ANNUAL REPORT

MAY 9, 2018

Message from Tom Congdon, Chair of the Task Force

The Task Force is pleased to issue its first Annual Report that documents significant progress is being made to plan a smooth transition to a future without Indian Point. Over the last year, the Task Force conducted a thorough analysis of impacts related to the closure; commissioned an independent analysis of site reuse and reutilization options; assessed needs and strategies related to employment, taxing jurisdictions, and energy supply; and inventoried federal, state, and local resources. The Task Force's work provided foundational information and support that led to several important changes in law that will help mitigate the impacts to the communities affected by the plant's closure.

The Indian Point Energy Center (IPEC) has been operating in Buchanan since 1962 and, despite the State's and many other parties' concerns regarding aging equipment, license renewal challenges, and safety, it has been an integral part of the community as a large employer, and major contributor to local tax base and regional economy. After years of litigation, the State, Riverkeeper, and Entergy came to an agreement to close Indian Point Unit 2 by April 30, 2020 and Indian Point Unit 3 by April 30, 2021 and resolve the State's longstanding safety and environmental concerns related to the plant's operations.

To ensure issues such as loss of payment-in-lieu-of-taxes (PILOT) revenue in the affected taxing jurisdictions, workforce, energy reliability, and site decommissioning and reuse are thoroughly considered, Governor Andrew M. Cuomo established the Indian Point Closure Task Force (Task Force) in February 2017 to examine these issues and to provide guidance and support to affected local municipalities and employees.

As documented in detail throughout this Report, progress has been made in each area of concern:

- **Local Taxes**: Governor Cuomo and the Legislature, led by local representatives Senator Terrence Murphy and Assemblywoman Sandy Galef, have expanded the State's Electric Generation Facility Cessation Program to ensure state funding assistance will be available to the affected taxing jurisdictions when IPEC closes. Legislation was also enacted authorizing the Hendrick Hudson School District to establish a reserve fund that will allow the District to smooth out reductions in PILOT payments post-closure.
- **Employment**: The UWUA Local 1-2 reached a 4-year agreement with Entergy, ensuring the required level of staffing needed to operate the plant through April 30, 2021 is available. The successful negotiations also resulted in ongoing discussions between Entergy and Local 1-2 regarding preparing the site for decommissioning post-closure. In addition, the Department of Labor is in the process of working with all employees to develop career transition plans, and will be identifying retraining opportunities for affected workers.
- **Energy Reliability**: On December 13, 2017, the New York Independent System Operator (NYISO) issued a report on system reliability impacts of IPEC closure dates of April 30, 2020 and April 30, 2021, respectively, and concluded that the plant can close on schedule without negatively impacting reliability.
- **Decommissioning and Reuse:** While Entergy has not yet filed its plans for decommissioning, the State contracted with DL English Consulting (DLEC), a firm with expertise in nuclear licensing and decommissioning, to develop a Reuse Study, which is included in this Annual Report. The study provides substantial background information

on the decommissioning process and identifies three parcels that are part of, or adjacent to, the IPEC property that DLEC indicates could potentially be made available for redevelopment in the near-term concurrent with the decommissioning of the plant. The Reuse Study will be a valuable resource to the State and host communities when discussing decommissioning and future use of the property with Entergy and the federal Nuclear Regulatory Commission (NRC).

Looking ahead, the Task Force will continue focusing on new economic development opportunities in the affected taxing jurisdictions that can help to replace lost PILOT revenue. This Report outlines many state government programs available to assist in this regard. We will also examine in depth the decommissioning process so that agencies and host communities can effectively work with NRC and Entergy to ensure a timely and safe decommissioning of the plant. The Reuse Study will be foundational to both work streams.

Department of Labor will continue to work with the workforce to develop individualized transition plans and will identify retraining opportunities, some of which are summarized in this report. Entergy's contract with the Teamsters Local 456, representing the security force at IPEC, expires in 2019, and we will monitor the outcome of upcoming labor negotiations.

On the federal level, the State is actively participating in the NRC decommissioning rulemaking process by advocating for strong safety standards post-closure. We will also work with our representatives in Congress, including Congresswoman Nita Lowey, to identify federal actions that will be needed to assist the affected region.

In closing, the Task Force will continue its work to bring together state and local leaders to collaboratively plan for the eventual closure of IPEC. Information sharing, frank dialogue, and non-partisan problem-solving have been hallmarks of this Task Force and it is my privilege to serve as its Chair.

Contents

I. Introduction

The information summarized in this report provides a foundation for future Task Force activities and is a valuable resource to local, state, and federal policy makers.

This is the first of six annual reports to be issued through April 30, 2023. Subsequent reports will provide updates on intermediate activity and will expand and adjust mitigation strategies as the needs and priorities of the affected workers and jurisdictions evolve.

This report meets the requirements established by Part RR of chapter 58 of the laws of 2017.

II. Indian Point

Indian Point Facility and Workforce

The Indian Point Energy Center (Indian Point, or IPEC) is a nuclear power facility and site located in the Village of Buchanan, New York. Situated on a 240-acre property along the Hudson River, the facility is 24 miles north of New York City. After receiving its initial construction permit in 1956, Indian Point began electric generation operations in 1962 as one of the first commercially-operating nuclear energy facilities in the United States. The facility is currently owned and operated by Entergy Corporation and its subsidiaries, and consists of two active reactors, Unit 2 (1032MW) and Unit 3 (1051MW).[1] The Indian Point property includes two spent fuel pools and an independent spent fuel storage installation (ISFSI).

There are approximately 950 individuals employed at Indian Point – about 35 percent of whom are unionized utility workers represented by the Utility Workers Union of America (UWUA) Local 1-2. There is also a sizeable security workforce represented by the International Brotherhood of Teamsters Local 456. There are additional unions and contractors that perform seasonal or periodic work at Indian Point.

Closure of Indian Point

In light of concerns and litigation and administrative disputes among the State, Riverkeeper, and Entergy regarding safety, environmental and operational issues, and Entergy Corporation's economic concerns, on January 9, 2017, the parties entered into an agreement to cease operations at Unit 2 by April 30, 2020 and at Unit 3 by April 30, 2021, and settle all litigation between the State, Riverkeeper and Entergy Corporation. The agreement provided a four-year planning horizon ahead of the plant closure, accelerated movement of spent fuel into dry cask storage, and established a $15 million fund for environmental and community benefits, among other provisions.

Task Force Formation

On February 28, 2017, Governor Cuomo announced the appointment of a task force to address the closure of Indian Point and to provide guidance and support to affected local municipalities and employees. The Indian Point Closure Task Force (Task Force) was formed to partner with local leaders to address employment and property tax impacts, develop new economic opportunities, evaluate site reuse options, and identify work force retraining programs and opportunities. The Task Force will also monitor the closure, and

[1] Unit 1 ceased generating electricity in 1974, but remains on site and has not been decommissioned.

related decommissioning and site restoration issues, report on safety inspections and review reliability and environmental concerns, among other issues. Recognizing the importance of the work to be conducted, the establishment, composition, and mission of the Task Force was codified in the 2017-18 New York State budget. By statute, the members of the Task Force include:

- Office of the Governor
- State Senator Terrence Murphy
- State Assemblywoman Sandy Galef
- Cortlandt Town Supervisor Linda Puglisi
- Buchanan Village Mayor Theresa Knickerbocker
- Hendrick Hudson School District Superintendent Joseph Hochreiter
- Westchester County Legislator Catherine Borgia (Majority Leader)
- Westchester County Legislator John Testa (Minority Leader)
- UWUA Local 1-2 President James Slevin
- Westchester Putnam Labor Council President Thomas Carey
- Teamsters Local 456 President Lou Picani
- NYS Department of Public Service (convening agency)
- Empire State Development Corporation
- NYS Department of Environmental Conservation
- NYS Department of Taxation and Finance
- NYS Department of State
- NYS Department of Labor
- NYS Department of Homeland Security and Emergency Services
- NYS Energy Research and Development Authority
- New York Power Authority

The Task Force meets at least three times per year. Public comments are accepted and meeting materials are available online at www.dps.ny.gov.

III. Anticipated Impacts of Indian Point Closure and Recommendations

Property Tax Impacts

Entergy, the owner of IPEC, has separate payment-in-lieu-of-taxes (PILOT) agreements with each of the four overlapping taxing jurisdictions that host the facility: the Hendrick Hudson School District, the Village of Buchanan, the Town of Cortlandt, and Westchester County. Those agreements are entered into pursuant to Section 485 of the Real Property Tax Law. Section 485 allows affected local governments to exempt nuclear generating facilities from real property taxes for a determined period. Pursuant to the statute, PILOTs are required during the exemption period and are based on taxes that were paid in the last taxable year unless a different schedule of payments is agreed to by the plant owner and the affected local governments.

All of Entergy's active Indian Point PILOT agreements cover 10 payment years from Tax Year 2015 to 2025 and all have clauses that phase out the PILOT agreements in the case of a permanent shutdown of the facility. In addition, each of the PILOTs have built in inflation factors which provide for growth in the annual payments equal to 2 percent or the allowable levy growth factor, whichever is less.

As provided by the settlement agreement between Entergy and New York State, Entergy will shut down Unit 2 on April 30, 2020 and Unit 3 on April 30, 2021. Pursuant to the PILOT agreements, 50 percent of the PILOT payments are attributable to Unit 2 and 50 percent to Unit 3. As a result, the phase out schedules will begin on a staggered schedule, with the phase out of the Unit 2 PILOT beginning with the payments due between May 1, 2020 and April 30, 2021. The phase out of the other half of the PILOT will begin with the payments scheduled to be made between May 1, 2021 and April 30, 2022.[2]

The schedule of the PILOT phase out is shown in the following chart:

Entergy PILOT Agreements with Taxing Jurisdictions

FISCAL YEAR ENDING IN	UNIT 2	UNIT 3
2020	NO REDUCTION	NO REDUCTION
2021	30% REDUCTION	NO REDUCTION
2022	60% REDUCTION	30% REDUCTION
2023	90% REDUCTION	60% REDUCTION
2024	90% REDUCTION	90% REDUCTION

What follows is an illustration of the importance of the PILOT payments to the finances of each of the host municipalities.

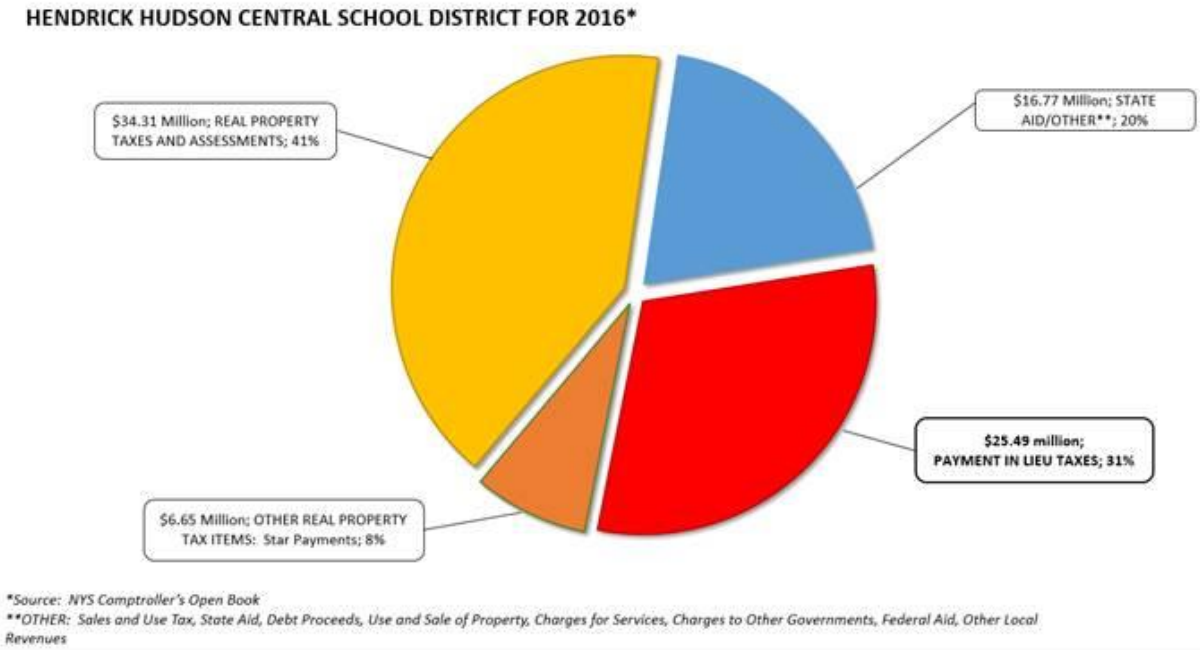
[2] The timing of the PILOT reductions will vary based on the start of the fiscal year in each of the impacted jurisdictions. For example, the Hendrick Hudson School District fiscal year begins on July 1 and thus the first reduction in PILOT payment will begin with the payment due on September 1, 2020 for the 2020-21 school year.

Hendrick Hudson Central School District (HHSCD)

The PILOT agreement between Entergy and the Hendrick Hudson School District states that beginning in Tax Year 2015-16, Entergy will make PILOT payments totaling $23,667,068 in each Tax Year during the term, with the payments adjusted annually by the inflation factor described above. The PILOT payments make up 31 percent of revenues for the District.

Based on the inflation adjustments, HHSD is estimated to receive annual PILOT payments of $25 million by SY 2019-20.[3] Pursuant to the PILOT agreement, these payments will be reduced by $22.3 million over three years to approximately $2.7 million by 2023-24.

Hendrick Hudson Free Library is a beneficiary of the PILOTs from Hendrick Hudson and the payments makeup 28 percent[4] of the Hendrick Hudson Free Library budget.



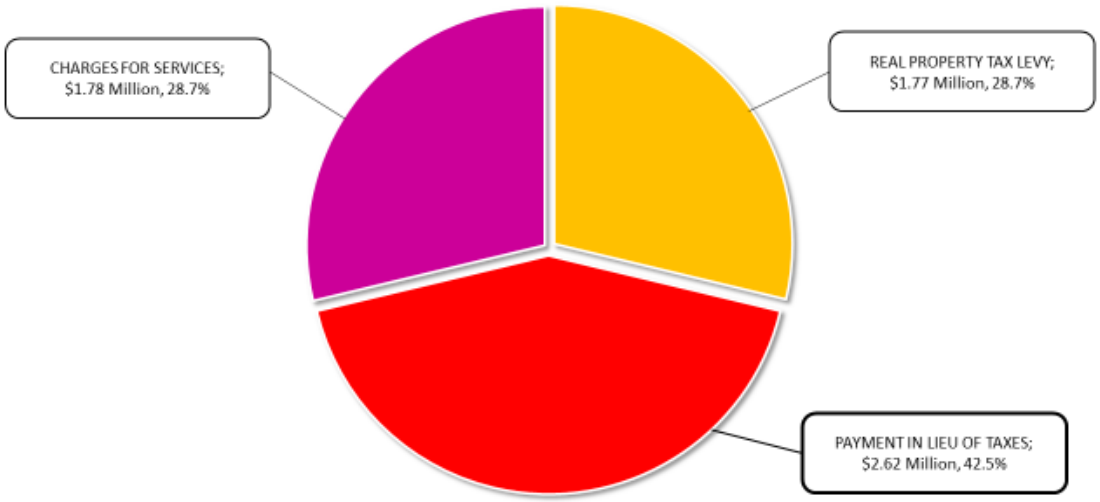
Village of Buchanan

The PILOT agreement between Entergy and the Village of Buchanan states that beginning in Tax Year 2015-16, Entergy will make a PILOT payment in the amount of $2,624,000 in each Tax Year during the term with the payment adjusted annually by the inflation factor described above. The PILOT payments make up 42.5 percent of revenues for the Village.

Based on the inflation adjustments, the Village is estimated to receive annual PILOT payments of $2.8 million by 2019-20. Pursuant to the PILOT agreements, payments will be reduced by $2.5 million over three years to $299,000 by 2023-24.

[3] All PILOT payments are calculated based on the Entergy PILOT agreements.
[4] Based on Hendrick Hudson Free Library 2016-17 Budget.

VILLAGE OF BUCHANAN REVENUES FOR 2016*

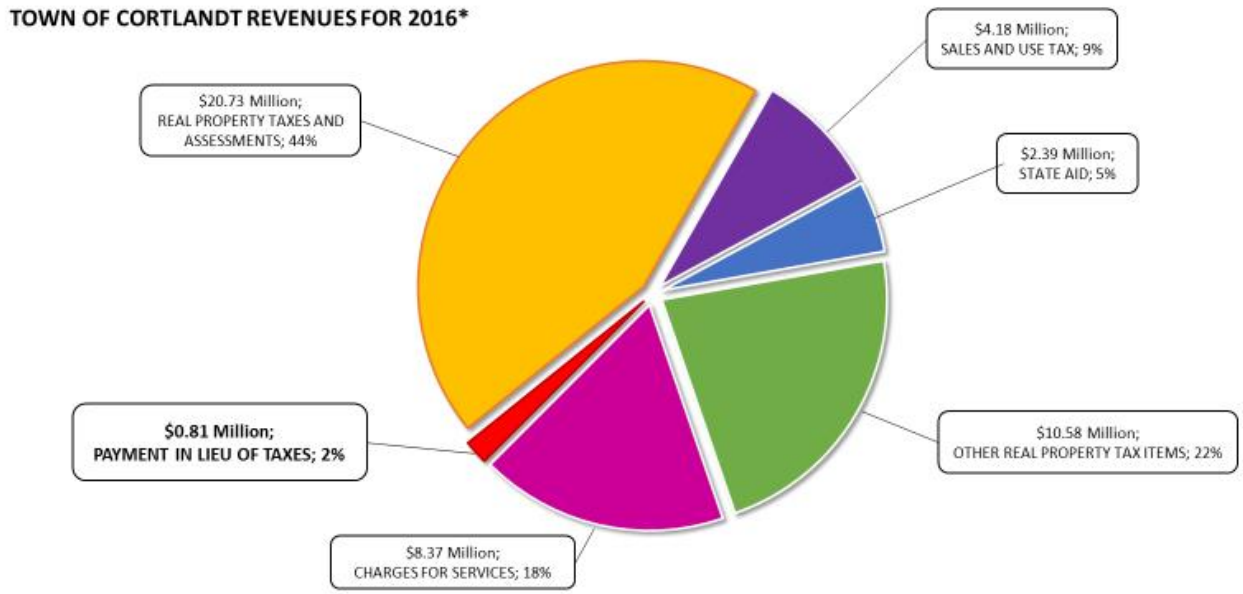


*Source: Village of Buchanan's 2016 Final Budget Appropriations, dated April 12, 2016. Water Fund not included.

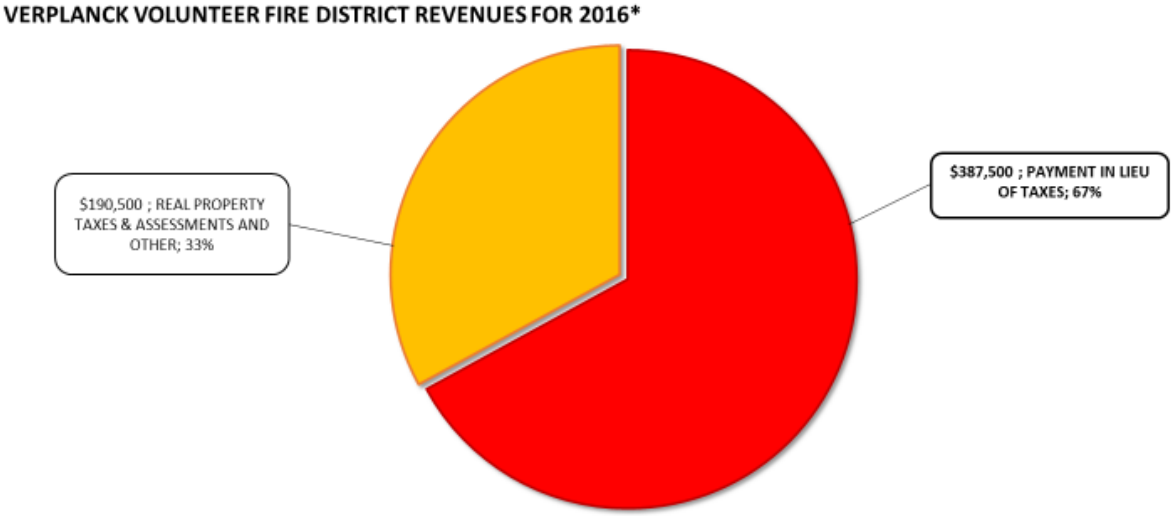
Town of Cortlandt

The PILOT agreement between Entergy and the Town of Cortlandt states that beginning in Tax Year 2015, Entergy will make a PILOT payment in the amount of $1,158,272 in each Tax Year during the term, with the payment adjusted annually by the inflation factor described above. The agreement allocates 68.2714 percent to the Town (for Town general, Town library, Town water and special district tax purposes) and 31.7286 percent to the Town for Fire District purposes (Verplanck Volunteer Fire District). The PILOT payments make up 2 percent of the revenues for the Town. The payment made by the Town to the Verplanck Volunteer Fire District PILOT payment constitutes 67 percent of the revenues for the Fire District.

Based on the inflation adjustments, the Town is estimated to receive annual PILOT payments of $850,000 in 2020. Following closure, these payments will be reduced by $758,000 over three years to $92,000 by 2024. The Fire District is estimated to receive annual PILOT payments of $395,000 in 2020. Following closure, these payments will be reduced by $352,000 over three years to $43,000 by 2024.



Source: NYS Comptroller's Open Book



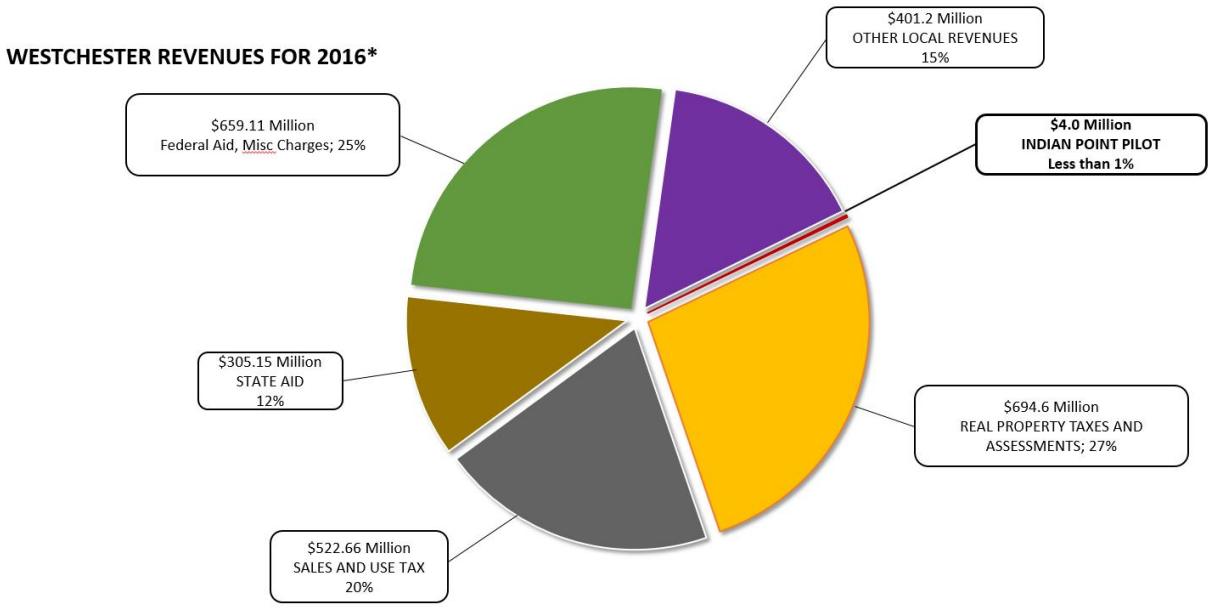
Source: NYS Comptroller's Open Book

Westchester County

The PILOT agreement between Entergy and the County states that beginning with Tax Year 2015, Entergy will make a PILOT payment in the amount of $3,995,660 in each Tax Year

during the term, with the payment adjusted annually by the inflation factor described above The PILOT payments make up less than 1 percent of the County's revenues.

Based on the inflation adjustments, the County is estimated to receive annual PILOT payments of $4.3 million in 2020. Following closure, the payments will be reduced by $3.8 million over three years to $465,000 by 2024.



Source: NYS Comptroller's Open Book, NYS DTF Estimate

Property Tax Resources

Resources to Address Gap

Cessation Fund

The Task Force identified the Electric Generation Facility Cessation Mitigation Program (Cessation Fund) as a primary mechanism to mitigate tax revenue losses. The Cessation Fund was created to provide financial assistance to support local government entities, including counties, towns, cities, villages, school districts and special districts, impacted by reductions in the tax liability and/or payments in lieu of taxes (Tax Loss) owed by an electric generation facility subject to their taxing authority. The State is not aware of a similar program in the country. The Tax Loss must be 20 percent or more and a direct result of an electric generation facility ceasing operation within its jurisdiction. Empire State Development, in consultation with the New York State Energy Research and Development Authority and the Department of Public Service, administers the program.

The Cessation Fund was created to provide grant assistance to support local government entities, including counties, towns, cities, villages, school districts and special districts, impacted by reductions in the tax liability and/or payments in lieu of taxes (Tax Loss) owed by an electric generation facility subject to their taxing authority.

The fiscal year 2016–17 New York State budget appropriated the initial $30 million to fund the Cessation Fund. An additional $15 million appropriation was approved in the fiscal year 2017-18 budget. With another $24 million addition approved in the fiscal year 2018-19 budget, a total of $69 million has been authorized for the Cessation Fund.

Based on Entergy's PILOT schedules after all units have discontinued operations, the affected local government entities will be eligible to access the Cessation Fund as soon as they experience a reduction in the PILOT of 20% or more.

The Cessation Fund's support smooths out the reduction of PILOT revenue, providing more time for adjusting the tax base and attracting new economic development that can generate new revenue for the taxing jurisdictions.

Federal Funds

After consultation with the Task Force, U.S. Congresswoman Nita Lowey introduced a bill aimed at offsetting revenue losses. The ***Redistribution of Fines to our Communities Act (H.R. 4440)*** would redistribute safety-related fines to support the local tax base with replaced revenues from the closed nuclear plant, mitigating the economic impacts of plant closure and aiding our communities with economic development.

Congresswoman Lowey also co-sponsored the ***STRANDED Act*** ***(H.R. 3970)***, which reimburses local communities $15 per kilogram per year for nuclear waste stored on site.

Development Opportunities

Indian Point Site

Based on the study of reuse opportunities of the Indian Point Energy Center property (see full report attached), the Task Force is reviewing the viability of Entergy's release of non-impacted parcels as soon as practicable for potential development. While the Task Force

will continue to assess potential reuse options for maximum benefit of the affected taxing jurisdictions, the Village of Buchanan already identified the following preliminary preferences for potential reuse:

1. Conference Center
2. Another Energy Producing Facility
3. Small Manufacturing Plant
4. Industrial Park

REDC Dedicated Fund

The Regional Economic Development Council initiative (REDC) is a key component of Governor Cuomo's transformative approach to state investment and economic development. In 2011, Governor Cuomo established 10 Regional Councils to develop long-term strategic plans for economic growth for their regions. The Councils are public-private partnerships made up of local experts and stakeholders from business, academia, local government, and non-governmental organizations. The Regional Councils have redefined the way New York invests in jobs and economic growth by putting in place a community-based, bottom up approach and establishing a competitive process for state resources.

The Mid-Hudson Regional Council strives to identify projects that will ensure our urban centers are transformed into vital, attractive places for businesses and millennial talent to locate; thriving businesses in a variety of industries create jobs and continue to grow; and continue to establish the Region as a popular and internationally-known tourist destination. This is progress with purpose – moving the Mid-Hudson forward to realize the vision of LIVE, WORK, and PLAY.

Given the unique needs of the communities immediately surrounding Indian Point, the Task Force recommends that the Mid-Hudson Regional Council consider establishing a dedicated fund for projects that directly benefit the taxing jurisdictions most affected by the closure of Indian Point.

Development Resources

Over the last year, the Task Force identified the following state programs to provide additional development resources to the affected jurisdictions. These programs are subject to annual budget appropriation and legislative changes:

Empire State Development Grant Funds

Capital grant funding is provided on a competitive basis for capital-based economic development projects intended to create or retain jobs; prevent, reduce or eliminate unemployment and underemployment; and/or increase business or economic activity in a community or Region. Eligible Applicants include but are not limited to: for-profit businesses, not-for-profit corporations, business improvement districts, local development corporations, public benefit corporations (including industrial development agencies), economic development organizations, research and academic institutions, incubators, technology parks, municipalities, counties, regional planning councils, tourist attractions and community facilities. Empire State Development Grant Funding is available on an annual basis through the Governor’s Consolidated Funding Application and can be made available on a time sensitive basis throughout the year depending on the needs of the project at hand. Eligible activities include acquisition of land, buildings, machinery and/or equipment; Demolition and environmental remediation; New

construction, renovation or leasehold improvements; Acquisition of furniture and fixtures; Soft costs of up to 25 percent of total project costs; and Planning and feasibility studies related to a specific capital project or site.

Empire State Development Strategic Planning and Feasibility Studies

Provides working capital grants on a competitive basis of up to $100,000 each to support 1) strategic development plans for a city, county, or municipality or a significant part thereof and 2) feasibility studies for site(s) or facility(ies) assessment and planning. ESD's Urban and Community Development Program promotes economic development in the State of New York by encouraging economic and employment opportunities and stimulating development of communities and urban areas. Eligible applicants are Cities, Counties, Municipalities, Business Improvement Districts, Local Development Corporations, and Not-for-profit Economic Development Organizations. Eligible activities include the Preparation and development of strategic development plans for a city, county or municipality or a significant part thereof; and Studies, surveys or reports, and feasibility studies and preliminary planning studies to assess a particular site or sites or facility or facilities for any economic development purpose other than residential, though mixed-use facilities with a residential component are allowed.

Environmental Protection Fund Local Waterfront Revitalization Program (DOS EPF LWRP)

Provides grants on a competitive basis to eligible villages, towns, cities, and counties (with the consent and on behalf of one or more villages, towns, cities) located along New York's coasts or designated inland waterways to revitalize communities and waterfronts through planning, design, and construction projects. Eligible applicants are villages, towns, or cities, and which are located along New York's coasts or inland waterways designated pursuant to Executive Law, Article 42. DOS EPF LWRP Grant Funding is available on an annual basis through the CFA. Eligible activities include preparation and implementation of Local Waterfront Revitalization Programs, and may include planning, design and construction.

In December 2017, the Town of Cortlandt and Village of Buchanan were awarded a $250,000 LWRP Grant Award by the Regional Economic Development Council.

In December 2017, the Town of Cortlandt and Village of Buchanan were awarded a $250,000 LWRP Grant Award by the Regional Economic Development Council. With this grant, the Town of Cortlandt and the Village of Buchanan will prepare a joint Local Waterfront Revitalization Program (LWRP) for nine miles of Hudson River waterfront. The LWRP will be developed through a community-based planning process and will serve as a guide for the development, protection and enhancement of the waterfront area. Additionally, the LWRP will address opportunities and challenges associated with the closure of the Indian Point nuclear power plant.

Following development of the LWRP, the Town and Village will establish the scope of work and execute the contract for the grant with the Department of State. After the contract is executed, LWRP staff will provide technical assistance to the town and guide them through the development of the LWRP, a practice which typically takes two years.

Once the LWRP is finished and approved by all appropriate parties, the Town and Village will be eligible to pursue LWRP earmarked funding through the CFA process for implementation of projects identified within the LWRP. For the state fiscal year 2018-19, $14 million is available for all LWRP projects in New York State.

Brownfield Opportunity Area Program (BOA)

The BOA Program provides grants on a competitive basis to municipalities and community-based organizations to complete BOA Nomination Plans, which are revitalization strategies for neighborhoods or areas affected by brownfields or economic distress. The program provides an area-wide approach, rather than the traditional site-by-site approach, to the assessment and redevelopment of contaminated parcels (brownfields) and other abandoned and underutilized or blighted properties. The area-wide approach enables communities to comprehensively assess existing economic and environmental conditions, identify and prioritize community supported redevelopment opportunities, and attract public and private investment. DOS is not currently accepting applications for the BOA program. When grants are available, an announcement will be posted on the DOS webpage at http://www.dos.ny.gov/opd/grantOpportunities/boagrants.html.

New York State DEC/EFC Wastewater Infrastructure Engineering Planning Grant Program

The New York State Department of Environmental Conservation (DEC), in cooperation with the New York State Environmental Facilities Corporation (EFC), makes funding available for municipalities that need to construct or improve their municipal wastewater system. Grant funds can be used to pay for engineering and/or consultant fees for engineering and planning services for the production of an engineering report. Municipalities can apply for the funding through the Consolidated Funding Application (CFA). Successful applicants will be required to submit a complete engineering report within 12 months of their grant agreement being executed. The engineering report will be used when seeking financing through the CWSRF program or other financial means to further pursue the identified solution.

New York State DEC – Water Quality Improvement Project Program

The Water Quality Improvement Project (WQIP) program is a competitive, statewide reimbursement grant program open to local governments and not-for-profit corporations for implementation projects that directly address documented water quality impairments or protect a drinking water source. This grant program requires recipients to provide 15 percent of the award amount as a local share of the project for high priority Wastewater Treatment Improvement projects; 25 percent of the award amount as a local share of the project for Non-agricultural Nonpoint Source Abatement and Control, Land Acquisition for Source Water Protection, Salt Storage, Aquatic Habitat Restoration, and Municipal Separate Storm Sewer System projects; and 60 percent of the award amount as a local share of the project for General Wastewater Infrastructure Improvement projects.

Government Efficiency Resources

Local Government Efficiency Grant Program

This program provides assistance for local governments to develop and implement new opportunities for savings and service delivery efficiencies (up to $4 million available). The Local Government Efficiency Grant Program (LGE) is an annual competition solicitation as part of the CFA normally due at the end of July.

- Annual competitive grant program to implement new local government efficiency actions.
    - Planning projects capped at $12,500 per local government, not to exceed $100,000.
    - Implementation projects capped at $200,000 per local government, not to exceed $1,000,000.
- Project applications are assessed on the expected fiscal impact realized through project implementation, level of shared effort and service improvement.

Municipal Restructuring Fund Program

This program provides assistance to local governments for implementation of large scale local government reorganization and modernization efforts (up to $25 million). The Municipal Restructuring Fund (MRF) is a four-phase program that assists local governments with continued project development and project implementation. Projects must meet threshold requirements for each phase before moving onto the next. The four MRF phases include:

- Phase 1 – Project Charter
- Phase 2 – Project Development
- Phase 3 – Small Scale implementation
- Phase 4 – Full Scale implementation

Applications to the MRF are accepted on a continuous cycle, with three submission deadlines throughout the year set for the second Wednesday in March, July and November. Unlike other competitive programs, MRF applications are ranked against established scoring thresholds, not against other applications submitted. While application recruitment is continuous, the 3 established deadlines provide a set timeline for review of applications.

Award amounts are determined based upon the project's projected savings, not to exceed the total cost of the project. The greater the project savings, the greater the amount of the award for which a municipality is eligible.

Recommendations

- In the FY2018 and FY2019 State budgets, the Governor and Legislature authorized an additional appropriation of $39 million to the Electric Generation Facility Cessation Mitigation Program. The Task Force recommends that the impacted municipalities avail themselves of this nation-leading program.
- The Task Force recommends that the State advocate for federal funding mechanisms, such as those provided by the STRANDED Act and the Redistribution of Fines to our Communities Act, to compensate taxing jurisdictions for storing radioactive spent nuclear fuel indefinitely on-site.
- The Task Force recommends that, based on the D.L. English report on possible reuse opportunities at the plant site, Entergy agree to release segments of the Indian Point property as soon as practicable to the appropriate development entity.
- The Task Force recommends that the Hudson Valley Regional Economic Development Council set aside funds for the sole purpose of attracting economic development to the affected taxing jurisdictions.

- The Task Force recommends that agency staff continue to work with affected taxing jurisdictions to strategically utilize all existing development programs.
- The Task Force recommends that the Village of Buchanan evaluate funding opportunities, including through the Water Quality Improvement Project Program, for engineering studies and upgrades to the Village's wastewater treatment plant to help improve water quality and capacity.
- The Task Force recommends that the Town of Cortlandt and Village of Buchanan apply for Local Government Efficiency funding to plan and implement a shared services initiative. The Task Force recommends that the Department of State provide technical and other assistance to facilitate the planning and implementation of shared services opportunities.

Labor Impacts

Workers at nuclear power plants are highly specialized and trained with wide ranging titles, job duties and skills sets. A number of employees are expected to remain at the plant following closure to assist with the shutdown and decommissioning processes as well as the transportation, monitoring, and protection of spent nuclear fuel.

While the specific numbers for Indian Point are not yet available, and will be specific to the unique needs of the plant, the Task Force reviewed the labor impacts associated with the closure of Entergy's Vermont Yankee nuclear plant.

It is important first to draw a distinction between Vermont Yankee and Indian Point. Vermont Yankee consists of one boiling water reactor, where Indian Point has three nuclear reactors -- two active pressurized water reactors and one shuttered reactor. The capacity of the reactors is also different at 620 megawatts for Vermont Yankee and 2,069 for Indian Point. As such, the number of employees needed at each facility is very different, with 650 at Vermont Yankee and approximately 1,000 at Indian Point.

On August 27, 2013, Entergy announced plans to close and decommission Vermont Yankee in the fourth quarter of 2014 due to unfavorable market conditions, according to Entergy. Following that announcement, 40 employees retired and 79 transferred to another Entergy facility.

On December 29, 2014 (sixteen months after its announcement), Vermont Yankee permanently ceased electricity-generation operations, at which time there were 550 employees. On January 19, 2015, Vermont Yankee transitioned to safe storage, or SAFSTOR, a deferred decommissioning pathway. There were 316 employees employed at the site at this time. Vermont Yankee transitioned to SAFSTOR II in May 2016, at which point the employment count was 132 employees. Between January 2015 and April 2016, 50 employees transferred to other Entergy facilities.

In June 2016, Vermont Yankee announced a security contract, effective June 28, to outsource security and related services as part of its decommissioning efforts, which further reduced the number of employees at the site. As of February 2018, Vermont Yankee employed approximately 65 individuals at the Vermont Yankee site (excluding security personnel).

Labor Resources and Recommendations

The Department of Labor has committed to ensuring the best possible results for each individual Indian Point worker. Any worker with questions or concerns is encouraged to both contact their labor union and visit their local Career Center. The Department will also establish and promote a devoted webpage on its website, with regional contact information, including a dedicated email address, highlighting information and opportunities for workers.

Resources

The economy of New York State is very dynamic, with historically high private sector job counts topping 8 million and plummeting unemployment rates in every region.

New York State, through the Department of Labor, is well versed in assisting workers at businesses that are closing, helping them reach the next stage in their career with the best customer service they can receive. The Indian Point situation is unique, given the extended notice of closure.

The Department of Labor, UWUA Local 1-2, Teamsters Local 456, and Westchester Putnam Central Labor Council established a process to meet both individual and collective employees' needs. The process to collect job titles at the plant has already begun and discussions with other employers and utilities are being scheduled.

On Sept. 20, 2017, Department of Labor representatives met with local labor leaders (James Slevin, from UWUA, Thomas Carey, from the Westchester Putnam Central Labor Council, and Louis Picani from the Teamsters) to hear their concerns. A second meeting was held on Oct. 26, 2017 with Mr. Slevin and Mr. Picani. The Department of Labor has designated a lead staff member to work directly with each union involved and informational sessions and individual meetings with union members will take place at the unions' discretion and request. The Department will also be working with Entergy on assisting non-union workers to ensure their needs are captured and that they are made aware of available State assistance.

On November 3, Department of Labor Executive Deputy Commissioner Mario Musolino and Energy Sector Program Manager Ross Gould, of the Workforce Development Institute, took part in a Journal News panel to discuss the status of Indian Point's workforce and the future possibilities for worker retention, training and placement.

UWUA Local 1-2 and Entergy reached a four-year agreement that covers 330 of Indian Point's workers. . . [and they] will also discuss potential opportunities for future work-related activities post-closure.

Unlike the more common closure of a retail facility which would have many competing employees, many Indian Point workers possess highly specific and technical skills that make them highly employable in other parts of the state or country. Electrical engineers, industrial machinery mechanics and electrical repairers, for example, will have access to jobs in the power generation and supply industry, but also in semiconductors, engineering services and electronic instruments. The skills of production worker supervisors are also transferrable to the fields of pharmaceuticals and medical equipment. And supervisors of mechanics may be able to find careers in automotive repair and telecommunications.

Ongoing labor negotiations will substantively impact the process for represented workers. In late January 2018, UWUA Local 1-2 and Entergy reached a four-year agreement that covers 330 of Indian Point's workers. That agreement includes provisions to ensure the required level of staffing needed to operate Indian Point through April 30, 2021. Entergy and UWUA Local 1-2 will also discuss potential opportunities for future work-related activities post-closure. A labor contract with Teamsters Local 456 covering security officers expires in October 2019.

In addition, the Department of Labor will work to determine a timeline for all employees as the project progresses -- specifically how many workers will be required at the plant until its closing date and afterward, including the possibility of workers transitioning to long-term decommissioning roles.

For those who will be separated, a certain percentage will decide to retire. In addition, Entergy will assist qualified individuals interested in other professional opportunities to relocate to other Entergy owned facilities outside New York State. Entergy is also expected to make offers of employment to some Indian Point workers to remain at the site for spent fuel management, decommissioning, and security purposes. In addition, the State will work

with utility companies to identify job opportunities in the Hudson Valley region, and with Exelon Nuclear to identify opportunities at Upstate nuclear facilities.

New York State wants these workers to stay in their communities whenever possible, and many of the skills these workers possess are transferrable to jobs within the surrounding communities, including with the New York Power Authority and Con Edison. An emphasis on green jobs in New York State means potential employment and retraining opportunities through the New York State Energy Research and Development Authority for jobs in clean energy fields.

The Department of Labor is prepared to deploy its Rapid Response Team, which will, in partnership with labor unions, lead general discussions and set up individual meetings with workers on a timeline made at the unions' direction.

Individualized career counseling will include customized resume development, job search assistance, job referrals, referrals to available (and possible creation of) training and retraining opportunities, recruitment events and career fairs and interview preparation. These services, and more, are already available at nearby Career Centers in Peekskill, Haverstraw, Newburgh, Carmel, White Plains, Yonkers and Mount Vernon.

Ensuring that workers are protected and assisted fairly and equitably continues to be a priority of both Governor Cuomo and the Department of Labor. The Department of Labor will continue to engage all labor leaders to assess the existing workforce as the decommissioning proceeds to meet workers' needs.

Recommendations

- The Department of Labor will meet with all interested employees at Indian Point to develop individualized transition plans. The Department of Labor will, among other services: 1. Provide résumé development assistance; 2. Identify other job opportunities with NYS utilities with a priority for remaining in the lower Hudson Valley region and opportunities with Entergy; and 3. Identify training opportunities to learn new skills.
- Based on data collected from employee meetings, the Department of Labor will identify training needs not met by existing programs, if any.
- The Task Force recommends that Entergy commit to retaining existing employees, where appropriate, for purposes of pre-decommissioning and decommissioning work and continued security of the site post-closure.

Electric System Impacts

The planning for a future without Indian Point began well before the actual closure was announced. In January of 2012, Governor Cuomo unveiled the Energy Highway initiative that called for strengthening our energy infrastructure and making plans for the replacement of older power plants, such as Indian Point. In October of that year, the Energy Highway Blueprint was issued following through on the Governor's initiative, and the Public Service Commission responded in November by commencing the Indian Point Contingency Planning Proceeding to prepare for the possible closure of the plant as early as 2015, the end of Unit 3's initial license term. As a result of this public review process, the Commission identified transmission upgrades, energy efficiency measures and distributed resources to mitigate reliability needs. These measures resulted in 600MW of transmission upgrades and 130MW of distributed energy resources and energy efficiency improvements, dramatically lessening replacement power needs.

On December 13, 2017, NYISO published the results of its assessment, finding that IPEC's planned retirement in 2020 and 2021 did not result in any reliability needs.

Any power generation facility intending to close in the State of New York must also go through a thorough, independent resource adequacy assessment by the New York Independent System Operator (NYISO) to ensure New York's energy needs will be met following plant closure.

In 2017, NYISO conducted its assessment of Indian Point following Entergy's submission of a Generator Deactivation Notice for Units 2 & 3. On December 13, 2017, NYISO published the results of its assessment, finding the retirement of Unit 2 and Unit 3 on April 30, 2020 and April 30, 2021, respectively did not result in any identified reliability needs. NYISO representatives reviewed these findings during the Task Force's December 19, 2017 public meeting. NYISO's findings were reaffirmed in its May 3, 2018 publication of Power Trends 2018, the system operator's annual in-depth assessment of New York's power grid.

Energy Reliability Recommendations

The Task Force recommends that the State of New York continue to monitor and report to the Task Force any changes in the energy market place that could change the NYISO findings that the reliability criteria will be met and Indian Point's closure will not result in any identified reliability needs.

Public Safety Impacts and Recommendations

The cessation of reactor operations and transfer of spent fuel to dry cask storage will reduce the potential human health and environmental impacts and hazard risks to the New York metropolitan area associated with a severe reactor or spent fuel pool accident at the Indian Point location.

The cessation of power reactor generation at the Indian Point site is also expected to reduce the hazard risk associated with potential sabotage events at the location.

Decommissioning Impacts and Recommendations

NRC Decommissioning Proceeding

In 2015, the federal NRC staff started a federal rulemaking process to amend various regulations concerning various decommissioning issues including, approval of decommissioning plans, decommissioning schedules, decommissioning funding, site security and protection of radioactive spent nuclear fuel, cybersecurity, emergency evacuation and planning, and spent fuel handling. *See* NRC Proceeding RIN 3150–AJ59 / NRC–2015–0070.

Over the past two years, the State of New York has actively participated in the rulemaking proceeding and has opposed the federal government's proposal to relax the suite of decommissioning standards. The proposed changes affect decommissioning protocols, financial assurance, accounting, spent fuel management, security, and emergency planning and evacuation protocols. Given the complexities of decommissioning and ongoing storage of nuclear waste, the State supports maintaining strong safety and security standards following plant closure. In February 2018, the NRC released a Regulatory Analysis that presented the staff's views concerning the costs and benefits of the staff's proposals. NRC staff may submit a draft rule to the NRC Commissioners in May 2018 and then publish a proposed rule for public comment later in 2018. After receiving input from the NRC Commissioners, the industry, and the public, a final rule may be published in early 2020.

Over the past two years, the State of New York has actively participated in the rulemaking proceeding and has opposed the federal government's proposal to relax the suite of decommissioning standards.

Nuclear Funds

The federal Nuclear Waste Policy Act authorized the collection of money to assist in the storage of radioactive spent nuclear fuel. According to an audit, at the end of FY 2016, the Nuclear Fund had approximately $36 billion in assets in Treasury securities. (The "fair value" of the Treasury securities could be higher.)

The federal government agreed to remove radioactive spent nuclear fuel from civilian power reactors, like Indian Point, starting in 1998. The federal government did not comply with its agreement and contract. Private companies that own reactors have sued the federal government for "breach of the contract" claims. As a result of such contract claims, the federal government has paid approximately $6 billion to private companies from the U.S. Department of Justice "Judgment Fund."

Legislation

Congresswoman Nita Lowey consulted with the Task Force before introducing two bills aimed at securing sensible security, emergency response and nuclear waste storage policies:

- ***Removing Nuclear Waste from our Communities Act* (H.R. 4442)**: One of the primary obstacles to redeveloping the Indian Point property will be the dry casks that will remain on-site in the absence of a central repository. This bill would expedite the process to remove spent fuel rods from the plant site by allowing the Nuclear Regulatory Commission (NRC) to license interim storage facilities elsewhere in the country and to prioritize the removal of nuclear waste from sites in densely populated areas like the Lower Hudson Valley.
- ***Safe and Secure Decommissioning Act* (H.R. 4441)**: This bill would maintain the NRC's emergency response and security requirements until all of the spent fuel on the site is moved into dry cask storage, which is the safest temporary way to store nuclear waste. This would ensure that spent fuel rods stored on-site at the closed facility remain safe and secure until a permanent repository for nuclear waste is operational.

The Task Force also continues to monitor several additional federal legislative proposals aimed at providing necessary resources to host communities. These include:

- ***Stranded Nuclear Waste Accountability Act* (H.R. 3929):** Introduced by Representatives Courtney (CT) and Welch (VT), this bill would provide for payments to communities hosting a decommissioned nuclear plant in which the spent nuclear fuel has not been removed.
- ***STRANDED Act* (H.R. 3970):** Introduced by Representative Schneider (IL), this bill would provide for financial assistance to host communities, direct the National Academy of Sciences and the National Laboratories to conduct substantive research on the effects of nuclear plant closures on communities hosting stranded spent fuel, and establish a federal task force.

Public Safety

The NRC and other federal agencies are responsible for the duration of the federal operating licenses. After the cessation of power reactor operations, those licenses will still continue until the NRC provides a written unrestricted release of the site; New York State will hold the NRC and the federal government accountable to protect New York citizens, the environment, and resources.

The Federal Emergency Management Agency (FEMA) and other federal agencies remain responsible for ensuring off-site public safety, emergency planning, and evacuation related to a radiological accident or emergency associated with the Indian Point site. Radioactive spent nuclear fuel can continue to pose a human health and environmental risk after removed from a reactor. The New York State Division of Homeland Security and Emergency Services will monitor the federal agencies actions in this area.

Vermont Yankee Monitoring

Potential decommissioning activities at the Vermont Yankee nuclear power reactor site, which is also owned and operated by Entergy, offer a potentially illustrative example of Entergy's future decommissioning plans for Indian Point. The Vermont Yankee reactor ceased generating electricity in December 2014. Thereafter, Entergy applied to the Vermont Public Utility Commission (VPUC) and the Nuclear Regulatory Commission (NRC) for permission to sell the Vermont Yankee facilities and property – including its spent fuel – to Northstar Group Services for decommissioning, site restoration, and spent fuel management. In early March 2018, a settlement in the VPUC proceeding was reached by Entergy, Northstar, Vermont, citizen groups and host communities. A hearing on the remaining party's contentions is scheduled for May 2018 before the VPUC. NRC staff has requested additional information about the proposed transfer of the Vermont Yankee facility and operating license from Entergy to Northstar. NRC is expected to make a decision on Entergy's application in the federal agency proceeding in or about June 2018.

Entergy has also announced its intent to cease power generation activities at its Pilgrim and Palisades facilities in Massachusetts and Michigan, respectively.

Recommendations

The Task Force recommends that all relevant members of the Task Force advocate to the Nuclear Regulatory Commission that it should ensure prompt decommissioning of the site and maintain protective decommissioning standards and maintain existing post-closure security standards.

Reuse Analysis

NYSERDA, in satisfaction of the State's statutory obligation, contracted with DL English Consulting, a firm with nuclear design, licensing, construction, operating and decommissioning experience, to complete the study. DL English presented preliminary findings to the Task Force at the December 19, 2017 public meeting, and draft final findings at the April 12, 2018 meeting. The final Study:

- Provides background on Indian Point Energy Center;
- Provides data on the decommissioning experiences of other nuclear generating facilities in the United States;
- Describes the critical timelines under different radiological decommissioning scenarios authorized by NRC regulations and projects the decommissioning duration for IPEC;
- Describes the critical steps and regulatory processes in the closure and decommissioning of IPEC;
- Identifies decision making governmental entity(ies);
- Identifies areas needing follow-up (e.g., discussions between Town, Village and Entergy regarding Parcel A boundaries and ownership); and
- Identifies Parcel characteristics and multiple reuse opportunities for each parcel.

Importantly, DL English identifies potential opportunities to reuse portions of the site even before decommissioning is completed. While any partial release of property would require the cooperation and agreement of the site owner, Entergy, and approval by the NRC, understanding the opportunities will be valuable to local host communities and the Task Force as we consider new economic development opportunities.

Working through NYSERDA, DL English will review any comments from taxing jurisdictions, and consider updates to the report if necessary. DL English will also be available to answer questions from members of the Task Force as it considers next steps that need to be taken to support safe decommissioning and potential redevelopment of the site (or portions thereof).

The Reuse Study is complete and attached as Appendix C.

IV. Inventory of Additional State Programs

In addition to the programs previously mentioned, New York State offers the following programs that may be of assistance to local leaders.

NYSERDA Programs

NYSERDA is identifying energy savings and renewable energy/economic development program opportunities for local communities impacted by the plant closure. Various NYSERDA programs are being explored that have the potential to provide local incentives and economic stimulus from both renewable energy projects and energy efficiency projects/programs. Example of projects/programs under consideration include:

- REV Demonstration Projects
- Energy efficiency opportunity zones
- Community distributed generation zones
- Clean Energy Communities
- Focused programs for the Hendrick Hudson School District

Retraining for Green Jobs (NYSERDA)

NYSERDA is committed to developing and providing employee retraining for opportunities in energy efficiency and renewable power generation. Over the coming years, NYSERDA will plan and execute a comprehensive training program – working in coordination with Entergy and other state agencies. Steps will include:

- Identifying employees not retiring, relocating with Entergy/NYPA, or staying on for decommissioning
- Conducting skills inventory with targeted group
- Planning and developing custom and targeted curricula to prepare displaced workers for position in the green energy economy

NYPA Smart Street Lighting NY Program

The New York Power Authority's (NYPA) Smart Street Lighting NY Program offers communities across New York a clear path to convert existing streetlight systems to energy-efficient LED. The program was announced by Governor Cuomo in the 2018 State of the State and calls for at least 500,000 street lights throughout the state to be replaced with energy-saving LED technology by 2025.

NYPA is prepared to work with the cities, towns, villages and counties affected by the Indian Point closure to fully manage and implement a transition to LED streetlight technology. NYPA will provide upfront financing for the project, with payments to NYPA made in the years following from the cost-savings created by the reduced energy use of the LED streetlights. NYPA is also willing to finance the purchase of street lighting systems from a municipality's utility if needed.

Training Programs (DOS)

DOS conducts training programs for elected and appointed local officials. These training programs are offered throughout the year at no cost. Generally, these events are hosted by county and regional planning agencies and municipal organizations. Recognizing that many officials are unable to attend day-long conferences, many of the events are held weekday

evenings. The Department also provides online courses, available 24 hours a day. DOS staff has a wide breadth of educational backgrounds and expertise in issues affecting local governments.

Technical Assistance (DOS)

Technical assistance is available through the Division of Local Government Services and the Office of Planning, Development and Community Infrastructure.

- The Division of Local Government Services serves as a technical assistance clearinghouse for local government officials, members of local boards, enforcement officers, attorneys, and others who assist local governments in their decision-making process. The Division keeps a collection of sample local regulations that span subjects from “A” (Accessory Structures) to “Z” (Zoning Enforcement) and serves as a valuable resource for municipalities contemplating a change to their regulations.

- The Office of Planning, Development and Community Infrastructure provides technical expertise, funding and regulatory support for communities to create and implement shared strategies and projects that make NY a better place to live, visit and invest. The Office governs the NYS Coastal Management Program to ensure the appropriate use and protection of coasts and waterways and determines that projects are consistent with the State's coastal policies, including permitting, funding and Federal agency actions. The Office oversees the development, adoption and implementation of Local Waterfront Revitalization Programs to advance community and waterfront revitalization. The Office facilitates local and county plans to enhance resiliency from sea level rise, increased precipitation, and flooding; and the preparation of model local laws to help communities implement their resiliency plans.

Comprehensive Planning (DOS)

The Division of Local Government Services also provides assistance to communities in the creation of a comprehensive plan. Communities can, upon request, be provided training on the practical and legal benefits of adopting a comprehensive plan. Including the importance of involving the public in the development of the plan early on; strategies for compiling essential data to set the direction of the plan; plan contents; and steps leading to the adoption of a comprehensive plan.

Other Department of State Functions (DOS)

The Department of State has multiple other resources that may, in the future, be of assistance within the purview of the Indian Point Task Force. The Division of Corporations and Licensing and the Office of New Americans may have resources to bring to bear if requested.

Climate Smart Communities Grant Program (DEC)

The Climate Smart Communities grant program provides 50/50 matching grants to counties (and NYC boroughs), cities, towns and villages of the State of New York for eligible climate adaptation and mitigation projects.

In 2017, $9.5 million was available for implementation projects related to flood risk reduction, extreme event preparation, reduction of vehicle miles travelled (VMT), reduction of food waste, reduction of landfill methane leakage, and reduction of hydrofluorocarbons

emissions from refrigeration and other air conditioning equipment. In addition, $500,000 is available for certification projects that advance adaptation, land use, transportation, and organic waste management planning, inventory and assessment actions aligned with Climate Smart Communities Certification requirements.

Hudson River Estuary Program (DEC Grants Program)

Since 1999, New York State Department of Environmental Conservation's (DEC) Hudson River Estuary Program has offered grants to municipalities and non-profits located within its Estuary Watershed Boundaries to plan or implement projects that advance priorities outlined in the Hudson River Estuary Action Agenda: conserving or improving clean water; fish, wildlife and their habitats; river access; the resiliency of communities; and natural scenery. To date, the Estuary Program has awarded 495 grants totaling $19.4 million for these projects. Funding for the Hudson River Estuary Grant Program is primarily from New York State's Environmental Protection Fund (EPF).

These competitive opportunities are announced annually as the Hudson River Estuary Grants Program Request for Applications (RFAs) posted on the NYS Grants Gateway. Descriptions of eligible projects, applications, eligibility requirements, and instructions for registering and prequalifying in the Grants Gateway are included in each RFA. There are generally three different grant opportunities for Tributary Restoration and Resiliency; Local Stewardship Planning; and River Access and Education. More information about the grants program can be found on DEC's website: www.dec.ny.gov

V. State and Local Legislative and Community Efforts

State Legislation

FY 2018 Budget

Governor Cuomo, Senator Murphy, and Assemblywoman Galef secured three major legislative victories in the FY2018 New York State budget for the communities affected by Indian Point:

a. Established the Indian Point Closure Task Force, including requirements to compile this report annually through 2024 and a study of site reuse options.

b. Added an additional $15 million to the Electric Generation Facility Cessation Mitigation Program (Cessation Fund)

c. Enabled the Hendrick Hudson School District to establish a reserve fund

FY 2019 Budget

In 2018, Governor Cuomo, Senator Murphy, and Assemblywoman Galef took another critical step toward mitigating tax loss impacts by authorizing an additional $24 million to the Cessation Fund.

Proposed Legislation

S6127A (Senator Murphy): The "Nuclear Facility Closing Workers' Protection Act" would establish certain health, safety and labor rights related to the closure of nuclear electric plants.

S5481 (Senator Murphy): This bill would direct the Department of Taxation and Finance to study and report on the impact on localities in the counties of Westchester, Putnam, and Dutchess of state-owned lands.

S3774 (Senator Murphy): The "New York State Water Infrastructure Relief Act" would provide assistance to municipalities seeking to finance water infrastructure improvement projects.

S2648 (Senator Carlucci): The "Nuclear Storage Safety Fund" would establish a dry cask storage fund directing certain nuclear generating facilities to transfer certain monies in exchange for the storage of dry casks containing spent fuel.

A8746 (Assemblywoman Galef): This bill would include "spent fuel rods from nuclear reactors" within the definition of real property.

Local Initiatives

Community Unity Task Force

In February 2017, community leaders from the Town of Cortlandt, the Village of Buchanan, Westchester County, and Hendrick Hudson School District convened the Community Unity Task Force. The purpose of the Community Unity Task Force is to represent a cross-section of the community to collectively work together to plan for the closure of Indian Point. The Task Force meets regularly. Meeting minutes, videos, and announcements are posted on the Cortlandt website.

County Legislature

On October 30, 2017, the Westchester County Board of Legislators approved Resolution 105-2017. It resolves that the Westchester County Board of Legislators is committed to working with all of the effected communities on how to mitigate the economic, social and environmental impacts of the Indian Point Energy Center closing, and outlines recommendations.

Community-Driven Initiatives

Power Through Cortlandt

Power Through Cortlandt is a non-partisan, community-led group focused on planning for the future after the closure of Indian Point. The grassroots organization participates on the Community Unity Task Force and has been asked to present to the Indian Point Closure Task Force.

VI. Assessment of Compliance with Federal, State, Local Laws and Regulations Relating to Closure and Decommissioning

Federal Law (DPS Assessment)

Overview

Although the federal government authorized the construction of the first Indian Point reactor in 1956 and provisionally licensed its operation in 1962, the Nuclear Regulatory Commission did not promulgate regulations about decommissioning power plants until 1988. Since then, that agency has modified its decommissioning regulations from time to time. Those regulations are set out at Title 10 Code of Federal Regulations sections 50.75. 50.82, and 50.83. The federal agency has stated that it is the responsibility of the corporations that own, operate, and profit from nuclear power plant – and not the States and communities that "host" such facilities -- to ensure the comprehensive decommissioning of power plant sites. Given that responsibility, the federal agency requires nuclear power plant operators to set aside money to fund the decommissioning of such sites. Among other things, the federal agency promulgated "financial assurance" regulations. *See e.g.*, 10 C.F.R. § 50.75. Under those regulations, the corporations must set aside money in a separate account; however, the amount of money set aside in such an account is not required to equal 100% of the total decommissioning costs. Moreover, the money to be placed in a "financial assurance" account is not based on characteristics specific to a particular site (e.g., the facility's record of compliance and waivers from regulations, history of radiation leaks to groundwater, design of spent fuel pool), but, rather, it is linked to the rated thermal output (MWt) of the reactor in question. In short, the federal financial assurance regulations reflect a minimum generic set aside and are not tailored to site-specific characteristics. Although the federal government anticipates that actual, physical dismantlement/decommissioning activities will take less than 10 years to complete, it defers to the schedule selected by companies who may prefer to take up to 60 years – or even longer – to complete dismantlement and decommissioning activities. *See* 10 C.F.R. § 50.82(a)(3).

"Partial & Early Release"

NRC allows for the possibility of a release of a *portion* of a regulated site from NRC regulatory jurisdiction before the agency terminates the operating license for all of the facilities and security areas located at a site. *See* 10 C.F.R. § 50.83 ("release of part of a power reactor facility or site for unrestricted use"). NRC has referenced this "partial & early release" regulation for sites in Illinois and Connecticut. At 250 acres, the Indian Point site is one of the smallest nuclear power plant sites in the nation.

Portions of the Indian Point site are used for dry storage casks that contain spent nuclear fuel. Concrete buildings encase Unit 2's and Unit 3's radiologically-contaminated steam generators; these generators were removed previously, and replacement generators were installed in their place.

Ownership of Radioactive Spent Nuclear Fuel

The ownership of spent nuclear fuel stored at the Indian Point site depends on when the fuel was manufactured. Under the original version of the Atomic Energy Act of 1954, nuclear fuel belonged to the federal government and private ownership of the fuel was prohibited.

Congress subsequently authorized private corporations to own nuclear fuel used at civilian reactors. [5]

All commercial spent nuclear fuel manufactured before August 6, 1964 was owned by the United States. Commercial spent nuclear fuel manufactured between August 7, 1964 and December 31, 1970 may be owned either by the United States or by the nuclear facility's owner. All commercial spent nuclear fuel that was manufactured on January 1, 1971 or thereafter is owned by the nuclear facility's owner.

Indian Point Unit 2 and Unit 3 began commercial operations in 1973 and 1975, respectively. With respect to the spent nuclear fuel removed from Indian Point Unit 2 and Unit 3, Entergy holds title to all such fuel—presently held in densely-packed spent fuel pools and certain dry storage casks at the Indian Point site.

Indian Point Unit 1 began commercial operations in 1962 and ceased generating electricity in 1974. With respect to the spent nuclear fuel associated with Indian Point Unit 1, Entergy holds title to some of the spent nuclear fuel removed from Unit 1, and the United States holds title to the remainder. All the spent nuclear fuel removed from Unit 1 remaining on site is presently stored in dry storage casks on the site; the Unit 1 spent fuel pool was emptied in late 2008.

