ADDENDUM

Five-Year Review Report

for

Brookhaven National Laboratory Superfund Site

Town of Brookhaven, Hamlet of Upton
Suffolk County, New York

February 14, 2017

PREPARED FOR:
The United States Department of Energy
Office of Science

PREPARED BY:
Environmental Protection Division
Brookhaven National Laboratory
Upton, New York 11973

This addendum has been prepared to address regulatory comments on the Five-Year Review Report for Brookhaven National Laboratory Superfund Site, Town of Brookhaven, Hamlet of Upton, Suffolk County, New York dated June 21, 2016.

On August 9, 2016, the United Sates Environmental Protection Agency (USEPA) provided concurrence with the protectiveness determinations made in the June 21, 2016 Report (see attached letter from W. Mugdan to F. Crescenzo). It was agreed that any comments from the regulators on this Report would be responded to and any issues clarified and documented separately. Since none of the comments altered the protectiveness determinations, USEPA accepted the June 21, 2016 Report as written. Comment letters were received from the following regulatory organizations:

- New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH), letter from B. Jankauskas to F. Crescenzo, dated August 9, 2016.
- United Sates Environmental Protection Agency (USEPA), letter from D. Pocze to F. Crescenzo, dated August 25, 2016.
- Suffolk County Department of Health Services (SCDHS), letter from A. Rapiejko to F. Crescenzo, dated September 28, 2016.

The responses to regulatory comments were reviewed by the regulators and found acceptable as documented via the following letters from the regulators:

- United Sates Environmental Protection Agency (USEPA), letter from J. Mollin to F. Crescenzo, dated January 12, 2017.
- New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH), letter from B. Jankauskas to F. Crescenzo, dated January 17, 2017.
- Suffolk County Department of Health Services (SCDHS), letter from A. Rapiejko to F. Crescenzo, dated February 6, 2017.

The responses are included in this Addendum, as well as copies of the letters identified above.

Comment Number	Section/ Page	Comment	Response
NYSDEC Letter from B. Jankauskas to F. Crescenzo (BHSO), dated August 9, 2016.			
The New York State Department of Environmental Conservation and the New York State Department of Health (Departments) have reviewed the Five-Year Review Report, dated June 21, 2016. The Departments provide the enclosed comments on the document.			
1	Section 3.4, fifth bullet	Suggest including mercury within the sediment contamination.	Agreed. The wording will be revised in future reports to say, "Mercury and PCB-contaminated sediment in the Peconic River".
2	Section 4.3, first sentence	Verify the number of extraction wells indicated (70) as the next two sentences total 43 extraction wells.	The total number of extraction wells is correct at 70. The number of wells operating full-time is 27. The wording will be revised in future reports to also include the number of extraction wells that are in full-time operation.
3	Section 6.4.5, second paragraph	Suggest removing "There is no specific action level for mercury in sediment in the ROD."	Although this statement is correct, it will be removed from future reports.
4	Section 6.4.5. Area PR-WC-06-D1-L50	Suggest modifying the table by either removing the 2015 row or changing the 0.77 mg/kg result to 23 mg/kg as this was detected within this area.	This table represents the results of the sediment sample obtained annually at this location which was 0.77 mg/kg in 2015. The table will be revised in future reports to also add the maximum mercury concentration of 23 mg/kg detected during the additional 2014/2015 sampling at this area.
5	Section 6.4.5, Peconic River Water Column, first and second paragraphs	These sections indicate results were below 70 ng/L and 7 ng/L. Suggest comparing to the surface water criteria.	Sediment is the only matrix in the ROD where a specific cleanup goal is provided. Since 2006, the

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			mercury surface water data has been compared to pre-cleanup concentrations, as well as trends over the last 10 years. There are several State ambient water quality standards for mercury. The standard for the dissolved form of mercury for the protection of aquatic life (chronic) is 770 ng/L. This will be referenced in the next Five Year Review.
6	Section 7.3, OU III Remedial Action Performance, sixth bullet	Suggest removing "NYSDOH-certified" from "NYSDOH-certified bottled water".	The reference to NYSDOH-certified bottled water comes directly from SCDHS 2014 correspondence to the property owner. NYSDOH provides the certification under Sanitary Code Chapter 1 Subpart 5-6. No change will be made to future reports.
7	Section 7.5, OU V Opportunities for Monitoring Optimization	Suggest indicating that future monitoring activities of the Peconic River shall be determined following the removal action.	As discussed in the Report, BNL/DOE are committed to performing supplemental remediation of Area WC-06, followed by confirmatory post-excavation sampling to ensure that the cleanup goals are met. The need to continue monitoring this area will be determined following the cleanup. However, BNL/DOE believe sufficient justification exists now to

Comment Number	Section/ Page	Comment	Response
			discontinue monitoring of the remainder of the river.

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USEPA Letter from D. Pocze to F. Crescenzo (BHSO), dated August 25, 2016.			
Per our letter to you dated August 9, 2016, while the U.S. Environmental Protection Agency (EPA) concurred with the protectiveness determination made by the Department of Energy (DOE) in the (CERCLA) Five-Year Review Report, there are several matters in regard to the report that need to be clarified. Clarification by written response is requested. Additionally, such clarification should be incorporated into future reports. As a reminder, these matters do not alter EPA's protectiveness determination and EPA accepts the June, 2016 Report as submitted. Enclosed are our comments on the Five-Year Review Report.			
General Comments:			
1	NA	Was 1,4-dioxane evaluated as a possible COC at any of the sites?	1,4-dioxane was not a contaminant of concern during the remedial investigations conducted in the 1990's.
2	NA	In general, the responses to Question B indicates that "there have been no changes in exposure assumptions" since the original ROD was completed. This statement is inconsistent with the updates to the 2014 Standard Exposure Assumptions issued in 2014 by EPA. The Standard Exposure Assumptions, OSWER Directive 9200.1-120 was issued on February 6, 2014 and are available at: https://rais.ornl.gov/documents/OSWER-Directive-9200-1-120-Exposure-Factors_corrected.pdf. It is recommended that the text recognize this update and also indicate that the changes in the exposure assumptions in the Standard Defaults do not change the overall cleanup levels.	Agreed. Future Five Year Review Reports will reference the 2014 Update to the Standard Exposure Assumptions. The changes in the assumptions in the standard defaults, such as the amount of water consumption per day and the weight of the individual, do not change the overall BNL cleanup goals. Future risk calculations, if performed, will use the updated exposure assumption parameters.
3	NA	There have been updates to the toxicity value for tetrachloroethylene in 2012 which is within the five year review period. It is suggested that the text recognize this for	Future Five Year Reviews will reference the change to PCE toxicity values and indicate that it

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		those areas impacted by PCE and indicate that this does not change the overall conclusions of the remedy and cleanup goals. The text does not indicate the planned updates to several chemicals on the IRIS Agenda including PCBs. It is suggested that the text include a statement that chemicals identified in the IRIS agenda that were found at the site will be evaluated in the next 5 year review if there are new toxicity values.	does not change the remedies or cleanup goals. Changes to toxicity values anticipated in the next five years for PCBs and other chemicals will be evaluated in the next Five Year Review to determine if any changes in the remedy or cleanup goals should be made.
Specific Comments:			
1	Executive Summary	It states that "The potable drinking water supply wells are "currently" not impacted .... " Please indicate where these potable supply wells are located in relation to the plumes on Figure 4-2.	Section 3.6 (Basis for Taking Action) states that the potable drinking water supply wells on and off of the BNL site are currently not impacted, nor are they expected to be impacted from the contamination. The five active potable wells on BNL property are located to the north and west of the plumes. They are identified on Figure 4-2. The public supply wells off of BNL property are located to the west, east, and south of the BNL plumes. Figure 4-2 will be updated in future Five Year Review Reports to identify these wells.
2	3.6 Basis for Taking Action, OU-III Soils, Page 13	Indicates that PCBs and mercury were remediated to TAGMS. However, the text for each OU indicate that have been no updates to the cleanup levels and TBCs. It is recommended that the Part 360 values should be identified	Noted. The cleanup goals are based on the TAGMS. Any changes to the TAGMS did not change the conclusion regarding the

