US Army Corps of Engineers ®
Huntington District

WILLOW ISLAND LOCKS AND DAM
AMERICAN MUNICIPAL POWER
PROPOSED HYDROELECTRIC POWER PROJECT
PLEASANTS COUNTY, WEST VIRGINIA
SUPPLEMENTAL
DRAFT ENVIRONMENTAL ASSESSMENT

December 2011
DEPARTMENT OF THE ARMY HUNTINGTON CORPS
CORPS OF ENGINEERS
HUNTINGTON, WEST VIRGINIA

ABSTRACT

In accordance with the National Environmental Policy Act, the U.S. Army Corps of Engineers (USACE), Huntington District, has prepared this Supplemental Environmental Assessment (EA) to evaluate the potential impacts associated with various rock excavation methods associated with noise impacts associated with the proposed American Municipal Power (AMP) Hydroelectric Power Project, Willow Island Locks and Dam (L&D), Pleasants County, West Virginia. It has come to the attention to the District that effects from construction activities, specifically in regards to rock excavation, was not provided in sufficient detail within the EA previously prepared to support Corps approval action on these projects. The analysis documented in this EA incorporates the previously prepared NEPA documents by reference and supplements the impact analysis as it relates to potential effects from rock excavation. The following documents are incorporated by reference:

1. Willow Island Final Environmental Assessment and Finding of No Significant Impact (FONSI), U.S. Army Corps of Engineers, November 2010.
2. Final Environmental Impact Statement for Hydroelectric Development in the Upper Ohio River Basin, Federal Energy Regulatory Commission, September 1988.

Copies of the document were made available for public viewing at the following locations:

Pleasants County Public Library
101 Lafayette Street
St. Mary's, WV 26170
(304) 684-7494

The documents may also be viewed at the following website: http://www.lrh.usace.army.mil/projects/review/. Copies of the Draft Supplemental EA may be obtained by contacting the Huntington District Office of the Corps of Engineers at (304) 399-5276. Comments pertaining to the documents may be submitted on the website named above, by e-mail to: LRHPublicComments@usace.army.mil

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Table of Contents

1.0 INTRODUCTION……..... 1

2.0 DESCRIPTION OF ALTERNATIVES CONSIDERED IN THIS SUPPLEMENTAL EA…..... 2

2.1 Rock Excavation by Blasting……..... 2

2.2 Rock Excavation by Mechanized Equipment……..... 2

2.3 Alternatives Eliminated from Further Consideration…… 2

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF PROJECT ALTERNATIVES…….. 3

3.1 Noise…… 3

3.2 Aquatic Environment…… 5

3.3 Terrestrial Environment……... 6

4.0 CONCLUSION…… 7

Appendices:

Appendix A – Noise Impact Calculations
Appendix B – Distribution List

1.0 INTRODUCTION

The Secretary of the Army is authorized under Section 14 of the Rivers and Harbors Act of 1899 [33 US Code (Navigation and Navigable Waters) – Section 408] to permit alterations and/or modifications to existing United States Army Corps of Engineers (Corps) projects in certain circumstances. The Secretary of the Army has delegated Section 408 approval authority to the Chief of Engineers. Hydropower projects that will be attached to Corps projects are considered an alteration/modification that requires evaluation and approval by the Chief of Engineers.

On September 27, 1989, the Federal Energy Regulatory Commission (FERC) issued a 50-year license to construct, operate, and maintain the proposed 35-megawatt (MW) Willow Island Hydroelectric Project, Commission Project No. 6902. The original license holder for the project was the City of New Martinsville, West Virginia. The City of New Martinsville has transferred the license to American Municipal Power (AMP). The project would be located at Willow Island Lock and Dam (Willow Island) (Figure 1). This non-federal hydropower plant qualifies as an alteration/modification of a Corp project. As such, it was reviewed and approved, 1 December 2010, under Section 408 of 33 US Code (Navigation and Navigable Waters) within Section 14 of the Rivers and Harbors Act of 1899. The Corps Section 408 review included, but was not limited to, analysis of potential hydrology and hydraulic changes, engineering design evaluation, and analysis and evaluation of potential environmental impacts.