Spent Fuel Management Costs

The NRC's decommissioning "financial assurance" regulations do *not* cover spent fuel management issues or costs. Various corporations have recently sought exemptions from these regulations so that the corporations can access money in the nuclear decommissioning trust funds to pay for spent fuel management – *e.g.*, operation of the spent fuel pool, transfer of spent fuel from a spent fuel pool to dry cask storage facility, and operation of a dry cask storage facility. Also, in early 2016, NRC Staff proposed that NRC Commissioners revise the NRC regulations to, among other things, remove the prohibition on the use of trust funds for spent fuel management. New York submitted comments opposing the NRC Staff proposal.

Compliance

At this point in time, the federal Nuclear Regulatory Commission has not publicly raised concerns about Indian Point's compliance with that agency's decommissioning regulations. As noted, NRC Staff has recommended relaxing the federal decommissioning regulations. At its Vermont Yankee site, Entergy has sought exemptions from various federal decommissioning concerning financial assurance (as well as security, emergency planning, emergency evacuation) issues.

[5] Under the original framework, the United States, through the Atomic Energy Commission (the NRC's predecessor) leased nuclear fuel to reactor operators for a fee. The United States retained title to the fuel. ATOMIC ENERGY ACT OF 1954, Pub. L. No. 83-703, ch. 6, § 52, 68 Stat. 919, 929-30 (1954); PRIVATE OWNERSHIP OF SPECIAL NUCLEAR FUELS ACT, Pub. L. No. 88-489, §§ 4-6, 78 Stat. 602, 603-04 (1964); *Private Ownership of Nuclear Fuels, in CQ Almanac 1964*, at 585, https://library.cqpress.com/cqalmanac/document.php?id=cqal64-1303435 (20th ed. 1965).

Local Law

The State is not aware of any local town or village ordinance that encompasses the radiological decommissioning of Indian Point facilities.

Environmental Compliance

DEC will continue to monitor compliance with its laws and regulations (at 6 NYCRR Parts 596 - 599 & 613) for the following:

- Clean Water Act: SPDES/WQC
- Petroleum Bulk Storage (PBS): Governed by WC Dept of Health but ultimate regulation is NYS. Confirm amount of tanks on site and registration status.
- Chemical Bulk Storage (CBS): IP2 and IP3 each have a CBS registration. 6 tanks each for water treatment systems. Confirm registration status.
    - PBS and CBS regulation will continue until proper tank closure.

Decommissioning Monitoring

DEC will also monitor as the decommissioning process progresses for potential activities that need environmental review, permits, technical requirements or reporting.

New York is an Agreement State (regulatory agreement with NRC). Through this agreement, the NRC relinquishes regulatory control over much of the uses of radioactive materials to the State. The Federal government exercises regulatory control over uranium utilization facilities, which includes nuclear reactors.

Consistent with its Agreement State status, New York State, including NYS DEC and the New York State Department of Health, may:

- Monitor the decommissioning process
- Accompany NRC on-site inspections[6]
- Perform confirmatory testing at the end of the process

Low Level Radioactive Waste (LLRW)

Preliminary estimates suggest that approximately six million cubic feet of waste, much of it low-level radioactive waste, may be produced through the IPEC decommissioning. State regulations (at 21 NYCRR Part 502) require all facilities in New York that produce LLRW to submit annual reports to NYSERDA detailing the waste produced and how it is handled, and giving 5-year projections for future waste production. NYSERDA will continue to monitor compliance with this requirement and work with the waste disposal sites and interstate disposal compacts to ensure continued access to disposal for this waste.

[6] NRC's policy for cooperation with the State at nuclear power plants, including State observation and accompaniment of NRC inspections, is outlined in NRC Management Directive 5.2 "Cooperation with States at Commercial Nuclear Power Plants and other Nuclear Production or Utilization Facilities".

VII. Listing of Enforcement Actions Initiated for Actual or Alleged Conditions at Facility

Department of Environmental Conservation

In 2010 and 2015, the New York State Department of Environmental Conservation initiated administrative enforcement actions, which subsequently were resolved by consent order, following two separate explosions and fires of large-scale electric transformers at the Indian Point facilities. Those explosions and fires resulted in the release of petroleum products, which flowed into the groundwater and Hudson River. Each of those transformer explosions and fires resulted in the associated power plant going offline and the loss of power to the grid. Another transformer exploded and caught fire in April 2007 at Indian Point Unit 3.

The Department of Environmental Conservation resolved administrative enforcement actions with Entergy in two comprehensive Orders on Consent. A 2012 action against Entergy Nuclear Indian Point 2, LLC and Entergy Nuclear Indian Point 3, LLC addressed violations of DEC's Chemical Bulk Storage regulations, Environmental Conservation Law (ECL) Article 17, and the Navigation Law for the discharge of petroleum at the Indian Point facility, and resulted in payment of substantial civil penalties and Natural Resources Damages to the State of New York. Under the Order, Entergy was also required to repair the secondary containment systems and conduct chemical tank inspections, testing and replacement. A 2017 Consent Order with Entergy Nuclear Indian Point 3, LLC resolved Navigation Law and ECL Article 17 violations for the discharge of petroleum, and required payment of substantial civil penalties and Natural Resources Damages to the State of New York. Entergy was also required to conduct offsite cleanup and undertake construction to repair the plant's discharge canal into the Hudson River.

Department of Public Service

Since the announcement of the Indian Point Agreement on January 9, 2017, the Department of Public Service and the Attorney General's Office have not initiated an enforcement action against Indian Point. The January 2017 Agreement, resolved various ongoing enforcement actions between the State and Entergy. Consistent with January 2017 Agreement, the State retains prosecutorial discretion to initiate enforcement actions should the State deem it appropriate given the totality of the circumstances.

In March 2011, the State of New York requested the initiation of an enforcement action pursuant Title 10 of the Code of Federal Regulations, Section 2.206 for numerous violations of the 1980 federal fire safety regulations at both Indian Point reactors (10 C.F.R. Part 50, Appendix R). Entergy opposed the petition; however, the NRC accepted the State's petition and ultimately granted the State's request to identify violations of the fire protection regulations at Indian Point and take appropriate enforcement actions. The State also opposed Entergy's request to exempt the Indian Point facilities from the federal fire safety regulations. In 2012, the NRC ordered Entergy to comply with the federal safety regulations with respect to a large majority of identified violations. Entergy agreed to comply with the fire safety regulations by the end of 2012. Entergy certified that it brought the reactors into compliance with the federal fire regulations by the spring of 2014.

VIII. Overview of Recent Outages, Operational Events, and Regulatory Actions

The following section summarizes various outages, operational events, and regulatory actions involving the Indian Point facilities since January 2017.

Transfer of Spent Nuclear Fuel

Movement of Spent Fuel Nuclear Fuel from Spent Fuel Pools to Dry Cask Storage During 2017		
UNIT	**NUMBER OF CASKS**	**NUMBER OF FUEL ASSEMBLIES**
IP2	4	126
IP3	3	96
total	7	222

Outages and Operational Events

Indian Point Plant Operations – Notable Events January 1, 2017 – April 30, 2018			
DATE	**UNIT**	**EVENT**	**DESCRIPTION**
3/13/17 to 5/18/17	IP3	Refueling Outage and Inspections (67 day outage)	Inspections of Reactor Vessel Internals reveals 259 potentially degraded baffle former bolts; 270 baffle former bolts removed and replaced
6/12/17	IP3	Manual shutdown	Replace o-ring gasket in reactor vessel
6/26/17	IP2	Manual shutdown	Dropping water level in steam generator
9/18/17	IP2	Manual shutdown	Maintenance and repair of boiler pumps
11/3/17	IP3	SCRAM shutdown	Generator trip
12/8/17	IP2	Manual shutdown	Reactor coolant pump seal maintenance
2/16/18	IP3	Manual shutdown (12 day outage)	Generator failure leads to turbine trip
3/19/18 to 4/21/18	IP2	Refueling Outage and Inspections (34 day outage)	Reactor vessel weld defect discovered (3/31/18) • Involved reactor coolant pressure boundary • Likely mechanism: primary water stress corrosion cracking • weld overlay repair proposal • NRC approves repair proposal on 4/9/18 for one operating cycle • State requested public explanation of NRC decision; NRC provided explanation on 4/12/18

Regulatory Actions

On October 4, 2017, NRC grants deferral of various aspects of the post-Fukushima beyond design basis seismic and flooding analysis for Indian Point Unit 2 and Unit 3. ML17222A239.

IX. Community and Environmental Funding from Settlement Agreement

As a condition of the Indian Point Agreement between New York State, Entergy, and Riverkeeper to shut down operations by April 30, 2020 and April 30, 2021 for Units 2 and 3, respectively, Entergy agreed to establish a $15 million Community Fund for community and environmental benefit. The Community Fund is described in the Agreement as follows:

> *To further augment its commitment to the environment and the community in which Indian Point operates, Entergy shall establish a fund in the amount of $15 million (the "Fund"), the goal of which is to fund projects designed to benefit the Hudson River and to support the community, and to provide environmental protection and other public benefits to the community. The Fund will provide for the completion of projects to be selected by NYS and Entergy, after consultation with regional environmental organizations and community groups and interests. With respect to the environmental projects, priority will be given to projects for dam or culvert removal, purchase of sensitive wetlands areas along the Hudson River, continuation of scientific studies designed to advance the protection of riverine species, and prevention of the introduction of invasive species into the Hudson River watershed, and other projects determined by NYS and Entergy that are consistent with the purposes for which the Fund has been established.*

The Task Force initiated a conversation among relevant community and environmental leaders – specifically: Theresa Knickerbocker, Mayor of Buchanan; Linda Puglisi, Town Supervisor of Cortlandt; Joe Hochreiter, Superintendent of Hendrick Hudson School District; and Paul Gallay, President of Riverkeeper – to discuss opportunities for mutual community and environmental benefit. At its meeting on January 24, this group began identifying priorities for fund disbursement. The group will schedule subsequent sessions with Power Through Cortlandt and other stakeholders to further refine project priorities.

Recommendations

The Task Force recommends that Entergy and the State of New York, as signatories to the Indian Point closure settlement and sole decision-makers on final use of $15 million for community and environmental project funds under the settlement, develop criteria for awards. Such criteria should encourage projects that have maximum benefit to the taxing jurisdictions affected by the plant's closure. The Task Force further recommends that Entergy immediately place the $15 million in an interest bearing escrow account. The Task Force further recommends that consideration be given to water and sewer infrastructure projects in the affected taxing jurisdictions and for consultant services that are specifically procured for the purposes of addressing impacts associated with the closure of the plant be eligible for reimbursement from the fund.

Appendix

Appendix A: Task Force Membership

Department of Public Service (DPS)

The primary mission of the New York State Department of Public Service (DPS) is to ensure affordable, safe, secure, and reliable access to electric, gas, steam, telecommunications, and water services for New York State's residential and business consumers, while protecting the natural environment. DPS also seeks to stimulate effective competitive markets that benefit New York consumers through strategic investments, as well as product and service innovations. With the federal Nuclear Regulatory Commission (NRC), DPS provides direct oversight over all operating commercial nuclear power generation facilities in New York. DPS serves as the lead agency for the Task Force.

Department of Environmental Conservation (DEC)

The New York State Department of Environmental Conservation (DEC) was created on July 1, 1970 to combine in a single agency all state programs designed to protect and enhance the environment. DEC's jurisdiction is outlined in the Environmental Conservation Law (ECL) and Title 6 of New York Codes, Rules and Regulations (6NYCRR). DEC's mission is to conserve, improve and protect New York's natural resources and environment and to prevent, abate and control water, land and air pollution, in order to enhance the health, safety and welfare of the people of the State and their overall economic and social well-being. DEC's goal is to achieve this mission through the simultaneous pursuit of environmental quality, public health, economic prosperity and social well-being, including environmental justice and the empowerment of individuals to participate in environmental decisions that affect their lives. DEC will continue to monitor the facility's compliance with governing laws and regulations, and will also monitor the decommissioning process.

Department of State (DOS)

Established in 1778, the New York State Department of State (DOS) is the oldest and perhaps most diverse Department in New York State government. Long known as the "keeper of records," it continues today to serve as the official compiler of state agency rules and regulations and publisher of information on the State Constitution, the Great Seal of New York and other official State documents.

Today, DOS has been re-imagined in the Cuomo Administration as a vehicle to help reinvigorate the State's economy and make our communities more livable through strategic investments to revitalize communities and spur economic growth. As a member of the Indian Point Task Force, DOS is committed to working with the local governments involved to lessen the effect the plant closure will have on them.

Department of Taxation and Finance (DTF)

The Department of Taxation and Finance administers more than 40 state and local taxes and fees, including more than $14 billion in local sales tax and $8 billion in local income tax. The Office of Real Property Tax Services (ORPTS), a division within the New York State Department of Taxation and Finance, oversees local assessment administration. As a member of Indian Point Task Force, the division is working directly with county and municipal officials and Task Force members to provide technical assistance regarding the valuation and taxation of complex properties such as Indian Point.

Department of Labor (DOL)

The New York State Department of Labor (DOL) connects job seekers to jobs, helps businesses find talented workers, assists unemployed workers with Unemployment Insurance, educates stakeholders about their rights and responsibilities, vigorously enforces state labor laws, and protects the safety and health of workers and the public. DOL will assist Indian Point workers through the decommissioning process by creating customized employment and career plans and providing related services such as resume reviews, skills gap analyses and job referrals. The agency will also continue to engage local union leadership through every step of the process.

Empire State Development (ESD)

The chief Economic Development Agency for New York State, Empire State Development (ESD) strives to promote a vigorous and growing state economy, encourage business investment and job creation, and support diverse, prosperous local economies across the State through the efficient use of loans, grants, tax credits, real estate development, marketing and other forms of assistance. As such, ESD is working with the Task force members, Town of Cortlandt and Village of Buchanan to facilitate business growth and job creation by identifying smart growth development opportunities and potential funding programs, including the Electric Generation Facility Cessation Mitigation Program, to build the economic base of the community. ESD administers the Electric Generation Facility Cessation Mitigation Program.

Division of Homeland Security and Emergency Services (DHSES)

Created in 2010, the New York State Division of Homeland Security and Emergency Services (DHSES) and its four offices -- Counter Terrorism, Emergency Management, Fire Prevention and Control, and Interoperable and Emergency Communications -- provide leadership, coordination and support for efforts to prevent, protect against, prepare for, respond to, and recover from terrorism and other man-made and natural disasters, threats, fires and other emergencies. The women and men of DHSES are dedicated to working closely on a daily basis with all levels of government, the private sector, and volunteer organizations to improve the readiness, response and recovery capabilities of communities throughout the Empire State. Under Governor Andrew M. Cuomo's leadership, DHSES has taken great strides in enhancing the State's readiness and response capabilities. From terrorist threats to natural weather disasters, the demands for public health and safety continue to increase as they simultaneously become more complex. As we face these challenges, it is critical that we remain focused on strengthening our partnerships through increased communication and coordination.

Specific to nuclear power plants, the role of DHSES focuses on off-site planning, preparedness, and response. This is accomplished by working with the Federal Emergency Management Agency (FEMA) as well as local offices of emergency management, healthcare facilities, and other response partners on planning, training, exercises, and other activities to help neighboring communities be prepared for an emergency, should it ever occur.

New York State Energy Research and Development Authority (NYSERDA)

The New York State Energy Research and Development Authority (NYSERDA) has a state-legislated responsibility to coordinate New York State’s programs and activities related to

atomic energy, including nuclear power and low-level radioactive waste[7]. In addition to being the State's nuclear coordinator, NYSERDA also serves as State Liaison Officer (SLO) to the U.S. Nuclear Regulatory Commission and as lead agency for nuclear issues where no other State agency has primary jurisdiction (*e.g.*, licensing). NYSERDA has hired a consultant, D.L. English Consulting, Inc., to assist the Task Force and prepare a Reuse Study for the Indian Point site.

New York Power Authority (NYPA)

The New York Power Authority's mission is to power the economic growth and competitiveness of New York State by providing customers with low-cost, reliable power and the innovative energy infrastructure and services they value. NYPA Human Resources Representatives are active members on the Indian Point task force to assist with identifying job opportunities for displaced employees at Entergy as a result of the Indian Point closure. Through our recruitment efforts, we will utilize job boards, social media and career fairs to broadcast job openings and assist with placing affected employees in vacant positions.

Village of Buchanan

The Village of Buchanan is situated in the northwestern corner of Westchester County on the eastern bank of the historic Hudson River. Located within the Town of Cortlandt, the village covers 1.4 square miles and has an estimated population of 2,265 as of 2016[8]. Rich in history and amenities, visitors and residents enjoy a thriving shopping district, parks, recreational facilities and more. Buchanan hosts the Indian Point facility, for which it receives a Payment in Lieu of Taxes (PILOT) from Entergy. The Village is represented on the Task Force by Mayor Theresa Knickerbocker.

Hendrick Hudson School District

Hendrick Hudson School District is a top performing public school district in Westchester County and New York State. With 2,324 K-12 students across five schools, the School District boasts a low 11 to 1 student-teacher ratio and a 93% graduation rate. Students are offered a comprehensive program of honors and A.P. courses, special education services, a band and orchestra, 40 interscholastic sports teams, and numerous extracurricular activities. Hendrick Hudson School District receives a PILOT from Entergy. The School District is represented on the Task Force by Superintendent Joe Hochreiter.

Town of Cortlandt

The Town of Cortlandt is located in the northwestern corner of Westchester County. The Town is bounded on the west by the Hudson River, the north by Putnam County, the east by the Town of Yorktown and on the south by the Towns of New Castle and Ossining. Cortlandt includes two incorporated villages, Croton-on-Hudson and Buchanan and several hamlets including Montrose, Crugers and Verplanck. The Hudson River, the New York City Watershed Lands, numerous wooded hills and steep slopes, wetland areas and streams define the rural character of the Town.

With a total area of 34.5 square miles and an estimated population of 31,292 in 2010, the unincorporated Town of Cortlandt composition, in relation to the County, remained constant since the last census with approximately 7.8 percent of the County's total area and

[7] Public Authorities Law – Article 8, Title 9 and New York Public Authorities Law § 1854(15).
[8] Based on US Census estimates as of 7/1/16.

3.2 percent of its population. Cortlandt hosts the Indian Point facility, for which it receives a PILOT from Entergy. The Town is represented on the Task Force by Supervisor Linda Puglisi.

Westchester County

Westchester County is located near the southeastern corner of New York, just north of New York City. The County is bound by the Long Island Sound and Bronx County to the south, the Hudson River to the west, Putnam County to the north, and Connecticut to the east. The County is 450 square miles and is estimated to be home to over 974,000 New Yorkers as of 2016[9]. Westchester County hosts the Indian Point facility, for which it receives a PILOT from Entergy. The County is represented on the Task Force by Majority Leader Catherine Borgia and Minority Leader John Testa.

New York State Senate 40th District

New York State Senate District 40 includes the towns of Beekman, Pawling and the village of Pawling in Dutchess County, the towns of Carmel, Patterson and Southeast, and the village of Brewster in Putnam County, and the city of Peekskill, the towns of Cortlandt, Lewisboro, Mount Pleasant, New Castle, North Salem, Pound Ridge, Somers and Yorktown, the town/village of Mount Kisco, and the villages of Briarcliff Manor, Buchanan, Croton-on-Hudson, Pleasantville and Sleepy Hollow in Westchester County. The 40th District has been represented by Senator Terrence Murphy since 2015.

New York State Assembly 95th District

New York State Assembly District 95 includes the Towns of Cortlandt, Ossining, Kent, Philipstown, and the City of Peekskill. The 95th District has been represented by Assemblywoman Sandy Galef since 1992.

Utility Workers Union of America Local 1-2

Utility Workers Union of America Local 1-2 represents workers in the electric, gas, steam, water, and nuclear industries in the greater New York area, including employees at the Indian Point facility. Local 1-2 is represented on the Task Force by President James Slevin.

Westchester Putnam Central Labor Council

The mission of the AFL-CIO Central Labor Council is to organize in the community to promote social justice for all working people. The 150,000-member Westchester Putnam Central Labor Council, chartered directly by the national AFL-CIO, determines policy on issues in Westchester and Putnam Counties, as well as works closely with the New York and National AFL-CIO to carry out Federation priorities. The Westchester Putnam Central Labor Council is represented on the Task Force by President Tom Carey.

Teamsters Local 456

Teamsters Local 456 represents workers from several industries in Westchester and Putnam Counties, including security personnel at the Indian Point facility. Local 456 is represented on the Task Force by President Lou Picani.

[9] Based on US Census estimates as of 7/1/16.

Appendix B: ISO Reliability Assessment

Generator Deactivation Assessment Indian Point Energy Center

A Report by the New York Independent System Operator

December 13, 2017

Purpose

On November 13, 2017 the New York Independent System Operator, Inc. ("NYISO") determined that Entergy Nuclear Power Marketing, LLC ("Entergy") had submitted a complete

Generator Deactivation Notice for the proposed retirement of the Indian Point Energy Center Units

2 & 3 (individually, “IP2” and “IP3,” respectively, and collectively, “IPEC” or “IPEC Facility” or “Generators”). Entergy reported that it intends to deactivate the 1,299 MW (nameplate) IP2 unit on April 30, 2020 and the 1,012 MW (nameplate) IP3 unit on April 30, 2021.

> Pursuant to Section 38.3.4.3 of the NYISO Open Access Transmission Tariff (“OATT”), the

NYISO performed resource adequacy and, in coordination with New York Transmission Owners (“NYTOs”)[10], transmission security analyses of the New York Control Area (“NYCA”) system to determine whether a Generator Deactivation Reliability Need (a “Need”) would result from the deactivation of the IPEC Facility. The NYISO and NYTOs timely completed this analysis within the
90-day period starting from November 13, 2017, the Generator Deactivation Assessment Start Date (by February 11, 2018). The Generator Deactivation Process ends if the assessment does not identify a Need or if the reliability need can be timely addressed during the next Reliability Needs
Assessment in the NYISO’s biennial reliability planning process. If the NYISO finds a Need, then the NYISO follows the process for soliciting and selecting a solution stated in Sections 38.3.5 – 38.10.5 of the OATT.

Assumptions

The NYISO evaluated the period five years from the conclusion of the 365-day notice period (November 13, 2018 – November 13, 2023) (the “Study Period”) using the most recent reliability planning process base case including removal of Greenport GT1, Selkirk I, Selkirk II, Binghamton Power Plant and Ravenswood GT9 in accordance with NYISO procedures, with the load forecast consistent with the 2017 Load and Capacity Data Report (“Gold Book”)[11]. In accordance with the Reliability Planning Process base case inclusion rules[3], generation and transmission projects are added to the base case if they have met significant milestones such that there is a reasonable expectation in completion of the project. There are three major generation facilities currently under construction that were included in the base case for this assessment that impact the findings:
Bayonne Energy Center II Uprate (Zone J, 120 MW), CPV Valley Energy Center (Zone G, 678 MW), and Cricket Valley Energy Center (Zone G, 1,020 MW).

Consistent with the NYISO’s obligations under its tariffs, the NYISO provided stakeholders within its shared governance process information on the modeling assumptions employed in conducting this assessment. Details on the study assumptions were originally reviewed with stakeholders at the August 28, 2017 joint Electric System Planning Working

[10] The NYTOs included in this assessment are: National Grid, New York State Electric and Gas, Rochester Gas and Electric, New York Power Authority, Central Hudson, Orange and Rockland, Consolidated Edison, Long Island Power Authority/PSEG Long Island, and New York Transco.

[11] This IPEC Generator Deactivation Assessment utilizes the 2017 Gold Book baseline summer peak load forecast. [3] NYISO Reliability Planning Process Manual, April 1, 2016

Group/Transmission Planning Advisory Subcommittee (ESPWG/TPAS) as part of an *ad hoc* reliability assessment and were later updated at the November 17, 2017 ESPWG/TPAS meeting. The meeting materials are posted on the NYISO's public website[12].

Base Case Findings

This assessment finds that reliability criteria would be met without Indian Point Energy Center throughout the Study Period under the assumed and forecasted base case system conditions. The NYISO assessed the resource adequacy of the overall NYCA system, per the one-day-in-ten-years (0.1 per year) Loss of Load Expectation ("LOLE") criterion, which measures the probability of disconnecting firm load due to a resource deficiency. This assessment finds that without IPEC the resource adequacy criterion is met throughout the Study Period for the base case assumptions.

Additionally, the NYISO performed a transmission security assessment for the Bulk Power Transmission Facilities ("BPTF") and the NYTOs performed a transmission security assessment of their non- BPTFs. The NYISO reviewed and verified the analysis performed by NYTOs. Without IPEC, no transmission security-related Need was identified in the Study Period for the base case assumptions[13].

Scenario Findings

For information purposes, the NYISO performed a scenario assessment to evaluate the reliability of the system without three major generation facilities currently under construction (Bayonne Energy Center II Uprate, CPV Valley Energy Center, and Cricket Valley Energy Center). This scenario identified both resource adequacy and transmission security reliability criteria violations without IPEC.

For this scenario, resource adequacy was assessed for the entire ten-year planning horizon. The resource adequacy scenario results show that the system exceeds the LOLE criterion starting in year 2021 upon deactivation of IPEC, with the exceedance growing worse through 2027. Compensatory megawatt analysis was performed to quantify the shortfall of power by year and by zone.

Compensatory megawatt amounts are determined by adding generic perfect-capacity[14] resources to zones to address the shortfall. These additions in 100 MW blocks are used to estimate the amount of resources generally needed within a given zone to bring the system back within the reliability criteria. The compensatory megawatt additions are not intended to represent specific solutions, as the impact of specific solutions can depend on the type of the

[12] http://www.nyiso.com/public/markets_operations/committees/meeting_materials/index.jsp?com=bic_espwg#.

[13] There are generators modeled as deactivated in the base case that have not yet completed their Generator Deactivations Notices. The local reliability impacts of each generator deactivation are addressed by the NYISO and the Responsible Transmission Owner in each generator's Deactivation Assessment when the notice has been deemed complete.

[14] Perfect capacity is capacity that is not derated (e.g., due to ambient temperature or unit unavailability) and not tested for transmission security or interface impacts. Actual resources may need to be larger in order to achieve the same impact as perfect-capacity resources.

solution and its location on the grid. Resource needs could potentially be met by combinations of solutions including generation, transmission, energy efficiency, and demand response measures.

A generic addition of at least 200 MW by 2023 anywhere within the G, H, I, or J zones (Lower Hudson Valley) would resolve the deficiency through the five-year horizon. To address the deficiency through 2027, the level of required additional resources would range from 400 MW to 600 MW depending on type and location of the resource(s) within the Lower Hudson Valley. Due to transmission constraints into the Lower Hudson Valley from upstate (Zones A-F) and Long Island (Zone K), additional resources in any other zone would not effectively resolve the deficiency. The results of the compensatory megawatt analysis are shown in the following table.

Table 1: Scenario Compensatory Megawatts

Year	LOLE	Compensatory MW
2018	0.031	-
2019	0.028	-
2020	0.043	-
2021	0.108	100 MW within Zones G, H, I, or J
2022	0.116	200 MW within Zones G, H, I, or J
2023	0.123	200 MW within Zones G, H, I, or J
2024	0.143	400 MW in G, or 300 MW within Zones H, I, or J
2025	0.152	500 MW in G, or 400 MW within Zones H, I, or J
2026	0.167	600 MW in G, or 400 MW within Zones H, I, or J
2027	0.168	600 MW in G, or 400 MW within Zones H, I, or J

Transmission security violations were also identified within the Lower Hudson Valley for this scenario, but the resource adequacy deficiency exceeds the transmission security deficiency.

These deficiencies would increase with any additional future deactivations within the Lower Hudson Valley.

These scenario results demonstrate that, without the expected new generation facilities currently under construction, additional replacement sources of power would be necessary to maintain reliability following deactivation of IPEC.

Conclusions

This assessment does not identify a Generator Deactivation Reliability Need following the deactivation of the Indian Point Energy Center for the Study Period under base case assumptions. This assessment also determined that following the deactivation of Indian Point Energy Center, the reliability of the existing system could only be maintained if sufficient replacement sources of power are added within the Lower Hudson Valley (Zones G-J). In the absence of the expected new generation facilities currently under construction, resource needs, as detailed in Table 1 of this report, would need to be met by one or more types of solutions including generation, transmission, energy efficiency, and demand response measures.

Entergy has satisfied the applicable requirements under the NYISO's Generator Deactivation Process to retire the Generators on or after its requested deactivation date.[15] This concludes the Generator Deactivation Process. The 2018 Reliability Needs Assessment will further evaluate the reliability of the New York Control Area through 2028 using the most up to date information at the time, in accordance with the applicable tariffs and procedures.

[15] Entergy must complete all required NYISO administrative processes and procedures prior to deactivation. The NYISO's determination in this Generator Deactivation Process does not relieve Entergy of any obligations it has with respect to its participation in the NYISO's markets. If Entergy rescinds its Generator Deactivation Notice or does not deactivate Indian Point Energy Center Unit 2 between April 30, 2020 and April 30, 2021 and Indian Point Energy Center Unit 3 between April 30, 2021 and April 30, 2022, then it will be required to submit a new Generator Deactivation Notice in order to deactivate the Generators, and will also be required to repay study costs in accordance with Section 38.14 of the OATT.

Appendix C: Indian Point Site Reuse Study

2018

Indian Point Closure Task Force

Indian Point Site Reuse Report

Submitted by

D. L. English Consulting, Inc.

www.english-consulting.com

30 April 2018

DISCLAIMER

This report was prepared by D. L. English Consulting, Inc. (DLEC) in the course of performing work contracted for and sponsored by the New York State Energy Research and Development Authority (hereafter "NYSERDA"). The opinions expressed in this report do not reflect those of NYSERDA or the State of New York, and reference to any specific product, service, process, or method does not constitute an implied or expressed recommendation or endorsement of it by the State. Further, NYSERDA, the State of New York, and the contractor make no warranties or representations, expressed or implied, as to the fitness for particular purpose or merchantability of any product, apparatus, or service, or the usefulness, completeness, or accuracy of any processes, methods, or other information contained, described, disclosed, or referred to in this report. NYSERDA, the State of New York, and the contractor make no representation that the use of any product, apparatus, process, method, or other information will not infringe privately owned rights and will assume no liability for any loss, injury, or damage resulting from, or occurring in connection with, the use of information contained, described, disclosed, or referred to in this report.

Acknowledgements

For meeting with us to discuss various aspects of this project, coordinating several tours of the IPEC site with key personnel and providing data to assist in our analysis, we want to thank those from Entergy.

In addition, we would like to thank the Town of Cortlandt for their efforts and collaboration in providing information and guidance in supporting the development of this report.

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Acronyms and Abbreviations

ANS	American Nuclear Society
AOC	Area of Concern
BOMA	Building Owners and Managers Association
BWR	Boiling Water Reactor
CAP/CAB	Community Advisory Panel or Board
CHP	Combined Heat and Power
DGC	Decommissioning General Contractor
DLEC	D. L. English Consulting, Inc.
DOE	Department of Energy
U.S. DOT	United States Department of Transportation
DPL	Decommissioning Planning Rule
EIA	Energy Information Agency
EPA	Environmental Protection Agency
EPC	Estimated Project Cost
EPRI	Electric Power Research Institute
FSB	(Spent) Fuel Storage Building
FSS	Final Status Survey
FTE	Full-Time Equivalent
GTCC	Greater Than Class C (pertains to radioactive waste)
HRSG	Heat Recover Steam Generator
HSA	Historical Site Assessment
HTGR	Hight Temperature Gas- Cooled Reactor
IP-1, IP-2, IP-3	Indian Point Unit 1, Unit 2, Unit 3
IPEC	Indian Point Energy Center
IPP	Independent Power Producer
ISFSI	Independent Spent Fuel Storage Installation
ISO	Independent System Operator
JEDI	Jobs and Economic Development Impact
LTP	License Termination Plan
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MW	Megawatt
MWe	Megawatts electrical
MWt	Megawatts thermal
NASA	National Aeronautics and Space Administration
NEI	Nuclear Energy Institute
NOAA	National Oceanic and Atmospheric Administration
NRC	Nuclear Regulatory Commission
NREL	National Renewable Energy Laboratory
NYISO	New York Independent System Operator
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSERDA	New York State Energy Research and Development Authority
O&M	Operations and Maintenance
PAB	Primary Auxiliary Building
PSDAR	Post-Shutdown Activities Report
PURPA	Public Utility Regulatory Policy Act
PWR	Pressurized Water Reactor
PV	Photovoltaic (type of solar panel)

RTO	Regional Transmission Organization
SEQRA	State Environmental Quality Review Act
SNL	Sandia National Laboratories
SFP	Spent Fuel Pool
SSC	Systems, Structures and Components
UFSAR	Updated Final Safety Analysis Report
U.S.	United States

Executive Summary

On February 28, 2017, New York State Governor Andrew M. Cuomo announced the appointment of a task force to provide guidance and support to local municipalities and Entergy employees affected by the pending closure of the Indian Point nuclear power plant located in Westchester County. The task force (Task Force) was formed to partner with local governments to offer guidance on:

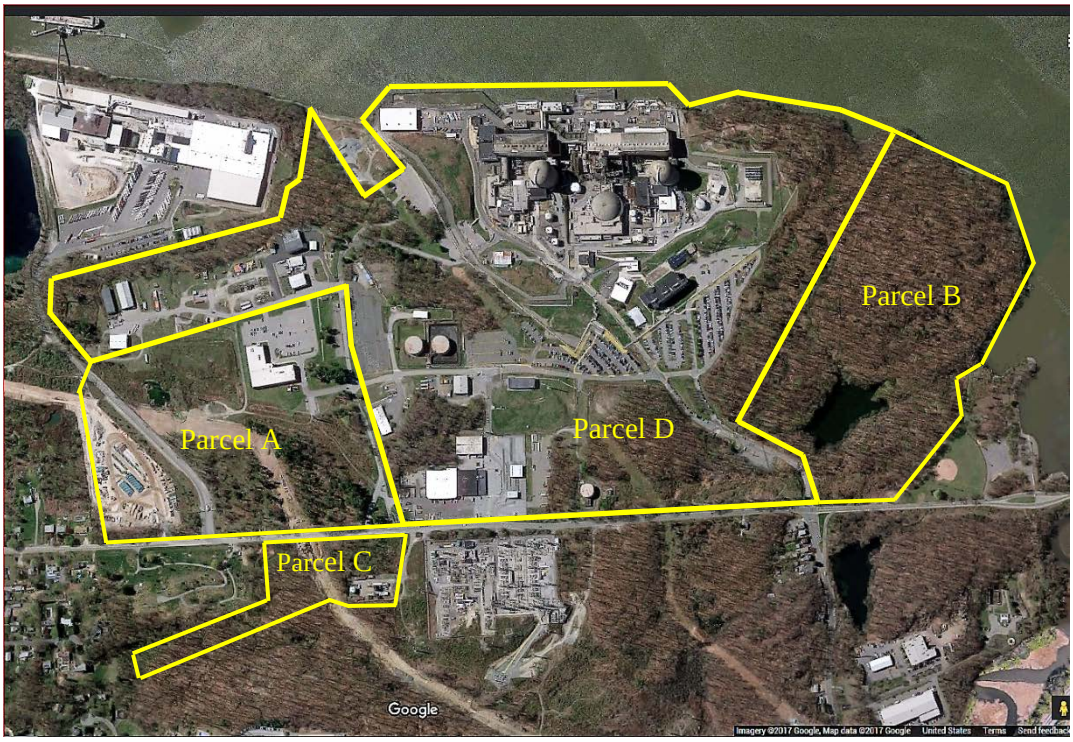
- Employment
- Property tax impacts
- New economic opportunities
- Potential site reuse opportunities
- Identify work force retraining programs and opportunities.

The 2017-2018 State budget legislation codified the Task Force and required the it to submit, no later than April 30, 2018, a study evaluating future reuse and reutilization options for the land where the facility is located. The Task Force, through the New York State Energy Research and Development Authority (NYSERDA), issued the Indian Point Task Force Consultation Services Request for Proposal (RFP), ultimately selecting and contracting with D. L. English Consulting, Inc. (DLEC) as a component of the Task Force's April 2018 Annual Report to identify and develop an Indian Point Site Reuse Report. The DLEC fact-based report has been developed in accordance with the needs and requirements described in the Indian Point Task Force Consultation Services RFP with specific focus on the following parameters:

- Determine the Indian Point Energy Center (IPEC) reuse opportunities both during and after decommissioning
- Provide economic insights for each reuse opportunity
- Compile decommissioning and reuse experiences at other decommissioned nuclear facilities
- Identify applicable federal regulations and guidance associated with the decommissioning process
- Present decommissioning options, timelines, and trust fund distribution constraints

All development opportunities are fact-based, employing verified site characteristic data documented in available third-party studies and reports. In addition, technical resources and industry data including information prepared for agencies within the U.S. Department of Energy have been utilized. The opportunities discussed in this report are not yet considered options because property subdivision and ownership transfer must first be resolved.

The IPEC site is defined and contained in licenses issued for Indian Point Units 1, 2, and 3 (IP-1, IP-2, and IP-3) by the Nuclear Regulatory Commission (NRC). The site occupies approximately 240 acres of land. Two parcels on this tract of land, Parcels A and B, are determined to be non-impacted land suitable for *Near-Term* reuse. *Near-Term* reuse is defined as property capable of being developed in parallel with decommissioning activities. A third parcel on this 240 acre tract, Parcel D, can only be considered for *Long-Term* reuse, which is defined as impacted property and determined to be necessary for decommissioning tasks. A fourth parcel of land, Parcel C, not contiguous with the 240 acre tract, is also available for development.



In identifying commercial opportunities and their potential economic value, Goodman-Marks, a DLEC team member, provides a preliminary appraisal for the *Near-Term* reuse and possible re-development of Parcel A and a *Long-Term* evaluation of the General Service Building on Parcel D. Goodman-Marks, applying accepted "Highest and Best Use" appraisal industry's practices and guidelines, has identified Parcel A as either heavy industrial for an undeveloped property (current training building demolished) or repurposed for office use adapting the existing training building. The Goodman-Marks report is attached to this report.

DLEC have further qualified the Goodman-Marks use of heavy industrial to mean non-energy production/commercial opportunities for this report. The non-energy production/commercial opportunities considered for the IPEC parcels include:

- Office Park
- Data Center
- Manufacturing/Heavy Industrial*
- Residential**
- Entertainment/Marina***

* Manufacturing facility (or heavy industrial) opportunities exist but are considered *Long-Term* due to IPEC decommissioning processes and the constraints imposed by Parcel D.

** The residential opportunity was eliminated from consideration as it does not meet the "Highest and Best Use" criteria identified by the Goodman-Marks' appraisal and defined in The Dictionary of Real Estate Appraisal.

*** An entertainment opportunity is eliminated because of the real estate criteria. Relatedly, for the specific case of a marina development, a review of applicable navigation charts shows the existing pier on the Hudson River to be approximately within 100 feet of the shipping channel. This fact would minimize the likelihood of obtaining U.S. Coast Guard approval for developing a marina.

Energy production opportunities reviewed includes:

- Renewables
  - Wind
  - Solar
  - Energy Storage
- Non-renewable
  - Fuel Cell
  - Combined Heat and Power
  - Combined Cycle

Renewable opportunities present challenges as wind velocity, sun exposure, wind turbine blade delivery to the column, and site elevation variations impact their effectiveness and viability. For renewable installations, construction times for each type is typically less than 18 months, local full-time employment may reach three full time employees (FTEs) who posses limited technical skills sets, and local operating and maintenance expenditures are minimal. Operation and Maintenance (O&M) budgets are not readily distinguishable from industry data but using U.S. Department of Energy (DOE) software, data for a 2 megawatt (MW) wind turbine located in New York State (NYS) is approximately $113,000, of which labor is approximately half. Energy Storage is not adversely impacted by the same challenges as wind and solar.

Non-renewable opportunities are not impacted by the atmospheric conditions or the site elevation variations. When compared to renewable opportunities, construction times are longer, local full-time employment may approach 20 for a combined cycle gas plant, require technical skill sets, and local operations and maintenance expenditures are expected to be 10% of the operating budget. For an 80 MW natural gas unit located in NYS, using DOE software, the fixed and variable O&M budget is approximately $2,285,000, of which labor is $660,000.

Parcel A – A potential *Near-Term* reuse property that is approximately 50 acres of non-impacted land containing the Training Building and rights-of-way easements for electric and gas transmission lines and an access road to the Continental Gypsum Plant. Parcel A warrants a more detailed property review between Entergy, Town of Cortlandt, and the Village of Buchanan because available Entergy and local tax parcel documentation present varying ownership and boundary definition for this *Near-Term* Reuse parcel.

Parcel B – Approximately 50-acres of undeveloped land identified as a *Near-Term* reuse parcel but more realistically is considered a delayed *Near-Term* parcel. IPEC operational history and available data indicate this acreage is non-impacted. This parcel is heavily wooded and rocky with an undulated terrain that presents challenges for each type of development. The area abuts the existing Independent Spent Fuel Storage Installation (ISFSI) and may support protected wildlife species. State and local laws and regulations will determine development of this parcel. If the State and local laws did not impact the *Near-Term* development of this parcel, it would support non-energy production/commercial and energy production opportunities. Renewable energy production is likely to be restricted to wind.

Parcel C – Located across Broadway Avenue from the IPEC site, is approximately 18 acres of non-impacted and non-NRC licensed land which is considered a *Near-Term* reuse parcel. The property's characteristics are relatively flat with land sloping down in the southern direction that includes wetland areas. This limited acreage can support non-energy and energy production opportunities. Commercial development similar to Parcel A is possible, but on a much smaller scale because the property is traversed by a natural gas transmission line. Renewable opportunities may integrate power production and storage, using a wind turbine and batteries, although other configurations are possible.

Parcel D – Is a *Long-Term* reuse parcel approximately 140 acres and is the impacted area of the IPEC licensed site. It includes IPEC's three nuclear power reactors and overhead electrical lines connecting to

the Consolidated Edison switchyard located across Broadway Avenue. In addition, gas transmission lines cross this parcel. This parcel is expected to be available for development 10 to 15 years after decommissioning work activities begin. The amount of land available for development after the 10- to 15-year decommissioning cycle is not discernable at this time because the ISFSI property boundaries are not yet known or established. Subsequently, identifying the extent of an opportunity deployment is currently highly speculative. This parcel will support non-energy production and energy production opportunities and may incorporate an expansion of the opportunities deployed on Parcels A, B, and possibly C as envisioned with today's technology.

Today's configuration of the approximate 240-acre IPEC site, with its multiple access roads and the ISFSI location in a remote corner of the site, is viewed as providing for an unencumbered decommissioning process simplifying *Near-Term* opportunity development. At this juncture, it is anticipated that the decommissioning timeline will last 10 to 15 years after decommissioning work activities begin. Ownership of the NRC license and IPEC property, along with the ownership and management of the ISFSI will play a significant role in the detailed planning and timing of the decommissioning project.

Two *Long-Term* considerations associated with site reuse are the ISFSI and the site condition following decommissioning. For the foreseeable future, the ISFSI is going to exist and will increase in size to accommodate additional spent fuel and reactor irradiated material storage needs. Thus, the ISFSI will reduce the amount of available property for future development. Moreover, due to required security/surveillance requirements, the ISFSI is likely to impose development challenges in the *Long-Term*. Secondly, regulations do not allow for the IPEC Trust Fund to include site restoration following completion of radiological decommissioning. Therefore, the final condition of the site can be expected to include miscellaneous non-radiological impacted structures and grounds that will add to development costs.

Conclusion

This report provides fact-based information to inform and facilitate ongoing site reuse planning and decision making by the Task Force, the Town of Cortlandt, and Village of Buchanan. Opportunities deemed possible for *Near-* and *Long-Term* reuse are presented for further consideration. It also identifies a priority to initiate early communications with Entergy to remediate property ownership and boundary documentation variances associated with Parcel A redevelopment.

During the preparation of this report a draft document was provided to Entergy for their review and comment. To provide transparency with respect to their concerns and comments a table was prepared to collect Entergy comments and record responses/clarifications by DLEC. All of Entergy's comments are intentionally not incorporated into the report so that differing perspectives are identified and can be evaluated by the Task Force, local municipalities, and citizens.

Section 1: Operational History and Site Description

1.1 Overview

Indian Point Energy Center (IPEC) is a three-unit nuclear power station (Photo 1) located in Buchanan, New York (NY). Just south of Peekskill, NY, the plant sits on the east bank of the Hudson River 24 miles north of New York City and 39 miles north of Wall Street, situated on approximately 240 acres. IPEC is owned and operated by Entergy Nuclear Northeast, a subsidiary of Entergy Corporation, and includes two operating Westinghouse pressurized water reactors (PWRs), designated Indian Point Unit 2 (IP-2) and Indian Point Unit 3 (IP-3). Entergy purchased IP-2 from Consolidated Edison in September 2001 and IP-3 from the New York Power Authority in March 2000. The licensed power output of each operating unit is 3216 megawatts thermal (MWt) with a net electrical output of approximately 1080 megawatts electrical (MWe) each.

Indian Point Unit 1 (IP-1) operated commercially from August 1962 until the plant ceased operations in 1974. By January 1976, all spent fuel was removed from the reactor vessel and temporarily placed in the IP-1 spent fuel pool, and later transferred to the ISFSI's dry storage casks.

On January 9, 2017 Entergy and New York State (NYS) Governor Cuomo announced the planned closure of IP-2 and IP-3. IP-2 is to permanently cease operations no later than April 30, 2020, and IP-3 is to permanently cease operations no later than April 30, 2021. These dates may be extended if an emergency exists and additional periods of operations are allowed in accordance with applicable law and regulatory requirements. Specifically, the operation of IP-2 and IP-3 may be extended upon the mutual agreement of NYS and Entergy, but in no event beyond April 30, 2024 for IP-2 and April 30, 2025 for IP-3.[1]

Photo 1: Indian Point Energy Center - Units 1, 2, and 3

On February 28, 2017, Governor Cuomo announced the appointment of the Indian Point Closure Task Force (Task Force) to provide guidance and support to affected local municipalities and employees

[1] State of New York et al., "Indian Point Closure Agreement," January 8, 2017, https://www.riverkeeper.org/wp-content/uploads/2017/01/Indian-Point-Closure-Agreement-January-8-2017.pdf

regarding the closure of IPEC. A contractor, through NYSERDA, will assist the Task Force in the preparation of this study in accordance with Task Force legislation, enacted as part of the 2017-18 State Budget.

1.2 Site Development and Usage

In 1923 the Hudson River Day Line steamboat company bought 320 riverside acres (Photo 2), the former site of a farm and brick yard in the Town of Buchanan just south of Peekskill. Indian Point Park was a day trip destination for Day Line passengers set up to rival a popular amusement park at Bear Mountain. The owners named the park Indian Point Park because they learned the Kitchawank tribe once walked there. [2]

Photo 2: Hudson River Day Line Steamer DeWitt Clinton Approaching Indian Point Park in Foreground, circa 1923 (Photo Credit with permission, The Donald C. Ringwald Collection, Hudson River Maritime Museum)

Indian Point Park provided a woodland respite for city dwellers. The Hudson River Day Line steamers left New York City docks in mid-morning, arrived at Indian Point Park at lunch time, giving passengers three hours to spend at the park before returning to the New York City docks in the late afternoon. The park property backed up to the Croton and Mt. Kisco reservoirs that provided water to New York City. Walks through the forested lands and along wildflower paths were outlined in Day Line brochures. In addition, a farm on the property provided produce for the meals served on the Hudson River Day Line steamers. [3]

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[2] Wesley Gottlock and Barbara H. Gottlock, "Indian Point Amusement Park" excerpted from "Lost Amusement Parks of the Hudson Valley" by Wesley and Barbara Gottlock, October 9, 2012, https://boatingonthehudson.wordpress.com/2012/10/09/indian-point-amusement-park/.

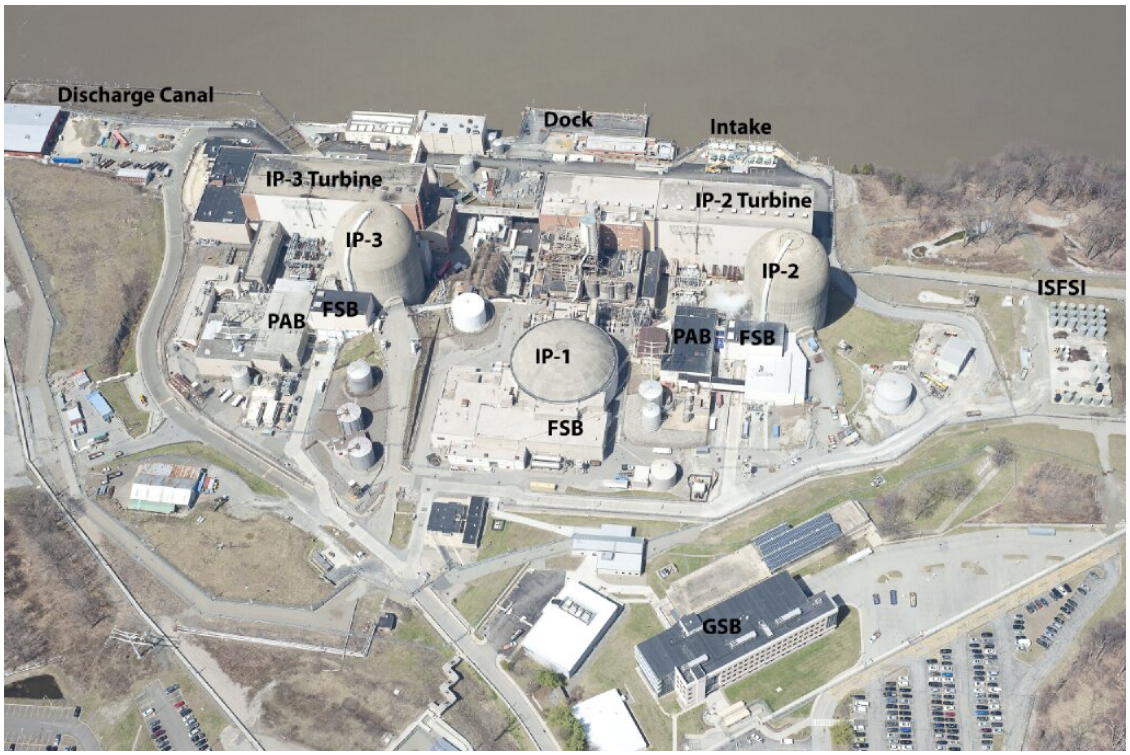
[3] Allynne Lange, Curator; Carla Lesh, Assistant Curator; and Sarah Wassberg, Director of Education, June 28, 2016, "Hudson River Maritime Museum Blog," http://www.hrmm.org/history-blog/indian-point-from-park-to-power.

The park operated successfully from 1923 until 1948 when it was closed due to low ridership. It was purchased by businessman Emanuel Kelmans in 1949 and operated until 1954. After owning and successfully operating the park for five years, Kelmans sought to sell the property. Consolidated Edison Gas and Electric Company, looking for property near New York City to build a new power plant to provide for the growing electrical demands of New York City, chose this site. In January 1954, the Buchanan Village Board held a short public hearing on rezoning, and the plan was passed without opposition. As part of the plan, Consolidated Edison was to pay 70 percent of the Hendrick-Hudson school district's taxes, install a village-wide sewer system, pave streets and provide streetlights.

1.3 IPEC Buildings and Structures

Photo 3 shows and labels the major IPEC buildings and structures. The two operating units, IP-2 and IP-3, each include a reactor containment building, primary auxiliary building (PAB), spent fuel storage building (FSB), turbine building, and an intake/discharge canal. The retired IP-1 facility includes a containment building, chemical systems and fuel storage building, and turbine building. IPEC has two modern office buildings, the Training Building (not shown in Photo 3) and General Services Building (GSB). The site also includes the Independent Spent Fuel Storage Installation (ISFSI).

Photo 3: Indian Point Buildings and Structures



The reactor containment buildings hold the major primary components including the reactor vessel, steam generators, pressurizer and reactor coolant pumps. The auxiliary buildings contain primary support systems and components including reactor water cleanup and emergency core cooling systems.

The turbine buildings (Photo 4) contain steam turbines and associated electrical generators for conversion of high-energy steam into electrical energy for distribution to the electrical grid via the NY Independent System Operator (NYISO). The high-energy steam is generated from reactor coolant water circulated through four steam generators located in the containment building.

The cooling water intake and discharge canal structures contain equipment used to pump condenser circulating water from the Hudson River and return it through the discharge canal. The river water flows under a floating debris skimmer wall, through continuously operating traveling screens, and into six separate screen wells.

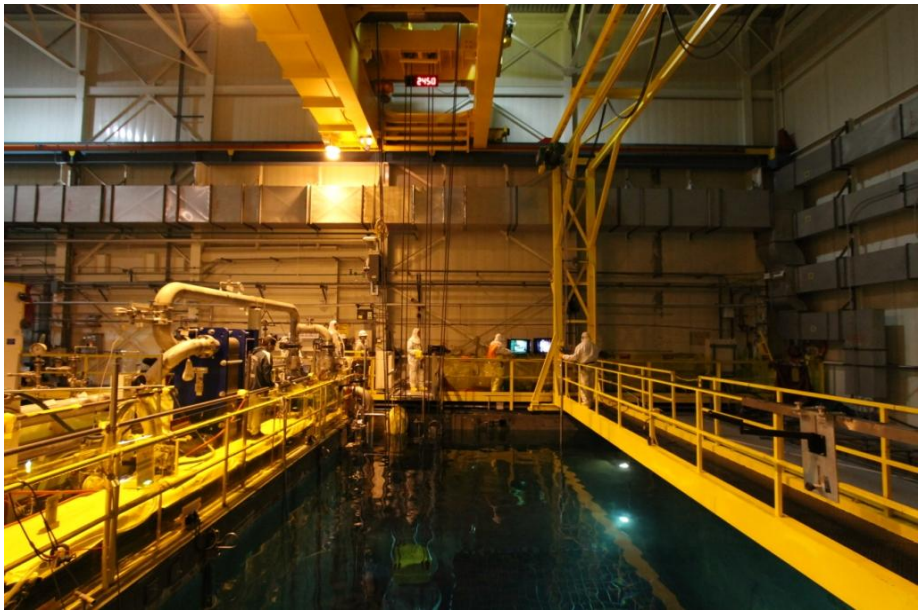
Photo 4: Indian Point Unit 2 Turbine Building

1.4 Spent Fuel Storage

Spent fuel at IPEC is stored by two methods: (1) in spent fuel pools within the spent fuel storage buildings and (2) in dry cask storage, on a single outdoor concrete pad or ISFSI that services the entire site. IP-1 spent fuel is in storage at the ISFSI. IP-2 and IP-3 spent fuel is stored at both the spent fuel storage buildings and the ISFSI.

Each fuel storage building contains a spent fuel pool (Photo 5) where fuel is stored under water until it is ultimately placed into a dry storage canister for onsite storage. The spent fuel pools are approximately 40 feet deep with a perimeter of about 30 feet by 35 feet. Spent fuel assemblies sit in racks on the bottom of each pool and are covered by about 25 feet of water. The water provides cooling to keep the fuel thermally cool as well as provides protection from the effects of radiation to personnel as they perform work around the fuel pool.

Photo 5: Indian Point Unit 3 Spent Fuel Pool



Because the U.S. does not have a licensed storage facility to accept nuclear power plant spent fuel and associated radioactive waste, IPEC implemented dry cask storage for the first time in 2007. Dry cask storage is a passive system that seals used nuclear fuel in a separate steel canister that is then placed within an outer massive concrete and steel housing that provides both structural strength and radiation shielding. The system of concentric cylindrical containers provides above ground, long-term storage of spent nuclear fuel. A dry system surrounds the fuel with helium gas rather than water as is used in a fuel pool. The canister/cask system is about 20 feet in height and 11 feet in diameter, with a cask wall that is over 2 feet thick and a total loaded weight of about 360,000 pounds. The inner canisters and outer casks have no operating equipment requiring regular maintenance. The fuel is cooled by passive means, with heat dissipating via cooling channels in the outer cask that allow air to circulate naturally on the outside of the inner canister. Photo 6 shows the IPEC ISFSI.

IP-1 spent fuel (160 assemblies) is in dry storage at the ISFSI in 5 Holtec HISTORM 100 casks (Photo 7). Some IP-2 spent fuel (672 assemblies) and IP-3 spent fuel (416 assemblies) have also been moved into dry cask storage at the ISFSI. There are currently 1,029 assemblies stored in the IP-2 spent fuel pool and 1,155 fuel assemblies stored in the IP-3 spent fuel pool. Ultimately, 3,998 assemblies contained within 125 dry casks will be temporarily stored at the ISFSI until the DOE accepts them for storage at an approved storage facility.

The current capacity of the IPEC ISFSI is 75 casks, thus additional construction is required to accommodate approximately 50 more casks, the final quantity being dependent on the vendor selected for the future cask procurement. Additionally, several casks containing segmented reactor internals will be required for storage at the ISFSI as a result of decommissioning IPEC.

Photo 6: Indian Point ISFSI

The ISFSI can be expected to remain at its current location for the foreseeable future. Mr. Edward F. Sproat, III, the Former Director of the Office of Civilian Radioactive Waste Management concluded in testimony before the Subcommittee on Environment, Committee on Energy and Commerce in the U.S. House of Representatives on April 26, 2017 that:

> "…in order for the Country to move forward with the permanent disposal of its high-level radioactive waste and spent nuclear fuel, it needs three things: 1) a licensed place to put it, 2) the ability to move it from around the Country to that site, and 3) an organization that is adequately funded and has the requisite authorities so that it can be held accountable for the cost and schedule of executing the program in accordance with the law. Congress has the ability to address all of these needs and it will need to do so in order for this national dilemma to be permanently solved. Technically, developing a repository is a fairly straightforward project. Politically, it is complex. If Congress can find a way to enable the project to move forward without political interference, the country will finally see success."

Since that testimony little notable progress has been made by the U.S. Congress to accomplish the three needs.

Photo 7: Holtec Inc. HISTORM Dry Casks and Transfer Device

1.5 IPEC Parcels for Potential *Near-Term* Reuse

With a clear understanding of the IPEC site history and facility configuration and decommissioning experiences drawn from other nuclear plants, IPEC presents opportunities for the potential *Near-Term* reuse for portions of the approximate 240-acre licensed site in parallel to decommissioning activities. Specifically, Entergy's licensed site contains two separate and possible areas identified as Parcels A and B in Photo 8. A third parcel, Parcel C, not on the licensed site exists across Broadway from the 240-acre site. These areas have been identified and selected for potential redevelopment based primarily on the expectation that they are unaffected by contamination from site operating activities and they are not viewed as necessary to support site decommissioning. The remaining property has been identified as being necessary for decommissioning and is identified as Parcel D. Photo 8 outlines Parcels A, B, C and D.

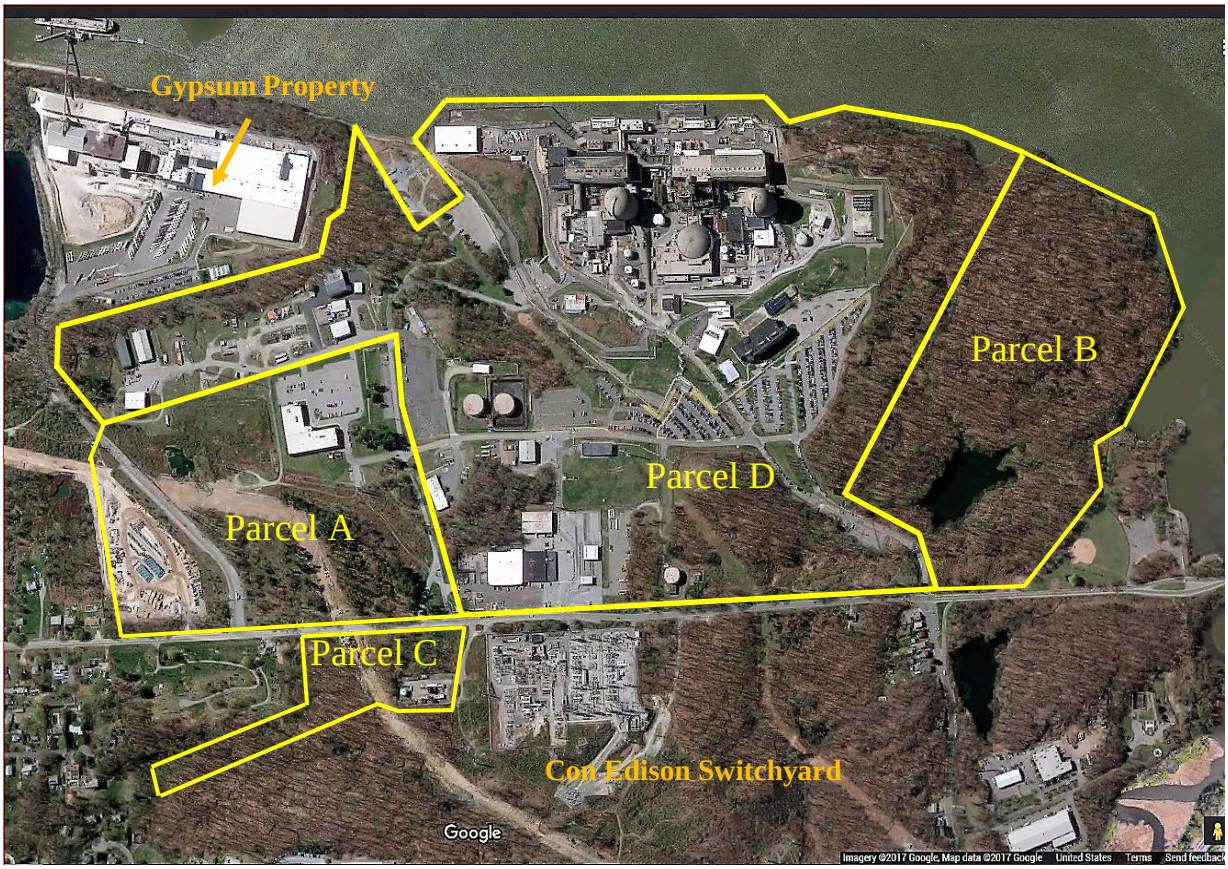
Parcel A is at a higher elevation as compared to the rest of IPEC, is relatively flat, and contains a limited number of buildings and separate access roads. Easements in Parcel A exist for electrical transmission lines, a gas transmission line, and a road for access to the adjacent Continental Gypsum plant.

Parcel B is virgin property that has a rocky terrain with multiple steep grade changes. It also abuts the ISFSI location. Aerial photography records show this parcel to be unchanged since 1927.

Parcel C includes the site of two previous gas turbine units and an associated fuel oil storage tank. One turbine has been removed and the remaining unit is currently not operable. The balance of this area is undeveloped and wooded. It is immediately adjacent to a Consolidated Edison of New York area electric transmission substation. This parcel is not part of the NRC licensed site.

Parcel D is the area anticipated to support decommissioning of IP-1, 2, and 3 and the expansion of the existing ISFSI.

Photo 8: Parcels Identification



Consolidated Edison conducted two site due-diligence evaluations, Phase 1 Environmental Site Assessment (January 2000) and a Final Phase 2 Summary Report (March 2000) with Earth Tech Inc. prior to the sale of IP-1 and IP-2 to Entergy in September 2001. These assessments included a review of both hazardous and radiological contamination.

Parcel A abuts two Areas of Concern (AOC): AOC-12 and AOC-14 as identified in the March 2000 Earth Tech Report.

AOC-12 is at the site of the Maintenance Training Facility (not the Entergy Training Building). There is a septic tank and underground storage tank housing heating oil in this location. On a previous occasion, the heating oil tank was overfilled and contaminated nearby soils. Contaminated soils were excavated and removed. To further investigate the issue, soil boring samples were taken. Two compounds were detected in the soils at low levels, 1.5 ppb of 1,2,4-trimethylbenzene in a shallow sample, and naphthalene concentrations of 1.6 and 1.2 ppb in shallow and deep samples, respectively. However, these results are below New York State Department of Environmental Conservation (DEC) Recommended Soil Cleanup Objectives to Protect Human Health as listed in their Technical and Administrative Guidance Memorandum (TAGM 4046) dated January 24, 1994.

