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CMD 18-H4.1D

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Supplementary Information

Submission from Bruce Power Inc.

In the Matter of

Bruce Power Inc. – Bruce A and B Nuclear Generating Station

Request for a ten-year renewal of its Nuclear Power Reactor Operating Licence for the Bruce A and B Nuclear Generating Station

Commission Public Hearing – Part 2

May 28-31, 2018

Renseignements supplémentaires

Mémoire de Bruce Power Inc.

À l'égard de

Bruce Power Inc. - Centrale nucléaire de Bruce A et Bruce B

Demande de renouvellement, pour une période de dix ans, de son permis d'exploitation d'un réacteur nucléaire de puissance à la centrale nucléaire de Bruce A et Bruce B

Audience publique de la Commission – Partie 2

28-31 mai 2018

Canada

May 23, 2018

NK21-CORR-00531-14428
NK29-CORR-00531-15130
NK37-CORR-00531-02989

Mr. M. Leblanc
Commission Secretary
Canadian Nuclear Safety Commission
P.O. Box 1046
280 Slater Street
Ottawa, Ontario
K1P 5S9

Dear Mr. Leblanc:

Application for
the Renewal of the Power Reactor Operating Licence: Supplemental Material

The purpose of this letter is to supplement Bruce Power's application for the renewal of the Power Reactor Operating Licence provided in Reference 1 and to address questions from Part One of the public hearing.

Updates to the community interest reports previously provided in Reference 2 are provided in Enclosure 1, Enclosure 2, and Enclosure 3.

These supplementary community interest reports were previously submitted to the Commission on May 16, 2018 as confidential enclosures to Reference 3. However, these confidential enclosures were subsequently withdrawn on May 18, 2018 (Reference 4), after questions were raised by the Commission staff about the confidentiality of the material.

Bruce Power has further considered this matter and determined that the information contained in these enclosures is not confidential and should be before the Commission, given Bruce Power's commitment to update the Commission on its engagement efforts with the Saugeen Ojibway Nation (SON), Métis Nation of Ontario (MNO), and the Historic Saugeen Métis (HSM). The SON, the MNO, and the HSM were provided copies of their respective supplementary community interest reports on May 17, 2018. In an effort to reduce the volume of material being submitted, we have removed the attachments to the supplementary community interest reports, but we can provide this information to the Commission upon request.

Bruce Power Frank Saunders Vice President - Nuclear Oversight and Regulatory Affairs
P.O. Box 1540 B10 4th floor W Tiverton ON N0G 2T0
Telephone 519 361-5025
frank.saunders@brucepower.com

In response to Appendix G of the written submission of the SON (CMD 18-H4.146), we have provided (Enclosure 4) the responses provided by Bruce Power to the SON with respect to the 296 comments on the 2012 Impingement and Entrainment Plan. This response was previously provided to Commission staff and the SON on December 4, 2013 (Reference 5), and is being submitted to ensure that Bruce Power's further responses on these issues are accurately reflected in the record.

If you require further information or have any questions regarding this submission, please contact Mr. Maury Burton, Department Manager, Nuclear Regulatory Affairs, at 519-361-2673 extension 15291, or maury.burton@brucepower.com.

Yours truly,

Frank Saunders
Vice President Nuclear Oversight and Regulatory Affairs
Bruce Power

cc: CNSC Bruce Site Office (Letter only)

Encl.

References:

1. Letter, F. Saunders to M.A. Leblanc, "Application for the Renewal of the Power Reactor Operating Licence", June 30, 2017, NK21-CORR-00531-13493 / NK29-CORR-05031-14085 / NK37-CORR-05031-02768.
2. Letter, F. Saunders to M. Leblanc, "Supplement to the Application for the Renewal of the Power Reactor Operating Licence: Bruce Power Indigenous Community Interest Reports for Saugeen Ojibway Nation, Historic Saugeen Metis and Metis Nation of Ontario", January 24, 2018, NK21-CORR-00531-14156 / NK29-CORR-00531-14842 / NK37-CORR-00531-02912.
3. Letter, F. Saunders to M. Leblanc, "Application for the Renewal of the Power Reactor Operating Licence: Supplemental Material", May 16, 2018, NK21-CORR-00531-14285 / NK29-CORR-00531-14980 / NK37-CORR-00531-02956.
4. Email, M. Burton to M. Leblanc, "Withdrawal of Part of the Bruce Power Supplemental Submission for Hearing 18-H4", May 18, 2018, NK21-CORR-00531-14417 / NK29-CORR-00531-15119 / NK37-CORR-05031-02984.
5. Email, F. Saunders to J. Stevenson and E. Cameron, "I&E Comments Review", December 4, 2013, NK21-CORR-00531-11001.

Enclosure 1

B-REP-03443-15MAY2018

Bruce Power Indigenous Community Interests: Saugeen Ojibway Nation (Supplementary Report)

NK21-CORR-00531-14428
NK29-CORR-00531-15130
NK37-CORR-00531-02989

Bruce Power™

Bruce Power Indigenous Community Interests – Saugeen Ojibway Nation

B-REP-03443-15MAY2018

UPDATE MAY 15, 2018

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1.0 EXECUTIVE SUMMARY

On June 30, 2017, Bruce Power applied to the Canadian Nuclear Safety Commission (the "CNSC" or "Commission") to renew its Nuclear Power Reactor Operating Licence for the Bruce Nuclear Generating Stations (the "Site") for 10 years and to undertake certain life extension activities, including Major Component Replacement ("MCR") for six reactors (the "Application"). The Application builds on the work that Bruce Power has undertaken since assuming responsibility for the operations of the Site in 2001 from Ontario Power Generation ("OPG") pursuant to a long-term lease of the Site. This includes a prior refurbishment of two reactors completed in 2012 which extended the life of these reactors to 2043. The life extension activities contemplated in the Application have all been previously carried out on the Site and have been the subject of previous licencing reviews and environmental assessments.

The Site is located within the traditional territory of the Saugeen Ojibway Nation ("SON") and the traditional harvesting territories of the Historic Saugeen Métis ("HSM") and the Métis Nation of Ontario ("MNO"). Since December 2015, Bruce Power has been providing information about the Application to the SON, the HSM, and the MNO. It provided a copy of the Application to each community in July 2017 and has had meetings with the SON, the HSM, and the MNO to discuss any concerns and answer any questions that they have. In January 2018, Bruce Power filed three Indigenous Community Interest documents which provide further information about each community, including their asserted and/or established Aboriginal and treaty rights and how the potential impacts of the Application on each community were assessed. These documents also detail the issues that the SON, the HSM, and the MNO have raised about the Site in past regulatory reviews, how these issues were assessed and taken into account in the Application, and Bruce Power's efforts to engage and share information with each community about the Application.

This document is intended to supplement *Bruce Power Indigenous Community Interests – Saugeen Ojibway Nation* B-REP-03443-17JAN2018 (the "SON CI"). The purpose is to provide further information about the discussions that have taken place since January 1, 2018 between Bruce Power and the SON about the Application and employment, training, and business opportunities for the SON relating to the Site. This is in addition to the meeting that Bruce Power and the SON had on December 21, 2017 about the Application and has included:

- Five additional meetings between Bruce Power and the SON Environmental Office (the "SON EO") to discuss issues and questions relating to the Application and associated regulatory approvals, including:
    - Mitigation measures (for impingement, entrainment, and thermal effects) and fisheries offset projects proposed in the Fisheries Act Authorization application;
    - The methodology used to prepare the Environmental Risk Assessment ("ERA") and Predictive Effects Assessments ("PEA");
    - Climate change and cumulative effects;
    - SON and Bruce Power Engagement with the CSNC, Department of Fisheries and Oceans ("DFO"), and Ministry of Environment and Climate Change ("MOECC") regarding various regulatory matters;

- The assessment of thermal effects and the Thermal Environmental Compliance Approval Application (the "ECA Application"); and
- Environmental monitoring and stewardship initiatives.

- A tour of the Site for the SON EO and three SON councillors to help further explain how impingement and entrainment occurs;
- Three meetings between SON and Bruce Power leadership to discuss employment, training, and business opportunities from the Site and life extension investments and ways to enhance the SON's involvement in regulatory decision-making, environmental monitoring, and stewardship activities, which included some discussions relating to the Application.

The SON EO also attended a meeting between Bruce Power and officials from the CNSC and DFO to discuss issues relating to the Fisheries Act Authorization application, with a particular focus on the draft offset plan. There has also been correspondence, telephone calls, and an additional meeting between Bruce Power and the SON EO to address capacity funding, general relationship issues, and logistical/meeting planning issues, among other things the SON were also invited to attend open houses about the Application which were held in January 2018. All of these meetings are in addition to the meetings that the SON have had with CNSC staff and the correspondence that they have exchanged about the Application in 2017 and 2018.

The SON have not requested any other meetings with Bruce Power to discuss issues relating to the Application, although Bruce Power and the SON are planning for further meetings in May and June to continue discussions from the leadership meetings, which include discussions in relation to future environmental monitoring and stewardship initiatives. In meetings with Bruce Power, the SON have expressed concerns about:

- Impacts to fish from impingement, entrainment, and thermal effects and the adequacy of current mitigation measures;
- The adequacy of environmental monitoring and the fisheries data that was relied upon by Bruce Power;
- The adequacy of the approach to assessing impacts in the Application, including ERA/PEA methodology, the assessment of cumulative effects, and the need to assess impacts from climate change;
- Legacy issues and nuclear waste; and
- SON employment, training, and financial participation in the Site.

The SON have also raised issues with Bruce Power's characterization of certain information in the SON CI and Bruce Power's assessment of impacts on the SON's asserted and established Aboriginal and treaty rights from the continued operations and life extension of the Site. Bruce Power has indicated on several occasions that it is open to any specific feedback on the document. The SON have not provided any information to Bruce Power that would change its assessment that the continued operation of the Site and the life extension activities will likely not have an appreciable impact on the

SON's asserted and established rights and that any impact would at most be minimal. This assessment is consistent with previous assessments carried out since 2001. Bruce Power acknowledges that there is a minimal loss of fish every year due to impingement and entrainment but the SON have not provided any information to explain how this is having or will have an appreciable impact on the SON's asserted and established rights. To the extent there is an appreciable impact from the Site's continued operation and life extension, Bruce Power remains of the view that it would at most be minimal and would be no different than what is currently experienced from the Site's operations, which has been safely operating in the SON's traditional territory for decades and has previously undergone refurbishment. Bruce Power is, however, willing to work with the SON on additional monitoring measures to verify its conclusions.

In response to the concerns and questions raised by the SON, Bruce Power has provided further information about current mitigation measures for impingement, entrainment and thermal effects, the alternative mitigation measures that have been considered by Bruce Power, and why these additional measures are not feasible, appropriate, and/or necessary to deploy. Bruce Power has also provided further information about its approach to assessing impacts in the Application, including the PEA and the assessment of cumulative effects and discussed the SON's concerns relating to this and future impacts of climate change.

While the issues that the SON have raised have not changed Bruce Power's conclusions regarding environmental impacts or impacts to SON Aboriginal and treaty rights, Bruce Power and/or CNSC staff have proposed a number of measures in response to the SON's concerns or identified existing or future mechanisms available to the SON to address their concerns:

- **Environmental Study and Monitoring Programs:** Bruce Power and the CNSC staff have proposed or will be undertaking several measures to continue to enhance already robust environmental monitoring, expand the SON's involvement in environmental monitoring, and reduce uncertainties in the current fisheries data:

    - Bruce Power has offered capacity funding to the SON and has begun discussions with the SON to develop a joint environmental monitoring and stewardship program that will enhance the SON's involvement in the design and implementation of monitoring measures. Bruce Power and the SON Environment Office recently met and agreed to an action plan for the development of a joint environmental monitoring program focused on three key areas of concern raised in this engagement: impingement/entrainment, thermal, and climate change;

    - The CNSC staff have invited the SON to be involved in CNSC's Independent Environmental Monitoring Program ("IEMP") and will be asking the Commission to direct CNSC staff to work with the SON on the planning and sampling for the IEMP. CNSC have asked the SON to identify any special foodstuffs or other environmental aspects of significance to the SON that could be included in the program and invited the SON to assist in gathering the samples to be monitored;

    - The CNSC staff will be proposing a thermal effluent study and analysis program which will focus on enhancements to environmental monitoring to support the development of a winter plume model and reduce uncertainties surrounding the

impact of the thermal plume. Bruce Power will also be consulting on the development of an updated thermal monitoring plan for the ECA Application;

- The CNSC staff will be proposing a fish impingement and entrainment study and analysis program that is focused on enhancing the previous impingement and entrainment monitoring plan. Bruce Power will be consulting with the SON on the development of an updated impingement and entrainment monitoring plan for the Fisheries Act Authorization application. This plan will be designed to understand and reduce uncertainties in the data collected and will be reviewed by both the CNSC and DFO; and

- Bruce Power will be consulting with the SON on the development of any additional enhancements to the environmental monitoring program beyond the above that are recommended or required by the CNSC.