An Environmental Assessment (EA) was completed to document the effects of the licensing action by FERC. FERC concluded the National Environmental Policy Act (NEPA) process with a Record of Decision (ROD). Subsequently, the license for the construction of the Willow Island Hydroelectric Project (FERC Project No. 6902-0031) was issued to the City of New Martinsville on September 27, 1989 and subsequently transferred to AMP. However, because the scale and scope of Environmental Impact Statement (EIS) was very broad and programmatic in nature, the Corps determined that an updated and site specific analysis must be completed to fulfill agency NEPA requirements in the form of an EA. The EA was circulated for public and agency review in November 2010. Comments were considered and addressed and the Corps concluded the NEPA process with a Finding of No Significant Impact (FONSI) executed December 2010. It has come to the attention to the Huntington District (District) that effects from construction activities, specifically in regards to rock excavation, were not provided in sufficient detail within the EA prepared to support the Section 404/408 actions. The discussion included in this EA incorporated the previously prepared NEPA documents by reference and supplements the impact analysis as it relates to potential additional effects from rock excavation. The following documents are incorporated by reference:

1. Willow Island Final Environmental Assessment and Finding of No Significant Impact (FONSI), U.S. Army Corps of Engineers, November 2010.
2. Final Environmental Impact Statement for Hydroelectric Development in the Upper Ohio River Basin, Federal Energy Regulatory Commission, September 1988.

The brief and concise nature of this document is consistent with the 40 CFR requirements of the NEPA to reduce paperwork and delay by eliminating duplication with existing environmental documentation, incorporating pertinent material by reference and by emphasizing interagency cooperation. Data collection and analysis for this document was performed by the U.S. Army Corps of Engineers (USACE) with the assistance of the AMP and their consultants. As this EA is specific in regards to effects of blasting, alternative discussions are limited to those that relate to rock excavation.

2.0 DESCRIPTION OF ALTERNATIVES CONSIDERED IN THIS SUPPLEMENTAL EA

2.1 Rock Excavation by Blasting

Blasting for rock excavation would entail drilling, site preparation, and charge detonation within the cofferdam area every 1-2 days. Area residents will be given notice of the impending detonation via siren which can be heard from one-half mile distance. This would provide advance notice of detonation to nearby residences. To accomplish rock excavation necessary for project construction, blasting is expected to require approximately three months.

2.2 Rock Excavation by Mechanized Equipment

Rock excavation through mechanized equipment would likely entail drilling and site preparation and use of multiple specialized pneumatic impact equipment. As this method is much slower than blasting, the equipment would be expected to be utilized eight hours a day for a period of ten months.

2.3 Alternatives Eliminated from Further Consideration

Rock excavation can also be accomplished through use of expansive chemicals. However, these methods are utilized in highly specialized situations where vibration and noise from other methods is unacceptable. These methods are used in highly urbanized environments where buildings and noise receptors are in very close proximity. Due to the extreme cost and time of this method, it was determined unnecessary and eliminated from further consideration.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES OF PROJECT ALTERNATIVES

3.1 Noise

USACE personnel determined during a November 5, 2009 field visit that the project area is a typical rural area where ambient noise levels are relatively low with noise increases from local car and truck traffic, as well as the operation of farm and lawn maintenance equipment. Noise is measured in "Weighted" decibels or dBA, and the baseline noise for the project area is around 56 dBA (EPA, 1978).

Construction of the proposed hydropower facility would temporarily increase ambient noise levels due to the operation of construction equipment and rock excavation. Rock excavation would entail the greatest potential for adverse effects. Outside of excavation activities, however, the increases in ambient noise levels will be localized to the specific construction area. Minimum equipment, other than that required for rock excavation necessary for project construction, include diesel backhoes, diesel front end loaders, dump trucks, a concrete mix truck, and a crane. The noise generated from this type of equipment ranges from 80 and 85 dBA, measured from a distance of 50 feet (EPA, 1971). If all six pieces of equipment were operated at the same time, the maximum total noise generated would be 91 dBA (EPA, 1978). Given the distance of potential receptors to construction and their proximity to surrounding woodlots, forested areas and ambient noise from nearby a chemical plant, noise from routine construction equipment is expected to be negligible. Figure 1 identifies potential receptors within 3,500 feet of the construction area.

Figure 1. Potential Receptors and Distances from rock excavation area

As the area is rural and sparsely developed, there are a few receptors in the area. Receptors include five homes, one church, and three buildings within an industrial complex that are within 3,500 feet of the blast area. The closest receptor is an industrial complex, which lies approximately 1,359 feet from the project area.

