US Army Corps of Engineers ®
Huntington District

MELDAHL LOCKS AND DAM
AMERICAN MUNICIPAL POWER
PROPOSED HYDROELECTRIC POWER PROJECT
BRACKEN COUNTY, KENTUCKY
SUPPLEMENTAL
DRAFT ENVIRONMENTAL ASSESSMENT

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

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ABSTRACT: On October 6, 2006, the City of Hamilton, Ohio, (Licensee) filed an application with the Federal Energy Regulatory Commission (FERC) for an original license to construct and operate the proposed 105-megawatt (MW) Meldahl Hydroelectric Project. The project would be located at Captain Anthony Meldahl Locks and Dam (Meldahl) (Figure 1). This non-federal hydropower plant qualifies as an alteration/modification of a Corp project. As such, it was reviewed and approved, 19 March 2011, 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. It has come to the attention to the District that effects from construction activities, specifically in regards to rock excavation was not detailed within the Environmental Assessment (EA) prepared to support the 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 additional effects from rock excavation.

This supplemental EA assesses potential impacts to resources caused by the excavation of rock by mechanized equipment and blasting. Both would have virtually no effects on aquatic and terrestrial resources. The greatest impact due to the rock excavation is that of noise annoyance. Using the Environmental Protection Agency developed method for determining noise annoyance, this EA compares the Day-Night sound levels of each of the alternatives. 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. As blasting minimizes impacts in regards to noise it is considered the recommended alternative for rock excavation.

For additional information please contact:

Mr. Jonathan J. Aya-ay, Chief
Environmental Analysis Section, Planning Branch
U.S. Army Corps of Engineers
502 8th Street
Huntington, West Virginia 25701-2070
Commercial Telephone: (304) 399-5872
Commercial Fax: (304) 399-5136

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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 October 6, 2006, the City of Hamilton, Ohio, (Licensee) filed an application with the Federal Energy Regulatory Commission (FERC) for an original license to construct and operate the proposed 105-megawatt (MW) Meldahl Hydroelectric Project. The project would be located at Captain Anthony Meldahl Locks and Dam (Meldahl) (Figure 1). This non-federal hydropower plant qualifies as an alteration/modification of a Corp project. As such, it was reviewed and approved, 19 March 2011, 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 NEPA process with a signed Finding of No Significant Impact (FONSI). Subsequently, the license for the construction of the Meldahl hydroelectric project (FERC Project No. 12667-003) was issued to the City of Hamilton on June 25, 2008. However, because the scale and scope of EA was very broad, 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 April 2009. Comments were considered and addressed and the Corps concluded the NEPA process with a Finding of No Significant Impact executed September 2009. 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 prepared to support the 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. Meldahl Final Environmental Assessment and Finding Of No Significant Impact (FONSI), U.S. Army Corps of Engineers, September 2009.
2. Environmental Assessment for Hydropower License, Federal Energy Regulatory Commission, April 2008.

The brief and concise nature of this document is consistent with the 40 CFR requirements of the National Environmental Policy Act (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 City of Hamilton 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 and 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 ½ mile distance. This would provide advance notice of detonation to nearby residences. To accomplish rock excavation necessary for project construction the blasting is expected to require approximately three (3) 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 constantly (8 hours a day) for a period of ten (12) 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

Corps 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, rail 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). In the unlikely circumstance that all six pieces of equipment were operated at the same time, the maximum total noise generated would be 91 dBA (EPA, 1978) at the construction site. Given the distance of potential receptors to construction and their proximity to both a highway and railroad, noise from routine construction equipment is expected to be negligible. Figure 1 identifies potential receptors within 3000 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 few receptors in the area. Receptors include eight homes within 3000 feet of the blast area, all of which lie south of the project area. The closest receptor is a home, which lies approximately 900 feet from the project area and is currently rented by project construction personnel.

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 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 Meldahl 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 at 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. Blast would occur 1 second a day over the 3 months of blasting. In the case of rock excavation utilizing mechanized equipment we assumed an estimated dB of 96 with the same attenuation for 8-hours a day for a year.

Second, the sound exposure from each individual blast is added to develop the total sound exposure. In this way 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 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. The Kentucky State Nature Preserves Commission indicates that several species of special concern may occur in or near the proposed project site, including paddlefish, silver lamprey, and black buffalo. There are no known federally listed threatened or endangered fish species, or species proposed for listing, in the project area.