Groundwater wells MW-104 and MW-105 were installed in the borings. Groundwater samples were collected and analyzed for volatile organic compounds, semi-volatile organic compounds, and total petroleum hydrocarbons. No compounds were detected above minimum detection levels in these samples.

AOC-14 is the site of Storage Yard 8 (abuts Parcel A) where radioactively contaminated equipment was previously stored. To evaluate the potential for soil contamination, in-situ gamma spectroscopy was

performed at the perimeter of this area. Three of the measurements in this area indicated the presence of Cesium-137 (Cs-137) at levels ranging from 0.07 to 0.19 pCi/gm. These levels are typically observed in environmental program samples and were classified as not a concern. For comparison, the 2016 Annual Environmental Operating Report lists 0.14 pCi/gm of Cs-137 for soil around the Indian Point 3 Training Building and 0.24 pCi/gm of Cs-137 for near the Meteorological Tower.

The original and replaced IP-3 steam generators (located outside and west of Parcel A, in designated Parcel D) are contained within a concrete monolith that limits radiation dose rates to a small fraction of permitted federal limits and therefore does not radiologically impact Parcel A.

Based on this information, Parcel A contains no significant radiological or environmental contamination. Parcel A is already a developed industrial site that would not require the disturbance of virgin woodlands. In addition, it is not visible from and does not border the Hudson River and would thus require much less environmental permitting for redevelopment. The site topography is generally good in that it is level and has very limited wetlands. Road access is favorable with multiple access points and driveways on the adjacent Broadway Avenue.

Parcel A is identified in the Updated Final Safety Analysis Report (UFSAR) as part of the Indian Point site and requires NRC concurrence to permit independent development.

Parcel B is a large area of non-impacted pristine property on the northeastern part of the IPEC 240 acres that is believed not to be the site of any IPEC operations or industrial activities. This area is a rocky and heavily wooded area that may be considered for future reuse development. However, this area may be a less desirable part of the IPEC footprint for *Near-Term* development when consideration is given to its proximity to the existing and anticipated future expansion of ISFSI. One key parameter of the ISFSI design is that the radiological dose per year to a member of the public cannot exceed 25 millirem at the IPEC owner-controlled fence line. It is difficult to confidently determine where the border between IPEC and Parcel B will be established due to the uncertainty of the final design of the ISFSI to support additional canisters. Subsequently, a random demarcation line has been established to allow for additional distance between Parcel B and the anticipated expansion of the ISFSI.

An additional concern of developing Parcel B is that it is adjacent to the north IPEC access road (currently closed) that is anticipated to be a key ingress and egress roadway during the estimated 10- to 15-year decommissioning timeframe. This proximity will challenge any reuse development construction in parallel to decommissioning activities. Furthermore, reuse occupants may be limited by the perception/concern associated with the nearby ISFSI and radiological decommissioning operations.

Development of Parcel B may be further challenged by existing or perceived environment sensitivities regarding native species and wildlife. According to the U.S. Fish and Wildlife Service, there are two species of bats that may be potentially affected by development of Parcel B: the Indiana bat (endangered) and the Northern Long-eared Bat (threatened). In addition, the DEC geographic mapping site lists this area within a boundary that requires an assessment be conducted on the potential impacts on rare animals, rare plants, and significant natural communities. State, local, and community stakeholders will need to be engaged in any future options for this parcel of land.

Finally, the development of Parcel B may involve regulatory compliance issues. For example, the State Environmental Quality Review Act (SEQRA) requires that, except for residential facilities, an evaluation be conducted of all projects that involve the physical alteration of 10 acres. A NYS Department of State Coastal Consistency Determination may be required as their jurisdiction covers tidal coastal waters and adjacent shorelands to 1000 feet inland. A Town of Cortlandt Ordinance also regulates the disturbances of steep slopes and ridgelines.

Parcel C includes two gas turbine generator facilities, although only one gas turbine generator exists, and AOC-5 which was identified in the March 2000 Earth Tech report.

AOC-5 was investigated through the collection of a groundwater sample from an existing ground water monitoring well MW-1. Results of the groundwater testing indicated 1.1 ppm of an unknown petroleum constituent in the C9-C36 carbon range as the only compound detected above minimum detectable levels. Other recent samples at the time of the study did not indicate concentrations above laboratory method detection limits. No exceedances of either the NYS Ambient Water Quality Standards and Guidance Values (dated June 1998) for GA Class groundwater as a source of drinking water or U.S. Environmental Protection Agency (EPA) Primary Drinking Water Standards were observed at that time.

In summary, Parcel C has no known radiological contamination and past oil spills in the area have been characterized and show no exceedances of limits. The portion of the site bordering Broadway Avenue has already been developed for industrial use. The only remaining piece of operating equipment is a black-start diesel engine used to supply power to a pump used to pump fuel oil from the gas turbine Fuel Oil Storage Tank. A noteworthy attribute of Parcel C is that it is not part of the IPEC licensed site and would not require NRC review and approval of partial site release for redevelopment. The negative aspects are the frontage of the property on Broadway is limited, the bulk of the parcel is behind a nearby cemetery, a gas transmission line traverses the property, and the lower elevations of the site contain some wetlands. Also, the site borders a Consolidated Edison substation with nearby transmission lines traversing overhead.

As part of this report's parcel evaluation study, NYSERDA contacted both the NRC and DEC staff and confirmed in a phone conversation with DLEC's staff that no significant contamination is believed to be present in Parcels A, B, and C.

1.6 Rationale for Expectation that Parcel Areas A, B, and C are Non-impacted by Groundwater

Groundwater flows from areas of higher pressure heads to areas of lower pressure heads along the path of least resistance. Low levels of groundwater contamination have been identified as originating at IPEC. The ground water at IPEC can be characterized as two commingled ground water contaminant plumes that flow west towards and into the plants' discharge canal and the Hudson River. The plume originating from IP-1 is comprised principally of Strontium (Sr-90), with other radionuclides being observed in smaller sub-sets of the plume [e.g., Cobalt (Co-60), Nickel (Ni-63), and Cesium (Cs-137)] while the plume originating from IP-2 was found to be comprised of predominantly Tritium (H-3). Figures 2 and 3 show the current groundwater isopleths of radioactivity from IP-1 and IP-2.

Figure 1: Current Unit 1 Activity Isopleths

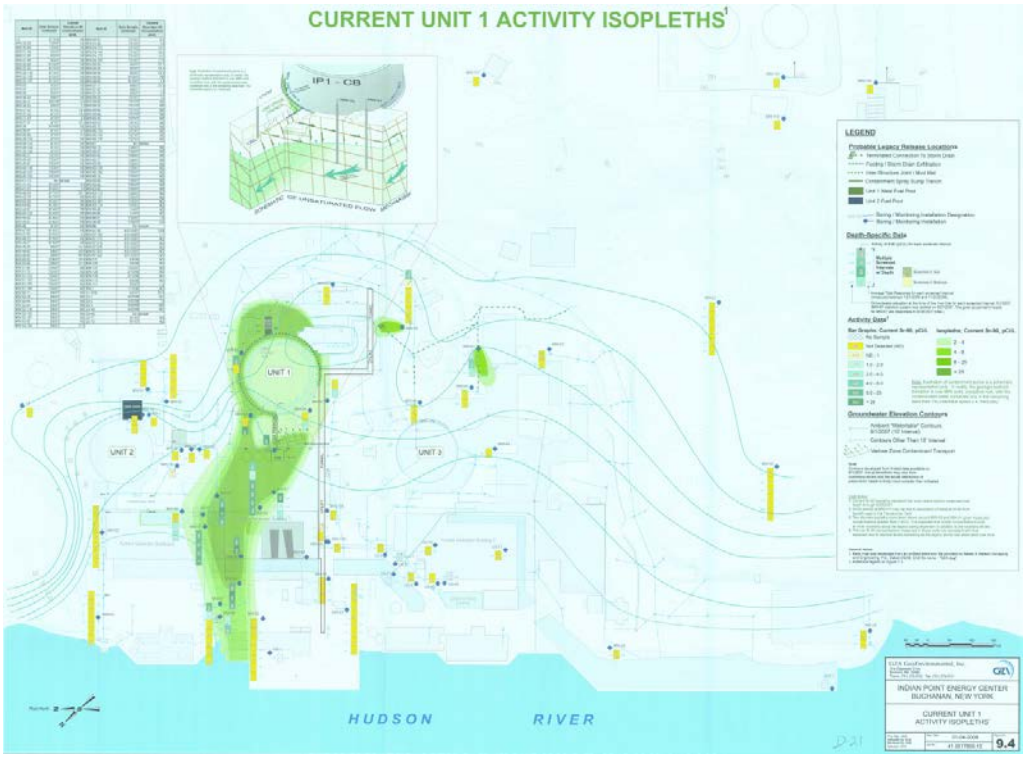
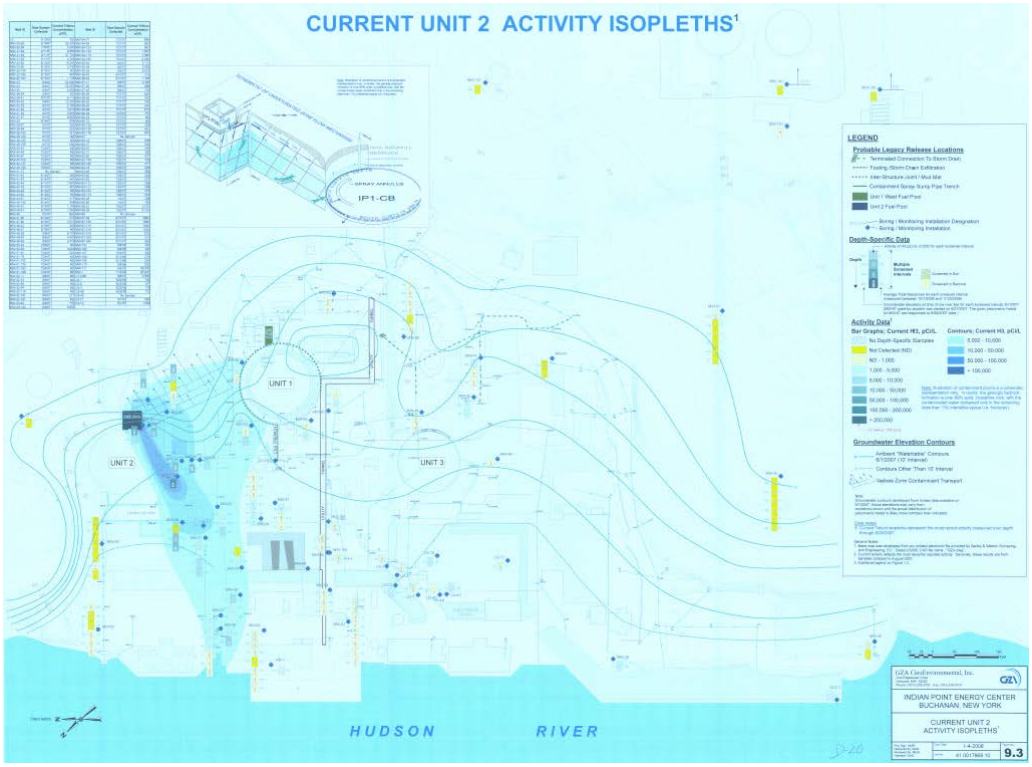


Figure 2: Current Unit 2 Activity Isopleths



Ground water contamination is limited to Indian Point's property and is not migrating towards off-site properties to the north, south, or east. The ground water contamination migrates with the site ground water

from areas of higher hydraulic heads to areas of lower heads along paths of least resistance and ultimately discharges to the Hudson River to the west. The contamination has been well characterized and defined through an extensive groundwater monitoring program.

Under its long-term monitoring plan, Entergy will continue to sample monitoring well water to check on the status of the contamination. The contamination events do not pose a public health and safety concern, as the contamination is below ground and groundwater at the site is not used for drinking-water purposes. The abnormal groundwater tritium release into the Hudson River represents a small incremental addition to the normal radionuclides released to the waterway during routine power plant operations. Those releases are within regulatory limits. The NRC staff has inspected the long-term monitoring plan to assess its effectiveness and found it to be satisfactory.

No contamination has been observed in any of the onsite, perimeter upgradient wells (i.e., MW-40, MW-51, LAF-002, MW-107, and MW I-2) immediately adjacent to IP-1, 2, or 3. As previously stated, the contamination migrates with the site groundwater from areas of higher heads to areas of lower heads along paths of least resistance. This is supported by the site bedrock geology, multi-level groundwater elevation data, and the radiological results from analytical testing.

A government Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) was developed to provide a standardized guidance document for investigating radioactively contaminated sites throughout the U.S. MARSSIM classifies areas that have no reasonable potential for residual contamination as non-impacted areas. These areas have no radiological impact from site operations and are typically identified early in decommissioning. Areas with some potential for residual contamination are classified as impacted areas.

For IPEC, Parcels A, B, and C are all expected to be non-impacted and, as such, are considered available for *Near-Term* reuse.

Section 2: Decommissioning Options

Entergy is scheduled to permanently cease all electric power production operations in April 2021 and IPEC must be decommissioned by reducing residual radioactivity to a level that permits release of the property and termination of the NRC license. The NRC has rules governing nuclear power plant decommissioning, involving cleanup of radioactively contaminated plant structures, systems, soils, and removal/storage of the spent fuel. These rules are designed to protect workers and the public during the entire decommissioning process and after the license is terminated.

Entergy may choose from three decommissioning alternatives: DECON, SAFSTOR, or ENTOMB.

Under **DECON** (immediate dismantling), equipment, structures, and portions of the facility containing radioactive contaminants are removed or decontaminated to a level that permits release of the property for unrestricted use[4] and termination of the NRC license.

Under **SAFSTOR** (deferred dismantling), a nuclear facility is maintained and monitored in a condition that allows the radioactivity to decay; afterwards, the plant is dismantled, and the property decontaminated to levels that permit release for unrestricted use and termination of the NRC license.

Under **ENTOMB**, radioactive contaminants are encased in a structurally long-lived substance, such as concrete. The entombed structure is appropriately maintained, and continued surveillance is carried out until the radioactivity decays to a level that permits release for unrestricted use and termination of the license.

Entergy may also choose to adopt a combination of the first two alternatives in which some portions of the facility are dismantled or decontaminated while other parts of the facility are left in SAFSTOR. The decision may be based on factors besides radioactive decay, such as access to waste disposal sites and available funds in the Decommissioning Trust Fund. Decommissioning must be completed within 60 years of the plant ceasing electricity generation. A time beyond that would be considered only when necessary to protect public health and safety in accordance with NRC regulations.

2.1 Decommissioning History

Worldwide there have been 110 commercial power reactors retired from operation. Some of these have been fully dismantled. Experience in the U.S. has varied. Table 1 lists the domestic commercial nuclear plants that have undergone decommissioning or are in the process of decommissioning. Table 1 also lists the status of facility spent fuel and indicates where Independent Spent Fuel Storage Installations (ISFSI) exist for storing spent fuel.

[4] NRC rules allow for "Restricted Use" that place restrictions on the facility use after license termination. A site would be considered acceptable for license termination under restricted conditions if the licensee can demonstrate that further reductions in residual radioactivity necessary to meet the requirements for unrestricted use would result in net public or environmental harm or were not being made because the residual levels were As Low As Reasonably Achievable (ALARA). For purposes of this Report "Restricted Use" options were not considered viable or prudent to develop reuse scenarios.

Table 1: Commercial Reactor Decommissioning History (Source: U.S. NRC Fact Sheet)

Reactor Site	*Decommissioning Alternative Selected*	*ISFSI*	*Location*
Big Rock Point	DECON *	Yes	Charlevoix, MI
Connecticut Yankee	DECON *	Yes	Haddam Neck, CT
Crystal River 3	SAFSTOR	Yes	Crystal River, FL
Dresden 1	SAFSTOR	Yes	Morris, IL
Fermi1	SAFSTOR	No	Monroe Co, MI
Fort St. Vrain	DECON *	Yes	Platteville, CO
Humboldt Bay	DECON (Ongoing)	Yes	Eureka, CA
Indian Point 1	SAFSTOR	Yes	Buchanan, NY
Kewaunee	SAFSTOR	Yes	Carlton, WI
La Crosse	DECON (Ongoing)	Yes	La Crosse, WI
Maine Yankee	DECON	Yes	Wiscasset, ME
Millstone 1	SAFSTOR	Spent fuel in Unit 1 pool	Waterford, CT
Pathfinder	License Terminated	No	Sioux Falls, SD
Peach Bottom 1	SAFSTOR	No	York Co., PA
Rancho Seco	DECON	Yes	Sacramento, CA
San Onofre 1	SAFSTOR	Yes	San Clemente, CA
San Onofre 2	DECON (Ongoing)	Yes	San Clemente, CA
San Onofre 3	DECON (Ongoing)	Yes	San Clemente, CA
Saxton	License Terminated	No	Saxton, PA
Shippingport	License Terminated	No	Shippingport, PA
Shoreham	License Terminated	No	Suffolk Co., NY
Three Mile Island 2	SAFSTOR	No	Middletown, PA
Trojan	DECON *	Yes	Columbia Co, Oregon
Vermont Yankee	SAFSTOR	Yes	Vernon, VT
Yankee Rowe	DECON *	Yes	Franklin Co., MA
Zion 1	DECON (Ongoing)	Yes	Zion, IL
Zion 2	DECON (Ongoing)	Yes	Zion, IL

* The operating license was terminated without restrictions.

The following paragraphs provide a brief historical and decommissioning overview of each nuclear power plant listed in Table 1. The facilities are presented and annotated in chronological order of the last operating date. Information provided comes from a variety of industry and utility publications, and websites, including the NRC, American Nuclear Society (ANS) and Nuclear Energy Institute (NEI).

Pathfinder (09/16/67): The Pathfinder Atomic Power Plant began construction in July 1959 near Sioux Falls, South Dakota and was designed as a 59 MWe prototype boiling water reactor (BWR). It shut down in 1967 after a very short life and the reactor never did achieve its designed operating full power of 203-MWt. The plant was converted to a fossil-fired peaker plant known as Pathfinder Peaking Plant and the isolated nuclear steam supply system of the plant was placed in SAFSTOR until 1992 when decommissioning of this system was completed.

Saxton (05/01/72): The Saxton Nuclear Experimental Corporation site in Liberty Township, Bedford County, Pennsylvania began operations in November 1961, primarily to research various aspects of power reactor technology and to train personnel. Saxton had an output of 23.5 MWt. After Saxton ceased operations, its spent fuel was shipped to the DOE's Savannah River Site. Limited decommissioning took

place at Saxton from 1972 to 1974, and the site was monitored until 1987. Support buildings and structures were decontaminated and removed between 1987 and 1992, and full-scale decommissioning started in 1998 and cleanup activities continued until completion in September 2005. On November 7, 2005 the NRC terminated the NRC license for Saxton.

Fermi 1 (09/22/72): The Enrico Fermi Atomic Power Plant, Unit 1, located in Monroe County, Michigan was a fast breeder reactor power plant cooled by sodium and operated at essentially atmospheric pressure. Construction started in August 1956 and operation reached initial criticality in August 1963. The reactor plant was designed for a maximum capacity of 430 MWt but only reached a maximum reactor power of 200 MWt. In November 1972, the Power Reactor Development Company made the decision to decommission Fermi 1. The fuel and blanket subassemblies were shipped offsite in 1973. The non-radioactive secondary sodium system was drained, and the sodium sent to Fike Chemical Company. The radioactive primary sodium was stored in storage tanks and in 55-gallon drums until the sodium was shipped offsite in 1984. The facility is in safe storage (SAFSTOR) and the reactor vessel, primary system piping, and major components have been removed.

Indian Point 1 (10/31/74): IP-1 was a four-loop PWR with a thermal rating of 615 MWt. The nuclear system was designed to generate saturated steam that was then heated to about 1000 degrees by an oil-fired superheater, giving the unit a net electrical generating capacity of 265-MWe. Operation of the unit was suspended in October 1974 when the plant's emergency core cooling system did not satisfy federal criteria that had come into effect after its start up. By January 1976, all spent fuel had been removed from the reactor vessel. Since that time, the unit has remained in deferred decommissioning status (SAFSTOR). In 2003 the NRC issued Amendment 52 to the Provisional Operating License for IP-1. Included within the amendment was a change to the expiration date of IP-1 license to be consistent with that of IP-2. In 2008, with concerns of the spent fuel pool integrity, the remaining 160 spent fuel assemblies were transferred to the site ISFSI (244 assemblies had previously been shipped to West Valley Reprocessing Plant, a commercial fuel reprocessing facility in upstate New York operated by Nuclear Fuel Services, Inc. from 1966 to 1972 for reprocessing).

Peach Bottom 1 (10/31/74): Peach Bottom Atomic Power Station, Unit 1, was a 200 MWt, high temperature, gas cooled reactor that was operated from June of 1967 to its final shutdown in October 1974. All spent fuel has been removed from the site, and the spent fuel pool is drained and decontaminated. The reactor vessel, primary system piping, and steam generators remain in place. The facility is currently in a SAFSTOR condition. Final decommissioning is not expected until 2034 when Units 2 and 3 are scheduled to shut down.

Humboldt Bay (07/02/76): Humboldt Bay was a 65 MWe, BWR plant, owned by the Pacific Gas and Electric Company, located 4 miles southwest of Eureka, California. The plant operated commercially from August 1963 to July 1976. It was shut down for refueling and seismic upgrades in July 1976, and the outage continued due to changing requirements. Pacific Gas and Electric announced plans to permanently shutter the plant in 1983, and it was then placed in SAFSTOR inactive status in 1988. Decommissioning commenced in 2008 including the completion of the transfer of spent fuel from the spent fuel pool to the ISFSI. Removal of the reactor vessel internals with the transfer of Greater Than Class C (GTCC) components into ISFSI was completed in November 2013. The control rod drive mechanisms, piping systems and components from the off-gas tunnels, suppression chamber down-comers, spent resin disposal tank and liquid radwaste system have been removed. In addition, the Turbine Building has been demolished.

Dresden 1 (10/31/78): Dresden Unit 1, located in Grundy County, near Morris, Illinois was the first privately financed nuclear power plant built in the US. It produced power commercially from 1960 to October 1978. Due to additional regulations, as a result of the 1979 incident at Three Mile Island, an

estimated cost to bring Dresden Unit 1 into compliance with these regulations was more than $300 million and the owner, Commonwealth Edison, concluded that the age of the unit and its relatively small size did not warrant the added investment. The plant shut down in October 1978 and is currently in SAFSTOR. No significant dismantlement activities are underway and all spent fuel from Unit 1 has now been transferred to the on-site ISFSI. Dresden is a multiple (three units) reactor site and Unit 1 will remain in SAFSTOR until it is decommissioned along with Units 2 and 3.

Three Mile Island 2 (03/28/79): Three Mile Island, Unit 2, located on the Susquehanna River just south of Harrisburg, Pennsylvania, was a PWR with a net generating capacity of 906 MWe. It operated from December 30, 1978 to March 28, 1979 when it suffered a partial meltdown. Following this accident, the fuel was removed and shipped to the DOE Idaho National Laboratory where it is currently in storage. After 14 years of comprehensive clean-up activities, including the removal of fuel, debris, and water from the 1979 accident, Unit 2, was placed in SAFSTOR condition. Dismantlement is expected to be performed together with Unit 1 after Unit 1 ceases operations.

Shippingport (10/01/82): Shippingport, located on the Ohio River, twenty-five miles northwest of Pittsburgh was a 72 MWe PWR constructed during the mid-1950s as a joint project between DOE and the Duquesne Light Company. At a cost of $72,500,000, it was the world's first full-scale atomic electric power plant devoted exclusively to peacetime uses. It operated from December 1957 to October 1982. DOE required five years to decommission the plant at the end of its useful life with all radioactive and mixed waste, including the reactor pressure vessel with internals intact, disposed at its Hanford, Washington site. The spent fuel was sent to its Idaho National Engineering Laboratory. The site was released unconditionally after decommissioning was completed.

La Crosse (04/30/87): Located on the east bank of the Mississippi River in Vernon County, Wisconsin, La Crosse nuclear power plant was owned and operated by the Dairyland Power Cooperative. The plant was one of a series of demonstration plants funded, in part, by the U.S. Atomic Energy Commission and was a 50 MWe BWR plant. La Crosse commenced operations in November 1969 and permanently ceased operations on April 30, 1987. Dairyland Power Cooperative submitted a decommissioning plan to the NRC, which was approved in August 1991, with a plan to place the facility into a SAFSTOR mode. As part of the plan, an onsite independent ISFSI was built and the spent fuel was moved to the ISFSI in 2012. Dismantlement and decommissioning activities were performed until the middle of 2014, when it was decided to return the facility to SAFSTOR until additional personnel resources could be acquired to complete the decommissioning effort. In June 2016, the license was transferred to La Crosse Solutions for the purpose of completing decommissioning of the plant. Decommissioning of La Crosse is scheduled to be completed in 2018.

Rancho Seco (06/07/89): Located in Herald, California, 25 miles southeast of downtown Sacramento, Rancho Seco was a 913 MWe PWR nuclear power plant owned by the Sacramento Municipal Utility District that began commercial operation in 1975. It was shut down in June of 1989 as the result of a voter referendum. Due to a minimal decommissioning fund balance, the decision was made to enter an extended period of SAFSTOR to allow the radioactivity to decay and the decommissioning fund build to a level that would allow dismantlement. All spent fuel was transferred and placed at the site's ISFSI. Since ceasing operations, all power generating equipment has been removed from the plant, the containment building, turbine building frame, and the two prominent hyperbolic cooling towers remain. In October 2009, the NRC released the majority of the site for unrestricted public use, while approximately 11 acres of land including a storage building for low-level radioactive waste and the ISFSI remain under NRC licenses.

Shoreham (06/28/89): Located on the north shore of Long Island, New York, the Shoreham Nuclear Power Plant was an 820 MWe BWR that operated at low power (< 5%) for two years and never received a full operating license. It was shut down in 1989 and proceeded with the DECON decommissioning option that

was completed in 1994 and the site was released for unrestricted use. No spent fuel remains at the Shoreham site. The fuel in the spent fuel pool at Shoreham was packaged in Department of Transportation's (U.S. DOT) shipping casks and shipped by intermodal transport including a heavy hauler, barge, and train to the Philadelphia Electric Company's Limerick Nuclear Power located northwest of Philadelphia.

Fort St. Vrain (08/18/89): Located near the town of Platteville, 35 miles north of Denver, Colorado, the Fort St. Vrain nuclear plant was in a 330 MWe high temperature gas-cooled reactor (HTGR) which operated for 16 years and was closed in 1989. The DECON decommissioning was selected and dismantlement activities were performed from 1989 to license termination in August 1997 when the facility was released for unrestricted use. All Fort St. Vrain spent fuel was transferred into an on-site ISFSI by June 1992.

Yankee Rowe (10/01/91): Yankee Rowe was located on the Deerfield River, in the town of Rowe, Massachusetts. It was 185 MWe PWR that operated from 1960 to 1992 when it was shut down permanently for economic reasons. The plant was successfully decommissioned between 1992–2007 and released for unrestricted reuse. Spent fuel remains at the on-site ISFSI.

Trojan (11/09/92): Located near Rainier, Oregon, 12 miles north of St. Helens, Trojan was a single-unit 1,130 MWe PWR that operated from May 1976 to January 1993. From the beginning, the plant was plagued by design flaws and other problems that led to temporary closures and expensive repairs. In 1993, the owner, Portland General Electric, proceeded with the DECON decommissioning option which was completed in 2004. By 2003, all Trojan spent nuclear fuel assemblies were transferred in dry casks at the on-site ISFSI.

San Onofre Unit 1 (11/30/92): Located south of San Clemente, California between I-5 and the Pacific Ocean, the Unit 1 nuclear generating station was a PWR with rated capacity of 436 MWe. The plant was owned by Southern California Edison and operated from January 1968 to November 1992. The DECON decommissioning option was selected for San Onofre Unit 1 in 2000 and most structures and equipment were removed and sent to appropriate disposal facilities by 2008. After removal of the internals, the only major component remaining from Unit 1 is the reactor vessel. This component remains onsite and will be part of the decommissioning activities for Units 2 and 3. Spent fuel from Unit 1 is stored at the on-site ISFSI. The ISFSI is currently being expanded onto the area previously occupied by Unit 1 in order to store all Unit 2 and Unit 3 spent fuel.

Maine Yankee (12/06/96): Located in Wiscasset, Maine, Maine Yankee was a single-unit 900 MWe, PWR, that operated from 1972 through 1996. The plant was permanently shut-down in August 1997 when it was no longer economically viable to operate. Maine Yankee selected the DECON decommissioning option and dismantlement activities began in 1997 with the site released for unrestricted use in 2005. Spent fuel from Maine Yankee remains stored in the on-site ISFSI.

Zion Units 1 and 2 (02/21/97, 09/19/96): Located in Zion, Illinois, 45 miles north of Chicago on the shores of Lake Michigan, Units 1 and 2 were two PWRs rated for 1098 MWe each. The reactors ceased operating in February 1997 and September 1996, respectively. Initially placed in SAFSTOR, the facility license was transferred from its owner, Exelon, to Zion Solutions in 2010 for the express purpose of expediting decommissioning. The DECON decommissioning option has been executed since license transfer with all major components from Zion 1 and 2 removed. Physical activities will be completed in 2018. Documentation review by the NRC will take a year prior to license transfer from Zion Solutions back to Exelon. Spent fuel from Zion Units 1 and 2 is stored in the on-site ISFSI.

Connecticut Yankee (12/05/96): Located in Haddam Neck, Connecticut, Connecticut Yankee was 619 MWe PWR. The facility operated from 1968 to 1996. The Connecticut Yankee Atomic Power Company Board of Directors voted to permanently close the plant based on an economic study that concluded that

due to changing market conditions, electric customers would save money if the plant were closed. The DECON decommissioning option was chosen because it was the most practical and environmentally responsible option for the plant. Other considerations included the use of current plant employees who were trained and knowledgeable about the facility, prevention of long-term maintenance costs, and the availability of low-level waste disposal facilities. Decommissioning activities began at Connecticut Yankee in May 1998 and were successfully completed in November 2007. Spent fuel from Connecticut Yankee remains stored in the on-site ISFSI.

Big Rock Point (08/29/97): Located in Charlevoix County, Michigan, on the northern shore of Michigan's lower peninsula, Big Rock Point was a BWR rated for 75MWe. Commercial operations began in March 1963 and the plant permanently ceased operations in August 1997. The owner, Consumers Energy Company, chose the DECON decommissioning option and dismantlement activities began in September 1997 and were completed in August 2006. All spent fuel at Big Rock Point was transferred to the on-site ISFSI by March 2003, where it remains today. In 2006, Consumers Energy Company sold Big Rock Point, including the ISFSI, as part of the Palisades Nuclear Power Station sale to the Entergy Corporation.

Millstone 1 (07/21/98): Millstone 1 located in the town of Waterford, New London County, Connecticut, on the north shore of Long Island Sound was a BWR producing 660 MWe of power and went into commercial operation in December 1970 and ceased operations in November 1995. A Post- Shutdown Decommissioning Activities Report (PSDAR) was submitted in June 1999, and a combination of the DECON and SAFSTOR options was selected. The owner, Dominion Energy, currently plans to leave the plant in SAFSTOR until Millstone Unit 2 ceases operation. After a formal assessment of spent fuel storage options in 2007, the licensee decided to keep the Millstone Unit 1 fuel in the Spent Fuel Pool, in a SAFSTOR status, until 2048 rather than move the fuel to an Independent Spent Fuel Storage Installation (ISFSI).

Crystal River 3 (02/20/13): Located in northwestern Citrus County, on Crystal Bay, an embayment of the Gulf of Mexico, Crystal River 3 was an 860 MWe PWR. The plant which is sited within 4,738 acres that also features four coal-fired plants, operated from March 1977 to September 2009. In 2009, while replacing two 500-ton steam generators, engineers discovered a delamination, or separation of concrete, within the containment building that surrounds the reactor vessel. Though crews successfully repaired the damage, additional delamination was discovered in two different areas of the containment building in 2011. In February 2013, the owner, Duke Energy, decided not to attempt costly repairs and certified to the NRC that the plant had permanently ceased operations and the fuel had been permanently removed from the reactor. Duke Energy chose the SAFSTOR decommissioning option. By July 2015, the decommissioning of Crystal River 3 reached its SAFSTOR condition. The PSDAR states that the plant spent fuel will remain in wet storage until August 2019 by which time all spent fuel will have been transferred to an on-site ISFSI. Final decommissioning will begin in May 2067 and the license is expected to be terminated in February 2073.

Kewaunee (05/07/13): Located on the western shore of Lake Michigan, 25 miles southeast of Green Bay, Wisconsin, the Kewaunee Nuclear Station was a 556 MWe, PWR, that operated from December 1973 to May 2013. Owned by Dominion Energy, the plant ceased operations due to economic reasons and the SAFSTOR decommissioning option was chosen. By June 2017 all spent fuel has be transferred and stored in the on-site ISFSI.

San Onofre Units 2 and 3 (06/12/13): Located south of San Clemente, California between I-5 and the Pacific Ocean, nuclear generating Units 2 and 3 were PWRs with a rated capacity of 1,070 and 1,080 MWe respectively. The majority owner of the units is Southern California Edison and the units operated from August 1983 (Unit 2) and April 1984 (Unit 3) to June 2013. Both reactors were shut down in January 2012 due to premature wear found in replacement steam generators that had been installed in 2010 and 2011. Southern California Edison chose the DECON decommissioning option and contracted with

decommissioning specialty firms in 2017 to dismantle Unit 2 and Unit 3 over the next ten years. Spent fuel is being transferred from wet storage to the on-site ISFSI with all spent fuel forecasted to be transferred to the ISFSI by mid-2019.

Vermont Yankee (12/29/14): Located in the town of Vernon, Vermont, Vermont Yankee was a BWR rated for 620 MWe. The plant operated from November 1972 until December 2014. Entergy, which owns the facility, selected the SAFSTOR decommissioning option as part of the Vermont Yankee Post-Shutdown Decommissioning Activities Report submitted to the NRC in December 2014. Spent fuel is being transferred from wet storage to the on-site ISFSI with all spent fuel forecasted to be transferred to the ISFSI by 2020. In January 2017, Entergy and NorthStar Group Services, Inc. participated in a public meeting with the NRC indicating Entergy's intention to request a license transfer of the Vermont Yankee Nuclear Power Station to NorthStar for the purposes of decommissioning. Under this proposal, and if approved, the spent fuel would be planned to be moved to dry storage by the end of 2018. At the issuance of this report, Entergy's license transfer intention has been formalized and submitted to the NRC and is undergoing their review and comment cycle. A transaction review is also expected by the State of Vermont Public Utility Commission.

2.2 Reuse Experiences of Decommissioned Facilities

The nuclear industry has had many facilities cease operations and proceed with various decommissioning options over the past 50 years. The following section summarizes reuse experiences of several nuclear plants that have completed the DECON decommissioning option and terminated their NRC license separate from the storage of spent fuel at an ISFSI.

Nuclear plants that have undergone decommissioning and have met cleanup goals are almost always released for "unrestricted use."[5]. Outside of a small footprint (several acres) where an ISFSI has been installed, decommissioned nuclear facilities often result in an original tract of land that is available for redevelopment. Facilities do vary in "as left" conditions in that radiological decommissioning does not include site restoration. In fact, decommissioning trust funds are not used for site refurbishment except when needed to stabilize remaining structures, systems, and components to ensure health and safety standards are met at the remaining facility. The following is a limited description of various decommissioned facility reuse activities after decommissioning.

Big Rock Point: After completing the decommissioning of Big Rock Point in 2006 with the property released for unrestricted reuse, the owner, Consumers Energy, hosted a "Greenfield Celebration" in 2006, celebrating the cleanup effort and restoration of the property. In 2007 a monument, the Big Rock Achievement Landmark, was dedicated on the site in addition to a state historical marker, which indicated the achievements of the plant and its workers. The 435 acres are available for reuse. There have been no definitive plans made for the future of the Big Rock Point site although the State of Michigan has shown some interest in purchasing the land and turning it into a state park, but numerous watchdog groups that still fear the presence of nuclear waste and contamination have protested this purchase.

[5] "Unrestricted use" refers to any residual radiation would be below NRC's limits of 25 millirem annual exposure and there would be no further regulatory controls by the NRC. Any plan proposing release of a site for "restricted use" must describe the site's end use, public consultation, institutional controls, and financial assurance needed to comply with the requirements for license termination for restricted release.

Connecticut Yankee: The successful decommissioning of the former plant site was completed in November 2007 in accordance with all NRC regulations. The NRC license was amended to the approximately 5-acre ISFSI. On January 8, 2013, a 38-acre portion of the Connecticut Yankee Atomic Power Company's property in Haddam Neck, Connecticut was transferred to the U.S. Fish and Wildlife Service. The parcel became part of the Salmon River Division of the Silvio O. Conte National Fish and Wildlife Refuge. This parcel of land was property acquired by Connecticut Yankee Atomic Power Company in 2000 that is located adjacent to the 544-acre former plant site. The site is of historical significance as it includes the homestead site of Venture Smith, the African slave who was able to earn freedom for himself and his family in the mid-1700's. In September 2014 the State of Connecticut Department of Energy and Environmental Protection terminated the State Stewardship Permit for the Connecticut Yankee site. The termination of that permit documented the successful environmental restoration of the nuclear reactor site and the completion of all the required federal and state corrective action measures necessary to release the former reactor site for unrestricted use.

Fort St. Vrain: In 1996, after decommissioning, electric power generation from Fort St. Vrain began again, this time with a combustion turbine burning natural gas and generating 130 megawatts of power. A heat recovery steam generator was added, and steam was provided to the old main steam turbine. A second gas turbine was added in 1998, making the plant capable of 500 MWe. In May 2001, a third combustion turbine was added, making the rated output of the plant 720 MWe. In 2009, additional gas turbines where added resulting in final rated capacity of 969 MWe.

Maine Yankee: Physical decommissioning of the former Maine Yankee plant was completed in 2005. The NRC license for the site was reduced to the approximately 11 acres surrounding the ISFSI site. During plant operations Maine Yankee owned about 800 acres of land. Today Maine Yankee owns about 180 acres on Bailey Point Peninsula, the site of the ISFSI and former power plant. In 2002, approximately 430 acres north of Ferry Road, were released from the NRC license and sold in August 2004 to a nonprofit entity created by the Town of Wiscasset. This entity then sold the property to a development company. In 2005, Maine Yankee donated the 200-acre Eaton Farm to the Chewonki Foundation as part of a Federal Energy Regulatory Commission settlement agreement. In 2008, as part of a Natural Resources Damages Restoration Plan and Settlement Agreement between Maine Yankee and the State of Maine, Maine Yankee conveyed to the Chewonki Foundation a small parcel of land around the Montsweag Brook and dam west of Route 1. The dam has since been removed. During plant operations the dam impoundment was used to provide raw water to the plant via a pipe running from the dam to a fire pond at the plant.

Shoreham: In August 2002, a 100 MW Gas Turbine Power Plant was commissioned on the Shoreham site utilizing the existing switchgear that was in place for the decommissioned nuclear facility. This facility utilizes two 42 MW GE LM6000PC Jet Engine Generators equipped with Sprint injection (can increase capacity to 50 MW each) and Spray Mist Evaporative Cooling. The electric transmission infrastructure has remained, connecting it to the Long Island electric grid. In 2002, the Cross-Sound Cable, a submarine power cable capable of transmitting 330 MW, was laid from the Shoreham plant across Long Island Sound to New Haven, Connecticut. During the Northeast Blackout of 2003 the cable was used to ease the effects of the blackout on Long Island. After extended negotiations with Connecticut the cable was put into permanent use. In 2005, two 100-foot (30 meter) tall wind turbines with 25-foot (7.6 m) blades were erected at the plant and attached to the electric grid, generating 50 kilowatts each.

Yankee Rowe: Physical decommissioning of the former Yankee Rowe plant was completed in 2007. The NRC notified Yankee in August 2007 that the former plant site had been fully decommissioned in accordance with NRC procedures and regulations and formally approved Yankee Atomics' Final Status Survey Reports in accordance with the License Termination Plan (LTP). The NRC license for the site was also reduced to the approximately two acres surrounding the ISFSI site. There has been no property transferred at the Yankee Atomic site in Rowe Massachusetts.

2.3 Taxes After Decommissioning

Of great interest is what tax base, if any, is returned to local municipalities after electric power generation operation were terminated. Many experiences have been chronicled in news articles. Table 2 lists several decommissioned plants' experience identifying property taxes generated during electric power generation operation and after stopping electric power generation (shutdown) and post decommissioning.

Table 2: Taxes Paid Pre and Post Decommissioning

Facility	Decommissioning Option	Taxes During Operation	Taxes After Shutdown or Decommissioning
Connecticut Yankee	DECON - ISFSI	$13M	$1.4M
Maine Yankee	DECON - ISFSI	$13M	$1M
Yankee Rowe	DECON – ISFSI	$400K	$200K
Zion	DECON - ISFSI	$20M	$1.6 M

2.4 Key Factors for Decommissioning IPEC

2.4.1 Decommissioning Management

A factor to monitor in the decommissioning of IPEC will be who is in charge of the project. Licensees for recent decommissioning projects are developing specifications where specialty companies, in the business of decommissioning, engage in a competitive bidding process to determine a lead contractor to execute the project. Such a business strategy for a nuclear facility owner/licensee avoids the necessary learning curve for a company that is not interested nor equipped to perform a decommissioning project.

If Entergy continues to hold the licensee and lead the decommissioning effort of IPEC, then they clearly dictate the dismantlement strategy and timeframe of such an effort. Any other management of the decommissioning of IPEC is likely to lead to an approach of a prompt DECON option where work would begin as soon as possible and be completed in an expeditious manner.

There have been recent industry contractual arrangements between utility licensees and decommissioning companies that have led to a prompt DECON strategy. These contractual arrangements include:

- Zion Decommissioning Project – Exelon Nuclear contracted with Energy Solutions to transfer the NRC license for the Zion nuclear plant to Energy Solutions. Energy Solutions received a transfer of the NRC license and has proceeded with the DECON option. At the completion of the project, Energy Solutions, having demonstrated meeting the NRC cleanup criteria, the site is anticipated to be released for unrestricted use, although Exelon will retain the radioactive material license for the on-site ISFSI.

- San Onofre Units 2 and 3 Decommissioning Project – Southern California Edison (SCE) selected the team of Energy Solutions and AECOM to execute a DECON decommissioning option for these two units. Under this contract arrangement, SCE maintains their NRC license and oversees the decommissioning activities. Upon completion of decommissioning activities that culminates with meeting NRC cleanup criteria, the San Onofre site is anticipated to be released for unrestricted use, except for the ISFSI. SCE will maintain ownership and control of the NRC license for the ISFSI.

- Vermont Yankee – Although contract negotiations are ongoing between Entergy and NorthStar Group Services, Entergy desires to sell the Vermont Yankee plant to NorthStar for $1,000 by the end of 2018. The arrangement requires approval of both the Vermont Public Utilities Commission and the NRC but, if approved, NorthStar would take ownership of the NRC license and property and manage the remaining ISFSI after decommissioning activities.

2.4.2 Low-Level Radioactive Waste Disposition Strategy

Decommissioning of a nuclear power facility is a complex and challenging undertaking, yet it is fundamentally centered on one key parameter. That parameter is material movement which includes a cycle of dismantlement and removal of waste material, selection of transport containers to meet regulatory requirements while maximizing payload weights and dimensions, and the selection of optimal shipping modes for transport to the ultimate waste disposal location.

DLEC believes that for the decommissioning of IPEC, the dismantling, packaging and transporting of an estimated 6,725,000[6] cubic feet of material will be challenging but doable. To achieve a successful project outcome, that is to achieve cost and schedule objectives, it is critical to consider all possible transportation modes (road, water, and rail) and, for many waste streams, a combination of modes, commonly referred to as "intermodal transport."

Since the beginning of nuclear operations in 1962, IPEC has generated mostly low-level radioactive waste that has been packaged, transported, and shipped to a licensed land disposal facility. During the early years, most IPEC low-level waste was sent to Barnwell, South Carolina for disposal. After the loss of access to Barnwell, low-level waste has been sent to either Energy Solutions in Clive, Utah or Waste Control specialists in Andrews, Texas. Occasionally waste has been sent to an intermediate facility to process a waste stream by volume reduction, segregation or other techniques to reduce burial costs or meet acceptance criteria at a burial facility. In most cases, during a nuclear plant's operating years, such waste is shipped, one or several packages at a time and almost always by road in accordance with all applicable U.S. DOT regulations. Such has been the practice at IPEC.

Decommissioning of a nuclear facility involves handling large volumes of waste generated during dismantlement and requires a different strategy to package and transport waste in bulk and all waste in an efficient and safe manner. The practice of packaging and transporting a container of radioactive waste by a dedicated truck to a designated low-level disposal facility is time consuming and inefficient. IPEC decommissioning is likely to require an alternative to shipping dismantled plant structures, systems, and components by individual trucks to a low-level burial facility. A strategy that is common to previous and ongoing decommissioning projects is to ship radioactive waste in bulk form on rail cars (Photo 9). Such a strategy allows for multiple shipping containers to be loaded onto rail cars for transport. For IPEC decommissioning, much thought and planning are anticipated to identify what and how waste is to be transported to a low-level burial site. The utilization of various transportation modes is anticipated.

[6] Combined waste volumes described in TLG Decommissioning Cost Estimates for Unit 1, 2 (April 2013) and 3 (May 2013).

Photo 9: Intermodal Containers for Transporting Radioactive Waste

2.5 Decommissioning Scenarios

As described at the beginning of this Section, the NRC allows for three decommissioning options, namely DECON, SAFSTOR and ENTOMB. Under all these options, the licensee is required to complete decommissioning within 60 years after shutdown.

ENTOMB has never been undertaken by a commercial nuclear plant licensee in the U.S. nor is this option considered viable for future consideration. The main reason for this limitation is that commercial reactors generate significant quantities of long-lived radioactive materials and, as such, will never decay to meet cleanup criteria within a 60-year timeframe.

SAFSTOR is a viable option for decommissioning that essentially postpones dismantlement of a facility to some point in the distant future. However, the start of decommissioning activities is normally expected to begin no later than 50 years after shutdown to allow 10 years for dismantlement and verification of meeting cleanup criteria. SAFSTOR, sometimes referred to as "delayed DECON," is often selected at a multi-unit reactor site allowing the first shutdown reactor to be placed in SAFSTOR while other unit(s) complete their operating lives. This situation applies to IP-1 which has been in a SAFSTOR mode since shutdown in 1974. Additional factors that may influence the decision to select the SAFSTOR decommissioning option include shortages in the Decommissioning Trust Fund and to allow for reduction in radiation levels. Reasons to not select SAFSTOR include the costs associated with unpredictable changes to regulatory framework and cleanup criteria and extended periods of security and facility maintenance. In addition, the SAFSTOR option introduces uncertainty in the availability of waste burial facilities.

DECON is an optimal decommissioning option that provides for the more predictable costs and highest confidence of outcome. In general, DECON is chosen when a licensee has adequate funding, has no further use for the site or envisions a *Near-Term* reuse of a site.

Based on the parameters and limitations above, IPEC decommissioning scenarios can be separated into two broad options.

- Option 1 - Entergy Manages the Decommissioning

Under this option, Entergy retains ownership and possession of their current NRC license. Entergy determines whether to submit a PSDAR to the NRC indicating their plan of selecting either SAFSTOR or DECON decommissioning methodology.

- SAFSTOR: Entergy submits a PSDAR to the NRC to delay decommissioning activities. Under the SAFSTOR methodology, IPEC would be placed in a safe and stable condition and maintained in that state for a specified time allowing levels of radioactivity to decrease through radioactive decay. After the selected dormancy period, the entire IPEC site would be dismantled and decontaminated to levels that permit license termination. A schedule and site-specific cost estimate would be presented in the PSDAR submittal for the selected SAFSTOR option. In addition, Entergy's PSDAR would demonstrate that their proposed plan would have no environmental impacts outside previously bounded impacts by the NRC Generic Environmental Impact Statement related to decommissioning.

- DECON: Entergy submits a PSDAR to the NRC outlining plans to begin dismantlement and decontamination activities immediately or soon after Unit 3 is shutdown in April 2021. A DECON PSDAR is to describe major dismantlement and decontamination activities, a schedule for the proposed activities and a site-specific cost estimate. The PSDAR would also likely include an explanation that demonstrates their proposed plan would have no environmental impacts outside the bounds of impacts found in the NRC Generic Environmental Impact Statements related to decommissioning.

➢ Option 2 – Decommissioning Managed and Performed by a Decommissioning General Contractor (DGC)

- Entergy decides it will not manage the IPEC Decommissioning Project. A determination, probably through a competitive contract bid process, to select a specialty company with technical and managerial experience in decommissioning including financial assurances to execute the IPEC Decommissioning Project. In addition, Entergy is likely to obtain approval to transfer their NRC license to the selected DGC for the duration of decommissioning project. If the spent fuel is still in storage at the ISFSI at the end of decommissioning, an NRC license will still be required for this facility which may or may not be transferred back to Entergy at the completion of decommissioning.

- With this option the chosen DGC will undoubtedly proceed with the DECON methodology. The DCG will begin the planning and execution of the decommissioning of IPEC in an expeditious manner. It is unlikely that a DCG would desire to enter into an agreement to proceed with the SAFSTOR option for IPEC due to limited financial incentives and increased risk.

- Once Entergy's IPEC license transfer is approved by the NRC, the selected DGC will submit a PSDAR for DECON describing major dismantlement and decontamination activities, a schedule for the proposed activities, and a site-specific cost estimate. The PSDAR would also include an explanation that concludes that their proposed plan would have no environmental impacts outside the bounds of impacts found in the NRC Generic Environmental Impact Statement related to decommissioning.

2.6 Decommissioning Process

Once the management for decommissioning of IPEC has been determined and a decision has been made to begin the DECON methodology, the activities involved for dismantling and decontamination of the plant and achieving cleanup goals in accordance with regulatory requirements are the same. In general, the decommissioning process can be divided into four major phases. Namely,

- *Phase 1* - Planning
- *Phase 2* - Dismantlement and Decontamination
- *Phase 3* - Meet Cleanup Goals
- *Phase 4* - License Termination

Phase 1 includes all preparatory activities prior to commencing physical work. An appropriate management structure will be put in place that will be functionally different than the site organization required during IPEC's operating life. Emphasis will change from generating electrical power to safe and efficient removal of contaminated soils and almost all plant structures, systems and components.

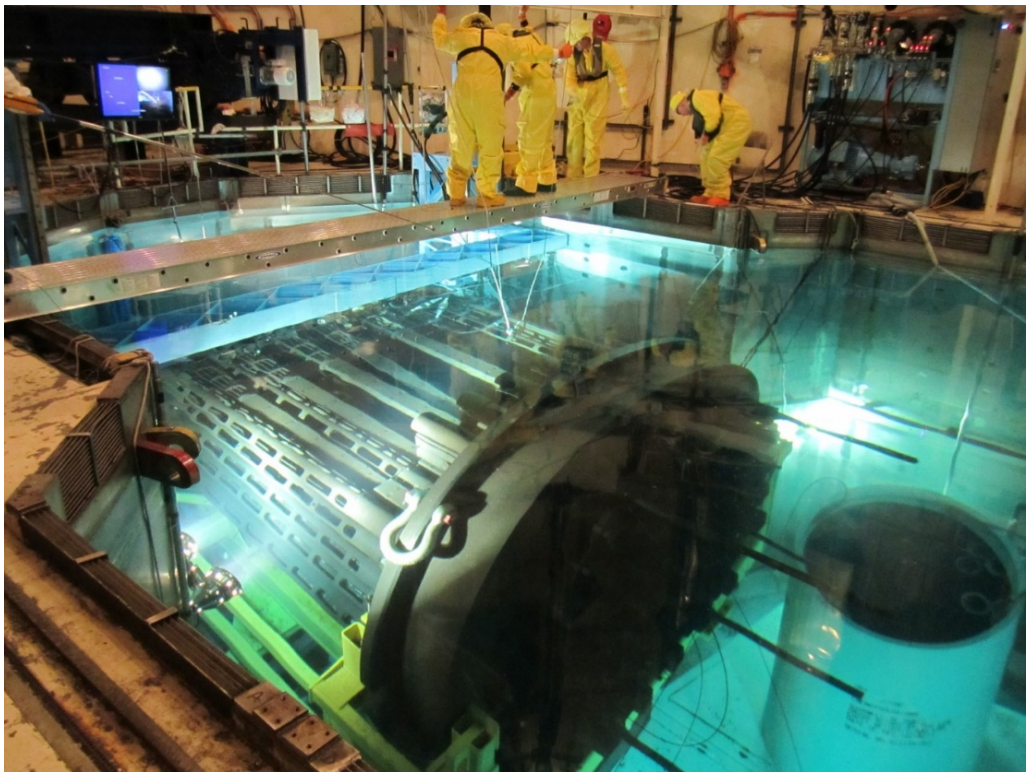
Although staffing in such areas as Radiation Protection, Security, and Procurement will remain similar to normal power generation operating days, other departments such as Operations, Maintenance, and Training will require less personnel due to the new focus of decommissioning at IPEC. Departments, such as Waste Management, are likely to see an increase in demand for experienced personnel and administrative controls for procurement, planning, and documentation. A reduction in the current IPEC staff of 1,000 personnel is expected. However, IPEC personnel and additional resources with experience and/or skill sets suitable for executing a decommissioning project, are likely to be hired to perform the work. The decommissioning staffing will fluctuate for the duration of the project, varying from several hundred (400-500) personnel during peak dismantlement periods to fewer personnel (<100) at the start and end of the project.

Planning phase activities are focused on revising procedures to better fit a decommissioning project, license amendments, and procurement. For example, procedures associated with alarm responses and maintenance of systems abandoned due to the non-operating status of the plant will not be required. New procedures will be required for activities such as cutting and packaging reactor internals and surveying areas and grounds to meet cleanup criteria. License amendments will be submitted to the NRC to reduce unnecessary requirements such as Technical Specifications applicable to generating electricity. New training in areas specific to decommissioning will be necessary and mock-ups will be planned and constructed to demonstrate proficiencies prior to safely executing actual work activities in the field.

Phase 2 involves all the physical work activities required to safely and efficiently remove all radioactive material to meet the criteria for unrestricted reuse of the site.

A major part of the IPEC Decommissioning Project will address the segmentation and removal of the reactor internals from each of the three reactors. Aside from the spent fuel, the reactor internals contain the majority of radioactivity at IPEC. Reactor internal segmentation requires detailed characterization and cutting techniques that separate components into two categories of radioactive waste. One group of waste, known as GTCC waste is required to be separated from other reactor internals because such waste is not suitable for shallow-land waste disposal at available burial facilities. Currently, the existing shallow-land waste disposal sites for IPEC radioactive waste are Energy Solutions in Clive, Utah and Waste Control Specialists in Andrews, Texas. GTCC waste removed from IPEC reactors is the responsibility of the DOE and will be packaged and stored in the same way as the spent fuel at the ISFSI. All other reactor internals and the three reactor vessels will be segmented, packaged, transported and buried at available shallow-land burial facilities (Photo 10).

Photo 10: Underwater Reactor Internals (Center) and Waste Container (Lower Right)



Other major activities during *Phase 2* will be the removal of major large components. These components include pressurizers, steam generators, and turbines. Additionally, large structures/buildings such as the spent fuel storage (after spent fuel has been removed), auxiliary, and containment buildings are anticipated to be demolished, including an industry standard approach of removing foundations to three feet below grade.

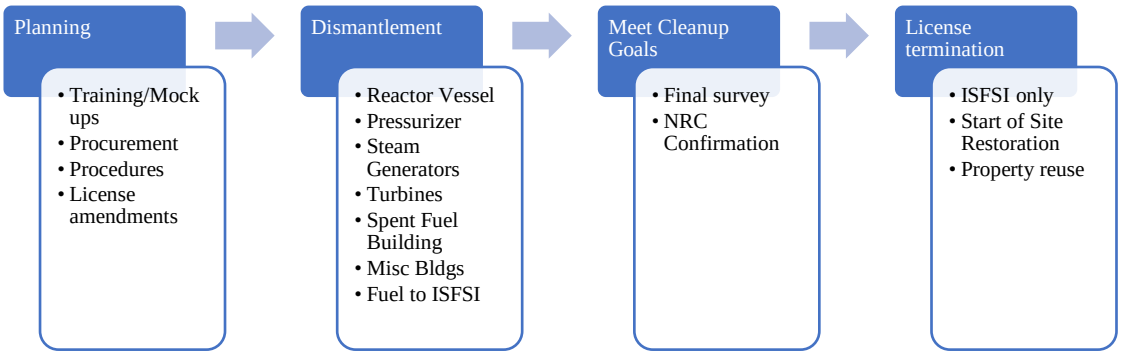
Phase 3 of the decommissioning process includes a design and execution of a Final Status Survey (FSS). A plan that describes the methodology and documentation associated with the FSS will be submitted as part of the required submittal of the LTP.

The FSS will encompass a comprehensive survey of the IPEC grounds and remaining structures and buildings. The FSS is performed in accordance with the MARSSIM and will document that regulatory cleanup criteria have been met. The FSS is confirmed by an NRC third-party independent contractor to validate the FSS documentation and conclusions. Any anomalies found during the conduct of the FSS and confirmatory surveys will require additional remediation to ensure that cleanup goals are satisfied and IPEC can be released for unrestricted use.

Phase 4 begins upon the successful completion of the FSS. The NRC will terminate the NRC license and release the IPEC site for unrestricted use. If spent fuel and GTCC waste remain at the ISFSI, then ISFSI procedures and administrative controls are to be set in place, including staffing the facility with adequate security, radiological controls, and management personnel until such time the ISFSI waste is removed and transported by DOE to an approved storage facility. *Phase 4* will challenge the IPEC owners to consider reuse options that may include site restoration activities that were not related to the decommissioning process.

Figure 3 summarizes the flow of activities that will occur during the decommissioning of IPEC.

Figure 3: Decommissioning Flow Diagram



2.7 Scenario Timelines

The history of decommissioning nuclear power facilities has demonstrated that there is no one timeline for decommissioning. The licensee is only required to complete dismantlement and decontamination of a facility and terminate the NRC license within 60 years of ceasing operations. The decommissioning option decision and duration of the project is driven, in part, by available trust funds, burial site availability, demand for reuse of the existing site, and whether a facility is part of a multiple nuclear unit complex. In the case of IPEC, IP-1 was shuttered in 1974 and limited decommissioning work has been performed to date with the objective of delaying IP-1 decommissioning work activities to achieve "economy of scale" by performing decommissioning with IP-2 and IP-3.

2.7.1 SAFSTOR Timeline

The timeline for this decommissioning scenario is variable and unpredictable. With the assumption that only Entergy would pursue this scenario, the period for SAFSTOR could be several years to as many as 50 years. Fifty years is considered an industry limit in that ultimately an NRC licensee is required to complete decommissioning within 60 years. A period of 50 years of SAFSTOR permits up to 10 years to complete decommissioning activities, meet cleanup criteria for unrestricted use, and terminate the NRC license.

An IPEC shutdown of April 2021 would allow the SAFSTOR timeline to extend until April 2071. This is followed by dismantlement and decontamination with license termination in April 2081. This estimate does not account for ultimate disposition of the ISFSI which is currently indeterminate because of the lack of a federal spent fuel repository.

2.7.2 Entergy DECON Timeline

Assuming Entergy continues as the NRC licensee and manages the decommissioning of IPEC, the DECON timeline would require between 10 to 15 years after decommissioning work activities begin. Several factors will further define estimates to complete the decommissioning of IPEC, but such data is not known at this time. Such factors include full characterization of IPEC to define the nature and extent of all radioactive contamination and other hazards, logistics associated with waste removal, packaging, transporting, disposal, and regulatory and stakeholder processes and involvement.

Given a shutdown scheduled for April 2021 and a 10- to 15-year timeframe to complete IPEC DECON, it is estimated that license termination may occur between 2031 and 2036. This timeline does not include the ultimate disposition of the ISFSI.

2.7.3 DGC DECON Timeline

This timeline assumes a DGC manages and executes DECON of IPEC and becomes the holder of the NRC's IPEC license. Similar to the Entergy DECON timeline, decommissioning is estimated to take 10 to 15 years. Also, given a shutdown scheduled for April 2021 and a 10 to 15-year timeframe to complete the decommissioning, it is estimated that license termination would occur between 2031 and 2036. This estimate does not account for ultimate disposition of the ISFSI.

In summary, the IPEC DECON timeline is the same regardless of the work being performed by Entergy or a DGC.

2.8 Fiscal Impacts During Decommissioning

During decommissioning, revenues for local communities are anticipated to come from several sources. These sources include local and state taxes on consumables and housing, payments in lieu of taxes (PILOTS) for the IPEC property, and possible revenues from subdivided non-impacted property where reuse opportunities are implemented. In addition to these revenue sources, the expenditure of decommissioning trust fund dollars is expected to provide revenues to local and regional businesses.

The decommissioning trust fund for IPEC is currently $1.7B. Assuming this amount will be expended for all activities to support the DECON methodology, a breakdown of the total $1.7B can be made based on information from the Electric Power Research Institute (EPRI).[7] The cost data from EPRI was compiled from eight U.S. plants and summarized decommissioning costs categories as follows:

Staffing - 43%
Removals - 24%
Waste - 19%
Other - 14%

- Staffing - Personnel supporting the decommissioning of IPEC will include a wide array of technical and administrative disciplines. The eventual mix of resources is not known at this time but is anticipated to include an integrated combination of incumbent personnel from IPEC and outside contractors. Assuming 43% of the decommissioning trust fund is allocated to staffing, then $731M is expected to be spent on labor during the course of the project.

- Removals - Equipment and work activities associated with structures, systems and component removals are estimated to be 24% of the decommissioning trust fund. This percentage results in $408M required for removal of items such as the reactor vessel and internals, steam generators, pressurizer, turbines, and buildings such as the reactor, auxiliary, turbine and spent fuel buildings.

[7] Information presented at the International Symposium on Preparation for Decommissioning (PREDEC 2016): EPRI Guidance for Transition from Operations to Decommissioning, February 16-18, Lyon, France

- Waste - The estimated waste disposal costs for the IPEC decommissioning project is at 19% of the trust fund. Therefore, $323M will be spent to dispose of waste at low-level burial facilities.

- Other - Costs for all other project related activities that are outside the scope of the three categories above are estimated to be 14% of the total project costs. Other costs will equal $238M.

This breakdown reflects the total costs for the IPEC decommissioning and includes almost all costs that either directly or indirectly involve the local community, except for waste disposal costs ($323M). The DECON approach will require between 10 and 15 years after decommissioning work activities begin. If 12 years is used as an educated guess estimate for the duration of the project and the trust fund expenditures are spread equally over this duration, the possible annual expenditures are (Table 3):

Table 3: Annual Trust Fund Expenditures for DECON Approach

Category	Yearly Expenditure
Staffing	$61M
Removals	$34M
Other	$20M
Total (Waste disposal not included)	$115M

Section 3: Regulatory Process and Requirements

When a power company (licensee) decides to permanently shut down a nuclear power plant, the facility must be decommissioned. As discussed in Section 2, decommissioning is the safe removal of a nuclear facility from service and the reduction of residual radioactivity to a level that permits release of the property and termination of the license. The NRC regulations establish site-release criteria and provide for unrestricted and (under certain conditions) restricted release of a site. The NRC includes provisions for partial site release. The regulations also require all licensees to maintain financial assurance that funds will be available when needed for decommissioning. The rules recognize the public's interest in the proper regulation of decommissioning activities and provide various opportunities for citizens to make their opinions known. In addition, the requirements are designed and enforced to protect workers and the public during the decommissioning process and the public after the license is terminated.

3.1 Regulatory Background

Regulations governing decommissioning of nuclear power plants evolved over time.

In June 1988, the general requirements for decommissioning that contained technical and financial criteria and addressed planning needs, timing, funding mechanisms, and environmental review requirements were published in the *Federal Register*.