Although there are several metrics available in the United States, the most accepted metric for assessing noise impact is the A-weighted day-night sound level (DNL). DNL was developed by the US Environmental Protection Agency (EPA) in the early 1970's. The American National Standards Institute (ANSI, 1996) and the National Research Council (NRC, 1977) recommend the use of DNL as do most federal agencies and administrations. Moreover, as this metric is very sensitive to individual loud events, we feel this is an appropriate metric to assess impacts from blasting for excavation in the case of the Willow Island Hydropower Project. This metric embodies several relatively simple concepts.

(a) The "A" frequency-weighting is used to filter the sound in a manner that tends to account for how people respond to noise—an approximation to loudness.
(b) All the sound energy from an event, such as a single airplane flyby, is summed to account for the event duration as well as its loudness.
(c) The sound energy of each event is summed separately into the total.
(d) The sound energy of each event at night is multiplied by ten before it is added into the total.

First, we predict or measure the A-weighted sound exposure (SE) of each event. Sound exposure is basically a measure of the loudness multiplied by the time it takes for the activity; i.e. loudness times duration. In the case of blasting, this was completed using an estimated blast event of 126 dB and a natural attenuation rate that decreases 6 dB with every doubling of distance after 50 feet. Blasting would occur one second a day over three months of blasting. In the case of rock excavation utilizing mechanized equipment, we assumed an estimated 96 db with the same attenuation for eight-hours a day for a year.

Second, the sound exposure from each individual blast is added together to develop the total sound exposure. By doing this we are accounting for the repetitions of each blast.

Finally, the sound exposure of each blast that occurs at night (nighttime penalty) is multiplied by ten before adding it into the daily total. As it is assumed no rock excavation would occur at night, no nighttime penalty is added for any alternative.

3.1.1 Noise Impacts from Rock Excavation Utilizing Blasting

Studies conclude the DNL for blasting at the closest receptor to be approximately 5dB. This value to other receptors in the area would diminish due to increasing distances and additional attenuation that would result. The Department of Defense recommends a minimum criterion DNL value of 65dB to assess impact in residential areas. This recommended value is most commonly used when assessing the compatibility of an area for long-term operation of air installations. As the values are well below the recommended DNL level and the activity will only occur over a period less than 3 months, no significant effects from blasting is expected.

3.1.2 Noise Impacts from Rock Excavation Utilizing Mechanized Equipment

Studies conclude the DNL for rock excavation utilizing mechanized equipment at the closest receptor to be approximately 66dB. This value to other receptors in the area would diminish due to increasing distances and additional attenuation that would result. As the values are above the recommended DNL level, further detailed analysis would be performed to determine significance of effect to individual receptors and subsequent mitigation.

3.2 Aquatic Environment

The reservoir created by the Willow Island Locks and Dam is 35.3 miles long and encompasses 6,400 acres. The river bottom is predominantly sand, gravel, and silt/clay with the primary areas of spawning habitat occurring in tributary streams and backwater embayment areas unaffected by river traffic.

The Ohio River in the project vicinity supports a wide variety of warmwater fishes. Game fish include Walleye, Sauger, Largemouth Bass, Smallmouth Bass, Spotted Bass, Rock Bass, Catfish, Striped Bass, Hybrid Striped Bass, Sunfish, Crappie, and White Bass. Nongame fish include Gar, Bullheads, Skipjack Herring, Mooneye, Chubs, Shiners, Drum, Suckers, Gizzard Shad, and Carp. This project is located within the known or historic range of the following endangered species: the Fanshell Mussel (*Cyprogenia stegaria*), and the Pink Mucket Pearly Mussel (*Lampsilis orbiculata*). Candidate species included the Sheepnose Mussel (*Plethobasus cyphyus*). The Snuffbox Mussel (*Epioblsma triuetra*) is considered a species of special concern.

The licensee has conducted a mussel survey and provided a copy of the survey report and monitoring plan to the USACE and the United States Fish and Wildlife Service (USFWS) (USACE Willow Island EA Appendix C, 2010). No federally listed threatened or endangered mussel species were collected during the survey. In addition, all native mussels were removed from the area to be affected by the construction of the proposed project and were relocated to a suitable site downstream, under the direction of West Virginia Department of Natural Resources (WVDNR). The USACE completed a review of this survey and monitoring plan and, in consultation with the USFWS, determined no adverse affects to the above listed mussel species would occur with implementation of the recommended plan. USFWS has concurred with this determination **(**USACE Willow Island EA Appendix L, 2010).