With the alteration of the entire Ohio River by the construction of locks and dams and channel improvements for navigation, free-flowing fishery habitat is limited primarily to areas immediately downstream of the navigation dams. Downstream of Meldahl locks and dam, a tailwater area exists that is approximately 1 mile long. Because of its scarcity in the Ohio River, the Kentucky Department of Fish and Wildlife Resources (Kentucky DFWR) has identified this habitat as an important resource for the Ohio River fishery. Kentucky DFWR considers the Meldahl locks and dam tailwater to be an excellent fishery. The Ohio Division of Wildlife (2008) rated the fishing outlook for 2007 in the Meldahl tailwater as excellent for sauger; good for flathead catfish, channel catfish, and hybrid striped bass; and fair for white bass and striped bass. Additionally, the project area supports a commercial fishery for freshwater drum, carp, and buffalo. Based on fish collection surveys conducted in the Markland and Meldahl pools, as well as in the Meldahl lock chamber, gizzard shad, freshwater drum, and emerald shiner appear to be the most abundant fish species in the vicinity of the project.

The reservoir created by the Meldahl locks and dam is 95 miles long and encompasses 21,809 acres, of which 1,182 acres are backwater embayments. 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.

There is one known mussel bed adjacent to the Big Snag Creek sandbar. McLane Environmental Services (2006) sampled along Big Snag Creek sandbar and identified 11 species of mussels, including sheepnose, a proposed species for listing under the ESA. The sheepnose is a freshwater mussel that reaches a size of approximately 5 inches in length and can inhabit medium to large-sized rivers. While this species has been found in riffles on cobble substrates, it is generally found on mud, sand, or gravel at a depth of six feet or greater, and appears to persist in reservoirs. Known host fish species include sauger and central stoneroller. Although it is still widely distributed in the Ohio and Mississippi River basins, the sheepnose is thought to have been extirpated from the majority of its former range and the remaining populations are small and isolated (Nature Serve, 2008).

3.2.1 Impact to Aquatic Environment from Rock Excavation Utilizing Blasting:

Blasting for rock excavation would entail drilling and site preparation, and charge detonation within the cofferdam area every 1-2 days. Impacts to fish, from blasting, occur to the swim bladder and are caused by the sudden drop 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.]. The closest mussel bed lies approximately 3500' from the blasting area along the left descending bank. Given that distance, the District believes that it is unlikely that blasting would have any impact to those 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 40 acres surrounding the blast site is within the construction work limits. This area has already been cleared of all vegetation and provides poor habitat for wildlife. Outside of those limits, the area is a mix of forest, agriculture, and residential (See Figure 1). This area near Meldahl Dam is fragmented by fields, roads, and railroad tracks. The Indiana Bat is the only federally listed terrestrial species in the area.

3.3.1 Terrestrial Impact from Rock Excavation Utilizing Blasting:

Blasting for rock excavation would entail drilling and 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 and site preparation, and use of hoe rams within the cofferdam area daily for 8 hours daily 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. 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:

NatureServe. 2008. NatureServe Explorer: An online encyclopedia of life. Version 7.0. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: April 14, 2008).

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.

APPENDIX A

Noise Impact Calculations

Blasting Rock Removal Noise Assessment

Assessment of noise annoyance at the Sharpe rental house due to blasting. An estimated value of 126 dB(A) was used for the blast site. The average measured dB(lin) at the Sharpe house 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, 101 dB(lin), a receptor standing in front of the Sharpe rental house (approx. 815 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 Sharp Rental House (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) =	25	* Assumes no attenuation from vegetation & topography (conservative)
Estimated Initial dB(A) at Sharpe House=	101	

Blast (Average)

Calculation	Pasques	Time	Sound Exposure
5.035701647	5.04	1	5.035702

Total SE (DNSE)
5.04

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

Mechanized Rock Removal Noise Assessment

Assessment of noise annoyance at the Sharpe rental house 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 25 dB loss at the Sharpe house because of the approximate 815 foot distance from the construction site. Mechanized removal resulted in a yearly average total day-night sound exposure of 66.21 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 Sharp Rental House (from distance)

Estimated dB(A) at Site for one hoe ram (50 ft away) =	90	* One Hoe Rams operates at ~90 dB(A)
Estimated dB(A) at Site for four hoe rams (50 ft away) =	96	* Four hoe rams results in an increase of 6 dB(A) at the project site
Attenuation (6 dB(A) per doubling of distance) =	25	* Assumes no attenuation from vegetation & topography (conservative)
Estimated Initial dB(A) at Sharpe House =	71	

Mechanized (Average)

Calculation	Pasques	Time	Sound Exposure
0.005035702	0.01	28800	145.0282

Total SE (DNSE)
145.0282

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