STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER RESOURCES
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

MEMORANDUM

To: Robert Haynes, Esquire, Hearing Officer

Through: Kathy Bunting-Howarth, Director of the Division of Water Resources
Laura M. Herr, Section Manager, Wetlands and Subaqueous Lands Section

From: Joanne M. Lee, Environmental Scientist IV, Wetlands and Subaqueous Lands Section

Re: Delaware City Refinery Draft Subaqueous Lands Permit/Water Quality Certification

Date: August 26, 2009

The Wetlands and Subaqueous Lands Section (WSLS) submits for your review the attached draft Subaqueous Lands Permit/Water Quality Certification for the Secretary's consideration in the event he determines that a permit should be granted to the Delaware City Refinery for dredging in Cedar Creek and the Delaware River near Delaware City in New Castle County, Delaware. The draft Permit/Certification is conditioned to assure compliance with the Subaqueous Lands Act and Regulations and includes Special Conditions addressing fees and mitigation. Following is some background information and a description of the mitigation concepts that the WSLS would support as appropriate compensation for impacts.

Fees

This draft Permit/Certification includes fees assessed to the refinery in accordance with 68 Delaware Laws, Chapter 82 for new dredging and maintenance dredging in public subaqueous lands. The fees include:

1) a fee of $1,000 for maintenance dredging in public subaqueous lands, and
2) a one-time fee of $1.50 per cubic yard for newly dredged material. Portions of the dredging in the berthing area and navigation channel are considered "new" dredging because the DCR has requested to dredge to depths deeper than the previously authorized.

hydrology. This work would offer some offset for the direct impacts to benthic organisms during dredging.

3) the funding of the removal of dams on the upstream tributaries of the Delaware River. Such work would provide additional habitat for anadromous fish impacted by the impingement and entrainment.
4) a contribution to the Northern Delaware Wetland Rehabilitation Program (NDWRP) to undertake marsh restoration in the tidal waters in northern Delaware. The NDWRP's work provides improved fish and benthic habitat in the marshes adjacent to the Delaware River. Funding of this work would provide some offset for losses associated directly with the dredging and with the secondary impacts of impingement and entrainment.

Because the aquatic ecosystem is an interconnected web, improvements to the aquatic ecosystem will enhance the public's use. However, the most tangible losses are recreational and commercial losses associated with fish impacts. Consequently, the mitigation directly improving fish habitat would provide more direct offsets for the public use losses. Public losses would be offset more comprehensively by the use of cooling towers.

The following technical documents were reviewed as part of the application review process:

Normandeau Associates, Impingement and Entrainment at the Cooling Water Intake Structure of the Delaware City Refinery, April 1998- March 2000, August 2000.

ESSA Technologies Ltd., Review of Report on Impingement and Entrainment at the Cooling Water Intake Structure of the Delaware City Refinery, April 1998- March 2000, Sept 6, 2001.

Kahn, Desmond, Impacts of Impingement and Entrainment Mortality by the Delaware City Refinery on Fish Stocks and Fisheries in the Delaware River and Bay, October 9, 2008.

Premcor Refining Group, Inc – Valero - Delaware City Refinery

DNREC Subaqueous Lands / Dredging Permit Renewal
September 22, 2008

Why do we need to dredge?

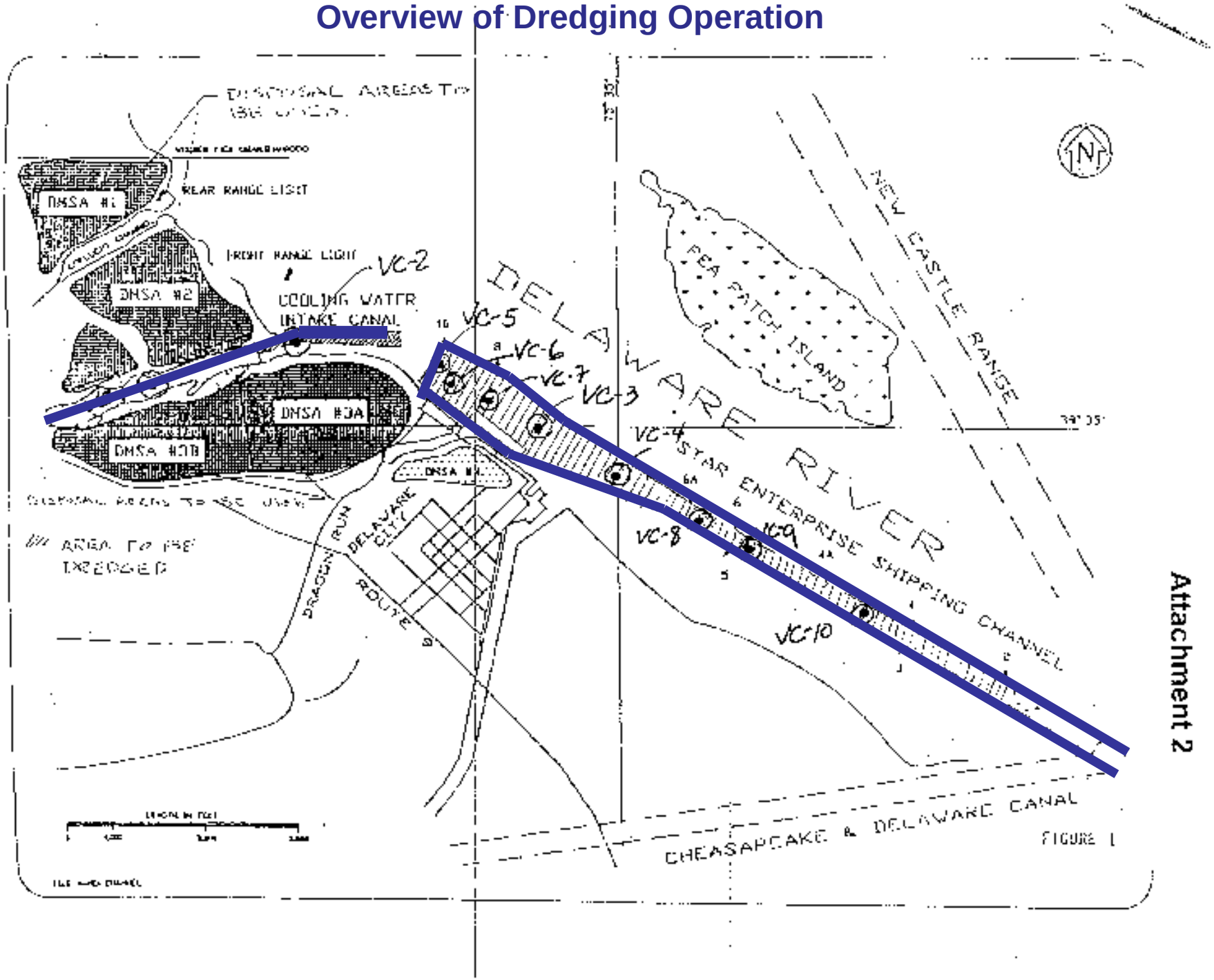
- **Maintaining depth in the Navigation Channel and Pier berthing area are critical to refinery operations.**
  - **All feed arrives via ship.**
  - **Significant product distribution via ship / barge.**
- **This area of the Delaware River is subject to shoaling (sediment build-up).**
- **US Army Corps of Engineers maintains the main stem Delaware River channel, but not the spur channel leading to our facility.**
- **Maintaining the Cooling Water Intake Channel (CWIC) is critical for supplying cooling water to the facility, which is essential to the safe, efficient and reliable operation of the facility.**