With the alteration of the entire Ohio River by the construction of locks and dams and channel improvements for navigation, the connectivity and passage of fish up and down the river has been affected. Fish community surveys have been conducted by the Ohio River Valley Sanitation Commission (ORSANCO) in the Willow Island Locks and Dam pool since 1957 and electro-fishing since 1977. In 2006, ORSANCO conducted a biological study of Willow Island L&D pool to determine the overall condition of the Ohio River fish community. These fish surveys yielded a total of 47 species representing ten families. Three fish species collected during the study were listed in Ohio as threatened or of special concern, including River Redhorse (*Moxostoma carinatum*), River Darter (*Percina shumardi*), and Channel Darter (*Percina copelandi*) (ORSANCO, 2006 b). Overall, results of this study indicated the fish population in the Willow Island Locks and Dam Pool was in exceptionally good condition,

primarily because of habitat conditions and the relatively high abundance of pollution intolerant fish species. Impact to the fish community is expected to be insignificant given licensee adherence to the sequential mitigation process as outlined and required by Articles 404 and 405 of the FERC license.

3.2.1 Impact to Aquatic Environment from Rock Excavation Utilizing Blasting

Blasting for rock excavation would entail drilling, site preparation, and charge detonation within the cofferdam area every 1-2 days. Blasting impacts to fish occur to the swim bladder and are caused by the sudden drop to below ambient hydrostatic pressure following the blast. These types of impacts are most commonly associated with blasting that occurs within aquatic habitats. However, when the blasting occurs on land, the land itself absorbs and buffers a large portion of the blast. The District has monitored such blasting events on the Kanawha River during the Marmet Lock Replacement Project. During that construction, no impacts to the fishery were found to be caused by blasting that had taken place on land [Steven Foster, Aquatic Biologist (USACE), pers. comm.]. Given that native mussels have been relocated, the District believes that it is unlikely that blasting would have any impact to mussel beds. No effect to aquatic resources is expected from this method of rock excavation.

3.2.2 Impact to Aquatic Environment from Rock Excavation Utilizing Mechanized Equipment

Similar to the vibrations associated with blasting, the land itself absorbs and buffers a large portion of vibrations associated with rock excavation equipment. Though vibrations would occur over a much longer period of time compared to blasting, attenuation of the vibrations would be expected to reduce effects such that they are negligible. No effect to aquatic resources is expected from this method of rock excavation.

3.3 Terrestrial Environment

The immediate 35 acres surrounding the blast site is within the construction work limits. The terrestrial resources at the site were significantly disturbed during construction of the Willow Island Locks and Dam between 1967 and 1976. This area currently supports sparse herbaceous vegetation and is poor habitat for wildlife. Adjacent areas to be impacted by the proposed project are also sparsely covered in second growth riparian forest assemblage typically found along the Ohio River. Outside of those limits, the area is a mix of forest, residential, agriculture, and some industry (See Figure 1). This area near Willow Island Locks and Dam is fragmented by fields and roads. The federally listed terrestrial species in the area are the Indiana Bat (*Myotis sodalis*) and the Eastern Cougar (*Puma concolor couguar*). The Bald Eagle (*Haliaeetus leuocephyus*) has been delisted from the threatened and endangered species list but remains protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668a-d). Based on the location and nature of the project and the absence of suitable habitat within the proposed impact, the USACE has determined the proposed project would have no effect on the Eastern Cougar or the Bald Eagle. Potential bat habitat would be mitigated by winter tree clearing therefore no adverse effect to the Indiana bat would occur.

3.3.1 Terrestrial Impact from Rock Excavation Utilizing Blasting

Blasting for rock excavation would entail drilling, site preparation, and charge detonation within the cofferdam area every 1-2 days. Due to the level of impact already associated with construction at the project site, the impacts of blasting on terrestrial resources are negligible.

3.3.2 Terrestial Impact Rock Excavation Utilizing Mechanized Equipment

Rock excavation through mechanized means would entail drilling, site preparation, and use of hoe rams within the cofferdam area daily for eight hours over a period of 12 months. Due to the level of impact already associated with construction at the project site, the impacts of mechanized equipment use on terrestrial resources are negligible.

4.0 CONCLUSION

The blasting alternative, when compared to mechanized rock removal, minimizes adverse effect in regards to noise annoyance to local receptors. Due to the prolonged nature of the mechanized rock removal alternative, it requires local receptors be subjected to more noise annoyance over the course of the construction period. In terms of effect on natural resources, mechanized rock removal and blasting are similar in their effect. Both would have virtually no effects on aquatic and terrestrial resources. As blasting minimizes impacts in regards to noise, it is considered the recommended alternative for rock excavation.