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		with a statement that TAGMs were updated to the Part 360 values but that these changes do not change the conclusion regarding the protectiveness of the remedy.	protectiveness of the remedy.
3	4.1 Remedy Selection, OU I Remedy Components, fourth bullet, page I5	Soil and sediment clean-up numbers should be provided.	The cleanup goals for soil/sediment in the Meadow Marsh were obtained from NYS TAGM 4046 and site background values. The cleanup values for the primary contaminants of concern were mercury 1.84 mg/kg, lead 15.8 mg/kg, thallium 0.35 mg/kg, zinc 22.4 mg/kg, and copper 25 mg/kg. These will be added to future Reports.
4	4.1 Remedy Selection, OU IV ROD, signed March 1996, page 17	Note that ecological exposure is generally not considered to subsurface soil (below the top 1') and groundwater unless the groundwater discharges to surface water.	Noted. These objectives are from the OU IV ROD. Future Five Year Review Reports will remove reference to environmental/ ecological exposure from the subsurface soil and groundwater.
5	Table 5-1: Follow-up Actions to the 2011 Five - Year Review Recommendations, Peconic River Monitoring Program, page 32	Note change in Peconic River habitat, where fish tissue and surface water sampling is no longer an option as biota and standing water are no longer present.	Future Reports will note that due to the change in discharge of the Sewage Treatment Plant effluent from surface water to groundwater in 2014, the areas of standing water in the river have been significantly diminished. Consequently, surface water and fish sampling is impracticable.

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6	OU I System Operations/ O&M, page 54	Indicate the mowing schedule and note whether the area is used by ground nesting birds; ideally grass should only be mowed periodically to encourage use by ground nesting and migratory birds.	The Landfill O&M Manuals require that the grass be cut at least twice per year. The landfills are used by migratory birds but not ground nesting birds.
7	OU I Changes in Standards and Items To Be Considered (TBCs), page 56	The discussion of OU-I should clarify that the planned updates to the groundwater standards will be addressed in the next Five Year review.	Planned updates to the groundwater standards for BNL contaminants of concern will be identified and addressed in the next Five Year Review.
8	OU I Changes In Exposure Pathways, Toxicity and Other Contaminant Characteristics, and Risk Assessment Methods, page 56	The discussion of vapor intrusion for OU-III indicates that a clean layer of groundwater exists over the plume that will interrupt potential vapors. It is recommended that the current Vapor Intrusion Guidance should be cited as the basis for this decision. Also, this OU indicates that chromium VI has been transformed to chromium III. It is suggested that the basis for this decision be identified e.g., sampling results if appropriate. Further, the text indicates that sampling was conducted at one residence and that levels of iron were elevated. It would be helpful to clarify the actions taken since the statement only indicates a potential action without information regarding actions i.e., resident was notified and decided to take action or not.	The most recent guidance, OSWER Publication 9200.2-154, *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway From Subsurface Vapor Sources to Indoor Air*, dated June 2015, will be referenced in future Five Year Review Reports. The next Five Year Review Report will reference that the groundwater monitoring data from 2008 through 2015 in the OU III Building 96 plume indicate that hexavalent chromium has been transformed back to the trivalent form. The data are presented in the annual Groundwater Status Reports. In 2015, one homeowner was notified by Suffolk County

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			Department of Health Services (SCDHS) that their private drinking water well had elevated manganese and nitrates, and they should not use their existing water supply for consumptive purposes. Further information on the homeowner's follow-up action is not available to BNL.
9	OU I Expected Progress in Meeting Remedial Action Objectives, page 57	There is a statement regarding "continued monitoring of the surface waters and sediment," however no surface water and sediment data are provided in this report. Please clarify. Please provide monitoring data and note whether monitoring is to measure potential groundwater discharge into the wetland area.	Section 6.4.1, page 39, presents a summary of the sediment and surface water sampling results over the last few years at the Wooded Wetlands adjacent to the Current Landfill. The monitoring is to evaluate potential impacts to the Tiger Salamander from the surface water and sediment. Section 7.1, page 57, will be updated in the next Five Year Review to reflect the Wooded Wetland sampling.
10	OU V Remedial Action Performance, page 67	Add a statement in the last bullet regarding how the STP effluent is now recharging directly to groundwater and this has contributed to the on-site portion of the Peconic River drying up. The absence of water means there is an absence of fish and thus the contaminant pathway to humans and ecological receptors is incomplete.	The next Five Year Review Report will include this discussion.
11	OU V Opportunities for Monitoring Optimization, page 69	Please note whether wetland monitoring continued for five years after the 2011 sediment cleanup and whether the plantings and control of invasive species met the	The next Five Year Review Report will reference that wetland monitoring and control from 2011

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		equivalency permits issued.	through 2012 met the State equivalency permit requirements, and invasive species monitoring and control from 2011 through 2014 met the federal duration requirements.
12	Table 7-1: Recommendations for Peconic River Optimization, page 69	In the "Comments" column for "fish" discuss why fish tissue collection is no longer required/conducted.	This table will be updated in the next Five Year Review to reference that there are no significant increasing or declining trends of mercury in fish over the last 10 years, and the increasing intermittent nature of the river following the discharge of the STP effluent to groundwater is not conducive to survival of fish.
13	OU V Opportunities for Monitoring Optimization, Fish Monitoring Optimization, page 70	Note whether the data referred to in the first bullet includes data collected under the environmental surveillance monitoring program.	This data does not include the results from the environmental surveillance monitoring program. The next Five Year Review Report will include this information.
14	OU V Opportunities for Monitoring Optimization, Fish Monitoring Optimization, page 71	Indicate that the habitat has changed with the elimination of STP discharge into the Peconic River and no longer supports a fish population (include recent site figures and information from inspection/monitoring activities which illustrate the lack of aquatic habitat). In the last bullet note specifically whether the fish targeted for monitoring under the OU 5 ROD are similar to those collected under the environmental surveillance monitoring program. Further, indicate whether tissue are analyzed for mercury.	The text in the next Five Year Review will further discuss the change in fish habitat as a result of the elimination of the STP discharge to the river. The fish targeted for collection under the environmental surveillance and monitoring

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			program and those previously collected under the CERCLA program are the same. Fillets/tissue of the fish are analyzed for mercury.
15	OU V Changes in Exposure Pathways, Toxicity and Other Contaminant Characteristics, and Risk Assessment Methods, page 71	The first bullet indicates there have been no changes in the physical conditions within the Peconic River which is incorrect as there was no standing water within the River during the June 2016 site visit. Therefore it is recommended that the exposure assumptions used in the original risk assessment be reevaluated to determine whether or not the risk assessment takes into account the current existing conditions and the potential risk associated with this terrestrial habitat.	The next Five Year Review will be updated to reflect the changes to the river water levels and reduced fish habitat as a result of the change in the Sewage Treatment Plant discharge to groundwater and the impact from the 2015/2016 drought. There was a terrestrial component to the original OU V ecological assessment due to the intermittent nature of this coastal plain stream.
16	Attachment 6 Operable Unit Cleanup Levels Matrix, OU IV	It is unclear why Remedial Action Objectives include "uptake of contaminants in soil by plants and animals" as the cleanup levels identified are only for groundwater.	The matrix in the next Five Year Review will state cleanup of the radiologically-contaminated soil in OU IV was performed under the OU I comprehensive soil cleanup.