- **Offset Measures for Impingement and Entrainment:** Bruce Power has repeatedly asked the SON since February 2016 to identify potential projects to offset impacts from impingement and entrainment as part of the Fisheries Act Authorization. Bruce Power has not received any proposals to date and has included proposed offset projects in the Fisheries Act Authorization. In an effort to advance dialogue with the SON about additional projects, Bruce Power proposed an additional five projects to the SON in February 2018 that would benefit the SON fishery and the environment as a whole and further offset any impacts from impingement and entrainment. These additional projects were identified through discussions with Saugeen First Nation community members. Bruce Power reiterated at a meeting with SON Leadership on May 2, 2018 that Bruce Power is interested in undertaking jointly developed environmental stewardship projects in the SON's traditional territory whether these are part of the Fisheries Act Authorization or not. Bruce Power remains open to other proposals from the SON and is eager to work with the SON on projects that could help benefit the SON fishery.

- **Alternative Mitigation Measures Assessment:** CNSC staff will be proposing a requirement in Bruce Power's proposed Licence Conditions Handbook that would require it to conduct a further assessment of feasible mitigation measures for thermal effluent and fish impingement/entrainment by December 31, 2019. This assessment is in addition to work that Bruce Power has already done to consider alternative mitigation measures as part of the ECA Application, the Fisheries Act Authorization application, and previous environmental assessments. It is being proposed in the event the level of risk changes in the future and notwithstanding the position of CNSC staff that additional mitigation measures are not necessary at this time and that Bruce Power has and will continue to make adequate provision for the protection of the environment. This information can be incorporated into the next ERA which will be submitted to the CNSC in 2022.

- **Climate Change:** Bruce Power has invited the SON to participate in and shape the scope of a 3-year climate change study that was recently announced by Bruce Power and the Council of the Great Lakes Region. This study will provide insight into, among other things:

- The state of climate change science in the Great Lakes Region;
- The impact of a changing climate on various ecosystems and sectors in the Great Lakes, including the region's aquatic environment, fisheries and Bruce Power's operations;
- The knowledge and decision-making systems companies and communities need to better manage changing risks as a result of climate; and
- The role that Bruce Power and other sectors might play in tackling climate change on a local and regional level, and how companies can adjust their corporate sustainability strategies to limit their impact.

The data gathered through these additional measures will be used to inform future applications for CNSC licence renewals, Fisheries Act Authorizations, ECA Applications, Permits to Take Water, and any changes required to monitoring program. It will also be incorporated into future ERAs and PEAs which are updated at least every five years or earlier if there are significant changes in operations or in the science on which the ERA is based. The next ERA and PEA will be submitted to the CNSC in 2022 prior to the restart of the first refurbished reactor in December 2023 under the current proposed schedule. As a lifecycle regulator, CNSC staff can direct Bruce Power to take further action in response to any updated information.

In addition to its engagement on the Application, Bruce Power has continued to make efforts to increase SON employment, training, education, and business opportunities from the Site. Since January 1, 2018, this has included:

- Discussing and proposing ways to enhance SON employment, training and business opportunities relating to the Site, including proposing specific business opportunities to the SON;
- Offering employment (directly or indirectly) to 12 additional SON members since January 1, 2018;
- Providing additional funding to support various initiatives of the Chippewas of Nawash and Saugeen First Nation through Bruce Power's Indigenous Community Investment Fund;
- Opening an office for the Indigenous Relations Suppliers Network ("IRSN") in Port Elgin in March 2018, which is designed to increase Indigenous employment and economic opportunities with Bruce Power suppliers; and
- Organizing a two-day career information session for SON members which is scheduled on May 17-18, 2018 and will include Bruce Power suppliers through the IRSN.

Discussions about business opportunities and ways to increase SON benefits from the Site are ongoing. These opportunities are in addition to the indirect benefits that the SON receive from the operation of the Site through its equity interest in the Bruce to Milton Transmission Reinforcement Project, which was constructed to transmit electricity from the Site and certain wind projects in the area to Hydro One's Switching Station in Milton.

Discussions between Bruce Power and the SON on these issues remain ongoing. Bruce Power is committed to working with the SON to advance these discussions and other shared priorities, including monitoring and mitigating any future impacts from the Site on SON rights and interests.

2.0 CONSULTATION AND ENGAGEMENT WITH THE SON

2.1 SON/Bruce Power Meeting – Initial Application Meeting (December 21, 2017)

As discussed in the SON CI, Bruce Power and the SON met to discuss the Application on December 21, 2017. The meeting was attended by four individuals from Bruce Power (the Manager of Environment, Community & Indigenous Relations, a technical expert in aquatic ecosystems, Bruce Power Legal counsel, and a person providing administrative support) and 10 individuals for the SON (three councillors from Chippewas of Nawash Unceded First Nation, three councillors from Saugeen First Nation, three lawyers for the SON, the SON Bruce Power Environment Office Coordinator, and the SON Community Engagement Coordinator). The meeting took place from 10:15am to approximately 1:50pm and a summary of the issues discussed are set out in the SON CI.

Since the meeting, Bruce Power and the SON have taken various steps to address the action items which are summarized below.

1. **ERA Update & CNSC Questions:** Bruce Power to provide the SON with additional information on the ERA update in December 2017 and the questions that were received from the CNSC on the ERA

Prior to the meeting on December 21st, Bruce Power advised the SON on December 8, 2017 that it updated the ERA and that this had been posted on Bruce Power's website. At the meeting, it was brought to Bruce Power's attention that the link to the ERA Update document was not working. Bruce Power fixed this issue the same day and confirmed that the SON were able to access the document.

In addition, Bruce Power provided the SON with the list of questions it had received from the CNSC on the ERA and the responses that had been provided by Bruce Power on January 16, 2018.

2. **Mitigation Measures:** Bruce Power to provide the SON with an overview of the technology available to mitigate fish impingement/entrainment and thermal effluents, including feasibility. It is expected that this explanation will include consideration of the design and construction of the stations, historical reviews, and more recent studies and monitoring programs along with a historical recap of mitigation measures for impacts to fish at the Site.

Bruce Power provided the SON with further information on alternative mitigation measures for fish impingement/entrainment and thermal effects on January 16, 2018. This included information on alternative mitigation measures that had been previously provided to the SON for the Fisheries Act Authorization and the ECA Application. The documents provided further information on the current mitigation measures and 16 alternative mitigation measures for thermal effects and 5 alternative mitigation measures for entrainment and impingement. The documents also explained why these alternative measures were less effective or not feasible and/or reasonable due to issues such as uncertainty of effectiveness, alternative adverse effects, space limitations, or costs relative to current impacts which are minimal.

This information was also further discussed in a meeting between the SON and Bruce Power on February 2, 2018 which was focused on mitigation measures for thermal effects, impingement and entrainment. This meeting is described in further detail in Section 2.2 below.

3. **SON to Provide Questions to Bruce Power**: SON to provide Bruce Power with their specific questions related to the ERA, PEA, thermal issues, and the Fisheries Act Authorization.

The SON have verbally asked Bruce Power numerous questions relating to these issues during meetings that were held on February 2, 15, 22, and 26. These questions were either answered during the meetings or through follow-up correspondence and, as of April 18, 2018, all questions have been answered. On March 26, 2018, Bruce Power sent a letter to the SON asking the SON to provide any outstanding questions relating to the Application so that they can be appropriately dispositioned. To date, Bruce Power has not received any further questions from the SON.

4. **SON Briefing on Regulatory Discussions:** The SON to brief Bruce Power on its interactions with CNSC and DFO on fisheries issues

The SON provided Bruce Power with a verbal update on the interactions they have had with the CNSC in relation to the Fisheries Act Authorization during the February 22, 2018 meeting. Details of this meeting are set out below in Section 2.4.

5. **Cumulative Effects:** The SON requested further detail on the assessment of cumulative effects

Bruce Power met with the SON on February 15, 2018 to discuss cumulative effects. Details of this meeting are set out below in Section 2.3.

6. **Draft Engagement Plan**: The SON to work towards an engagement plan and capacity funding and the parties will plan meetings.

On July 26, 2017, Bruce Power provided the SON with a copy of the Application and a draft Engagement Plan for discussion. Bruce Power followed up with the SON on several occasions to discuss the draft Engagement Plan (August 31, October 16, October 19, November 10, November 17, November 24, and November 28) and there was an initial discussion of the plan at the December 21st meeting as set out in the SON CI. This was following multiple attempts to engage dating back to 2015 when the 5-year regulatory look ahead was provided. On January 31st, the SON provided its own Draft Preliminary Engagement Plan to Bruce Power which included four technical meetings on the Application, a further Bruce Power and SON Leadership meeting in March 2018 (where a schedule for further meetings would discussed), and potential community information sessions which would be run by the SON. Since January 1st, Bruce Power and the SON have completed four technical meetings on the Application and three meetings between the leadership of Bruce Power and the SON. The SON advised Bruce Power on April 17, 2018 that they would be conducting community meetings after the Part II hearing.

With respect to capacity funding, Bruce Power did not receive a draft proposal for any additional capacity needs for the Application until March 26, 2018, despite repeated follow-up requests from Bruce Power since July 26th. Discussions relating to a portion of the proposal are ongoing but Bruce Power advised the SON on April 17, 2018 that it would provide a substantial portion of the capacity

funding (in addition to the annual base capacity funding that Bruce Power provides) once the SON provides certain supporting documentation. Bruce Power also advised that it would discuss the remaining funding requested once the SON provides further particulars. During the May 2, 2018 meeting, Bruce Power reiterated they are in a position to immediately release the substantial portion of capacity funding agreed to once the SON provides the requested supporting documentation. The discussion on the remaining capacity funding request is ongoing. This funding is in addition to the annual capacity funding that Bruce Power provides to the SON pursuant to the SON-Bruce Power Protocol Agreement (the "SON/Bruce Power Agreement").

2.2 SON/Bruce Power Meeting – Mitigation Measures (February 2, 2018)

On February 2, 2018, Bruce Power and the SON met to discuss current and alternative mitigation measures relating to impingement, entrainment, and thermal effects. The meeting was attended by the SON EO-Bruce Power Coordinator, Bruce Power's Manager of Environment, Community & Indigenous Relations, and three technical experts from Bruce Power who specialize in aquatic biology. The meeting took place between 10:00am to 3:00pm with a break for lunch.

Mitigation Measures for Impingement and Entrainment

Prior to meeting, Bruce Power provided the SON with two documents explaining how impingement and entrainment occurs, the current mitigation measures utilized by Bruce Power (velocity caps and a chain rope barrier on the Bruce B velocity cap) to reduce impingement and entrainment, and why alternative measures like fences, nets, chains, bubble curtains, and light deterrent systems are less effective. The information explained how velocity caps reduce fish loss by slowing down the speed of water entering the intakes and allowing juvenile and adult fish to escape before they are drawn into the station and that velocity caps remain an industry best practice to mitigate fish loss. It also explains that Bruce A does not have a chain-rope curtain because the cap was not engineered to withstand the additional weight of the chain, especially during the winter when frazil ice can form and add substantially more weight.

At the meeting, Bruce Power technical experts explained the Condenser Cooling Water (CCW) System, impingement and entrainment, and current mitigation technologies and other alternatives. Documents provided prior to the meeting were provided in hard copy and used to guide dialogue. Bruce Power explained how water is drawn in from Lake Huron and used for once-through cooling, as well as the difference between impingement and entrainment. There was a discussion about current and alternative mitigation measures for impingement and entrainment and Bruce Power advised the SON that the alternative measures have been considered but they are not as effective and tend to be species specific.

In response to questions from the SON, Bruce Power explained the difference between Bruce A and Bruce B's mitigation and variation in the impingement numbers year to year. Bruce Power explained that the number and abundance of species are reflective of what is occurring in the lake due to natural lake trends, however, the numbers (in terms of annual kg loss) are still very small and spread across numerous species. It was explained the Bruce A and Bruce B intakes are at different locations with different depths and local bathymetry. The Site is located on Douglas Point, which is a prominent headland into the lake. Currents move alongshore, generally from south to north and thus the location of the Bruce B intake (at 14m deep) is at the southern end of this headland where there is a steep drop off. Bruce A (at 10m deep) is at the northern end where the bathymetry becomes generally shallower

overall and has more shoals, so these physical differences in the lake bathymetry result in some changes to fish species presence and abundance. A chain rope curtain was installed on the Bruce B velocity cap to deter schooling fish (i.e. shad, smelt). There is no indication that a chain rope barrier at Bruce A would result in material differences, as the intake of fish is more impacted by the patterns of the lake current, fish community and wave action. For example, gizzard shad are prone to cold shock during late winter/early spring when naturally occurring seasonal temperature swings. This results in impingement of gizzard shad at both stations and trends (shown in the annual EMP report) do not clearly indicate the reduction of this at Bruce B due to the chain rope curtain presence.

During the meeting, the SON asked about the option of putting a camera on the velocity cap for monitoring purposes. This suggestion was taken back for review by technical staff. On April 17, 2018 Bruce Power communicated to the SON that a camera on the velocity cap was not feasible due to safety concerns, given the risk that it could break off and enter the CCW System and cause damage to equipment and pumps. Bruce Power acknowledged that it would be willing to explore the use of cameras for monitoring in other areas where there are no safety concerns.