Existing Maintenance Dredging Permit

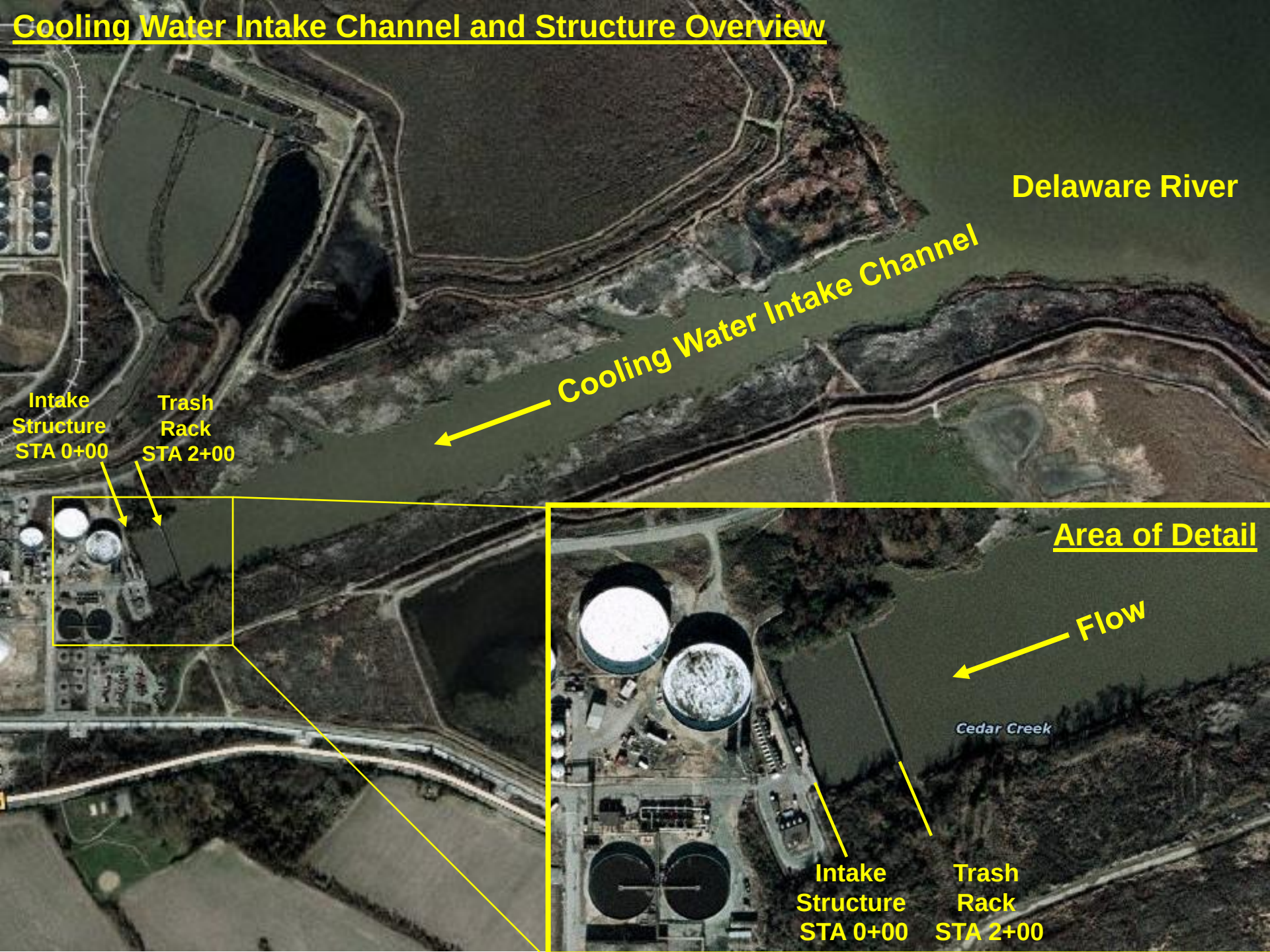
- **Navigational Channel (Includes Turning Basin)**
  - **Occurs every three years**
  - **Existing permit dredge target depth is – 32 ft. MLW**
- **Pier Berthing Area**
  - **Occurs every three years**
  - **Existing permit dredge target depth is – 37 ft. MLW**
- **Cooling Water Intake Channel (CWIC)**
  - **Occurs twice per year**
  - **Existing permit dredge target depth is – 12 ft. MLW**


Overview View of Dredging Operation
DMSA #1
DMSA #2
DMSA #3A
DMSA #3B
Cooling Water Intake Channel
Piers
Navigation Channel
Pea Patch Island
Delaware City
Wrangle Hill Rd
River Rd
5th St
2000 ft

Overview of Dredging Operation



Attachment 2


Cooling Water Intake Channel and Structure Overview
Delaware River
Cooling Water Intake Channel
Intake Structure STA 0+00
Trash Rack STA 2+00
Area of Detail
Flow
Cedar Creek
Intake Structure STA 0+00
Trash Rack STA 2+00

Permit renewal application

- **Dredging footprint same as existing permit.**
- **Dredging frequency same as existing permit.**
- **Dredging technique (hydraulic dredging) same as existing permit.**
- **CWIC targeted dredge depth same as existing permit.**
- **Destination of dredge material same as existing permit.**
- **Request to increase targeted dredge depth in Navigation Channel and Turning Basin from -32 ft. MLW to -37 ft. MLW.**
- **Request to increase targeted dredge depth in Pier Berthing Area from -37 ft. MLW to -40 ft. MLW.**

Why increase targeted dredge depth?

- **Optimize ship / barge traffic.**

Sediment Quality

- **DNREC required sampling and analysis of sediments to ensure the quality of sediments in place after dredging was complete.**
- **DNREC and Premcor mutually developed a sampling and analytical plan consisting of:**
  - **Ten sediment cores obtained throughout the dredging locations.**
  - **Each sediment core separated into two samples, one representing material to be removed, and one representing the sediments to remain after the operation.**
  - **The twenty samples were analyzed for: Polychlorinated biphenyls (PCBs), polyaromatic hydrocarbons (PAHs), organochlorine pesticides, metals. Total Organic Carbon (TOC) and grain size.**

Sediment Quality

- **"Evaluation of Sediment Data Collected in Conjunction with the Proposed Valero Delaware City Refinery Dredging Project" dated September 5, 2008 by Dr. Rick Greene of DNREC :**
  - **"Significantly, this assessment indicates that the environmental benefit of removing these sediments from the aquatic environment of the Delaware Estuary exceeds the environmental risks. For example, this project will remove an estimated 133.6 kg of PCB; 12,609 kg of PAH; and 710.9 kg of mercury from the Estuary."**
  - **"…the concentrations in the tops are no different than the bottoms indicates that the sediments will basically be the same after dredging as before dredging."**
  - **"…the quality of sediments will be the same after dredging as before dredging with regard to total PCB concentration."**

What are the benefits?