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SCDHS Letter from A. Rapiejko to F. Crescenzo (BHSO), dated September 28, 2016.			
The Suffolk County Department of Health Services (SCDHS) has reviewed the above referenced document and is generally satisfied with the overall progress and effort put forth in the cleanup of the various Operable Units at the site. The SCDHS offers the following specific comments indicated below:			
1	Section 3.3 Land and Resource Use and Institutional Controls, Page 9, 6th paragraph	*"This brings the number of homes not connected to public water to six ...Annually, DOE formally offers those homeowners free testing of their private drinking water wells. "* In April of 201 l, the Agency for Toxic Substances and Disease Registry (ATSDR) finalized their Public Health Assessment for Brookhaven National Laboratory. A recommendation in this report addresses the homes referenced above that are still using private wells in the hook up area as follows, *"DOE should continue to sample the wells of the seven residents who declined the public water hookup to determine whether the contaminant plumes are affecting wells in the areas. If any of the seven wells are found to contain contaminants at levels above drinking water standards in* *the future, residents should immediately cease using the wells and DOE should provide alternative water sources to those individuals until the private well data are found to meet drinking water standards. "* The SCDHS supports ATSDR's recommendation and encourages connections to public water supplies when feasible. We recommend that the DOE implement this recommendation, to the extent practicable.	Per the Operable Unit III Record of Decision, DOE will continue to offer to sample the wells of those homeowners within the designated hookup area that are not connected to public water. The statement by ATSDR must be considered in context: As responsible stewards of taxpayer resources, DOE must justify its expenditures and ensure expenditures are made in accordance with the law. If contamination is found in a drinking water well and that contamination does not come from BNL, the DOE cannot technically justify spending taxpayer dollars to remedy the situation and would not attempt to do so.

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2	Section 5.0 Progress Since the Last Review, Page 27, 4th paragraph, 2nd bullet	The last sentence is missing the referenced section number.	Comment noted.
3	Cleanup Levels Used for Soils Contaminated with Radionuclides	The soil cleanup levels developed for radionuclides were established in the OU I ROD and assumed an institutional control period of 50 years, the time period after which BNL might reasonably be available for public use. When the OU I ROD was signed in 1999, in effect the parties agreed that a reasonable date in which BNL would no longer be a National Laboratory under federal control use was the year 2049 (1999 plus 50 years). Since 17 years have passed since the signing of the ROD, the assumed end of the institutional control period is now 33 years hence. Based on the above, the SCDHS believes it would be appropriate to use 2049 as the end date for current and new cleanup projects and that new radiological soil cleanup levels should be established that are now based upon the assumption of 33 years of institutional control. This will allow for new cleanup projects to be consistent with the OU I ROD assumption for the end of institutional controls at BNL in the year 2049.	The OU I ROD identified radionuclide soil cleanup levels to meet residential land use in 50 years for all areas except for the Former Hazardous Waste Management Facility, which is 100 years. The institutional control timeframe does not begin when the ROD is signed, but rather following the actual cleanup for a given area. All of the radiological soil cleanups under the OU I ROD or the HFBR ROD (which references the OU I cleanup goals) have been completed. In many cases, the cleanups have already exceeded the goals. For example, all of the HFBR soil cleanups, except for the Waste Loading Area, have already exceeded the goals at the time of cleanup. The recently completed Building 811 soil cleanup also met the 15 millirem per year dose (above background) at the time of cleanup. For future soil cleanups,

Comment Number	Section/ Page	Comment	Response
			the planned cleanup goals will be discussed with the regulators prior to the cleanup.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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290 BROADWAY
NEW YORK, NY 10007-1866

AUG - 9 2016

Mr. Frank Crescenzo
Site Manager
Department of Energy
Brookhaven Site Office
P.O. Box 5000
Upton, New York 11973

Re: Draft Five Year Review Report and Protectiveness Determination
Brookhaven National Lab, Upton, NY

Dear Mr. Crescenzo:

I am writing in regard to Department of Energy's (DOE) June, 2016 Five-Year Review Report for Brookhaven National Lab (BNL). My office has reviewed the subject report on behalf of the U.S. Environmental Protection Agency (EPA), and I am pleased to advise you that EPA concurs with the protectiveness determinations made in the report.

EPA may have specific technical comments regarding the report. However, as the statutory deadline for submitting the final Five-Year Review Report is August 9, 2016, there will not be adequate time for DOE to make the necessary revisions and finalize the report prior to this deadline. EPA cannot grant extensions to statutory deadlines. Therefore, EPA will be reporting to Congress, as required, the protectiveness determination for Brookhaven National Labe. EPA is also required to report annually to Congress on the progress made towards achieving and determining protectiveness on an annual basis and will look to the DOE to continue providing monitoring reports for that purpose.

EPA will be submitting specific comments regarding the Draft Five-Year Review report and will await the revisions from DOE for final approval. This will not, however, impact the protectiveness of the remedies in place, and can be coordinated between the respective project managers at EPA and DOE.

Our review of the report was conducted in accordance with EPA's "Comprehensive Five-Year Review Guidance" (OSWER Directive No. 9355.7-03B-P) and subsequent memoranda updating this guidance. Pursuant to 40 CFR 300.430 (f)(4)(ii), Five-Year Reviews are needed when waste remains in place at levels that do not allow for unrestricted reuse or unrestricted exposure. As such, DOE has performed two previous reviews of the remedy to ensure that it remains protective of human health and the environment. The statutory deadline for submitting the next Five-Year Review Report will be August 9, 2021.

With regards to EPA's concurrence, the protectiveness considers three main questions:

a) Is the remedy functioning as intended?

EPA agrees that components of the remedy are operating and functioning as intended. Long-term groundwater and surface water monitoring continue to demonstrate that ARARs will or continue to be met.

b) Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives used at the time of the remedy selection still valid?

EPA has reviewed the exposure assumptions, toxicity, and remedial objectives that were identified at the time of the remedy, and concludes that these are valid.

c) Has any other information come to light that could call into question the protectiveness of the remedy?

EPA finds that the comparison of the data to the assumptions, criteria, objectives and all standards support the continued protectiveness of the remedy. EPA further agrees that no new information has come to light that would question the protectiveness of these remedies. This determination is made with the understanding that the recommendations of the Five-Year Review are implemented and the specific technical comments are addressed.

Thank you for your continued cooperation regarding Brookhaven National Lab. If you have any questions or comments regarding this letter, please contact me at (212) 637-4390 or Jessica Mollin, Remedial Project Manager at (212) 637-3921.

Sincerely,

For Walter E. Mugdan, Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency, Region 2

cc: G. Granzen, SC-BHSO
R. Howe, BSA
B. Jankauskas, NYSDEC
Rapiejko, SCDHS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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AUG 09 2016

Mr. Frank Crescenzo
Manager, Brookhaven Site Office
Department of Energy
Brookhaven Site Office
P.O. Box 5000
Upton, NY 11973

Re: Brookhaven National Laboratory (Site ID: 152009)

Dear Mr. Crescenzo:

The New York State Department of Environmental Conservation and the New York State Department of Health (Departments) have reviewed the Five-Year Review Report, dated June 21, 2016. The Departments provide the enclosed comments on the document. Please contact me at (518) 402-9626 if you have any questions.

Regards,

Brian Jankauskas, P.E.
Environmental Engineer 2
Remedial Bureau A, Section C

cc: J. Swartwout, DEC
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File

1. Section 3.4, fifth bullet – Suggest including mercury within the sediment contamination.

2. Section 4.3, first sentence – Verify the number of extraction wells indicated (70) as the next two sentences total 43 extraction wells.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

August 25, 2016

Mr. Frank Crescenzo
Site Manager
Department of Energy
Brookhaven Site Office
P.O. Box 5000
Upton, New York 11973

Re: Brookhaven National Laboratory (BNL) 2016 Five Year Review Report

Dear Mr. Crescenzo:

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Enclosed are our comments on the Five-Year Review Report.

If you have any questions, please call me at 212-637-4432 or have your staff contact Jessica Mollin, EPA Project Manager at 212-637-3921.

Sincerely,

Douglas M. Pocze, Section Chief
Federal Facilities Section

Enclosure

cc: G. Granzen, SC-BHSO
B. Howe, BSA
A. Rapiejko, SCDHS
B. Jankauskas, NYSDEC

Enclosure

Comments on Five-Year Review, Brookhaven National Lab, June, 2016

General Comments

1) Was 1,4-dioxane evaluated as a possible COC at any of the sites?