The SON requested a tour of the facility to better understand the entire impingement and entrainment process from intake to plant to outfall. This tour was provided on March 28, 2018 and is further described in Section 2.7. They also asked for shape files showing the flowpath and water intake/effluent so that they can better explain the information to SON members. Bruce Power was unable to provide shape files for security reasons. However, alternative high-resolution images of site that include infrastructure locations, station buildings, and Lake Bathymetry were provided on March 21, 2018.

During the discussion on impingement and entrainment, there was a high-level discussion about developing environmental stewardship initiatives and the SON indicated that there was need to build SON capacity and address the mistrust that the SON have across the board. The SON also indicated that the criteria the regulator looks at is not the same as the criteria that the SON look at and there is a desire to incorporate cumulative effects and climate change into monitoring.

Mitigation Measures for Thermal Effects

Prior to the meeting, Bruce Power provided the SON with two documents that provided further information on thermal mitigation technologies and why additional mitigation measures are not necessary. These documents included information on 16 alternative thermal mitigation technologies, such as extending intake further offshore, increasing flow rate, installing mechanical or natural drift cooling towers, or installing cooling basins, and why they were not feasible or reasonable due to issues such as alternative adverse effects (i.e. to human health or fish), space limitations for necessary equipment, uncertainty of effectiveness, and costs relative to current minimal impacts.

During the meeting, Bruce Power provided a technical overview of thermal emissions and mitigation technology at each station. Discussion included thermal plume modelling and an overview on what the Ministry of Environment and Climate Change ("MOECC") has been provided to date. Bruce Power explained that to date the MOECC has typically only requested outputs of the model; however, two years ago the MOECC and the Golder Modeller who does work for Bruce Power met to go over the model in real time. This meeting also included the SON Science Representative at the time. The SON requested that it be included in future meetings between Golder and MOECC regarding thermal plume modelling and Bruce Power indicated that this would be discussed at one of the upcoming technical

meetings with the SON that MOECC and Golder would be attending on February 26, 2018. Details of this meeting are further described below in Section 2.4.

There was a lengthy discussion of the alternative mitigation technologies identified in the documents that Bruce Power provided to the SON, including increased flow rate, cooling towers, cooling basins, recirculation of water from forebay, and redirecting discharge. The SON asked if thermal mitigation was described in the ERA. Bruce Power indicated that the risk assessment was done and there was no trigger for it to be included in the ERA. The SON asked why this was the case. Bruce Power explained the tiered process and why a further assessment beyond Tier 2 was not required. This is similar to the screening assessments conducted in an EA, where additional mitigation is proposed if significant adverse effects are identified. The ERA process also includes detailed quantitative risk assessment, where applicable, to estimate more realistic exposure concentrations or effects, and a predictive effects assessments. Many elements of the Tier 3 process were undertaken as part of the ERA in support of the assessment of effects for thermal. Moreover, unlike an EA, the ERA is regularly reviewed and updated every five years and at key licensing milestones, in contrast to one-time environmental assessments the former CEAA process. Since mitigation measures already incorporated into the facility design are effectively implemented, the detailed quantitative risk assessment for thermal effects indicates that Bruce Power's impact to the Lake Huron fishery is very low, and further mitigation measures are not warranted.

SON indicated that there is a lack of trust with Bruce Power and that the SON feel that they need to collect their own information to verify what Bruce Power is reporting. Bruce Power indicated that it would be easy to add additional temperature monitoring sites in 2018 and that both parties could do tandem data collection. Bruce Power indicated that if SON wanted to be a part of the monitoring in 2018 they could partake in May and all they needed to do was outline how they would like to participate. This offer was repeated to the SON on February 22, and May 2, 2018. Following the May 2, 2018 meeting, there was agreement to meet again in the upcoming weeks to further map out environmental monitoring and stewardship initiatives. This meeting took place on May 10, 2018 and is further described in Section 2.9.

The SON expressed concerns surrounding the offsets that Bruce Power has proposed particularly stocking of Lake Trout by the Ontario Ministry of Natural Resources and Forestry (“MNRF”) as stocking is not necessarily a sustainable solution and observations from those who fish Lake Trout have indicated that juvenile Lake Whitefish have been found in the stomachs of Lake Trout. Bruce Power indicated that they would appreciate any suggestions from the SON on offset projects. Bruce Power first asked the SON to provide proposals for offset projects over two years ago during a meeting on February 8, 2016. The SON have not provided any proposals despite follow-up requests in 2016, 2017, and 2018. During a meeting on April 18, 2018 between Bruce Power and the MNRF, Bruce Power took the opportunity to relay the SON’s concern in relation to Lake Trout stocking. The MNRF indicated that they have heard these concerns from the SON and the MNO previously and they intend to discuss these issues with both groups further.

2.3 SON/Bruce Power Meeting - Predictive Effects Assessment, Climate Change, and Cumulative Effects (February 15, 2018)

On February 15, 2018, Bruce Power and the SON met to discuss the PEA, climate change and cumulative effects. The meeting was attended by Bruce Power’s Manager of Environment, Community & Indigenous Relations and five other team members (including technical experts in aquatic biology),

the SON EO-Bruce Power Coordinator, SON legal counsel, an articling student from Nawash, and a SON consultant (via teleconference) who works with Chesapeake Nuclear Services. The meeting took place between 10:00am and 2:00pm with a break for lunch.

During this meeting, Bruce Power provided a detailed presentation on the PEA and the Cumulative Effects Assessment, and discussed climate change. The presentation walked through the regulatory requirements, the technical process Bruce Power used, the scenarios that were evaluated as well as the overall summary of what was found from the assessments.

During the meeting, Bruce Power provided further information on a broad range of issues in response to questions raised by the SON. This included:

- **Assessment of Thermal Effects:** The SON asked why the thermal modelling that Bruce Power did for its ECA Application was not included in the ERA. Bruce Power explained that they did not incorporate the results of ECA modelling into the June 2017 ERA because thermal modelling conducted in support of the ECA Application was still ongoing at this time and not finalised until November 2017. This modelling does not change the conclusions of the ERA because it is consistent with the results from prior modelling assessments which have been undertaken since 2013 and in previous environmental assessments. Ongoing monitoring of lake temperatures is planned as part of the routine environmental monitoring program.

- **Mitigation of Thermal Effects:** The SON asked Bruce Power what would trigger a decision to implement additional thermal mitigation and would this be mandated by a regulator (CNSC, ECCC, MOECC). Bruce Power explained that any decision on additional mitigation would need to consider the degree of impacts that are being mitigated (which are currently assessed to be low to negligible), as well as time, effort, cost, and benefit relative to the impacts. In this case, additional measures are not necessary due to the low to negligible impacts and the demonstrated track record of performance. Bruce Power indicated that the regulator can mandate a licensee to implement mitigation measures where it has been assessed by the regulator that the licensee is not taking action to adequately protect the environment. The MOECC can also take action if the Tmax and Delta T limits are exceeded. Bruce Power will continue to assess whether additional mitigation measures are necessary or appropriate using the output from the routine updates to the ERA. The SON asked about winter plume modelling, which does not currently exist. Bruce Power explained that it is working on and transitioning to a thermal model that would address the current model limitations but there are currently no models that simulate ice cover well, especially with the onshore/offshore movement of pack ice. ECCC has indicated that new technology may be available to increase the success of data collection in a winter plume model. Bruce Power is willing to work with the ECCC, the CNSC, and the SON to develop a winter plume model. In the meantime, Bruce Power continues to rely on winter water temperature data to assess impact or risk and based on this data has concluded that there is no significant adverse impacts from thermal effects.

  While this was not discussed at this meeting, there are already a number of mitigation measures incorporated into the facility design to reduce thermal effects. These have been considered inherently as part of previous EAs and within the ERA. The location of Bruce Power, situated on the Douglas Point headland, was strategically chosen because of its high energy zone with access to cold, deep water. The headland juts into Lake Huron providing a natural feature for dispersion of thermal effluent and the shoreline location itself is naturally low in diversity of fish

species due to high wave action and winter ice movement. The placement and orientation of the intake and outfall structures at each station effectively minimize the physical (flow and temperature) and ecological (fish response) changes to the water body.

- **Other Monitoring Programs**: The SON asked whether there will be any changes in current or future monitoring programs and whether there will be additional entrainment sampling. Bruce Power explained that it will be updating its impingement and entrainment monitoring plan to incorporate new regulatory guidance anticipated in May 2018 (CSA N288.9 on I&E monitoring) and will consult with the SON on the updated plan. This CSA Standard incorporates best practices for I&E monitoring used in Canada and internationally. As part of these discussions, Bruce Power will review the 296 comments raised by the SON in relation to the previous EA Follow-up Monitoring Plan to determine which comments the SON believe are still outstanding and remain relevant and may be addressed in the updated plan or other monitoring measures going forward. Any future improvements to the existing program will also be outlined in the annual Environmental Monitoring Program (EMP) report. This report is produced on an annual basis and Bruce Power will continue its practice of notifying the SON of the report's release and offering the opportunity to discuss any concerns that they have.

- **CNSC Comments on the 2015 ERA:** The SON asked Bruce Power about the comments they received from the CNSC on the 2015 ERA. Bruce Power explained that there were three main topics that were expanded into 24 comments. The three topics were: foods for Indigenous groups to include in future dose calculations for the human health risk assessment, uncertainties in morpholine exposure for the human health risk assessment, and further monitoring to validate results and reduce uncertainty for impacts to human and non-human biota. All of these topics are included in the 2017 ERA and a full list of questions and responses are included in an appendix of the ERA which was provided to the SON on January 16, 2018.

- **PEA and ERA Methodology:** the SON asked whether the risk assessment matrix used by Bruce Power is prescribed by the CNSC or developed by Bruce Power. Bruce Power's ERA was developed using widely accepted procedures and best practices in the nuclear industry for pathway analysis, exposure and dose derivation, and risk characterization. Bruce Power explained that the guiding document for development of the Baseline ERA was the methodology set out in the Canadian Standards Association Standard N288.6. This CSA Standard incorporates best practices used in Canada and internationally. In the presentation provided, Bruce Power included an overview of the regulatory framework for the CNSC's Environmental Assessments. These standards are developed using a consensus process by committee that includes industry, regulators and consultants with processes for broader industry and public review of the standards before publication. The SON also asked when the next PEA would be submitted and Bruce Power indicated that it would be reviewed and updated every 5 years as part of the ERA cycle even though it is not technically required until the next licence renewal. This update will also verify assumptions made and then compare this to results over the past 5 years, which is part of the next ERA update.

- **Groundwater Monitoring:** The SON asked Bruce Power to clarify where groundwater monitoring was taking place and Bruce Power explained that it was taking place within our Site fence for the purposes of the groundwater monitoring standard (CSA Standard N288.7). Groundwater monitoring does take place outside our fence as part of the Radiological Environmental Monitoring Program (REMP). Results of this monitoring are reported annually in

the EMP report.

During this discussion, the SON expressed concerns that the ERA and PEA do not take into account the changing climate. Bruce Power emphasized that this is not a one-time assessment and the process is iterative and will be re-evaluated every 5 years taking into account updated information. This would include any future changes to water temperatures of Lake Huron or other impacts from a changing climate. Bruce Power also noted that MCR will not change the Site's baseline impacts from thermal, impingement and entrainment which are currently minimal. The SON acknowledged that MCR would not change the output but, if MCR did not occur, the six reactors would have to shut down and the heat output and water taking would decrease. The SON indicated that it wants to be assured now that the environment will be protected for the full lifetime of the facility instead of being asked to trust that this will be addressed in the iterative assessment process.

The remainder of the meeting focused on cumulative effects and climate change. With respect to cumulative effects, Bruce Power explained during their presentation that the cumulative effects assessment in the ERA and the PEA included all activities on the Site, including activities of Hydro One, Ontario Power Generation's Western Waste Management Facility, Canadian Nuclear Laboratories Douglas Point, and the proposed Deep Geological Repository. This assessment concluded that the cumulative influence of the WWMF, Canadian Nuclear Laboratories, Hydro One, and the Site were already included and assessed within the ERA and PEA and that no adverse cumulative effects are likely between the DGR project and the continued operations of the Site including MCR.

Bruce Power explained that the assessment concluded that all activities are within the bounds of regulatory limits and that these limits will continue to be met and do not require further detailed assessment. No interactions were identified that pose a risk to humans or the environment, and potential environmental effects of future activities are anticipated to be similar to those of existing and predicted operations. While this was not discussed, cumulative effects were also previously considered in prior environmental assessments relating to the Site, including the Restart of Bruce A Units 3 & 4 EA, the New Fuel EA, the Bruce A Refurbishment EA, and the New Build EA. These assessments demonstrated that there was likely no significant adverse cumulative effects on the environment, including for the previous life extension of the Site to 2043. Furthermore, as part of the Bruce New Nuclear Power Plant Project Environmental Impact Statement, a cumulative effects assessment was completed, considering continued operation of Bruce A and Bruce B along with a new generating station, which was proposed to operate past 2080. The assessment concluded no significant adverse cumulative effects for all VECs considered and contemplated a period of time where up to 12 reactors would be operating at the Site.