In July 1996, a final rule amending the regulations on decommissioning procedures was published. The rule reflected the experience and knowledge gained during actual facility decommissioning. The rule clarified ambiguities in the previous regulations, reduced unnecessary requirements, provided additional flexibility, and codified procedures and terminology that had been used on a case-by-case basis. In addition, the rule increased the opportunities for the public to learn about a licensee's decommissioning activities. The 1996 rule established a level of oversight commensurate with the level of regulated activities expected during decommissioning.

In June 2011, the Decommissioning Planning Rule (DPR) was promulgated. The DPR requires all licensees to establish operational practices to minimize site contamination and perform reasonable subsurface radiological surveys and sets forth new financial assurance requirements that require more detail in the cost estimate submitted periodically to the NRC. The goal of the DPR is for licensees to have sufficient funds to conduct site remediation and terminate their licenses effectively and efficiently.

3.2 Applicable Rules and Regulations

The requirements for decommissioning a nuclear power plant are set out in several regulations. The regulations define "decommission" as "to remove a facility or site safely from service and reduce residual radioactivity to a level that permits (1) release of the property for unrestricted use and termination of the license or (2) release of the property under restricted conditions and termination of the license.

The regulations regarding the decommissioning of nuclear power plants appear in the Code of Federal Regulations (CFR). The regulations related to the decommissioning of power reactors are included in Title 10, "Energy," Chapter I. Chapter I of Title 10 is divided into several parts. They include:

- 10 CFR Part 20 provides the standards for radiation protection:
  - 10 CFR 20.1402 provides the radiological criteria for unrestricted use.
  - 10 CFR 20.1403 provides the criteria for license termination under restricted conditions.

- 10 CFR 20.1404 provides the alternate criteria for license termination.
- 10 CFR 20.1405 provides the requirements for public notification and public participation.
- 10 CFR 20.1406 provides the requirements for minimization of contamination.

- 10 CFR Part 50 provides the requirements for the domestic licensing of production and utilization facilities:
  - 10 CFR 50.2 provides definitions.
  - 10 CFR 50.4 provides the requirements for written communications.
  - 10 CFR 50.54 provides the conditions for a license.
  - 10 CFR 50.75 provides the requirements for reporting and recordkeeping for decommissioning planning.
  - 10 CFR 50.82 provides the requirements for termination of a license including a requirement for nuclear power reactor licensees to submit a PSDAR and an LTP.
  - 10 CFR 50.83 provides the requirements for the release of part of a power reactor facility or site for unrestricted use.

- 10 CFR Part 51 provides the requirements for environmental protection regulations for the domestic licensing and related regulatory functions.

3.3 Regulatory Guidance

Regulatory guides and standard review plans describe methods acceptable to the NRC staff for use in implementing specific parts of the regulations, provide an explanation of techniques that the staff uses in evaluating specific problems, and provide guidance to applicants and licensees. Regulatory guides and standard review plans are not substitutes for regulations and compliance with them is not mandatory, but variance to the guidelines is subject to examination. Applicable guides and standards include:

- Regulatory Guide 1.179, "Standard Format and Content of License Termination Plans for Nuclear Power Reactors" provides guidance for the preparation of License Termination Plans.
- Regulatory Guide 1.184, "Decommissioning of Nuclear Power Reactors" provides overall guidance on steps involved with the decommissioning of power reactors.
- Regulatory Guide 1.185, "Standard Format and Content for Post-Shutdown Decommissioning Activities Report" provides guidance on the type of information that the PSDAR must contain and establishes a standard format for the PSDAR.
- Regulatory Guide 4.21, "Life Cycle Planning for Decommissioning" provides guidance to license applicants on the steps that can be taken to minimize contamination and facilitate decommissioning in the context of a risk-informed approach.
- Regulatory Guide 4.22, "Decommissioning Planning During Operations" provides guidance on implementation of the Decommissioning Planning Rule.
- "Final Standard Review Plan for Decommissioning Cost Estimates for Nuclear Power Reactors," NUREG-1713, provides information on how the NRC staff will review site-specific decommissioning cost estimates.
- "Standard Review Plan for Evaluating Nuclear Power Reactor License Termination Plans," NUREG-1700, provides information on how the NRC staff will review license termination plans.

3.4 Regulatory Oversight - Operating and Decommissioning Stages

A nuclear power reactor that has permanently ceased electricity generation and has no fuel in the reactor vessel presents a significantly reduced risk to public health and safety than an operating reactor. Therefore,

the degree of regulatory oversight required for a power reactor during its decommissioning stage is considerably less than that required for the facility during its operating stage.

3.4.1 Operating Stage

During the operating stage of the reactor, fuel in the reactor core undergoes a controlled nuclear fission reaction that generates a high neutron flux and large amounts of heat. Safe control of the nuclear reaction involves the use and operation of many complex systems. The nature of maintaining and controlling a nuclear reaction and the complexity of systems and operating requirements necessary to prevent and mitigate adverse consequences requires considerable oversight.

3.4.2 Decommissioning Stage

During the decommissioning stage of a nuclear power reactor, the nuclear fission reaction is stopped and the fuel (spent fuel assemblies) is permanently removed and placed in the spent fuel pool until moved to an ISFSI or transferred offsite for long term storage or disposal. While the spent fuel is still highly radioactive and generates heat resulting from radioactive decay, no neutron flux is generated, and the fuel slowly cools as its inventory of decay products diminishes. The systems required for maintaining the spent fuel in the spent fuel pool and the operations required to contain the remaining residual contamination in the facility and spent fuel pool are relatively simple. The types of potential accidents at decommissioning reactors are fewer, and the risks of radiological releases are reduced, when compared to those at an operating reactor. Consequently, the activities performed by the licensee during decommissioning require considerably less regulatory oversight than during power operations.

3.5 Decommissioning Process

Licensees may choose from three alternative decommissioning strategies: DECON, SAFSTOR, or ENTOMB. These alternatives are discussed in detail in Section 2.

The licensee may also choose to adopt a combination of the first two choices - DECON and SAFSTOR. The decision may be based on factors such as availability of funds and availability of waste disposal sites.

From the regulatory perspective, the decommissioning process for power reactors may be divided into three phases: (1) initial activities, (2) major decommissioning activities and storage, and (3) license termination activities.

- The first phase of decommissioning includes the initial activities, starting on the effective date of permanent cessation of operations and encompassing the activities before the licensee either places the power reactor in a storage mode or begins major decommissioning activities.
- The second phase encompasses activities during the storage period or during major decommissioning activities (i.e., decontamination and dismantlement), or some combination of the two.
- The third phase consists of the balance of activities that the licensee undertakes to terminate the license.

3.5.1 Initial Activities

When a nuclear power plant licensee shuts down the plant permanently, the licensee must submit a written certification of permanent cessation of operations within 30 days. The licensee must submit another written certification to the NRC when the radioactive nuclear fuel is permanently removed from the reactor vessel,

surrendering its authority to operate the reactor or load fuel into the reactor vessel. This eliminates the obligation to adhere to certain requirements needed only during reactor operation.

Before or within two years following cessation of operations, the licensee must submit a PSDAR. The PSDAR must include:

- A description and schedule for the planned decommissioning activities.
- An estimate of the expected costs.
- A discussion that provides the means for concluding that the environmental impacts associated with the site-specific decommissioning activities will be bounded by appropriate previously issued environmental impact statements.

On receipt of the PSDAR, the NRC will place a notice of receipt of the PSDAR in the *Federal Register* and make the PSDAR available for public comment. A public meeting in the vicinity of the licensee's facility will also be held. A notice of this public meeting will be published in the *Federal Register* and in a place or places readily available to the residents near the plant site, such as a local newspaper. The notice will include the date, time, and location of the public meeting, as well as a brief description of the purpose of the meeting.

During the public meeting, the licensee will present its plans for decommissioning. NRC staff will discuss the regulatory process for decommissioning the facility. Representatives from the affected state will be given the opportunity to discuss any state regulations, concerns, or oversight roles. Other representatives from the state, local officials, and the general public will be invited to comment on the licensee's PSDAR. Comments received on the PSDAR will be addressed at the public meeting, and a question and answer period will follow the presentations. A written transcript of the meeting will be prepared and made available to the public. The NRC does not approve the PSDAR.

The licensee cannot perform any major decommissioning activities until 90 days after the NRC receipt of the PSDAR. After this period, the licensee can perform decommissioning activities as long as the activities do not:

- Foreclose release of the site for unrestricted use
- Result in significant environmental impacts not previously reviewed
- Result in there no longer being reasonable assurance that adequate funds will be available for decommissioning

In taking actions following submittal of the PSDAR, the licensee must notify the NRC in writing before performing any decommissioning activity inconsistent with, or making any significant schedule change from, those actions and schedules in the PSDAR.

3.5.2 Major Decommissioning Activities

Ninety days after the NRC receives the PSDAR, the owner can begin major decommissioning activities without specific NRC approval. These include permanent removal of such major components as the reactor vessel, steam generators, large piping systems, pumps, and valves.

However, decommissioning activities conducted without specific prior approval must not (1) prevent release of the site for possible unrestricted use, (2) result in there being no reasonable assurance that adequate funds will be available for decommissioning, or (3) cause any significant environmental impact not previously reviewed.

3.5.3 License Termination Activities

Each power reactor licensee must submit an application for termination of its license. The application must be accompanied or preceded by the LTP submitted for NRC approval. The LTP must be submitted at least two years before license termination date. The LTP must include:

- Site characterization
- Identification of remaining dismantlement activities
- Plans for site remediation
- Detailed plans for the final radiation survey
- Description of the end use of the site, if restricted
- Updated site-specific estimate of remaining decommissioning costs and
- Supplement to the environmental report describing any new information or significant environmental change associated with the licensee's proposed termination activities

Most LTPs envision releasing the site to the public for unrestricted use, meaning any residual radiation would be below the limit of 25 millirem annual exposure and there would be no further regulatory controls by the NRC.

Any plan proposing release of a site for restricted use must describe the site's end use, public consultation, institutional controls, and financial assurance needed to comply with the requirements for license termination for restricted release.

After receiving the LTP, a notice of receipt will be published in the *Federal Register* and the plan will be available to the public for comment. A public meeting will be scheduled near the facility to discuss the plan's contents with the public. An opportunity for a public hearing on the license amendment associated with the LTP will also be offered. If the LTP demonstrates that the remainder of decommissioning activities (1) will be performed in accordance with the regulations, (2) is not detrimental to the health and safety of the public, and (3) does not have a significant effect on the quality of the environment, the plan will be approved by a license amendment (subject to whatever conditions and limitations are considered appropriate and necessary). Once the license amendment is granted, the licensee may achieve license termination by successfully demonstrating implementation of the LTP.

The NRC staff will inspect the licensee during decommissioning operations to ensure compliance with the approved LTP. These inspections will normally include in-process and confirmatory radiological surveys. In general, decommissioning must be completed within 60 years of permanent cessation of operations.

3.5.4 Completion of Decommissioning

At the conclusion of decommissioning activities, the licensee will submit a final radiation survey report. NRC will terminate the license if it determines that

- The remaining dismantlement has been performed in accordance with the approved LTP.
- The final radiation survey and associated documentation demonstrates that the facility and site are suitable for release.

3.5.5 Pictorial Representation of the Decommissioning Process

Figure 4 shows the steps involved in the decommissioning process beginning with the initial notification and ending in license termination. It also shows the roles and responsibilities of the licensee, the NRC, and the public. Figure 4 is excerpted from an NRC presentation titled "NRC Decommissioning for the San Onofre Nuclear Generating Station" of April 2015.

Figure 4: Decommissioning Process

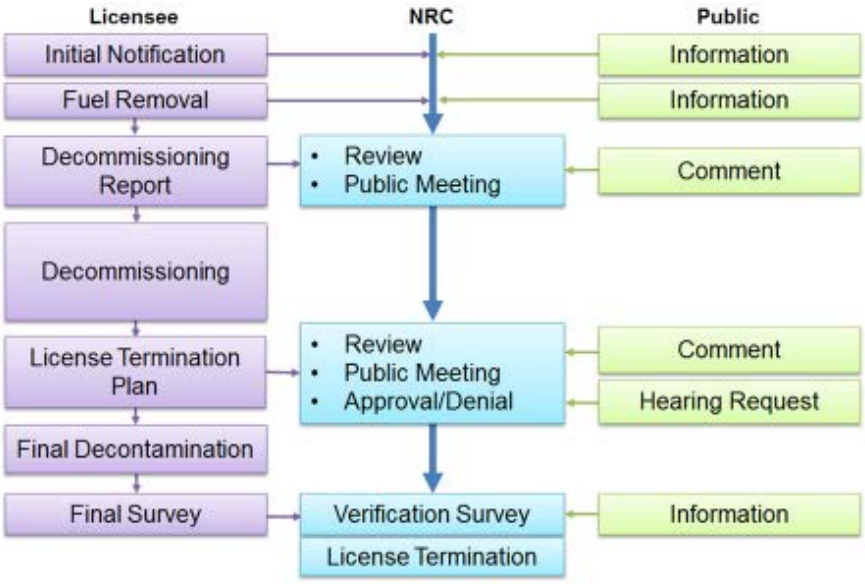
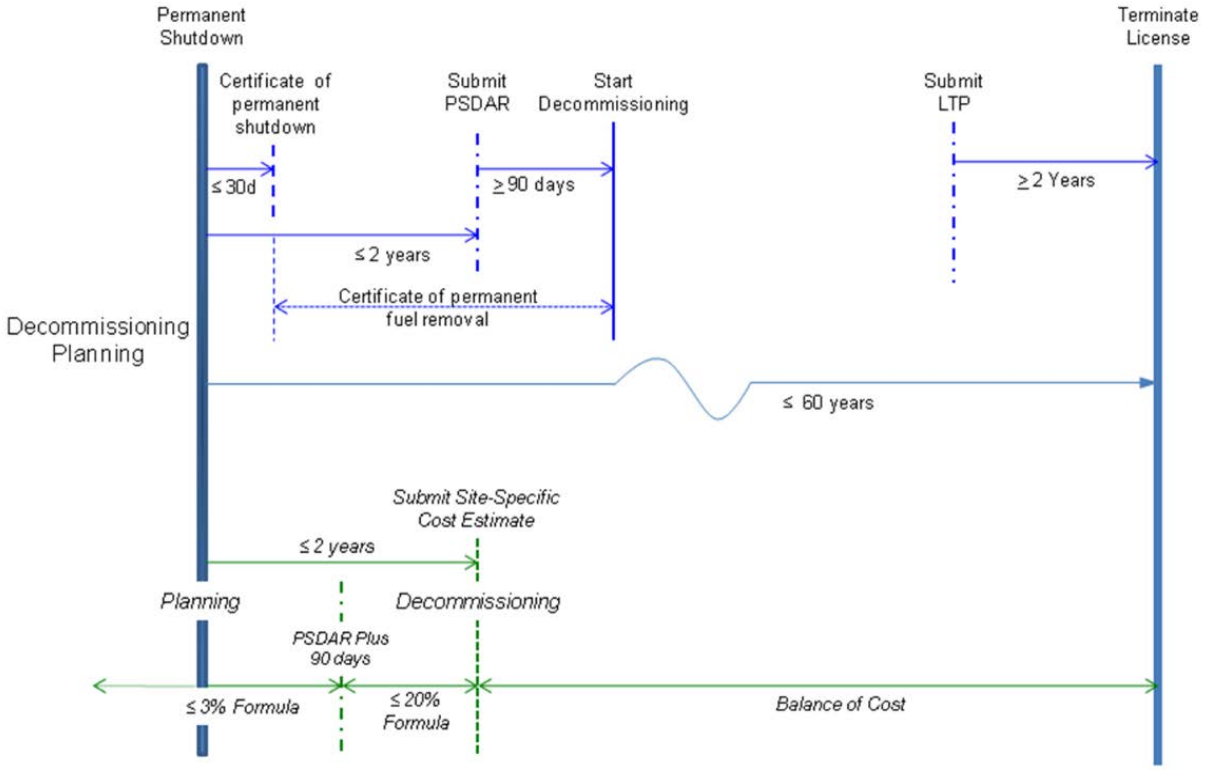


Figure 5 shows a simplified time line for decommissioning. As discussed in detail in the preceding sections, the regulations require the following:

- Submit written certification within 30 days of permanent shutdown
- Submit a PSDAR before or within two years after permanent cessation of operations
- No major decommissioning activities may be performed until 90 days after the NRC has received both the PSDAR and the certification that fuel has been permanently removed from the reactor
- Submit a site-specific cost estimate no later than two years after permanent cessation of operation
- Submit an LTP at least two years before license termination date
- Decommissioning must be completed within 60 years of permanent cessation of operations
- Licensees may use 3 percent of the of the decommissioning trust funds for planning before submitting the PSDAR and an additional 20 percent for decommissioning activities before submitting a site-specific decommissioning cost estimate
- Remaining decommissioning trust funds would be available for decommissioning activities after submitting a site-specific decommissioning cost estimate

Figure 5: Decommissioning Timeline



3.5.6 Historical Perspective

As summarized in Section 2, a review of the historical decommissioning experiences was performed. Table 4 shows the significant regulatory milestones and other pertinent information associated with the decommissioning and license termination of eight nuclear power plants:

- Big Rock Point
- Fort St. Vrain
- Connecticut Yankee
- Maine Yankee
- Rancho Seco
- Shoreham
- Trojan
- Yankee Rowe

All eight plants chose DECON as the decommissioning alternative, completed decommissioning and final surveys, and achieved license termination. The regulatory milestones presented include the dates for the following:

- Operating license issuance
- Permanent shut down
- License termination

Table 4 also shows that there is a wide variation in the decommissioning durations (measured here as the time it took to achieve license termination after permanent shut down of the plant). It ranged from 5.8 years

(Shoreham) to 20.3 years (Rancho Seco) for an average of 11.5 years. Even if the two outliers (Shoreham and Rancho Seco) are ignored, the average decommissioning duration remains essentially the same at 10.9 years.

Table 4: Decommissioned Nuclear Power Plants-Significant Regulatory Milestones and Decommissioning Durations

Unit	Type	MWt	Reactor Vendor	Op License Issued	Shut Down	License Terminated	DECON Duration, Years	Current Status
Big Rock Point	BWR	240	General Electric	05/01/64	08/29/97	01/08/07	9.4	DECON Completed
Fort St. Vrain	HTGR	842	General Atomics	12/21/73	08/18/89	08/08/97	8.0	DECON Completed
Conn. Yankee	PWR	1,825	Westinghouse	12/27/74	12/05/96	11/26/07	11.0	DECON Completed
Maine Yankee	PWR	2,700	Combustion Engineering	06/29/73	12/06/96	09/30/05	8.8	DECON Completed
Rancho Seco	PWR	2,772	Babcock &Wilcox	08/16/74	06/07/89	09/25/09	20.3	DECON Completed
Shoreham	BWR	2,436	General Electric	04/21/89	06/28/89	04/11/95	5.8	DECON Completed
Trojan	PWR	3,411	Westinghouse	11/21/75	11/09/92	05/23/05	12.5	DECON Completed
Yankee-Rowe	PWR	600	Westinghouse	12/24/63	10/01/91	08/10/07	15.9	DECON Completed

3.6 Public and Stakeholder Involvement

The public has several opportunities to participate in the decommissioning process. Public involvement in the decommissioning activities is an important element of an efficient decommissioning process. To be effective, it is important to seek and encourage public involvement early in the process, so that safety concerns that may affect the community can be resolved in a timely and practical manner. This process is considered vital to assuring the public that the decisions made about public safety and environmental protection are sound and balanced. This policy is best implemented through frequent meetings with interested stakeholders, including members of the public, non-governmental organizations, and local and state government officials to discuss any issues and topics that may be of interest.

Decommissioning is a complex process and the decommissioning regulations recognize the need and desire for community involvement in the decommissioning of a nuclear power plant. The regulations have evolved to ensure that all members of the public are given an opportunity to comment on a licensee's decommissioning and license termination plans.

Although not required by the regulations, an initial public information meeting is held shortly after the licensee submits the certification of permanent cessation of operations. At the meeting, the NRC presents its process for decommissioning, the licensee presents its plans for shutting down the facility and for decommissioning it (if any such plans have been made), and questions and comments from members of the public are addressed.

3.6.1 Public Meetings on Decommissioning Documents

A public meeting is held in the vicinity of the facility after submittal of a PSDAR to the NRC. Another public meeting is held when the LTP is submitted. An opportunity for a public hearing is provided prior to issuance of a license amendment approving the LTP or any other license amendment request.

In addition, when the licensee holds a meeting with the NRC, members of the public may observe the meeting (except when the discussion involves proprietary, sensitive, safeguards, or classified information). The license termination report requires NRC approval of a license amendment. Before approval can be given, a notice of opportunity for hearing is published and a public meeting is held near the plant site.

3.6.2 Community Outreach and Community Advisory Panels/Boards

Although the regulations do not require the establishment of a community advisory group, industry experience gained, and lessons learned from prior decommissioning projects have underscored the benefits of community advisory groups. In 2005, EPRI published a report detailing the Maine Yankee decommissioning experience. It recognized that engaging the local community and forming a Community Advisory Panel or Board (CAP/CAB) is a good practice. Specifically, the EPRI report states that: "the Maine Yankee Community Advisory Panel was established in 1997 to enhance opportunities for public involvement in the decommissioning process of Maine Yankee. The CAP represents the local community. By thoroughly reviewing the decommissioning process, the CAP is in a position to advise Maine Yankee on key issues of concern to the local community."

A decommissioning status meeting was held in October 2005, during which members of the Maine Yankee CAP were invited to speak regarding their experiences. At this meeting, the Vice Chairman of the Maine Yankee CAP stated that CAPs "provide an important window for the public in the process of decommissioning and provide the opportunity for issues of local concern to be addressed both within and without the strict process defined by the regulations. As a result, in our decommissioning, a level of trust was gained that had evaded Maine Yankee for the previous 24 years of operation." It should be noted that there was intense public interest in Maine Yankee during its operating life as well. Three State of Maine referendums were held that attempted to shut down the plant. The Maine voters, however, defeated the bids to close the plant.

Since the decommissioning of Maine Yankee, licensees have employed a CAP or CAB at many other sites, including Connecticut Yankee, Yankee Rowe, Big Rock Point, Millstone, Humboldt Bay, Zion, San Onofre and others. For all the nuclear plants currently entering the decommissioning process, there is a strong incentive for the licensees to establish a CAP/CAB in order to enhance communications with the local communities and stakeholders.

It would be very beneficial for the licensee to establish an IPEC CAP/CAB to obtain local community's views, concerns and recommendations regarding the decommissioning process. However, the success of the CAP/CAB would depend on the following:

- Strong commitment from the decommissioning team, including senior management.
- Education of Panel/Board members on the complex issues associated with decommissioning.
- Careful preparation of presentations to the Panel/Board on a regular basis to keep them appraised of progress, emerging issues and upcoming decisions.

3.6.3 Regulators and Stakeholders

Many of the decommissioning activities and regulatory decisions may be influenced by other regulator/stakeholder input in addition to public involvement.

The federal, state and local government agencies with potential significant involvement in the decommissioning process are expected to include:

- United States Nuclear Regulatory Commission
- United States Environmental Protection Agency
- United States Department of Transportation
- Federal Emergency Management Agency
- New York State Department of Health
- Indian Point Closure Task Force, consisting of State, local, and union representatives**,** including the following:

    - New York State Representatives
        - New York State Department of Environmental Conservation
        - Department of Public Service
        - New York State Energy Research and Development Authority
        - New York State Department of State
        - New York State Department of Homeland Security and Emergency Services
    - Local Representatives
        - Westchester County
        - Town of Cortlandt
        - Village of Buchanan
    - Labor Representatives
        - Teamsters Local 456
        - Utility Workers Union of America 1-2
        - Westchester Putnam Central Labor Council
        - Community Advisory Panel/Board (when established)
        - Rockland, Orange and Putnam Counties

Three State agencies - DEC, the New York State Department of Health (DOH), and NYSERDA - are expected to play a significant role in the IPEC decommissioning project. DEC and DOH by monitoring the decommissioning process, accompanying federal inspectors during site inspections[8] and performing confirmatory testing. NYSERDA has a State-legislated responsibility to coordinate New York State's programs and activities related to atomic energy, including nuclear power and low-level radioactive waste. In addition, NYSERDA serves as State Liaison Officer (SLO) to the NRC and as lead agency for nuclear issues where no other state agency has primary jurisdiction (*e.g.*, licensing).

[8] NRC's policy for cooperation with the State at nuclear power plants, including State observation and accompaniment of NRC inspections, is outlined in NRC Management Directive 5.2 "Cooperation with States at Commercial Nuclear Power Plants and other Nuclear Production or Utilization Facilities".

3.7 Decommissioning Funding

The regulations in 10 CFR 50.2, 10 CFR 50.75, and 10 CFR 50.82 restrict the licensee's ability to access the trust funds set aside for radiological decommissioning. This limitation on the accessibility of the decommissioning funds is designed to ensure that sufficient funds are always available to place the facility in a safe, stable condition that ultimately leads to decommissioning and license termination.

3.7.1 Use of Decommissioning Trust Funds

The regulations restrict the use of the trust fund to legitimate decommissioning activities (i.e., removal of a facility or site safely from service and reduction of residual radioactivity to a level that permits restricted or unrestricted release of the property and license termination). Therefore, the amount set aside for radiological decommissioning should not be used for (1) the maintenance and storage of spent fuel in the spent fuel pool, (2) the design, construction, or decommissioning of spent fuel dry storage facilities directly related to permanent disposal, and (3) other activities not directly related to radiological decontamination or dismantlement of the facility or site.

The regulations limit the use of a decommissioning trust fund in three ways:

- The withdrawals must be for expenses for legitimate decommissioning activities consistent with the definition of decommissioning in 10 CFR50.2
- The expenditure must not reduce the value of the decommissioning trust below an amount necessary to place and maintain the reactor in a safe storage condition if unforeseen conditions or expenses arise
- The withdrawals must not inhibit the ability of the licensee to complete funding of any shortfalls in the decommissioning trust needed to ensure the availability of funds to ultimately release the site and terminate the license

3.7.2 Exemptions for the Use of Excess Funds

In those cases, in which the trust fund is projected to have more than enough money to complete legitimate decommissioning activities, licensees have requested exemptions to use the excess funds for spent fuel management and, in some cases, site restoration activities.

The NRC staff conducts a detailed review to determine whether the licensee has provided reasonable assurance that adequate funds will be available to complete decommissioning and license termination. In some cases, the detailed reviews concluded that allowing the licensees to use a portion of the trust fund for spent fuel management would not prevent the completion of radiological decommissioning and license termination.

Some licensees have also requested and received exemptions to use the trust fund to support the accelerated transfer of spent fuel from the spent fuel pool to dry cask storage.

It may be possible to use a portion of the IPEC decommissioning trust fund to pay for the management of the spent fuel and for the expansion of the ISFSI to facilitate the accelerated removal of the spent fuel assemblies currently stored in the spent fuel pool. This requires approval of an exemption request.

Vermont Yankee Experience

In the case of Vermont Yankee, the NRC Staff approved (in June 2015) an exemption request from Entergy to use a portion of the $665 million of its decommissioning trust fund to manage spent fuel. This exemption allowed Entergy to use about $225 million for spent fuel management, but only after using about $145 million from a line of credit.

The exemption was approved because the NRC concluded that Entergy was adequately investing the $665 million fund which allowed the company sufficient money to decommission Vermont Yankee over a 60-year (SAFSTOR) period. It was estimated that the total cost of decommissioning will likely exceed $1 billion.

The exemption was granted based on a site-specific cost estimate and the cash-flow analysis. It showed that use of a portion of the trust fund for fuel management would not adversely impact Entergy's ability to complete radiological decommissioning within 60 years and terminate the Vermont Yankee license.

Entergy was planning to use about $143 million of its $145 million credit line for spent fuel storage casks. The roughly $225 million from the decommissioning fund would help pay for the management of the spent fuel.

Vermont State officials, however, demanded a comprehensive review of the ways in which Entergy was spending money from Vermont Yankee's decommissioning trust fund. The State was concerned that Entergy was spending down the fund for activities not related to decommissioning.

In November 2015, The State of Vermont filed a petition requesting that the NRC take a hard look at Entergy's spending. Vermont officials expressed fears that there could eventually be a shortfall in the decommissioning fund that would prevent the site from being fully decontaminated and restored.

In November 2016, NRC commissioners decided the matter. The Commissioners agreed with Entergy's use of the fund for spent fuel management.

The commission did, however, order NRC staff to conduct an environmental assessment related to the previous regulatory exemption granted for spending trust fund money on Vermont Yankee's spent fuel management.

3.8 Technical Requirements

The fact that a licensee ceased operations and removed the fuel from the reactor vessel does not reduce or alter the licensee's obligation to comply with applicable regulations, its license, and its Technical Specifications. Some regulations automatically no longer apply because the licensee is no longer authorized to operate.

The regulations explicitly extend requirements for specific parts of the Technical Specifications that will cover decommissioning activities. The licensee will review the operational technical specifications and determine which specifications are no longer applicable and which should remain in force. The licensee will make the appropriate submittals to request changes to the technical specifications as required by the regulations.

Licensees must continue to submit an annual report that specifies the quantity of each of the principal radionuclides released to unrestricted areas in liquid and gaseous effluents during the previous 12 months.

The report must include any other information that may be required to estimate maximum potential annual radiation doses to the public resulting from effluent releases. The time between submittal of the reports must be no longer than 12 months. If quantities of radioactive materials released during the reporting period are significantly greater than the design objectives for the facility when it was operating, the report must specifically address the reasons for this variation.

Additional requirements for the licensee during the period of major decommissioning activities include those described in paragraphs 3.8.1 through 3.8.5.

3.8.1 The Maintenance Rule

The maintenance rule requires monitoring the performance or condition of certain systems, structures, and components (SSCs) that could affect safety. For licensees that have submitted the certifications for cessation of operation and for permanent fuel removal, this section applies only to the extent the licensee monitors the performance or condition of the SSCs associated with the storage, control, and maintenance of spent fuel in a safe condition. The monitoring must be sufficient to provide reasonable assurance that such SSCs can fulfill their intended functions.

3.8.2 Keeping the Updated Final Safety Analysis Report Current

The UFSAR, or other comparable document, provides a licensing basis document for the evaluation of licensee activities. This licensing basis will have to be updated to cover decommissioning activities. Subsequent revisions updating the licensing basis must be filed at least every 24 months.

Specific sections of the UFSAR that the licensee should continue to update periodically include:

- Facility Description
- Licensee Organization
- Radioactive Waste Management
- Radiation Protection
- Conduct of Operations
- Site Characteristics
- Accident Analysis

3.8.3 Fire Protection Requirements

The fire protection regulations require licensees to maintain a fire protection program to address the potential for fires that could result in a radiological hazard. The objectives of the fire protection program are to (1) reasonably prevent such fires from occurring; (2) rapidly detect, control, and extinguish fires that could result in a radiological hazard; and (3) minimize the risk of fire-induced radiological hazards to the public, environment, and plant personnel. Further, the licensees are required to assess the fire protection program on a regular basis and revise it, as needed, throughout the various stages of facility decommissioning. The regulations permit licensees to make changes to the fire protection program without NRC approval if these changes do not reduce the effectiveness of fire protection for facilities, systems, and equipment that could result in a radiological hazard, taking into account the conditions and decommissioning activities at the facility.

3.8.4 Actions by Certified Fuel Handlers

After review and approval of a licensee's certified fuel handler training program either a certified fuel handler or a licensed senior operator may, in an emergency, take reasonable actions that may be different from a license condition or technical specification.

3.8.5 Changes to the PSDAR

For any decommissioning activity that is not consistent with or could be a change from the actions or schedules described in the PSDAR, the licensee is required to notify the NRC in writing and send a copy to the affected State. The NRC staff will use the PSDAR, and any written notification of changes required of a licensee, to schedule inspections and provide regulatory oversight of decommissioning activities. Licensees must also issue notification of changes that would significantly increase the decommissioning costs and send a copy of this notification to the state.

3.9 Partial Site Release - Non-Impacted Areas

10 CFR 50.2 defines "non-impacted areas" as "the areas with no reasonable potential for residual radioactivity in excess of natural background or fallout levels."

The non-impacted areas include the outlying open land areas of the site, as well as contiguous areas that have no impact from site operations based upon the locations of licensed operations, site use, topography, discharge locations, and other physical characteristics.

Plants embarking on the decommissioning process may derive significant benefits from removing non-impacted areas of the site from the 10 CFR Part 50 license and releasing them for unrestricted reuse.

3.9.1 Regulatory Requirements for Partial Site Release

10 CFR 50.83, "Release of part of a power reactor facility or site for unrestricted use," establishes the requirements for partial site releases. It calls for extensive evaluations and documentation followed by NRC review and approval. It also provides for public meetings for informing the public and receiving comments. It establishes the following requirements for non-impacted areas:

a. Prior written NRC approval is required to release part of a facility or site for unrestricted use at any time before receiving approval of a license termination plan. Section 50.75 specifies recordkeeping requirements associated with partial release. Nuclear power reactor licensees seeking NRC approval shall:

    1. Evaluate the effect of releasing the property to ensure that:
        i. The dose to individual members of the public does not exceed the limits and standards of 10 CFR Part 20, Subpart D
        ii. There is no reduction in the effectiveness of emergency planning or physical security
        iii. Effluent releases remain within license conditions
        iv. The environmental monitoring program and off-site dose calculation manual are revised to account for the changes
        v. The siting criteria of 10 CFR Part 100 continue to be met
        vi. All other applicable statutory and regulatory requirements continue to be met

2. Perform a Historical Site Assessment (HSA) of the part of the facility or site to be released
3. Perform surveys adequate to demonstrate compliance with the radiological criteria for unrestricted use specified in 10 CFR 20.1402 for impacted areas

b. For release of non-impacted areas, the licensee may submit a written request for NRC approval of the release if a license amendment is not otherwise required. The request submittal must include:

1. The results of the evaluations performed in accordance with paragraphs (a)(1) and (a)(2) of this section
2. A description of the part of the facility or site to be released
3. The schedule for release of the property
4. The results of the evaluations performed in accordance with § 50.59
5. A discussion that provides the reasons for concluding that the environmental impacts associated with the licensee's proposed release of the property will be bounded by appropriate previously issued environmental impact statements

c. After receiving an approval request from the licensee for the release of a non-impacted area, the NRC shall:

1. Determine whether the licensee has adequately evaluated the effect of releasing the property as required by paragraph (a)(1) of this section
2. Determine whether the licensee's classification of any release areas as non-impacted is adequately justified
3. Upon determining that the licensee's submittal is adequate, inform the licensee in writing that the release is approved

3.9.2 Experience with Partial Site Release

Two nuclear power plants, Zion and Connecticut Yankee, have successfully used the provisions in the regulations for early release of non-impacted areas from the 10 CFR Part 50 license for possible reuse.

Zion: In August 2015, Zion Solutions submitted a request for approval to remove a portion of the Zion Nuclear Power Station site from the Part 50 License. Specifically, Zion Solutions wanted to remove and release from its Part 50 licenses the portions of the site that the HSA characterization process had classified as radiologically non-impacted, in accordance with 10 CFR 50.83(b). The property that was the subject of the release request was an approximately 214-acre parcel of uninhabited, essentially undeveloped land that had not been negatively impacted by Zion operations or subsequent decommissioning activities. Based on their evaluation of this partial site release application, the NRC staff concluded that the submittal had adequately:

- Assessed the property to be released
- Evaluated the effect of releasing the property
- Justified the property was a non-impacted area and no amendment to the license was needed
- Addressed the effect of releasing the property for unrestricted use

The NRC staff concluded that the request met the requirements in 10 CFR 50.83, and approved the partial site release in March 2016.

Connecticut Yankee: In April 2004, Connecticut Yankee Atomic Power Company requested approval to remove a portion of the site (designated as East Side Grounds, 93 acres**)** from the Part 50 License. It should be noted that the requirements of 10 CFR 50.83 are not applicable in cases where there is an approved LTP (the Connecticut Yankee LTP was approved in November 2002). For non-impacted areas, Section 1.4.2 of the LTP and NRC's Safety Evaluation Report required Connecticut Yankee to provide the basis for the non-impacted classification and review, and assess the impacts on the following documents in preparation for releasing a portion of the site from the license:

- Updated Final Safety Analysis Report (UFSAR) and Technical Specifications
- Environmental Monitoring Program
- Offsite Dose Calculations Manual
- Defueled Emergency Plan
- Security Plan
- Post-Shutdown Decommissioning Activities Report
- License Termination Plan
- Ground Water Monitoring Program
- 10 CFR 100 Siting Criteria
- Environmental Report

Connecticut Yankee provided the basis for the non-impacted area determination and an assessment of the impacts to each of the documents listed above, and identified the changes required to implement the phased release.

NRC inspectors and survey contractors performed an independent survey of the area proposed for release. The approval of Connecticut Yankee's request was granted in September 2004 with the condition that following removal from the license, in the unlikely event the removed area was to become radiologically contaminated as a result of later decommissioning activities, the contamination would be considered an off-site release, and subject to 10 CFR Part 20.

3.9.3 Partial Site Release and Reuse at IPEC

Section 1 (Photo 8) shows the two areas (designated as Parcels A and B) of the IPEC site that are candidates for early removal from the 10 CFR Part 50 license, and release for unrestricted reuse as non-impacted areas. The basis for classifying these areas as non-impacted areas would have to be confirmed through an HSA, surveys, or both, as needed.

3.10 Potential Changes to Decommissioning Regulations and Guidance

The NRC is exploring ways to modify the current decommissioning regulations to address industry's request to amend the decommissioning regulations, reduce the need for exemptions from existing regulations, and address other issues based on lessons learned from decommissioned nuclear power plants.

In November 2017, the regulatory basis for the proposed new regulations were published. The regulatory basis supports a proposed rule expected to be issued for public comment in 2018. In the regulatory basis, the NRC staff concluded that there was sufficient justification to proceed with new regulations in the areas of emergency preparedness, physical security, cyber security, drug and alcohol testing, training requirements for certified fuel handlers, decommissioning trust funds, financial protection requirements and indemnity agreements, and application of the backfit provisions.

In many cases, these new regulations would formalize steps to transition power reactors from operating status to decommissioning, without the use of exemptions and license amendments. Clarifying requirements related to spent fuel management and environmental reporting was also recommended. The Staff recommended addressing some topics by means of updated guidance instead of rulemaking. These topics include the role of state and local governments in the decommissioning process, certain staffing requirements, level of review of the PSDAR, revision of the 60-year limit for decommissioning duration, and aging management of plant systems, structures, and components.

The NRC issued an advance notice of proposed rulemaking in November 2015, followed by a draft regulatory basis in March 2017. Comments received during both stages have been considered in preparing the regulatory basis.

Section 4: IPEC Reuse

The initial steps in identifying all reuse opportunities includes a thorough understanding and definition of the existing site, its contents, and any inherent conditions either naturally occurring or resulting from the operation of IPEC. The opportunities presented in this section are a result of considering site characteristics and should not be used as a partial or total IPEC site development plan. A site development plan is a future activity that may consider these opportunities in its preparation.

The objective in identifying reuse opportunities is to leverage site characteristics to maximize the potential of the development while recognizing the impacts of the development on real-estate tax, construction employment, and a development's full-time employment. The result of this review is a presentation of potential opportunities and their impacts that will assist in visualizing the range of development issues.

The process for developing reuse opportunities is presented graphically by Figure 6.

Figure 6: Reuse Review Process Flow

The process collects:

- Specific site and operating information from Entergy
- Site topographical information
- Confirmation of building locations represented by public domain aerial photography and abutter properties through site walkdowns
- Assessor information from Town of Cortlandt and Village of Buchanan

Information and data collected and reviewed for this assessment establishes the underlying facts associated with potential reuse opportunities for property parcels at the IPEC site. It should be understood that these reuse opportunities assume that Entergy is, or will be, willing to subdivide its property parcels and make them available for sale, lease, or grant to either the Town of Cortlandt, Village of Buchanan, and/or developers. Furthermore, subdividing the property will require the filing of a request with the NRC. Approval by the NRC is required before beginning any development activities. If NRC approval is received, it is expected that developers will likely work with the Town of Cortlandt and the Village of Buchanan for any property division and zoning changes.

All available data has been reviewed and where applicable compared to federal, state, and local laws, regulations, or ordinances to determine impacts on potential opportunities. The laws and regulations most critical to the evaluation are the federal laws and NRC regulations governing the operation, decommissioning, decontamination, and potential reuse of the IPEC site. Regulator, community, and stakeholder involvement in the decommissioning process is discussed in Section 3.6. This involvement is expected to continue during the planning and implementation of any development, as many of the development activities are anticipated to be executed in parallel with the decommissioning process. The details of the involvement, however, will depend on the specific projects chosen.

The seven paragraph headings and functional description in Table 5 are employed to assist in understanding what and where information about an opportunity is found in this report.

Table 5: Section 4 Paragraph Information Summary

Section 4 Paragraphs	Functional Description
4.1 Site Review and Walkdown	Identifies data collected and evaluated in support of determining the opportunities that may be applicable for *Near* and *Long-Term* development. Discusses commercial/heavy industry opportunities not evaluated due to site availability timeline and DECON constraints.
4.2 Potential Development Types	Table 7 identifies the development type (non-energy or energy generation) and opportunity (residential, commercial, energy generation process) for *Near and Long-Term* development of property parcels. The supporting paragraphs introduces and discusses generic and technical data about each opportunity that should be considered.
4.3 Parcel A Development	Identifies this *Near-Term* development parcel development types and opportunities providing specific technical details and issues associated with the parcel for each applicable opportunity. Supporting paragraphs also provide generic cost data for each opportunity identifying potential ratable revenues, construction costs, and employment needs. These revenues and costs are applicable for succeeding parcel development paragraphs as well.
4.4 Parcel B Development	Identifies specific data unique to the parcel and discusses development types and opportunities and potential development constraints. Generic cost data for opportunities identifying potential ratable revenues, construction costs, and employment needs found in Paragraph 4.3 are applicable for this parcel.
4.5 Parcel C Development	Identifies this parcel as not subject to the NRC license and discusses development types, opportunities, and potential development constraints. Generic cost data for opportunities identifying potential ratable revenues, construction costs, and employment needs found in Paragraph 4.3 are applicable for this parcel.
4.6 Parcel D Development	Identifies this *Long-Term* development parcel as needed for DECON and describes development types possible for the property along with possible reuse of the GSB. Also describes future constraints on development because of the ISFSI. Generic cost data for opportunities identifying potential ratable revenues, construction costs, and employment needs found in Paragraph 4.3 are applicable for this parcel.
4.7 Summary of Opportunity Development Costs	Assembles opportunity development cost data from paragraph 4.3 in a table that identifies potential construction cost, construction labor, land value, and O&M costs. The table also estimates employment needs for each opportunity. Supporting paragraphs also discuss the impact of opportunities on local business using existing IPEC expenditure data for local communities.

4.1 Site Review and Walkdown

The four parcels identified in Section 1 (Photo 8), include three within the NRC licensed site boundary and one outside the site boundary located across Broadway. Licensed property within the site boundaries are identified as Parcels A, B, and D. Parcels A and B are potential *Near-Term* development properties as the review of data indicates these areas are non-impacted by the existing operation of the plant and are,

therefore, likely to receive NRC approval for release and subdivision from the licensed site. Parcel D is considered necessary for DECON or SAFESTOR and is identified as being available for *Long-Term* development. It is important to note that Parcel D will require further subdivision post DECON as a portion of the property will be needed for the ISFSI facility, thus reducing the acreage that is available for development. Parcel C located across Broadway is not within the licensed site boundary and is considered available for immediate *Near-Term* development.

The site characteristics are presented in Table 6. These characteristics are considered in an initial screening of the parcels. As noted in Table 6, the land involves many natural and man-made rises and depressions that need to be considered when determining an opportunity. Two separate site walkdowns were conducted to confirm site information presented in this report.

There are multiple structures that exist on Parcels A, C, and D. Two structures in particular, the Training Building and the GSB, appear to be buildings that are capable of being repurposed. The Training Building is addressed in the Parcel A discussion and the GSB is addressed in the Parcel D discussion. In addition, both buildings are reviewed in the Goodman-Marks appraisal. The balance of non-nuclear power generation related structures in Parcel D, except for IP-1, IP-2, IP-3, two old steam generator buildings, and ISSFI, will warrant further consideration when the detailed planning for development begins. The non-nuclear power generation related structures (or non-impacted structures) do not require demolition and removal under NRC DECON requirements. The following parcel reuse discussions assumes the structures subject to DECON will be demolished and rubble removed using the decommissioning funds. An approximate demolition and removal cost of non-DECON (or non-impacted) buildings currently ranges between $20.00 and $30.00 per square foot.

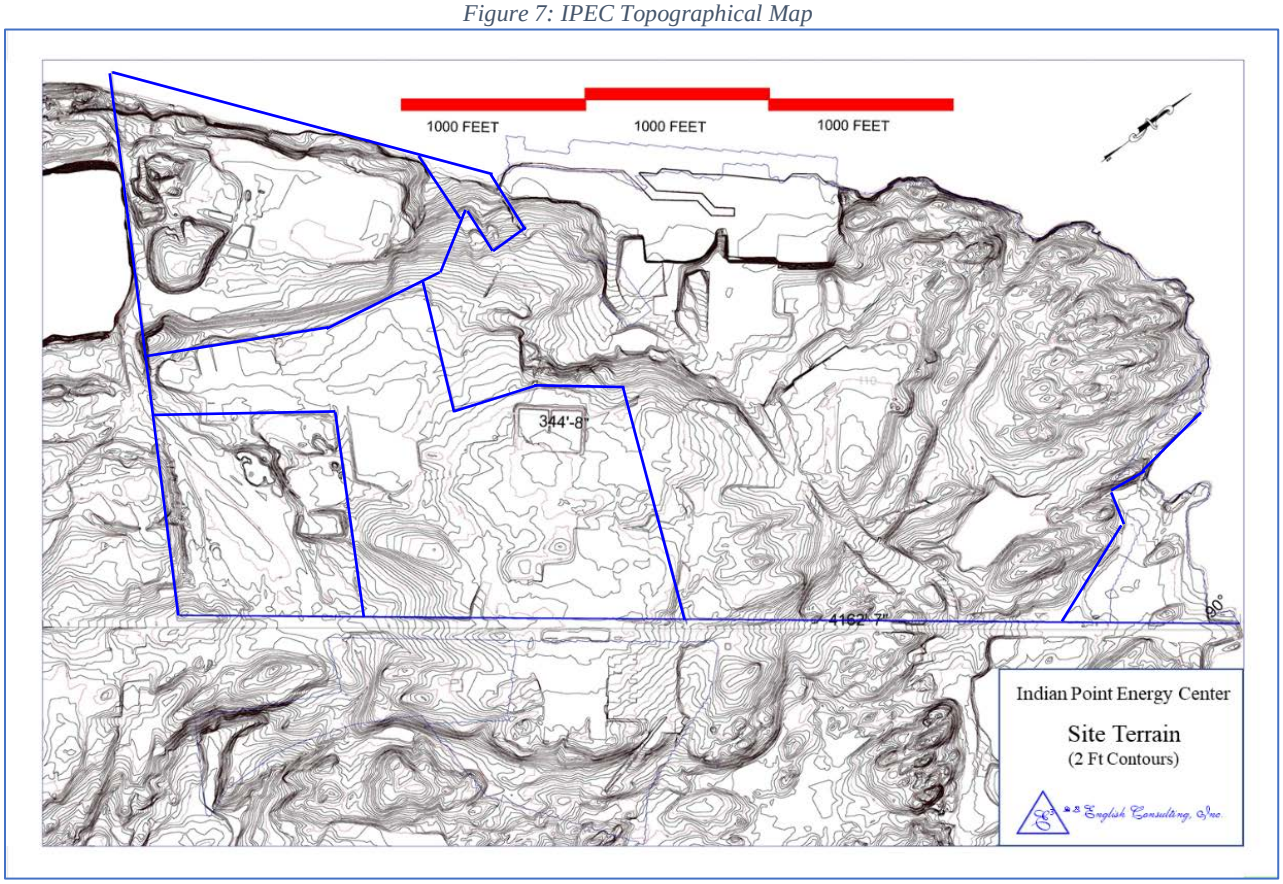
Table 6: IPEC Site Characteristics

Item	Characteristic Type	Description	Significance
1	Natural/Man-made	IP 1, 2, & 3 occupy a compact portion of the total property	A larger area of non-impacted property is available for development.
2	Man-made	IP 1, 2, & 3 are adjacent to the Hudson River and approximately 40 feet above the waterline.	Access to the Hudson River is potentially available post DECON, *Long-Term* opportunity.
3	Man-made	Area anticipated to support decommissioning IP 1, 2, & 3 and the ISFSI is approximately 140 acres.	Establishes the minimum decommissioning and long-term storage areas subject to at least 10 years of not being available for development.
4	Man-made	Approximately 2000 feet of the shoreline is in daily use by IP 2 & 3 and includes intake and discharge structures A pier for vessels and barges is in this shoreline area.	Marine access/use availability post DECON may be possible if the pier is not required to support ISFSI disposition. Pier provides access for shipments that may not easily traverse the local roadways. *Long-Term* use uncertain as ISFSI disposition may require access to shoreline for barge shipments.
5	Natural	Waterfront at North end of property not used by IP 2 and 3 is rugged, steep, and very limited in accessible pedestrian area.	Waterfront access following DECON will be limited by existing terrain and possible restricted access because of ISFSI.
6	Man-made	Parking lots for employees and visitors elevated above IP 1, 2, & 3 ranging from 100 to 130+ above waterline.	*Long-Term* use likely to require civil engineering to support future development for non-energy and energy producing opportunities. Elevation differences in the area if left unchanged may inhibit performance of renewable energy generation opportunities.
7	Natural	Waterfront parcel south of IP 1, 2, & 3 is identified as being owned by Consolidated Edison on assessor's maps.	Parcel ownership should be verified prior to plants shutdown. This parcel is considered part of Parcel D and required for DECON
8	Natural / Man-made	Parcel A property (southeast of IP 1, 2, & 3) is at a higher elevation and is relatively flat, contains limited number of buildings, provides separate access road to Broadway Easements exist for electrical transmission lines, gas transmission line, and road for access to the Continental Gypsum plant.	Topography is relatively flat. Electrical and gas lines limit extent and type of development.
9	Man-made	Old steam generators from Units 2 & 3 are enclosed in two separate buildings.	Buildings and steam generators need to be isolated from *Near*-Term parcel development opportunities as it is not known when steam generators will be removed from site.
10	Natural	Terrain of Parcel B is virgin property that is rocky and includes multiple steep grade changes. It also abuts the ISFSI location. Aerial photography records show this parcel to be unchanged since 1927.	Development of parcel may involve coordination with Entergy to gain access to high ground and additional development cost to address land conditions. Protected species may inhabit this parcel and may delay or preclude its *Near-Term* development. Expansion of the ISFSI is likely to limit how much of the land can be developed.

Item	Characteristic Type	Description	Significance
			A proposed DECON access road (road currently exists) abuts Parcel B. Impact on Parcel B development may be a concern from an NRC perspective during DECON activities.
11	Man-made	Several access roads exist to enter IPEC property. One at north end of property. Three at south end of property	An additional access road from the gypsum plant road could be added to access the training center building. Road would need to address easements for electric and gas transmission lines. Access to the site provides versatility in getting supplies and materials on and off the site.
12	Man-made	Consolidated Edison substation across street.	May be capable of supporting renewable and conventional electric power generation opportunities for the IPEC site. Possible significant benefits associated with close interconnection with the transmission system.
13	Man-made	Transmission lines and towers on site	Existing towers and overhead lines may reduce costs associated with the development of any future renewable or conventional generation station.
14	Man-made	Gas Transmission line cross property at two separate locations	Natural gas lines possess the capability of supporting any future development opportunities.
15	Man-made	Town/Village access roads to the site are general purpose roads	Vehicles used to support reuse opportunities and DECON will require conformance to NYS Department of Transportation vehicle load distribution requirements
16	Man-made	Water tank on property.	Serves site potable water needs.
17	Man-made	Training Building located on Parcel A with paved parking lot	Building is a two-story structure in good condition. Building has the potential to be repurposed for *Near-Term* use. Alternately, it may be demolished to support parcel reuse development.
18	Man-made	General Service Building located on Parcel D	Building is a multiple story structure. Building is presently used as an office building and includes a cafeteria. Paved parking lots exist with access from Broadway. Building is a *Long-Term* development opportunity because of its location on site.
19	Man-made	Two Fuel Oil Tanks	Tanks located on Parcel D are old and one reported to contain some fuel. Likely to require demolition after DECON is complete.
20	Man-made	Wastewater disposal systems	Part of the site is connected to the Buchanan sewer system discharging to the village's wastewater treatment plant. Other buildings/structures are supported with septic systems.

The following topographical map, Figure 7, provides dimensional perspective to the site terrain and current land features not easily presented in aerial photograph. The blue lines identify property parcels found on property tax maps.

Figure 7: IPEC Topographical Map



Selecting a reuse opportunity should consider both *Near-Term* and *Long-Term* consequences, development interdependencies, and DECON/ISFSI constraints. Simply, in identifying and selecting a *Near-Term* opportunity, that opportunity should consider its potential impact on *Long-Term* developments. For example, should a data center opportunity be the preferred development for today, the *Long-Term* site development plan is likely to involve more office park development. However, some flexibility exists with selecting a data center as integrated office park and residential developments are not uncommon. By comparison, the selection of an energy generation and/or energy storage facility for *Near-Term* development may impact the options available at the time of *Long-Term* development.

The selection of a *Near-Term* opportunity may also be combined with other opportunities when developing Parcel D, after DECON is completed. If an energy generation opportunity was selected for the *Near-Term*, then combining it with an energy storage opportunity may be a logical expansion of energy generation. Alternately, the energy generation opportunity, such as a Combined Heat and Power (CHP) plant may be expanded to satisfy future industrial demands, which may include campus heating and cooling for an industrial or office park.

Several reuse opportunities are identified for each Parcel in the following Development Types and Opportunities Table (Table 7). These opportunities are presented only with the objective of providing an insight into the technical and financial factors that are involved with developing an opportunity. This table does not present any recommendation for selecting one opportunity over another. The choice of what

opportunity is best will be determined by many subsequent discussions and analysis among the communities, State officials, and potential developers.

Furthermore, these opportunities are not representative of all possible opportunities for the IPEC site. Specifically, the *Near-Term* and *Long-Term* opportunities for non-energy generation manufacturing or heavy industry developments are not detailed in this assessment. Where a definite potential for manufacturing development exists, selecting and identifying a specific industry type presents challenges due to the characteristics of the various parcels. In addition, the existing overhead electric and underground gas transmission lines limit both the energy related opportunities as well as the extent of property available for development, presenting a *Near-Term* constraint.

4.2 Potential Development Types

Each of the opportunities in Table 7 considers the existing site characteristics as a means of assessing their contribution to or detraction from the opportunity. The following review provides technical perspectives and identifies challenges associated with each opportunity, regardless of opportunity cost or potential ratable value to the Village of Buchanan, the Town of Cortlandt, and New York State. As previously noted, this review does not include a review of industrial development possibilities of the IPEC site. For example, expansion of the existing gypsum plant or interest expressed to local officials by other industrial businesses is not considered for the *Near-Term.* There are significant issues which will need to be addressed in subsequent reviews/studies. These issues may include Parcel location, anticipated DECON land requirements, and the location of equipment and radioactive materials adjacent to non-impacted parcels. While industrial development is a reasonable approach to developing the IPEC site, at this juncture, overall it appears to be better suited for *Long-Term* development consideration as available parcel property may not provide sufficient access and flexibility.

Table 7: Development Types & Opportunities

Timing	Property	Development Type	Opportunity
Near-Term	Parcels A & C	Non-Energy Generation	Residential
			Commercial
		Energy Generation	Renewables (Wind & Solar)
			Energy Storage
			CHP
			Combined Cycle (Independent Power Producer (IPP))
Possible Near-Term	Parcel B	Non-Energy Generation	Residential
		Energy Generation	Renewables
Long-Term	Parcel D	Non-Energy Generation	Residential
			Commercial
			Marina/Entertainment
		Energy Generation	Renewables (Wind & Solar)
			Energy Storage
			CHP
			Combined Cycle (IPP)
Long-Term	Parcels A, C, & D		Combinations of Energy Generation Opportunities

4.2.1 Non-Energy Development Opportunities: Residential and Commercial

Residential development may be either individual homes or a condominium complex that may take various forms and vary in density in accordance with zoning ordinances. Implementing either of these two opportunities requires a review of existing town/village water and sewer services and identification of what must be expanded to support this selection. As noted in Table 6, some sewer lines do exist, but parts of the IPEC site are served by septic systems. Should a residential opportunity be preferred, a detailed engineering study is likely to be required to address sewer and lift station requirements. For the Village of Buchanan, it may also involve verifying whether the existing wastewater treatment plant possesses the capacity to accept this additional demand. Similarly, the existing infrastructure possesses a water storage tank which may simplify expansion by minimizing or eliminating the need for new or additional booster pumps to serve the IPEC site elevation, although the water supply system will require an engineering review to assess expansion of a distribution system. Other utility services such as electric and gas, while requiring a distribution review, are not town/village owned and maintained services and are considerations for the developer and the local utility. Environmental permitting requirements will certainly influence the number, configuration, and locations of residential development.

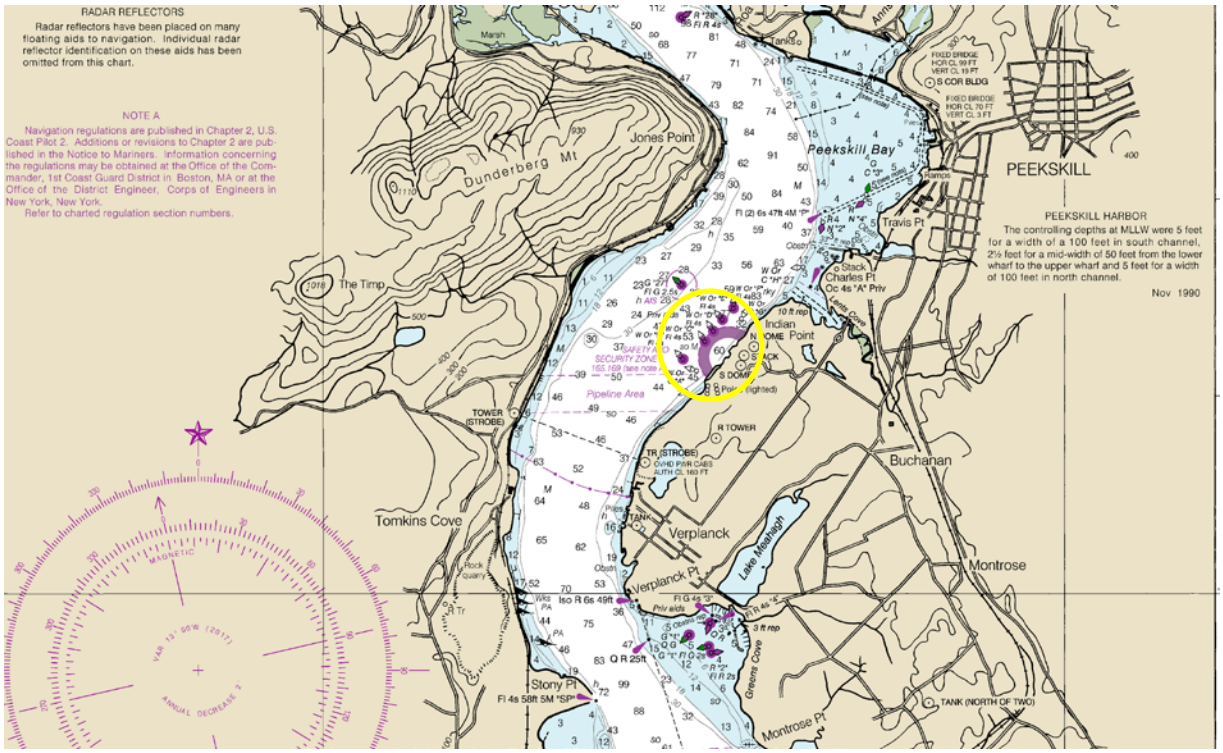
A detailed appraisal of Parcel A has been performed by Goodman-Marks which is an attachment to this report. Goodman-Marks has developed an appraised value for Parcel A that defines both the value of the vacant land and the land with the existing Training Building. Their review, using and applying accepted appraisal standards, has also identified the *Highest and Best Use* possibilities for the parcel considering existing zoning and has determined that heavy industry siting is most appropriate. Residential development is not excluded by their determination, but the interest in a residential development may be exposed to future heavy industry development on contiguous properties resulting in a potential negative impact to a residential market development. Because of the appraisal industry's (1) *Highest and Best Use* possibility guideline, (2) Goodman-Marks' interpretation of a successful residential development, and (3) the infrastructure costs that the Village of Buchanan and the Town of Cortlandt may be required to incur to support such a development, the residential opportunity is not being further evaluated for Parcel A.

The Goodman-Marks appraisal also provides a projection for future real estate tax potential using comparable tax data for buildings and land. The results of their analysis projects a possible real estate tax for Parcel A (based on current land and its anticipated improvements) as $1,970,820 as of November 2017.

Commercial development includes office park, data center, marina, entertainment opportunities. These opportunities will require the same water and sewer services review and resolution as for a residential development. Beyond the possible greater water and sewer requirements for commercial development opportunities, there is also concern with increases in vehicle traffic usage. Each opportunity possesses different traffic volumes and flows at various times of the day and on weekends, contrary to the existing weekday traffic demands during current operation of IPEC. The office park/data center opportunity is one that may repurpose the Training Center Building or demolish it and build a facility that best fits the needs of a potential developer/owner. This opportunity also provides flexibility in future planning as it may be integrated into different *Long-Term* development opportunities not envisioned at this time. The marina/entertainment opportunities present interesting challenges. Both are viewed as *Long-Term* opportunities as the land and waterfront are part of Parcel D, the property required for DECON. Another concern with the marina/entertainment opportunities is the existence of the ISFSI site. Security and safety demands of the ISFSI site may warrant a large buffer zone with marina/entertainment opportunities nearby. This buffer zone is difficult to anticipate as the final siting and size of the ISFSI is yet to be determined. The use of the pier and expanding it into a marina is also an ISFSI issue. The future transportation of spent fuel is yet to be determined. There is the possibility that when spent fuel is picked up by DOE, the preferred transport method may be barge. As such, the pier may be identified as part of the ISFSI site making it unavailable for a marina. Another marina issue is the pier's proximity to the Hudson River shipping channel.

The following National Oceanic and Atmospheric Administration (NOAA) chart, Figure 8, indicates the shipping channel appears to be within 100 feet of the pier. The proximity of the pier to the shipping channel may not receive U.S. Coast Guard approval should a marina expansion be requested. There may also be permitting considerations under the state and federal coastal zone management act or agency.

Figure 8: NOAA Navigation Chart



4.2.2 Energy Generation Development: Wind, Solar, Storage, Fuel Cell, Combined Heat and Power, and Combined Cycle Opportunities

Power generation and energy storage are development opportunities that utilize most of the IPEC available site characteristics. However, as identified in the Goodman-Marks Appraisal Report, re-zoning of the IPEC site is likely to be required as once IP-2 and 3 are shutdown, current zoning does not include electric power generation using non-nuclear fuel sources, including renewables. The generation and storage opportunities can be standalone designs or integrated with each other to satisfy energy generation diversity and optimize output from the site. Examples of an integrated scheme might consist of coupling wind turbines with a solar field. Similarly, a solar field coupled with battery storage may be combined with a more conventional combined cycle or cogeneration power generation plant. When considering any of these types of configurations it is important to determine whether the generation company will be an electric utility or non-utility generator (NUG) whose primary mission is to produce electric energy, or a company which produces electricity and/or thermal energy for itself (self-generator) and for other nearby facilities or office campuses. This forethought in development is necessary as the dedicated electric energy generation and delivery company requires a rigorous coordination and a determination of need. In this example the coordination and need determination is with NYISO, Federal Energy Regulatory Commission, and NYS. A generation facility that limits its electrical output to approximately 80 MW is subject to current Public Utility Regulatory Policy Act (PURPA) regulations which allows development of the plant and requires excess power to be purchased provided the plant's output is determined reliable and state permitting processes are satisfied. Given these two development approaches, electric utility/NUG or self-generation, the following types of generation and

storage facilities are potential *Near-Term* and *Long-Term* development opportunities for the IPEC site. No specific reuse opportunity combination(s) or scheme(s) is being recommended, rather information on the technical and economic challenges associated for each opportunity is being presented to provide a perspective on what site development is plausible. Furthermore, the opportunities identified in this section assumes that Entergy is willing to subdivide their property, submits to and gets approval from the NRC for the subdivision, and a purchaser exists to buy and develop the property considering all local zoning and community ordinances.