2) In general, the responses to Question B indicates that "there have been no changes in exposure assumptions" since the original ROD was completed. This statement is inconsistent with the updates to the 2014 Standard Exposure Assumptions issued in 2014 by EPA. The Standard Exposure Assumptions, OSWER Directive 9200.1-120 was issued on February 6, 2014 and are available at: https://rais.ornl.gov/documents/OSWER-Directive-9200-1-120-Exposure-Factors_corrected.pdf . It is recommended that the text recognize this update and also indicate that the changes in the exposure assumptions in the Standard Defaults do not change the overall cleanup levels.

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Specific Comments

1) Within the Executive Summary, it states that "The potable drinking water supply wells are "currently" not impacted ...." Please indicate where these potable supply wells are located in relation to the plumes on Figure 4-2.

2) 3.6 Basis for Taking Action, OU-III Soils, Page 13: indicates that PCBs and mercury were remediated to TAGMS. However, the text for each OU indicate that have been no updates to the cleanup levels and TBCs. It is recommended that the Part 360 values should be identified with a statement that TAGMs were updated to the Part 360 values but that these changes do not change the conclusion regarding the protectiveness of the remedy.

3) 4.1 Remedy Selection, OU 1 Remedy Components, fourth bullet, page 15: Soil and sediment clean-up numbers should be provided.

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5) Table 5-1: Follow-up Actions to the 2011 Five –Year Review Recommendations, Peconic River Monitoring Program, page 32: Note change in Peconic River habitat, where fish tissue and surface water sampling is no longer an option as biota and standing water are no longer present.

6) OU I System Operations/O&M, page 54: Indicate the mowing schedule and note whether the area is used by ground nesting birds; ideally grass should only be mowed periodically to encourage use by ground nesting and migratory birds.

7) OU I Changes in Standards and Items To Be Considered (TBCs), page 56: The discussion of OU-1 should clarify that the planned updates to the groundwater standards will be addressed in the next Five Year review.

8) OU I Changes In Exposure Pathways,Toxicity and Other Contaminant Characteristics, and Risk Assessment Methods, page 56: The discussion of vapor intrusion for OU-III indicates that a clean layer of groundwater exists over the plume that will interrupt potential vapors. It is recommended that the current Vapor Intrusion Guidance should be cited as the basis for this decision. Also, this OU indicates that chromium VI has been transformed to chromium III. It is suggested that the basis for this decision be identified e.g., sampling results if appropriate. Further, the text indicates that sampling was conducted at one residence and that levels of iron were elevated. It would be helpful to clarify the actions taken since the statement only indicates a potential action without information regarding actions i.e., resident was notified and decided to take action or not.

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10) OU V Remedial Action Performance, page 67: Add a statement in the last bullet regarding how the STP effluent is now recharging directly to groundwater and this has contributed to the on-site portion of the Peconic River drying up. The absence of water means there is an absence of fish and thus the contaminant pathway to humans and ecological receptors is incomplete.

11) OU V Opportunities for Monitoring Optimization, page 69: Please note whether wetland monitoring continued for five years after the 2011 sediment cleanup and whether the plantings and control of invasive species met the equivalency permits issued.

12) Table 7-1: Recommendations for Peconic River Optimization, page 69: In the "Comments" column for "fish" discuss why fish tissue collection is no longer required/conducted.

13) OU V Opportunities for Monitoring Optimization, Fish Monitoring Optimization, page 70: Note whether the data referred to in the first bullet includes data collected under the environmental surveillance monitoring program.

14) OU V Opportunities for Monitoring Optimization, Fish Monitoring Optimization, page 71: Indicate that the habitat has changed with the elimination of STP discharge into the Peconic River and no longer supports a fish population (include recent site figures and information from inspection/monitoring activities which illustrate the lack of aquatic habitat). In the last bullet note specifically whether the fish targeted for monitoring under the OU 5 ROD are similar to those collected under the environmental surveillance monitoring program. Further, indicate whether tissue are analyzed for mercury.

15) OU V Changes in Exposure Pathways, Toxicity and Other Contaminant Characteristics, and Risk Assessment Methods, page 71: The first bullet indicates there have been no changes in the physical conditions within the Peconic River which is incorrect as there was no standing water within the River during the June 2016 site visit. Therefore it is recommended that the exposure assumptions used in the original risk assessment be reevaluated to determine whether or not the risk assessment takes into account the current existing conditions and the potential risk associated with this terrestrial habitat.

16) Attachment 6 Operable Unit Cleanup Levels Matrix, OU IV: It is unclear why Remedial Action Objectives include "uptake of contaminants in soil by plants and animals" as the cleanup levels identified are only for groundwater.

COUNTY OF SUFFOLK

STEVE BELLONE
SUFFOLK COUNTY EXECUTIVE

DEPARTMENT OF HEALTH SERVICES

JAMES L. TOMARKEN, MD
MSW, MPH, MBA, FRCPC, FACP
Commissioner

September 28, 2016
Mr. Frank Crescenzo
U.S. Department of Energy
Brookhaven Site Office
P.O. Box 5000
Upton, New York 11973

Re: Comments on Five Year Review Report for Brookhaven National Laboratory Superfund Site June 24, 2016

Dear Mr. Crescenzo,

The Suffolk County Department of Health Services (SCDHS) has reviewed the above referenced document and is generally satisfied with the overall progress and effort put forth in the cleanup of the various Operable Units at the site. The SCDHS offers the following specific comments indicated below:

1) <u>Section 3.3 Land and Resource Use and Institutional Controls</u>
Page 9, 6th paragraph

"This brings the number of homes not connected to public water to six...Annually, DOE formally offers those homeowners free testing of their private drinking water wells."

In April of 2011, the Agency for Toxic Substances and Disease Registry (ATSDR) finalized their Public Health Assessment for Brookhaven National Laboratory. A recommendation in this report addresses the homes referenced above that are still using private wells in the hook up area as follows, "*DOE should continue to sample the wells of the seven residents who declined the public water hookup to determine whether the contaminant plumes are affecting wells in the areas. If any of the seven wells are found to contain contaminants at levels above drinking water standards in the future, residents should immediately cease using the wells and DOE should provide alternative water sources to those individuals until the private well data are found to meet drinking water standards.*"

The SCDHS supports ATSDR's recommendation and encourages connections to public water supplies when feasible. We recommend that the DOE implement this recommendation, to the extent practicable.

2) <u>Section 5.0 Progress Since the Last Review</u>
Page 27, 4th paragraph, 2nd Bullet

The last sentence is missing the referenced section number.

3) <u>Cleanup Levels Used for Soils Contaminated with Radionuclides</u>
The soil cleanup levels developed for radionuclides were established in the OU I ROD and assumed an institutional control period of 50 years, the time period after which BNL might reasonably be available for public use. When the OU I ROD was signed in 1999, in effect the parties agreed that a reasonable date in which BNL would no longer be a National Laboratory under federal control use was the year 2049 (1999 plus 50 years). Since 17 years have passed since the signing of the ROD, the assumed end of the institutional control period is now 33 years hence. Based on the above, the SCDHS believes it would be appropriate to use 2049 as the end date for current and new cleanup projects and that new radiological soil cleanup levels should be established that are now based upon the assumption of 33 years of institutional control. This will allow for new cleanup projects to be consistent with the OU I ROD assumption for the end of institutional controls at BNL in the year 2049.

Should you have any questions concerning these comments, please contact me at (631) 852-5786.

Sincerely,

Andrew Rapiejko
Associate Hydrogeologist
Office of Water Resources

cc: D. Feldman, SCDHS
B. Jankauskas, NYSDEC
J. Mollin, USEPA
S. Karpinski, NYSDOH

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

January 12, 2017

Mr. Frank Crescenzo
Site Manager
Department of Energy
Brookhaven Site Office
P.O. Box 5000
Upton, New York 11973

Re: Brookhaven National Laboratory (BNL) Addendum Five Year Review Report, November 2016

Dear Mr. Crescenzo:

The U.S. Environmental Protection Agency (EPA) has reviewed the above report and finds BNL's response to EPA comments on the Five-Year Review report acceptable.