With respect to climate change, SON asked if Bruce Power had looked at how impacts from climate change will impact aquatic ecosystems in 30 years, particularly due to increasing lake temperatures, the potential impact of invasive species and changing food web dynamics and its effect on fish. Bruce Power indicated that they are staying abreast on developing knowledge and predictions on climate change and the potential impacts on Lake Huron and fish and continuing to consider how these future impacts may affect future operations.

Bruce Power explained that aspects of climate change have been incorporated into the thinking of the ERA and PEA (via understanding of conditions and including this thinking when evaluating the outcome of the assessment). The PEA considers continued operations to 2064, with focus on the next 10 years, where no significant changes in climate are anticipated. The focus was on the next 10 years as this is

the licencing period at issue. Bruce Power would not be able to operate after 2028 unless it obtains a further licence from the Commission, which will require updated assessments that will take into account any changes to the climate that impact Bruce Power's operations for the future licence period at issue.

Bruce Power recognizes that this is an evolving area, including the current state and reliability of climate change models. However, the overall existing regulatory framework requires Bruce Power to continually update its assessment and incorporate any changed baseline conditions. It is Bruce Power's position that any changes from climate change that require changes in Bruce Power's operations to ensure continued protection of the environment can be taken into account through the iterative environmental assessment process, licencing reviews, and permitting. While this was not discussed at the meeting, Bruce Power subsequently announced on March 12, 2018 that it is partnering with the Council for the Great Lakes Region on a 3-year climate change study that will provide insight into the following issues:

- The state of climate change science in the Great Lakes Region;
- The impact of a changing climate on various ecosystems and sectors in the Great Lakes, including the region's aquatic environment, fisheries and Bruce Power's operations;
- The knowledge and decision-making systems companies and communities need to better manage changing risks as a result of climate change; and
- The role that Bruce Power and other sectors might play in tackling climate change on a local and regional level, and how companies can adjust their corporate sustainability strategies to limit their impact.

This information will be incorporated into future ERAs and PEAs which are updated at least every five years or earlier if there are significant changes in operations or in the science on which the ERA is based. The next ERA and PEA will be submitted to the CNSC in 2022 prior to the restart of the first refurbished reactor in December 2023 under the current proposed schedule. As a lifecycle regulator, CNSC staff can direct Bruce Power to take further action in response to any updated information.

On March 23, 2018, Bruce Power wrote to the SON about this study and indicated that the scope was not defined in detail and Bruce Power would like to work together from the start of the study and incorporate input from the SON. The SON-EO Coordinator indicated that she would be happy to be involved in defining some of the scope and objectives of the work and that it could assist in addressing some of the SON's concerns around the Site and the changing climate and there was the potential for it to address some of the other concerns that the SON has identified with respect to the local aquatic ecosystem. On April 6, 2018, the Council for the Great Lakes Region wrote to the SON to formally invite them to participate in this study and to request an initial meeting in April or May 2018 to help define the scope, objectives, and degree of desired involvement by the SON. Bruce Power understands that an initial meeting has yet to be scheduled. On April 17, 2018, the SON acknowledged to Bruce Power that they had received the letter and indicated that they have not yet reached out to CGLR and are likely not to meet until after the Part II licence hearing.

2.4 SON/Bruce Power Meeting - Communications with Federal and Provincial Regulators (February 22, 2018)

On February 22, 2018, Bruce Power and the SON met to discuss the communications that the SON and Bruce Power have been having with various federal and provincial regulators relating to the Fisheries Act Authorization, the ECA Application, and the CNSC Application. The meeting was attended by Bruce Power's Manager of Environment, Community & Indigenous Relations and four other team members (including technical experts in Aquatic Biology) and the SON EO-Bruce Power Coordinator. The meeting took place from 10:00am to 4:00pm with a break for lunch.

Discussions with Federal Regulators – CNSC & DFO

The SON provided a high-level summary of four meetings it had with the CNSC in May and September of 2017 and January and February of 2018. Bruce Power understands that these meetings covered various issues such as the CNSC and Fisheries Act Application processes and the respective roles of the CNSC and DFO, the timing and scheduling of the CNSC hearing, OPG legacy issues, the SON's concerns with the Bruce Power EA Follow-up Monitoring program and the reliability of fisheries data, fisheries offsets, cumulative effects, and the PEA. Bruce Power understands that DFO was in attendance at the two meetings in January and February of this year and that ECCC was in attendance at the meeting in February. Bruce Power anticipates that CNSC staff and the SON will provide more detailed relevant information to the Commission about these meetings.

During the course of this update, there was a discussion about fisheries offsets, entrainment data, and the 296 concerns that the SON had previously raised about the EA Follow-up Monitoring Program for the prior refurbishment during the proceedings for Bruce Power's 2015 licence renewal.

With respect to fisheries offsets, the SON reiterated they were concerned about stocking of Lake Trout and that they would be taking this up with the MNRF. The SON indicated that they would like the MNRF to reduce the stocking of Lake Trout and conduct further research to determine the right balance of fish composition for ongoing sustainable commercial fishing. As noted above, Bruce Power passed this concern along to the MNRF on April 18th. Bruce Power also notes that the SON previously participated in a Fish Stocking Working Group with the MNRF due to concerns about the stocking of species that prey on Lake Whitefish and consume many of the nutrients that Lake Whitefish require for their natural reproduction. Bruce Power was not party to these discussions and has no information on the outcome of these discussions.

Bruce Power communicated that for the Fisheries Act Authorization Application, Bruce Power was planning to include three projects that will be considered as offset projects in the application. These projects are: (1) MNRF Lake Trout Stocking Program, (2) Truax Dam Removal, and (3) Shebeshekong River Rehabilitation. Bruce Power indicated that all other projects that were previously identified, in the order of 20 or so fisheries related projects, will be listed in the application but will not be recognized as offset projects. Bruce Power indicated that as part of the Company's overall Corporate Social Responsibility Program, Bruce Power will work with community based organizations to execute these fisheries related projects outside of the requirements and commitments in the application.

In addition, Bruce Power raised five potential offset projects that had been previously identified to Bruce Power by community members of the Saugeen First Nation. Bruce Power has indicated it would like to discuss these community identified offset projects in greater detail with the SON in order to assess

feasibility and work towards defining scope of projects for execution where interest exists. These projects included:

1. stream rehabilitation on Franks Creek within the Saugeen First Nation Reserve to allow reestablishment of fish population in the creek, which drains into the Saugeen River which drains into Lake Huron;

2. fish ladder improvement at Stoney Creek within the Saugeen First Nation Reserve to improve fish passage;

3. Debris removal in a stream at the Saugeen River flats, to improve fish access to the Saugeen River;

4. removal and harvest of cattails in a wetland area; and

5. removal of phragmites in various areas across the Saugeen First Nation Reserve.

The SON indicated that they would potentially consider items (1), (2), and (5) above; there was no support or conceptual agreement with the SON EO that items (3) and (4) were of value to explore further. Bruce Power remains committed to furthering discussions on these or any other SON identified projects in Saugeen or Nawash.

The SON indicated that they would consider the above and propose additional offset projects. They advised that they would potentially prioritize offset projects in Stokes Bay and the vicinity, which is a spawning area for Lake Whitefish near the Bruce Peninsula National Park. Bruce Power reiterated that it would welcome additional ideas for offsets and monitoring relating to offset projects.

In regards to impingement and entrainment data, Bruce Power provided a high level explanation of how the monitoring was completed, and details were provided in the presentation prior to the pump house tour. This information has also been included in prior annual reports for the Environmental Assessment Follow-up Monitoring Program (EA FUMP). Entrainment monitoring occurred day and night and a high number of samples were collected indicative of the level of effort put towards quantification of entrainment. Through interactions and information sharing with other CANDU organizations and companies that are part of the Electric Power Research Institute ("EPRI") (these can be nuclear or non-nuclear power generating companies), it was found that Bruce Power's level of effort for entrainment monitoring was greater than other organizations. For example, the duration of Bruce Power's sampling was done over a two year period resulting in a seasonal spread over the course of all months of the year (weather permitting) and within each month there were multiple sampling events. Other companies have conducted less intensive programs, which focus on just a single year, single season, limited number of months and/or limited number of sampling events, which decreased the amount of data going into their analysis.

Samples are sorted immediately for removal of fish larvae and eggs and identification of live versus dead specimens, with long dead specimens removed from loss calculations as they were dead prior to being entrained in the circulating cooling water. Counts of fish are then scaled to the total flow as the flow through the net during the sample is known. Scaled counts are then used to construct a Bayesian model to estimate fish losses throughout the year. These counts are then used to determine biomass via established methods such as age-1 equivalents or foregone fishery yield calculations for

commercial fish species. Entrainment monitoring is intensive and must be conducted according to larval/egg fish presence which is seasonal (predominately spring and also in the fall).

During the tour, it was physically shown where entrainment monitoring had taken place. SON asked why entrainment monitoring does not occur more frequently and Bruce Power explained that more frequent entrainment monitoring does not necessarily lead to more meaningful results. The entrainment sampling program approach is structured and rigorous; the intensive and focused data collection over a two year period allows Bruce Power not only to understand overall annual biomass entrained but also allows for correlation to lake wide trends. Furthermore, the program has specific equipment that is set-up and maintained for the duration of the campaign; the equipment and staff would not be present for an adhoc monitoring event. Hence, the approach of an intensive two year period of monitoring was chosen.

Finally, with respect to the issues relating to the follow-up monitoring program, SON indicated that they have unresolved concerns with the 296 comments in relation to the I&E monitoring plan for the EA FUMP which concluded last year. Bruce Power has communicated responses to all 296 comments and these are set out in a disposition table which was provided to the SON and the CNSC on December 4, 2013. Modifications were also incorporated in the annual EA FUMP reports. Bruce Power understands that the SON are not satisfied with all of the responses received and the SON believe that there are many outstanding items, particularly in the areas of including timely communication of results, definition and characterization of effects, appropriateness of monitoring and effects assessment methodologies, cumulative effects, and uncertainty arising from the SON's views about the potential unreliability of I&E effects estimates. The SON have largely been discussing these issues directly with CNSC staff rather than with Bruce Power. However, Bruce Power has indicated to the SON that it wants to work collaboratively to develop a new I&E monitoring plan for the Fisheries Act Authorization. As part of these discussions, Bruce Power intends to have further discussions with the SON in an attempt to better understand the concerns that the SON believe are still outstanding and may be addressed in the updated plan or other monitoring measures going forward. Through this, Bruce Power hopes to reduce areas of disagreement going forward and build greater SON confidence in the data and related assessments.

Discussions with Provincial Regulator- Ontario Ministry of Environment and Climate Change ("MOECC")

Bruce Power provided a brief update on its interactions with the MOECC about the ECA Application and the information that it has been providing MOECC in terms of annual monitoring plans and quarterly updates on discussions with Indigenous groups, in particular discussions with MOECC on the SON questions.

The SON indicated that they met with the MOECC in December 2017, and that they continue to meet on a regular basis, and provide the MOECC with updates on the progress of resolving the issues set out in the Bruce Power–SON disposition table related to this file. The SON explained that there were some issues that remained unresolved (10 out of 39 issues originally raised) but they have no additional issues at this time. The SON indicated that they would not likely provide further comment on the ECA Application until after the licence renewal hearings were completed. Bruce Power notified the SON on April 5, 2018 that the updated version of Bruce Power's ECA Application was posted on the MOECC Environmental Registry. Bruce Power provided the SON with the ECA Application on February 12, 2018 followed by a revised version on March 7, 2018.

In the course of this discussion, the SON asked about Bruce Power notifying the SON when the ECA thresholds were exceeded in the future. The SON indicated that the MOECC will not be able to force Bruce Power as a proponent to have those conditions rather agreement would need to be made between Bruce Power and SON. Bruce Power indicated that it would be willing to provide notification if water output is above the Tmax limit (currently 32.2 degrees C) and therefore when it is invoking operational flexibility (between 32.2 and 34.5 degrees C for a limited number of days) and when it terminates the need to invoke the operational flexibility. Bruce Power also indicated that it would be willing to provide notification if the 34.5 degrees C limit is exceeded, which is a reportable event. Operation flexibility has been invoked on one occasion in the last 5 years when the water output was at 32.3 degrees during a 24 hour period in 2016. On all other occasions, the water output was below 32.2 degrees.

Bruce Power reiterated that it would still like to work with the SON to discuss how they can be involved in thermal monitoring prior to the Part II Hearing for the Application. Bruce Power asked the SON to look at what might be possible from their end in terms of being involved in the 2018 thermal monitoring and the SON committed to advising Bruce Power about how they would like to be involved in this program.