4.2.2.1 Wind Overview

Wind turbines were evaluated using industry and government design guidelines, National Aeronautics and Space Administration (NASA) site data for wind velocity and direction, and meteorological tower data collected by Entergy for a utility grade installation to determine whether site conditions would be appropriate for their installation. The evaluation included identifying the prevailing wind speeds, the type of wind turbine blade needed for the wind speed(s), the height of the wind turbines, and the amount of land needed to permit an efficient operation of each wind turbine.

"Grid connected systems may be practical if the following conditions exist

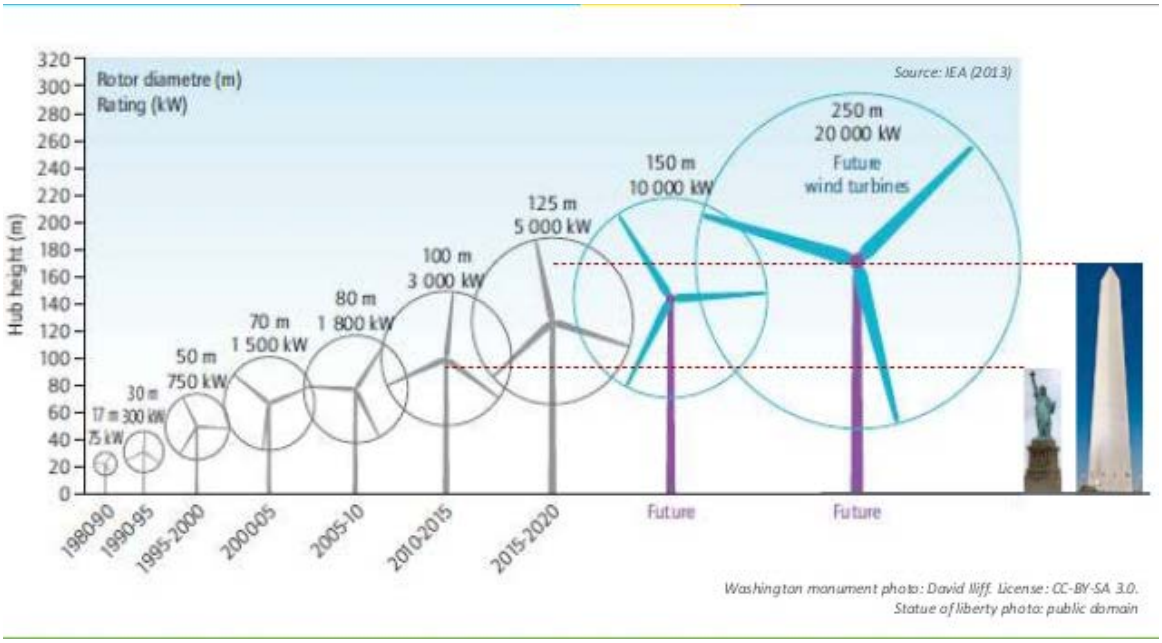
- The wind resource at hub height averages at least 10 mph over the course of the year
- Local electrical rates are high – ranging from 10 to 15 cents per kilowatt hour (¢/kWh)
- The local utility requirements for connecting a small wind turbine are not prohibitively expensive
- Good incentives for the sale of excess electricity or for the purchase of a small wind turbine exist"[9]

NOAA, National Renewable Energy Laboratory (NREL), and Entergy wind speed data identify the IPEC area as a poor wind turbine installation site. The NREL Wind Power Classification map identifies a wind turbine installation poor when wind speed ranges from 0.0 to 5.6 meters per second (or up to 12.5 miles per hour) at a height of 50 meters (164 feet). Entergy site data for the year October 2016 to October 2017 confirms site average wind conditions less than 3 meters/second (3 m/s x 2.2.2369 conversion factor = 6.7 miles per hour) 90.7% of the year. Site meteorological conditions for the same October to October period show a maximum wind speed from the WNW at 3.49 meters/second (or 9.8 miles per hour) occurring 9.3% of the measured period.

[9] Wind Energy Toolkit, page 7, Developed under NYSERDA PON 995, Agreement 9998, dated May 2009, Prepared by AWS Truewind, LLC

Photo 11: Wind Turbines and Tree Lines

Photo 12: Wind Turbine Height Comparison



The low wind speeds suggest that large rotor blades be utilized to extract the most energy out of the wind. A GE 4.8 MW On-Shore Wind Turbine was selected from available manufacturers for this analysis as its blade length would make best use of the low wind speeds at the site. The height of the tower would be a minimum of 101 meters (or 331.4 feet above grade). The rotor diameter of 158 meters (518.4 Feet) would then determine the optimum spacing between wind turbines. "Charles Meneveau, who studies fluid dynamics at Johns Hopkins University, and his collaborator Johan Meyers from Leuven University in Belgium, are said to have developed a model to calculate the optimal spacing of turbines for the very large wind farms of the future. Using as example 5 megawatt-rated machines and "some reasonable economic figures," a statement related to the study says, Meneveau calculated that the optimal spacing between turbines should be about 15

rotor diameters instead of the currently prevalent figure of 7 rotor diameters.."[10] Using a spacing requirement of 7 rotor diameters for this report, the second wind turbine is being positioned approximately 1106 meters (3628.8 feet) or over half a mile away. And if 15 rotor diameter spacing is used, the second turbine would be off the property.

Construction and installation of a wind turbine is another factor to be addressed when developing a wind turbine installation. The rotor assembly, hub and typically three (3) blades are shipped as separate items. The blades present transportation challenges due to their length. For the size of rotor presented above, a blade is approximately 255 feet long. Blades are mounted on special trailers that allow for tight turning radii. The longer the blade, the greater the turning radius. This presents a challenge for the IPEC site as intersections in the surrounding neighborhood are developed with houses, business structures, and overhead utilities, limiting how much of the intersection corners may be used to navigate a turn. For the IPEC site, it is likely a barge would be required to deliver the blades to the site's waterfront, which raises another issue. An arrangement would need to be made with Entergy to gain access to the site high-security area and it is likely that road preparation would be necessary to transport the blades from the waterfront up the grade to the installation site. Alternately, a helicopter lift may be required, which is always high risk. Blade movement may be an issue during concurrent decommissioning work.

Photo 13: Turbine Blade Transport Vehicle -1

While smaller rotor diameters may be applied to a wind turbine installation to account for delivery challenges, the resulting electric output of the facility will be reduced, potentially impacting the economic viability of the development.

[10] How Far Apart Should Wind Turbines Be: by Nino Marchetti, November 29, 2010, Earthtechling.com, COPYRIGHT © 2017 BODIEWORKS LLC. ALL RIGHTS RESERVED

Photo 14: Turbine Blade Transport Vehicle-2

Photo 15: Turbine Rotor Lift

The impact of commercial flight paths has not been evaluated for a wind turbine installation and would require a review for this site.

Consideration of the concerns of abutters warrants review as the impact of wind turbine operation is being identified as property values and health issues. Wind Turbines are recognized as impacting radiocommunication signals, produce undesired noise, and create are reported to affect people's health. "Nina Pierpont, MD, PhD,[4] and a practicing pediatrician, coined the term *Wind Turbine Syndrome* (WTS) in 2009 to describe the symptoms she observed in a cohort study of 38 members of 10 families. Those symptoms include: sleep disturbance; headache; Visceral Vibratory Vestibular Disturbance (VVVD); dizziness, vertigo, unsteadiness; tinnitus; ear pressure or pain; external auditory canal sensation; memory and concentration deficits; irritability and anger; and fatigue and loss of motivation. Although her case-series report, published

as a book, has often been maligned by the wind industry as being non-scientific, an increasing body of scientific evidence supports her observations and their links to exposure to wind turbines. Dr. Robert McMurtry, a well-respected Ontario physician, recently proposed specific diagnostic criteria for a case definition of AHEs due to IWTs."[11]

4.2.2.2 Solar Overview

Photovoltaic (PV) solar panels were reviewed to determine whether they would be a viable utility scale opportunity to develop at the IPEC site. The review assembled NASA data to identify the monthly average daylight percentage. The NASA data for Buchanan, NY (Latitude 41.262 and Longitude -73.938) provided a 22-year average daylight cloud percentage for each month of the year. The high month with 70.9% is January and the low month with 57.1% is October where 0% means no clouds and 100% means full clouds. The annual average daylight cloud amount is 64.1%. By comparison, in Upton, NY the site of the Brookhaven National Laboratory (BNL) solar farm the annual average daylight cloud amount is 60.9% and in Sacramento, CA the amount is 43.6%. This indicates that cloud coverage is a site consideration with respect to the electric output of solar panels during daylight hours. Installing single or dual axis solar panel movement combined with an energy storage system (batteries) may improve the reliability and economic viability of a solar farm's electrical output. With the addition of the energy storage component, the result is fewer solar panels can be installed and the electric output is reduced, a factor in determining the venture's viability.

The BNL's, Long Island Solar Farm, installation is a fixed panel installation and occupies 225.5 acres out of a total solar acreage site of 231.3. The solar installation is rated at 37 MW and the PV modules are 13% efficient. "For a large PV (>20 MW), a 2-axis CPV panel requires 8.1 acres/MWac." [12] For this analysis we are intentionally using available (less ISFSI acreage) IPEC acreage to reflect a best-case scenario for today's technology and comparison to BNL's site. Assuming the total IPEC property is available for a solar PV installation, using 200 acres for panels, the nameplate electrical output for the site is approximately 24.4 MW. Estimated project cost for a "20 MW utility scale facility is $74,704,000"[13] and the "fixed O&M (operations and maintenance) expenses are $27.75/kW-AC-year."[14] The construction workforce at BNL involved approximately 200 workers over a period of 12 months. While a full PV site deployment at IPEC is not likely to be as large as BNL and all IPEC property is not available in the *Near-Term*, the BNL labor force provides some perspective of the construction labor effort. For utility scale PV facilities, the owner may "contract O&M services and also perform them in-house. For the latter operation, labor estimates to service utility-scale PV range between 1 FTE per 18 MW to 1 FTE for 30 MW. Meanwhile, per one respondent, the system size threshold for having someone remain on-site on a full-time basis is around 40 MW. Often, in-house utility O&M personnel are composed of employees with multiple skill sets - such as transformer repair, natural gas and/or fuel cell plant maintenance, etc., in order to leverage labor efficiencies."[15]

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[11] National Wind Watch, November 12, 2014, www.wind-watch.org, Negative health impact of noise for industrial turbine: The Evidence, Jerry Punch and Richard James.

[12] Land-Use Requirements for Solar Power Plants in the US, Technical Report, NREL/TP-6A20-56290, June 2013, National Renewable Energy Laboratory, Department of Energy.

[13] Updated Capital Cost Estimates for Utility Scale Electric Generating Plants, April 2013, U.S. Energy Information Administration, page 24-3.

[14] Updated Capital Cost Estimates for Utility Scale Electric Generating Plants, April 2013, U.S. Energy Information Administration, page 24-5.

[15] Sandia Laboratories, SAND2016-0649R, EPRI co-authors, Budgeting for Solar PV Plant Operations and Maintenance: Practices and Pricing, December 2015, page 16.

Photo 16: Fixed Solar Panel Installation

Photo 17: Solar Panel Single-Axis Installation (Photo Credit: Deger energie-Bmbh & Co. website)

Photo 18: Dual Axis Panel Installation (Photo Credit: Deger energie Gmbh & Co. website)

The nameplate output of the solar system with today's technology could approach 32 MW if all 241 acres of IPEC property is used for PV panels. Approximately 200 acres of land was used at the BNL in Upton (Long Island), NY for their 32 MW solar farm.[16] IPEC is likely to require re-grading of the terrain and tree trimming to improve the exposure to the sun.

4.2.2.3 Energy Storage: Battery/Flywheel Overview

Choosing the application of a utility grade energy storage system dictates its economic viability. Subsequently, when selecting an energy storage opportunity, it is critical that its function(s) be identified and evaluated for its intended purpose. Lazard's presentation, Levelized Cost of Storage - Version 2.0 dated December 2016, page 23, highlights the economic viability fact in their Demand Response and Demand Charge Management (or Peaker Replacement) application example for a NYISO application. The following discussion assumes a Demand Charge/Management application along with grid frequency regulation application as being economically viable. For each case, the majority of the hardware is similar.

"An important characteristic of electricity is that electrical energy cannot be stored directly. Thus, the supply of electricity must be balanced continuously with the demand for it. The constant balancing of supply and demand has significant operational and cost implications. For example, sufficient generating capacity needs to exist to supply the highest level of demand, even though the last increment of capacity will only be needed infrequently and for short periods. Also, the inability to store electricity requires that reserve generating capacity, either in the form of spinning or non-spinning reserves, be maintained to account for changes in the amount of load or unplanned loss of an operating generator."[17]

Historical energy storage approaches and systems are challenged to meet the reliability goals established for the electric grid. Furthermore, the introduction of wind and solar compound to ability to achieve reliability goals as they are "uncontrolled" or "intermittent" energy sources that must be promptly replaced with "controlled" supplies when the wind velocity drops below minimum turbine requirements or when overcast conditions exist. Batteries and flywheels fill this void and provide "firming power" with immediate power

[16] Project Overview Brochure for the Long Island Solar Farm prepared by the Department of Energy
[17] Utility Scale Energy Storage Systems, Benefits, Applications, and Technologies, State Utility Forecasting Group, June 2013, page 4.

to fill the need until a slower to respond "controlled" power source is connected to the grid. Grid power quality variables are continuously monitored and measured with variable disturbances lasting fractions of a second which can result in the isolation of grid regions or the whole grid being deenergized. Protective relaying monitors the quality variables of frequency and voltage and respond to out-of-tolerance values in fractions of a second. Today's battery and flywheel storage system technology provide the capability and capacity to supplement immediate power fluctuation demands. Storage systems are designed to operate until other "controlled" generators can assume the load (or meet the electrical demand).

Energy storage technology is evolving and improving and becoming more cost effective. There are limitations with today's battery and flywheel technology, simply the technology limits how much can be economically stored, how long the storage device is able to supply the electrical demand, and, in the case of a battery, how many discharge cycles does it experience before it loses its ability to recharge? Many long duration storage systems are measured in minutes and some recent installations in hours and all depend upon how much load they are replacing and for how long. For example, a nameplate rated 20 MW battery system shown in Photo 19 is capable of delivering 80 MWh. It delivers a four hour flow of 20 MW per hour for a total of 80 MWh of electricity. Similarly, flywheel storage units are generally limited in the length of time they are rotating and able to deliver power, which is generally minutes.

The deployment of a storage system is also coordinated with the ISO or Regional Transmission Organization (RTO) controlling the grid in that state or region. The installation of a storage system for IPEC would likely involve coordination between Consolidated Edison, NYISO, and NYS.

The installation shown in Photo 19 requires 1.5 acres of land and the construction contract was awarded for $100,000,000.00. As it is a recent installation there is little published data available.

Photo 19: 20 MW/80 MWh Battery Storage - Southern California Edison (Photo Credit, Tesla website)

Photo 20: 20 MW Flywheel Storage, Hazle Township, PA (Photo Credit -Beacon Power Website)

Jobs associated with energy storage opportunities offer very limited or no full-time employment. These systems are supported by the equipment manufacturer/representative who provide maintenance and remote online diagnostics at their factories or offices.

4.2.2.4 Fuel Cell Overview

Fuel cells generate electricity resulting from a chemical reaction between hydrogen and oxygen. Natural gas is a feedstock for producing hydrogen used in the fuel cell system to produce electricity. In addition to producing electricity, a fuel cell type may generate heat that may be used in other commercial processes such as building heating or cooling or to generate steam that may be used to generate more electricity. Subsequently, the selection of the fuel cell configuration and application will dictate whether it will serve primarily as an electricity generator or as a CHP.

Figure 9 provides a schematic representation of a fuel cell pod capable of satisfying a CHP application. Fuel cell pods vary in size based on cell technology employed and electrical output. A 10 MW fuel cell configuration deployed in Bridgeport, Connecticut occupies approximately 1 acre.

Because the fuel cell is self-contained and requires virtually no on-site operator, the need for a full-time employee is minimal. O&M contracts with the fuel cell supplier are available which reduce or eliminate the need for full-time employees to service the units. Fuel cells do require replacement with use and age and as the quantity of fuel cells deployed at a site increases, the demand for personnel may be cause for adding a full-time employee. Alternately, the O&M contractor may train a local organization or resident to handle operating alarms or general maintenance of the deployment, but still rely on a technical staff from the factory or remote service center.

No apparent construction challenges are anticipated with a fuel cell deployment. A typical deployment would include concrete pads for the fuel cell pod, natural gas piping to the pods, and an electrical transformer to bring output voltage to the required level for either supplying a building or an electric distribution/transmission connection. If the deployment were to involve a CHP configuration, then piping necessary for steam distribution and condensate return is needed.

Figure 9: Fuel Cell Pod

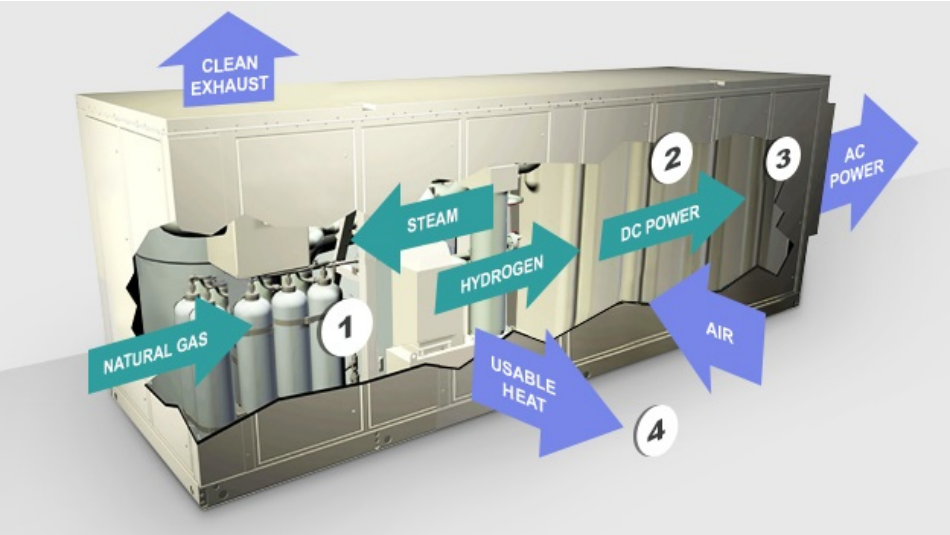
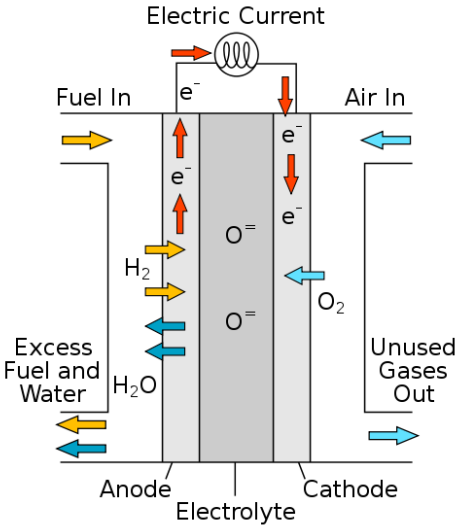


Figure 10: Fuel Cell Chemical Reaction

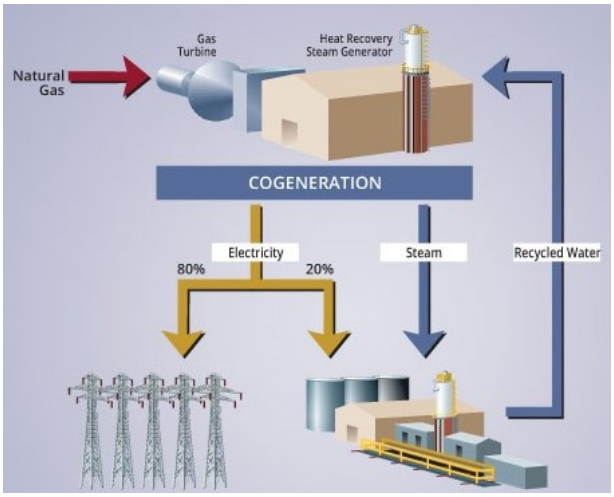


4.2.2.5 CHP / Cogeneration Overview

CHP or cogeneration from a conventional power plant design is similar to a combined cycle power plant that utilizes a combustion turbine, waste heat recovery steam generator (HRSG), and a steam turbine (Figure 11). The distinction is its primary objective is to provide thermal and/or electric energy to a host facility with excess energy from the CHP plant principally in the form of electricity available for sale to a utility. The host facility purchases the CHP plant's energy, generally steam and electric power to support the host's production needs. For this reuse opportunity, consider the Continental Gypsum Plant as a host facility, assuming there is such a desire. The host would take (buy) steam and possibly electricity from the CHP plant to support its existing gypsum board production needs and the CHP plant's excess electric power is sold to an electric utility. A CHP facility does not require a NYISO needs review as the facility would fall under existing PURPA regulations which allows a developer to provide energy to the host and excess electric power would be available for purchase by a utility. The electricity could be delivered to the transmission or distribution

system via the existing site overhead lines connected to the Consolidated Edison switchyard located across Broadway. The effort to develop a CHP at IPEC is simplified because of the existing electrical and natural gas infrastructures. However, there is likely to be some electrical system additions to tie into existing power lines. The existing gas transmission line may be augmented to supply the necessary gas for this application.

Figure 11: CHP Process Flow Diagram



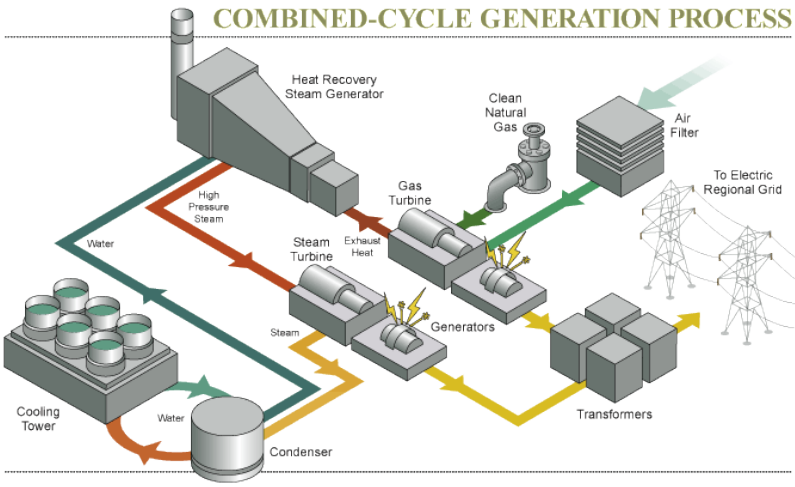
Similar to an IPP owned generating facility, the CHP reuse opportunity, provides the local municipality the opportunity to negotiate a ratable value structure that is designed to provide a predictable annual payment-in-lieu-of-taxes (PILOT), similar in structure to the existing Entergy PILOT agreement.

Jobs associated with this opportunity offer full-time employment for approximately 4 to 10 employees. In addition, there will be a need for local technical services to support plant operations

4.2.2.6 Combined Cycle Generation Overview

A Combined Cycle generation plant is typically a configuration consisting of a combustion turbine, HRSG, condenser, and two generators. Circulating water for the HRSG condenser is circulated through a water to air heat exchanger, that will not rely on Hudson River water extraction or discharge. A simple diagram of the process is presented in Figure 12.

Figure 12: Combined Cycle Process Flow



Combined cycle plants are efficient and depending upon MW capacity require a comparatively small property footprint.

4.3 Parcel A Development

The property boundaries of Parcel A require a detailed review prior to being subdivided. Tax records and Entergy's property filing with the NRC reflect some inconsistencies regarding ownership and boundaries. This issue has been identified and raised by the Town of Cortlandt's Engineer and by the Goodman-Marks Appraisal Report. A review of plot plans in the IPEC FSAR appears to include property the Town of Cortlandt is claiming ownership of. A review of this property is warranted with Entergy, the Town of Cortlandt, and the Village of Buchanan. A clear and unambiguous definition of what property is subject to the NRC license and who is the owner needs to be resolved prior to contacting the NRC regarding a possible site boundary plot plan revision and subsequently requesting the subdivision of non-impacted property.

Parcel A, Photo 21, includes the existing training center, an 80,000 square foot two story structure built circa 1980. The building condition is identified as average in the Goodman-Marks Appraisal document and subsequently suitable for conversion into office space or a mission critical data center. Alternately, a developer may determine that demolition of the structure may best suit their needs for the available property. The property includes overhead electric transmissions lines and an underground natural gas transmission pipeline with the easements. In addition, the access road to the Continental Gypsum Plant passes through the property. The property extends south to include a construction worksite located left of the gypsum plant access road. This parcel has the potential to take advantage of many the inherent site characteristics including electric power, natural gas, water, and parking. Wastewater is reported to discharge to a septic system and future development may require the addition of a sewer interceptor and storm water management facility. It is also important to note that existing electric and gas transmission lines traverse the lower left quadrant of Parcel A, so development of the parcel requires building and equipment space planning. The Continental Gypsum Plant access road may be possible to relocate to the south boundary to open up more space for development.

Photo 21: Parcel A

Access to the property already exists from Broadway. A traffic study will likely be required to assess any impacts of sit-related traffic on local roads.

4.3.1 Non-Energy Opportunities

Parcel A provides an opportunity for development of a mission critical data center, providing a ratable value based on the land and building assessment. In considering what business types may provide longer term stability for employment and occupancy, technology-based entities appear to best meet those requirements.

Repurposing the Training Center building may satisfy both general office and/or mission critical data center functions. An annex to the existing training center building is possible and occupant parking expansion may be required. Promoting the building as a mission critical data center provides some flexibility with the type of function and the number of employees supporting the data center. Because technology is continuously evolving, so too does its personnel requirements and terminology. For this discussion, two main types of data centers are identified and include:

- Private Data Centers

Private Data Centers are owned and operated by an enterprise that offers goods and services into the marketplace. Data centers in this category may be public companies, private companies or government agencies. Large companies and agencies providing technology products and technology services such as Amazon, Microsoft, Google, NASA, banks, utilities, telecommunication companies, and the IRS would fall into this category (GraybaR, 2018).

- Co-location/Managed Services

Co-location/Managed Services are companies that house and maintain data center equipment for third parties. They provide the clients with high bandwidth access connections to major carriers' networks. They can also provide data center outsourcing services from their facilities. In most cases, the co-location/managed services company will provide the data center infrastructure and facility to house their clients' own equipment. Their revenue model is based upon sub-dividing a raised floor space, cordoning off the space in fenced cages and renting it based upon the square footage and energy consumption. Maintenance and operational services are also part of the revenue model. (GraybaR, 2018)

Telecommunications companies, both large and small, also fall under both types of data center users. National and international banks for the most part are Private Data Centers. For further comparison purposes and a clearer understanding of the differences, the "Cloud" is presented for clarification. Everywhere you turn the "Cloud" is being touted with limited explanation for what it is and isn't. Its very name makes the non-tech savvy individual wonder what it means and where it is. Simply, the cloud has similarities to a data center. It contains much of the same equipment as a private data center, but it is designed for multiple functions and users, unlike the Private Data Center which is in the owner's facility and designed for a specific business function and purpose. Alternately, the "Cloud" is off-site/remote from its owner, may consists of multiple physical facilities at locations hundreds of miles apart, and is intended to provide for the storage of data as opposed to performing unique real-time user applications and workloads. By design, the "Cloud" data center provides quick system scalability to the user as the user does not need to add more equipment and/or facilities to the Private Data Center (capital expenditure) for storing corporate information. Subsequently, the "Cloud" is grouped into the Co-location/Managed Services type of data center.

The development of the Training Building as a "data center" increases the marketability of the Training Center to multiple developers. While the marketability of the Training Center is increased, so too are the employment opportunities. However, there are differences with the number of employees associated with each type of "data center."

Generally, the Private Data Center is likely to require a larger number of specialized full-time employees on a 24 x 7 schedule to operate, maintain, and troubleshoot proprietary and business specific software applications (e.g. banks, telecommunications, manufacturing) as well as infrastructure equipment when compared to a Co-Location / Managed Service Facility. By contrast, the Co-location / Managed services facility requires fewer full time employees to address operating, maintenance, and troubleshooting capabilities. From a local community perspective, the use of the Training Center as a Private Data Center may increase the potential of more employees seeking residence in the local area as well as seeking local services.

O&M costs in New York City as of August 2014 BOMA report is $11.77 per square foot. This includes all utilities, repairs and maintenance, roads and grounds cleaning, administration, and security. For the Training Center, an 80,000 square foot building, the expense is approximately $941,600.00. It is anticipated that many services are expected to be awarded to a local contractors or regional service providers which limits the demand for full-time technology trained local personnel to fill the demand.

4.3.2 Energy Generation Opportunities and Order of Magnitude Estimates

The Order of Magnitude Estimate and associated data provided in this section is principally obtained from:

- United States Department of Energy
  - Energy Information Agency (EIA)
  - NREL
  - Sandia National Laboratory

    - Lawrence Berkeley National Laboratory
- Lazard's
    - Levelized Cost of Energy Analysis, Versions 2.0 through 10.0

The data reflects national average cost data and does not include cost variations for specific locations such as New York. There are two exceptions to this: the Lazard data for energy storage and the Jobs and Economic Development Impact (JEDI) software specifically accounts for New York variations. Because of technology changes, manufacturing methods are reducing the cost of renewable energy systems, this data required a thorough analysis that accounts for the specific application of the opportunity. For example, selecting a battery storage system requires a clear definition of how it will be applied, e.g. frequency regulation or peaking generating station replacement which is likely to impact the economic viability of the opportunity.

The cost data is provided within this report with the limited intent of presenting a range of costs and employment opportunities that may be considered in selecting development opportunities for the *Near-Term* and *Long-Term* reuse of the IPEC site. This data is only a reference point and a subsequent, more detailed, analysis of each opportunity will be necessary.

4.3.2.1 Wind Opportunity

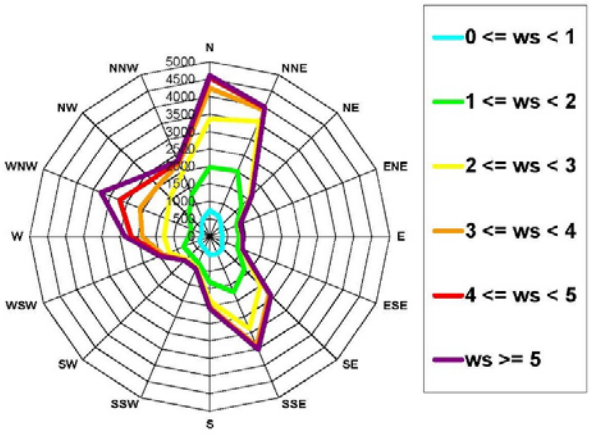
One wind turbine could be installed on Parcel A, provided the Training Building was demolished. Two other turbines may be located, one in Parcel C and the other in Parcel D.

In siting a wind turbine on Parcel A, a developer must consider the height and placement of the desired tower in relation to the existing transmission lines running in the southeast corner of the parcel. The wind tower height may be restricted by the easement as a catastrophic failure of a 101-meter tower falling on the electric transmission lines would impact the transmission lines and grid operations. Photo 22 shows the possible placement of wind turbines on Parcels A, B, and C for *Near-Term* development. While the positioning of the wind turbines is not optimum for all wind directions, the predominate wind directions minimizes turbulence impact from Turbine 3 on the downwind Turbines 1 and 2.

Photo 22: Possible Wind Turbine Placement

A copy of the Entergy wind profile is presented in Figure 13 for the period October 2016 through October 2017 which indicates that 187.5 days of the year (4500 hours), wind from the North was greater than 5 meters per second. This figure is presented as the basis for installing Turbine 2 in Parcel C, which does not satisfy the desired spacing recommendations. Because the predominate wind directions are from the North and North-Northeast, it is possible that potential turbulence from Turbines 1 and 3may be minimized.

Figure 13: Oct 2016 to Oct 2017 IPEC Wind Rose



The following economic summary using NREL's JEDI software program, presented in Tables 8 and 9, reflect the economic impact of constructing and operating three wind turbines each rated at 2 MW located at a NYS installation. While it is not reflective of the GE 4.8 MW turbine considered for this site, it does provide a perspective on costs and revenues for a wind turbine installation. The software was configured to use model default values and any wind turbine installation requires a more thorough technical and financial analysis.

This analysis is provided as a basis for discussion and not a final economic viability test of this opportunity. The JEDI tool provides estimates for construction jobs and the number of full-time employees to support operations for NYS. This economic summary does not reflect cost reductions associated with existing overhead generation lines and towers that currently exist on site and the substation across Broadway. This opportunity offers limited full-time employment. According to the JEDI software a wind installation of this capacity requires employment for less than one employee. Furthermore, this employee is likely to be a roving employee not based in the local area but covering a large geographic area. Note, however, that Tables 8 and 9 exclude any information about the impact of this development on property taxes, employment-related taxes, or interconnections to the electrical transmission or distribution system.

Table 8: 2 MW Wind Project Development Summary Costs

2 MW Distributed Wind System Development Summary Cost using model default values		
Project Location		NEW YORK
Year of Construction		2022
Construction Period (months)		6
Turbine/System Size - DC Nameplate Capacity (KW)		2000
Number of Turbines Installed		3
Project Size - DC Nameplate Capacity (KW)		6000
System Cost ($/kW)		$2,466
Annual Operations and Maintenance Cost ($/kW)		$18.82
Money Value (Dollar Year)		2022
Total Construction/Installation Cost		$14,795,838
Local Spending		$4,976,745
Total Annual Operational Expenses		$1,609,659
Direct Operating and Maintenance Costs		$112,927
Local Spending		$89,151
Debt Payments (Financing) and Taxes (Annually)		$1,496,731
Local Spending		$827
Debt Payments		$0
Property Taxes		$0
Local Economic Impacts - Summary Results	Jobs	Earnings
During construction/installation period		
Project Development and Onsite Labor Impacts		
Construction Sector Only	22.5	$1,738,791
Construction and Installation Related Services	14.8	$1,531,768
Subtotal	37.4	$3,270,559
Turbine and Supply Chain Impacts	12.4	$1,185,308
Induced Impacts	8.7	$707,420
Total Impacts	58.5	$5,163,287

2 MW Distributed Wind System Development Summary Cost using model default values		
During operating years (annual)		
Onsite Labor Impacts		
Field Technicians Only	0.6	$41,435
Local Revenue and Supply Chain Impacts	0.2	$19,162
Induced Impacts	0.1	$10,736
Total Impacts	0.9	$71,333

Notes:

1. Earnings and Output values are dollars in year 2022 dollars. Construction period jobs are full-time equivalent jobs for one year.
2. Labor includes field technicians, administration and management. Turbine and Local Revenue and Supply Chain includes jobs related to goods and services purchased locally.
3. Economic impacts "During operating years" represents impacts that occur annually from system expenditures.
4. The analysis does not include impacts associated with spending of income from sales of excess electricity generated and assumes no tax abatement unless noted.
5. Totals may not add up due to independent rounding.
6. A detailed identification of construction and operating costs is provided for informational purposes. This analysis utilizes default values established by NREL in preparing this analysis tool. It is assumed the software accounts for New York State policies and practices regarding taxes for a wind turbine installation which reflects a 100% tax exemption for the facility.

Table 9: 2 MW Wind Project Development Detail Costs

Detailed Distributed 2 MW Wind System Project - Using model defaults	
	Cost
Construction/Installation Costs	
Site Preparation and Erection Materials	
Grading and Backfill	$0
Foundation Materials (concrete, rebar, etc.)	$519,300
Electrical (wire, conduit, etc.)	$332,352
Tower wiring kit	$346,200
Materials Subtotal	$1,197,852
Labor	
Trenching and Pipe Installation	$849,177
Foundation, Erection, and Electrical	$1,779,228
Subtotal	$2,628,405
Construction Subtotal	
Equipment Costs	
Turbines	$6,231,600
Towers	$1,246,320
Inverter	$166,176
Subtotal	$7,644,096
Other Costs	
Tower Raising Kit	$207,720
Misc. Electrical	$13,848

Detailed Distributed 2 MW Wind System Project - Using model defaults	
	Cost
Shipping Freight	$484,680
Professional Services	$1,442,434
Other Services	$415,440
Site Permits/Fees	$110,784
Miscellaneous	$276,960
Other Subtotal	$2,951,866
Subtotal	$14,422,219
Sales Tax	$373,619
Total	$14,795,838
Small Wind System Annual Operating and Maintenance	
Labor	
Technicians	$66,409
Labor Subtotal	$66,409
Materials and Services	
Misc. Services	$10,337
Fees, Permits, Licenses	$0
Insurance	$0
Tools and Misc. Supplies	$0
Parts and Consumables	$20,675
Subtotal	$31,012
Subtotal	$112,927
Sales Tax	$827
Financing (debt payment)	$1,495,905
Property Taxes	$0
Total	$1,609,659
Other Parameters	
Financial Parameters	
Debt Financing	
Percentage financed	80%
Years financed (term)	10
Interest rate	4.5%
Tax Parameters	
Local Property/Other Tax Rate (percent of taxable value)	0%
Assessed value (percent of construction cost)	0%
Taxable Value (percent of assessed value)	0%
Taxable Value ($)	$0
Property Tax Exemption (percent of local taxes)	100.0%

Detailed Distributed 2 MW Wind System Project - Using model defaults	
	Cost
Local Property Taxes	$0
Local Sales Tax Rate	4.00%
Sales Tax Exemption (percent of local taxes)	0%
Payroll Parameters	Wage per hour
Construction and Installation Labor	
Trenching and Pipe Installation	$25.67
Foundation, Erection, and Electrical	$28.28
O & M Labor	
Technicians	$40.88

4.3.2.2 Solar Opportunity

NREL does not offer a JEDI program to address PV Solar installation development costs at the time of this report. However, EIA provides a capital cost estimate data in its 2013 Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants report for a 20 MW PV solar installation. This data is considered appropriate as the IPEC site nameplate PV output is estimated at 24.4 MW, which may vary with a detailed engineering study. For this analysis we are intentionally using available (less ISFSI acreage) IPEC acreage to reflect a best-case scenario for today's technology and for comparison purposes. Table 10 is found on page 24-3 of the referenced EIA report.

Table 10: 20 MW PV Solar Capital Costs

(EIA TABLE 24-1 – BASE PLANT SITE CAPITAL COST ESTIMATE FOR PV)[18] Technology: PV Nominal Capacity (ISO): 20,000 kW Nominal Heat Rate (ISO): N/A Btu/kWh-HHV	
Capital Cost Category	October 1, 2012 $
Civil Structural Material and Installation	$14,200,000
Mechanical Equipment Supply and Installation	$36,500,000
Electrical / I&C Supply and Installation	$10,900,000
Project Indirects (1)	$5,100,000
EPC Cost before Contingency and Fee	$66,700,000
Fee and Contingency	$8,004,000
Total Project EPC	$74,704,000
Owner Costs (excluding project finance)	$8,964,000

[18] Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants, April 2013, U.S. Energy Information Administration, page 24-4.

(EIA TABLE 24-1 – BASE PLANT SITE CAPITAL COST ESTIMATE FOR PV)[18] Technology: PV Nominal Capacity (ISO): 20,000 kW Nominal Heat Rate (ISO): N/A Btu/kWh-HHV	
Capital Cost Category	October 1, 2012 $
Total Project Cost (excluding finance)	$83,668,000
Total Project EPC / kW	$3,735,000
Owner Costs 12% (excluding project finance) / kW	$448,000
Total Project Cost (excluding project finance) / kW	$4,183,000
(1) Includes engineering, distributable costs, scaffolding, construction management, and start-up.	

The information in Table 9 indicates that the EPC Project Cost and Taxable Value for this installation is $66,700,000.00. Construction labor in Tables 9 and 10 incorporates materials in this Quarter 1: 2017 report. The Quarter 1: 2015 version of the same report expanded construction as a separate item allowing for clearer understanding of the labor contribution. The 2015 report identified construction labor as contributing $0.20 to the system price per Watt for a 100 MW system. This rate is reduced to $0.16 for this discussion to account for a 20 MW installation as well as cost reductions associated with the PV panels. For a 20 MW installation the construction labor cost is estimated to be:

$$20{,}000{,}000 \times \$0.16 = \$3{,}200{,}000$$

[The] "Following are perspectives on labor from O&M providers as well as electric utilities:

> • **Independent and Vertically Integrated O&M Provider Perspective** - To be economically feasible, one trained technician must be able to supervise at least ~10 MW of PV in a particular region (1 field technician is potentially capable of servicing up to 50 MW.) In some cases, the O&M provider will subcontract installers to do corrective maintenance on an as-needed basis. For larger, central inverter-based systems, standard preventative maintenance activities are usually covered by 2 technicians at 8 hours per MWac (not including cleaning). Peak irradiance months often require greater staffing levels to ensure the optimal amount of energy is harvested (thus contributing to annual production thresholds). Separately, the ability to have a roll-over budget allows providers to save funds in years with little maintenance (and associated labor) as a contingency for years when more maintenance is required.
>
> • **Electric Utility Perspective** - Utilities contract O&M services and also perform O&M in-house. For the latter option, labor estimates to service utility-scale PV range between 1 full-time employee (FTE) per 18 MW to 1 FTE for 30 MW. Meanwhile, per one respondent, the system size threshold for having someone remain on-site on a full-time basis is around 40 MW. Often, in-house utility O&M personnel are composed of employees with multiple skill sets—such as transformer repair, natural gas and/or fuel cell plant maintenance, etc.—in order to leverage labor efficiencies. One identified utility used to sub-contract for O&M services but later switched to in-house staff due to

its cost structure, which provided significant savings. Some utilities that conduct PV O&M in-house have unionized employees, which can upwardly impact labor costs."[19]

"The significant O&M items for a PV Facility include periodic inverter maintenance and periodic panel water washing."[20] The resulting annual O&M costs suggest that no full-time employment is likely with a PV solar opportunity.

4.3.2.3 Fuel Cell

Two configurations may be considered for Parcel A when considering fuel cells. The first would be to apply fuel cells as the power source for the existing Training Building. This configuration may provide an economic advantage for building electric and heating needs. Sufficient property exists to install over a MW of electric capacity and heat from the fuel cell process which may provide hot water or steam for heating and possibly air conditioning. The air conditioning consideration requires an engineering study to determine it viability.

The second configuration involves demolition of the Training Building and using the available property to generate electricity for sale using fuel cells as the generation medium. The available property appears capable of supporting integrated fuel cell pods that exceeds 10 MW of electric power. "Stationary Fuel cell systems also take up much less space in proportion to other clean energy technologies. For instance, a 10 megawatt (MW) fuel cell installation can be sited in about an acre of land."[21]

Table 11 provides cost data for a new 10 MW fuel cell electricity central station and is obtained from DOE, Energy Information Administration's Assumptions to the Annual Energy Outlook 2017, page 105.

Table 11: 10 MW Fuel Cell Cost Data

Cost and Performance Characteristics (EIA Assumptions to Annual Energy Outlook 2017 – Table 8.2)			
Size in MW	*Overnight Cost in 2016 (2016 $/kW)*	*Fixed O&M (2016 $/kW/yr)*	*Variable O&M (2016 $/MWh)*
10	$6,252	$0.00	$44.91

A 10 MW central station fuel cell "Overnight" cost would be $62,520,000. This "Overnight" cost value does not include owner contingency factors, regional multipliers, and interest charges and simply means the project was completed overnight. The central station cost is being considered as the Taxable/Ratable Value. Construction jobs will be created for a fuel cell installation that is likely to require 18 months to complete. The 18- month period does not include manufacturing time for the fuel cells.

O&M costs for fuel cells, as well as storage systems, are being reported as "variable" by the various system owners/operators. This makes identification of direct and indirect labor costs and local expenditures/costs difficult to extract from the reported data. For the purpose of discussion, if we use the Variable O&M costs value and assume the fuel cell is used to generate electricity 365 days a year or 8760 hours, then:

8760 hours x 10 MW = 43,800 MWh / $44.91/MWh = $1,950.57 Variable O&M dollar per year.

[19] SNL and EPRI, Budgeting for Solar PV Plant Operations & Maintenance: Practices and Pricing, SAND2016-0649R, page 16.
[20] SNL and EPRI, Budgeting for Solar PV Plant Operations & Maintenance: Practices and Pricing, SAND2016-0649R, pages 13 and 14.
[21] Fuel Cell & Hydrogen Energy Association, Stationary Power Fuel Cells, www.fcheaorg/stationary/

This Variable O&M cost would not support full-time employment and it would indicate that a minor amount of the budget is likely to be expended in the local community. While increasing the size of the stationary fuel cell installation will raise the Variable O&M dollars per year, it is more likely that a contracted service with the fuel cell manufacturer or manufacturer approved contractor that can service multiple installation will be the likely choice.

4.3.2.4 Energy Storage

Energy storage on Parcel A is also possible. Like a fuel cell application, it requires a comparatively short construction cycle and almost no full-time operating staff. San Diego Gas & Electric recently completed constructing a 120 MWh battery storage in 13-months and Southern California Edison completed an 80 MWh facility within a 13-month period.

The expedited construction period is attributable to the fact that storage equipment comes assembled in modules which are placed on concrete pads. The field work involves site preparation to include concrete pads and installing underground conduits, pulling electrical cables, installing control systems, and installing any additional electrical equipment (e.g., breakers, transformers) necessary to connect to either an electrical distribution or transmission system.

Table 12 provides a comparison of costs between a 4 MW and 50 MW Lithium Ion battery storage system based on 2016 dollars. The information is found in the U.S. Energy Information Administration's Capital Cost Estimates for Utility Scale Electricity Generating Plants, dated November 2016 and the associated Addendum dated April 2017.

Table 12: Lithium Ion Battery Storage Plant Cost

Updated Estimates of Power Plant Capital and Operating Costs
Source: US EIA Capital Cost Estimates 2016 & 2017

Size	Overnight Capital Cost ($/kW)	Fixed O&M ($/kW-yr)[1]	Variable O&M ($/MWh)[2]
4	$2,813	$40	$8
50	$3,122	$40	$8

Notes:
1. Overnight capital cost is the cost of a construction project if no interest was incurred during construction
2. EIA document identifies this Fixed cost to include insurance, property taxes, and asset management fees
3. EIA document identifies this Variable cost to include major maintenance but not fuel-related expenses

The average 4 MW plant capital cost (less interest, contingency, and regional variance) is $11,252,000 while a 50 MW plant is $156,100,000. These capital costs are assumed to be the taxable/ratable value.

The Fixed O&M for the 4 MW facility is calculated assuming the storage facility provides power for half a year. The result is:

0.5 x 8760 x 4,000 kW = 17,520,000 kW-year
17,520,000 kW-year / $40 = $438,000 (Refer to Note 2 from Table 12)

Similarly, the 50 MW facility Fixed O&M cost is estimated to be:

0.5 x 8760 x 50,000 kW = 219,000,000 kW-year
219,000,000 kW-year / $40 = $5,475,000 (refer to Note 2 from Table 12)

Attempting to extract the cost for local labor and services is not easily accomplished from the available data as the cost of fuel is not included. However, for discussion purposes it is assumed that 1 full-time employee is assigned to the 4 MW facility and 3 full-time employees are assigned to the 50 MW facility.

4.3.2.5 CHP Opportunity

NREL's JEDI program is used for a typical Natural Gas Plant project deployed in the State of New York. While this tool doesn't distinguish between natural gas plant types, e.g. CHP versus Combined Cycle. The data in this analysis presents a perspective for an 80 MW natural gas plant which includes cooling towers. The CHP plant generally doesn't employ cooling towers as the low-pressure steam is used in the host's facility to support production process. For this preliminary analysis, it is assumed the cost of low pressure steam piping and condensate return piping and pumps are considered approximately the same cost for a condenser and cooling tower for this very preliminary review. The following Tables 13 and 14 identify development costs for discussion purpose.

Table 13: 80 MW Natural Gas Development Summary Data

Natural Gas Plant - Project Data Summary using JEDI model default values	
Project Location	**NEW YORK**
Year Construction Starts	2022
Project Size - Nameplate Capacity (MW)	80
Capacity Factor (Percentage)	80%
Heat Rate (Btu per kWh)	7000
Construction Period (Months)	36
Plant Construction Cost ($/KW)	$675
Cost of Fuel ($/mmbtu)	$5.10
Produced Locally (Percent)	0%
Fixed Operations and Maintenance Cost ($/kW)	$8.25
Variable Operations and Maintenance Cost ($/MWh)	$2.90
Money Value (Dollar Year)	2022
Project Construction Cost	$54,000,000
Local Spending (portion of Project Construction Cost)	$14,379,882
Total Annual Operational Expenses	$28,381,995
Direct Operating and Maintenance Costs	$22,300,704
Local Spending (portion of Direct O&M Costs)	$770,343
Other Annual Costs	$6,081,291
Local Spending (portion of Other Annual Costs)	$793,726
Debt and Equity Payments (Portion of Local Spending)	$0
Property Taxes (Portion of Local Spending)	$0
Local Economic Impacts - Summary Results	**Jobs**
During construction period	
Project Development and Onsite Labor Impacts	37
Construction and Interconnection Labor	37
Construction Related Services	0

Natural Gas Plant - Project Data Summary using JEDI model default values	
Power Generation and Supply Chain Impacts	29
Induced Impacts	26
Total Impacts	92
During operating years (annual)	
Onsite Labor Impacts	4
Local Revenue and Supply Chain Impacts	4
Induced Impacts	2
Total Impacts	10

Notes:
1. Earnings and Output values are millions of dollars in year 2022 dollars.
2. Construction period related jobs are full- time equivalent for the 36 months (an annual average of approximately 30 full-time equivalent jobs).
3. Plant workers includes operators, maintenance, administration and management.
4. Economic impacts "During operating years" represent impacts that occur from plant operations/expenditures.
5. The analysis does not include impacts associated with spending of plant "profits" and assumes no tax abatement unless noted.
6. Totals may not add up due to independent rounding.

Table 14: 80 MW Natural Gas Development Detail Data

Detailed Gas Project Data using JEDI model defaults	NEW YORK
Construction Costs	**Cost**
Facility and Equipment	
Power Generation	$19,058,824
General facilities	$4,764,706
Plant Equipment	$8,576,471
Subtotal	$32,400,000
Labor and Management	
Construction Labor	$9,211,765
Project management (construction and owner's)	$5,082,353
Subtotal	$14,611,765
Construction Subtotal	$47,011,765
Other Costs	
Engineering/Design	$1,270,588
Construction insurance	$317,647
Land	$2,541,176
Permitting Fees	$1,270,588
Grid intertie	$1,270,588
Spare Parts	$317,647
Other Subtotal	$6,988,235
Subtotal All Costs (without sales tax)	$54,000,000
Sales Tax (Materials & Equipment Purchases)	$1,308,706

Detailed Gas Project Data using JEDI model defaults	NEW YORK
Total Project Cost	$55,308,706
Annual Operating and Maintenance Costs	**Cost**
Fixed Costs	
Labor	$276,012
Materials	$39,999
Services	$343,989
Fixed Subtotal	$660,000
Variable Costs	
Water	$84,096
Catalysts & chemicals	$168,192
Variable Subtotal	$1,625,856
Fuel Cost	$20,014,848
Sales Tax (Materials & Equipment Purchases)	$11,691
Other Taxes/Payments	$0
Total (with Sales Tax and Other Taxes/Payments	$22,312,395
Financing (avg annual debt payment)	$4,212,000
Equity Payment - Individuals (avg annual payment)	$0
Equity Payment - Corporations (avg annual payment)	$1,857,600
Property Tax	$0
Land Lease	$0
Total (with financing)	$28,381,995
Other Parameters	
Financial Parameters	
Debt Financing	
Percentage financed	80%
Years financed (term)	20
Interest rate	10%
Equity Financing/Repayment	
Percentage equity	20%
Individual Investors (percent of equity)	0%
Corporate Investors (percent of equity)	100%
Return on equity	16%
Repayment term (years)	
Tax Parameters	
Local Property/Other Tax Rate (percent of taxable value)	0%
Assessed Value (percent of construction cost)	100%
Taxable Value (percent of assessed value)	100%
Taxable Value	$54,000,000

Detailed Gas Project Data using JEDI model defaults	NEW YORK
Local Taxes	$0
Local Sales Tax Rate	4.0%
Land Lease Parameters	
Land Lease (total cost)	$0
Lease Payment Recipient (F = farmer/household, O = Other)	O
Payroll Parameters	**Wage per hour**
Labor (average wage per hour for all plant workers)	$23.80

4.3.2.6 Combined Cycle Opportunity

The following economic summary uses NREL's JEDI program for a 350 MW combined cycle plant including construction and operation costs for a New York State installation. It is generic, using model default values, requires a more thorough analysis, and is provided as a basis for discussion and not a final economic prediction or resultant for this opportunity. This tool also provides estimates for construction jobs and the number of full-time employees to support operations. This economic summary does not reflect cost reductions associated with existing generation lines and towers that currently exist on site nor does it include demolition costs for any structures. Table 15 reflects a projection of what potential exists with the opportunity.

Table 15: 350 MW Natural Gas Plant Development Summary Costs-Model Defaults

Natural Gas Plant - Project Data Summary based on JEDI model default values	
Project Location	**NEW YORK**
Year Construction Starts	2022
Project Size - Nameplate Capacity (MW)	350
Capacity Factor (Percentage)	80%
Heat Rate (Btu per kWh)	7000
Construction Period (Months)	36
Plant Construction Cost ($/KW)	$675
Cost of Fuel ($/mmbtu)	$5.10
Produced Locally (Percent)	0%
Fixed Operations and Maintenance Cost ($/kW)	$8.25
Variable Operations and Maintenance Cost ($/MWh)	$2.90
Money Value (Dollar Year)	2022
Project Construction Cost	$236,250,000
Local Spending (portion of Project Construction Cost)	$62,911,985
Total Annual Operational Expenses (Direct O&M + Other Annual Cost)	$124,171,230
Direct Operating and Maintenance Costs	$97,565,580
Local Spending (portion of Direct Operating and Maintenance Costs)	$3,370,250
Other Annual Costs	$26,605,650
Local Spending (portion of Annual Costs)	$3,472,550
Debt and Equity Payments (portion of Local Spending)	$0
Property Taxes (portion of Local Spending)	$0

Natural Gas Plant - Project Data Summary based on JEDI model default values	
Local Economic Impacts - Summary Results	**Jobs**
During construction period	
Project Development and Onsite Labor Impacts	161
Construction and Interconnection Labor	161
Construction Related Services	0
Power Generation and Supply Chain Impacts	128
Induced Impacts	112
Total Impacts	401
During operating years (annual)	
Onsite Labor Impacts	18
Local Revenue and Supply Chain Impacts	19
Induced Impacts	8
Total Impacts	44

Notes:
1. Earnings are millions of dollars in year 2010 dollars.
2. Construction period related jobs are full- time equivalent for the 36 months (an annual average of approximately 310 full-time equivalent jobs).
3. Plant workers includes operators, maintenance, administration and management.
4. Economic impacts "During operating years" represent impacts that occur from plant operations/expenditures.
5. The analysis does not include impacts associated with spending of plant "profits" and assumes no tax abatement unless noted.
6. Totals may not add up due to independent rounding.

The JEDI model also provides detailed breakout of project data. This model run, presented in Table 16, is intended to provide order of magnitude information and does not include all site variables. It is useful is in providing a view of what potential exists.

Table 16: 350 MW Combined Cycle Natural Gas Project Detail Data

350 MW Combined Cycle Detailed Project Data - JEDI	NEW YORK
Construction Costs	**Cost**
Facility and Equipment	
Power Generation	$83,382,353
General facilities	$20,845,588
Plant Equipment	$37,522,059
Subtotal	$141,750,000
Labor and Management	
Construction Labor	$40,301,471
Project management (construction and owner's)	$22,235,294
Subtotal	$63,926,471
Construction Subtotal	$205,676,471
Other Costs	

350 MW Combined Cycle Detailed Project Data - JEDI	NEW YORK
Engineering/Design	$5,558,824
Construction insurance	$1,389,706
Land	$11,117,647
Permitting Fees	$5,558,824
Grid intertie	$5,558,824
Spare Parts	$1,389,706
Other Subtotal	$30,573,529
Subtotal All Costs (without sales tax)	$236,250,000
Sales Tax (Materials & Equipment Purchases)	$5,725,588
Total Project Cost	$241,975,588
Annual Operating and Maintenance Costs	**Cost**
Fixed Costs	
Labor	$1,207,553
Materials	$174,995
Services	$1,504,953
Fixed Subtotal	$2,887,500
Variable Costs	
Water	$367,920
Catalysts & chemicals	$735,840
Variable Subtotal	$7,113,120
Fuel Cost	$87,564,960
Sales Tax (Materials & Equipment Purchases)	$51,150
Other Taxes/Payments	$0
Total (with Sales Tax and Other Taxes/Payments	$97,616,730
Financing (avg ann debt payment)	$18,427,500
Equity Payment - Individuals (avg ann payment)	$0
Equity Payment - Corporations (avg ann payment)	$8,127,000
Property Tax	$0
Land Lease	$0
Total (with financing)	$124,171,230
Other Parameters	
Financial Parameters	
Debt Financing	
Percentage financed	80%
Years financed (term)	20
Interest rate	10%
Equity Financing/Repayment	
Percentage equity	20%
Individual Investors (percent of equity)	0%

350 MW Combined Cycle Detailed Project Data - JEDI	NEW YORK
Corporate Investors (percent of equity)	100%
Return on equity	16%
Repayment term (years)	
Tax Parameters	
Local Property/Other Tax Rate (percent of taxable value)	0%
Assessed Value (percent of construction cost)	100%
Taxable Value (percent of assessed value)	100%
Taxable Value	$236,250,000
Local Taxes	$0
Local Sales Tax Rate	4.0%
Land Lease Parameters	
Land Lease (total cost)	$0
Lease Payment Recipient (F = farmer/household, O = Other)	O
Payroll Parameters	**Wage per hour**
Labor (average wage per hour for all plant workers)	$23.80

4.4 Parcel B Development

Parcel B is property at the northern most point of the IPEC site. It has remained an undeveloped parcel for over 80 years. Developing this property is subject not only to NRC review but other state and local laws and ordinances and subsequently questionable for *Near-Term* development. Because the parcel may foster endangered and protected species on the parcel it is viewed as requiring a review and approval cycle before it is approved for development. For this review, reuse opportunities are presented for Non-Energy and Energy development projects to identify the parcel's potential. The proximity of the ISFSI site is also likely to impact the extent of possible development for this parcel. It is known that the ISFSI site requires expansion prior to or during DECON, but it is not known in which direction expansion will occur. It is also anticipated that a security zone may be required for the ISFSI which may require additional property. The ISFSI expansion plan is likely to include an earthen berm, for shielding purposes, which also reduces the amount of property available for reuse. In identifying Parcel B reuse boundaries, allowances for a berm and security zone is included in the designated development area.

Photo 23: Parcel B

4.4.1 Non-Energy Generation: Opportunities

A commercial opportunity may be implemented on this parcel and the opportunity information contained in Parcel A is applicable for Parcel B. Architectural and engineering studies are likely needed to develop appropriate plans to support development considering the parcel's rocky terrain including several steep gradients. Should there be a desire to develop this northern end of the property, a review may be warranted to determine the availability of sewer line and/or lift station on Broadway that allows for a tie-in from the property.

4.4.2 Energy Generation: Opportunities

One wind turbine installation is assumed for this parcel for the purpose of discussion. The proposed wind turbine is positioned at a high point on the property that would limit its impact on the remainder of the property and is assumed to be located at an appropriate distance from ISFSI expansion. Should new or additional development of this parcel be desired, relocating the potential wind turbine position may be possible. Access to this parcel during DECON activities will present a turbine constructability issue similar to Parcel A which may preclude the *Near-Term* installation of large wind turbines on Parcel B.

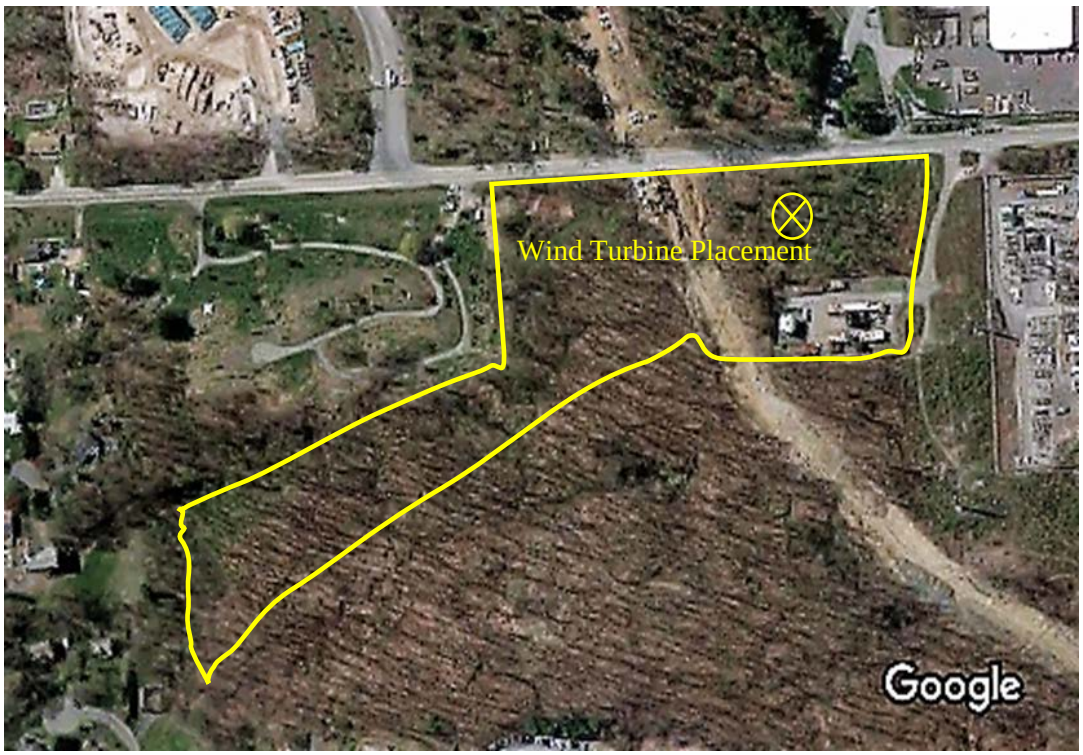
No further energy development opportunities are specifically considered for this site because of potential protected species issues, undeveloped history, and any local ordinance restrictions that may apply. However, should energy generation development be desired and determined appropriate, a combined cycle plant is a

possibility. In reviewing a combined cycle installation for this parcel, or a solar facility, additional civil work will need to be added to account for the property's rocky and steep gradients that are not reflected in the development cost tables located in paragraph 4.3.2.6. A CHP plant is not considered at this time for a *Near-Term* development as there is no industrial facility in close proximity to support such a facility. However, it should not be ruled out for *Long-Term* development.

4.5 Parcel C Development

Parcel C is located across the street from the IPEC licensed facility and adjacent to the Consolidated Edison switchyard. Parcel C may be immediately available as it is not included in the UFSAR and subsequently not a NRC licensed property. The site contains remnants of two combustion turbines previously owned by Consolidated Edison, a small internal combustion engine generator used to power fuel transfer pumps associated with a diesel fuel storage tank located south of the combustion turbine structures. Demolition and removal of this equipment is needed to support site development.

Photo 24: Parcel C - Approximate Boundaries



4.5.1 Non-Energy Opportunities

Parcel C is also suitable for small office building/data center development upon demolition of existing structures. It includes a direct electrical tie to the Consolidated Edison switchyard which, if permitted with modifications, has the potential to provide a high reliability power supply for a mission critical data center installation. Alternately, electric power for a conventional office building would be supplied from the local power distribution system.