If you have any questions, please call me at 212-637-3921.

Sincerely,

Jessica Mollin, Remedial Project Manager
Federal Facilities Section

cc: G. Granzen, SC-BHSO
B. Howe, BSA
A. Rapiejko, SCDHS
B. Jankauskas, NYSDEC

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau A
625 Broadway, 12th Floor, Albany, NY 12233-7015
P: (518) 402-9625 I F: (518) 402-9627
www.dec.ny.gov

JAN 17 2017

Mr. Frank Crescenzo
Manager, Brookhaven Site Office
Department of Energy
Brookhaven Site Office
P.O. Box 5000
Upton, NY 11973

Re: Brookhaven National Laboratory (Site ID: 152009)

Dear Mr. Crescenzo:

The New York State Department of Environmental Conservation and the New York State Department of Health (Departments) have reviewed the November 17, 2016 response to comments provided on the Five-Year Review Report, dated June 21, 2016. The responses to the State comments are acceptable.

The Department noticed in the Brookhaven National Laboratory responses to the Five-Year Review Report that the EPA had multiple comments (e.g. 5, 10, 12, 14 and 15) regarding the Peconic River on-site has changed due to the elimination of the STP discharge and no longer supports a fish population and thus the contaminant pathway to humans and ecological receptors is incomplete.

The Department considers the on-site portion of the Peconic River to be an intermittent river that is dependent on groundwater. The attached flow graphs show that water was present on-site for a portion of 2015, which is after the STP was shutdown in September 2014. Peconic Flow data for Station HE located near the STP indicated that flow occurred from January to May 2015. Peconic Flow data was available from the three stations, identified as HE, HM-N and HQ, from early March to mid April, which suggests that the fish were able to migrate within the on-site portion of the Peconic River. This is why in 2015 on-site fish were collected and sampled to determine mercury concentrations. Fish were collected from Areas A and C, which are upstream of Area D where the proposed cleanup will occur. The 2015 Site Environmental Report indicated that a small depression remained wet throughout the year as part of the Banded Sunfish assessment, which is considered a threatened species in the State of New York. The report further indicated that 2015 was a drought year. Based on this information the Department does not agree with the comments indicated by the EPA for the Five-Year Review Report. The Department finds that additional fish monitoring of the river is necessary to understand where fish are present throughout the year and future decisions should not be based on information obtained during drought conditions.

I have also included a graph of mercury results in Largemouth Bass from the Peconic River. Please note that the average mercury concentrations in the on-site fish are consistently above the EPA criteria.

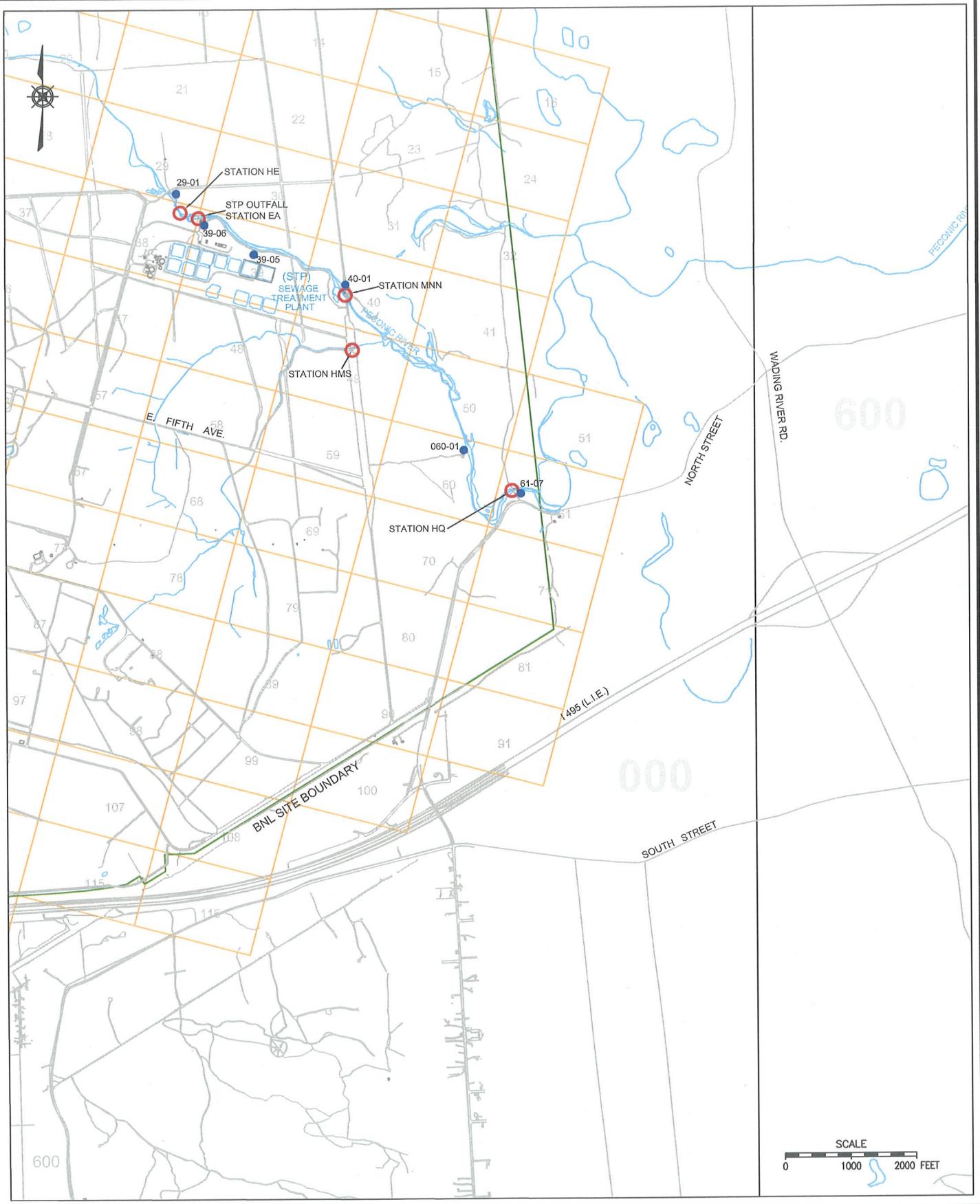
Based on your responses, the Department understands that the need to continue monitoring will be determined following the cleanup.

Please contact me at (518) 402-9626 if you have any questions.

Regards,

Brian Jankauskas, P.E.
Professional Engineer 1
Remedial Bureau A, Section C

cc: J. Swartwout, DEC
T. Papura
S. Karpinski, DOH
D. O'Hehir, DOH
J. Mollin, EPA Mollin.Jessica@epa.gov
A. Rapiejko, SCDHS andrew.rapiejko@suffolkcountyny.gov
W. Dorsch, BSA dorsch@bnl.gov
B. Howe, BSA howe@bnl.gov
T. Kneitel, DOE kneitel@bnl.gov
File