Other Discussions

In addition to discussions relating to regulatory communications, Bruce Power and the SON briefly discussed materials that could be provided to the SON to assist with a potential community meeting. The SON indicated that it would be helpful to have better visuals of the Site that would enable them to better explain issues like thermal discharge. Bruce Power indicated that it would review its reports and presentations and provide a powerpoint with additional visuals that could be used for this purpose. Bruce Power provided aerial maps of the site, showing building location and lake bathymetry on March 21, 2018. Bruce Power also provided two additional powerpoints of images for the Fisheries Act (58 slides of images) and the ECA Application (60 slides of images) on April 11, 2018. These presentations consolidated images that have previously been provided to the SON through various technical applications.

2.5 SON/Bruce Power Meeting – Thermal Effects & ECA Application (February 26, 2018)

On February 26, 2018, Bruce Power, the SON, and officials from the MOECC met to discuss the assessment of thermal effects and the ECA Application. The meeting took place from 10:00am to 3:00pm and was attended by 9 members or consultants for Bruce Power (including Bruce Power's Manager Environment Community & Indigenous Relations and 7 technical experts in the areas of aquatic biology and fisheries management), the SON EO-Bruce Power Coordinator, SON Legal Counsel, and five officials from the MOECC.

The purpose of this meeting was for Bruce Power to provide more detail on the thermal assessment as it relates to the ongoing ECA Application under review by the MOECC. Bruce Power, in collaboration with a consultant from Golder Associates, provided a technical presentation on the overall analysis that was conducted for the thermal evaluation, with a detailed focus on the thermal plume. The presentation explained the Once-Through Cooling System and provided information on certain natural conditions of Lake Huron (historic and current water temperatures, ice coverage and water levels), current ECA limits and Bruce Power operational performance, results of environmental monitoring (lake

temperatures & water currents, bass nesting, and creel surveys), the thermal plume model, and various simulated climate change scenarios. The presentation, demonstrated, among other things that:

- Many years of environmental monitoring has shown that operations have little-to-no risk on fish near the Site;
- Thermal plume modelling studies have provided a thorough understanding of the dynamics and extent of the thermal plume under a range of environmental and operational conditions;
- There is very low risk to fish species from thermal effluents being discharged at the maximum threshold requested by Bruce Power (34.5C between June 15 to September 30 for 15 consecutive days), even continually for 15 straight days

Throughout this presentation, the SON requested numerous clarifications about the information being presented and asked various technical questions relating to the inputs to the thermal model, margins of error in the model, limitations of the model, and temperature benchmarks. Most of the questions were answered at the meeting except for four follow-up action items that were agreed to:

- **Additional Thermal Data:** Bruce Power agreed to provide the SON with additional thermal data, including the Bruce B intake, discharge and delta T temperatures (similar to the Bruce A figures in the Application) as well as the current roses (in the presentation but not shown in the Application, for Douglas Point and Gunn Point from 2013 to 2016). This data was provided to the SON on March 6, 2018.
- **Thermal Assessment Methodology:** Bruce Power agreed to explain the relationship between Hazard Quotients' methodology in the ERA, which looks at the entire year, and the ECA, which is June 15 to September 30th. This was further explained in the ECA Application disposition table sent to the SON on April 18, 2018.
- **Reference Sites vs. Ambient Water Temperatures:** Bruce Power agreed to clarify the distinction if any between "reference sites" in the ERA and "ambient water temperatures" in the ECA application. This was answered in the ECA Application disposition table sent to the SON on April 18, 2018.
- **Updates to the ECA Disposition Table**: The SON agreed to update the disposition table to provide any further commentary or issues as they review the ECA Application. The SON subsequently advised that they will likely not provide any further input on the ECA Application until after the Part II hearing.

2.6 Fisheries Act Authorization Offset Plan Meeting (March 22, 2018)

On March 22, 2018, Bruce Power and its consultants met in Burlington with officials from DFO and the CNSC and the SON participated via teleconference. The meeting took place from 9:00am to approximately 2:00pm and was set up by DFO and CNSC staff to discuss the offset projects that had been proposed in the Fisheries Act Authorization application and the way in which they would be monitored. The meeting was intended to achieve the following objectives as set out by DFO and agreed to by Bruce Power:

1. Provide an overview of the proposed offsetting projects, the Habitat Productivity Index (HPI) and how HPI will be used to quantity the increased biomass of the proposed offsetting projects;

2. Define the effectiveness monitoring plan study for the design of the proposed offsetting projects, including the variables to be monitored, scope of field monitoring, and analytical methods to be used

3. Agree on key information that must be included in the effectiveness monitoring plan;

4. Identify anticipated uncertainties and how these will be addressed through risk and adaptive management processes;

5. Identify interests or concerns of Indigenous communities with proposed offsetting projects and effectiveness monitoring plans

The revised Offset Plan was provided prior to the meeting to the CNSC, DFO and the SON on March 21. This document was reviewed throughout the meeting in detail. A powerpoint presentation was provided..

The SON EO-Bruce Power Coordinator did not ask any questions during the meeting but provided comments at the end. The SON expressed concerns with Lake Trout stocking as an offset measure and concerns about the Truax Dam project as it favoured non-native species that are not favourable to the SON. The SON acknowledged that the dam removals in general were an improvement but noted that the Saugeen River upstream is not an area utilized by the SON and questioned whether there were other projects in the SON Territory that could be pursued.

The SON acknowledged during the meeting that they have not provided Bruce Power with any potential offsetting projects. It was indicated that they have had lower level discussion and would be proposing two potential offsetting projects in the future although the SON did not anticipate the two projects would be used to meet Bruce Power's offsetting requirements due to the strict monitoring requirements associated to demonstrate a net gain in fish production. The SON committed to providing feedback on the Offset Plan by the end of March. The SON reiterated that because they do not consider the 296 comments related to the Environmental Assessment Follow up Monitoring Program closed, they continued to have issues with the data used to calculate losses and current impingement and entrainment methods.

2.7 March 28th Facility Tour

This tour was attended by three councillors from the SON joint council, the SON EO Bruce Power coordinator, another member of the SON EO, and the Nawash Fisheries Biologist. The tour involved a PowerPoint presentation that provided an overview of the design of the CCW system, the design of Bruce A & B and two other intake channels that are onsite, the current mitigation measures, an overview of the entrainment sampling program and results, and an overview of impingement process, monitoring program and results. The powerpoint presentation was sent electronically to the SON following the tour on March 28, 2018. The tour itself included a drive by of the Bruce A intake and outfall to view those outside the security fence, and then a tour of Bruce B intake, outfall and the Unit 8 and 7 pumphouse The SON asked questions during the tour in relation to the sampling program, more

specifically if we ever see deep water sculpin as well as how the intake channels are inspected. Questions were answered on tour and no further follow up was requested.

In addition to the above, the SON and Bruce Power also met on May 10, 2018 to discuss planning of a Joint Environmental Monitoring Program. The details are set out in Section 2.9 as this was a result of the SON-Bruce Power Leadership Meetings discussed below in Section 2.8. There have been regular calls and email correspondence between Bruce Power and the SON regarding various issues, to discuss logistics, administrative and general relationship issues, and discussions on how to improve dialogue. This included an additional meeting on March 26, 2018 between Bruce Power's Manager of Environment, Community and Indigenous Relations and the SON EO-Bruce Power Coordinator to discuss the status of various regulatory items, capacity funding, and planning for future leadership meetings.

2.8 SON-Bruce Power Leadership Meetings

Since January 1, 2018, there have also been three meetings between the leadership of the SON and the leadership of Bruce Power:

(i) January 24, 2018 – attended by the SON Chiefs, eight SON council members, the SON EO Bruce Power Coordinator, SON legal counsel, the CEO and Vice President of Corporate Affairs & Environment of Bruce Power, and three other members of Bruce Power

(ii) March 9, 2018 – attended by the Chief of Saugeen First Nation, 9 SON council members, two members of the SON Environment Office, the CEO and Vice President of Corporate Affairs & Environment of Bruce Power, and four other members of Bruce Power

(iii) May 2, 2018 – attended by 5 SON Council members, two members of the SON Environment Office, two SON Legal Counsel, the Vice President of Corporate Affairs & Environment of Bruce Power and six other members of Bruce Power.

These meetings have largely focused on ways in which the existing SON-Bruce Power Agreement could be enhanced, supplemented, or replaced in order to further address specific SON priorities. Bruce Power and the SON have exchanged proposals and there have been productive discussions on a way forward. Among other things, Bruce Power has proposed measures to enhance SON involvement in regulatory decision-making and the development of a SON Environmental Monitoring and Stewardship Program that could include joint or parallel SON thermal, impingement, and entrainment monitoring. Bruce Power has also proposed specific and immediate business opportunities to the SON that would result in an annual revenue stream into the community. In order to respect the confidentiality of these ongoing discussion, Bruce Power will not disclose any further specifics about these or other proposals and discussions relating thereto.

During these meetings, the SON reiterated concerns that they have previously stated publicly including that that they were not involved in the decision to locate the Site in their territory and that they are not receiving sufficient economic benefits from the Site and there is insufficient employment of SON members at the Site. They also raised concerns about the ongoing management of nuclear waste, used fuel, and decommissioning plans. Bruce Power reiterated that OPG is responsible for legacy issues and clarified that OPG was also responsible for the management of nuclear waste, used fuel, decommissioning. In a subsequent letter to the SON on April 25, 2018, Bruce Power advised based on

discussions with OPG that that OPG is committed to engaging with the SON about these issues. This letter was copied to OPG.

In response to a follow-up question from the SON on May 2nd about roles and responsibilities relating to decommissioning, Bruce Power indicated that it would provide the SON with a briefing note on Bruce Power's accountabilities as it relates to end of life plans. Once the SON has a chance to review this note, they can then advise if they require further information or a meeting on this topic.

During the second meeting, the SON also raised a number of concerns with the SON CI, including:

- **Acknowledgement of SON Territory** – it was suggested by the SON that the SON CI does not acknowledge that the Site is in the SON's territory and that the SON CI creates the impression that the Site is beside their territory. Bruce Power acknowledges that the Site is within the traditional territory of the SON in several parts of the SON CI and describes the location of the SON's traditional territory, which includes the Site (pp 4,9,14-15,17, and 20-21 of the SON CI). The SON CI also includes maps of the SON's traditional territory at pages 15 and 17 which clearly include the Site.

- **Descriptions of Historic Treaties** – concern was expressed about references in the SON CI to the SON surrendering rights in their traditional territory. Bruce Power used the term "surrender" in the summaries of several historic treaties that the SON is signatory to. These summaries can be found at p. 20 of the SON CI. This was not meant in any way to disrespect or minimize the acknowledgement of the SON's traditional territory. It did so because this is the term that was used in the historic treaties, such as Treaty 45 1/2 which surrendered the land below the Saugeen (Bruce) Peninsula including the Site and lands in the vicinity of the Site up to the Bruce Peninsula.[1] The SON have also themselves used the term "surrender" in describing Treaty 45 1/2 in the Treaty 72 litigation.[2] The SON assert that Treaty 45 1/2 did not surrender their rights to the lakebed or their harvesting rights in this territory and its waters but it is Bruce Power's understanding that they are not challenging the Treaty 45 1/2 land surrender. Instead, they rely on this aspect of Treaty 45 1/2 as part of their claim for damages in the Treaty 72 litigation due to the Crown's failure to protect the Saugeen (Bruce) Peninsula as promised in Treaty 45 1/2.

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[1] Indigenous and Northern Affairs Canada, *Treaty Texts – Upper Canada Land Surrenders,* https://www.aadnc-aandc.gc.ca/eng/1370372152585/1370372222012#ucls23

[2] At paragraph 16 of the SON's Amended Statement of Claim filed on January 25, 2017, the SON state: "At Treaty No. 45 1/2 dated August 9, 1836, Lieutenant Governor Bond Head of Upper Canada exploited the fear of the Saugeen Ojibway Nation that their lands would be taken over by white settlers, and stated that this was inevitable and that the government was unable to prevent this. In this context, the Saugeen Ojibway Nation agreed to a surrender of their lands south of the Saugeen Peninsula. In return for this, among other things, Treaty No. 45 1/2 contained a specific promise that the Crown would protect the Saugeen Peninsula from encroachments by whites." Similar language is used in a factum filed by the SON on or around November 18, 2016, "This story begins in 1836, when the Plaintiffs plead that Crown agents pressed the SON to surrender 1.5 million acres of rich agricultural land south of the Saugeen peninsula to help manage increasing demand for settlement in Upper Canada. As consideration for the surrender of this land through Treaty 45 1/2, the Crown promised the SON that the Crown would protect the northern part of their territory – the Saugeen Peninsula – for the SON forever."

- **Description of Lakebed Claim** – concern was raised about the fact that Bruce Power described the SON's lakebed claim as "novel" and it was felt that this was an attempt to diminish this claim. The use of the term novel was simply a recognition of the fact that this is a new type of Aboriginal title claim and that Canadian courts have not to date recognized Aboriginal title to the bed of a water body. Bruce Power recognized in the SON CI that several similar claims are being advanced by other Indigenous groups in Canada.