- **Per Dr. Greene's evaluation, an overall environmental benefit is realized from the removal of the sediments.**
- **Will reduce lightering events by approximately 16 events per year.**
- **Will reduce emissions associated with ship / barge traffic, lightering events, and loading / offloading activities.**
- **Reduced environmental risk due to material transfers.**

Bottom line for Dredging Permit...

- **Maintenance dredging is essential to facility operation.**
- **Dredging will result in an overall environmental benefit from sediment removal.**
- **Dredging will result in environmental benefit from reduced vessel traffic and transfers.**

CWIC Maintenance Dredging

- **Urgent need to perform CWIC maintenance dredging ASAP to maintain safe, reliable refinery operations.**
- **Present CWIC depth less than - 4.5’ MLW – insufficient for reliable cooling water supply.**
- **Necessary to prevent potential cooling water loss which could lead to refinery upsets.**
- **Permit remains in renewal process – therefore Premcor submitted request 9/4/08 to initiate cooling water intake maintenance dredging while awaiting permit issuance.**
- **Upon receiving DNREC approval, we would target 9/29/08 to begin the CWIC maintenance dredging operation.**

CWA 316(b) Discussion

- **DNREC has specifically requested that we address, at this public hearing, CWA 316(b) impingement/entrainment issues raised during the public comment period.**
- **The regulatory program governing CWA 316(b) impingement/entrainment is DNREC's NPDES permit program, not the Dredging Permit program.**
- **EPA has determined that, for cooling water intake structures (CWIS) at existing facilities not within Phase II (large electric generators), CWA 316(b) should be implemented under the existing NPDES program by the NPDES permitting authority on a case-by-case basis using Best Professional Judgment (BPJ).**
- **Premcor has been working with DNREC at multiple levels to develop a plan to satisfy CWA 316(b) requirements within the context of the NPDES permit renewal process.**
- **Ultimate goal is to convert facility to recirculating cooling towers.**
- **Project approved to complete first phase of multiple stage project.**
- **Project development in progress for next stages.**
- **Commitment made to reduce quantity of Delaware River intake by 33%.**

DRBC Water Allocation Docket

- **Excerpt from Docket approved 5/19/08**

D-93-4-6 (The Premcor Refining Group, Inc. - Ground and Surface Water Withdrawal) 7

f. The docket holder shall undertake an initiative to construct improvements to reduce Delaware River surface water withdrawals in accordance with the following:

i. The docket holder shall complete construction of a project to reduce the annual Delaware River surface water intake from 452 mgd to 303 mgd, based on a 12 month rolling average, by December 31, 2013. If any issues that arise that will delay implementation/construction of the project, the docket holder shall notify DNREC within 90 days of such discovery.

ii. The docket holder's preliminary project scope projects a phased approach to optimize and augment existing re-circulating cooling towers, with the potential to supplement with additional re-circulating cooling towers as necessary, to reduce surface water withdrawals. Within 6 months after the completion of the final project scope, the docket holder will submit a report to DRBC and DNREC identifying the proposed actions to be taken to reduce the volume of water withdrawn, as identified in (i) above

iii. The docket holder shall commence collection of data to demonstrate compliance with this requirement upon completion of construction. The docket holder can request an extension based on circumstances beyond its control. The Executive Director may extend any compliance date with the concurrence of the DNREC.

Optimize existing cooling towers…

- **Premcor will re-configure/optimize the use of existing Cooling Towers and augment with an additional Cooling Towers in order to reduce cooling water intake flow using a staged approach.**

Bottom line for 316(b) Compliance Strategy

- **Specific commitments are in place in DRBC Water Allocation Docket.**
- **Projects are approved and in the execution phase.**
- **Scope development for next phase is in progress.**
- **We are working with DNREC to satisfy CWA 316(b) requirements through the governing NPDES program.**

Conclusion

- **Information has been provided on scope of dredging permit and renewal action.**
- **Maintenance dredging is essential to facility operation.**
- **Dredging will result in environmental benefit from reduced vessel traffic and transfers.**
- **Dredging will result in an overall environmental benefit from sediment removal.**

Habitat Replacement Cost

Value of fish estimated killed at Valero refinery using Habitat-based Replacement Cost (HRC)

	A	B	C	D	E	F
Species	Age 1 fish lost	Mean wt. of age 1 (g)	Kg lost per year (A*B)	Annual kg production per hectare per year	Hectares needed to offset (C/D)	Restoration based on $5,000 per hectare (E*$5,000)
Striped bass [1]	74,064	220	16294.02	0.1900	85758	$428,789,940
Weakfish [2]	39,806	118	4697.108	0.2485	18902	$94,509,215
White Perch [2]	328291	9	2954.619	12.7500	232	$1,158,674
Bay Anchovy [2]	1,546,368	1.7	2628.826	0.0340	77318	$386,592,000
Restoration hectares greatest for striped bass, thus restoration cost is:						**$428,789,940**

Estimates based on analysis presented for PSEG Salem in Strange, E.M., P. D. Allen, D. Beltman, J. Lipton, and D. Mills. 2004. The habitat-based replacement cost method for assessing monetary damages for fish resource injuries. Fisheries 29(7): 17-24

[1] Estimated Equivalent recruits developed at age 1 based on data supplied by Normandeau Associates, Inc.(2001) Tables 17 and 18. Average of estima

[2] Average of the Equivalent Adult weakfish and bay anchovy at age 1 killed by the Delaware City refinery in 1998 and 1999 by Normandeau Associates

White perch Equivalent Adults from Normandeau Associates (2001), Tables 19 and 20, adjusted to age 1.
In all cases, the estimate is the average of the estimated losses from the two years of sampling.

Reference Cited

Normandeau Associates (2001). Impingement and Entrainment at the Cooling Water Intake Structure of the Delaware City Refinery, April 1998 - March 2000. Final report for: Motiva Enterprises LLC, Delaware City Refinery, Delaware City, DE May

MEMORANDUM

To: Robert Haynes, Esquire, Hearing Officer

Through: Kathy Bunting-Howarth, Director, Division of Water Resources
Laura Herr, Section Manager, Wetlands and Subaqueous Lands Section

From: Joanne Lee, Environmental Scientist
Division of Water Resources, Wetlands and Subaqueous Lands Section

Date: July 23, 2009

Subject: Wetlands and Subaqueous Lands Section Findings – Premcor Refining Group, Inc., Delaware City Refinery

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BACKGROUND INFORMATION

SITE

The Premcor Refining Group, Inc. (Premcor) operates the Delaware City Refinery (DCR or refinery), located on Wrangle Hill Road, Delaware City, New Castle County, Delaware. The facility has frontage on the Delaware River and uses the resources of the river in its operations. This review is limited to the proposed dredging required for the following two water uses at the refinery:

- The facility has three piers and docks and associated structures in the Delaware River where vessels are moored for the transfer of product to and from the refinery. To facilitate movement of the vessels to the docks, the refinery dredges a navigation channel and berthing area every three years in the Delaware River to maintain adequate depth.
- The refinery operates a cooling water system using water from Cedar Creek, a tidal tributary of the Delaware River located on the refinery property. Cedar Creek was channelized and dredged and now functions as an approximately one mile long cooling water intake channel for the refinery. The refinery dredges Cedar Creek twice annually to maintain sufficient depth to provide water for the cooling water system.