BROOKHAVEN NATIONAL LABORATORY

ENVIRONMENTAL PROTECTION DIVISION

TITLE: Stream Gage & Monitoring Well Location Map

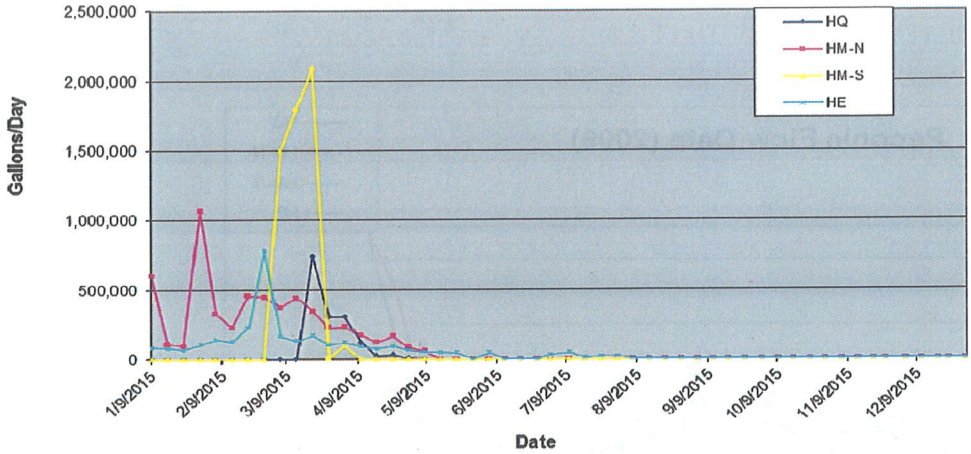
BNL SEWAGE TREATMENT PLANT & PECONIC RIVER BASEFLOW MODEL

BNL SPDES PERMIT MODIFICATION STUDY

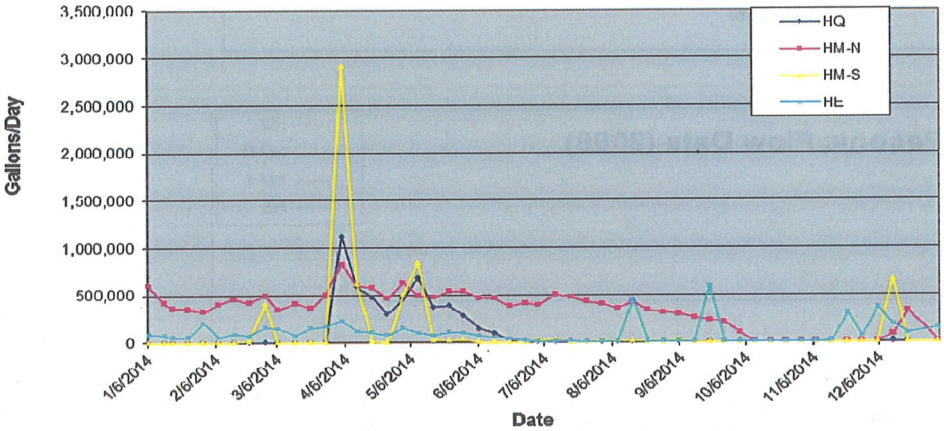
DWN:	VT: HZ.:	DATE:	PROJECT NO.:
DBB	–	12/23/09	–
CHKD:	APPD:	REV.:	NOTES:
–	–	–	–

FIGURE NO.: 9

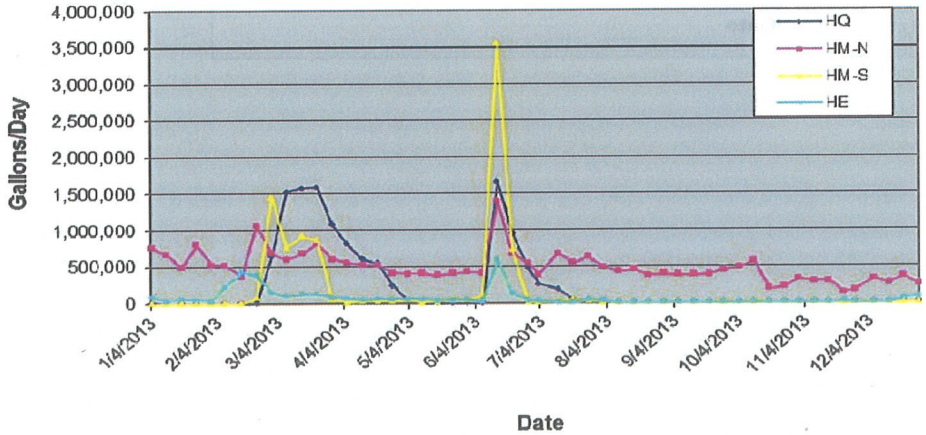
Peconic Flow Data (2015)



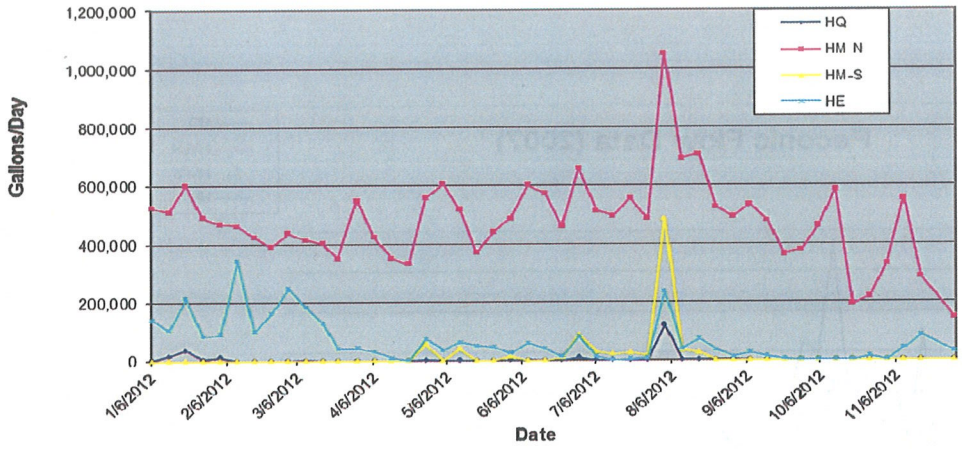
Peconic Flow Data (2014)



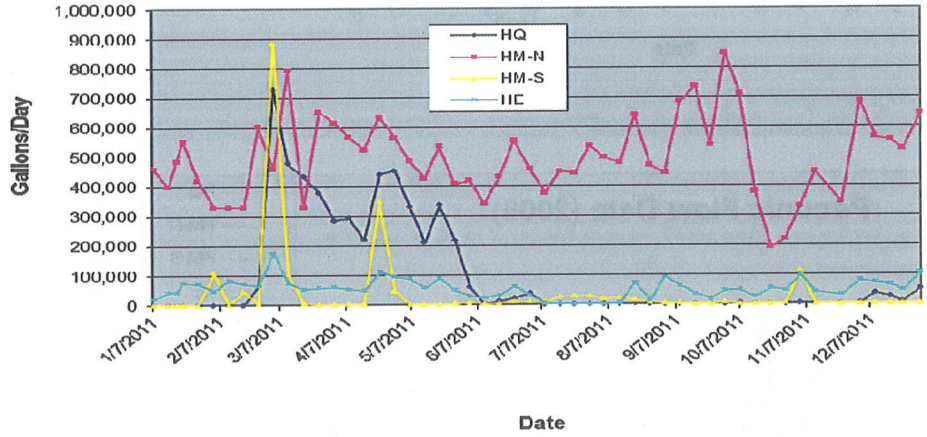
Peconic Flow Data (2013)



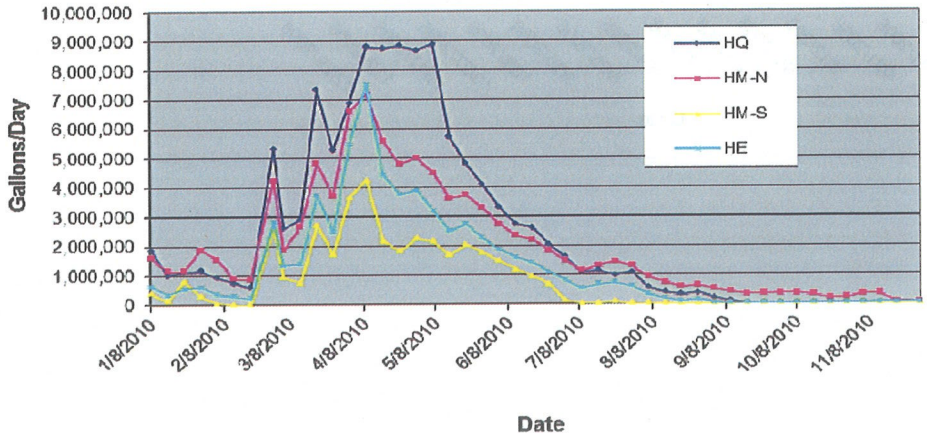
Peconic Flow Data (2012)