- **Bruce Power's Description of the *Jones* decision** – the SON disagree with Bruce Power's summary of the *Jones* decision at pp. 22-24 of the SON CI. They specifically disagree with Bruce Power's statements that the *Jones* decision formally recognized a commercial fishing right for sustenance purposes in the waters adjacent to the Treaty 72 territory surrounding the Bruce Peninsula and it did not decide one way or another whether this right also extended to the waters adjacent to the Treaty 45 1/2 territory. Bruce Power did not mean any disrespect by this summary and it was simply attempting to accurately summarize from its perspective what was specifically recognized in the *Jones* case based on the text of the decision and what was at issue. This has not, however, impacted Bruce Power's approach to the Application or its operation of the Site. As Bruce Power stated in the SON CI, it has assessed impacts assuming an established commercial fishing right in the waters adjacent to the Site. It also operates the Site based on this assumption to ensure respect for the SON's asserted and established rights and in recognition of the SON's commercial harvesting area in its agreement with the Ontario government, which includes the waters adjacent to the Site. Bruce Power understands that this agreement was renewed earlier this year without substantial changes to its terms.

2.9 Joint Environmental Monitoring Program Planning Meeting (May 10, 2018)

On May 10, 2018, Bruce Power Manager of Environment, Community and Indigenous Relations and one other team member met with the SON EO-Bruce Power Coordinator from 9:30am to 2:00pm. The purpose of this meeting was to discuss the next steps in developing a SON-Bruce Power Joint Environmental Monitoring Program, which was proposed at the May 2, 2018 Leadership meeting. During the meeting on May 10th, Bruce Power and the SON-EO agreed to action items for the SON-Bruce Power Joint Environmental Monitoring Program which would focus on three issues of concern that the SON raised in the engagement on the Application: impingement/entrainment, thermal and climate change. Bruce Power and the SON EO agreed to work together to develop the following:

6. Impingement and Entrainment

- Develop a checklist and seasonal schedule for routine visits were SON EO staff and councillors can observe the pumphouses, intake, and discharge channels, similar to the tour that was conducted on March 28, 2018;

- Develop an Impingement and Entrainment Plan to support the Fisheries Act Authorization;

- Develop a monitoring program that will provide further data and insight for monitoring impacts to fish from impingement/entrainment, thermal, and climate change. Conceptually, this could include a sampling program to monitor the fish community (through such things as coastal shoreline work, at least two seasons to capture species use and species diversity), a basic vegetation survey (i.e. emergent vegetation and

semi-aquatic vegetation) and basic water quality parameters (e.g. temperature and dissolved oxygen). Monitoring and assessment would occur within the vicinity of the thermal plume and outside of the thermal plume. This monitoring could be expanded monitoring beyond the local Bruce Site to other areas of the SON Territory and Bruce Power and the SON have agreed to jointly pursue funding to implement this; and

- Develop a fisheries knowledge and use mapping plan and conduct a workshop as part of the plan.

7. Thermal

- Develop a monitoring program as discussed above;
- Great Lakes Observing Station (GLOS) Buoy deployment and monitoring; and
- Develop a process that will result in the reporting of regulatory events and non-regulatory events to the SON.

8. Climate Change:

- Develop a monitoring program as discussed above;
- Host an annual climate change workshop and fisheries workshop with the SON every year for the next 10 years to gather community information to understand what is being observed, allowing for the knowledge of the community to be included. This will involve the development of a survey for SON members;
- The SON to participate in shaping the scope of the climate change study being led by the Council of the Great Lakes Region and to participate in the study itself; and
- Great Lakes Observing Station (GLOS) Buoy Deployment and monitoring.

The next meeting scheduled to further map out these actions will occur in mid-June 2018. Bruce Power is very pleased by the progress in this area and looking forward to working collaboratively with the SON on a Joint Environmental Monitoring Program.

3.0 BRUCE POWER INDIGENOUS RELATIONS PROGRAM

In the SON CI, Bruce Power provided a detailed overview of its Indigenous Relations Program and the various programs and initiatives that it has in place to support investment in local Indigenous communities and increase Indigenous employment, training, and business opportunities from the Site. The information below is intended to supplement the information provided in the SON CI.

3.1 Indigenous Community Investment Fund

In 2016, Bruce Power launched a $1.2 million Indigenous Community Investment Fund ("ICIF") that focuses on supporting initiatives in local Indigenous communities from 2016-2020 in four areas:

- **Community Initiatives** focused on health and wellness and the environment;
- **Youth Leadership** through education and sports programs;
- **Cultural Events** through awareness activities and celebrations; and
- **Community Infrastructure** as it pertains to public works and recreation.

Bruce Power provides funding under the ICIF to the Saugeen First Nation and the Chippewas of Nawash Unceded First Nation separately. The 2018 funding provides support for a number of initiatives, including but not limited to:

1. **Science, Technology, Engineering, and Mathematics (STEM) Camps for SON Children (Ages 5-13)** – this will funding will support the hosting of STEM camps for children from the Saugeen First Nation and Chippewas of Nawash this summer, which will provide SON children with a mechanism to learn more about their history and culture through, or in conjunction with, STEM activities. This will be the first STEM camp to be carried out within First Nations communities in Canada and they are organized by a Canadian not-for-profit organization whose mandate is to inspire youth with Science, Technology, Engineering, and Mathematics.

2. **Child and Youth-Centred Nutrition Programs** – this funding was provided to support programming by Canadian Feed the Children which works with the Chippewas of Nawash to provide holistic and integrated child and youth-centred programs focusing on four areas – student and family nutrition; nutrition education (including traditional foods and food practices); community engagement; and land-based education and skills building.

3. **Little NHL Cape Croker and Saugeen Sports Fund** – funding was provided to support approximately 70 of the communities' hockey players and their families to attend a week long hockey tournament in Mississauga which brings together First Nation communities across Ontario.

4. **The University of Waterloo's Engineering Science Quest Program** – this funding will provide support for a camp run at Saugeen First Nation this summer where participants are exposed to a wide variety of subjects such as biology, chemistry, electricity, engineering and design.

5. **The Nawash Home and Community Care Program** – this funding provides support for the Basic Shelf Program, uniforms and medical bags for a program run by the Chippewas of Nawash that provides services to its members in the community who have a physical, emotional, mental, or social need for assistance in order to continue living independently in their community.

3.2 SON Employment, Training and Education

Bruce Power is committed to providing training, education and employment opportunities to Indigenous peoples. We are committed to creating a work environment in which Indigenous peoples' cultures, beliefs and values are acknowledged and respected.

As discussed in the SON CI, Bruce Power has hired 2 full time resources that are dedicated to increasing Indigenous employment at Bruce Power and with Bruce Power suppliers and building trades. They are supported by the Section Manager of Talent Management as well as the Department Manager of Talent Management and have full support from the Human Resources Team and the whole organization for additional resources when required. In addition, Bruce Power has introduced a number of measures designed to address barriers to increasing Indigenous employment through various education and training initiatives.

Since January 1, 2018, Bruce Power has made further progress on increasing SON employment, education and training opportunities. This has included hiring 19 additional SON members directly or indirectly for placements at Bruce Power or with suppliers. As part of its discussions with the SON, Bruce Power has also proposed additional measures to increase SON employment at the Site and has repeatedly asked the SON to resume meetings of the SON-Bruce Power Training, Education, Employment, and Business Opportunities ("TEEBO") Working Group, which has not met since June 2017 despite repeated requests of Bruce Power to resume meetings.

Bruce Power is hosting a Career Fair in May for the SON. The 2018 Career Fair aims to bring in Suppliers of the IRSN to SON communities for a two-day career fair event during which SON members will have the opportunity to engage with Bruce Power employees, Unions and Suppliers by exploring career opportunities and employment pursuits.

The Career Fair will be hosted over a 2 day period and will include invitations to local elementary schools, with a particular focus on SON students in grades 7 & 8, secondary, or post-secondary and other community members seeking employment.

The purpose of this Career Fair is to increase awareness about the opportunities for SON employment and training at Bruce Power and the opportunities that exist with the Building Trade Union and Bruce Power's suppliers.

3.3 Tools for Success Workshops

The Indigenous Employment Team annually participates in an event hosted by the Nawash Board of Education where local SON high school students are invited to an exploration day at Georgian College in Owen Sound to learn about various college programs offered and discuss career planning.

Workshops are delivered at Georgian College with excerpts from the Indigenous Employment Programs Build Your Success delivery. The workshop provides high school students tips on skills that appeal to employers from developing resumes to interview skills, the do's and don'ts of social media to networking that leads to greater opportunity.

3.4 Bruce Power Indigenous Relations Suppliers Network

The Bruce Power Indigenous Relations Suppliers Network was launched in June 2017 as part of Bruce Power's commitment to increase Indigenous employment and create new economic opportunities for Indigenous communities. This is a network of all major suppliers to Bruce Power with a commitment to:

- Hiring programs and commitments;

- Enabling community investment opportunities; and
- Partnering with Indigenous communities on business opportunities that will provide community benefit.

There are over 25 companies participating in the network, including but not limited to AECON, AMEC Foster Wheeler, Bird Construction, Black & MacDonald Limited, BWX Technologies, Cameco, GE Power, Hatch Ltd, Kinectrics Inc., Sargent & Lundy Canada Company, Sierra Systems, SNC-Lavalin Nuclear Inc..

On March 21, 2018, the IRSN opened an office in Port Elgin with the Organization of Canadian Nuclear Industries (OCNI), which represents more than 200 suppliers to the Canadian nuclear industry. The opening of this office is part of Bruce Power's work to increase supplier presence in the region and to increase opportunities for local Indigenous groups with these suppliers.

In order to build community capacity and to generate wealth through sustainable and long-term business ventures, Bruce Power plans to support the following strategies:

- To develop and implement a comprehensive Indigenous Procurement Policy;
- To work through the IRSN to increase the engagement between suppliers and the local Indigenous communities, including exploring opportunities in procurement processes;
- To enhance key reporting metrics in order to track progress and improvements; and
- To support Indigenous business development initiatives that will provide economic opportunities to the SON, HSM, and MNO.

Indigenous procurement policies will drive the implementation of a local Indigenous modifier in order to evaluate proposals and to promote local Indigenous businesses. The modifier, planned to be in place by May 30, 2018, will favour proposals that involve local Indigenous ownership through the Bruce Power's IRSN and/or value-added work performed by local Indigenous peoples. The modifier will result in a benefit to local Indigenous communities through direct contracts from Bruce Power and through contracts issued by Bruce Power's IRSN.

The OCNI also recently created a First Nations, Métis, and Inuit (FNMI) committee to assist with Indigenous hiring strategies in the greater nuclear industry across the country. Bruce Power is represented on the committee by members from the Indigenous Relations Team and the IRSN to ensure that local interests are represented and promoted.

As discussed above, Bruce Power has also proposed specific and immediate business opportunities for the SON relating to the Site. Bruce Power looks forward to continuing to discuss these opportunities with the SON and is optimistic about what Bruce Power and the SON can accomplish together.

4.0 CONCLUSIONS AND NEXT STEPS

Bruce Power is committed to continuing to build and maintain a positive relationship with the SON and ensuring that the SON's asserted and established rights are not impacted by the Site.

Bruce Power began providing information to the SON about the Application in December 2015 and provided a copy of the Application to the SON in July 2017. Bruce Power has made repeated efforts to engage the SON on the Application since December 2015 and has had numerous meetings with the SON since December 2017 to answer questions and discuss concerns relating to the Application and associated regulatory approvals. Bruce Power has heard the concerns raised by the SON and both Bruce Power and the CNSC have proposed measures that would help address their concerns, including various environmental study and monitoring measures, additional fisheries offset projects, a study on alternative mitigation measures, and the opportunity to participate in and help shape the scope of a 3-year climate change study that is being conducted in partnership with Bruce Power and the Council for the Great Lakes Region.

Bruce Power is very grateful for the input that it has received from the SON and the time that they have taken to engage in this process. Bruce Power looks forward to continuing to work with the SON on these joint measures to ensure that SON rights and interests are not impacted by the Site and to advance other initiatives that will increase SON employment, training, and business opportunities relating to the Site and with Bruce Power's suppliers.

Enclosure 2

B-REP-03443-15MAY2018

Bruce Power Community Interests: Métis Nation of Ontario (Supplementary Report)

NK21-CORR-00531-14428
NK29-CORR-00531-15130
NK37-CORR-00531-02989

Bruce Power Indigenous Community Interests – Métis Nation of Ontario (Supplementary Report)

B-REP-03443-15MAY2018

UPDATE MAY 15, 2018

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1.0 EXECUTIVE SUMMARY

On June 30, 2017, Bruce Power applied to the Canadian Nuclear Safety Commission (the "CNSC" or "Commission") to renew its Nuclear Power Reactor Operating Licence for the Bruce Nuclear Generating Stations (the "Site") for 10 years and to undertake certain life extension activities, including Major Component Replacement ("MCR") for six reactors (the "Application"). The Application builds on the work that Bruce Power has undertaken since assuming responsibility for the operations of the Site in 2001 from Ontario Power Generation ("OPG") pursuant to a long-term lease of the Site. This includes a prior refurbishment of two reactors completed in 2012 which extended the life of these reactors to 2043. The life extension activities contemplated in the Application have all been previously carried out on the Site and have been the subject of previous licencing reviews and environmental assessments.

