie complex is characterized by moderately to well-drained soils located on narrow escarpments. Slopes range from 3% to 8% and have experienced erosion. The Muskogee soils are wet for a short period after a rain because permeability is slow. In a representative profile, the Musogee surface layer is a grayish-brown silt loam six inches thick. The subsoil, to a depth of 22 inches, is yellow brown silty clay loam. Below a depth of 22 inches, it is gray and yellowish-brown clay mottled with red. Generally, the content of nitrogen, phosphorous and potassium is very low. The soil is strongly acidic. Runoff is rapid. Available water capacity is high. The Muskegee soils in Evangeline Parish are mapped only with McKamie soils.

The well-drained McKamie soils have a dark-gray very fine sandy loam or silt loam surface layer. The subsoil is red clay. Generally, the content of nitrogen, phosphorous and potassium is very low. The soil is very strongly acidic in the surface layer and strongly acidic in the subsoil grading to neutral. Permeability is very slow and runoff is rapid. Available water capacity is moderate.

About 85% of the acreage is woodland. Other uses of the land are for crops and pasture. The supply of moisture available to plants is inadequate during dry periods in some years. The principle limitations are the erosion hazard and low fertility.

The Duralde series consists of somewhat poorly drained soils that are loamy throughout the profile. These soils are mainly gently sloping (1% to 3% slopes), but they also occur in very small mounds. The Duralde series is wet for extended periods because permeability is slow in the lower part of the subsoil. The surface layer is dark grayish-brown silt loam. The subsurface layer is yellowish-brown silt loam, and the subsoil is dark-brown silty clay loam mottled with grayish brown and yellowish brown. Generally, the content of nitrogen, phosphorous, potassium and calcium is very low. The soil is medium acidic to very strongly acidic in the surface layer and upper part of the subsoil and grades to neutral in the lower part. Runoff is medium. Available water capacity is high.

About 90% of the acreage is wooded. A small percentage has been cleared for crops and pasture. The soil is saturated in winter and spring, but lacks adequate moisture for plants during dry periods in some years. The principle limitations for crops are low fertility, wetness and the erosion hazard.

5. Aquifer location

The aquifer location is described in detail in Section IV E.

6. Subsidence problems

The geologic hazards of the area are discussed below.

Geologic Hazards

Earthquakes/Seismic Risk

USGS Earthquake Hazard Map shows that the project area is located in a very small hazard zone: 4 to 6% g peak acceleration, with 2% probability of exceedance in 50 years (USGS Louisiana seismic hazard map on their website).

Louisiana is not considered seismically active although historical records indicate that small earthquakes occasionally occur (Stevenson & McCulloh, 2001). Historical data indicate that 43 mostly low intensity earthquakes with recorded magnitudes of ~ 2.7 to 4.4 have been felt in

Louisiana since 1843 (Stevenson & McCulloh, 2001). No definite earthquakes have definitely been attributed to any specific mapped fault systems in Louisiana (Stevenson & McCulloh, 2001).

Active Faults

Louisiana is within the Gulf Coast Basin tectonic province generally characterized by south dipping and thickening sedimentary strata. In south Louisiana, the most prominent structural features are parallel to the coast growth faulting and salt domes or diapirs. The regional fault systems in south Louisiana are growth faults that are generally contemporaneous with deposition where active movement generally occurs during periods of rapid localized sedimentation and basin subsidence. Movement along growth fault systems is generally related to a process of gradual creep as opposed to sudden rupture of rock that is associated with earthquakes.

Review of more detailed published subsurface maps of the area (Geomap 2001, Varvaro, 1957) show the Pine Prairie dome to be in an area of gentle southward dip except where modified by the salt withdrawal area associated with the dome. There is no local faulting shown except for some radial faulting associated with the dome. The closest regional growth faulting is ~ 5 miles to the south, where a regional east-west trending fault system terminates into the deep-seated Reddell salt dome.

Examination of well data and the structure maps of the flank sediments surrounding the Pine Prairie dome in the interval down to the Vickburg (which is the lowermost horizon considered for brine disposal) give no indication of faulting other than some radial faulting associated with the dome. No topographic features suggestive of active faulting have been recognized in the Project area. Currently, the data give no indication of active faulting that could pose a risk to the project.

Soil Liquefaction

Soil liquefaction is a phenomenon in which saturated, cohesion-less soils temporarily lose their strength and liquefy when subjected to dynamic forces such as intense and prolonged ground shaking. FERC defines areas with potential soil liquefaction as "areas which are underlain by Holocene deposits which are likely to be non-cohesive, such as alluvial, lacustrine, and littoral deposits, and where the water table occurs at 10 feet or less below the surface, and where the U.S.G.S. Open-File Report (OFR) 82-1033 indicates a 90 percent probability that horizontal ground accelerations of 10 percent of gravity or greater would be exceeded in 50 years." (Northeast U.S. Pipeline Projects, 44 FERC § 61,149 and 61,420 (1988)).