Cooling Water System

The cooling water system is a vital system at the refinery because many of the processes use heat to separate gasoline, diesel and other components from crude oil. These distilled components become gases and need to be cooled to return to a liquid. If cooling water is unavailable, hot vapors may be discharged as an air emission by the refinery's flares to avoid overpressuring of the refinery equipment. Cooling is integral to safety and operation of the refinery.

Currently the cooling water for the refinery is a once-through system, where water is taken from the Delaware River, via the channelized Cedar Creek, and used to cool equipment at the refinery. The intake pipes are located at the landward end of Cedar Creek. Near the intake are screens which prevent larger organisms and debris from entering the pipe. The water flows into a complex pipe system that is used for cooling processes at the refinery and is eventually discharged back to the Delaware River.

Because this water is part of the natural river system, aquatic organisms, including fish, plankton, microbes, larvae, and eggs live in the cooling water and are carried (entrained) into the system. Larger debris and organisms, including fish of sufficient size, are caught (impinged) on screens prior to prevent entering the piped portion of the system. The mortality rate for the organisms impinged or entrained in the cooling water system is very high. The refinery is currently authorized to draw up to an average of 452 million gallons of water daily, so significant numbers of aquatic organisms are impinged and entrained in the system.

Newer technology, such as closed loop systems, which re-circulate the cooling water, would significantly reduce the need for water intake and the impact on aquatic organisms. Premcor has made a commitment to lower the current water intake to 303 million gallons a day, a reduction of 33 percent compared to current permitted levels. Premcor has also agreed to optimize use of existing cooling towers on site and augment existing towers with additional towers in the future.

Confined Disposal Facilities

There are four active confined dredge materials disposal facilities on the refinery property. The refinery is currently evaluating new locations for placement of a new confined disposal facility.

PERMIT APPLICATION

The refinery is required to obtain a Subaqueous Lands Permit (Permit) and Water Quality Certification (Certification) from the Wetlands and Subaqueous Lands Section (WSLS) for the dredging operations.

The Subaqueous Lands permit is reviewed in accordance with the Subaqueous Land Act (Act), (7 Del. C., Chap. 72) and the Department's Regulations Governing the Use of

Subaqueous Lands (Regulations). The Subaqueous Lands permit regulates all work in subaqueous lands, including the dredging in the Delaware River and Cedar Creek and the discharge of effluent from the disposal sites into the waterways.

The Water Quality Certification is reviewed pursuant to the authority granted by Section 401 of the Clean Water Act and Section 5 of the State's Regulations Governing the Control of Water Pollution. The regulatory authority granted under Section 401 of the Clean Water Act applies to discharges of pollutants into State waters, which in this case results from the "discharge of dredged or fill material" into waters. The hydraulic dredging is not considered a "discharge of dredged or fill material" because dredged materials are sucked into the pipelines and not discharged to the waters. Only the discharge of effluent from the confined disposal facility is subject to Water Quality Certification review.

Proposed Project

In January 2008 Premcor submitted a permit application to the WSLS requesting authorization to dredge for a five year period. The application requested authorization for:

- New Dredging
  DCR has applied to dredge to deeper depths in the navigation channel and the berthing area in the Delaware River. The proposed dredging depths in the Delaware River increased from 32 feet to 37 feet below mean low water (MLW) for the navigation channel and from 37 feet to 42 feet below MLW for the berthing area. In subsequent submissions, the requested dredge in the berthing area was changed to 40 feet below MLW. The proposed frequency of dredging for these areas was once every three years, twice within this five year period. The proposed volume of dredged material is 1,200,000 cubic yards of material during each event.

- Maintenance Dredging
  DCR has requested to dredge to a previously authorized depth of 12 feet below MLW in Cedar Creek. Dredging is proposed to occur twice annually (during March and October) in Cedar Creek with an anticipated dredge volume of 115,000 cubic yards per event.

The proposed dredging includes a request for authorization of an additional 2 foot overdredge at each location. Previous dredging authorizations did not include overdredge authorization. The volumes of proposed dredged materials for a five year period are projected to be a total of 3,665,000 cubic yards of material. The dredged material is proposed to be placed in the confined disposal facilities on the refinery site.

Application Completeness

The WSLS deemed the January 2008 application incomplete because the application lacked a) information on the disposal sites, b) plans depicting the requested dredging depth and c) a sediment sampling plan. In March 2008, the WSLS received a mutually agreed upon sediment sampling plan from Premcor. Adequate information about the disposal sites was obtained through various e-mails. On May 30, 2008 the WSLS received a revised permit application from Premcor providing the required plans that accurately depicted proposed dredging depths. The WSLS deemed the application complete on May 30, 2008.

Public Notice

A public notice of the proposed project was placed in The News Journal and the State News on June 4, 2008. Two citizens commented on the project during the 20-day public notice period, both requesting a public hearing. Both commenters cited impacts to aquatic species. One commenter stated that the application lacked adequate information and was placed prematurely on public notice. A public hearing was held on September 22, 2008 in response to these comments.

SEDIMENT SAMPLING AND ANALYTICAL REVIEW

Sediment sampling in the Delaware River and Cedar Creek in the vicinity of the proposed dredging began July 8, 2008. A total of 10 sediment cores were collected from targeted dredging areas in Cedar Creek and the Delaware River. Each core sample was split into two samples – one sample taken from the material that would be dredged and the second from the sediment that would be exposed after dredging. A total of twenty sediment samples were submitted for environmental testing. Each sample was submitted for analysis of Total Organic Carbon, grain size, Target Analyte List (TAL) metals, Polynuclear Aromatic Hydrocarbons (including alkylated homologs), TAL Organochlorine Pesticides, and PCB Homologs. The analytic results for the sediment sampling were submitted to the WSLS on August 15, 2008.

Richard Greene, an Engineer V with the DNREC Watershed Assessment group and a toxic sediment specialist, reviewed the analytical data and submitted an assessment of the data to the WSLS on September 5, 2009. He determined that while toxic chemicals were a component of the sediments, there was little to no risk that they would:

1) become bioavailable in the water column;
2) cause toxicity in the water column; or
3) exceed State standards for human health or the environment.

Mr. Greene stated that removal of the contaminants would improve water quality conditions in the Delaware River. His review also determined that the bottom sediment samples were not significantly different than the top sediment samples and the quality of the exposed sediment would basically be the same pre- and post-dredging.