The natural gas transmission line crosses the property to the south of the two combustion turbine structures and fuel storage tank. The location of the transmission line will impact to the placement of structures and roadways on this parcel for Non-Energy and Energy Generation opportunities.

The development of Parcel C for residential use is also a possibility but based on the Goodman-Marks appraisal of Parcel A it is being eliminated from consideration as it does not yield the "Highest and Best Use" test.

4.5.2 Energy Generation: Opportunities

4.5.2.1 Wind Opportunity

A wind turbine is considered for Parcel C. The proposed wind turbine is a large GE 4.8 MW unit to obtain optimum use of existing wind. The installation is anticipated to utilize the existing transmission path and potentially the lines connecting the combustion turbines with the Consolidated Edison substation. A detailed electrical design will be required to include the potential re-use of existing electrical infrastructure. A transformer is likely needed to increase the output voltage of the wind turbine to connect to the substation.

The proximity of the wind turbine to the existing overhead transmission lines and substation may pose a reliability issue and should be reviewed by Consolidated Edison. It is possible that siting a wind turbine in Parcel C will not be permitted.

Similar to Parcel A, the constructability of a wind turbine is a challenge for this location in the *Near-Term.* However, post decommissioning, access to the location may improve for a 4.8 MW unit.

4.5.2.2 Wind-Storage Opportunity

This is a parcel where energy storage may also be viable development. Two acres of the available parcel would appear to be capable of supporting a 20 MW / 80 MWh storage battery array similar to the system installed at Southern California Edison Mira Loma switchyard in Ontario, California and as shown in Photograph 22. The proximity of the parcel to the substation suggests a convenient application. If the wind turbine and battery storage systems are integrated with the substation, the wind turbine may be the mechanism to recharge the storage batteries, providing a low-cost power source as an alternative to using grid power to recharge the batteries.

4.5.2.3 Solar Opportunity

The parcel's terrain, the gas transmission line, and acreage limit the size of a utility scale solar field and its output. If a solar array is coupled with a battery storage system, the available acreage is further reduced. Employing a wind turbine with battery storage appears to offer a greater electrical output compared to a solar installation.

4.4.23 CHP/Combined Cycle Opportunity

Parcel size is again the limiting feature and siting either CHP or a Combined Cycle plant is unlikely.

4.6 Parcel D Development

This review has not included a review of industrial/manufacturing development of the IPEC site. Expansion of the existing gypsum plant or interest expressed to local officials by other industrial businesses is not being

considered for the *Near-* or *Long-Term* development at this time due to parcel location, anticipated DECON land requirements, and the location of equipment and radioactive materials adjacent, including the ISFSI, to non-impacted properties. While industrial development is a reasonable approach to developing the IPEC site, the *Long-Term* development opportunity and presently interested businesses are unlikely to wait for 10 to 15 years or more before Parcel D boundaries are formally established for the ISFSI and the available property declared suitable for unrestricted use by the NRC. This is anticipated to be a deterrent to any industrial developer.

Long-Term development of Parcel D provides the opportunity to offer a variety of hybrid possibilities for both Non-Energy and Energy Generation opportunities. Natural gas lines traverse the property and provide an energy source for either type of opportunity development. The challenges are identifying the date when DECON is complete (NRC has determined is ready for Unrestricted Use) and the ISFSI site security boundaries are clearly delineated or the spent fuel is moved to another location not on the IPEC site. Another challenge is to identify the portion of the parcel which would eventually be declared suitable for development. Only when these two challenges have been addressed will it be appropriate for any serious consideration of development opportunities.

4.6.1 Non-Energy Opportunities

Entertainment opportunities such as restaurant, theatres, public parks and other facilities have been considered for *Long-Term* development but based on ISFSI constraints, such opportunities would appear to be unlikely. The anticipated security demands and requirements associated with the ISFSI installation, including water front access are impediments for the foreseeable future making any future entertainment opportunities dubious.

The contribution of the four-story GSB to *Long-Term* development is expected to be directly influenced by the development of surrounding Parcels A and B. For non-energy opportunities such as an office park/data center, the potential exists for the GSB to serve as a flagship property. Factors that will impact GSB reuse and value 10 to 15 years after plant shutdown include sustaining its current building management and maintenance practices and procedures. Another potential factor impacting the *Long-Term* use of the GSB is its proximity to the ISFSI. Depending on which direction the ISFSI is to be expanded, reuse of the GSB may be limited to general use due to security reasons as well as radiological reasons. Subsequently, the use of the GSB is speculative at this point because of the ISFSI and the final selection of reuse for Parcels A and B.

Goodman-Marks developed a GSB value review to provide a perspective on today's and the future's potential market value of the GSB. The building value review is an appendix to their Parcel A Appraisal report. The GSB is viewed as the significant non-nuclear reuse structure on Parcel D. The balance of the non-nuclear structures on Parcel D, less the water tank, are incidental structures viewed as not providing future reuse value.

4.6.2 Energy Generation: Opportunities

Energy generation opportunities for Parcel D are viewed as an expansion of what is being presented for Parcels A and C with a wind turbine being a questionable addition and subject to spacing recommendations. One additional wind turbine may be possible to be added to bring a total installation to four and increasing the maximum nameplate output for the site to 19.2 MW. The possible location for the fourth wind turbine is identified in Photo 25. This placement assumes a prevailing wind direction from the north which may minimize downstream wind turbulence on Turbine 1 (Parcel A). A detailed engineering study is warranted to evaluate the maximum number of turbines for the site and their economic viability.

4.6.2.1 Wind

Expanding the wind turbine opportunity is limited by the topography of the site. Locating wind turbines in the area where IP-1, IP-2, and IP-3 reside appears to present operating challenges as it is 60 to 100 feet below the overall property elevation. This decommissioned parcel may accommodate a fourth wind turbine, but recommended spacing requirements are not likely to be satisfied, assuming a GE 4.8 MW wind turbine with a 158-meter diameter rotor.

Photo 25: Possible Fourth Wind Turbine Placement

4.6.2.2 Solar/Storage Opportunity

A PV solar installation may be installed along with battery storage to improve overall system effectiveness and efficiency. With a two-axis solar installation requiring 8.1 acres per MW and assuming approximately 100 acres available for PV panels, the site has a nameplate rating of 12.3 MW. While PV solar installation is possible, the topology of the land may impact panel electrical production. Installing panels where IP-1, IP-2, and IP-3 currently exist (and after their removal) is approximately 60 feet below the existing parking lots. This height difference is anticipated to cast a shadow over some of the available area reducing the amount of time panels are exposure to the sun and though a 2-axis design is employed, it may not significantly increase sun exposure time. Any PV installation in this lower area warrants careful review and analysis, to include resilience considerations.

Another factor affecting the nameplate output is integrating a battery storage system. The battery storage system is expected to be charged by the solar panel system when it is not providing power to the distribution and/or transmission system. As previously discussed, the battery system provides an immediate short-term source of power for the electric system should the PV array electrical output be interrupted due to overcast skies or technical issues. The battery system will provide power to the electric system allowing the distribution/transmission system operator some time to make the necessary load adjustments from other generating sources.

4.6.2.3 Combined Cycle or CHP Generation Opportunity

If natural gas power generation is selected for Parcel A, expansion of the power generation in the form of a combined cycle design is the anticipated, though not mandatory, opportunity for Parcel D. If industrial production facilities are introduced into these parcels, alternative strategies need to be developed to determine if CHP is more appropriate. It may be possible to site several compact combined cycle plants or one larger plant with a possible MW output capacity achieving 1000 MW and more when this parcel becomes available. The facilities are anticipated to be developed by an IPP. In each plant configuration no river water would be used for condenser cooling. It is important to note again that this expansion is dependent on revised zoning and the need for power as identified by NYISO and agreed to by all applicable federal and state regulatory authorities. Access to a natural gas supply with associated facilities is also a consideration. Combined cycle expansion into Parcel D can be accommodated under all topology conditions which may result in increasing the MW output of the site and potentially achieving the MW output of the current IPEC units.

One combined cycle concept may involve repurposing the existing IP-2 and IP-3 steam turbine-generators with waste heat from new combustion turbines and associated HRSGs. This will again require some coordination and agreement with the owner as to the disposition of these turbine-generator units. Repowering nuclear plant turbine-generators has been successfully done in the past. Specifically, Fort St. Vrain (Colorado) decommissioned their nuclear plant equipment and repowered the original turbine generators using a natural gas combined cycle design. The site also added combined cycle plants that has uprated the original 301 MW plant to be a 969 MW generating station.

Expansion of combined cycle generation is possible for Parcel D by adding two more 350 MW units similar to the one presented for Parcel A and possibly of increasing the unit output beyond 350 MW. All combined cycle plant configurations incorporate air cooled condensers that are not requiring river water extraction or discharge.

4.7 Summary of Energy-Related Opportunity Development Costs

The following Table 17 provides a summary view of selected energy-related development costs. It provides a comparison of development costs for various opportunities in a single table to ease visualization of expenditure differences. This table does not imply a recommendation for selecting any opportunity. The values in the table do not reflect expected development costs for the IPEC site and require detailed evaluation by a developer. Rather, they present development and historical cost data found in the U.S. Department of Energy's Energy Information Administration and National Renewable Energy Laboratory data bases and projections from JEDI software to provide an overview of tax revenue sources and expenditures. There are additional income sources that warrant attention, such as the revenue local businesses receive as a supplier to another local business entity. This income is represented in Table 17 in the O&M – Fixed Cost Local topic. The O&M source data is a challenge to distinguish and verify for all opportunities as it is inconsistently reported by various entities, but an approximation is provided to show how it varies from one opportunity to another.

Table 17: Opportunity Development Cost Comparison

Source / Topic	Commercial Goodman-Marks	Three 2 MW Wind Turbines JEDI software	Solar (all IPEC site acreage) EPRI & EIA Reports	Fuel Cell EIA[1] (10 MW)	50 MW Storage EIA Report	One 80 MW CHP JEDI software	One 350 MW Combined Cycle JEDI software
Total Existing or Constructed Cost	$21,200,000	$14,795,838	$66,700,000	$62,560,000	$156,100,000	$56,000,000	$437,500,000
Labor-construction		$3,270,559	$3,200,000	Note 2	Note 2	$9,211,765	$40,301,471
Appraised Value – Local	$21,200,000	$14,795,838	$66,700,000	$62,560,000	$156,100,000	$56,000,000	$437,500,000
O&M – Fixed Cost Local	$941,600[5]	$112,927	Note 3	$0.00	Note 3	$660,000	$2,887,500
Employee Labor (FTE)	N/A	<1	1	<1	1 to 3	6 to 10	15 to 18

Notes:

1) EIA, Assumptions to the Annual Energy Outlook April 2013. EIA, Capital Cost Estimates for Utility Scale Electricity Generating Plans did not include latest Fuel Cell data.
2) EIA reports combine labor and equipment costs as one item.
3) Local O&M and services expenses not specifically identified in EIA or NREL data.
4) Fuel Cell owners not identifying O&M on a fixed cost basis. Bundled into Variable Costs which includes fuel costs and prevents identification of actual dollars spent locally. It does suggest that maintenance contracts are impacting local expenditures.
5) Variable cost (utilities) included in this number. BOMA reported NY City operating cost per square foot for 2013 / 2014 was $11.77.

For comparison purposes, expenses associated with IPEC operations specifically involving business in the local zip codes for Buchanan, Cortlandt, Verplank, Peekskill, and Croton-on-Hudson are presented in Table 18, provided by Entergy. This information presents a dimension to local expenditures. Entergy was specifically requested to run an accounts payable report identifying IPEC payments to entities/businesses in specific local zip codes. It should be noted that the data does not account for payments to local entities/businesses using an accounts receivable/billing service outside the identified zip codes. The data provided is for 2015, 2016, and through November 2017.

Industry experience with operating power plants reinforces the fact that day-to-day plant operating costs do extend their reach to the local communities and businesses on a day-to-day basis and it is not uncommon for local expenses to be at least 10% of the plant's day-to-day operating budget. Subsequently, when considering an opportunity and site reuse, factoring in purchases to local community businesses/resources is significant as it exceeds PILOT payments and other real estate, personal property, and sales/use taxes.

Table 18: Entergy Report: Local Day-to-Day Expenditures

IPEC Expenditures for Specified Zip Codes ($ 000s)						
City / Town	Zip Code	Description	2015	2016	YTD Nov 2017	Total
Buchanan	10511	Materials	2,691	1,572	1,043	5,306
		Contract Services	171	63	25	259
		Utilities	1,907	1,670	1,804	5,381
		General Nuclear Services	0	244	0	244
		Sub Total	$4,769	$3,549	$2,872	$11,191
Peekskill	10566	Materials	93	3	68	164
		Equipment & Other Rentals	1	1	0	2
		Contract Services	244	142	111	497
		Company Memberships	17	7	9	33
		Other	0	1	0	1
		Sub Total	$354	$153	$189	$696
Cortlandt	10567	Contract Services	9	9	9	27
		Office & General	2	0	0	2
		Other	1	0	0	1
		Sub Total	$13	$9	$9	$31
Verplank	10596	Company Memberships	0	5	5	10
		Other	222	0	0	222
		Sub Total	$222	$5	$5	$232
Croton-on Hudson	10520		0	0	0	0
	10521		0	0	0	0
		TOTAL	**$5,358**	**$3,716**	**$3,075**	**$12,150**

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Attachment 1: Entergy Review Comments

Indian Point Site Reuse Report
Entergy Comment and Response

NOTE: The discussion associated with each of the issues raised by Entergy are addressed in this table and the table will be included in the Final Report. Adjustments to the body of the report may or may not be incorporated, as noted in this table. The reasoning for this approach is to provide a transparent and traceable understanding of the review process the report was subjected to prior to its issuance.

Comment Number/Date	Comment By	Reference Page or Subsection	Comment	DLEC Response/Resolution	Accepted or Acknowledged By & Date
1	Entergy	1	Throughout the Draft Report, reference is made to a decommissioning timeline of 10 - 15 years. These speculative and unsubstantiated statements about a 10 – 15-year timeline are misleading and could create significant confusion among community members, elected officials, and other stakeholders.	As discussed on page 20 of the Reuse Report, based on the Zion approximate 10-year project duration for a two-unit PWR facility, and improvements and lessons learned in the decommissioning arena, it is believed that once the DECON physical work begins, a duration of 10-15 years is a reasonable and correct duration for the decommissioning of IPEC.	
2	Entergy	1	Until a DCE for IPEC has been developed, there is no basis for a reasonable estimate of the decommissioning timeline.	It is acknowledged that adequate funding is required to fund the decommissioning of IPEC. However, the DCE is not the only parameter that determines whether adequate funding exists to decommission a nuclear facility. For example, the Entergy PSDAR at Vermont Yankee (VY) proposed a SAFSTOR option requiring $1.24B in its DCE. Nonetheless, public information has indicated that a decommissioning contractor, NorthStar, will perform the VY decommissioning (DECON option) for the current Nuclear Decommissioning Trust (NDT) fund of $580M.	
3	Entergy	1 and 2	Another significant issue that will affect the decommissioning timeline at IPEC is the movement of all spent nuclear fuel from the spent fuel pools into dry cask storage. Major decommissioning activities will likely not be performed at IPEC until all of the spent nuclear fuel is in dry cask storage. Entergy has provided an estimate of approximately 10 years after the last unit permanently ceases to operate for that work to be completed, based on current technology and configuration of the equipment at the site… We believe it would be prudent to add at least 5 years to any decommissioning timeline estimate included in the Draft Report in order to account for this issue.	The Zion decommissioning project has demonstrated that major decommissioning removal activities can be performed in parallel to fuel movement to the ISFSI. The design of a PWR facility places spent fuel in a dedicated building and this design allows for major removal activities within the containment, auxiliary building and turbine buildings in parallel to fuel movements.	

Comment Number/Date	Comment By	Reference Page or Subsection	Comment	DLEC Response/Resolution	Accepted or Acknowledged By & Date
4	Entergy	2	The Draft Report fails to account for the likelihood that parts of the site may be needed for different purposes than those for which they have historically been used. Entergy is only in the very preliminary stages of decommissioning planning and has not yet made any final decisions about which parts of the site might be needed throughout the decommissioning project. For example, during the decommissioning project, Parcel A may be needed for storage of material and the fuel oil storage tank in Parcel C may also be needed during decommissioning.	There are many alternate locations for storage of materials within Parcel D. An analysis of fuel oil, located on Parcel C, needed to support decommissioning activities was not performed in the report. However, should fuel oil be required during decommissioning, it is reasonable to assume that an alternative source of fuel oil could be made available outside Parcel C.	
5	Entergy	2	The Draft Report fails to consistently acknowledge issues related to utility easements with respect to Parcel A. Station power needs will continue through the decommissioning process, for the spent fuel pool and for the ISFSI, and thus, these easements will remain in place and an uninterrupted power source will remain an important site consideration. Moreover, the easements will likely have to continue to be respected for purposes of overall bulk power system operations.	Rights-of-way / easements affecting Parcel A are identified in several locations throughout the report: • Executive Summary • Table 6, Item 8 where it specifically identifies it as a characteristic that must be considered in development • Paragraph 4.3 • Goodman-Marks Report We expect the rights-of-way/easements to be accounted for going forward and clearly state that they will impact the development of Parcel A. The report does not indicate or suggest that power for the site post unit shutdown is not necessary. Nor do we indicate or suggest that transmission lines will be removed or eliminated. We fully understand and appreciate that the transmission lines are monitored and controlled by either NYISO and/or Consolidated Edison.	
6	Entergy	3	The Draft Report does not accurately reflect the continued use of certain equipment on parcels designated as candidates for “near - term” reuse. For example, there is an environmental monitoring	We do not suggest or minimize the requirement for such equipment and understand the requirements that exist for such monitory and sampling equipment. Our perspective is that	

Comment Number/Date	Comment By	Reference Page or Subsection	Comment	DLEC Response/Resolution	Accepted or Acknowledged By & Date
			station (air and precipitation) behind the Training C enter that is part of the IPEC Radiological Environmental Monitoring Program. It will continue to be used during the decommissioning period.	monitoring equipment and sampling locations may be relocated and/or eliminated at the discretion of the licensee with a documented rationale. For example, we are aware that relocating this equipment has had been previously done by the Con Edison NEM Manager and NYPA Radiological Superintendent in the 1980's to streamline the Radiological Environmental Monitoring Program.	
7	Entergy	3	The Draft Report fails to account for the cost or administrative process associated with an NRC license amendment to remove a parcel of property from the license. Entergy would likely not file any such license amendment request earlier than after the shutdown of Unit 3 (no later than April 30, 2021) and such a license amendment would likely take at least one year to obtain.	The partitioning of non-impacted areas, Parcels A, B, and C, does NOT automatically require a license amendment. As detailed in 3.9 Partial Site Release – Non-Impacted Areas, and specifically on Page 47, Paragraph 3.9.2, the precedence has been established for partitioning of non-impacted areas without a license amendment has occurred at Connecticut Yankee and Zion. These paragraphs explain the specifics associated with the process.	
8	Entergy	3	It does not appear that the Draft Report has taken into account the possibility that reuse of certain parts of the site may impact cultural resources, affect endangered species, or implicate other local, state, or federal laws or regulations.	The Executive Summary, the paragraph introducing Parcel B states: "Parcel B – Approximately 50-acres of undeveloped land identified as a Near-Term parcel … The area abuts the existing Independent Spent Fuel Storage Installation (ISFSI) and may support protected wildlife species. State and local laws and regulations will determine development of this parcel. If the state and local laws did not impact the Near-Term development of this parcel, it would support non-energy production/commercial and energy production opportunities". In Section 4, Paragraph 4.3 of the report further identification of "cultural resources" and "endangered species" are presented.	
9	Entergy	3	Throughout the Draft Report, reference is made to the expected retirements of Unit 2 an d Unit 3 as "in April 2020" or "in April 2021," respectively. For the sake of clarity, the expected retirement dates should be referenced as April 30,	The Executive Summary does compress the retirement dates to April of 2020 and 2021 and does so intentionally to provide a summary introduction. Section 1 of the report, Paragraph 1.1 "Overview" provides the specific dates. The approach taken was to	

Comment Number/Date	Comment By	Reference Page or Subsection	Comment	DLEC Response/Resolution	Accepted or Acknowledged By & Date
			2020, and April 30, 2021, respectively. We observed this issue on pages 1, 17, 28, 31, and 135.	minimize repetitiveness an improve readability in the report regarding the retirement dates.	
10	Entergy	3	Acknowledgements (p. iii) – We would prefer a general acknowledgement of Entergy, rather than identification of any individual employees.	Agree with request and change incorporated into report.	
11	Entergy	3	Section 1.1 (p.5) – The Draft Report's description of IPEC's legal ownership is incorrect "Entergy Nuclear Northeast" is not a legal entity. The Draft Report should state "IPEC is owned and operated by indirect subsidiaries of Entergy Corporation . . ."	Clarification appreciated, and we understand that organizations adjust their asset ownership for various business reasons. Our research identified numerous sources on the Web reflecting "Entergy Nuclear Northeast" as the designated owner of IPEC. One recent 2017 example was found in a letter from Rossana Rosado, NYS Department of State, regarding the "Withdrawal of Objection to Coastal Zone Management Act Consistency Certification." The letter was addressed to Mr. F. Dacimo, Vice President, Operations License Renewal, Entergy Nuclear Northeast, IPEC. We trust that Entergy can appreciate our effort to identify what we believed to be the legal owner.	
12	Entergy	3	The description in the third paragraph of the conditions under which IPEC could operate beyond April 30, 2020, and April 30, 2021, respectively, is incorrect. It should read: These dates may be extended if the State of New York determines that an emergency exists under specific conditions and the applicable law and regulatory requirements are met. Under these conditions and upon the mutual agreement of the State of New York and Entergy, the operation of IP2 may be extended, but in no event beyond April 30, 2024, and the operation of IP3 may be extended, but in no event beyond April 30, 2025.	Additional specificity noted.	
13	Entergy	3	Section 1.3 (p. 8, second paragraph, first sentence) – We suggest replacing the phrase "electrical grid via" with "transmission system operated by" or replacing distribution" with "transmission."	Additional specificity noted.	

Comment Number/Date	Comment By	Reference Page or Subsection	Comment	DLEC Response/Resolution	Accepted or Acknowledged By & Date
14	Entergy	4	Section 1.4 (p. 8) – Reference to all Unit 1 spent nuclear fuel being located on the ISFSI pad is not accurate. Some of the Unit 1 spent nuclear fuel was transported off site prior to Entergy's ownership.	Additional specificity noted.	
15	Entergy	4	Section 2.2 (p. 23) There is still an ISFSI at Big Rock Point.	Paragraph 2.1, Page 21 of the Reuse Report states that Big Rock Point has an ISFSI. Repeating this fact was not deemed necessary for this paragraph.	
16	Entergy	4	Section 2.2 (p. 23) – The description of Vermont Yankee is incorrect. Specific suggested edits are below: Vermont Yankee (12/29/14): Located in the town of Vernon, Vermont, Vermont Yankee was a Boiling Water Reactor rated for 620 MWe. The plant operated from November 1972 until December 2014. Entergy, which owns the facility, selected the SAFSTOR decommissioning option as part of the Vermont Yankee Post-Shutdown Decommissioning Activities Report submitted to the NRC in December 2014. Spent fuel is being transferred from wet storage to the on site ISFSI with all spent fuel forecasted to be on the ISFSI by the end of 2018. In January 2017, Entergy and NorthStar Group Services, Inc. participated in a public meeting with the NRC indicating Entergy's intention to request a license transfer of the Vermont Yankee Nuclear Power Station to NorthStar for the purposes of accelerating the site's decommissioning. At the issuance of this report, Entergy's license transfer intention has been formalized and submitted to the NRC and is undergoing their review and comment cycle. A transaction review is also expected by the The State of Vermont Public Utility Commission is also currently reviewing the proposed transaction.	Additional specificity noted.	
17	Entergy	4	Section 2.4.1 (p. 26) – The description of the pending Entergy – NorthStar deal is incorrect. Specific suggested edits are below:	Additional specificity noted.	

Comment Number/Date	Comment By	Reference Page or Subsection	Comment	DLEC Response/Resolution	Accepted or Acknowledged By & Date
			Entergy and NorthStar Group Services have executed an agreement for the sale of the Entergy subsidiary that owns the Vermont Yankee plant to NorthStar for $1,000 by the end of 2018. The arrangement requires approval of both the Vermont Public Utility Commission and the NRC but, if approved, NorthStar will take ownership of the NRC license and property and manage the remaining ISFSI after decommissioning activities.		
18	Entergy	4	Section 3.7.2 (pp. 44 - 45) Vermont Yankee section: The NRC staff completed the environmental assessment.	Additional specificity noted.	
19	Entergy	4	Section 3.9.2 (pp. 48 - 49) In addition to the UFSAR, the proposed changes to the site boundary will affect the ODCM (Xu/Q) and the Emergency Plan. While this is mentioned as an NRC requirement, there are monitoring considerations including Reuter Stokes and TLDs that could require removal, evaluation, and repositioning.	Additional specificity noted.	
20	Entergy	5	Table 6, IPEC Site Characteristics (pp. 52 - 53) and Section 4.1.2 (p. 69) – These sections reference use of transmission tie - in points. However, proximity to such points does not ensure system access. Any efforts in this regard would be subject to the NYISO's interconnection study requirements. The report appears to acknowledge later (Section 4.4.1, p. 90) that there are limitations involving interconnection.	Entergy's issue answered in the last sentence of their comment.	
21	Entergy	5	Section 4.1.1 (p.57) and Real Estate Tax Data (p. 147) Setting aside the issue of whether the $21.2M value the appraiser reached for "Parcel A" is accurate, the appraiser's projection of real estate taxes of $1.97 million for that Parcel is excessive. The appraiser uses an average tax rate from several sites in different locations as far south as New Rochelle and as far north as Peekskill, instead of the Town of Cortlandt tax rate. Using the appraiser's value and the Cortlandt tax rates, the real estate tax would be approximately $600,000.	We have revised our comparable real estate tax analysis for the subject's excess land area by incorporating current real estate taxes of vacant land found within the immediate area of the subject in the Town of Cortlandt. This produced a concluded a RETX liability for the excess land of $0.25 per square foot of land area, and total projected RETX liability of $732,705.00. See: Figures 30-32.	

Comment Number/Date	Comment By	Reference Page or Subsection	Comment	DLEC Response/Resolution	Accepted or Acknowledged By & Date
22	Entergy	5	Section 4.2.2.1 (pp. 73 - 78) – Incorporation of wind turbines/tall buildings/other obstructions at the IPEC site could affect Meteorology/Mixing for the Plant Vent Effluent Release Points. Also, there is a potential interference with the primary met tower. Although E - plan requirements will change over time, there will still be a requirement for determining site boundary dose.	Additional design consideration noted. Alternately, the primary tower may be eliminated and, in its place, a backup one may be used to determine offsite dose.	
23	Entergy	5	Appraisal - The discussion at page 113 (and earlier at page 70) of the "unnamed parcel" is inaccurate. The appraiser indicates in the chart on page 145 that no tax is paid on this parcel of land, which is not correct. A letter from the Town Supervisor dated September 8, 2017 requesting that Entergy donate this part of the site (the "unnamed parcel") to the Town contains the legal description of the property. That same property description is listed in the PILOT agreements as being an asset of the company covered under the tax agreements. Therefore, taxes are being paid on the "unnamed parcel" and the report should be adjusted to indicate as such. It is not clear why this parcel is not identified on the tax maps, but it may be due to the fact that this property was once owned by the New York Power Authority and exempt from local taxes. When Entergy acquired the site, it became taxable and was rolled into the PILOT agreements for the total plant site.	No revisions were applied as we are not aware of a section/block/lot number identifying the "Unnamed Parcel".	
24	Entergy	5	Typographical Errors - Executive Summary (p. 1, last paragraph, last sentence) - Suggest inserting the word "is" after the word "which." Executive Summary (pp. 5 - 6) -Footnote reference 1 should be placed at the end of the first	Verb will be added. Will relocate the footnote to the third paragraph. Will search and correct this grammar error. Will correct this grammar error.	

Comment Number/Date	Comment By	Reference Page or Subsection	Comment	DLEC Response/Resolution	Accepted or Acknowledged By & Date
			sentence of the third paragraph on page 5, rather than its current position at the end of the last sentence of the last paragraph on page 6. Section 3.5.5 (p. 39, bullet 7) -The term “of the” is repeated. Section 4.2.1 (p. 72) -Toward the end of the page there is a reference to an “$80,000 square foot building.” We believe this should read 80,000 (no $) square foot building.		

Attachment 2: Goodman-Marks Appraisal Report

Goodman-Marks Associates, Inc.

REAL ESTATE APPRAISERS AND CONSULTANTS

APPRAISAL REPORT

INDIAN POINT ENERGY CENTER
"PARCEL A" AT BROADWAY,
VILLAGE OF BUCHANAN, TOWN OF CORTLANDT
WESTCHESTER COUNTY, NEW YORK

PREPARED FOR:

Indian Point Task Force
& NYSERDA
in association with
DL English Consulting, Inc.

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April 12, 2018

Mr. David English
DL English Consulting, Inc.
616 Elm Street,
South Dartmouth, MA 02748

Re: Indian Point Energy Center
"Parcel A" at Broadway,
Village of Buchanan, Town of Cortlandt
Westchester County, NY
File No.: 17-1339

Dear Mr. English:

At your request, we have inspected and appraised the above-captioned property, which is located on the east side of Broadway, in the Village of Buchanan, Town of Cortlandt, Westchester County and State of New York. Currently, the subject property operates as part of the Indian Point Energy Center ("IPEC"); a three-unit nuclear power station situated on the east bank of the Hudson River that was first officially issued its operating license circa 1962. The site has been identified on the Westchester County Tax Maps as Section 43.10, Block 2, *part of* Lots 1 and 2; and also include one (1) parcel which has not been assigned a block and lot number. Based upon our research into the history of the unnamed parcel, it would appear that the land is considered to be part of Section 43.14, Block 3, Lot 1, though it is referenced separately in various public documents concerning transfers of ownership. A discussion with the Town Assessor confirmed the non-existence of a block and lot assignment for the parcel in question. For the purposes of clarity, we have referenced the parcel in question as the "Unnamed Parcel," herein.

The subject property site is a large, irregular shaped parcel of land which contains a gross land area of 45.24± acres (1,970,820± square feet). The subject contains portions of two (2) parcels of land which are located in the Village of Buchanan (43.10-10-1; 43.10-10-2) and one (1) parcel which is wholly-located in the Town of Cortlandt ("Unnamed Parcel"). The parcels found in the Village are both zoned within an M-2 – Planned Industrial District. The parcel located in the Town is split-zoned between an MD – Designed Industrial District and an R-15 – Single-Family Residential District. Both of the industrial districts allow specifically for heavy manufacturing uses, while the residential district calls for the construction of single-family homes on 15,000 square-foot plots.

The subject property is improved with a two-story office building which is currently utilized as a training facility by "IPEC." The improvements contain approximately 80,000± square feet of gross building area and were constructed circa 1980. They were observed to be in average condition upon inspection. For the purposes of clarity, the subject property improvements and land area shall be referenced as a whole as "Parcel A" herein.

Based upon the aforementioned land and building measurements, it is indicated that "Parcel A" currently features a land-to-building ratio of 24.64:1.00. Research into the Westchester County office market revealed that this ratio is highly atypical as office properties in Upper Westchester County do not require this amount of land to support the existing improvements. An analysis of similar properties proved a land-to-building ratio of 4.00:1.00 to be reasonable and we have utilized this ratio in our analysis of the subject property. Given the 80,000± square feet of improvements, it was determined that 320,000± square feet of land is required to support the subject office building. The remaining land area therefore, contains, 37.89± acres, or 1,650,820± square feet. As it unclear as to whether or not the remaining land area can be developed, we have considered this remaining land area to be excess land.

The purpose of this appraisal report is to provide an opinion of the market value of the fee simple estate of the subject property, as of November 8, 2017, to assist our client, DL English Consulting, Inc., in establishing an asset valuation for the Indian Point Task Force. It should be noted that the market value opinion provided herein only contains the real property and does not include the furniture, fixtures and equipment (FF&E) and business enterprise value (i.e. Going-Concern). The intended users of this appraisal are Mr. David English and those persons authorized by DL English Consulting, Inc. to utilize this report.

This appraisal report conforms to the current Uniform Standards of Professional Appraisal Practice (USPAP) promulgated by the Appraisal Standards Board of the Appraisal Foundation, the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute.

In arriving at the appraised value, we considered all items influencing value, including the location of the subject property, zoning, comparable sales and rentals, market trends, existing and projected competition, continued demand, mortgage availability, mortgage rates and equity return rates.

It is noted that as an Addendum to this report, we have included a present value conclusion of the General Services Building ("GSB"), which is located on a portion of Section 43.10, Block 2, Lot 1, which is part of the IPEC. Please refer to the Addenda for more information regarding this property.

We are of the opinion that the "as is" market value of the fee simple estate of the subject property, *predicated upon the extraordinary assumptions and limiting conditions as defined within the body of this report*, as of November 8, 2017, was:

TWENTY ONE MILLION TWO HUNDRED THOUSAND DOLLARS
($21,200,000.00)

A report of 95 pages plus addenda is attached hereto and made part hereof, and the valuation is expressly made subject to the conditions and comments appearing herein.

Very truly yours,

GOODMAN-MARKS ASSOCIATES, INC.

Matthew J. Guzowski, MAI, MRICS
President
Goodman-Marks Associates, Inc.
Certified General Real Estate Appraiser
New York Certificate #468986

Matthew F. Boylan, MAI
Executive Vice President
Goodman-Marks Associates, Inc.
Certified General Real Estate Appraiser
New York Certificate #4651008

Anthony M. Savino
Associate
Goodman-Marks Associates, Inc.

CERTIFICATE OF APPRAISAL

Premises: Indian Point Energy Center
"Parcel A" at Broadway
Village of Buchanan, Town of Cortlandt, Westchester County, New York

We, Matthew J. Guzowski, Matthew Boylan and Anthony M. Savino, certify that, to the best of our knowledge and belief:

THAT, the statements of fact contained in this report are true and correct.

THAT, the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions and are our personal, impartial, and unbiased professional analyses, opinions, and conclusions;

THAT, we have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved;

THAT, we have performed no services, as an appraiser(s) or in any other capacity, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment;

THAT, we have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment;

THAT, our engagement in this assignment was not contingent upon developing or reporting predetermined results;

THAT, our compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal;

THAT, our analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the *Uniform Standards of Professional Appraisal Practice (USPAP)*;

THAT, Matthew J. Guzowski and Matthew F. Boylan have each made a personal interior and exterior inspection of the property that is the subject of this report;

THAT, no one provided significant real property appraisal assistance to the person(s) signing this certification;

THAT, the reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute.

THAT, the use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives;

THAT, as of the date of this report, Matthew J. Guzowski and Matthew F. Boylan have completed the continuing education program for Designated Members of the Appraisal Institute.

DATE: April 12, 2018

Matthew J. Guzowski, MAI, MRICS
President
Goodman-Marks Associates, Inc.
Certified General Real Estate Appraiser

Matthew F. Boylan, MAI
Executive Vice President
Goodman-Marks Associates, Inc.
Certified General Real Estate Appraiser

Anthony M. Savino
Associate
Goodman-Marks Associates, Inc.

SUMMARY OF SALIENT FACTS AND CONCLUSIONS

Property Location:	Indian Point Energy Center "Parcel A" at Broadway, Village of Buchanan, Town of Cortlandt Westchester County, New York
Tax Map Identification:	Section 43.10, Block 2, p/o Lot 1 Section 43.10, Block 2, p/o Lot 2 *Village of Buchanan* "Unnamed Parcel" *Town of Cortlandt*
Current Owner of Record:	Entergy Nuclear Indian Point 2, LLC (43.10-2-1) Entergy Nuclear Indian Point 3, LLC (43.10-2-2) Entergy Nuclear Indian Point 3, LLC ("Unnamed Parcel")
Property Rights Appraised:	Fee simple estate
Property Description:	Two-story, 80,000± square-foot office building currently utilized as a training center as part of the Indian Point Energy Center. These improvements rest on three (3) contiguous land parcels, forming an irregular site which contains 45.24± acres (1,970,820± square feet). Based on a market-derived land-to-building ratio of 4.00:1.00, it has been estimated that in order to support the subject improvements, 320,000± square feet of land area is required. As it is unclear if the remaining 1,650,820± square feet of land area is developable, it has been considered excess land.
Land Area:	45.24± acres (1,970,820± square feet)
Zoning:	M-2 – Planned Industrial District (43.10-2-1; 43.10-2-2; 43.14-2-1.1) *Village of Buchanan* MD – Planned Industrial ("Unnamed Parcel") *Town of Cortlandt* R-15 – Residential ("Unnamed Parcel") *Town of Cortlandt*
Gross Building Area:	80,000± square feet
Highest & Best Use:	*As Vacant* – Construction of a heavy manufacturing facility, built to its maximum allowable density under current zoning, with considerations made for existing rights-of-way and utility easements. *As Improved* – Interim use as a training facility in support of "IPEC." As the existing improvements were noted to be in average condition, they should not be demolished, but may be repurposed for office use pending a decommissioning of "IPEC" or any potential rezoning initiatives.
Valuation Date:	November 8, 2017

SUMMARY OF SALIENT FACTS AND CONCLUSIONS
(Continued)

Value Conclusions

Cost Approach:	N/A
Income Capitalization Approach:	N/A
Sale Comparison Approach:	$21,200,000.00
Final Market Value Opinion:	**$21,200,000.00**

UNDERLYING ASSUMPTIONS AND LIMITING & QUALIFYING CONDITIONS

1. This report is intended to comply with the reporting requirements set forth under Standards Rule 2-2(a) of the Uniform Standards of Professional Appraisal Practice for an appraisal report. The information contained in this report is specific to the needs of the client and for the intended use stated in this report. We are not responsible for unauthorized use of this report.
2. No responsibility is assumed for legal or title considerations. Title to the property is assumed to be good and marketable unless stated otherwise in this report.
3. The property was appraised free and clear of any or all liens and encumbrances unless stated otherwise in this report.
4. Responsible ownership and competent property management are assumed unless stated otherwise in this report.
5. The information furnished by others for the appraised property is believed to be reliable. However, no warranty is given for its accuracy.
6. All engineering is assumed to be correct. Any plot plans and illustrative material in this report are included only to assist the reader in visualizing the property.
7. It is assumed that there are no hidden or unapparent conditions of the property, subsoil or structures that render it more or less valuable. No responsibility is assumed for such conditions or for arranging for engineering studies that may be required to discover them.
8. It is assumed that there is full compliance with all applicable federal, state and local environmental regulations and laws unless stated otherwise in this report.
9. It is assumed that all applicable zoning and use regulations and restrictions have been complied with, unless a nonconformity has been stated, defined and considered in this report.
10. It is assumed that all required licenses, Certificates of Occupancy or other legislative or administrative authority from any local, state or national government or private entity have been or can be obtained or renewed for any use on which the value estimates contained in this report are based.
11. Any sketch in this report may show approximate dimensions and is included to assist the reader in visualizing the property. Maps and exhibits found in this report are provided for reader reference purposes only. No guarantee as to accuracy is expressed or implied unless stated otherwise in this report. No survey has been made for the purpose of this report.
12. It is assumed that the utilization of the land and improvements is within the boundaries or property lines of the property described, and that there is no encroachment or trespass unless stated otherwise in this report.
13. We are aware of three (3) existing easements which encumber and which substantially impact the subject property. However, we have not been provided with a title report and if in the event such report detailed the existence of an otherwise unknown easement or encumbrance, the value conclusion contained herein may be subject to change.
14. We are not qualified to detect hazardous waste and/or toxic materials. Any comment by us that might suggest the possibility of the presence of such substances should not be taken as confirmation of the presence of hazardous waste and/or toxic materials. Such determination would require investigation by a qualified expert in the field of environmental assessment. The presence of substances such as asbestos, urea-formaldehyde foam insulation or other potentially hazardous materials may affect the value of the property. Our value estimate(s) is predicated on the assumption that there is no such material on or in the property that would cause a loss in value unless stated otherwise in this report. No responsibility is assumed for any environmental conditions or any expertise or engineering knowledge required to discover them. Our descriptions and comments are the result of our routine observations made during the appraisal process.

15. Unless stated otherwise in this report, the subject property was appraised without a specific compliance survey having been conducted to determine whether the property is or is not in conformance with the requirements of the Americans with Disabilities Act (ADA). The presence of architectural and communications barriers that are structural in nature that would restrict access by disabled individuals may adversely affect the property's value, marketability or utility.

16. Any proposed improvements are assumed to be completed in a good and workmanlike manner in accordance with the submitted plans and specifications, and conforming to all municipal, building and health codes.

17. Our value conclusions were based on the assumption that the subject property will continue to be adequately maintained and professionally managed to sustain its competitiveness in the marketplace.

18. The distribution, if any, of the total valuation in this report between land and improvements applies only under the stated program of utilization. The separate allocations for land and buildings must not be used in conjunction with any other appraisal and are invalid if so used.

19. Possession of this report, or a copy thereof, does not carry with it the right of publication. It may not be used for any purpose by any person other than the parties to whom it is addressed without the written consent of the appraiser(s), and in any event, only with properly written qualification and only in its entirety.

20. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraiser(s) or the firm with which the appraiser(s) is/are connected) shall be disseminated to the public through advertising, public relations, news sales or other media without the prior written consent and approval of the appraiser(s).

APPRAISAL DEFINITIONS

Market Value [1]

"The most probable price that a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

- Buyer and seller are typically motivated;
- Both parties are well informed or well advised, and acting in what they consider their own best interests;
- A reasonable time is allowed for exposure in the open market;
- Payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and
- The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale." (12 C.F.R. Part 34.42(g); *55 Federal Register* 34696, August 24, 1990, as amended at *57 Federal Register* 12202, April 9, 1992; *59 Federal Register* 29499, June 7, 1994.)"

Fee Simple Estate [2]

"Absolute ownership unencumbered by any other interest or estate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police power, and escheat."

Intended Use [3]

"The use(s) of an appraiser's reported appraisal or appraisal review assignment results, as identified by the appraiser based on communication with the client at the time of the assignment."

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[1] *The Dictionary of Real Estate Appraisal – Sixth Edition*, Appraisal Institute, Chicago, IL, 2015, p. 142.

[2] *Ibid.*, p. 78.

[3] *Uniform Standards of Professional Appraisal Practice (USPAP) 2018-2019 Edition*, The Appraisal Foundation, Washington, DC, 2018, p. U-5.

.

Intended User [4]

"The client and any other party as identified, by name or type, as users of the appraisal or appraisal review report by the appraiser, based on communication with the client at the time of the assignment."

Excess Land [5]

"Land that is not needed to serve or support the existing use. The highest and best use of the excess land may or may not be the same as the highest and best use of the improved parcel. Excess land has the potential to be sold separately and is valued separately."

Extraordinary Assumption[6]

"An assignment-specific assumption as of the effective date regarding uncertain information used in analysis. which, if found to be false, could alter the appraiser's opinions or conclusions. Comment: Uncertain information might include physical, legal, or economic characteristics of the subject property; or conditions external to the property, such as market conditions or trends; or the integrity of data used in an analysis.

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[4] *Uniform Standards of Professional Appraisal Practice (USPAP) 2018-2019 Edition*, The Appraisal Foundation, Washington, DC, 2018, p. U-5..

[5] *The Dictionary of Real Estate Appraisal – Sixth Edition*, Appraisal Institute, Chicago, IL, 2015, p 80.

[6] *Uniform Standards of Professional Appraisal Practice (USPAP) 2018-2019 Edition*, The Appraisal Foundation, Washington, DC, 2018, p. U-4.

VALUATION DATE

The date of valuation is November 8, 2017, the date of inspection of the subject property.

PURPOSE OF THE APPRAISAL

The purpose of this appraisal report is to provide market value opinions of the fee simple estate of the subject property, subject to its highest and best use.

INTENDED USE AND USERS OF THE APPRAISAL

The intended use of this appraisal is to assist our client in understanding the market value of the subject property. The intended users of this appraisal report are the New York State Energy Research and Development Authority ("NYSERDA"), and the Indian Point Task Force, appointed by the Governor of the State of New York. Mr. David English and DL English Consulting, Incorporated ("DLEC"), as a contractor to "NYSERDA" for this work, is also authorized to use this report. The information contained within this report is specific to the needs of the client and for the intended use stated in this report. We are not responsible for unauthorized use of this report

IDENTIFICATION OF THE SUBJECT PROPERTY

The subject property, identified as "Parcel" A in the "Indian Point Site Reuse Report," has been identified as part of the Indian Point Energy Center ("IPEC"); a three-unit nuclear power station situated on the east bank of the Hudson River which began operations in 1962. The site has been identified on the Westchester County Tax Maps as Section 43.10, Block 2, part of Lots 1 and 2; and also include one (1) parcel which has not been assigned a block and lot number, referenced throughout this report as the "Unnamed Parcel."

The subject property site is a large, irregular shaped parcel of land which contains a gross land area of 45.24± acres (1,970,820± square feet). The subject contains portions of two (2) tax parcels of land which are located in the Village of Buchanan (43.10-10-1; 43.10-10-2) and one (1) tax parcel which is wholly-located in the Town of Cortlandt ("Unnamed Parcel").

The subject property, referenced throughout this report as "Parcel A," is improved with a two-story office building which is currently utilized as a training facility by "IPEC." The improvements contain approximately 80,000± square feet of gross building area and were observed to be in average condition upon inspection.

It has also been noted that several easements exist within "Parcel A." They are identified as follows:

1. One (1) roadway access easement that is approximately 1,430.0± feet long and 65.0± feet wide, and runs east to west through "Parcel A." The easement originates at Broadway and provides access to the Continental Gypsum Plant.

2. One (1) utility easement that is approximately 1,610.0± feet long and 30.0± feet wide, and runs through the southeastern corner of "Parcel A." The easement is held by Georgia-Pacific Corporation (and successors) and is used for overhead electrical power and telephone lines and sub-surface gas, water and sewer lines.

3. One (1) utility easement that is approximately 1,400.0± feet long and 100.0± feet wide, and through the southeastern corner of "Parcel A." The easement is held by Algonquin Gas Transmission Company and is used for 42-inch gas mainline.

SUBJECT PROPERTY OWNERSHIP HISTORY

According to public record, the subject property Lot 43.10-2-1 is currently owned by Entergy Nuclear Indian Point 2, LLC; a subsidiary of Entergy Corporation.

According to public record, the subject property Lot 43.10-2-2 is currently owned by Entergy Nuclear Indian Point 3, LLC; a subsidiary of Entergy Corporation.

According to public record, the subject property "Unnamed Parcel" is currently owned by Entergy Nuclear Indian Point 3, LLC; a subsidiary of Entergy Corporation.

There have been no further arm's-length transfers of the subject property within the past five (5) years.

MARKETING PERIOD & EXPOSURE TIME

A ***marketing period*** is generally defined as "An opinion of the amount of time it might take to sell a real or personal property interest at the concluded market value level during the period immediately after the effective date of an appraisal. Marketing time differs from exposure time, which is always presumed to precede the effective date of an appraisal. (Advisory Opinion 7 of the Appraisal Standards Board of the Appraisal Foundation and Statement on Appraisal Standards No. 6, "Reasonable Exposure Time in Real Property and Personal Property Market Value Opinions" address the determination of reasonable exposure and marketing time.)" [7]

Based on the subject property age, condition and location, were the subject property available for sale, the marketing period is estimated to be approximately one year.

Exposure time is generally defined as 1) The time a property remains on the market. 2) The estimated length of time that the property interest being appraised would have been offered on the market prior to the hypothetical consummation of a sale at market value on the effective date of the appraisal; Comment Exposure time is a retrospective opinion based on an analysis of past events assuming a competitive and open market." [8]

We have estimated that the exposure time for the subject is approximately one year.

[7] *The Dictionary of Real Estate Appraisal - Sixth Edition,* Appraisal Institute, Chicago, IL, 2015, p 140
[8] *Ibid*, p 83.

EXTRAORDINARY ASSUMPTIONS

Our analysis and value conclusions herein were based on the following *extraordinary assumption and limiting conditions.* Any information to the contrary may affect our valuation conclusions herein:

1) It has been noted that we have not been provided with a survey for subject parcel "Parcel A." Furthermore, we were unable to uncover any public records of the gross building area (GBA) of the subject training facility improvements. As such, we have relied upon the *extraordinary assumption* that both the gross land area and gross building area estimates provided in this report are accurate. Any information to the contrary may affect our valuation conclusions herein.

FIGURE 1 – AERIAL VIEW OF SUBJECT SITE

PHOTOGRAPHS OF SUBJECT PROPERTY

Figure 2

Views of Subject Office Building

Figure 3

PHOTOGRAPHS OF SUBJECT PROPERTY

(Continued)

Figure 4

Views of Subject Office Building

Figure 5

PHOTOGRAPHS OF SUBJECT PROPERTY

(Continued)

Figure 6

Views of Subject Office Building

Figure 7

PHOTOGRAPHS OF SUBJECT PROPERTY

(Continued)

Figure 8

Views of Subject Office Building Parking Lot

Figure 9

PHOTOGRAPHS OF SUBJECT PROPERTY

(Continued)

Figure 10

Views of Subject Office Building Lobby

Figure 11

PHOTOGRAPHS OF SUBJECT PROPERTY

(Continued)

Figure 12

Views of Subject Property Grounds

Figure 13

PHOTOGRAPHS OF SUBJECT PROPERTY

(Continued)

Figure 14

Views of Subject Property Grounds

Figure 15

PHOTOGRAPHS OF SUBJECT PROPERTY

(Continued)

Figure 16

Views of Subject Property Grounds

Figure 17

PHOTOGRAPHS OF SUBJECT PROPERTY

(Continued)

Figure 18

Street Scene Facing East at Continental Entrance Checkpoint

Figure 19

Street Scene Facing South on Broadway

SCOPE OF THE APPRAISAL AND METHODS OF VALUATION

There are three generally accepted approaches to the valuation of real estate: the *Cost Approach*, *Income Capitalization Approach* and *Sales Comparison Approach*. In all three valuation methods, local market data is sought for sales and offerings of similar properties and tracts of vacant land, current prices for construction materials and labor, rentals of similar properties and their operating expenses and current rates of return on investments. From this data, value estimates may be developed for the property.

Cost Approach

The *Cost Approach* assumes that informed purchaser would pay no more for a property than the cost of producing a similar investment. The approach entails estimating the value of the land as if vacant, which is then added to the depreciated value of the improvements. This is considered a valid indicator when a property is new and there are a sufficient number of land sales.

In valuing the subject property, the *Cost Approach* was not used to determine value, as an estimate of depreciation for the existing training facility, built circa 1980, would be difficult to support with market data and speculative, at best.

Income Capitalization Approach

The *Income Capitalization Approach* values the future benefits (in the form of income) from an income-producing property by measuring the potential net income received. This approach is significant in determining the market value of a property where investors purchase the income-producing real estate for its earning power.

In valuing the subject property, the *Income Capitalization Approach* was not used to determined value, given its unknown re-use potential, extensive rehabilitation requirements for a new user and limited available market data (i.e., lease transactions of similar properties in the local area).

Sales Comparison Approach

The major premise of the *Sales Comparison Approach* is the principle of substitution, which state that an informed and knowledgeable purchaser would pay no more for a property than the cost of acquiring an existing property with similar investment features. We have employed the *Sales Comparison Approach* in this assignment in order to value the fee simple estate of the subject property in its "as-is" condition.

We have identified a number of meaningful transfers of similar office building sales as compared to the subject property. The process required us to individually analyze and compare each office building sale to the subject and make adjustments to the per-square-foot value for market-sensitive differences between each comparable sale and the subject property. The appropriately adjusted building sales have provided an indication of value for the subject.

We have also included comparable land sales for the subject excess land. We have identified a number of meaningful transfers of similar vacant land sales as compared to the subject property excess land. The process required us to individually analyze and compare each land sale to the subject and make adjustments to the per-square-foot value for market-sensitive differences between each comparable sale and the subject property. The appropriately adjusted land sales have provided an indication of value for the subject excess land.

AREA MAP – FIGURE 20

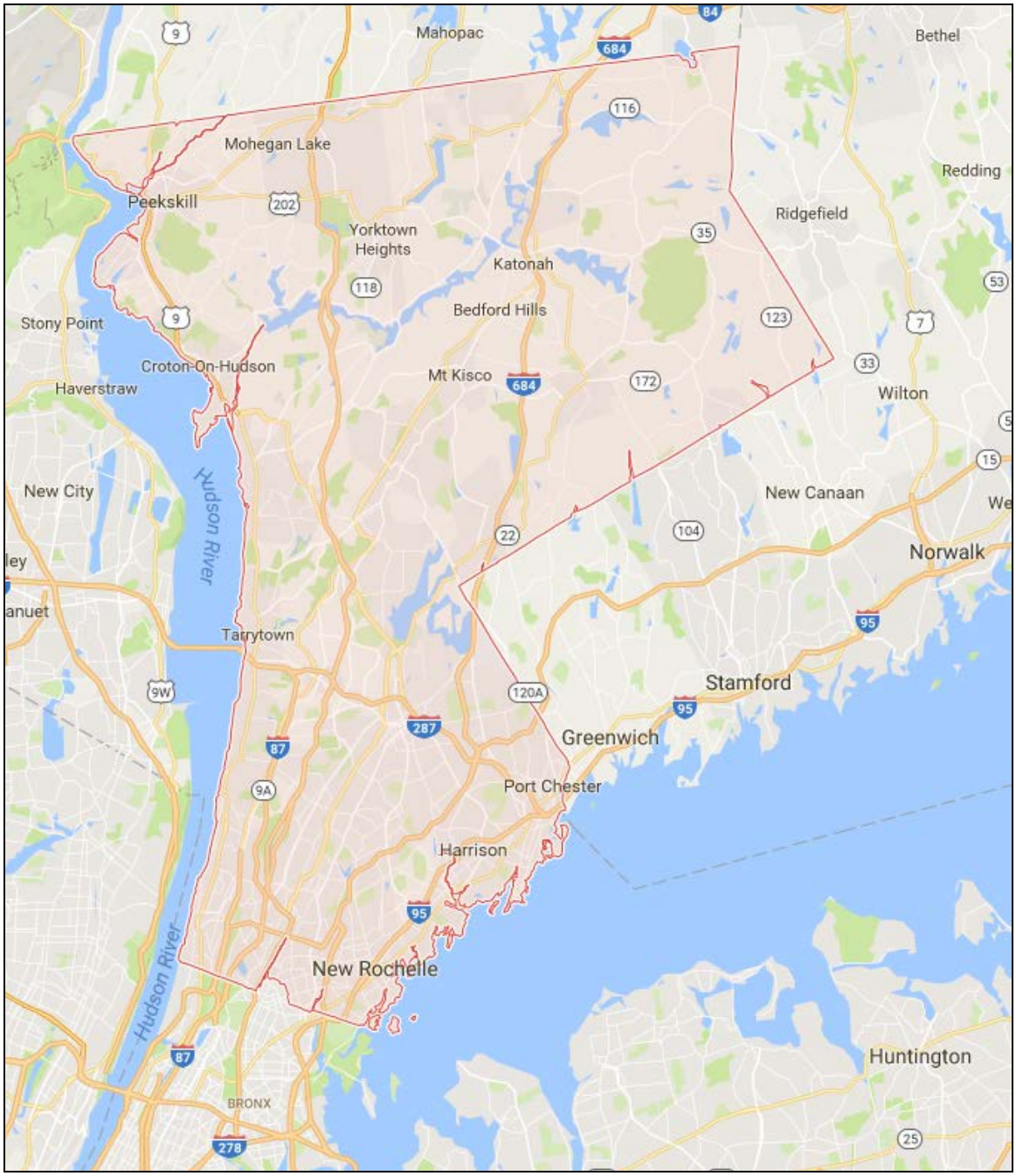


Figure 20

AREA DESCRIPTION

Westchester County is a county located in the lower Hudson River Valley, in the State of New York. Native tribes of the region, which populated the area circa the first contact with Europeans, were part of the Algonquin peoples. Although the area had been scouted by European explorers as early as 1524, settlement by the Dutch began during the 1620's, followed by English settlers in the 1640's. Westchester County was one of the original twelve (12) founding counties created as part of the British-controlled Province of New York. At the time, it bordered present-day Bronx County at the south and Dutchess County at the north. It was not until 1812 that Putnam County was formed after splitting off from Dutchess County, thence becoming the present-day, northern neighbor of Westchester County.

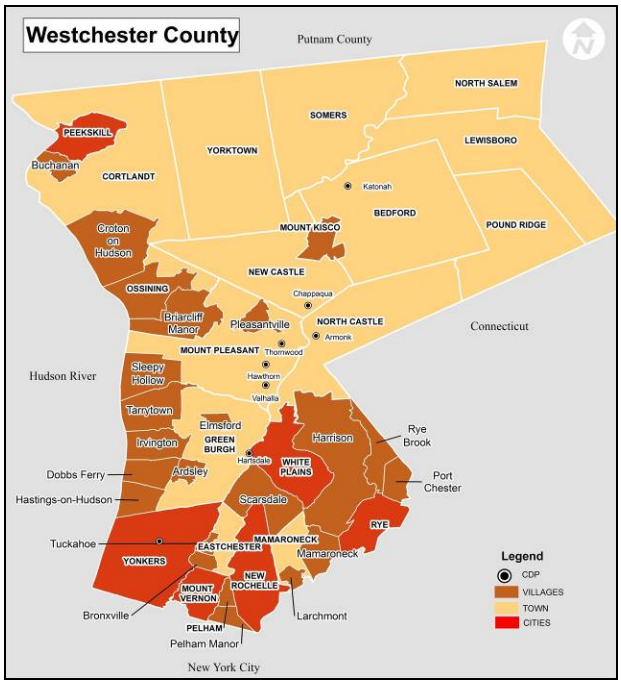


Figure 21

Created in 1683, Westchester County covers a land area 430.0± square miles; it is composed of six (6) cities, nineteen (19) towns and twenty-three (23) villages. Currently, it is the second-most populous county in the State of New York, following only Bronx County; its southern neighbor. As per the 2010 U.S. Census, the population was 949,113

individuals, with 2015 estimates projecting an increase of 2.9% up to 976,396 individuals. On the basis of 2015 U.S. Census population estimates, Westchester County has a population density of 876 persons per square mile. Furthermore, due the expansive road and mass transit systems found within the county borders, areas at the southern end of the county are as densely developed as sections of New York City.

According to the 2011-2015 U.S. Census estimates, the median income per household in Westchester County was $83,958. This was based upon 347,232 households and furthermore represents the 2nd highest median income in New York State. Approximately 25.0% of the population is under the age of 18, 7.2% range from age 18 to 24 years old, 30.4% from age 25 to 44, 23.5% from age 45 to 64 and 14.0% who were aged 65 years or older. The median age of the population was 40.0 years.

Major roadways located within Westchester County include the following highway routes:

Interstate 87 (NYS Thruway)	U.S. Route 9A
Interstate 95	U.S. Route 22
Interstate 287	Bronx River Parkway
Interstate 684	Cross County Parkway
U.S. Route 1	Hutchinson River Parkway
U.S. Route 6	Saw Mill River Parkway
U.S. Route 9	Sprain Brook Parkway
U.S. Route 202	Taconic State Parkway

Figure 22

The roadway system connecting Westchester County to other areas of New York State is inclusive of two (2) bridges, which the span the Hudson River. The first of these bridges, the Tappan Zee Bridge, is the southernmost bridge in the county. It is anchored on the western shore of the Hudson River at the Rockland County Village of South Nyack, connecting to the Village of Tarrytown in Westchester. The Tappan Zee Bridge is part of the New York State Thruway (I-87/I-287). The second bridge is located further north and is known as the Bear Mountain Bridge. It spans the Hudson River from the Town of Highlands

in Orange County at the west, to the Town of Cortlandt in Westchester County at the east. Bear Mountain Bridge is part of U.S. Route 6 and U.S. Route 202.

Westchester County is also well known for its mass transit system, connecting the county to the Greater New York City Metropolitan Area by rail. Originating at Grand Central Station in Midtown Manhattan, there are three (3) main rail lines operated by Metropolitan Transportation Authority with service to Westchester County; they include the Hudson Line (western), Harlem Line (central) and New Haven Lines (eastern).