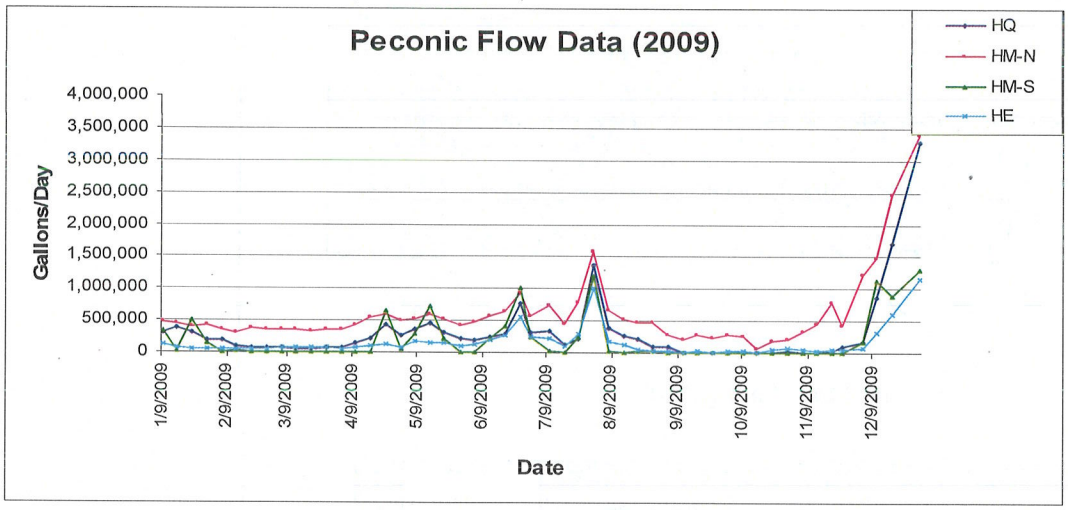


Peconic Flow Data (2011)



Peconic Flow Data (2010)




Peconic Flow Data (2009)
HQ
HM-N
HM-S
HE
Gallons/Day
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1/9/2009
2/9/2009
3/9/2009
4/9/2009
5/9/2009
6/9/2009
7/9/2009
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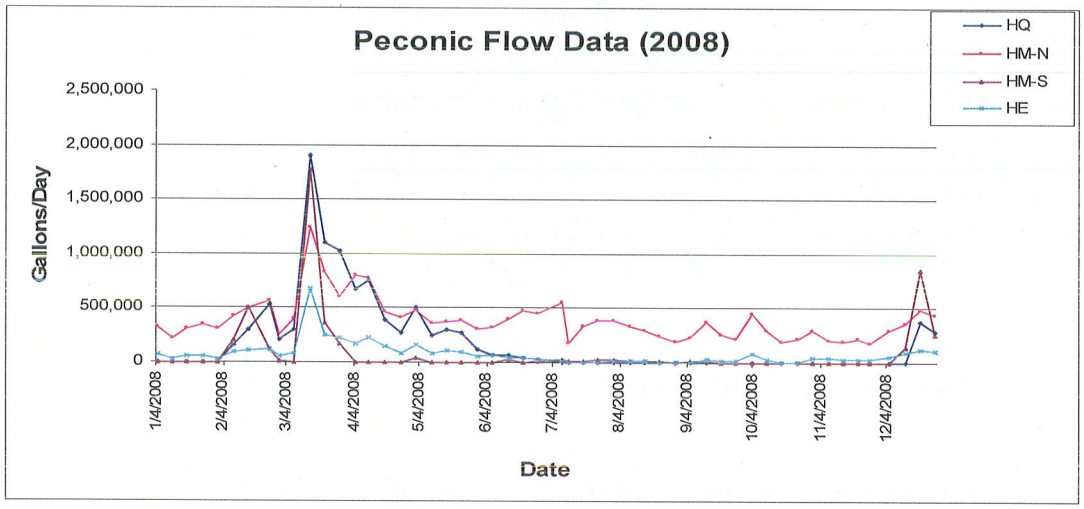
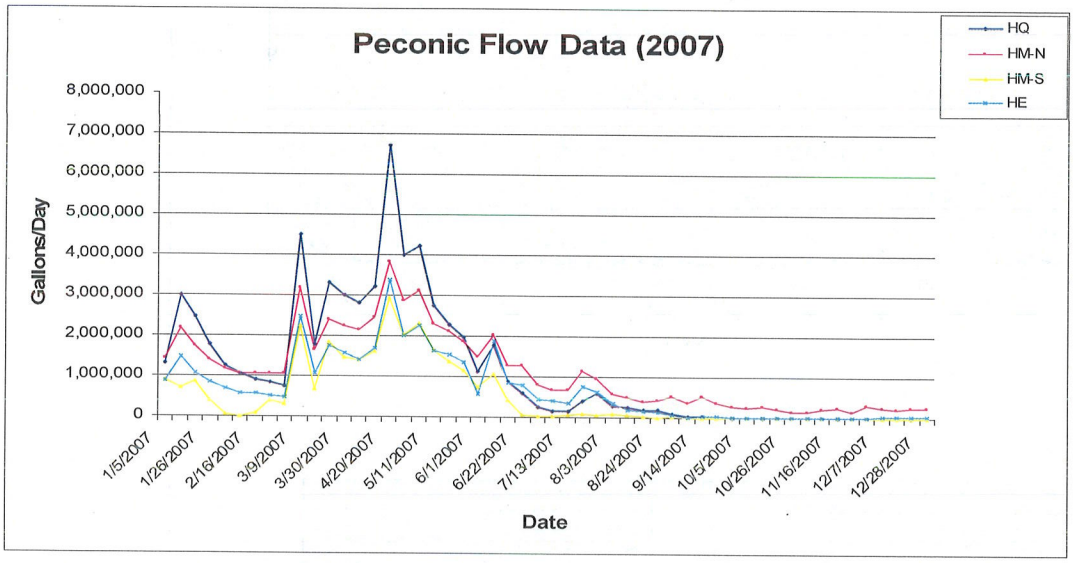
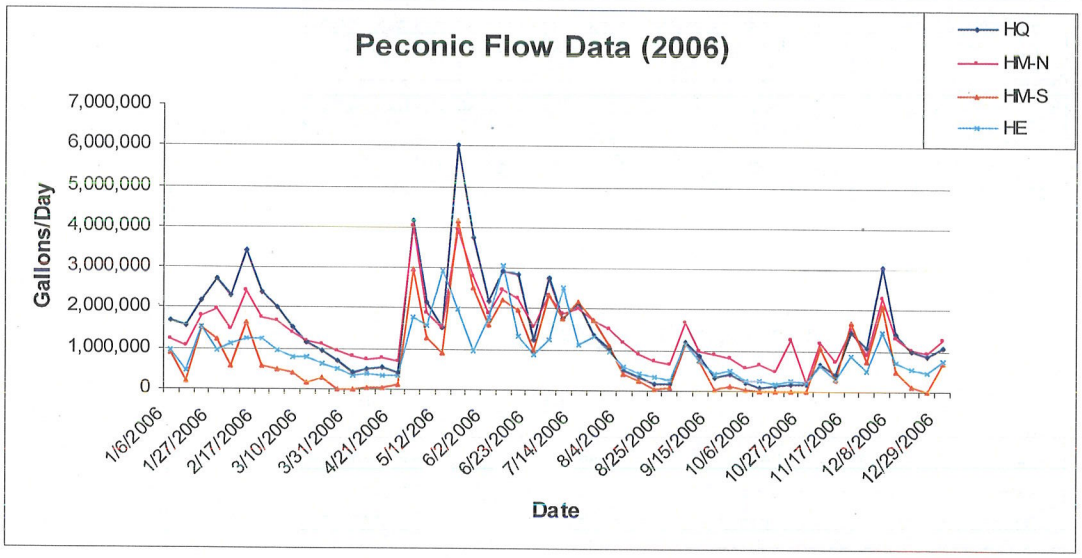
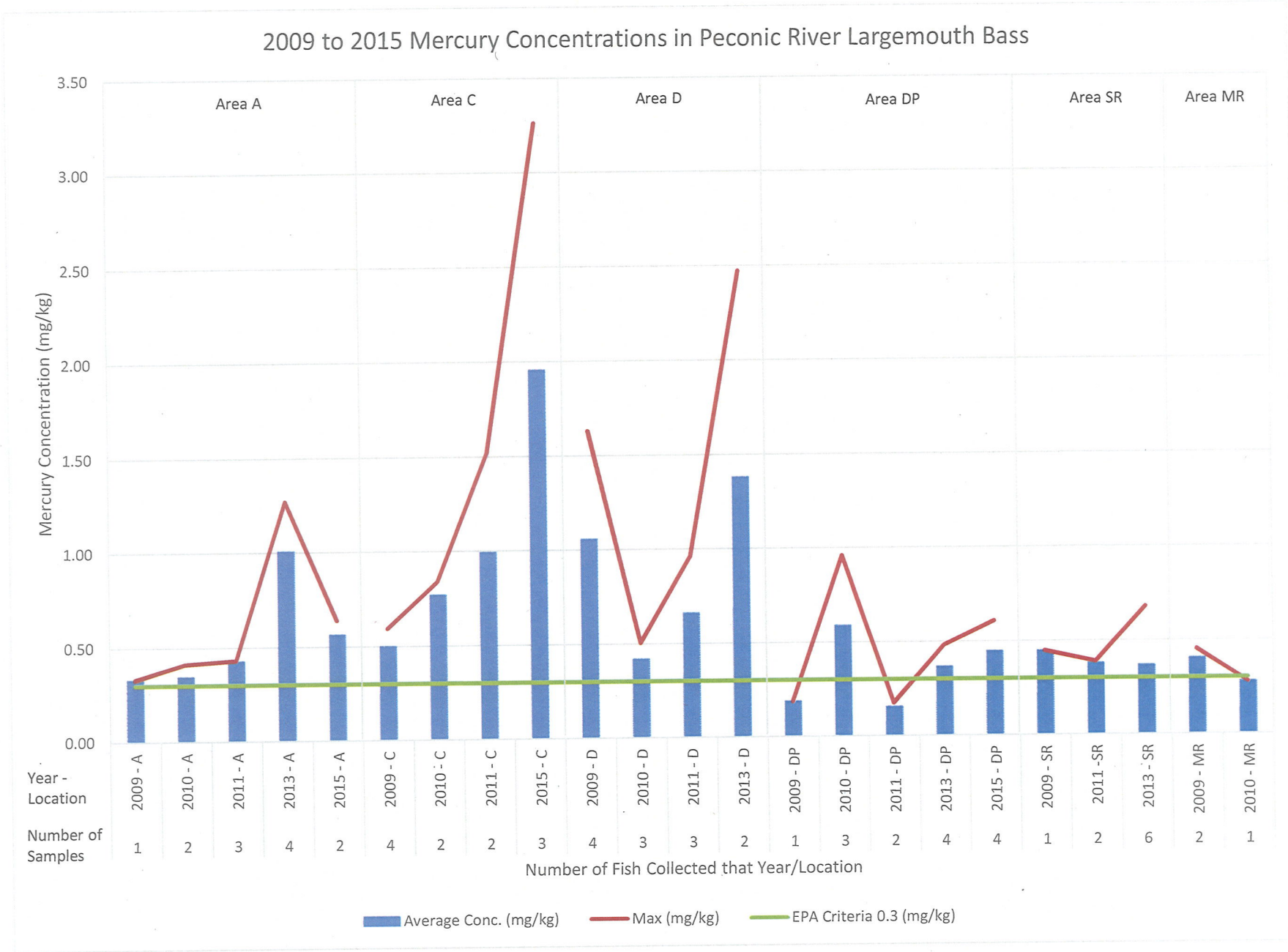
10/9/2009
11/9/2009
12/9/2009
Date