The Ground Shaking Hazards from Earthquakes in the Contiguous United States map presented on the USGS website showing the geographic distribution of major hazards indicates that the State of Louisiana is a low risk area for soil liquefaction where there is less than a 10% chance of experiencing an earthquake strong enough to cause appreciable damage in a 50 year period. USGS OFR 82-1033 indicates that there is a 90% probability that horizontal ground acceleration of 4-6% of gravity or greater would not be exceeded in 50 years in the Project area.

Although some portion of the project may have cohesion-less soils or have a water table at 10 feet or less below the surface, the limestone/anhydrite of the caprock outcrops at/or near the surface, the surface deposits are Pleistocene terrace sediments, and the seismic risk is low in the Project area. Therefore, the potential for soil liquefaction appears to be low in the Project area.

Landsliding

The Landslides Areas in the Contiguous United States map (Radbruch-Hall et al., 1982) and USGS Open File Report 97-289 (Godt) showing the geographic distribution of major hazards indicate that Louisiana has a low susceptibility for landslides. Landsliding involves the downward and outward movement of earth material under the force of gravity due to natural or artificial cause. Landslide susceptibility is associated predominantly with the greater relief and more varied and rugged terrains than those found in the Project area.

The Project area is characterized by flat and gently rolling hills with elevation ranging from 95 to 120 feet above the mean sea level. The potential risk of ground failure due to landsliding appears to be low in the project area.

Karst Terrain

Karst features, such as caves, caverns and sinkholes, form as the result of long-term dissolution of soluble carbonate (limestone, dolostone, and marble) rocks by slightly acidic groundwater. Although the caprock at Pine Prairie outcrops at the surface or occurs in the near-subsurface, there is no indication that karstic conditions exist in the project area.

Surface and Subsurface Mines

There are no subsurface mines in the Project area. There is an inactive surface quarry ~ 2500 feet west of the project area. There are three LPG storage caverns in the salt south of the proposed cavern field. Other than these three LPG caverns, there is no surface or subsurface mining known to be planned or active in the Project area. Therefore, the project is not likely to hinder mine reclamation or expansion effort, nor induce contamination from surface mines or induce ground failure associated with surface and subsurface (underground) mining.

7. Climatic conditions

The annual average temperature is 66°F; with an average January temperature of 57°F and an average July temperature of 92°F. The average annual rainfall is 57.5 inches.

V. Are there mitigating measures which would offer more protection to the environment than the facility as proposed without unduly curtailing non-environmental benefits?

(This question requires the permittee to demonstrate having considered the most stringent techniques for reducing or more efficiently handling waste.)

*This is **NOT** a waste Treatment, Storage, Disposal Facility (TSDF). Wastes generated on-site will be disposed of in industry-accepted methods.*

A. Is this facility part of a master plan to provide waste management? Whose plan?

1. How does it fit into the plan?

2. What geographical area is served by the plan?

This facility is not part of a master plan to provide waste management.

B. Does this facility fit into an integrated waste management system? (reduction, recovery, recycling, sales tax, exchange, storage, treatment, disposal).

1. On-site

a. Regional

The facility does not fit into an integrated waste management system.

C. Can waste be disposed in another fashion (way)?

1. Technology limitations

2. Cost factors

3. Other reasons

*This is **NOT** a waste Treatment, Storage, Disposal Facility (TSDF). Wastes generated on-site will be disposed of in industry-accepted methods.*

D. What quality assurance control will be utilized to protect the environment?

1. Plans for lab work

2. How are out-of-spec wastes handled

3. What happens to rejected wastes

4. Treatment stabilization

5. Segregation of noncompatible wastes

6. Handling of containerized wastes

*The proposed project is **NOT** a waste Treatment, Storage, Disposal Facility (TSDF) and does not include a laboratory.*

E. Innovative techniques used to control release of waste or waste constituents into the environment.

1. Surface impoundment

2. Land application treatment

3. Landfill (burial)

4. Incinerator
5. Container storage
6. Tanks

Berms will be used to control releases from tanks. Trash will be transported and disposed of at a local landfill. Used oil and used filters will be recycled. Brine from the cavern excavation will be temporarily stored on-site until it is transported by pipeline to specifically designed disposal wells.

The facility Spill Prevention Control and Countermeasure Plan is included with this UIC-? HSW Permit Application in Attachment 20 in addition to the Emergency Response Plan. Every effort is and will be made to guard against any spills that may have a detrimental effect on the ground water or other elements of the environment. Specific response actions are addressed in the Spill Prevention Control and Countermeasure Plan.

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