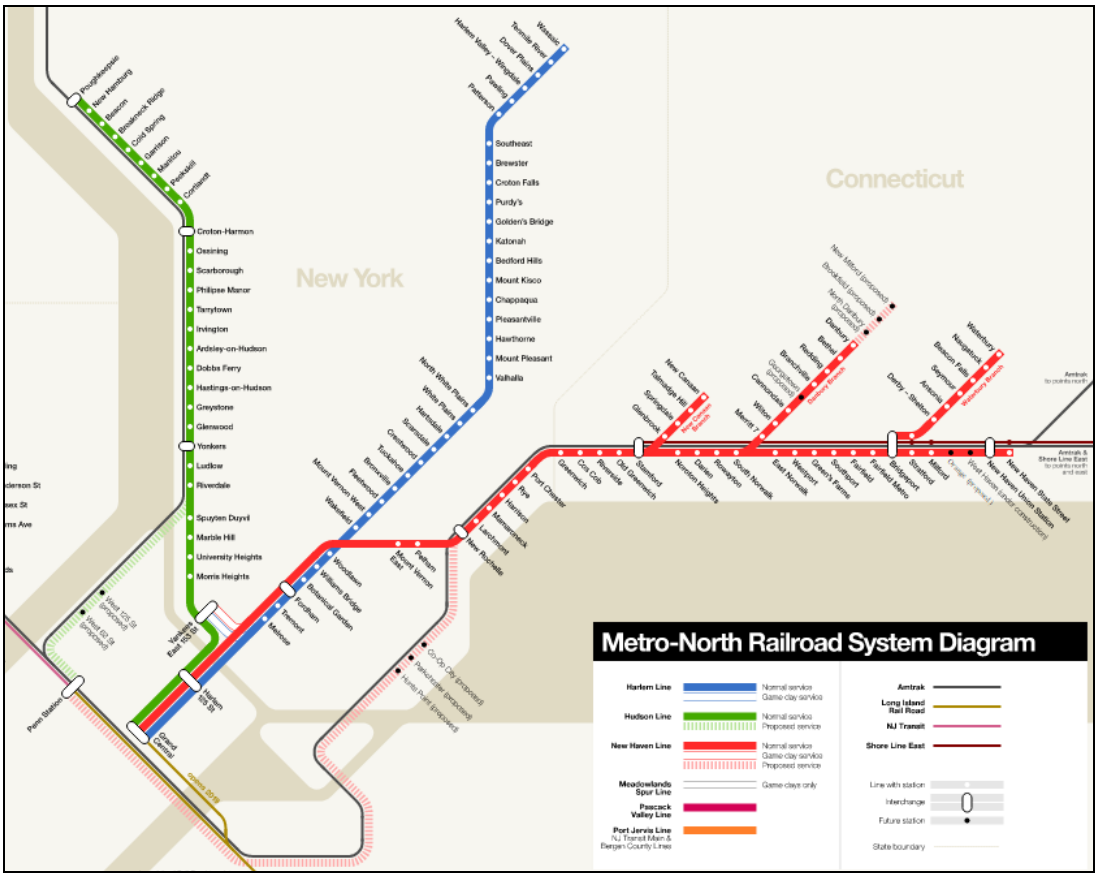


Figure 23

LOCAL AREA MAP – FIGURE 24

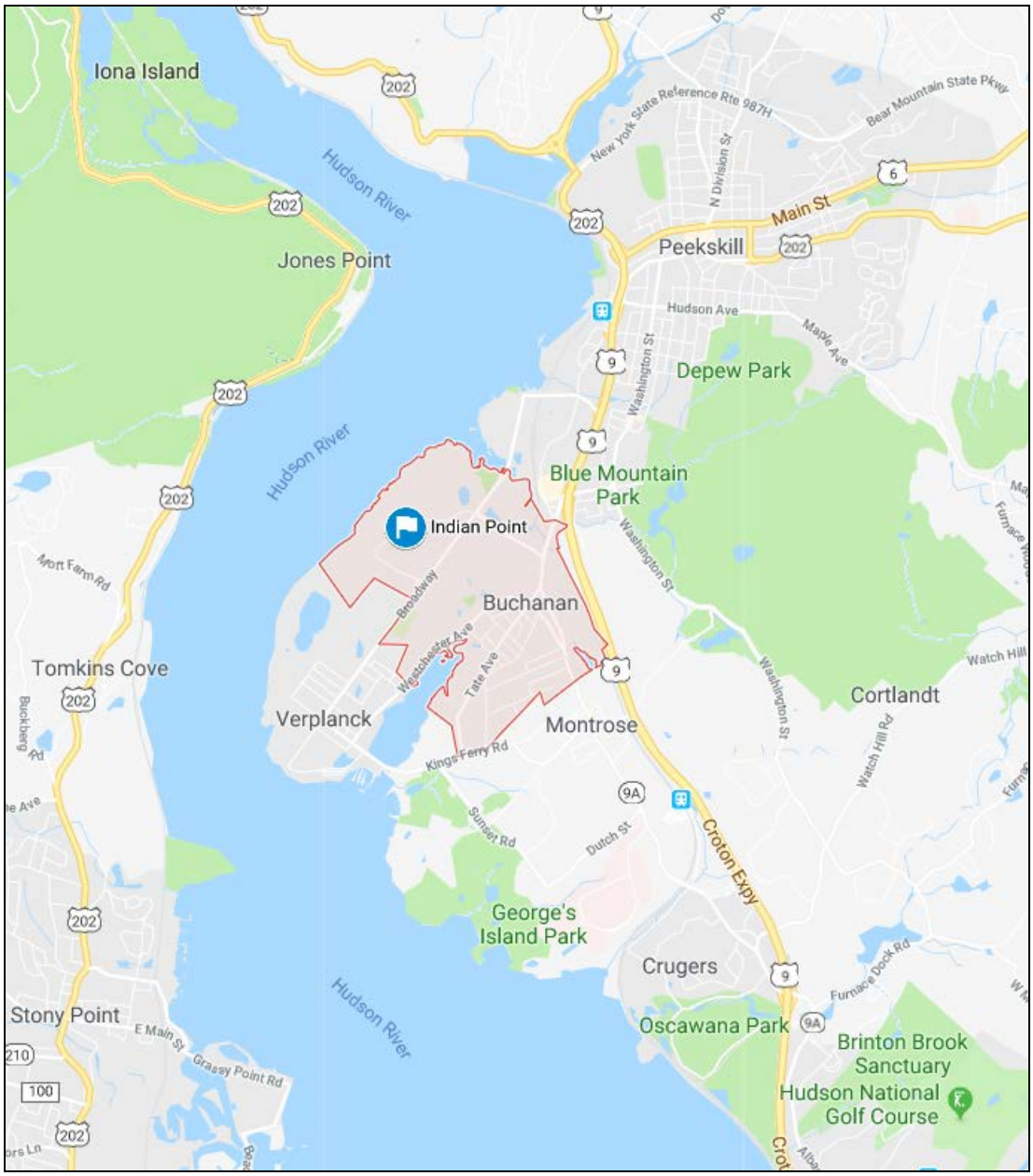


Figure 24

LOCAL AREA DESCRIPTION

Village of Buchanan

The subject property, "Parcel A," is part of the Indian Point Energy Center, which in turn is located in the Village of Buchanan, Town of Cortlandt, Westchester County, State of New York. Buchanan is bordered to the north by the City of Peekskill, to the south by the Hamlets of Verplanck of Montrose, and to the east by the Town of Cortlandt proper. Buchanan rests on the eastern shore of the Hudson River. The Village contains a total land area of 1.7± square miles, of which 1.4± square miles is representative of land, with the remainder representing area covered by water. Population estimates for the year 2016, as provided by the U.S. Census Bureau, indicate that the overall population has grown by 1.6% since the previous census (2010) to 2,265± individuals.

Town of Cortlandt

The Town of Cortlandt is the northwesternmost town in Westchester County. It contains two (2) incorporated villages; the Village of Buchanan and the Village of Croton-on-Hudson. The Town itself is bordered by Putnam County to the north, the Towns of Ossining and New Castle to the south and the Town of Yorktown to the east. To its west lies the City of Peekskill and the Hudson River. The Town contains a total land area of 50.02± square miles, of which 39.26± square miles is representative of land, with the remaining 10.76± square miles representing area covered by water.

According to the American Community Survey 5-Year Estimates, as provided by the U.S. Census Bureau, the Town of Cortlandt showed a modest population increase of 3.0%, to 42,821± individuals, up from 41,592± individuals accounted for at the 2010 U.S. Census. Based on its total land area, this equates to 1,091± individuals per square mile of land area. Like many of the northern towns of Westchester, the Town of Cortlandt features a low population density, though it is noted to be above average in relation to the other communities. Over 94.0% of the Town of Cortlandt land area is zoned for

residential usage, with many of those living within the municipality commuting south to the City of White Plains and New York City for work.

The Town of Cortlandt is served by U.S Route 9; a major north-south roadway found near the Hudson River, and also the Metro-North Railroad Hudson Line, with stops at the Cortlandt and Croton-on-Hudson Stations.

Indian Point Energy Center

The Indian Point Energy Center ("IPEC"), located in the Village of Buchanan, Town of Cortlandt, New York, is a three-unit nuclear power station situated on the east bank of the Hudson River. The site upon which "IPEC" is located was originally acquired by Consolidated Edison Company of New York, Inc. in 1954, with the first unit ("IP-1") having been issued its operating license in 1962. Construction of the remaining reactors, "IP-2" and "IP-3," were completed in 1974 and 1976, respectively.

At the start of January 2017, it was announced by Entergy Corporation ("Entergy") that an agreement had been reached with New York State officials to initiate an early shutdown of the Indian Point Energy Center. Under the current arrangement, this would see operations ceasing on the "IP-2" reactor by April of 2020, with "IP-3" soon to follow in 2021.

WESTCHESTER OFFICE MARKET OVERVIEW

MARKETBEAT

Westchester County

Office Q4 2017

CUSHMAN & WAKEFIELD

WESTCHESTER COUNTY OFFICE

Economic Indicators

	Q4 16	Q4 17	12-Month Forecast
Westchester Employment	457K	465K	▬
Westchester Unemployment	4.4%	4.6%	▬
U.S. Unemployment	4.7%	4.1%	▼

Market Indicators (Overall, All Classes)

	Q4 16	Q4 17	12-Month Forecast
Vacancy	21.2%	19.6%	▼
YTD Net Absorption (sf)	-263K	169K	▲
YTD Leasing (sf)	1.5M	1.3M	▬
Average Asking Rent*	$29.69	$29.06	▲

*Rental rates reflect gross asking $psf/year

Overall Net Absorption/Overall Asking Rent

4-QTR TRAILING AVERAGE

Overall Vacancy

Economy

Westchester County has yet to regain the amount of jobs lost since the 2007 recession, but managed to add more than 2,300 new jobs over the last 12 months. Surprisingly, the annual average unemployment rate increased marginally by 10 basis points (bps) to 4.4% since the end of 2016. The uptick in the unemployment rate was most likely the result of more people re-entering the labor pool.

Market Overview

Leasing velocity tapered in 2017, falling 10.7% year-over-year, to 1.3 million square feet (msf) in new transactions. White Plains CBD continued to be the predominant driver in county-wide demand, accounting for 31.9% of overall leasing activity. Demand in the Southern submarket more than doubled since 2016, recording 84,592 square feet (sf) of new lease transactions. Predominant leases, such as Montefiore Hospital expanding and renewing for 281,497 sf at Southern Westchester Executive Park in Yonkers, propelled the submarket's notable year-over-year increase in leasing velocity.

Despite the county lagging behind 2016's leasing benchmark, the overall vacancy rate fell by 160 bps to 19.6%. The primary driver of the vacancy decline can be attributed to substantial demand for urban markets. Such markets include downtown White Plains, where the overall vacancy rate fell by 500 bps in 2017 to 16.7%.

Westchester County's overall average asking rent depreciated by $0.63 per square foot (psf) since 2016 to $29.06, while White Plains CBD average asking rents registered a $0.78 psf increase to $33.29. More notably, Class A space in downtown White Plains appreciated by $1.97 psf to $35.66, due to accelerated interest within recent months.

Outlook

The overall inventory in Westchester County continues to evolve as the use for office space in more suburban markets becomes more varied, with health care facilities and multifamily residences among growing alternative uses. Demand is anticipated to remain relatively stable in 2018, with more urban, transit-oriented markets, barring most of the activity.

WESTCHESTER OFFICE MARKET OVERVIEW
(Continued)

MARKETBEAT
Westchester County
Office Q4 2017

CUSHMAN & WAKEFIELD

SUBMARKET	INVENTORY (SF)	SUBLET VACANT (SF)	DIRECT VACANT (SF)	OVERALL VACANCY RATE	CURRENT QTR OVERALL NET ABSORPTION (SF)	YTD OVERALL NET ABSORPTION (SF)	YTD LEASING ACTIVITY (SF)	UNDER CNSTR (SF)	OVERALL AVERAGE ASKING RENT (ALL CLASSES)*	OVERALL AVERAGE ASKING RENT (CLASS A)*
White Plains CBD	5,987,675	107,707	891,764	16.7%	4,569	138,590	428,187	0	$33.29	$35.66
White Plains Non-CBD	4,478,881	42,759	907,113	21.2%	16,983	120,066	220,075	0	$27.39	$27.38
Northern	3,243,927	19,034	1,398,076	43.7%	-109,469	-120,054	67,560	0	$26.49	$27.58
Central	6,178,139	65,923	879,925	15.3%	24,126	74,013	321,401	0	$26.84	$27.07
Eastern	6,392,196	79,565	1,002,823	16.9%	-49,580	-67,340	219,888	0	$30.98	$31.07
Southern	2,402,433	8,866	216,346	9.4%	2,000	24,088	84,592	0	$28.60	$29.62
WESTCHESTER TOTALS	**28,683,251**	**323,854**	**5,296,047**	**19.6%**	**-111,371**	**169,363**	**1,341,703**	**0**	**$29.06**	**$29.75**

*Rental rates reflect gross asking $psf/year

BUILDING CLASS	INVENTORY (SF)	SUBLET VACANT (SF)	DIRECT VACANT (SF)	OVERALL VACANCY RATE	CURRENT QTR OVERALL NET ABSORPTION (SF)	YTD OVERALL NET ABSORPTION (SF)	YTD LEASING ACTIVITY (SF)	UNDER CNSTR (SF)	OVERALL AVERAGE ASKING RENT*	OVERALL AVERAGE ASKING RENT (DIRECT)*
Class A	21,771,418	310,132	4,593,158	22.5%	18,508	328,507	1,115,323	0	$29.77	$29.75
Class B	6,911,833	13,722	702,889	10.4%	-129,879	-159,144	226,380	0	$25.04	$25.04

Key Lease Transactions Q4 2017

PROPERTY	SF	TENANT	TRANSACTION TYPE	SUBMARKET
Southern Westchester Executive Park, Yonkers	281,497	Montefiore Hospital	Renewal / Expansion	Southern
1 North Lexington Avenue, White Plains	100,107	Sumitomo Mitsui Banking Corporation	New Lease	White Plains CBD
44 South Broadway, White Plains	89,426	NY Life Insurance	New Lease	White Plains CBD
100 Summit Lake Drive, Valhalla	65,000	Ascensia Diabetes Care	New Lease	Central
4 Westchester Park Drive, White Plains	35,163	Brain and Spine Surgeons of New York	New Lease	White Plains Non-CBD
1 North Lexington Avenue, White Plains	33,738	Turbonomic	New Lease	White Plains CBD

Key Sales Transactions Q4 2017

PROPERTY	SF	SELLER / BUYER	PRICE / $PSF	SUBMARKET
520 White Plains Road, Tarrytown	172,528	SL Green Realty / Signature Acquisitions LLC	$21,000,000 / $121.72	Central
555 White Plains Road, Tarrytown	126,497	RNY Property Trust / Robert Martin Company, LLC	$5,475,000 / $43.28	Central
75 South Broadway, White Plains	91,028	KABR Real Estate Investment Partners / Zel Perlieshi	$13,700,000 / $150.50	White Plains CBD
80 Grasslands Road, Elmsford	86,000	RNY Property Trust / PAG Investments LLC	$5,677,505 / $66.00	Central

JLL

Westchester County

Q4 2017

Office Insight

Stronger market fundamentals spurs leasing activity in the White Plains CBD

- Average asking rents fell by $0.71 year-over-year due to prime space being taken off the market.
- The White Plains CBD recorded the largest volume of yearly net absorption at 335,600 square feet, which was a direct result of the high demand for transit-centric opportunities among corporate occupiers.
- Strengthening market fundamentals led to positive yearly net absorption levels in all but one submarket.

Vacancy rates continued to inch upward despite declining availabilities in most submarkets, largely due to large occupancy losses in northern Westchester. The overall vacancy rate reached nearly 25.0 percent, representing an increase of 190 basis points since 2016. New vacancy in large office campuses was the main driver of the rate increase. Still, the Westchester market experienced an increase in leasing activity in comparison to last year. The White Plains CBD submarket attracted the most activity, through significant deals such as New York Life Insurance's leasing of 176,000 square feet at 44 S Broadway, which marked the largest deal of the quarter, as well as Sumitomo Bank's 101,000-square-foot lease at 1 N Lexington Avenue. The I-287 West Corridor overall vacancy rate declined 40 basis points since three months ago, driven mainly by ENT & Allergy Associates' leasing of 38,000 square feet at 660 White Plains Road in Tarrytown.

The 364,000 square feet of total negative net absorption recorded in 2017 was an offset between the healthy Westchester CBD and I-287 East submarkets, and the spiraling downturn of the Westchester North submarket. Westchester North recorded more than 1.0 million square feet of negative net absorption, which weighed heavily on total yearly net absorption levels.

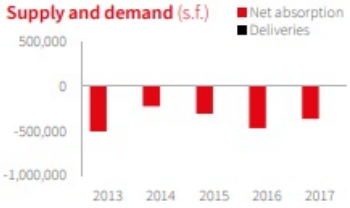
Outlook

The rise of multifamily developments will continue to spur the demolition and conversion of office buildings throughout Westchester County. A lack of large available blocks will keep concessions trending downward in 2018 as office availabilities decline. Demand from the healthcare sector will persist, and will continue to be the primary driver of office activity. While fundamentals are slowly improving, the uncertainty of future occupancy in pivotal office assets such as the PepsiCo and IBM buildings should keep vacancy levels at the mid-20 percentage rate levels.

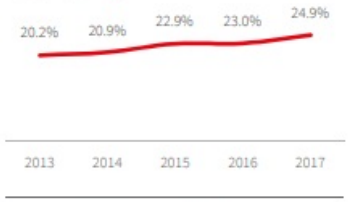
For more information, contact: Sarah Bouzarouata | Sarah.Bouzarouata@am.jll.com

Fundamentals	Forecast
YTD net absorption	-363,863 s.f. ▲
Under construction	0 s.f. ▶
Total vacancy	24.9% ▼
Average asking rent (gross)	$26.84 p.s.f. ▼
Concessions	Falling ▼

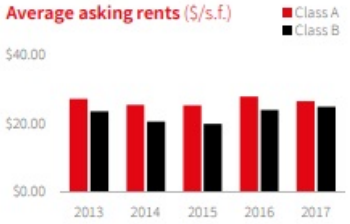
Supply and demand (s.f.)



Total vacancy



Average asking rents ($/s.f.)



WESTCHESTER OFFICE MARKET OVERVIEW
(Continued)

JLL

Westchester

Q4 2017

Office Statistics

	Class	Inventory (s.f.)	Total net absorption (s.f.)	YTD total net absorption (s.f.)	YTD total net absorption (% of stock)	Direct vacancy (%)	Total vacancy (%)	Average direct asking rent ($ p.s.f.)	YTD Completions (s.f.)	Under Development (s.f.)
White Plains CBD	Totals	6,368,620	-67,282	335,629	5.3%	20.2%	21.7%	$30.11	0	0
CBD	**Totals**	**6,368,620**	**-67,282**	**335,629**	**5.3%**	**20.2%**	**21.7%**	**$30.11**	**0**	**0**
I-287 East Corridor	Totals	6,634,518	-40,601	80,377	1.2%	14.1%	15.6%	$27.57	0	0
I-287 West Corridor	Totals	4,707,758	10,377	55,833	1.2%	20.5%	22.2%	$24.73	0	0
Westchester North	Totals	5,770,182	-130,396	-1,093,616	-19.0%	47.8%	49.5%	$24.92	0	0
Westchester South	Totals	3,564,670	62,257	118,526	3.3%	14.3%	15.2%	$26.83	0	0
White Plains East	Totals	4,682,957	-19,842	139,388	3.0%	20.0%	22.2%	$25.71	0	0
Suburban	**Totals**	**25,360,085**	**-118,205**	**-699,492**	**-2.8%**	**24.1%**	**25.7%**	**$25.60**	**0**	**0**
Westchester	**Totals**	**31,728,705**	**-185,487**	**-363,863**	**-1.1%**	**23.3%**	**24.9%**	**$26.46**	**0**	**0**
White Plains CBD	A	5,100,485	14,277	410,961	8.1%	19.6%	21.4%	$30.52	0	0
CBD	**A**	**5,100,485**	**14,277**	**410,961**	**8.1%**	**19.6%**	**21.4%**	**$30.52**	**0**	**0**
I-287 East Corridor	A	6,060,505	-45,333	80,467	1.3%	14.5%	16.2%	$27.53	0	0
I-287 West Corridor	A	3,084,973	64,807	26,707	0.9%	20.6%	23.0%	$25.16	0	0
Westchester North	A	4,060,337	-140,018	-1,155,569	-28.5%	63.1%	65.5%	$24.83	0	0
Westchester South	A	805,403	27,744	33,789	4.2%	16.6%	17.7%	$27.88	0	0
White Plains East	A	4,082,638	-10,892	73,409	1.8%	20.8%	23.3%	$25.73	0	0
Suburban	**A**	**18,093,856**	**-103,692**	**-941,197**	**-5.2%**	**28.0%**	**30.1%**	**$25.65**	**0**	**0**
Westchester	**A**	**23,194,341**	**-89,415**	**-530,236**	**-2.3%**	**26.1%**	**28.2%**	**$26.64**	**0**	**0**
White Plains CBD	B	1,268,135	-81,559	-75,332	-5.9%	22.7%	22.7%	$22.66	0	0
CBD	**B**	**1,268,135**	**-81,559**	**-75,332**	**-5.9%**	**22.7%**	**22.7%**	**$22.66**	**0**	**0**
I-287 East Corridor	B	574,013	4,732	-90	0.0%	9.9%	9.9%	$28.35	0	0
I-287 West Corridor	B	1,622,785	-54,430	29,126	1.8%	20.3%	20.8%	$24.07	0	0
Westchester North	B	1,709,845	9,622	61,953	3.6%	11.6%	11.6%	$28.76	0	0
Westchester South	B	2,759,267	34,513	84,737	3.1%	13.6%	14.5%	$25.47	0	0
White Plains East	B	600,319	-8,950	65,979	11.0%	14.7%	14.7%	$24.59	0	0
Suburban	**B**	**7,266,229**	**-14,513**	**241,705**	**3.3%**	**14.4%**	**14.9%**	**$25.19**	**0**	**0**
Westchester	**B**	**8,534,364**	**-96,072**	**166,373**	**1.9%**	**15.7%**	**16.0%**	**$24.96**	**0**	**0**

PROPERTY DESCRIPTION

Site Description

"Parcel A" consists of portions of three (3) contiguous, irregular-shaped land parcels which contain 45.24± acres (1,970,820± square feet) of gross land area, in aggregate. The parcels have been identified on the Westchester County Tax Maps as Section 43.10, Block 2, *part of* Lots 1 and 2; and the entirety of a parcel which has not been assigned a block and lot identification number, referenced throughout this report as the "Unnamed Parcel."

"Parcel A" is part of the Indian Point Energy Center ("IPEC"); a nuclear power station. "Parcel A" is more specifically located on the west side of Broadway; a central north-south thoroughfare, and east of the Hudson River and the Continental Gypsum Plant. In relation to IP-1, IP-2 and IP-3, "Parcel A" is found to their southeast.

The subject site is composed of portions of subject Lots 43.10-2-1 and 43.10-2-2, as well as the entirety of the subject "Unnamed Parcel." Subject Lots 43.10-2-1 and 43.10-2-2 are found within the borders of the Village of Buchanan. The subject "Unnamed Parcel" is technically not a part of the Village, but rather is found in the Hamlet of Verplanck, which falls under the jurisdiction of the Town of Cortlandt. However, as per a discussion with the Village Assessor, the "Unnamed Parcel" is assessed by the Village of Buchanan, but is otherwise subject to laws and ordinance specific to the Town of Cortlandt.

The three (3) contiguous subject parcels which compose "Parcel A" contain 45.24± acres (1,970,820± square feet) of gross land area. Site improvements include concrete sidewalks, asphalt paving and public utility connections (electric, gas, sanitary & telephone), as well as a driveway with two (2) curb cuts.

Additionally, it has been noted that "Parcel A" is encumbered by three (3) easements which run through its southeastern corner, most significantly affecting the "Unnamed Parcel." They are inclusive of one (1) roadway access easement, and two (2) separate utility easements. The existence of these easements has called into question the ability to develop this portion of "Parcel A."

FEMA FLOOD MAP

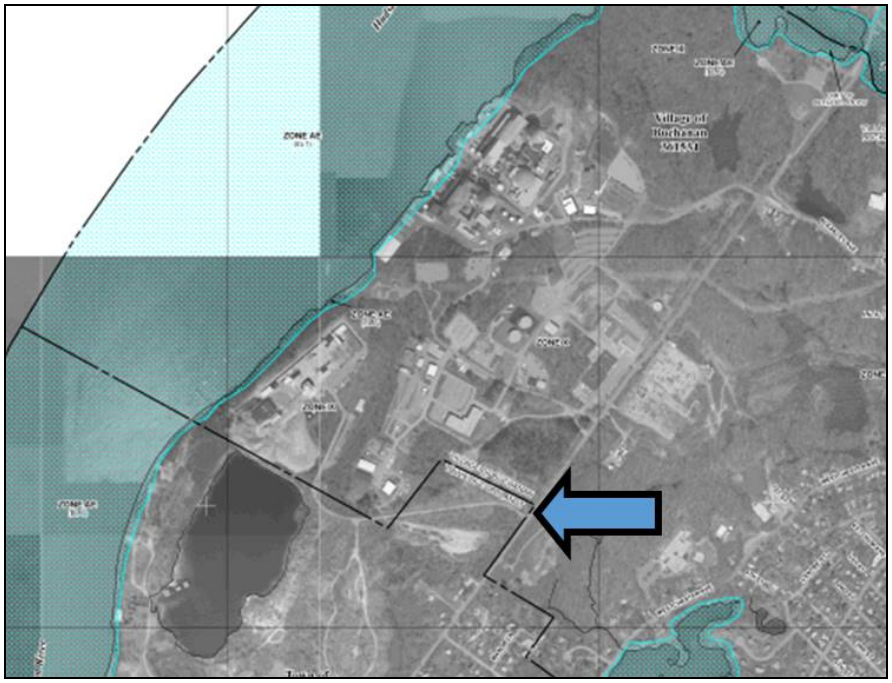


Figure 25

According to Flood Insurance Rate Map Community-Panel Number 36119C0014F, effective September 28, 2007, the subject property is located in a Zone X, an area determined to be outside of the 0.2% annual chance floodplain. While "Parcel A" is within sight of the Hudson River, it is at a minimal risk of flooding.

While the main campus, i.e., the area immediately surrounding the training facility, is cleared and generally level, the site topography is inundated with rolling hills, inclines and forestation at points found along the main entrance and southeast section of the "Parcel A."

The physical inspection, performed by the real estate appraisal firm Goodman-Mark and Associates, Inc., did not include an environmental audit, as real estate appraisers are not qualified to perform that service.

Description of the Improvements

The subject property improvements consist of a two-story office building, which is primarily used a training center for "IPEC." The improvements were constructed circa 1980 and contain an estimated 80,000± square feet of gross building area. They were observed to be in average overall condition at the time of inspection.

The office building is accessed via an 800.0± foot length of road, originating from an access point on the west side of Broadway. The office building site is improved with a parking lot containing approximately 260± individual parking spaces.

TAX MAP – FIGURE 26

Section 43.10, Block 2, Lot 1
Section 43.10, Block 2, Lot 2
"Unnamed Parcel"

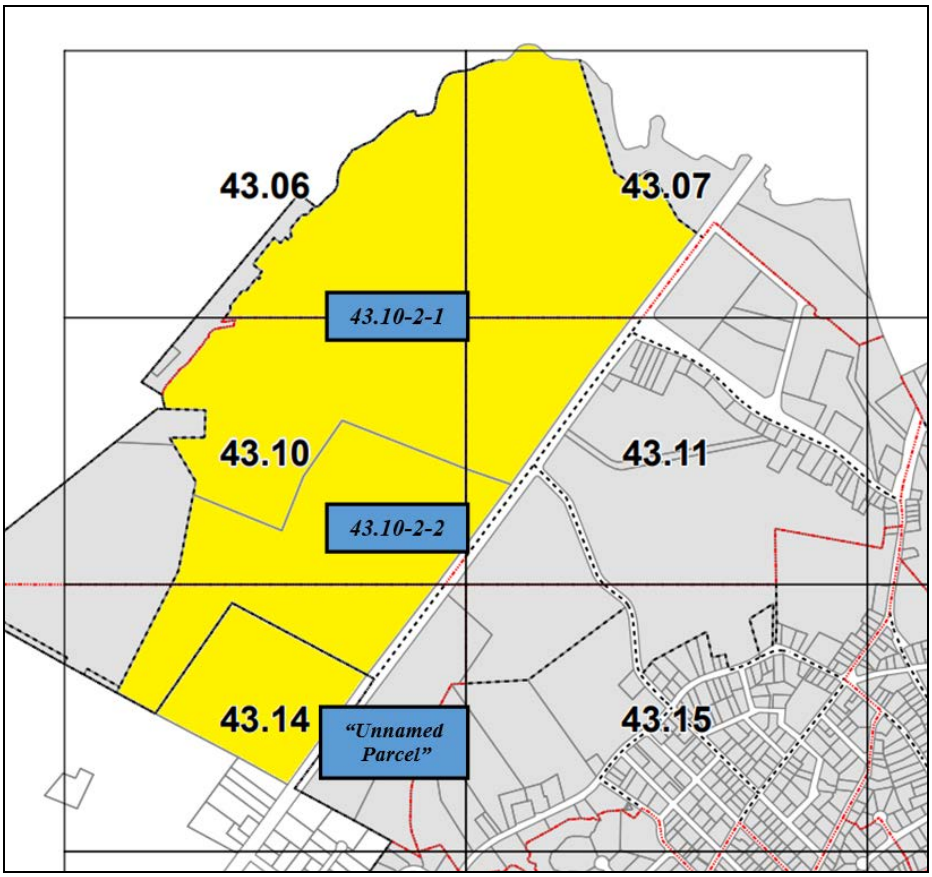


Figure 26

ASSESSMENT & REAL ESTATE TAX DATA

The subject property has been identified on the Westchester County Tax Maps as Section 43.10, Block 2, *part of* Lots 1 and 2; and the parcel referenced throughout this report as the "Unnamed Parcel."

According to the Town of Cortlandt Municipal Code, Chapter 275, Article VIII, Section 24: "Pursuant to Section 485 of the Real Property Tax Law of the State of New York, the Town of Cortlandt is authorized to exempt nuclear-powered electric generating facilities (Exemption Code: NPEGF) from taxation, special ad valorem levies and special assessments imposed by the Town to the extent provided under Sections 485 and 490 of the Real Property Tax Law." This exemption is reiterated under the Village of Buchanan Municipal Code, Chapter 181 Article III, Section 9.

In the case of both municipalities, the legislative intent of the exemption is based on the understanding that "exemption from taxation of nuclear-powered electric generating facilities located in the Town and Village, providing payments in lieu of tax (PILOT) agreements, and removal of the nuclear-powered electric generating facilities located in the Town and Village from the state equalization program is in the best interest of the Town and Village and will facilitate economic and fiscal stability for the Town and Village and its citizens." That said, "Parcel A" is officially exempt from taxation at the village, town and county levels, as well as by the Hendrick Hudson Central School District.

However, as per our research regarding the taxation of the subject property, "Parcel A" is enrolled in a PILOT program with both the Village of Buchanan and the Town of Cortlandt. According to Town of Cortlandt and Entergy documentation, PILOT payments for fiscal year 2017 totaled approximately $33,566,800.00.

Therefore, we have provided an estimate of real estate taxes for the subject property based on the most recent available tax data, herein. Assessment values were extracted from the Town of Cortlandt 2017 Tentative Assessment Roll. These values were calculated based upon the application of an equalization rate of 1.70 to fair market value.

There are two (2) important items to be noted in regard to our calculation of the current real estate taxes. First, as the "Unnamed Parcel" has not been assigned a block and lot number, it, it does not appear on the tax rolls; no assessment data is available for the "Unnamed Parcel" at this time. Second, a conversation with the Village of Buchanan Assessor's Office revealed that while the Town of Cortlandt provides a final assessment value to subject Section 43.10, Block 2, Lots 1 and 2, each year, the Village has discontinued this practice since the initiation of the PILOT program. However, we were informed that the Village has been in discussions to adopt the assessment values concluded by the town government in the near future. Therefore, we have relied of the Town of Cortlandt assessment values to calculate village taxes, utilizing the Village of Buchanan property tax rate.

The following table outlines our estimate of current real estate taxes for the tax lots which compose subject property "Parcel A" under their existing use as a Nuclear Power Plant Facility:

2017 Assessment & Real Estate Taxes
(Figure 27)

Section-Block-Lot		**43.10-2-1**	**43.10-2-2**	**"Unnamed Parcel"**
2017 Full Market Value		**$506,000,000.00**	**$414,000,000.00**	**$0.00**
2017 Total Assessed Value		**$ 8,602,000.00**	**$ 7,038,000.00**	**$0.00**
General RETX	**$1 per $1,000**			
Westchester County				
2017 County Tax Rate	192.720000	$ 1,657,777.44	$1,356,363.36	$0.00
Total County RETX		**$ 1,657,777.44**	**$1,356,363.36**	**$0.00**
Town of Cortlandt				
2017 Library Tax Rate	7.040000	$ 60,558.08	$ 49,547.52	$0.00
2017 Town Tax Rate	31.370001	$ 269,844.75	$ 220,782.07	$0.00
Total Town RETX		**$ 330,402.83**	**$ 270,329.59**	**$0.00**
Village of Buchanan				
2017 Village Tax Rate	269.820000	$ 2,320,991.64	$ 1,898,993.16	N/A
Total Village RETX		**$ 2,320,991.64**	**$ 1,898,993.16**	**N/A**
Total General Tax		**$ 4,309,171.91**	**$ 3,525,686.11**	**$0.00**
School RETX	**$1 per $1,000**			
Hendrick Hudson CSD				
2017 Library Tax Rate	22.154262	$ 190,570.96	$ 155,921.70	$0.00
2017 School Tax Rate	1017.627031	$ 8,753,627.72	$ 7,162,059.04	$0.00
Total School RETX		**$ 8,944,198.68**	**$ 7,317,980.74**	**$0.00**
Total 2017 RETX Liability		**$ 13,253,370.59**	**$ 10,843,666.85**	**$0.00**

As the decommissioning of "IPEC" will lead to a repurposing and redevelopment of the subject property, we have also included a survey of comparable real estate taxes for office properties in the Westchester County market. It is the intention of this survey to offer some form of comparison for the taxes forgone as a result of a repurposing of the "IPEC" property.

Due to a limited number of comparable office properties in the Town of Cortlandt, we have researched the current real estate taxes of the comparable building sales utilized within this appraisal. The following table outlines the real estate taxes for comparable offices properties in Westchester County:

Comparable Real Estate Tax Data – Improvements & Supporting Land Area
(Figure 28)

No.	Location	Gross Building Area (Sq. Ft.)	2017 RETX Liability	RETX per Sq. Ft.
1	1200 Brown Street, Peekskill, NY	23,000	$ 47,079.99	$2.05
2	2651 Strang Boulevard, Yorktown Heights, NY	211,000	$643,301.52	$3.05
3	90 South Ridge Street, Rye Brook, NY	65,520	$374,180.84	$5.71
4	555 Theodore Fremd Avenue, Rye, NY	180,000	$683,388.95	$3.80
5	600 Albany Post Road, Briarcliff Manor	38,000	$145,490.68	$3.83
			Min.	**$2.05**
			Max.	**$5.71**
			Mean	**$3.69**
			Say	**$4.00**

The comparable real estate tax liabilities range from $2.05 to $5.71 per square foot of gross building area, with a mean of $3.69 per square foot of gross building area. By rounding the mean upward, we have selected a real estate tax liability of $4.00 per square foot for the improvements and supporting land area in our projection of the real estate tax liability for the subject property.

This resulted in the following projected real estate tax liability for "Parcel A":

Projection of Real Estate Taxes – Improvements & Supporting Land Area
(Figure 29)

Gross Building Area (Sq. Ft.)		80,000
Projected RETX Rate per Sq. Ft.	x	$ 4.00
Projected RETX Liability		**$320,000.00**

We have also researched current real estate taxes for vacant land parcels within the immediate area of the subject property in order to project a real estate tax liability for the subject's excess land area, which is detailed as follows:

Comparable Real Estate Tax Data – Excess Land Area
(Figure 30)

No.	Location	S-B-L	Gross Land Area (Sq. Ft.)	2017 RETX Liability	RETX per Sq. Ft.
1	Broadway, Buchanan, NY	43.14-2-1.1	798,019	$618,654.46	$0.78
2	301 6th Street, Verplanck, NY	43.17-1-38	226,925	$29,002.30	$0.13
3	270 6th Street, Verplanck, NY	43.17-1-36	274,428	$31,507.95	$0.11
4	501 Broadway, Buchanan, NY	43.11-1-1	319,730	$14,791.02	$0.05
				Min.	**$0.05**
				Max.	**$0.78**
				Mean	**$0.27**
				Say	**$0.25**

The comparable real estate tax liabilities range from $0.05 to $0.78 per square foot of land area, with a mean of $0.27 per square foot of land area. By rounding the mean downward, we have selected a real estate tax liability of $0.25 per square foot for the excess land area in our projection of the real estate tax liability for the subject property.

This resulted in the following projected real estate tax liability for "Parcel A":

Projection of Real Estate Taxes – Excess Land Area
(Figure 31)

Excess Area (Sq. Ft.)		1,650,820
Projected RETX Rate per Sq. Ft.	x	$ 0.25
Projected RETX Liability		**$412,705.00**

Based upon the findings uncovered from our survey of the comparable real estate tax rates, we have concluded the following projection of real estate taxes for "Parcel A":

Total Projection of Real Estate Taxes
(Figure 32)

Projected RETX Liability (Improvements)		$320,000.00
Projected RETX Liability (Excess Land)	+	$412,705.00
Total Projected RETX Liability		**$732,705.00**

ZONING MAP – VILLAGE OF BUCHANNAN

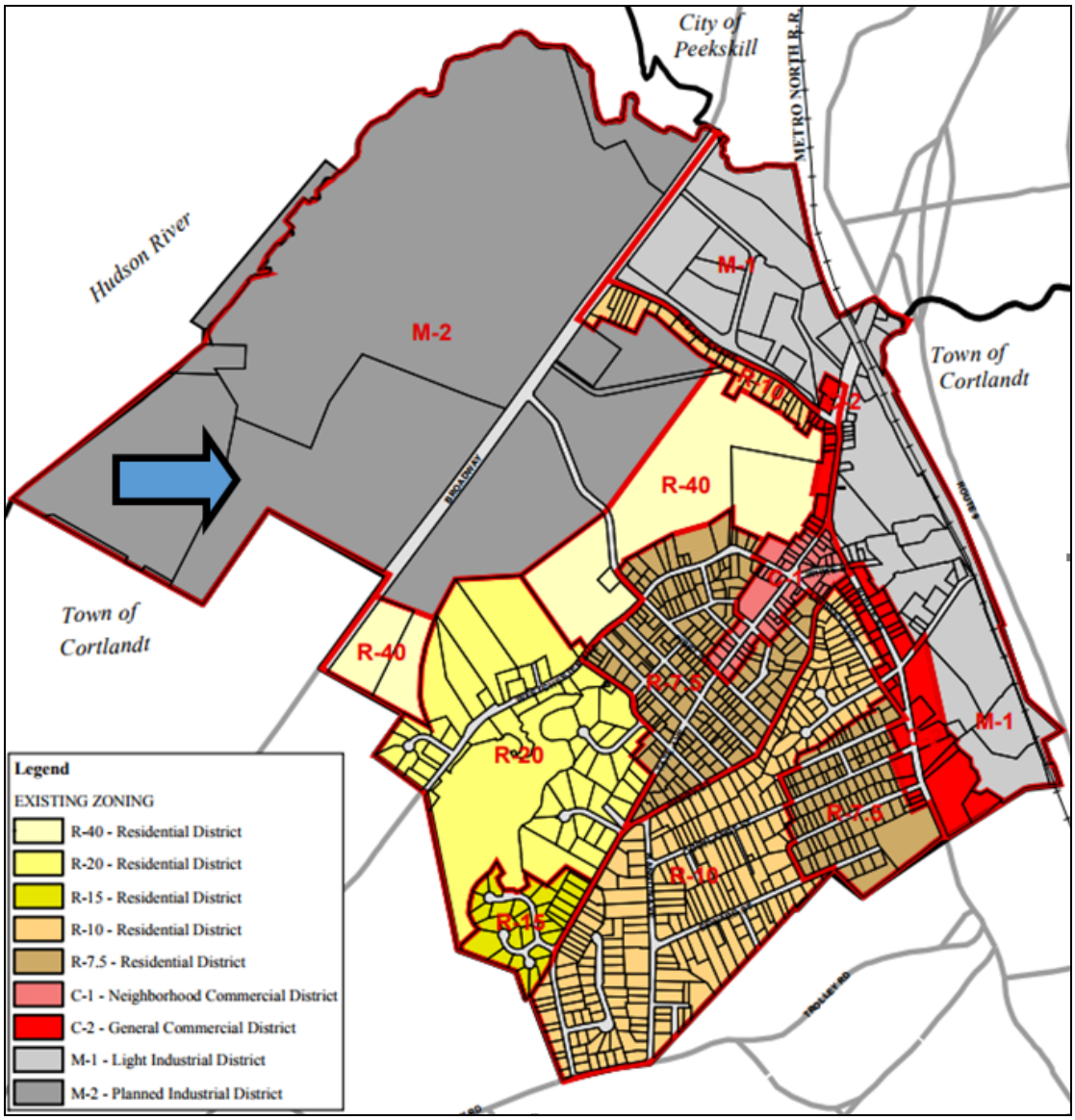


Figure 33

ZONING EXCERPT – VILLAGE OF BUCHANNAN

As per the Village of Buchanan Zoning Board, part of the subject property is located within what has been denoted on the municipal zoning map as an M-2 Planned Industrial District. The majority of the as-of-right uses within an M-2 zone are identical to the immediately given uses of the related M-1 Light Industrial district; this includes the entirety of those uses allowed by special permit as well. The largest distinction between M-2 and M-1 zoning lies in the allowance of heavy industrial uses; most specifically, the immediately permissible use of nuclear power facilities.

A more detailed illustration of the principally-permitted and special permit uses allowed within the M-2 District are shown on the following table:

Permissible Uses – M-2 Zoning District
(Figure 34)

Principally-Permitted Uses:	A. Gasoline stations; Auto repair shops; Fast lubrication gas stations; Gas stations with retail convenience stores. B. Gypsum board manufacturing. C. Peaceful use of atomic energy.
Special Permit Uses:	A. Sheet metal shops; lumberyards; masonry supply; commercial warehouses; self-storage; fabricated metal products; welding; plumbing and heating; air-conditioning supply; dewatering facility. B. Senior multi-family developments on parcels of land not less than seven (7) acres, provided that the parcel of land to be developed adjoins a residentially-zoned district with a maximum density of six (6) dwelling units per acre, and no more than forty-two (42) dwelling units on any parcel of land less than eight (8) acres in size.

The bulk regulations for the M-2 zoning district are shown on the following table:

Dimensional & Bulk Regulations – M-2 Zoning District
(Figure 35)

Dimensional Regulations	
Minimum Lot Area	80,000 square feet
Minimum Lot Width	250.0 feet
Minimum Lot Depth	250.0 feet
Minimum Yard	
Front	75.0 feet
Side	50.0 feet
Rear	100.0 feet
Rear (if abutting a residential district)	125.0 feet
Bulk Regulations	
Maximum Lot Coverage	40.0%
Maximum Building Height	
Stories	2.5 stories
Feet	35.0 feet

As per a discussion with the Village Assessor, the Village of Buchannan and the Town of Cortlandt are interested in determining a reuse for the land area. As previously addressed, while the majority of uses specific to the M-2 zone are industrial in nature, residential, multi-family housing for seniors is an admissible use (by way of special permit). However, it is assumed that with the closure of "IPEC," the Village of Buchanan Zoning Code shall likely be amended to disallow uses associated with harnessing atomic energy as a source of power generation. Furthermore, it has been confirmed with the Village Assessor that the Village is flexible on all options concerning a rezoning of the district.

ZONING MAP – TOWN OF CORTLANDT

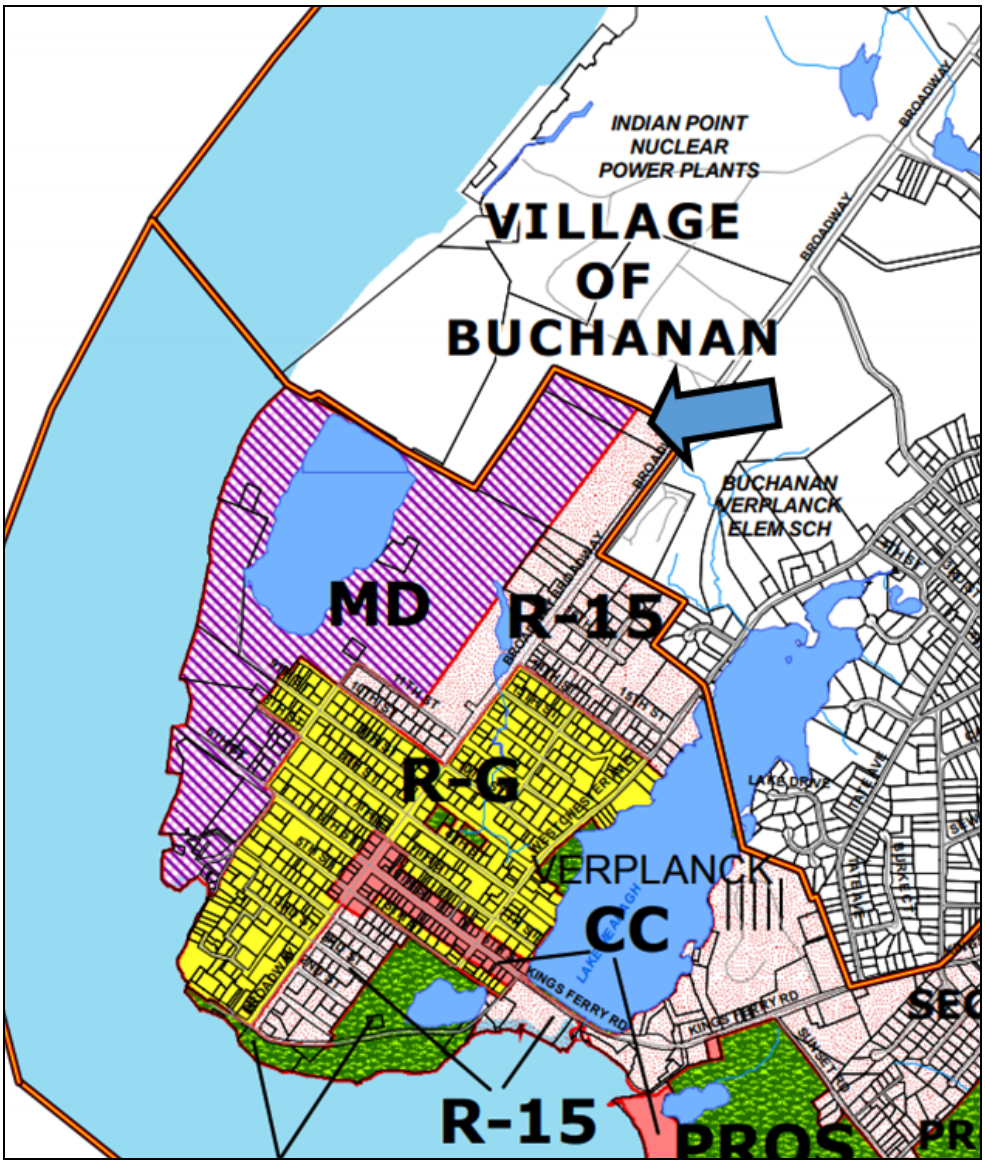


Figure 36

Legend

MD-DESIGNED INDUSTRIAL

R-15-SINGLE FAMILY RESIDENTIAL

ZONING EXCERPT – TOWN OF CORTLANDT

As per the Town of Cortlandt Zoning Board, part of the subject property is located within what has been denoted on the municipal zoning map as an MD Designed Industrial District. While a wide variety of uses are permitted, the majority of the immediately permissible uses within an MD zone center on heavy manufacturing uses. This is inclusive of, but not limited to, the production of textiles, lumber and wood products, furniture production, paper mills, printing and publishing, stone cutting and rock quarries, electronic component production and assembly, and boat building and repair.

A more detailed illustration of the principally-permitted and special permit uses allowed within the MD District are shown on the following table:

Permissible Uses – MD Zoning District
(Figure 37)

Principally-Permitted Uses:	Public park and open space; Agricultural and animal services; Churches or places of worship; Public or private schools; Country clubs; Physical fitness facilities; Museum, art galleries and theatres; Retail (automotive sales, home and garden supplies); Gasoline service station; Dry cleaners and laundromats; Automotive repair services; Health care offices; Professional service offices; Trucking terminals; Storage and warehousing; Taxicab operations; Heavy manufacturing.
Special Permit Uses:	University, college or seminary; Public golf course; Amusement center; Marina; Automotive body shop; Hospital or nursing home; Office or residential use (of historic structures); Contractor yards; Special trade contractors; Public utility facilities.

The bulk regulations for the MD zoning district are shown on the following table:

Dimensional & Bulk Regulations – MD Zoning District

(Figure 38)

Dimensional Regulations	
Minimum Lot Area	5.0 acres
Minimum Lot Width	300.0 feet
Minimum Lot Depth	N/A
Minimum Yard	
Front	75.0 feet
Side	75.0 feet
Rear	75.0 feet
Bulk Regulations	
Maximum Lot Coverage	25.0%
Maximum Building Height	
Stories	3.0 stories
Feet	40.0 feet

As per the Town of Cortlandt Zoning Board, part of the subject property is located within what has been denoted on the municipal zoning map as an R-15 Residential District. The district primarily calls for the production of single-family residences built on lots containing a minimum lot area of 15,000 square feet. While additional uses are immediately permissible, and even more so are allowed via special permit, these uses tend to be low impact and are fairly limited in the greater scope of allowable uses across all zoning types.

A more detailed illustration of the principally-permitted and special permit uses allowed within the R-15 District are shown on the following table:

Permissible Uses – R-15 Zoning District

(Figure 39)

Principally-Permitted Uses:	Single-family dwelling; Public park and open space; Agricultural services; Churches or places of worship; Public or private schools.
Special Permit Uses:	Two-family dwelling; University, college or seminary; Public golf course; Country clubs; Museums and art galleries; Marina; Funeral homes; Hospital or nursing home; Health care offices; Professional service offices; Office or residential use (of historic structures); Public utility facilities.

The bulk regulations for the R-15 zoning district are shown on the following table:

Dimensional & Bulk Regulations – R-15 Zoning District
(Figure 40)

Dimensional Regulations	
Minimum Lot Area	15,000 square feet
Minimum Lot Width	80.0 feet
Minimum Lot Depth	N/A
Minimum Yard	
Front	35.0 feet
Side	50.0 feet
Width greater than 70.0 feet	20.0% of width to a max. of 10.0 feet
Width less than 70.0 feet	15.0% of width to a min. of 5.0 feet
Rear	25.0 feet
Bulk Regulations	
Maximum Lot Coverage	65.0%
Maximum Building Height	
Stories	2.5 stories
Feet	35.0 feet

We recognize that issues involving zoning compliance are complex and require the special skills, knowledge and training of professionals familiar with the appropriate regulations. Therefore, the determination and degree of zoning non-compliance can be determined only by an architect or engineer.

HIGHEST AND BEST USE

Highest and Best Use [9]

"The reasonably probable and legal use of vacant land or an improved property, that is physically possible, appropriately supported, financially feasible, and that results in the highest value. The four criteria the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum productivity. Alternatively, the probable use of land or improved property, specific with respect to the user and timing of the use, that is adequately supported and results in the highest present value."

In order to determine the highest and best use of the site, the physically possible, legally permitted, economically feasible and maximally productive uses of the subject property was considered both as vacant and as improved.

Highest and Best Use of Land or a Site as Though Vacant [10]

"Among all reasonable, alternative uses, the use that yields the highest present land value, after payments are made for labor, capital and coordination. The use of a property based on the assumption that the parcel of land is vacant or can be made vacant by demolishing any improvements."

The physically possible uses are determined by the size and configuration of the subject site. The subject property "Parcel A" is part of the Indian Point Energy Center ("IPEC"), and is more specifically located on the west side of Broadway where it holds approximately 1,755.14± linear feet of direct street frontage. "Parcel A" is composed of portions of three (3) contiguous, irregular tax parcels, which in aggregate of one another contain 45.24± acres, or 1,970,820± square feet of gross land area. The topography is generally level with some rolling hills. "Parcel A" is host to a variety of easements which cut across the property, most affecting the southeastern corner in particular.

The legally permitted uses are determined by the zoning of the subject property. As previously noted in the *Zoning Excerpt*, "Parcel A" is divided amongst several zoning

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[9] *The Dictionary of Real Estate Appraisal – Fifth Edition*, Appraisal Institute, Chicago, IL, 2010, p. 93.
[10] *Ibid*., p. 93.

districts, across two (2) municipalities. Two (2) of the three (3) parcels which compose "Parcel A" are located within the borders of the Village of Buchanan; they are zoned as part of an M-2 – Planned Industrial District. The remaining parcel is located within the Town of Cortlandt; it is split-zoned between an MD – Designed Industrial District and an R-15 – Single-Family Residential District. This zoning district split appears to be approximately equal (i.e., 50:50). Both the M-2 and MD industrial zoning ordinances allow for similar uses. The R-15 zoning however, calls for single-family residences built on 15,000 square-foot plots. While the physical characteristics of "Parcel A" and surrounding uses indicate the site can support industrial uses, the area zoned for residential is heavily affected by the presence of existing rights-of-way and utility easements, which could restrict the extent of future development.

The next step is to determine the uses that are economically feasible. The most economically feasible use is the use that provides the greatest return to the land and is the most reasonably probable use in the subject market. In light of the principle of conformity, it has been noted that "Parcel A" is located in an area dominated by industrial uses as part of the still active Indian Point Energy Center. Residential use may not be economically feasible as the development would be unduly impacted by surrounding heavy industrial uses, improvements, utility easements, traffic and security concerns at the neighboring power station.

The final step is to determine from the financially feasible use, the use that is maximally productive. Our drive-through analysis of the area suggests a stable local real estate market. We have concluded that "Parcel A" is a large parcel of land with zoning which allows for heavy industrial uses. Given the economically viable surrounding uses, a developer may also note that access to internal transportation linkages and utilities provided via the various rights-of-way and utility easements offer readily available supporting infrastructure. Therefore, we have concluded that the highest and best use of "Parcel A" would be for the

construction of a heavy manufacturing facility built to its maximal allowable density under current zoning regulations.

Highest and Best Use of Property as Improved [11]

"The use that should be made of a property as it exists. An existing improvement should be renovated or retained as is so long as it continues to contribute to the total market value of the property, or until the return from a new improvement would more than offset the cost of demolishing the existing building and constructing a new one."

The subject improvements are inclusive of an 80,000± square foot office property, currently utilized in support as a training facility in support of "IPEC." The improvements were noted to be in average condition upon inspection and as such, demolition is not warranted. Therefore, the highest and best use of "Parcel A," as improved, is for interim use as a training facility in support of "IPEC," but may be repurposed for office use pending a decommissioning of "IPEC" or any potential rezoning initiatives.

[11] *The Dictionary of Real Estate Appraisal – Fifth Edition*, Appraisal Institute, Chicago, IL, 2010, p. 94.

SALES COMPARISON APPROACH

SALES COMPARISON APPROACH METHODOLOGY

The *Sales Comparison Approach* involved the comparison of the subject property to similar properties that have sold in the same or in a similar market. The following steps were used to estimate the fee simple estate of the subject property via the *Sales Comparison Approach*:

1) Research was conducted of pertinent sales, listings, and/or offerings data available for similar properties were researched.

2) Public sources were used to confirm and qualify the sale prices as to the terms, motivating forces and bona fide nature of each transaction.

3) All dissimilarities were considered and their probable effect on the price of each comparable property to derive individual market value indication for the subject.

4) The resultant value is the opinion of market value of the subject's fee simple estate under the *Sales Comparison Approach*.

ANALYSIS OF COMPARABLE OFFICE BUILDING SALES

The subject property, identified as "Parcel A," is considered to be part of the Indian Point Energy Center, and is specifically located on the west side of Broadway, at the shared border of the Village of Buchanan and the Town of Cortlandt, within Westchester County, State of New York. "Parcel A" is composed of three (3) irregular-shaped land parcels. According to measurements provided by our client, the site contains a gross land area of approximately 45.24± acres, or 1,970,820± square feet. Currently, "Parcel A" is improved with a two-story, office building which contains an estimated 80,000± square feet of gross building area. We have surveyed the upper Westchester County office market for sales of office buildings with property characteristics found to be similar to those of the subject improvements.

The following table summarizes comparable office buildings sales used within our analysis throughout the *Sales Comparison Approach*:

Summary of Comparable Office Building Sales
(Figure 41)

No.	Location	S-B-L	Sale Date	Land Area (Sq. Ft.)	Gross Building Area (Sq. Ft.)	Land-to-Bldg. Ratio	Sale Price	Sale Price per Sq. Ft.
1	1200 Brown Street Peekskill, Westchester County, NY	33.3-4-15	*Offering*	13,710	23,000	0.60	$ 4,800,000.00	$208.70
2	90 South Ridge Street Rye Brook, Westchester County, NY	141.27-1-9	4/28/2016	145,044	65,520	2.21	$11,100,000.00	$169.41
3	140 Huguenot Street New Rochelle, Westchester County, NY	1-242-1	3/22/2016	32,360	63,675	0.51	$ 6,400,000.00	$100.51
4	210 North Central Avenue Hartsdale, Westchester County, NY	8.210-158-24	3/1/2016	168,965	48,000	3.52	$ 5,800,000.00	$120.83
5	600 Albany Post Road Briarcliff Manor, Westchester County, NY	104.11-1-40	12/19/2013	409,072	38,000	10.77	$ 3,500,000.00	$ 92.11

Our research of the surrounding office market offered an important insight into the one of the regional property characteristics of office properties in Westchester County. Land-to-building ratios for office properties in the Westchester County market tend to be smaller

(i.e., less than 1:00) in the southern reaches of the county found south of Interstate 287, where the municipalities are more densely populated and developed.

As one moves northerly from the interstate dividing line, individual villages and towns become more rural in nature. Though local zoning laws may vary, requirements which call for development on larger lots are common throughout this section of the county. Frequently, this prerequisite comes with the attached caveat that such development minimally impacts the surrounding natural aesthetic of the area. That said, upper Westchester County office building stock trends toward low- to mid-rise properties, with sprawling, campus-style layouts. Land-to-building ratios can range from double the land versus improvements, to many multiples greater.

The following table provides a summary of land-to-building ratios for office complexes in upper Westchester County:

Land-to-Building Ratio Comparison
(Figure 42)

No.	Location	Land Area (Acres)	Land Area (Sq. Ft.)	Gross Building Area (Sq. Ft.)	Land-to-Building Ratio
SUB	**"Parcel A," Buchanan, NY**	**45.24**	**1,970,820**	**80,000**	**24.64**
1	1 Rockwood Road, Mount Pleasant, NY	76.07	3,313,609	383,000	8.65
2	90-110 South Bedford Road, Mount Kisco, NY	12.64	550,598	119,254	4.62
3	113 King Street, Armonk, NY	14.28	622,037	287,000	2.17
4	2651 Strang Boulevard, Yorktown Heights, NY	17.95	781,902	211,000	3.71
5	555 Theodore Fremd Avenue, Rye, NY	13.24	576,734	180,000	3.20
				min	**2.17**
				max	**8.65**
				mean	**4.47**

As detailed in the table above, the subject property was determined to feature a land-to-building ratio of approximately 24.64:1.00. As per our research, this ratio is extraordinarily atypical for office buildings which are similar in size to the subject. Therefore, it is indicated that the subject property features a large amount of superfluous land, which is not required to support the existing improvements.

As determined by our survey of land-to-building ratios for office properties in upper Westchester County, we have relied upon the resultant mean value indicator and have

considered a land-to-building ratio of 4.00:1.00 for the subject property to be reasonable, herein. From this baseline, we have concluded that 7.35± acres (320,000± square feet) of land area would provide the requisite site volume needed to support the 80,000± square feet of existing improvements, and have attributed this assumption to our concluded value.

Furthermore, given the layout, location of improvements, topography and easements for access and utility lines of the subject property, it is unclear if the subject could be subdivided for independent development. As such, we have considered the remainder not utilized to support the improvements to be excess land, which contains 37.89± acres, or 1,650,820± square feet of gross land area.

Calculation of Excess Land Area
(Figure 43)

	Gross Land Area (Acres)	Gross Land Area (Sq. Ft.)
Subject Gross Land Area	45.24	1,970,820
Less: Supporting Land Area @ 4.00:1.00	7.35	320,000
Excess Land Area	37.89	1,650,820

Comparable Office Building Sales Adjustment Analysis

The comparable office building sales transferred ownership between April 2016 and December 2013, and include one current offering. Building measurements range from 23,000± square feet to 65,250± square feet. The unadjusted sale prices featured a low of $92.11 per square foot to a high of $208.70 per square foot, with a mean and median indicator of $138.31 and $120.83 per square foot of gross building area, respectively.

To derive a value for the subject property, we have considered different factors that affect the sale price of each property as compared to the subject. In our analysis, price adjustments were made for notable differences and through this process, the presented price range was narrowed to better reflect the value of the subject property. Upward adjustments suggest that the comparable is inferior to the subject, while downward adjustments indicate the comparable to be superior.

We considered the terms of the sale and financing. All of the comparable sales were sold under similar conditions and did not require adjustments for these factor.

Market Conditions (Time)

We have considered an adjustment for market conditions (time), whereby older sales have been adjusted to consider current trends. The comparable sales occurred between April 2016 and December 2013, and include one current offering.

Sale #1 is a current market offering, and as such, it was adjusted downward to reflect the typical negotiations process.

Market conditions in the Lower Hudson Valley have remained consistent over the course of the past several years. In light of this, only Sale #5 was considered to have occurred under inferior market conditions; Sale #5 was adjusted upward. The remaining comparable sales did not require an adjustment for this category.

Location

The subject property "Parcel A," is considered to be part of the Indian Point Energy Center, and is specifically located on the west side of Broadway, at the shared border of the Village of Buchanan and the Town of Cortlandt, within Westchester County, State of New York.

The Village of Buchanan, and by default the subject property, is located in the northwesternmost corner of Westchester County. In comparison, the northern reaches of the county are far more rural in nature, are less densely populated and experience lower levels of automotive traffic than its southern counterpart. The Village of Buchanan is well served by local transportation routes, such as U.S. Route 9, however it is far removed from any major interstate highway.

This lack of transportation linkages is considered detrimental, in that potential owner-users would factor in the ability of commuters to access the property on a daily basis. Although found in northern Westchester as well, Sale #1 has been considered to be superior to the subject, being that it is found within the City of Peekskill; an urban market unto itself, which is more readily served by local transport routes and is a centralized destination. Sales

#2, #3 and #4 were also considered to be superior to the subject, as they are located in southern Westchester, in more robust office markets. The final comparable sale, Sale #5 is found in Upper Westchester County, in a market which has been found to be similar to the subject. Sale #5 was not adjusted for this category.

Size

Typically, smaller buildings sell for more on a per square-foot basis than their larger counterparts. This assumes a quantity discount and the diminishing number of market participants able to purchase a large property. The subject property office building contains an estimated 80,000± square feet of gross building area.

The comparable sales range in size from 23,000± square feet to 65,250± square feet of gross building area. As such, this data set features comparable sales which are all smaller than the subject property improvements. Each sale was adjusted downward by the degree to which it differed from the subject property.

Property Characteristics

The next adjustment considered was for property characteristics, which considers the age/condition of the properties. The subject property office building was constructed circa 1980 and was considered to be in average overall condition.

All of the comparable sales were considered to be of a similar vintage and were noted to be in average condition as well. These sales were considered similar overall and were not adjusted for this category.

Land-to-Building Ratio

The next adjustment considered was for the respective land-to-building ratio inherent to each comparable property. During the course of our research of the Westchester County office market, it was determined that land-to-building ratios tend to be lower (i.e., less than 1.00) in the southern, more densely developed areas of Westchester and higher in the upper reaches the county where land-to-building ratios can be double the amount of land versus improvements, or greater. We have concluded that a land-to-building ratio of 4.00:1.00 is reasonable for the subject property.

With this in mind, only Sale #2, #4 and #5 were considered to be similar to the subject in that they feature land-to-building ratios reflective of Upper Westchester County. The remaining sales had land-to-building ratios which were less than 1.00, and therefore required upward adjustments in each case.

The following table presents the above-described adjustments made to each comparable office building sale:

ADJUSTMENTS TO THE COMPARABLE OFFICE BUILDING SALES

(Figure 44)

No.	Location	Sale Date	Sale Price per Sq. Ft.	x	Time Adj.	=	Time-Adj. Price per Sq. Ft.	x	Loc.	x	Size	x	Prop. Char.	x	L-t-B Ratio	=	Total Adj.	=	Adj. Sale Price per Sq. Ft.
1	1200 Brown Street Peekskill, Westchester County, NY	*Offering*	$208.70		0.80		$166.96		0.90		0.80		1.00		1.10		0.79		$131.90
2	90 South Ridge Street Rye Brook, Westchester County, NY	4/28/2016	$169.41		1.00		$169.41		0.80		0.95		1.00		1.00		0.76		$128.75
3	140 Huguenot Street New Rochelle, Westchester County, NY	3/22/2016	$100.51		1.00		$100.51		0.80		0.95		1.00		1.10		0.84		$ 84.43
4	210 North Central Avenue Hartsdale, Westchester County, NY	3/1/2016	$120.83		1.00		$120.83		0.80		0.90		1.00		1.00		0.72		$ 87.00
5	600 Albany Post Road Briarcliff Manor, Westchester County, NY	12/19/2013	$ 92.11		1.15		$105.92		1.00		0.85		1.00		1.00		0.85		$ 90.03

SALES COMPARISON APPROACH – OFFICE BUILDING VALUE CONCLUSION

Prior to adjustments, the comparable office sales ranged in price from $92.11 to $208.70 per square foot. The range featured a mean value of $138.31 and a median value of $120.83 per square foot of gross building area.

Following our adjustment process, the comparable office sales ranged in price from $84.43 to $131.90 per square foot. The range featured a mean value of $104.42 and a median value of $90.03 per square foot of gross building area. By approximating the mean and median value indicators, we have concluded the price of the subject office property space to be $100.00 per square foot of gross building area.