DREDGING FEE

In accordance with 68 Delaware Laws, Volume 1, Chapter 86, the new dredging in public subaqueous lands is subject to a fee of $1.50 per cubic yard. The areas subject to this fee are those sediments in the navigation channel and berthing area in the Delaware River that are below the current authorized dredge depths.

PUBLIC HEARING

A public hearing was held in response to public comments. Notice of the public hearing was placed in The News Journal and the State News. The public hearing was held on September 22, 2008 at the Delaware City Library in Delaware City, Delaware.

PREMCOR PRESENTATION

At the public hearing, Mr. Joe Greenfield of Delaware City Refinery presented the project to the public. He stated that the purpose of the deeper dredging in the Delaware River was to reduce lightering operations and that dredging in Cedar Creek was necessary to obtain cooling water for safe operation of the facility. Mr. Greenfield explained that the refinery had completed sediment sampling at the request of the WSLS and that this data indicated that the sediment quality would not be affected by the dredging. Mr. Greenfield also stressed that Cedar Creek was currently in critical need of dredging, that the water level may soon below the minimum level necessary to safely maintain cooling operations at the refinery.

In response to public notice comments about impingement and entrainment of aquatic species associated with the cooling water system and dredging, Mr. Greenfield stated that Premcor's position is that impingement and entrainment is governed under Section 316 b of the Clean Water Act and the DNREC National Pollutant Discharge Elimination System (NPDES) program. Premcor does not acknowledge Subaqueous Lands Act authority to review impacts associated with the dredging. However, Mr. Greenfield also spoke of Premcor's long-term commitment to reduce cooling water intake at the refinery. He made the following commitments on behalf of the refinery:

- The refinery would reduce use of cooling water by 33 percent compared to current permitted levels;
- The refinery would optimize existing cooling towers; and
- The refinery would eventually convert the system to a 100% recirculating or closed loop cooling system.

PUBLIC COMMENTS

Several citizens commented on the application at the public hearing. The public comments largely addressed environmental and aquatic impacts due to the dredging activity, and included the following concerns:

- The continued disturbance of the creek and river bed and the aquatic life therein by the dredging;
- The impingement and entrainment of aquatic organisms in the plant's cooling water system and the impact on fisheries,
- Reduced fish populations due to the dredging and impingement and entrainment,
- The impact of fish reduction on other industries, such as tourism and commercial and recreational fisheries,
- The negative impact from the cooling water system on the entire aquatic ecosystem, including all other parts of the food chain,
- The refinery's long use of antiquated fish screens that been known to be of poor design for decades and the refinery's refusal to update the system.

Mr. William Moyer, one of the public commenters, also stated that he believed that the application was insufficient and the project was wrongly noticed by the WSLS. Mr. Moyer specifically expressed the following:

- The application was incorrectly noticed by the WSLS, because it did not contain notice of the Water Quality Certification.
- The application was incomplete and not in proper form at the time of the public notice.
- The application does not comply with various State regulations.
- The refinery de-waters the confined disposal facilities after dredging is complete and does not have a permit authorizing the action.

Ms. Noble also stated that she was concerned because the public did not have enough time to review the sediment sampling analysis prior to the hearing.

The hearing office, Robert Haynes, Esquire, closed the public hearing and the record at the end of the proceedings.

INTERIM SECRETARY'S ORDER

Secretary's Order - 2008-W-0052

On September 29, 2008, the Secretary of the Department, John Hughes, issued an Interim Secretary's Order that authorized two dredging events in Cedar Creek. He issued this Order due to the Applicant's concern that low water conditions in Cedar Creek may pose a risk that the facility may not receive enough water to operate safely and in compliance with the law, the Department's regulations and permits.

In the Interim Secretary's Order, the Secretary reopened the public comment period for a period of 90 days. The Department's presiding hearing officer had closed the record at the end of the hearing due to the applicant's request for expedited consideration so that the refinery could operate safely. With the re-opening of the record, the Secretary afforded the public additional time to review and make comment on the project.

The Interim Order also required Premcor to submit a mitigation plan within 45 days to offset the loss to the public of substantial resources of aquatic life caused by the dredging.

RESPONSE TO HEARING COMMENTS

The WSLS addresses the concerns about the application process in the following paragraphs. The comments expressed about environmental and aquatic issues will be discussed in the following section, Subaqueous Lands Regulatory Review.

COMMENTS ABOUT APPLICATION

Inaccurate Notice

The WSLS placed the DCR dredging application on public notice on June 4, 2008, and the public was given a 20 day public notice period to comment upon the project. The project was inadvertently placed under the heading of "Subaqueous Lands Permit Applications," instead of a heading that read "Subaqueous Lands and Water Quality Certification Applications." While the majority of the project – including all the dredging work - is subject to subaqueous lands review only, a small portion of the project - the discharge of dredged material in the effluent from the confined disposal facility - is only subject to water quality review. The WSLS regrets that this error was made. However, the WSLS notes that the notice provided the public with sufficient notice of the project and a thorough description of the project. As proof of the effectiveness of the notice, the WSLS received comments from the public during the public notice period. Subsequently the WSLS held a public hearing for the Subaqueous Lands and the Water Quality Certification permit application.

Completeness of Application

1. Subaqueous Lands Permit Application

   Mr. Moyer stated that he believes the application was incomplete and prematurely noticed. The WSLS disagrees with Mr. Moyer's assessment and believes that the application was in "proper form" as required by Section 7207 of the Subaqueous Lands Act. The Act requires that the applicant submit a request "using the appropriate forms…showing the location of the area and containing specifications for any proposed construction." It also states that the "Secretary may require additional

information as will enable him or her to consider the application properly." Likewise the Regulations Governing the Use of Subaqueous Lands require the applicant to submit a "written request, using the appropriate forms." While the original application was submitted in January 2008, it was not until May 2008, when accurate plans were submitted by DCR that the application was considered in "proper form." The public notice was placed in the newspaper after this submittal.

2. Water Quality Certification

The application for Water Quality Certification is submitted on a joint form with the Subaqueous Lands permit application. Premcor was required to submit this application for the portions of the work subject to Certification in accordance Section 5 of the Regulations Governing the Control of Water Pollution. Section 5.1 of these regulations requires an extensive review of feasible alternatives, minimization and compensation. Because only the discharge from the confined disposal facility is regulated by these regulations, the response concerning minimization was limited to addressing this effluent. Premcor's response was that there was sufficient space in the disposal facilities such that the effluent would be discharged only when it met required permit limits. Because of the limited scope of the Certification, the WSLS considered the response adequate.

Sediment Sampling Plan

The WSLS did not require that the results of the sediment sampling be submitted prior to the public notice. This decision was made due to the time sensitive nature of the application for safe operation of the facility, the necessary time allowance for the sampling and analytical review of the samples, and the desire to ensure sufficient time for comprehensive public input. The analytical results were not available for review until August 2008. Ms. Noble, a commenter at the hearing, felt that the community should have more time to review the results of the sediment sampling. The WSLS accepts the validity of her comment and was pleased that the Secretary's Order addressed this issue and re-opened the public comment period for 90 days after the Interim Order. This provided additional time for review of the analytical results.