The Site is located within the traditional territory of the Saugeen Ojibway Nation ("SON") and the traditional harvesting territories of the Historic Saugeen Métis ("HSM") and the Métis Nation of Ontario ("MNO"). Since December 2015, Bruce Power has been providing information about the Application to the SON, the HSM, and the MNO. It provided a copy of the Application to each community in July 2017 and has had meetings with the SON, the HSM, and the MNO to discuss any concerns and answer any questions that they have. In January 2018, Bruce Power filed three Indigenous Community Interest documents which provide further information about each community, including their asserted and/or established Aboriginal and treaty rights and how the potential impacts of the continued operation and life extension of the Site on each community were assessed. These documents also detail the issues that the SON, the HSM, and the MNO have raised about the Site in past regulatory reviews, how these issues were assessed and taken into account in the Application, and Bruce Power's efforts to engage and share information with each community about the Application.

This document is intended to supplement *Bruce Power Indigenous Community Interests – Métis Nation of Ontario* B-REP-03443-17JAN2018 (the "MNO CI"). The purpose is to provide further information about the discussions that have taken place since January 1, 2018 between Bruce Power and the MNO about the Application, the Fisheries Act application (the "Fisheries Act Authorization"), the Environmental Compliance Approval application (the "ECA Approval"), and employment, training, and business opportunities for the MNO relating to the Site. This has included four meetings and the exchange of detailed correspondence in response to comments provided from a technical review of the Application by the MNO's consultant, MNP. These meetings are in addition to the discussions that the MNO have had with CNSC staff about the Application.

Through these meetings, correspondence, and their written submission to the Commission (CMD 18-H4.57 (E-DOCS-#5509435-CMD-H4.57), the MNO have expressed concerns about a number of issues, including:

- A lack of incorporation and assessment of MNO Valued Components in the Environmental Risk Assessment ("ERA") and Predictive Effects Assessment ("PEA"), including perceptive effects of the project on MNO rights and interests;

- Gaps in baseline data in the ERA and PEA with respect to predicting impacts on Métis rights and interests and the need for MNO involvement in monitoring;

- Cumulative effects and climate change, particularly the combined effects of thermal emissions, rising lake temperatures, other thermal influences, and nutrient loading on important aquatic life and habitats;

- A lack of involvement of the MNO in emergency response plans; and

- The adequacy of the proposed fisheries offset projects.

In the course of the engagement, Bruce Power responded to 143 written comments or questions relating to the Application from the MNO's consultant, MNP. The vast majority of the comments were responded to on March 26, 2018 and the remaining three were responded to on April 9, 2018. While Bruce Power and the MNO have differing views over the adequacy of the assessments and baseline data included in the Application, Bruce Power is eager to work collaboratively with the MNO to address three specific recommendations that they made during the engagement. Specifically, Bruce Power and the MNO have agreed to co-develop:

(i) a MNO monitoring program to ensure that MNO VCs are being appropriately monitored, assessed, and are incorporated into future ERAs;

(ii) a MNO-specific diet survey to further assess and understand any impacts of the Site on MNO Citizens' health, which will verify the conclusions of the existing Human Health Risk Assessment; and

(iii) a MNO Emergency and Communications Plan.

Bruce Power and the MNO have identified preliminary tasks to implement these measures and Bruce Power is looking forward to working with the MNO on these important initiatives. The MNO monitoring program and diet survey will be used to supplement existing data and verify Bruce Power's assessments of the impacts of the Site and proposed life extension on MNO citizens' health and MNO harvesting rights, which are discussed in Section 7 of the MNO CI and have not changed.

With respect to climate change and the fisheries offset projects, Bruce Power has invited the MNO to:

- Participate in and shape the scope of a 3-year climate change study that was recently announced by Bruce Power and the Council of the Great Lakes Region. This study will provide insight into, among other things:

    - The state of climate change science in the Great Lakes Region;

    - The impact of a changing climate on various ecosystems and sectors in the Great Lakes, including the region's aquatic environment, fisheries and Bruce Power's operations;

    - The knowledge and decision-making systems companies and communities need to better manage changing risks as a result of climate;

  - The role that Bruce Power and other sectors might play in tackling climate change on a local and regional level, and how companies can adjust their corporate sustainability strategies to limit their impact.

- Identify alternative fisheries offset projects for impacts from impingement and entrainment and other ideas for general fisheries improvement projects that can be considered outside of the Fisheries Act Authorization application; and

- Tour the Truax Dam Removal Project site (scheduled for May, 2018).

The information gathered through these additional measures will be used where applicable to inform future applications for CNSC licence renewals, Fisheries Act Authorizations, ECA Approvals, Permits to Take Water, and any changes required to Bruce Power's monitoring program. It will also be incorporated where applicable in future ERAs and PEAs which will be updated every five years or earlier if there is a significant change in Bruce Power's operations or the science on which the ERA is based. The next ERA and PEA will be submitted to the CNSC in 2022 prior to the restart of the first refurbished reactor in December 2023 under the current proposed schedule.

In addition to its engagement on the Application, Bruce Power has continued to make efforts to increase MNO employment, training, education, and business opportunities from the Site. Since January 1, 2018, this has included:

- Signing an Economic Development Memorandum of Understanding with the MNO to enhance employment and business opportunities relating to the Site, including with Bruce Power's suppliers;

- Opening an office for the Bruce Power Indigenous Relations Suppliers Network in Port Elgin in March 2018, which is designed to increase Indigenous employment and economic opportunities with Bruce Power suppliers; and

- Providing additional funding through Bruce Power's Indigenous Community Investment Fund ("ICIF") to sponsor the 2018 MNO Annual General Assembly and support the expansion of programs focusing on health and wellness, education and training, and cultural activities for the Georgian Bay Traditional Territory Consultation Committee.

Discussions with the MNO about ways to increase MNO employment and business opportunities from the Site are ongoing. Bruce Power is committed to working with the MNO to advance these discussions and joint work to monitor and mitigate any future impacts from the Site on MNO rights and interests.

2.0 CONSULTATION AND ENGAGEMENT WITH THE MNO

Since January 1, 2018, Bruce Power and the MNO have had four meetings to discuss issues relating to the Application, the Fisheries Act Authorization, the ECA Approval, and MNO employment and business opportunities from the Site and proposed life extension activities. Bruce Power also had an initial call with MNO's consultants, MNP, on January 31, 2018 to answer some preliminary questions relating to the Application and exchanged detailed correspondence relating to the issues raised by

MNP.

2.1 Technical Review of Application by MNP – February 26, 2018

As part of their review of the Application, the MNO retained MNP to conduct a technical review. Bruce Power provided additional regulatory top-up capacity funding to the MNO to support this review and other work of the MNO related to the Application. This is in addition to the annual capacity funding that Bruce Power provides to the MNO as well as the $24,470 that the MNO received in participant funding from the CNSC for the Application.

On February 26, 2018, the MNO provided Bruce Power with MNP's 60 page technical review of the Application. This review raised 143 comments/questions relating to the Application. Bruce Power responded to 140 of the comments/questions on March 26, 2018 and responded to the remaining three comments/questions on April 9, 2018. Bruce Power provided additional information than is reflected in the chart in the MNO's written submission to the CNSC, which was just a summary of the comments and responses.

In a covering letter to the technical review, the MNP raised several overarching concerns which are further described below.

Inclusion of Métis Specific Valued Components

In their letter, MNP state that the Application lacks an assessment of effects to Métis-specific Valued Components, including the perceptive effects of the Project on MNO rights and interests.

By way of background, in June 2017, the MNO provided a report to Bruce Power that was prepared by MNP in respect of OPG's Deep Geologic Repository ("DGR") and Bruce Power's relicencing for Bruce A and B Nuclear Generating Stations. The Report, titled *Métis Nation of Ontario Valued Components Monitoring Report,* was commissioned by the MNO to "facilitate the inclusion of additional Métis specific information in the Monitoring Program(s), and potentially the Environmental Risk Assessment, and allow for additional discussions with regards to changes to Métis specific VCs between the MNO, OPG and Bruce Power."

The report identified two Métis specific Valued Components ("VCs") and the following measurable parameters and indicators for each VC:

1. **Métis Lands, Resources and Water,** referring to the lands, resources and water available for the exercise of rights, including the quality, quantity and accessibility of land, water and resources

Potential Effect	Measurable Parameter	Indicator
Change in Ecological Health	Perception of Change in land or Water	Perception of Change in the Land or Water Available for the Exercise of Métis Rights
	Avoidance Behaviour	Lack of Use of Land or Water in Proximity to the Project
	Attitude towards Resource	Avoidance of Consuming Resources in Proximity to the Project
		Perceived Contamination of Resources
		Perception of Pollutants in the Environment
	Food Insecurity	Availability of Resources

2. **Métis Nationhood,** covering concepts including the cohesion of the Métis community, Métis economy, the capacity of the Nation to serve its membership and knowledge transfer between the MNO, citizens, and their families

Potential Effect	Measurable Parameter	Indicator
Change in Métis Way-of-Life	Community Cohesion	Participation in Community events
		Perception of Change in Key Components of Métis Identity
Changes in Métis Economy	Trade Economy	Time Available for Participation in Trade Economy
	General Economy	Actual Opportunities for business/contractors
		Perceived Opportunities for business/contractors
		Need for affordable Housing
		Increased cost of Necessities such as Rent, Food, Electricity, Transportation
		Increased dependence on Social Welfare Programs
Changes in Métis Governance	Capacity	Increase or Decrease in MNO

Potential Effect	Measurable Parameter	Indicator
		Political Capacity
Change in Teaching or Transmission	MNO Knowledge Transfer	Increase or Decrease in MNO Knowledge Transfer
	Métis Citizen Knowledge Transfer	Increase or Decrease in Métis Citizen Knowledge Transfer

This information was not included in the ERA and PEA because it was received shortly before the Application was finalized and submitted and it did not provide the level of detail and information needed to separately assess impacts to MNO VCs and incorporate it in a meaningful way into the ERA and PEA. Bruce Power is committed to working with the MNO through the diet survey and a joint monitoring plan to ensure that the information and data needed for MNO VCs is collected for inclusion in future ERAs/PEAs or other assessments, where applicable.

The MNO CI does discuss this report and assesses impacts to MNO Health and the MNO's asserted Aboriginal harvesting rights. While it does not expressly assess impacts to VCs, the assessment of impacts to MNO citizens' health and MNO harvesting rights in Section 7 of the MNO CI incorporates many of the issues raised in the Métis Lands, Resources and Water.

Bruce Power concluded in its assessment that there will be no adverse impacts on the health of MNO citizens and that any impacts on MNO harvesting rights will likely not be appreciable. If there is an appreciable impact on MNO harvesting rights, Bruce Power believes that it would at most be minimal and it would be no different from what is currently experienced from the operation of the Site, which has been safely operating for decades.

Bruce Power has not received sufficient information to assess the perceptive effects of the Site on MNO rights and interests although it does not at this time anticipate that such an assessment would result in a material change in Bruce Power's assessment of impacts from the continued operation and proposed life extension of the Site. As discussed in the MNO CI, the last MNO survey asked a number of questions about perceptive affects relating to "the DGR Project or Bruce A or Bruce B" and it is unclear whether the answers in response to these questions related to the DGR, the Site, or both. These two projects are quite different (an existing facility that has been safely operating for decades and has already undergone refurbishment of two reactors vs. a greenfield precedent-setting project relating to the storage of nuclear waste underground) and it is anticipated the perceptive effects would be far more significant for the DGR. Bruce Power looks forward to working with the MNO to assess this issue going forward through further monitoring and, to the extent there are perceptive effects, working with the MNO to identify ways to address them.

Bruce Power also looks forward to working with the MNO to monitor and assess any impacts to Métis Nationhood. At this time, Bruce Power has not been provided with any information that would suggest that the continued operation of the Site and proposed life extension would have a negative impact on Métis Nationhood and anticipates positive impacts for business/contractors due to increased business and employment opportunities from MCR.

Gaps in Baseline Data

MNP indicates in their covering letter that there are gaps in baseline data in both the ERA and PEA, which led to the exclusion of assessing potential effects on MNO VCs, including but not limited to reptiles, amphibians, effects to the aquatic environment from Contaminants of Potential Concern (COPCs) (e.g. potassium), and terrestrial biota exposure to radionuclide (e.g. Carbon-14).

The ERA did assess potential effects on various reptiles, amphibians, effects to the aquatic environment from COPCs, and terrestrial biota exposure to radionuclides. Since 2001, Bruce Power has done numerous environmental surveys to identify the presence or absence of particular species on Site and in the vicinity of the Site. The impacts of the Site's continued operations and life extension on all of these species were assessed in the ERA either directly or through the use of a surrogate, which is a species that is similar or more sensitive to the species being assessed. The use of appropriate surrogate species rather than assessing impacts to each individual species is a common approach in environmental assessments and Bruce Power believes that the ERA and PEA and previous EAs have adequately assessed impacts to all MNO species of concern through this approach. Bruce Power looks forward to working with the MNO through the MNO monitoring program and other monitoring measures to verify the conclusions in the ERA and previous EAs.