References:

Final Environmental Impact Statement for Hydroelectric Development in the Upper Ohio River Basin, Federal Energy Regulatory Commission, September 1988.

Schomer, Paul. 2001. A White Paper: Assessment of Noise Annoyance. Schomer and Associates, Inc., Champaign, Illinois.

Timerson, Brian. 1999. A Guide to Noise Control in Minnesota. Minnesota Pollution Control Agency. Saint Paul, Minnesota.

WHO. 1999. Guidelines for Community Noise, Edited by Birgitta Berglund, World Heath Organization, Thomas Lindvall, and Dietrich Schwela, Geneva, April 1999.

Willow Island Final Environmental Assessment and Finding of No Significant Impact (FONSI), U.S. Army Corps of Engineers, November 2010.

APPENDIX A

Noise Impact Calculations

Blasting Rock Removal Noise Assessment

Assessment of noise annoyance at the Industrial Complex due to blasting. An estimated value of 126 dB(A) was used for the blast site. The average measured dB(lin) at the Industrial Complex was 111dB(lin). It should be noted that Db(lin) is almost always higher than dB(A), the measure for noise assessment. This analysis did not include the additional noise of the warning horn because it is being used as a noise mitigation tool. Using Shomer and Associates report (2001), the calculated Day-Night Sound Level (DNL) was 51.62 per day. Blasting resulted in a yearly average total day-night sound exposure of 4.95 dB. The Department of Defense "recommends a minimum criterion value of 65 DNL to assess impact in residential areas. . ." This recommended value is most commonly used when assessing the compatibility of an area for air installations. At the maximum estimated sound level, 98 dB(lin), a receptor standing in front of the Industrial Complex (approx. 1359 linear feet from blast zone) during the blast would recieve sound exposure equivalent to a short range shout. On average, these blasts occur every other day for a period of 1 second. The mitigative use of the alert horn allows receptors to move indoors to further decrease their sound level exposure. To date, there have been no complaints from local residents about the increase in noise due to construction or, more specifically, blasting. The yearly average was based on 35 total days of blasting.

Reduction of dB(A) to the Industrial Complex (from distance)

Estimated dB(A) at blast site (50 ft away) =	126	* Estimated sound level for blasting
Attenuation (6 dB(A) per doubling of distance) =	28	* Assumes no attenuation from vegetation & topography (conservative)
Estimated Initial dB(A) at Industrial Complex=	98	

Blast (Average)

Calculation	Pasques Time		Sound Exposure
2.523829378	2.52	1	2.523829

Total SE (DNSE)
2.52

Day-Night Sound (DNL, dB)
48.62 per day while blasting
4.66 yearly average total day-night sound exposure

Mechanized Rock Removal Noise Assessment

Assessment of noise annoyance at the Industrial Complex due to mechanized rock removal. After speaking to the construction contractors, an assumption was made that removal of bedrock would take ten times the amount of time compared to blasting and would require use of multiple pieces of equipment simultaneously. For these calculations, a four hoe rams are used for rock removal (96 dB). Sound energy dissapation accounts for a 28 dB loss at the Industrial Complex because of the approximate 1359 linear feet from the construction site. Mechanized removal resulted in a yearly average total day-night sound exposure of 63.21 dB. The yearly average was based on 365 days of total mechanized rock removal for 8 hours per day. According to the construction contractor, it would be necessary to operate the four hoe rams everyday for the entire year in order to complete the rock removal during that year's time. The Department of Defense "recommends a minimum criterion value of 65 DNL to assess impact in residential areas. . ." This recommended value is most commonly used when assessing the compatibility of an area for air installations.

Reduction of dB(A) to the Industrial Complex (from distance)

Estimated dB(A) at Site for one hoe ram (50 ft away) =	90
Estimated dB(A) at Site for four hoe rams (50 ft away) =	96
Attenuation (6 dB(A) per doubling of distance) =	28
Estimated Initial dB(A) at Industrial Complex =	68

* One Hoe Rams operates at ~90 dB(A)
* Four hoe rams results in an increase of 6 dB(A) at the project site
* Assumes no attenuation from vegetation & topography (conservative)

Mechanized (Average)

Calculation	Pasques	Time	Sound Exposure
0.002523829	0.003	28800	72.68629

Total SE (DNSE)
72.68629

Day-Night Sound (DNL, dB)
63.21 per day
63.21 yearly average total day-night sound exposure

APPENDIX B

Distribution List

DISTRIBUTION LIST

Pleasants County Commission
301 Court Ln.
St. Marys, West Virginia 26170
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