Compliance with State Regulations

Mr. Moyer identified the refinery's handling of dead and dying fish at the intake screens as a potential solid waste issue. The WSLS addressed this concern to DNREC's Division of Air and Waste Management.

Mr. Moyer identified the refinery's practice of de-watering the site after completion of dredging as a regulatory issue because the water and possibly sediment and contaminants are discharged to waters. The WSLS understands that this de-watering is a routine operating practice at confined disposal facilities. It is used to consolidate sediments and to create new berms within the confined disposal facility. However, the WSLS concurs

that analytical sampling for total suspended solids should occur during de-watering to ensure protection of water quality. The WSLS will include this as a permit condition in the future permits.

Mr. Moyer indicated that the application does not comply with The Delaware Statewide Dredging Policy Framework, a document which provides guidance for dredging projects. The WSLS worked to ensure that the dredging is in accordance with this document. The sediment sampling undertaken by the refinery and the evaluation completed by Richard Greene of the Department addressed the Environmental Evaluation section of the Policy.

REGULATORY REVIEW

The State of Delaware has jurisdiction over the dredging and effluent discharge of the project in accordance with 7 Del. C., Chapter 72, the Subaqueous Lands Act , and the "Regulations Governing the Use of Subaqueous Lands." Section 3 of the Regulations provides criteria for the Department's evaluation of the project based on the project's impact on the environment and on the public's use of the resource. The WSLS is also required to evaluate the impact of the effluent discharge on water quality in accordance with Section 401 of the Clean Water Act and Section 5 of Delaware's Regulations Governing the Control of Water Pollution. The WSLS has combined these reviews in the following paragraphs.

ENVIRONMENTAL IMPACT REVIEW

Section 3.01.B of the Regulations requires that the WSLS complete a comprehensive evaluation of the environmental impacts on subaqueous lands caused by the dredging and discharge of effluent. For this project, the WSLS's review centered on the project's impact on water quality (Section 3.01.B.1.a), harm to aquatic organisms (Section 3.01.B.1.c), loss of habitat (Section 3.01.B.1.d), cumulative and secondary effects to the aquatic ecosystem (Section 3.01.B.3.a and b), and effects on recreational activities (Section 3.01.B.1.b). This Section of the Regulation also authorizes the WSLS to require mitigating measures to offset significant impacts or potential harm to the environment. (Section 3.01.B.4)

Water Quality

Based on an assessment of the sediment analysis, it does not appear that the dredging will have significant water quality impacts on the Delaware River and the work will be in compliance with both State and federal regulations concerning water quality.

Richard Greene, an Engineer V with the DNREC Watershed Assessment group and a toxic sediment specialist, reviewed the analytical data from the sediment sampling. He determined that while toxic chemicals were a component of the sediments, there was little to no risk that they would:

1) become bioavailable in the water column;
2) cause toxicity in the water column; or

3) exceed state standards for human health or the environment.

He also stated that removal of the contaminants would improve water quality conditions in the Delaware River. His review also determined that the bottom sediment samples were not significantly different from the top sediment samples and the quality of the exposed sediment would be essentially the same before and after the dredging

The refinery's proposed method of dredging - hydraulic dredging - is generally considered a cleaner method of dredging than mechanical dredging. This is because the dredge sucks the sediments into the cutterhead and through a pipeline to the disposal site. This reduces suspended sediments in the water column during dredging.

In order to ensure that sediments are not discharged at a high concentration in the effluent from the confined disposal facility, the WSLS regularly places a restriction on the suspended solids that can be disposed in the effluent. The refinery is required to collect a composite effluent sample daily and analyze it for total suspended solids to ensure that the limits are not exceeded. This requirement has been in place for several years and has worked effectively. While there have been occasional excess discharges, the refinery has quickly responded and corrected the problem. Because of the concerns of effluent discharge during subsequent de-watering of the disposal facility, the WSLS will also require that discharge of the sediments be measured and controlled during routine maintenance that causes discharge from the confined disposal facility.

Harm to Aquatic Organisms and Loss of Natural Aquatic Habitat

1. Physical Disturbance of Dredging

   The continued dredging, twice annually in Cedar Creek and every three years in the navigation channel and berthing area of the Delaware River, disturbs the sediments by the physical act of removing them and exposing new bottom sediments, and eliminates the existing population of bottom-dwelling (benthic) species. The dredging of the navigation channel and the berthing area impacts approximately 100 acres of public underwater lands during each dredging operation. The dredging in Cedar Creek impacts approximately an additional 15 acres of underwater lands. The benthic organisms found in these underwater lands are a part of the aquatic food chain and are used by other species as a food resource. The continued degradation of the river bottom depletes the benthic community, prevents maturation of the community, and reduces food supply in the aquatic food chain.

2. Potential Contaminant Exposure

   The required sediment sampling in the vicinity of the proposed dredging was designed to determine whether aquatic organisms would be exposed to higher contaminant levels after the dredging. To evaluate this, each of the ten sediment cores were split into two samples – one composed of material that would be removed by dredging and one of materials that would remain after dredging. Of particular interest was the navigation channel and berthing area, which are proposed to be dredged to deeper depths than previous dredging and would expose previously long buried materials in this industrial area. Based on the information collected from the sediment sampling data, the newly exposed sediments in the Delaware River and Cedar Creek will not be more highly contaminated than the existing sediments.

3. Impingement and Entrainment

   Cedar Creek, an approximately mile long channel tributary to the Delaware River, has been deepened and channelized to provide cooling water for the refinery. The refinery is currently authorized to draw up to an average of 452 million gallons of water daily from Cedar Creek.

   The Delaware River and its tributary, Cedar Creek, are habitat for a vast interconnected ecosystem of aquatic insects, plankton, microbes, bivalves, eggs, larvae and fish. Many of these organisms are sucked into the cooling water system to be carried (entrainment) through a lengthy pipe system that cools the refinery equipment before it is discharged into the Delaware River. Other larger species are caught (impinged) on screens that prevent their entry into the cooling water system. These screens are rotated at lengthy intervals and the impinged fish are sent down a concrete sluice where they are either eaten by birds or mammals or discharged back into the water being drawn into the plant. It is generally considered that there is a 100% mortality rate for species impinged or entrained in the refinery's cooling water system.

   A study titled "Impingement and Entrainment at the Cooling Water Intake Structure of the Delaware City Refinery, April 1998 – March 2000,"completed by Normandeau Associates, Inc, and dated August 2000, found that 118,485 fish, including 53 species were killed during 77 sampling days. Many millions of organisms were entrained during a sampling period from April through October in 1998 and 1999. Because these samples only represent a fraction of the aquatic losses in the cooling water system, actual mortality far exceeds these numbers. It should be noted that not all organisms would have survived to maturity, but this represents a loss of millions of individual organisms, affecting scores of species, and a loss of a portion of the aquatic food chain.

The refinery has argued that this loss of organisms due to impingement and entrainment is not subject to Subaqueous Lands Act review because it is not a direct impact of the dredging. However, Sections 3.01.B.3.a and b of the Regulation state that the Department shall consider whether the action causes cumulative or secondary effects on the aquatic ecosystem. The intake of the cooling water and the impingement and entrainment of aquatic organisms is a secondary impact of the dredging of the cooling water channel. These are also cumulative impacts because the refinery has been operating the site with an antiquated intake system for decades and plans to continue the dredging for at least five years, the duration of the proposed dredging.