ERA and PEA Methodology

MNP raises concerns in their review that the ERA and PEA do not follow standard environmental impact assessment methodology, including the lack of a residual effects assessment, determination of significance, or discussion of mitigation measures.

The ERA and PEA were prepared in compliance with REGDOC 2.9.1 and CSA Standard N288.6. The tiered approach to assessment in the ERA is similar to the screening approach in an EA and, unlike an EA, the ERA and PEA are not one-time assessments but undertaken every 5 years or when there is a significant change in operations or the science on which the ERA is based. Moreover, the conclusions of the ERA and PEA should not be viewed in isolation. Since 2001, Bruce Power has undertaken numerous environmental assessments and reviews. This has included reviews for:

- the restart and return to service of four nuclear reactors, including the refurbishment and life extension of two reactors to 2043 (2001 & 2006);
- the ongoing operations of Bruce B to 2037 when Bruce Power applied to the CNSC to refuel the reactors at the Bruce B facility with low void reactivity fuel (2004 – not implemented)
- a proposed new build of up to 4 new reactors which contemplated and assessed the impacts of 12 reactors operating at the same time (2009 - not implemented); and
- licence renewals to operate eight reactors (2009 and 2015).

All of these studies, along with the 2017 ERA, and the follow-up monitoring programs, have confirmed a lack of significant adverse environmental effects from the ongoing operations of the Site, including the prior refurbishment of two reactors. In several of the EAs, Bruce Power evaluated the operation of the

Site out to 2043 or to 2075 in the case of the New Build. The Predictive Effects Assessment conducted in 2017 also considered future Site activities including the extension of the operating life through to 2064.

Bruce Power looks forward to working with the MNO on monitoring measures to verify the conclusions in the ERA and previous EAs.

Cumulative Effects & Climate Change

MNP raised concerns with the assessment of cumulative effects, particularly with respect to thermal emissions combined with rising lake temperatures, other thermal influences, and nutrient loading on important aquatic life and habitats.

Thermal loading from Bruce Power operations to Lake Huron represents significantly less than 1% of those from atmospheric and natural sources. The most pronounced effects of Bruce Power operations on lake temperatures are very localized and temperature increases associated with thermal plumes decrease exponentially with distance. Water temperatures in the discharge area are monitored and compared to thermal effects criteria and action is taken if the temperatures reach or exceed thermal limits.

The PEA includes a Cumulative Effects Assessment, which consider the cumulative effects for the refurbishment and continued operation of the Site with other facilities on the Site, including the WWMF, Canadian Nuclear Laboratories, Hydro One and the OPG DGR. The assessment concluded that the cumulative influence of the WWMF, Canadian Nuclear Laboratories, and Hydro One were already included and assessed within the ERA and PEA and that no adverse cumulative effects are likely between the DGR project and the continued operations at the Site including MCR.

Cumulative effects were also previously considered in prior environmental assessments relating to the Site, including the Restart of Bruce A Units 3 & 4 EA, the New Fuel EA, the Bruce A Refurbishment EA, and the New Build EA. These assessments concluded that there would likely be no significant adverse cumulative effects on the environment.

It is important to underscore that the licence that Bruce Power is applying for would only allow it to operate the Site until 2028. The ability to operate the Site after 2028 will depend upon Bruce Power satisfying the CNSC at that time that it will continue to make adequate provision for the protection of the environment. These future licencing reviews, annual CNSC and Bruce Power monitoring, and future ECA Applications will require Bruce Power to consider impacts from changing lake temperatures and any new mitigation measures that are required. This information will also be incorporated into updates to the ERA every five years, the next one to occur in 2022. This would be done prior to the restart of the first refurbished reactor in 2023 and the CNSC as a life-cycle regulator can direct Bruce Power to take any further action required in response to any impacts that are identified in future ERAs.

In the meantime, Bruce Power continues to be engaged in understanding the impacts from climate change and considering how future changes may affect future operations and the local environment. In order to assist future reviews, Bruce Power has recently invited the MNO to participate in and shape the scope of a 3-year climate change study that was recently announced by Bruce Power and the Council of the Great Lakes Region ("CGLR"). This study will provide insight into, among other things:

- The state of climate change science in the Great Lakes Region;
- The impact of a changing climate on various ecosystems and sectors in the Great Lakes, including the region's aquatic environment, fisheries and Bruce Power's operations;
- The knowledge and decision-making systems companies and communities need to better manage changing risks as a result of climate; and
- The role that Bruce Power and other sectors might play in tackling climate change on a local and regional level, and how companies can adjust their corporate sustainability strategies to limit their impact.

On April 9th, the CEO and President of CGLR sent a letter to the MNO inviting them to participate in the formation of the scope of the study. The MNO and CGLR have scheduled this meeting for May 29, 2018. Bruce Power looks forward to participating in this study, reviewing its results, and incorporating the information into future ERAs, applications for relicencing, and relevant permitting applications.

2.2 MNO-Bruce Power Quarterly Meeting - February 27, 2018 Meeting

On February 27, 2018, the day after receiving the MNP technical review, Bruce Power and the MNO met for their first quarterly meeting of the year. This meeting took place from approximately 10am to 2:30pm and was attended by:

(i) 7 individuals from Bruce Power, including the Manager of Environment, Community & Indigenous Relations, the Manager of Communications, 2 individuals from Environment programs, Bruce Power's lead for the Indigenous Relations Suppliers Network, and a person providing administrative support) and

(ii) The MNO Georgian Bay Traditional Territory Consultation Committee, which included the MNO Region 7 Councillor, the MNO Georgian Bay Métis Council President, the MNO Great Lakes Métis Council President, the MNO Moon River Métis Council Senator and the Region 7 Captain of the Hunt (the "GBTTCC") as well as the Consultation Assessment Coordinator for Region 7, the MNO Head Office Energy Policy Analyst, and a representative from MNP.

During this meeting, the MNP's technical review was discussed and Bruce Power and the MNO raised questions or concerns about several issues, including:

- **Human Health Receptors** – the MNO questioned whether the critical receptor group and the hunter/fisherman receptors in the Human Health Risk Assessment adequately captures MNO citizens, particularly given that many MNO harvesters travel to the region but do not live there. Bruce Power explained that the critical receptor group, comprised of subsistence farm residents living full-time adjacent to the Site, and the hunter/fisherman receptors living 20km north of the Site would both have greater exposure than the MNO harvesters who travel to the region. The Human Health Risk Assessment demonstrated that there is no radiological risk to human health to both receptors and this conclusion would equally apply to MNO harvesters who have less exposure.

- **Perceptive Effects** – the MNO expressed concerns about perceptive effects leading to avoidance behaviours and the need to further assess this. There were discussions about a potential Métis diet survey and Bruce Power and the MNO agreed to further discuss the development of this survey and a work plan. There were also discussions about Bruce Power providing input on the next survey of MNO harvesters so that it is designed in a way that can been meaningfully incorporated into future assessments.

- **MNO Monitoring –** the MNO and Bruce Power discussed the development of a MNO Monitoring program which was identified as an action item in the Bruce Power-MNO Relationship Agreement signed in December 2017. The MNO underscored the importance of their involvement in monitoring to ensure their rights and interests are protected and indicated that their intent was not to duplicate existing monitoring.

- **Emergency Response** – the MNO expressed their desire to develop a communications protocol for emergency response and reportable events that would be specific to the MNO and their interests. Bruce Power indicated that it would be happy to work with the MNO on the development of this protocol.

- **Fisheries Act Authorization and Offset Projects** – Bruce Power provided further information about the proposed offset projects and why these projects were selected. The MNO expressed concern that none of the offset projects specifically addressed Lake Whitefish and indicated that it did not necessarily agree with Bruce Power that Lake Whitefish cannot be stocked. Bruce Power indicated that it was willing to look at other projects and invited the MNO to provide any further ideas that they have.

During the meeting, there was also a discussion about economic development and business opportunities, the development of an economic development MOU, and a potential specific business opportunity for the MNO relating to the Site. Bruce Power also provided further information to the MNO on the Bruce Power Indigenous Relations Suppliers Network and how the MNO could benefit from this.

2.3 MNO-Bruce Power Meeting re Truax Dam Removal Project – April 4, 2018

On April 4, 2018, Bruce Power, GSS Engineering, and the MNO met from 1:00pm to 4:00pm to discuss the Truax Dam Removal Project. GSS Engineering explained how the dam removal would be performed and how it would increase fish migration. Model sediment movement and deposition were discussed and the MNO were shown hydraulic models.

During this meeting, the MNO raised a number of concerns:

- **Effects on Shoreline and Silt Release** – the MNO asked what measures were being taken to stabilize or rehabilitate the shoreline upstream of the Truax Dam and to mitigate silt release from the riverbed. GSS engineering explained that no intervention is required at this point because it is thought that the river bed contains minimal amounts of fine sediment. In its existing deteriorating condition, the dam allows much of the water through because it is so porous and the water velocity is not expected to change significantly after the dam is removed. With respect to shoreline erosion after the headpond is lowered, GSS Engineering informed the

MNO that it expected natural re-vegetation to occur quickly and that the dam removal would not exacerbate erosion any more than what already occurs throughout year due to natural variations in river flow. They explained that the water level rises and falls naturally throughout the year and the movement of sediment is a natural process. GSS also explained that the local community would likely be opposed to engineered reinforcement of the river bank (e.g., rip rap) for aesthetic reasons.

- **Contingency Plans –** the MNO asked whether there are cautionary/contingency plans in the event that assumptions about shoreline erosions and silt release are incorrect. GSS Engineering explained its view that the best approach is to let things naturally re-establish as opposed to having human intervention. Bruce Power added that its approach would be to monitor and verify the predictions of the model and if the predictions are not accurate further interventions can be considered and implemented.

- **Agricultural runoff and contaminant testing** – the MNO expressed concern that contaminants in sediment in the dam may not meet provincial sediment quality standards and asked what will be done to address this. Bruce Power indicated that tests on the sediment will occur before the dam is removed and the sediment will be evaluated against provincial standards. It was explained that contamination is not anticipated to be an issue because the riverbed is comprised of coarse material that has a low ability to bind contaminants.

- **Potential effects/impacts on aquifer, groundwater, tributaries** – in response to concerns raised by the MNO about lowering the headpond upstream of the Truax Dam, Bruce Power indicated that impacts to the aquifer (groundwater) or tributaries are unlikely because the project is not removing surface water or groundwater in any way, rather redistributing surface water on a very small, localized scale. It explained that the existing narrow headpond extended for ~2km upstream, and lowering the river level in this upstream zone could only have a very small localized effect on the shallow groundwater (if any). Bruce Power explained that tributaries should not dry up as a result of this dam removal because they flow into the river and their water table is higher.

Due to the length of discussion on the Truax Dam Removal Project with the engineer, the allotted three hours of the meeting did not allow for a discussion on the overall offsetting program being proposed by Bruce Power. A decision was made to defer the presentation to April 5, 2018.

2.4 MNO-Bruce Power Quarterly Meeting - April 5, 2018

On April 5, 2018, Bruce Power and the MNO met from 9:00am to 2:30pm for their quarterly meeting to further discuss the Application and other economic development items. This meeting was attended by the seven members of Bruce Power (including the Manager of Environment, Community & Indigenous Relations, Manager of Communications and Media Relations, and a technical expert in aquatic ecology) and members of the GBTTCC, MNO consultation coordinators, and one of MNO's technical consultants.

During the meeting, Bruce Power and the MNO discussed and agreed to implement three main recommendations:

1. **Co-development of a MNO Monitoring Program:** Bruce Power and the MNO agreed to expand upon Bruce Power's current monitoring programs to ensure that MNO identified Valued Components (VCs) are being appropriately monitored, assessed, and incorporated into future ERAs.

1. **A MNO-Specific Diet Survey:** Bruce Power and the MNO agreed to co-design a diet survey to further assess any impacts of the Project on MNO Citizens' health.

2. **A MNO Emergency Communications and Management Plan:** Bruce Power and MNO agreed to develop a notification protocol for emergency communications.

Bruce Power and the MNO discussed a number of proposed preliminary tasks to implement these recommendations and agreed to the preliminary plan set out in the MNO's CNSC Submission (CMD 18-H4.57), as set out below.

1. **MNO Monitoring Program**

MNO AMP tasks	Desired Outcome	Activity	Timeline
Understand existing CNSC IEMP, BP Environmental Monitoring Program	• Avoid overlapping monitoring activities and define where gaps exist between MNO areas of interest and current monitoring programs	• Define current state of proponent and regulator monitoring • A working session between CNSC, BP and MNO	Fall to winter 2018
Review and evaluate MNO VCs and areas of concern to focus the MNO AMP	• Ensure all identified impacts to MNO VCs and areas of interest have a corresponding monitoring plan to continue to understand the project effects	• MNO to complete a workshop with MNO Harvesters to refine key areas for consideration	Fall to winter 2018
Create an implementation plan for monitoring/oversight of areas of interests (as identified above)	• