



DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON TX 77553-1229

REPLY TO
ATTENTION OF:

CESWG-RD-P

September 4, 2018

MEMORANDUM FOR THE RECORD

SUBJECT: Determination of the requirement for an Environmental Impact Statement for Department of the Army Permit SWG-2016-01027

1. Purpose: To make a decision whether to prepare an Environmental Impact Statement (EIS) for the Department of the Army (DA) permit decision on the proposed DA Permit SWG-2016-01027, Dow Chemical Company (Dow). Pursuant to 33 CFR 325, Appendix B and 40 CFR 1500-1508, this Memorandum For the Record (MFR) will document why the subject application, as currently proposed, will necessitate the preparation of an environmental impact statement.

2. Permit Authority: This permit action is being taken under authority delegated to the District Engineer from the Secretary of the Army and the Chief of Engineers by Title 33 CFR Part 325.8, pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act.

3. Permit Background: Dow has applied to construct a new "major" reservoir (major meaning it can hold more than 5,000 acre-feet of water). Dow's proposed project facilities for the Harris Reservoir Expansion (Reservoir) are intended to provide a reliable water supply from the Brazos River for Dow's Texas Operations in Freeport, Texas and other users of Dow's water supply system, including the Brazosport Water Authority, during extended periods of low stream flows and/or drought. The project site is located approximately eight miles northwest of the City of Angleton and abuts the Brazos River. The proposed Reservoir has been in the planning stages for many years and is included in both the 2011 and 2016 Texas Region H Regional Water Plans and the 2012 and 2017 State Water Plans.

The proposed Reservoir would provide additional water storage capacity by constructing an off-channel reservoir and associated infrastructure located immediately north of the existing Harris Reservoir site. The off-channel reservoir would include a 1,929-acre impoundment with a nominal storage capacity of 50,000 acre-feet, an intake and pump station to divert Dow's existing surface water rights from the Brazos River into the reservoir, with any releases diverted to an outlet on Oyster Creek and an emergency spillway.

The proposed Reservoir is located immediately north of the existing Harris Reservoir within both the Brazos River and Oyster Creek 100-year Federal Emergency Management Agency (FEMA) regulatory floodplains with designated special flood hazard zones AE and AO on the Brazoria County Flood Insurance Rate Map (FIRM). The proposed Project will be constructed above existing grade within the Oyster Creek floodplain with a constructed berm surrounding the reservoir. The project will also

include three floodplain enhancement projects and four stream restoration projects within the Oyster Creek floodplain to mitigate the effects of the reservoir.

The proposed reservoir will be operated in conjunction with the existing Brazoria and Harris reservoirs, currently capable of a combined nominal storage capacity of 50,000 acre-feet, to supplement the total available storage capacity and to provide additional operational flexibility.

The diversity of vegetation, soils, and available water resources on the approximately 2000-acre site provides habitat for a large number of native wildlife species. Habitats within the site consist of Columbia Bottomland Hardwoods, scrub-shrub uplands, forested uplands, forested wetlands, emergent wetlands, ephemeral and intermittent streams, and a series of man-made drainage ditches. Initial estimates by Dow indicated that the construction of the proposed project will result in the loss of 12.19 acres of emergent wetlands, 4.15 acres of forested wetlands, and 20,486.3 linear feet (5.73 acres) of streams. Ongoing verification of Dow's delineations and jurisdictional determination request indicate these numbers will likely increase.

A 60-day public notice was issued 15 June 2018. During the public notice period, comments were received from the general public, non-government organizations, as well as local, state, and federal government agencies.

Major concerns raised by the public, as well as state and federal agencies, include hydraulic alterations to the combined floodplains of the Brazos River and Oyster Creek as well as hydraulic alterations to the in-stream flows of the Brazos River, Oyster Creek, Buffalo Camp Bayou and their downstream estuaries. State and federal agencies, as well as several non-profit environmental organizations, requested considerable analysis of the direct, indirect and cumulative impacts to riparian habitat and bottomland forested areas along the Brazos River and Oyster Creek resulting from both the construction of the reservoir, including the required floodplain enhancements, and their hydraulic alterations to several stream systems and their estuaries.

While the majority of comments requested detailed analysis on the impacts to aquatic resource function over a large geographic area, many of the commenters also noted that the site is located in the Columbia Bottomland, an ecologically important region to avian species. The state and federal agencies, the non-profit environmental organizations, and several public citizens requested the impacts to migratory or nesting avian species be further studied.

In addition, it is important to note that the EPA stated that the impact analysis, alternatives analysis, and compensatory mitigation plan provided by Dow does not appear to adequately reflect consideration of direct, secondary, and cumulative impacts and does not seem to be in compliance with the requirements of Section 230.10(c) of the 404(b)(1) Guidelines. Section 230.10(c) requires that no discharge of dredged or fill

material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. EPA advised the Corps that the information provided by Dow is insufficient to enable the Corps to make a legally defensible permit decision in regard to compliance with these Guidelines. EPA recommended further assessment of on-site aquatic resources as well as analysis of potential downstream impacts to Oyster Creek habitat as a result of increased flows and potential impacts to the Brazos River system from water withdrawals, such as upstream saltwater migration, to assure compliance with the Guidelines.

4. Decision Authority: The following presents the relevant statutes considered in assessing whether to prepare an EIS or an environmental assessment (EA), pursuant to the National Environmental Policy Act (NEPA), for a Department of the Army permit (DA) SWG-2016-01027 (statutory language in italics below).

Guidance found in 33 CFR Part 230 describes procedural provisions of NEPA for the Corps' Civil Works Program. Specifically, 33 CFR Part 230.6 identifies actions which normally require an EIS as: (a) feasibility reports for authorization and construction of major projects; (b) proposed changes in projects which increase size substantially or add additional purposes; and (c) proposed major changes in the operation and/or maintenance of completed projects. In addition, 33 CFR Part 230.7 identifies actions that normally require only an EA as: a) regulatory actions; (b) authorized projects and projects under construction; (c) continuing authorities program; (d) construction and operations and maintenance; (e) real estate management and disposal actions.

Appendix B of 33 CFR Part 325 NEPA Implementation Procedures for the Regulatory Program establishes the procedures for implementing NEPA in processing DA permits. It does not specifically identify the types of proposals which require an EIS or an EA other than to identify categorical exclusions. In regards to determining the appropriate NEPA documentation, Paragraph 7 of Appendix B states that, "*In those cases where it is obvious an EIS is required, an EA is not required. However, the district engineer should document his reasons for requiring an EIS.*" For additional guidance in determining the required NEPA documentation, Appendix B recommends, "*the Corps NEPA regulation 33 CFR Part 230 and for general policy guidance, see the Council on Environmental Quality (CEQ) regulations 40 CFR 1500 – 1508.*"

Central to the determination as to whether an EIS is required is the determination that the proposed action may have significant effect(s) on the quality of the human environment. To make this determination, the CEQ's regulations establish criteria requiring considerations of both context and intensity in 40 CFR § 1508.27.

Establishing the context for this determination requires that the significance of the action "*...be analyzed in several contexts such as society as a whole (human,*

national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action... Both short- and long-term effects are relevant.” (40 CFR 1508.27(a))

The CEQ’s regulations denote that intensity is the severity of the impacts. When evaluating the severity of the potential impacts to the human environment, the CEQ has highlighted ten factors which the agency may consider to determine the significance of a project’s impacts. Those factors, found in 40 CFR § 1508.27(b), are as follows:

- 1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.*
- 2. The degree to which the proposed action affects public health or safety.*
- 3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.*
- 4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.*
- 5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.*
- 6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.*
- 7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.*
- 8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.*
- 9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.*
- 10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.*

5. Discussion: The proposed 2000-acre reservoir is being built to provide a drought resilient water supply for local municipalities, industries, and Dow's Texas Operations site in Freeport. This proposed reservoir will be used in conjunction with the existing Harris Reservoir and Brazoria Reservoir, which is already subject to the saltwater wedge during low river flows. The proposed reservoir is not intended for flood control purposes. Dow is proposing to construct the reservoir within the combined Brazos River and Oyster Creek floodplains to store and transfer raw water by pumping from the river into the reservoir and then discharging to the creek through a siphon system. The project will also include three floodplain enhancement projects to mitigate the effects of the reservoir and four stream restoration projects within the Oyster Creek floodplain.

In general, the Corps considers alteration of floodplains and in-stream flows as an adverse effect to aquatic resource functions; although the Corps also acknowledges that some hydrologic modifications can benefit aquatic functions. The majority of the Corps' permit actions are made in light of current conditions. However, it is not uncommon for larger more complex actions to require the development of models illustrating future hydrologic and resource conditions to adequately frame and disclose anticipated effects. The current and predicted hydrology can be used to inform analysis specific to each relevant aquatic resource category and allows for comparison of the predicted modifications to current hydrologic conditions. Typical categories of the aquatic ecosystem to be evaluated include surface water, groundwater, water quality, geomorphology, fisheries, aquatics (including macro- and micro-invertebrates), and riparian areas.

The Section 404(B)(1) Guidelines For Specification Of Disposal Sites For Dredged Or Fill Material (40 CFR Part § 230) specify certain evaluations be undertaken in subparts C through F, as well as at 40 CFR 230.11(a-h) and 230.23, .24, .25 and .77. While evaluation of both direct and indirect (secondary) effects are required, the primary applicability of hydrologic analysis is to capture and be able to appropriately evaluate the causal secondary effects from a proposed water supply project and/or its alternatives. The 404(b)(1) guidelines define secondary effects as those effects on the aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. The Corps is required to evaluate data and information about secondary effects on aquatic ecosystems prior to the time it takes final action on a permit decision. The 404(b)(1) guidelines also identify several examples of relevant secondary effects on the aquatic ecosystem which include: 1) fluctuating water levels in an impoundment; 2) areas downstream of an impoundment; 3) other effects. Additionally, activities to be conducted on lands created by the discharge of material in waters of the United States as well as reasonably foreseeable activities that may have secondary impacts within those waters should also be considered in evaluating the impact of creating the proposed reservoir.

In addition to the effects analysis, the 404(b)(1) guidelines (Subpart H) and associated implementing guidance further require that impacts be avoided and minimized and those impacts that cannot be are to be compensated. Avoidance and minimization actions that may be relevant to or influenced by the hydrologic analysis include operations of the project involving diversions, storage and/or releases. This is particularly true as it relates to impoundments as the 404(b)(1) guidelines at 40 CFR 230.77(b) state “in the case of dams, designing water releases to accommodate the needs of fish and wildlife” as specific components of how to avoid, minimize and compensate for the effects of the project.

At the outset of a permit review, the Corps will initially use available hydrology data and any Applicant-prepared modeling to estimate the potential for modification of flows to waters of the United States to analyze the effects of a project. This practice allows for the potential to avoid undertaking any additional specific hydrologic modeling designed to inform or evaluate impacts to aquatic resources from hydrologic modification. The Corps balances whether to forgo or require additional intermediate data or possibly quantitative stream and resource assessments — which can be a time consuming and expensive effort. The need for the amount, accuracy, and sophistication of data, information, and analysis to assess causal effects to aquatic resources increases as the scope of the project or the magnitude of the project’s potential impacts increase, both directly at the project site and indirectly to upstream and downstream aquatic resource functions.

A study was commissioned by the Brazos River Authority (BRA) in 2014 to better understand the effects of large rain events and provide comprehensive regional drainage criteria for the lower Brazos River watershed. The models in the study include assessing the impacts of the Memorial Day 2015, Tax Day 2016, and Hurricane Harvey 2017 flood events. The five counties affected by this study include: Washington, Waller, Austin, Fort Bend, and Brazoria where Dow’s proposed project is located. Although the final study is not due to be published until later in 2018, the preliminary results of BRA’s modeling demonstrate that the Brazos River has considerable lateral flows between the Brazos River and neighboring streams, including Oyster Creek. This study does not seem to have included the proposed Reservoir in its analysis.

Dow submitted a report with their application titled, “Floodplain Study for the Brazos River and Oyster Creek.” The hydraulic analysis in this report updated the effective FEMA modeling and verified a no-rise condition exists for the Brazos River. However, the no-rise conditions on Oyster Creek was limited to the immediate area and, per the report, is not being adopted by FEMA. This study was limited to the Water Surface Elevation (WSEL) for the 100-year event and did not include impacts to in-stream flows, environmental flows, in-stream water quality, geomorphologic changes to the river and creek, or freshwater inflows to the downstream bays and estuaries.

If constructed, the proposed Reservoir will remove and impose an unnatural pattern of flow variations in both the Brazos River and Oyster Creek. Moving water out of rivers and into off-channel reservoirs lowers the instream flows and disrupts the environmental flow regime of the river, which can have a significant secondary effect on geomorphology and the fish and wildlife values. Varying releases into Oyster Creek will also effect instream flows which may have significant ecological consequences. Rapid water level fluctuations speed up erosion downstream and prevent fish and other aquatic species from spawning by alternately exposing and submerging the favored nesting and breeding areas in shallow waters. High flows can wash away the trees, shrubs and grasses along its banks resulting in accelerated erosion. In addition, the riparian vegetation provides food and shelter for nesting waterfowl and other birds. It also prevents the stream becoming dangerously hot and devoid of dissolved oxygen during the summer by providing shade.

In addition to in-stream impacts, the proposed project would result in the removal of approximately 2000 acres of wide floodplains with significant storage effects on the hydrograph in a region currently vulnerable to flooding. If the proposed Reservoir significantly alters the flooding on the Brazos River or Oyster Creek, the impacts to local citizens and stakeholders may be significant.

On a cumulative basis, three major reservoirs removing water from a single river within one county have the potential to result in significant hydrologic alterations when combined with the other current and proposed reservoirs, such as Allen's Creek, within the Lower Brazos River basin.

To be able to evaluate the significance of the direct, indirect (i.e. the causal secondary effects), and the cumulative effects in the Lower Brazos River basin from the proposed water supply project and/or its alternatives, the development of current hydrologic conditions without and then with the project is needed as well as the ability to predict future hydrologic conditions.

CONCLUSION: I have reviewed and evaluated the factors concerning this permit application, as well as the stated views of other interested Federal and non-Federal agencies and the concerned public, relative to the proposed work in waters of the United States. Based on my review, when considering both context and intensity, I am reasonably able to arrive at a conclusion that the project, as proposed, may have a significant effect on public safety due to the unknown and controversial risk for flooding and changes to in-stream flows resulting from construction and operation of the proposed Reservoir.

Further investigation into these areas of potential significant impacts on the human environment will allow the Galveston District to be able to address these issues so that the proper permit decision will be made and should help the applicant better address these problems in the design of their project. Therefore, in accordance with of 33 CFR 325 Appendix B paragraph 7, I have determined that the project requires the preparation of an Environmental Impact Statement.

A handwritten signature in black ink, appearing to read 'Lars N. Zetterstrom', is written over the typed name below.

LARS N. ZETTERSTROM, P.E.
COL, EN
Commanding