Harm to Recreational Fisheries

The direct loss of aquatic habitat and the loss of organisms to impingement and entrainment in 452 million gallons of water daily directly destroy large numbers of fish, shellfish and other organisms. These activities deplete the food chain and reduce the numbers of finfish and shellfish available for recreational fishing and shellfishing.

PUBLIC USE IMPACT REVIEW

Section 3.01 A of the Regulations requires that the WSLS consider how the public interest will be affected by the applicant's proposed use of subaqueous lands.

The Delaware River is a public subaqueous land, held in trust by the State, for Delaware's citizens. The State has, over the decades, authorized the owners of the DCR to dredge in the Delaware River. This project requests similar authorization, but seeks to dredge to deeper depths. The value to the State and public in authorizing this work is the continued commerce at the facility and its value to the State's economy, as well as the refinery's energy production and importance to the national energy market. (Section 3.01.A.1 and 2).

Section 3.01.A.3 requires the WSLS to consider "the potential effect on the public with respect to commerce, navigation, recreation, aesthetic enjoyment, natural resources and other uses of the subaqueous lands." The DCR is located in an industrial portion of the Delaware River and the dredging will have little additional impact on the public's navigation or general aesthetic enjoyment of the river. However, natural resource impacts, which negatively affect the public's ability to recreate, as well as the natural resources and commerce associated with fishing and ecotourism, will result from the project. As detailed in the previous Section, the project has significant adverse impacts on aquatic organisms and natural resources. The impacts on the natural resources of the Delaware River affect commerce associated with commercial and recreational fishing, and ecotourism.

Section 3.01.A.4 seeks to evaluate the "disruption of the public use" of the waterways. The direct disruption of public use of the Delaware River by boaters due to the dredging is likely minimal; however, recreational and commercial activities, such as fishing and crabbing are likely diminished due to impacts associated with the dredging.

Section 3.01.A.8 requires an evaluation of "the extent to which the public at large would benefit from the activity and the extent to which it would suffer detriment." The public benefits from the commerce and the energy production at the facility and in this way, the public benefits from the dredging. On the other hand, the public suffers detriment due to the loss of fisheries and aquatic organisms and the associated commercial and recreational losses.

The project is water dependent in that cooling water is required for operation of the facility and dredging is required for navigation at the facility. However, actions taken by the refinery could eliminate the need for dredging in Cedar Creek. (Section 3.01.A.9)

Sections 3.01.A.5, 6 and 7 require an evaluation of whether the applicant's purpose can be achieved without the use of subaqueous lands, the extent to which the disruption can be minimized to reduce adverse impacts, and the extent to which the applicant can offset losses to the public by employing mitigation measures. In order to gain access to the facility, the refinery is currently dependent on dredging in the Delaware River. However, there are alternatives that will minimize the dredging of Cedar creek. Premcor has taken steps to minimize impacts from the cooling water intake structure. The refinery has committed to reducing the use of cooling water by 33 percent compared to current permitted levels. The refinery has also stated they would optimize use of the existing cooling towers, and that they will eventually convert the system to a 100% recirculating or closed loop cooling system.

The WSLS applauds DCR's pledges and looks forward to attainment of their goal. However, until that time there are ongoing natural resource impacts in both the Delaware River and Cedar Creek that affect the public, and the WSLS finds that compensation for these impacts is justified and supported by the Act and Regulations.

REQUIRED MITIGATION PLAN

In furtherance of Sections 3.01.A.7 and 3.01.B.4 of the Regulations, the Secretary's Order required that Premcor submit a mitigation plan within 45 days of the issuance of the Order to offset public use and environmental impacts. Premcor's response letter offered compliance with standard permit conditions, but provided no mitigation plan to offset aquatic resource impacts. To date, Premcor has not submitted a mitigation plan for the environmental and public use impacts associated with the dredging as required by the Secretary's Order.

SUMMARY

The WSLS finds that, while the refinery provides needed commerce and energy for the region, its on-going dredging operation has significant adverse impacts on the environment of the Delaware River and Cedar Creek, as well as the public's use of these underwater lands. However, the Regulations contemplate the possibility of avoidance, minimization and compensation for impacts that could allow the issuance of a permit to conduct the proposed activities.

The dredging directly impacts the habitat and benthic organisms in approximately 100 acres of public lands of the Delaware River every three years and approximately 15 acres of Cedar Creek twice annually by the physical removal of the habitat and the organisms. The dredging also causes secondary impacts on the aquatic ecosystem by facilitating the impingement and entrainment of organisms in the cooling water system. The impingement and entrainment impacts are both secondary and cumulative effects because the facility has been drawing cooling water from the Delaware River for decades without upgrading the system. The impacts from dredging affect aquatic species, benthic organisms, their natural habitat, and the public's commercial and recreation use of these resources.

The impacts of dredging Cedar Creek could be avoided or at least greatly minimized by installation of a cooling tower, or other recirculating system. The refinery has made commitments to move forward to improve the cooling water system. However, until such time that these measures have been fully implemented the WSLS finds that compensation is an appropriate remedy under the Regulations to offset harms caused by the dredging.

Likewise, the dredging for access to the refinery's piers causes a direct loss of aquatic habitat and benthic organisms. In addition, the dredging frequency is such that it prevents maturation of the benthic community and results in a permanent, ongoing impact. Until such time that dredging for the access and berthing are no longer necessary, the WSLS finds that compensation for impacts to the aquatic organisms is an appropriate remedy under the Regulations.

The WSLS finds that the WSLS's authority to require mitigation is contained both in State law and regulation. Section 7205a of the Subaqueous Lands Act states that a permit, "if granted, may include reasonable conditions required in the judgment of the Department to protect the interests of the public." "If it is determined that granting the permit...will result in loss to the public of a substantial resource, the permittee may be required to take measures which will offset or mitigate the loss." Section 3 of the Regulations Governing the Use of Subaqueous Lands requires the WSLS to evaluate whether avoidance, mitigation or compensation could be used to offset the impact to the public and significant harm to the environment. Mitigation "may be included as conditions of the permit."

DREDGING FEE

In accordance with 68 Delaware Laws, Volume 1, Chapter 86, the new dredging in public subaqueous lands is subject to a fee of $1.50 per cubic yard. The areas of new dredging are those areas proposed for dredging in the navigation channel and berthing area in the Delaware River that are below the current authorized dredge depths.

The refinery has requested authorization to increase the dredge depth in the Delaware River from 32 feet to 37 feet below mean low water (MLW) for the navigation channel and from 37 feet to 42 feet below MLW for the berthing area. The refinery has estimated that the volume of material that will be dredged beyond the previously authorized depths is between 680,000 and 1,000,000 cubic yards.