Peconic Flow Data (2008)
HQ
HM-N
HM-S
HE
Gallons/Day
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
1/4/2008
2/4/2008
3/4/2008
4/4/2008
5/4/2008
6/4/2008
7/4/2008
8/4/2008
9/4/2008
10/4/2008
11/4/2008
12/4/2008
Date


Peconic Flow Data (2007)
HQ
HM-N
HM-S
HE
Gallons/Day
8,000,000
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1/5/2007
1/26/2007
2/16/2007
3/9/2007
3/30/2007
4/20/2007
5/11/2007
6/1/2007
6/22/2007
7/13/2007
8/3/2007
8/24/2007
9/14/2007
10/5/2007
10/26/2007
11/16/2007
12/7/2007
12/28/2007
Date


Peconic Flow Data (2006)
HQ
HM-N
HM-S
HE
Gallons/Day
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
1/6/2006
1/27/2006
2/17/2006
3/10/2006
3/31/2006
4/21/2006
5/12/206
6/2/2006
6/23/2006
7/14/2006
8/4/2006
8/25/2006
9/15/2006
10/6/2006
10/27/2006
11/17/2006
12/8/2006
12/29/2006
Date


2009 to 2015 Mercury Concentrations in Peconic River Largemouth Bass
Area A
Area C
Area D
Area DP
Area SR
Area MR
Mercury Concentration (mg/kg)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Year - Location
2009 - A
2010 - A
2011 - A
2013 - A
2015 - A
2009 - C
2010 - C
2011 - C
2015 - C
2009 - D
2010 - D
2011 - D
2013 - D
2009 - DP
2010 - DP
2011 - DP
2013 - DP
2015 - DP
2009 - SR
2011 -SR
2013 - SR
2009 - MR
2010 - MR
Number of Samples
1 2 3 4 2 4 2 2 3 4 3 3 2 1 3 2 4 4 1 2 6 2 1
Number of Fish Collected that Year/Location
Average Conc. (mg/kg)
Max (mg/kg)
EPA Criteria 0.3 (mg/kg)

COUNTY OF SUFFOLK

STEVE BELLONE
SUFFOLK COUNTY EXECUTIVE

DEPARTMENT OF HEALTH SERVICES

JAMES L. TOMARKEN, MD
MSW, MPH, MBA, FRCPC, FACP
Commissioner

February 6, 2017

Mr. Frank Crescenzo
U.S. Department of Energy
Brookhaven Site Office
P.O. Box 5000
Upton, New York 11973

Re: Addendum Five-Year Review Report

Dear Mr. Crescenzo,

The above referenced document has been reviewed and the SCDHS is generally satisfied with the responses provided. The SCDHS is not necessarily in agreement with the response provided to SCDHS Comment #3 (regarding the cleanup levels used for soil contaminated with radionuclides). The SCDHS still believes that the intent and understanding used in the development of the cleanup levels calculated in the OUI ROD in 1999 was that the identified radionuclide soil cleanup levels were to meet residential land use in 50 years from 1999 (or in the year 2049). In 1999, after much debate, it was agreed that it was reasonable to consider the property would be under Department of Energy Control for another 50 years (ending in 2049), and not any longer.

The SCDHS is encouraged that the response includes the following commitment, "*For future soil cleanups, the planned cleanup goals will be discussed with the regulators prior to the cleanup.*" The SCDHS looks forward to participating in those discussions in the future.

Should you have any questions concerning these comments, please contact me at (631) 852-5786. issues

Sincerely,

Andrew Rapiejko
Associate Hydrogeologist
Office of Water Resources

cc: D. Feldman, SCDHS
B. Jankauskas, NYSDEC
J. Mollin, USEPA
S. Karpinski, NYSDOH

Public Health
Prevent. Promote. Protect.

OFFICE OF WATER RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY – 360 YAPHANK AVENUE, SUITE 1C – YAPHANK, NY 11980
PHONE: (631) 852-5810 – FAX: (631) 852-5787