The following table outlines our opinion of value for the subject property office building, concluded under the *Sales Comparison Approach*:

Value Conclusion – Office Building
(Figure 45)

Gross Building Area (Sq. Ft.)		80,000
Value per Sq. Ft. of GBA	x	$ 100.00
Indicated Value via Sales Comparison Approach		**$8,000,000.00**

MAP OF COMPARABLE OFFICE BUILDING SALES

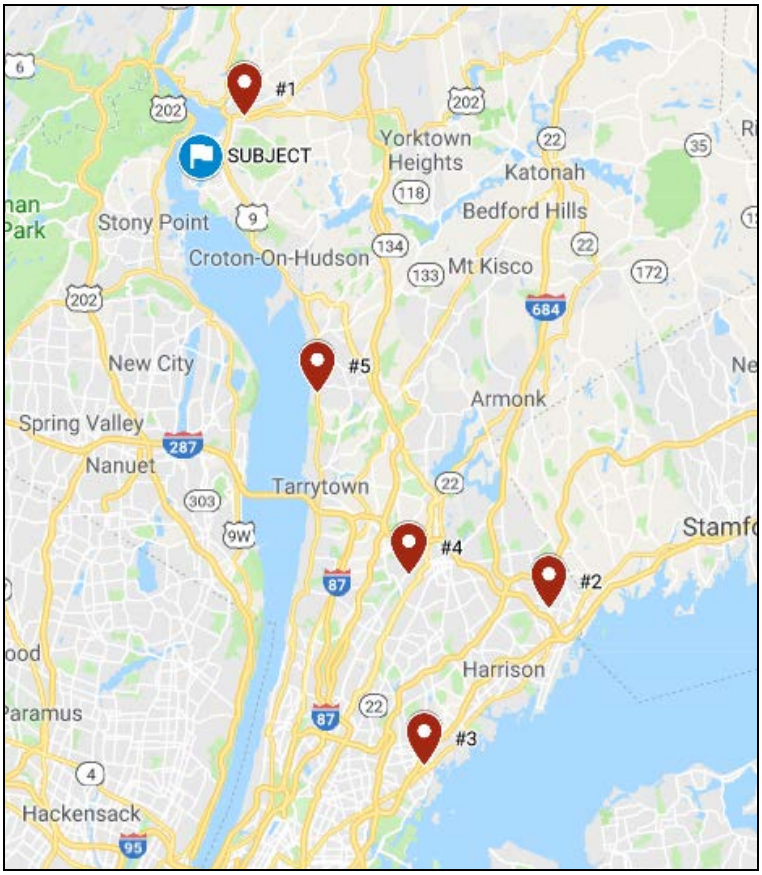


Figure 46

No.	Location
1	1200 Brown Street, Peekskill, Westchester County, NY
2	90 South Ridge Street, Rye Brook, Westchester County, NY
3	140 Huguenot Street, New Rochelle, Westchester County, NY
4	210 North Central Avenue, Hartsdale, Westchester County, NY
5	600 Albany Post Road, Briarcliff Manor, Westchester County, NY

SUMMARY OF COMPARABLE OFFICE BUILDING SALES

Building Sale #1 (Current Offering)	**1200 Brown Street**
Section 33.30, Block 4, Lot 15	**Peekskill, Westchester County, NY**

Current Owner	Renato Cottini LLC
Date of Sale (Recorded)	Current offering
Book/Page	N/A
Description	Four-story office building located at the northwest corner of Brown and South Saint James Streets, in the City of Peekskill, New York. The improvements were constructed circa 1989 and feature a land-to-building ratio of 0.60:1.00.
Land Area	13,710± square feet
Gross Building Area	23,000± square feet
Asking Price	$4,800,000.00
Asking Price per Sq. Ft.	$208.70
Confirmation	

Building Sale #2	**90 South Ridge Street**
Section 141.27, Block 1, Lot 9	**Rye Brook, Westchester County, NY**

Grantor/Grantee	BRG Rye Brook LLC / RSP Group LLC
Date of Sale (Recorded)	4/28/2016 (5/10/2016)
Book/Page	56109/3036
Description	Four-story office building located west side of South Ridge Street, in the Village of Rye Brook, New York. The improvements were constructed circa 1985 and feature a land-to-building ratio of 2.21:1.00.
Land Area	145,044± square feet
Gross Building Area	65,520± square feet
Indicated Sale Price	$11,100,000.00
Sale Price per Sq. Ft.	$169.41
Confirmation	Deed; Buyer's Attorney

Building Sale #3 *Section 1, Block 242, Lot 1* *Section 1, Block 241, Lots 46 & 48*	**140 Huguenot Street** **New Rochelle, Westchester County, NY**

Grantor/Grantee	Thirty Two BJ North Pension Holding Corp. / GHP 140 H LLC
Date of Sale (Recorded)	3/22/2016 (4/29/2016)
Book/Page	56064/3024
Description	Three-story office building located on the south side of Huguenot Street, in the City of New Rochelle, New York. The improvements were constructed circa 1974 and feature a land-to-building ratio of 0.51:1.00.
Land Area	32,360± square feet
Gross Building Area	63,675± square feet
Indicated Sale Price	$6,400,000.00
Sale Price per Sq. Ft.	$100.51
Confirmation	Deed; Buyer's Attorney

Building Sale #4	**210 North Central Avenue**
Section 8.210, Block 158, Lot 24	**Hartsdale, Westchester County, NY**

Grantor/Grantee	Marli Hartsdale, LLC / Citywall Realty, LLC
Date of Sale (Recorded)	3/1/2016 (3/14/2016)
Book/Page	56060/3213
Description	Three-story office building located on the north side of North Central Avenue, in the Hamlet of Hartsdale, Town of Greenburgh, New York. The improvements were constructed circa 1938 and feature a land-to-building ratio of 3.52:1.00.
Land Area	168,965± square feet
Gross Building Area	48,000± square feet
Indicated Sale Price	$5,800,000.00
Sale Price per Sq. Ft.	$120.83
Confirmation	Deed;

Building Sale #5	**600 Albany Post Road**
Section 104.11, Block 1, Lot 40	**Briarcliff Manor, Westchester County, NY**

Grantor/Grantee	Sony Electronics, Inc. / T5@New York LLC
Date of Sale (Recorded)	12/19/2013 (2/11/2014)
Book/Page	53349/3006
Description	Two-story office building located on the west side of Albany Post Road (U.S. Route 9), in the Village of Briarcliff Manor, New York. The improvements were constructed circa 1961 and feature land-to-building ratio of 10.77:1.00.
Land Area	409,072± square feet
Gross Building Area	38,000± square feet
Indicated Sale Price	$3,500,000.00
Sale Price per Sq. Ft.	$92.11
Confirmation	Deed;

ANALYSIS OF COMPARABLE VACANT LAND SALES

"Parcel A" is composed of three (3) irregular-shaped land parcels which contain a gross land area of approximately 45.24± acres, or 1,970,820± square feet. However, it was previously estimated that just 7.35± acres of the subject site would need to be utilized in order to support the existing 80,000± square-foot office building, based on a land-to-building ratio of 4.00:1.00. This requisite supporting acreage has been deducted from the total subject site measurement, indicating that 37.89± acres, or 1,650,820± square feet of "Parcel A" represents excess land area.

Therefore, in the second step of our valuation under the *Sales Comparison Approach*, we have examined sales of vacant land in the Westchester County market in order to estimate the market value of the subject property excess land area. The concluded excess land valuation has been added to the indicated value of the subject property office building improvement so as to arrive at the overall market value for "Parcel A." All of the following comparable sales were analyzed herein on the basis of price per square foot of land area.

The following table summarizes comparable vacant land sales used within our analysis throughout the *Sales Comparison Approach*:

Summary of Comparable Vacant Land Sales
(Figure 47)

No.	Location	S/B-L	Sale Date	Land Area (Acres)	Land Area (Sq. Ft.)	Zoning	Sale Price	Sale Price per Sq. Ft.
1	1200 Lower South Street Peekskill, Westchester County, NY	42.7-1-1 32.16-1-9	*Offering*	5.27	229,561	M-2	$ 2,400,000.00	$10.45
2	1723 Main Street Peekskill, Westchester County, NY	33.6-11-3.3	6/25/2015	1.23	53,579	C-2	$ 775,000.00	$14.46
3	199 Beekman Avenue Sleepy Hollow, Westchester County, NY	115.10-1-1 115.15-1-1	12/22/2014	67.60	2,944,656	RF	$39,500,000.00	$13.41
4	301 6th Street Verplanck, Westchester County, NY	43.17-1-38	8/4/2014	5.21	226,925	MD	$ 1,300,000.00	$ 5.73
5	107-109 Marbledale Road Tuckahoe, Westchester County, NY	35-1-1.AE 35-1-1.AT	6/17/2014	3.40	148,104	GC	$ 1,600,000.00	$10.80

Comparable Vacant Land Sales Adjustment Analysis

The comparable vacant land sales transferred ownership between June 2015 and June 2014, and include one current offering. Site measurements range from 53,579± square feet (1.23± acres) to 2,944,656± square feet (67.60± acres). The unadjusted sale prices featured a low of $5.73 per square foot to a high of $14.46 per square foot, with a mean and median indicator of $10.97 and $10.80 per square foot of land area, respectively.

To derive a value for the subject property, we have considered different factors that affect the sale price of each property as compared to the subject. In our analysis, price adjustments were made for notable differences and through this process, the presented price range was narrowed to better reflect the value of the subject property. Upward adjustments suggest that the comparable is inferior to the subject, while downward adjustments indicate the comparable to be superior.

We considered the terms of the sale and financing. All of the comparable sales were sold under similar conditions and did not require adjustments for these factors.

Market Conditions (Time)

We have considered an adjustment for market conditions (time), whereby older sales have been adjusted to consider current trends. The comparable sales occurred between June 2015 and June 2014, and include one current offering.

Sale #1 is a current market offering, and as such, it was adjusted downward to reflect the typical negotiations process.

Market conditions in the Lower Hudson Valley have remained consistent over the course of the past several years. In light of this, the remaining comparable sales did not require an adjustment for this category.

Location

The subject property "Parcel A," is considered to be part of the Indian Point Energy Center, and is specifically located on the west side of Broadway, at the shared border of the Village of Buchanan and the Town of Cortlandt, within Westchester County, State of New York.

The Village of Buchanan, and by default the subject property, is located in the northwesternmost corner of Westchester County. In comparison, the northern reaches of the county are far more rural in nature, are less densely populated and experience lower levels of automotive traffic than its southern counterpart. The Village of Buchanan is well served by local transportation routes, such as U.S. Route 9, however it is far removed from any major interstate highway.

This lack of transportation linkages was considered detrimental, in that potential developers would factor in the possibility of limited demand from industrial market participants resulting from limited immediate transport options. Although found in northern Westchester as well, Sale #1 and #2 were considered to be superior to the subject, being that they found within the City of Peekskill; an urban market unto itself, which is more readily served by local transport routes and is a centralized destination. Sales #3 and #5 were also considered to be superior to the subject, as they are located in southern Westchester, with better access to the interstate highway system. The final comparable sale, Sale #4 is found in the Hamlet of Verplanck, just south of the subject site and was considered to be similar to the subject. Sale #4 was not adjusted for this category.

Size

Typically, smaller parcels sell for more on a per square-foot basis than their larger counterparts. This assumes a quantity discount and the diminishing number of market participants able to purchase a large property. The subject property excess land area contains an estimated 1,650,820± square feet (37.89± acres) of gross land area.

The comparable sales range in size from 53,579± square feet (1.23± acres) to 2,944,656± square feet (67.60± acres). It should be noted that sales of large tracts of vacant land are rare in the Westchester County market area; we have utilized the most pertinent data available herein.

Of this data set, only Sale #3 was considered to be similar to the subject as it contains virtually the same amount of land area. The remaining comparable land sales are all significantly smaller than the subject and required downward adjustments in each case.

Site Utility

The subject property is composed of three (3) irregular land parcels. It has ample space for development, but portions of the site are subject to a variety of utility easements, which may hinder development efforts.

Sales #1 and #5 were considered inferior to the subject property. They are irregular in shape; long and narrow, and would have limited development options. Sales #1 and #5 were adjusted upward. Sale #2 was considered to be superior to the subject in terms of utility. It is generally level and is rectangular in shape. Sale #2 was adjusted downward. Sale #3 and #4 are irregular-shaped parcels located near the Hudson River. They were considered to be similar and were not adjusted herein.

Zoning

The subject property "Parcel A" is partially located in both the Village of Buchanan and the Town of Cortlandt. As such, it is split-zoned. The portion of the subject property found in the Village is zoned M-2 – Planned Industrial District. The portion of the subject property found in the Town is split-zoned further, between and MD – Designed Industrial District and an R-15 – Single-Family Residential District.

It should be noted that there are a limited number of sales of large, vacant industrial land parcels in the Westchester County market. Therefore, we have utilized the most appropriate sales available.

Of the comparable sale properties, Sales #1 and #4 are both zoned for industrial usage and were not adjusted further herein. Sales #2 and #5 are earmarked for commercial use and were considered superior as a result; they were adjusted downward to reflect this. Finally, Sale #3 is a waterfront property which is currently being developed with mixed-use and multi-family properties; this was considered a superior and Sale #3 was adjusted downward as well.

The following table presents the above-described adjustments made to each comparable vacant land sale:

ADJUSTMENTS TO THE COMPARABLE VACANT LAND SALES

(Figure 48)

No.	Location	Sale Date	Sale Price per Sq. Ft.	x	Time Adj.	=	Time-Adj. Price per Sq. Ft.	x	Adjustments: Loc.	x	Size	x	Site Utility	x	Zoning	=	Total Adj.	=	Adj. Sale Price per Sq. Ft.
1	1200 Lower South Street Peekskill, Westchester County, NY	*Offering*	$10.45		0.95		$ 9.93		0.95		0.70		1.15		1.00		0.76		$ 7.55
2	1723 Main Street Peekskill, Westchester County, NY	6/25/2015	$14.46		1.00		$14.46		0.95		0.70		0.95		0.95		0.60		$ 8.68
3	199 Beekman Avenue Sleepy Hollow, Westchester County, NY	12/22/2014	$13.41		1.00		$13.41		0.95		1.00		1.00		0.80		0.76		$10.19
4	301 6th Street Verplanck, Westchester County, NY	8/4/2014	$ 5.73		1.00		$ 5.73		1.00		0.70		1.00		1.00		0.70		$ 4.01
5	107-109 Marbledale Road Tuckahoe, Westchester County, NY	6/17/2014	$10.80		1.00		$10.80		0.95		0.70		1.15		0.95		0.73		$ 7.88

SALES COMPARISON APPROACH – EXCESS LAND VALUE CONCLUSION

Prior to adjustments, the comparable vacant land sales ranged in price $5.73 to $14.46 per square foot. The range featured a mean value of $10.97 and a median value of $10.80 per square foot of gross land area.

Following our adjustment process, the comparable land sales ranged in price $4.01 to $10.19 per square foot. The range featured a mean value of $7.66 and a median value of $7.88 per square foot of gross land area. By approximating the mean and median value indicators, we have concluded the price of the subject office property space to be $8.00 per square foot of gross land area.

The following table outlines our opinion of value for the subject property excess land area, concluded under the *Sales Comparison Approach*:

Value Conclusion – Excess Land Area
(Figure 49)

Excess Land Area (Sq. Ft.)		1,650,820
Value per Sq. Ft. of Land Area	x	$ 8.00
Indicated Value		**$13,206,560.00**

VALUE CONCLUSION – SALES COMPARISON APPROACH

The following table outlines our opinion of value for the subject property "Parcel A," concluded under the *Sales Comparison Approach*:

Final Opinion of Value via Sales Comparison Approach
(Figure 50)

Indicated Value of the Subject Office Property		$ 8,000,000.00
Indicated Value of Excess Land Area	+	$13,206,560.00
Total Indicated Value via Sales Comparison Approach		$21,206,560.00
(Rounded)		**$21,200,000.00**

MAP OF COMPARABLE VACANT LAND SALES

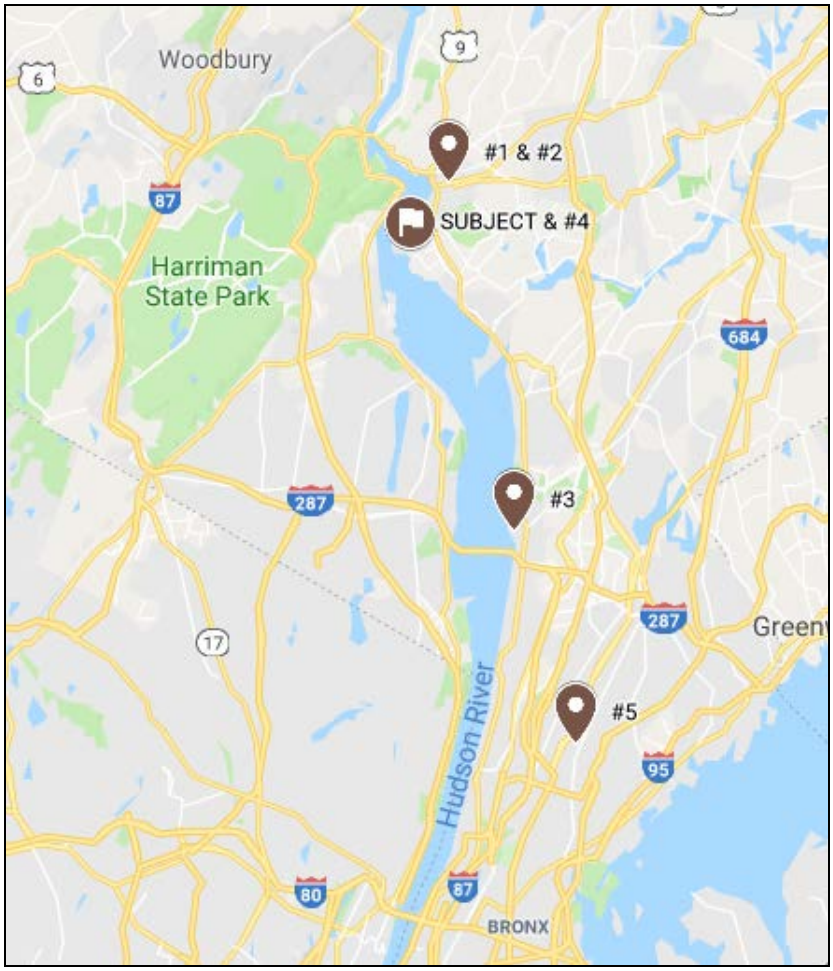


Figure 51

No.	Location
1	1200 Lower South Street, Peekskill, NY
2	1723 Main Street, Peekskill, NY
3	199 Beekman Avenue, Sleepy Hollow, NY
4	301 6th Street, Verplanck, NY
5	109 Marbledale Road, Tuckahoe, NY

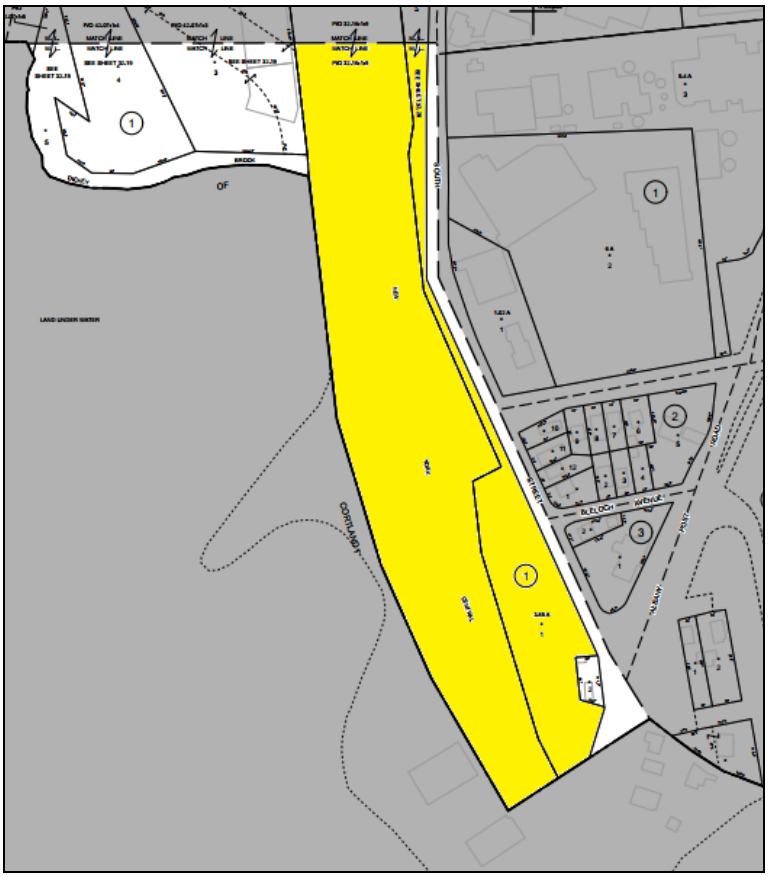
LIST OF COMPARABLE VACANT LAND SALES

Vacant Land Sale #1 (Current Offering) ***Section 42.7, Block 1, Lot 1*** ***Section 32.16, Block 1, p/o Lot 9***	**1200 Lower South Street** **Peekskill, Westchester County, NY**

Current Owner	Penn Central Rail Road
Date of Sale (Recorded)	Current offering
Book/Page	N/A
Description	Irregular-shaped, vacant land parcel found on the west side of Lower South Street, where it merges with Albany Post Road (NYS Route 9A), in the City of Peekskill, New York. This parcel features approvals for heavy rail spurs. A conversation with the listing broker revealed that there has been limited interest in this property and no competitive offers to buy or lease the land at the stated asking rates. The property has been on the market for over three (3) years, however the asking price has not been reduced.
Land Area	222,561± square feet (5.27± acres)
Zoning	M-2 – General Industrial *(City of Peekskill)*
Asking Price	$2,400,000.00
Asking Price per Sq. Ft.	$10.45
Confirmation	Listing Broker

TAX MAP – LAND SALE #1

Section 42.7, Block 1, Lot 1
Section 32.16, Block 1, p/o Lot 9

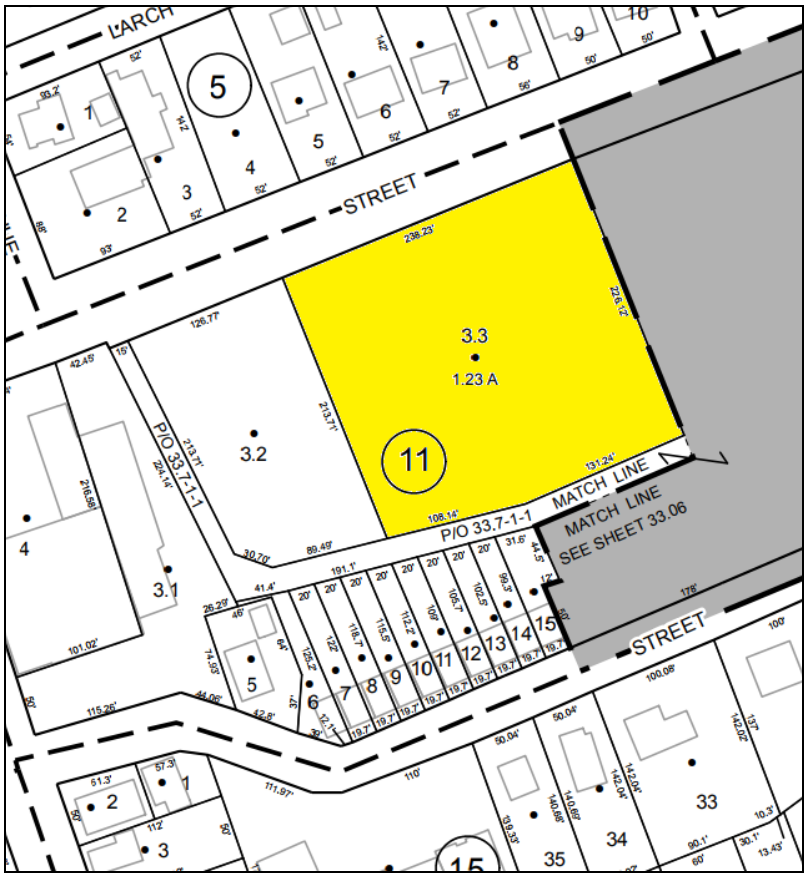


Vacant Land Sale #2 *Section 33.6, Block 11, Lot 3.3*	**1723 Main Street** **Peekskill, Westchester County, NY**

Grantor/Grantee	1719 Main Street Holdings LLC / Triple C Development Inc.
Date of Sale (Recorded)	6/25/2015 (7/15/2015)
Book/Page	55175/3365
Description	Rectangular vacant land parcel with 238.23± linear feet of street frontage on the south side of Main Street (U.S. Route 6), in the City of Peekskill, New York. The site was sold with construction approvals in place. Ultimately, a retail strip center was constructed following the sale and is anchored by a Family Dollar store.
Land Area	53,579± square feet (1.23± acres)
Zoning	C-2 – Central Commercial *(City of Peekskill)*
Indicated Sale Price	$775,000.00
Sale Price per Sq. Ft.	$14.46
Confirmation	Deed; Buyer's Attorney

TAX MAP – LAND SALE #2

Section 33.6, Block 11, Lot 3.3

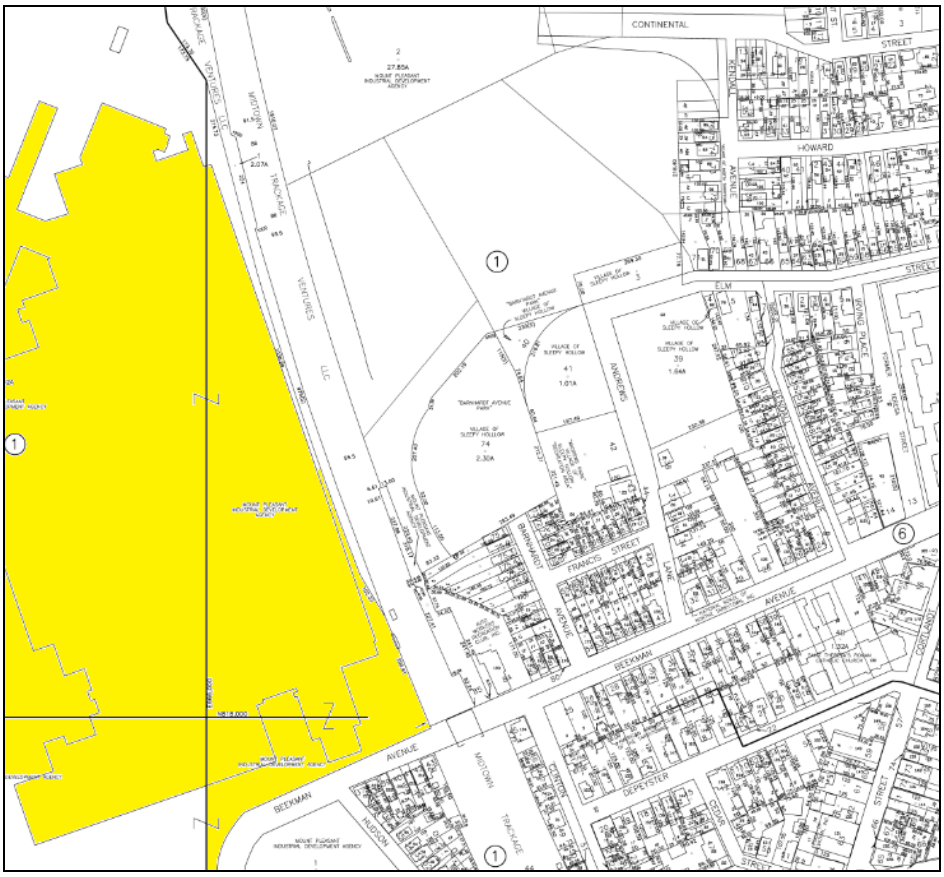


Vacant Land Sale #3 *Section 115.10, Block 1, Lot 1* *Section 115.15, Block 1, Lot 1*	**199 Beekman Avenue** **Sleepy Hollow, Westchester County, NY**

Grantor/Grantee	Mount Pleasant IDA / Lighthouse Ventures LLC
Date of Sale (Recorded)	12/22/2014 (12/24/2014)
Book/Page	54317/3351
Description	Irregular-shaped, through-block parcel (115.10/1/1) improved with the foundation of a former automobile assembly plant, containing 65.92± acres. This parcel features frontage along the north side of Beekman Avenue, with the Metro-North Railroad Hudson Line found adjacent, to the east. Also included in this transaction was an irregular-shaped, through-block parcel (115.15/1/1) found to the south, containing 1.68± acres. This transfer included an additional parcel on the east side of the railway corridor, however, it was directly donated by the grantor to the Sleepy Hollow Local Development Corporation (SHLDC) and restricted by deed to municipal and public uses (Document #: 54317/3286).
Land Area	2,944,656± square feet (67.60± acres)
Zoning	RF – Riverfront Development District *(Village of Sleepy Hollow)*
Indicated Sale Price	$39,500,000.00
Sale Price per Sq. Ft.	$13.41
Confirmation	Deed; Village Tax Assessor

TAX MAP – LAND SALE #3

Section 115.10, Block 1, Lot 1

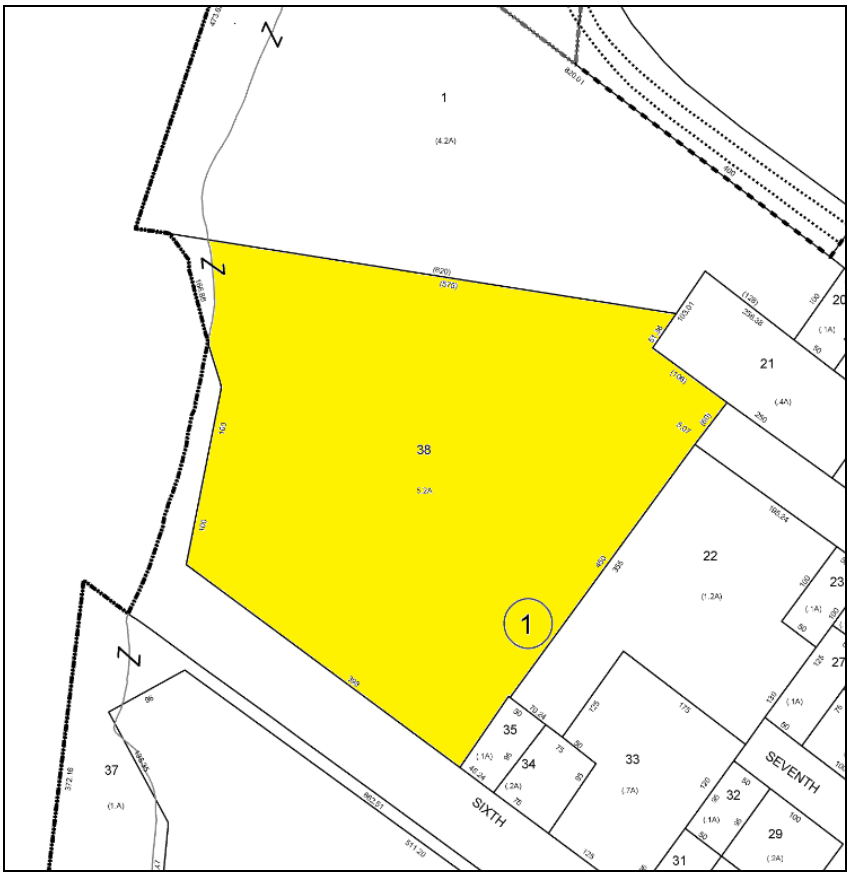


Vacant Land Sale #4 *Section 43.17, Block 1, Lot 38*	**301 6th Street** **Cortlandt, Westchester County, NY**

Grantor/Grantee	Ferry Slip II LLC / Worth Properties LLC
Date of Sale (Recorded)	8/4/2014 (8/8/2014)
Book/Page	54211/3111
Description	Irregular-shaped, vacant land parcel found on the eastern bank of the Hudson River in the Hamlet of Verplanck, Town of Cortlandt, New York. The parcel is improved at the waterfront with a steel pier and two (2) wooden dolphins, which are used for stabilizing docked ships. This parcel is noted to be located just to the south of the subject property and in part, shares identical MD zoning.
Land Area	226,925± square feet (5.21± acres)
Zoning	MD – Designed Industrial *(Town of Cortlandt)*
Indicated Sale Price	$1,300,000.00
Sale Price per Sq. Ft.	$5.73
Confirmation	Deed;

TAX MAP – LAND SALE #4

Section 43.17, Block 1, Lot 38

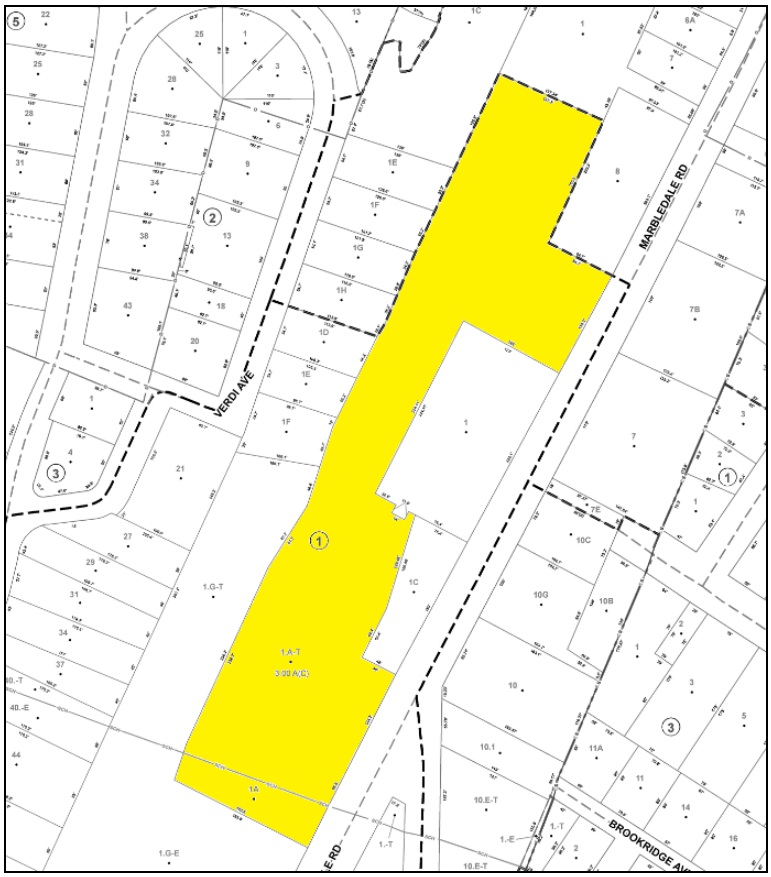


Vacant Land Sale #5 *Section 35, Block 1, Lots 1.AE & 1.AT*	**107-109 Marbledale Road** **Tuckahoe, Westchester County, NY**

Grantor/Grantee	Ardmar Realty Co. LLC / Bilwin Development Affiliates LLC
Date of Sale (Recorded)	6/17/2014 (6/27/2014)
Book/Page	54080-3106
Description	Irregular-shaped, vacant land parcel found on the west of Marbledale Road in the Village of Tuckahoe, Town of Eastchester, New York. The street frontage of the site is split, as the parcel features two (2) non-related parcels which are cut from the whole at the streetline. That said, the first exposure at the north features 135.30± feet of street frontage and the southern exposure features 240.80± feet of street frontage.
Land Area	148,104± square feet (3.19± acres)
Zoning	GC – General Commercial *(Village of Tuckahoe)*
Indicated Sale Price	$1,600,000.00
Sale Price per Sq. Ft.	$10.80
Confirmation	Deed; Buyer's Attorney

TAX MAP – LAND SALE #5

Section 35, Block 1, Lots 1.AE & 1.AT



CORRELATION AND VALUE CHOICE

There are three generally accepted approaches to the valuation of real estate: the *Cost Approach*, *Income Capitalization Approach* and *Sales Comparison Approach*. In all three valuation methods, local market data is sought for sales and offerings of similar properties and tracts of vacant land, current prices for construction materials and labor, rentals of similar properties and their operating expenses and current rates of return on investments. From this data, value estimates may be developed for the property.

Cost Approach

The *Cost Approach* assumes that informed purchaser would pay no more for a property than the cost of producing a similar investment. The approach entails estimating the value of the land as if vacant, which is then added to the depreciated value of the improvements. This is considered a valid indicator when a property is new and there are a sufficient number of land sales.

In valuing the subject property, the *Cost Approach* was not used to determine value, as an estimate of depreciation for the existing training facility, built circa 1980, would be difficult to support with market data and speculative, at best.

Income Capitalization Approach

The *Income Capitalization Approach* values the future benefits (in the form of income) from an income-producing property by measuring the potential net income received. This approach is significant in determining the market value of a property where investors purchase the income-producing real estate for its earning power.

In valuing the subject property, the *Income Capitalization Approach* was not used to determined value, given its unknown re-use potential, extensive rehabilitation requirements for a new user and limited available market data (i.e., lease transactions of similar properties in the local area).

Sales Comparison Approach

The major premise of the *Sales Comparison Approach* is the principle of substitution, which state that an informed and knowledgeable purchaser would pay no more for a property than the cost of pf acquiring an existing property with similar investment features. We have employed the *Sales Comparison Approach* in this assignment in order to value the fee simple estate of the subject property in its "as-is" condition.

We have identified a number of meaningful transfers of similar office building sales as compared to the subject property. The process required us to individually analyze and compare each office building sale to the subject and make adjustments to the per-square-foot value for market-sensitive differences between each comparable sale and the subject property. The appropriately adjusted building sales have provided an indication of value for the subject.

We have also included comparable land sales for the subject *excess land*. We have identified a number of meaningful transfers of similar vacant land sales as compared to the subject property *excess land*. The process required us to individually analyze and compare each land sale to the subject and make adjustments to the per-square-foot value for market-sensitive differences between each comparable sale and the subject property. The appropriately adjusted land sales have provided an indication of value for the subject *excess land*.

RECONCILIATION AND FINAL VALUE CHOICE

We are of the opinion that the "as is" market value of the subject property, *predicated upon the extraordinary assumptions and limiting conditions as defined within the body of this report*, as of November 8, 2017:

TWENTY ONE MILLION TWO HUNDRED THOUSAND DOLLARS
($21,200,000.00)

QUALIFICATIONS

The firm of Goodman-Marks Associates, Inc., with offices located at 170 Old Country Road, Mineola, New York, 420 Lexington Avenue, New York, New York, 55 Madison Avenue, Morristown, New Jersey is a licensed real estate broker in the State of New York. Members of the firm are licensed real estate appraisers in the States of New York and New Jersey.

The firm has furnished real estate appraisals to financial institutions for mortgage and sale purposes, and many of these valuation assignments have been performed throughout the country.

The types of assignments that we typically handle encompass all facets of the real estate appraisal/consultation spectrum. These have included office buildings (both urban and suburban), shopping centers (strip, neighborhood and regional mall), freestanding department stores, fast-food buildings, gas stations, apartment houses (both urban and suburban; high-rise and garden type), cooperative and condominium residential housing (to be developed as well as to be converted), Apartment development, hotels and motels, industrial and warehouse facilities and vacant land. Special types have included banks, auto showrooms, theaters, schools, bowling alleys, golf courses, nursing homes, etc.

Members of the firm have testified as to the value of land and buildings before the Supreme Court of the State of New York, the Court of Claims of New York State and the United States Federal Court.

The above history, the additional personal experience, affiliations, numerous similar properties appraised and education of the appraisers, as outlined on this and the following pages, qualify them as competent to complete this assignment.

MATTHEW J. GUZOWSKI, MAI, MRICS, PRESIDENT
GOODMAN-MARKS ASSOCIATES, INC.

GENERAL EXPERIENCE

Over 34 years as a commercial real estate appraiser and consultant

Testified as an expert witness – New York State Supreme Court, New York County
New York State Supreme Court, Queens County
New York State Supreme Court, Kings County
New York State Supreme Court, Nassau County
New York State Supreme Court, Suffolk County
U.S. District Court, Eastern District of New York
U. S. Bankruptcy Court, Kings County
Civil Court of the City of New York, Kings County
District Court, Landlord & Tenant Court, Suffolk County
Zoning and Arbitration Testimony, Nassau County

EMPLOYMENT

4/91 to Date: *Goodman-Marks Associates, Inc.*

President preparing narrative appraisal reports of income-producing and other properties to determine market valuations. These reports are used for mortgage purposes, settlement of estates, real estate tax certiorari actions and condemnation cases.

1/83 to 4/91: *New York City Economic Development Corporation*
161 William Street
New York, New York

Vice President of appraisal services preparing narrative appraisal reports and reviewing fee appraisals to determine the market value of real estate for disposition, development and lease.

EDUCATION

College: St. John's University
Degree: MBA – Finance
December, 1989

Queens College, C.U.N.Y.
Degree: BA – English
January, 1981

Professional: Appraisal Institute
Courses successfully completed:

1A1 - Real Estate Appraisal Principles
1A2 - Basic Valuation Procedures
SPP - Standards of Professional Practice
1BA - Capitalization Theory & Techniques - Part A
1BB - Capitalization Theory & Techniques - Part B
2-1 Case Studies in Real Estate Valuation
2-2 Report Writing and Valuation Analysis

Seminars attended:

Arbitration in Real Estate
Real Estate Financial Statement Analysis

PROFESSIONAL MEMBERSHIP

Appraisal Institute - MAI Designation #10114
Long Island, New York Chapter
Chairman – Admissions Committee, Long Island Chapter, 2000-2006
Chairman – Budget & Finance Committee, Long Island Chapter, 2007
Treasurer – Long Island Chapter, 2007
Secretary – Long Island Chapter, 2008
Vice President – Long Island Chapter, 2009
Senior Vice President – Long Island Chapter, 2010
President – Long Island Chapter, 2011

The Royal Institution of Chartered Surveyors I.D. #6404964

REBNY – Membership I.D. #49202

Community Bankers Mortgage Forum

International Right of Way Association I.D.#7902612

GUEST LECTURER New York University – Real Estate Institute

LICENSES
Certified General Real Estate Appraiser
State of New York Certificate #468986
State of New Jersey Certificate #42RG00146100
State of Connecticut Certificate #RCG0001210
New York State Salesperson License #10401205644

MATTHEW F. BOYLAN, MAI, EXECUTIVE VICE PRESIDENT
GOODMAN-MARKS ASSOCIATES, INC.

EMPLOYMENT

7/07 to Present: *Goodman-Marks Associates, Inc.*

Executive Vice President preparing advanced narrative appraisal reports of income-producing and other properties to determine market valuations. Assignments include financing for many local and national lenders, government/municipality work, real estate tax certiorari actions, condemnation, litigation, arbitration, estate planning and large-scale downtown revitalization projects among other things. Over the past several years Matthew has concentrated his work in the New York City market, including each of the five (5) Boroughs. Matthew also has experience valuing commercial property in a variety of markets including Long Island, Westchester, New Jersey, Connecticut, Boston, Raleigh and Washington DC.

EDUCATION

Professional:

Courses successfully completed:
Appraisal Institute
Course 100GR – Basic Appraisal Principles
Course 101GR – Basic Appraisal Procedures
Course 300GR – Real Estate Finance Statistics and Valuation Modeling
Course 401G – General Appraiser Sales Comparison Approach
Course 400G – General Appraiser Market Analysis and Highest & Best Use
Course N403G – General Appraiser Income Approach/Part 1
Course N404G – General Appraiser Income Approach/Part 2
Course 402G – General Appraiser Site Valuation and Cost Approach
Course N420DM – Business Practices and Ethics
Course 405G – General Appraiser Report Writing and Case Studies
AQ-GE-1 – Fair Housing, Fair Lending and Environmental Issues
Course 501GD – Advanced Income Capitalization
Course 503GD – Advanced Concepts & Case Studies
General Demonstration Report – Capstone Program

New York University
USPAP - Uniform Standards of Professional Appraisal Practice

New York Real Estate Institute
GE-3 – Using the HP12C Financial Calculator

College:

Buffalo State College, Buffalo, New York
Bachelor of Science Degree
Major: Business Administration
2003-2007

PROFESSIONAL MEMBERSHIP

Appraisal Institute - MAI Designation

LICENSE

Certified General Real Estate Appraiser
New York State Certificate #4651008

ANTHONY M. SAVINO, ASSOCIATE
GOODMAN-MARKS ASSOCIATES, INC.

EMPLOYMENT

3/16 to Date: ***Goodman-Marks Associates, Inc.*** – Associate Real Estate Appraiser

Associate Real Estate Appraiser preparing narrative appraisal reports of income-producing and other properties to determine market valuations. These reports are used for mortgage purposes, settlement of estates, litigation, real estate tax certiorari actions and condemnation cases.

EDUCATION

Professional: ***Appraisal Institute***

Basic Appraisal Principles & Procedures – 60 hrs.
National Uniform Standards of Professional Appraisal Practice (USPAP) 15 hrs.
General Appraiser Site Valuation & Cost Approach – 30 hrs.
General Appraiser Income Approach (Part 1) – 30 hrs.
General Appraiser Market Analysis and Highest & Best Use – 30 hrs.
General Appraiser Sales Comparison Approach – 30 hrs.
Real Estate Finance, Statistics & Valuation Modeling – 15 hrs.
General Appraiser Income Approach (Part 2) – 30 hrs.
Advanced Income Capitalization – 30 hrs.
General Report Writing & Case Studies – 30 hrs.

Baruch College – New York, NY
Professional Certificate: Real Estate Finance
November, 2013

College: ***University of Tampa – Tampa, FL***
Bachelor of Science
Major: International Business
December, 2005

ADDENDA

PRESENT VALUE OF GENERAL SERVICE BUILDING ("GSB")

We have been requested to provide an opinion of the net present market value for the office building improvements identified as the "General Services Building".

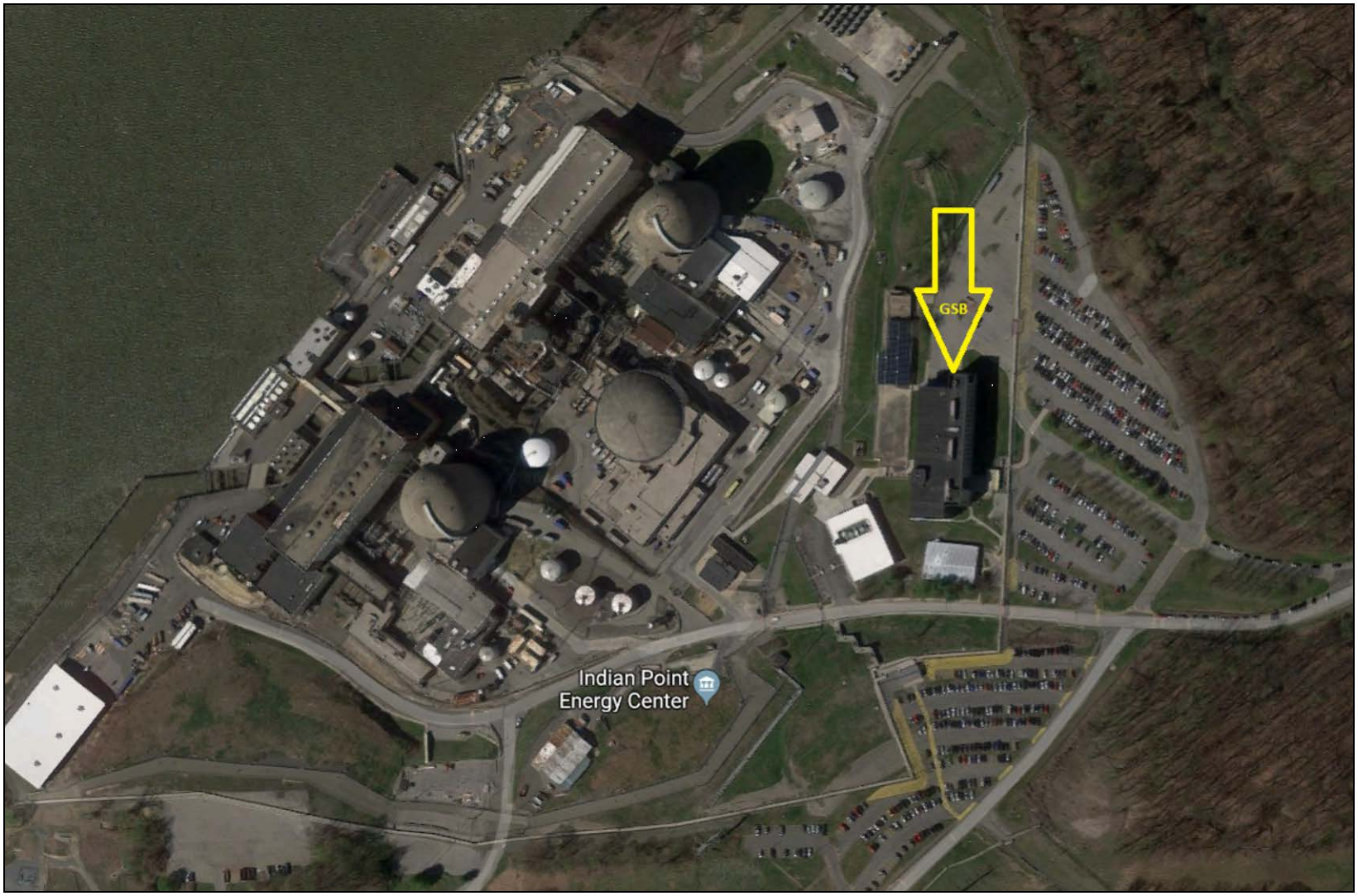
The "General Services Building" is located on *part of* Section 43.10, Block 2, Lot 1, which is centrally located within the Indian Point Energy Center ("IPEC"). The "General Services Building" is found to the west of Broadway, and east of the Hudson River and the three-unit nuclear power station.

The "General Services Building" consists of a four-story office property, which we have estimated to contain 103,540± square feet of gross building area. Any information to the contrary may affect our valuation conclusions herein. The improvements were observed to be in above-average condition at the time of our limited inspection. The "General Services Building" is accessed via a 1,100.0± foot length of road, originating from an access point on the west side of Broadway. The office building site is improved with a parking lot containing approximately 345± individual parking spaces.

This property will be a central part of the planned "de-nuclearization" process due to its proximity to the existing power plant. Based on discussion with our client, we have assumed a 15-year holding period until this property would be available for re-use to the open market. In our valuation of this property, we have assumed continued prudent management and maintenance of the improvements.

The following page includes an aerial view of the property and identifies the GSB building improvements:

AERIAL VIEW OF SUBJECT GSB PROPERTY



ANALYSIS OF COMPARABLE OFFICE BUILDING SALES

We have surveyed the upper Westchester County office market for sales of office buildings with property characteristics found to be similar to those of the subject improvements.

The following table summarizes comparable office buildings sales used within our analysis throughout the *Sales Comparison Approach*:

Summary of Comparable Office Building Sales
(Figure 52)

No.	Location	S-B-L	Sale Date	Land Area (Sq. Ft.)	Gross Building Area (Sq. Ft.)	Land-to-Bldg. Ratio	Sale Price	Sale Price per Sq. Ft.
1	1200 Brown Street Peekskill, Westchester County, NY	33.3-4-15	*Offering*	13,710	23,000	0.60	$ 4,800,000.00	$208.70
2	90 South Ridge Street Rye Brook, Westchester County, NY	141.27-1-9	4/28/2016	145,044	65,520	2.21	$11,100,000.00	$169.41
3	140 Huguenot Street New Rochelle, Westchester County, NY	1-242-1	3/22/2016	32,360	63,675	0.51	$ 6,400,000.00	$100.51
4	210 North Central Avenue Hartsdale, Westchester County, NY	8.210-158-24	3/1/2016	168,965	48,000	3.52	$ 5,800,000.00	$120.83
5	600 Albany Post Road Briarcliff Manor, Westchester County, NY	104.11-1-40	12/19/2013	409,072	38,000	10.77	$ 3,500,000.00	$ 92.11

Our research of the surrounding office market offered an important insight into the one of the regional property characteristics of office properties in Westchester County. Land-to-building ratios for office properties in the Westchester County market tend to be smaller (i.e., less than 1:00) in the southern reaches of the county found south of Interstate 287, where the municipalities are more densely populated and developed.

As one moves northerly from the interstate dividing line, individual villages and towns become more rural in nature. Though local zoning laws may vary, requirements which call for development on larger lots are common throughout this section of the county. Frequently, this prerequisite comes with the attached caveat that such development minimally impacts the surrounding natural aesthetic of the area. That said, upper Westchester County office building stock trends toward low- to mid-rise properties, with

sprawling, campus-style layouts. Land-to-building ratios can range from double the land versus improvements, to many multiples greater.

As previously determined by our survey of land-to-building ratios for office properties in upper Westchester County, we have considered a land-to-building ratio of 4.00:1.00 for the subject property to be reasonable, herein. From this baseline, we have concluded that 9.51± acres (414,160± square feet) of land area would provide the requisite site volume needed to support the 103,540± square feet of existing improvements, and have attributed this assumption to our concluded value.

Comparable Office Building Sales Adjustment Analysis

The comparable office building sales transferred ownership between April 2016 and December 2013, and include one current offering. Building measurements range from 23,000± square feet to 65,250± square feet. The unadjusted sale prices featured a low of $92.11 per square foot to a high of $208.70 per square foot, with a mean and median indicator of $138.31 and $120.83 per square foot of gross building area, respectively.

To derive a value for the subject property, we have considered different factors that affect the sale price of each property as compared to the subject. In our analysis, price adjustments were made for notable differences and through this process, the presented price range was narrowed to better reflect the value of the subject property. Upward adjustments suggest that the comparable is inferior to the subject, while downward adjustments indicate the comparable to be superior.

We considered the terms of the sale and financing. All of the comparable sales were sold under similar conditions and did not require adjustments for these factor.

Market Conditions (Time)

We have considered an adjustment for market conditions (time), whereby older sales have been adjusted to consider current trends. The comparable sales occurred between April 2016 and December 2013, and include one current offering.

Sale #1 is a current market offering, and as such, it was adjusted downward to reflect the typical negotiations process.

Market conditions in the Lower Hudson Valley have remained consistent over the course of the past several years. In light of this, only Sale #5 was considered to have occurred under inferior market conditions; Sale #5 was adjusted upward. The remaining comparable sales did not require an adjustment for this category.

Location

The subject GSB property is part of the Indian Point Energy Center, and is specifically located on the west side of Broadway, east of the Hudson River and the three-unit nuclear power station Village of Buchanan and the Town of Cortlandt, within Westchester County, State of New York.

The Village of Buchanan, and by default the subject property, is located in the northwesternmost corner of Westchester County. In comparison, the northern reaches of the county are far more rural in nature, are less densely populated and experience lower levels of automotive traffic than its southern counterpart. The Village of Buchanan is well served by local transportation routes, such as U.S. Route 9, however it is far removed from any major interstate highway.

This lack of transportation linkages is considered detrimental, in that potential owner-users would factor in the ability of commuters to access the property on a daily basis. Although found in northern Westchester as well, Sale #1 has been considered to be superior to the subject, being that it is found within the City of Peekskill; an urban market unto itself, which is more readily served by local transport routes and is a centralized destination. Sales #2, #3 and #4 were also considered to be superior to the subject, as they are located in southern Westchester, in more robust office markets. The final comparable sale, Sale #5 is

found in Upper Westchester County, in a market which has been found to be similar to the subject. Sale #5 was not adjusted for this category.

Size

Typically, smaller buildings sell for more on a per square-foot basis than their larger counterparts. This assumes a quantity discount and the diminishing number of market participants able to purchase a large property. The subject property "General Services Building" contains an estimated 103,540± square feet of gross building area.

The comparable sales range in size from 23,000± square feet to 65,250± square feet of gross building area. As such, this data set features comparable sales which are all smaller than the subject property improvements. Each sale was adjusted downward by the degree to which it differed from the subject property.

Property Characteristics

The next adjustment considered was for property characteristics, which considers the age/condition of the properties. The subject property office building was considered to be in above-average overall condition.

All of the comparable sales were considered to be in average condition, and thus inferior to the subject. The comparable sales each required an upward adjustment for this category.

Land-to-Building Ratio

The next adjustment considered was for the respective land-to-building ratio inherent to each comparable property. During the course of our research of the Westchester County office market, it was determined that land-to-building ratios tend to be lower (i.e., less than 1.00) in the southern, more densely developed areas of Westchester and higher in the upper reaches the county where land-to-building ratios can be double the amount of land versus improvements, or greater. We have concluded that a land-to-building ratio of 4.00:1.00 is reasonable for the subject property.

With this in mind, only Sale #2, #4 and #5 were considered to be similar to the subject in that they feature land-to-building ratios reflective of Upper Westchester County. The

remaining sales had land-to-building ratios which were less than 1.00, and therefore required upward adjustments in each case.

The following table presents the above-described adjustments made to each comparable office building sale:

ADJUSTMENTS TO THE COMPARABLE OFFICE BUILDING SALES

(Figure 53)

No.	Location	Sale Date	Sale Price per Sq. Ft.	x	Time Adj.	=	Time-Adj. Price per Sq. Ft.	x	Loc.	x	Size	x	Prop. Char.	x	L-t-B Ratio	=	Total Adj.	=	Adj. Sale Price per Sq. Ft.
1	1200 Brown Street Peekskill, Westchester County, NY	*Offering*	$208.70		0.80		$166.96		0.90		0.75		1.10		1.10		0.82		$136.91
2	90 South Ridge Street Rye Brook, Westchester County, NY	4/28/2016	$169.41		1.00		$169.41		0.80		0.90		1.10		1.00		0.79		$133.83
3	140 Huguenot Street New Rochelle, Westchester County, NY	3/22/2016	$100.51		1.00		$100.51		0.80		0.90		1.10		1.10		0.87		$ 87.44
4	210 North Central Avenue Hartsdale, Westchester County, NY	3/1/2016	$120.83		1.00		$120.83		0.80		0.85		1.10		1.00		0.75		$ 90.62
5	600 Albany Post Road Briarcliff Manor, Westchester County, NY	12/19/2013	$ 92.11		1.15		$105.92		1.00		0.90		1.10		1.00		0.99		$104.86

SALES COMPARISON APPROACH – GENERAL SERVICES BUILDING VALUE CONCLUSION

Prior to adjustments, the comparable office sales ranged in price $92.11 to $208.70 per square foot. The range featured a mean value of $138.31 and a median value of $120.83 per square foot of gross building area.

Following our adjustment process, the comparable office sales ranged in price $87.44 to $136.91 per square foot. The range featured a mean value of $110.73 and a median value of $104.86 per square foot of gross building area. By approximating the mean and median value indicators, we have concluded the price of the subject office property space to be $105.00 per square foot of gross building area.

The following table outlines a fee simple estate market value opinion of the subject GSB building, under the assumption the subject improvements are available for free market occupancy and not part of the planned "de-nuclearization" process:

Value Conclusion – General Services Building
(Figure 54)

Gross Building Area (Sq. Ft.)		103,540
Value per Sq. Ft. of GBA	x	$ 105.00
Indicated Value via Sales Comparison Approach		**$10,871,700.00**

As previously discussed, the GSB property will be a central part of the planned "de-nuclearization" process due to its proximity to the existing power plant. Based on discussion with our client, we have assumed a 15-year holding period until this property would be available for re-use to the open market. In our valuation of this property, we have assumed continued prudent management and maintenance of the improvements. Therefore, we have provided a present value calculation of the GSB property following a 15-year holding period. The 15-year holding period assumes 3.0% annual inflation, an estimate that approximates historical CPI index. The following pages provide support for our chosen discount rate (IRR) applied to the future reversionary value of the GSB property following the projected holding period to arrive at a present value indication.

Investor Indices and Investment Parameters

According to the *PricewaterhouseCoopers Real Estate Investor Survey – National Suburban Office Market Report (Fourth Quarter 2017)*: "Overall vacancy held relatively steady for the national suburban office market in the third quarter of 2017 compared to a year ago as more areas are reporting year-over-year declines in vacancy rather than increases. Specifically, overall vacancy was 13.7%, as per Cush man & Wakefield.

While a few surveyed investors list steady leasing activity and generally low levels of new construction as reasons for this market's stability, another states that the trend of repurposing older office product into other uses is helping to maintain vacancy and even lower it in certain areas.

Nevertheless, occupancy and retaining tenants remain top concerns for owners of suburban office product. "Keeping assets stabilized and determining the future space needs of tenants are priorities," says an investor.

Tracking tenant trends has been difficult for many suburban office property owners over the past few years as the workforce and employers showed a greater preference for downtown locations. Now, it appears the pendulum is starting to swing in favor of the suburbs again as suburban landlords upgrade office parks to include amenities like food trucks, concert venues, and coffee lounges, which mimic urban life and appeal to an aging, family-forming millennial population."

The following table presents a synopsis of the *PwC National Suburban Office Market Report (Fourth Quarter 2017)*:

NATIONAL SUBURBAN OFFICE MARKET
(Fourth Quarter 2017)

Table 5
NATIONAL SUBURBAN OFFICE MARKET
Fourth Quarter 2017

	CURRENT	LAST QUARTER	1 YEAR AGO	3 YEARS AGO	5 YEARS AGO
DISCOUNT RATE (IRR)[a]					
Range	6.00% – 12.00%	6.00% – 11.50%	6.00% – 10.50%	6.25% – 10.50%	6.00% – 12.50%
Average	8.34%	8.03%	7.86%	7.92%	8.49%
Change (Basis Points)		+ 31	+ 48	+ 42	– 15
OVERALL CAP RATE (OAR)[a]					
Range	4.20% – 10.00%	5.00% – 10.00%	5.00% – 9.50%	5.00% – 9.00%	5.00% – 10.50%
Average	6.72%	6.69%	6.63%	6.66%	7.42%
Change (Basis Points)		+ 3	+ 9	+ 6	– 70
RESIDUAL CAP RATE					
Range	6.00% – 11.50%	5.75% – 11.50%	6.00% – 10.50%	6.00% – 9.50%	6.00% – 11.00%
Average	7.61%	7.42%	7.59%	7.27%	7.89%
Change (Basis Points)		+ 19	+ 2	+ 34	– 28
MARKET RENT CHANGE[b]					
Range	0.00% – 5.00%	0.00% – 5.00%	0.00% – 5.00%	0.00% – 5.00%	(3.00%) – 4.00%
Average	1.86%	2.00%	2.13%	2.63%	1.55%
Change (Basis Points)		– 14	– 27	– 77	+ 31
EXPENSE CHANGE[b]					
Range	0.00% – 4.00%	0.00% – 4.00%	0.00% – 4.00%	1.00% – 3.50%	2.00% – 4.00%
Average	2.68%	2.72%	2.72%	2.75%	2.73%
Change (Basis Points)		– 4	– 4	– 7	– 5
MARKETING TIME[c]					
Range	1 – 12	1 – 12	1 – 12	3 – 12	2 – 18
Average	6.5	6.0	6.0	7.1	9.0
Change (▼, ▲, =)		▲	▲	▼	▼

a. Rate on unleveraged, all-cash transactions b. Initial rate of change c. In months

The market survey indicates a discount rate (IRR) range for the National Suburban Office Market of 6.00% to 12.00%, with a mean of 8.34%. We have selected a 12.0% discount rate, which falls within the high end of the provided range and considers the high level of risk associated with the subject property given its position within the IPEC and uncertainty of its use over the projected 15-year term, as well as the stigma of its location within a nuclear power plant property.

PRESENT VALUE CONCLUSION

Based on the preceding analysis, our income approach conclusion of the "as is" market value of the fee simple estate fee interest of the subject GSB property, as of November 8, 2017, is calculated as follows:

Present Value Conclusion – GSB Property
(Figure 55)

Indicated Value via Sales Comparison Approach		$10,871,700.00
Growth Rate (3.0% annual inflation, 15 years hence)	x	1.5580
Future Value - 15 years hence		$16,938,109.00
Present Value (12.0% IRR, 15 years)	x	0.1827
Present Value Indication		**$3,094,593.00**
Rounded		**$3,100,000.00**

FINAL VALUE CONCLUSION – GSB PROPERTY

We are of the opinion that the market value of the fee simple estate of the subject "GSB" property, *predicated upon the extraordinary assumptions and limiting conditions as defined within the body of this report*, as of November 8, 2017, was:

THREE MILLION ONE HUNDRED THOUSAND DOLLARS
($3,100,000.00)