The WSLS supports either of the following alternative approaches for determining the volumes and the fee:

1. A pre-dredge bathymetric survey could be used to calculate the volume of dredge materials that currently exist above the proposed new dredge depth plus the 2 foot overdredge; or

2. Pre- and post-dredging surveys could be used to calculate the actual volume of material dredged between the existing authorized dredge depth and the new dredge depth. If this method is accepted, the WSLS recommends that this fee be calculated over several dredging operations in a manner which ensures that Premcor does not pay extra fees, but also ensures that all fees rightfully owed to the State are paid.

These surveys would not represent significant additional costs to the refinery because they currently employ an independent entity to determine pre- and post dredge depths in order to calculate fees owed to the dredging company.

CONCLUSION

The Wetlands and Subaqueous Lands Section has reviewed the Delaware City Refinery dredging application for a Subaqueous Lands Permit and Water Quality Certification. The dredging application is for a five-year period and requests authorization to dredge 3,655,000 cubic yards of material during that period in order to gain access to piers and to provide sufficient cooling water to cool the refinery.

The Delaware City Refinery provides community and regional benefits by its energy production and commerce, and the WSLS concurs that Premcor's request to authorize deeper dredging in the Delaware River to minimize lightering operations can have certain benefits. However, the refinery's dredging practices and associated cooling water system have had and continue to have a long term negative impact on the aquatic resources in Cedar Creek and Delaware River. These impacts include the direct impact of dredging

on the benthic organisms and secondary impact of the dredging that allows for the impingement and entrainment of millions of aquatic organisms in the refinery's antiquated cooling water intake system.

Premcor, which has recently acquired the refinery, has committed to updating the cooling water system. They have committed to reduce the volume of cooling water from the currently authorized 452 million gallons per day, optimize use of existing cooling towers on site and augment existing towers with additional towers. The WSLS applauds the refinery's commitment to updating the cooling water system and recommends that they act quickly on these commitments. Until the refinery's cooling water system is updated, the refinery continues to incur substantial negative impacts on the aquatic ecosystem due to the secondary and cumulative effects of the cooling water system.

The WSLS finds that Premcor's Subaqueous Lands Permit/Water Quality Certification application for dredging in Cedar Creek and the Delaware River can comply with the Regulations provided that the permit is conditioned to offset impacts as follows:

1. The Permit/Certification should require Premcor to submit annual reports on the status of the cooling water system upgrades and the refinery's alternatives to dredging in Cedar Creek. Future dredging authorizations should be tied to continued progress on updating the cooling water system.

2. The lawful fee should be assessed for each cubic yard of newly dredged material which is removed. In order to determine the actual volume of new dredge material, the Permit/Certification should specify how the volume of new dredging will be determined utilizing one of the two methodologies described above.

   The Permit/Certification should require that $500,000 be paid at the time of the issuance of the Permit/Certification and the additional fee be paid immediately after dredging in the Delaware River has occurred.

3. Significant mitigation to offset the direct, secondary and cumulative adverse effects of the dredging should be required as a Permit/Certification condition. The WSLS finds that the mitigation should be significant due to the sizable impact of the dredging operation and on-going due to the continuous impacts caused by the dredging. Mitigation should address both impingement and entrainment and direct impacts to benthic organisms.

   To offset the effects of the dredging, the applicant should seek to find ways to improve aquatic habitat and eliminate impingement and entrainment. An example of appropriate mitigation for the aquatic impacts is the restoration of degraded tidal marshes or the creation of new tidal marsh adjacent to the Delaware River or the tidal portion of its tributaries, and long-term maintenance of the restoration site(s). Such work should provide good tidal hydrology, correct marsh and bed elevations to support aquatic plants and animals, clean sediment, control of invasive species,

planting of desirable native species if necessary and long-term monitoring and maintenance. It should be sustainable and provide long-term, high quality habitat. An appropriate scope of mitigation would consider both the magnitude of the impact and the refinery's work to reduce impingement and entrainment.

The WSLS supports and applauds the goal of a closed-loop cooling tower that would significantly reduce reliance on cooling water, thereby significantly reducing, or even eliminating, the impingement and entrainment of aquatic organisms. However, given the anticipated length of time necessary to achieve that goal, mitigation for ongoing impingement/entrainment impacts during this interim period should be a part of any subaqueous lands authorization necessary for continued operation of the refinery. Appropriate mitigation for impingement and entrainment is potentially represented by the restoration work described above (which would provide additional and/or enhanced feeding and nursery areas for aquatic organisms), or could possibly include physical changes to the intake screens or structures that would substantially reduce the impingement and entrainment of aquatic organisms.

These WSLS provides these compensation plans as examples of mitigation that would be acceptable for compensation for impacts. The refinery may suggest an alternative viable, comprehensive and well-conceived mitigation package that reduces impingement and entrainment and mitigates for habitat impacts. No dredging should be authorized to begin until an acceptable mitigation plan is approved by the Department.

4. The Permit/Certification regularly contains a permit condition that limits the amount of total suspended solids that can be discharged in the effluent. Such a condition should be placed in the Permit/Certification for any time Premcor is de-watering the confined disposal facility.

MEMORANDUM

TO: Robert Haynes, Esquire, Hearing Officer

FROM: Sarah Cooksey, Administrator, Delaware Coastal Management Program

SUBJECT: Delaware City Refinery Permit Application – Request for Technical Assistance

DATE: September 3, 2009

This is the Delaware Coastal Management Program (DCMP) response to your request for technical assistance for the Delaware City Refinery Dredging Permit Application. The DCMP fully supports the conclusions and recommendations outlined in the Wetlands and Subaqueous Lands Section (WSLS) Findings Memorandum dated July 29, 2009 as well as their Technical Response Memorandum dated August 26, 2009.

The Subaqueous Lands Permit/Water Quality Certification (permit) must include the permit conditions as proposed by the WSLS in their Findings memo. Specifically, this project requires a significant mitigation plan to address the direct, secondary, and cumulative impacts to fish and wildlife due to the continuous dredging and the impingement and entrainment of fish and aquatic invertebrates. The DCMP supports the recommended mitigation plans, either individually or in combination, as described in the WSLS Technical Response memo to partially offset these adverse impacts. To that end, the DCMP would like to offer particular examples of projects to be considered as suitable mitigation.

- Involvement in and/or contribution to the Delaware Estuary Living Shoreline Initiative developed by the Partnership for the Delaware Estuary. This initiative addresses the eroding shorelines of tidal marshes along the Northern Delaware River and would create and restore tidal marsh habitat.
- Involvement in and/or contribution to tidal marsh restoration at Thousand Acre Marsh.

The DCMP further agrees that the mitigation plan must be submitted and approved before any dredging is authorized.

Please be advised that the DCMP is reviewing this project for consistency with its coastal management policies. The review period is currently on hold pending the Secretary's Order and is set to expire on November 20, 2009. It is the intent of the DCMP to condition its federal consistency determination to reflect the directives in the Secretary's Order. However, without the inclusion of the permit conditions proposed by the WSLS, the project will not be consistent with the policies of the DCMP that address Fish and Wildlife (5.C.3), Coastal Waters Management (5.A.3), and Subaqueous Lands and Coastal Strip Management (5.A.4).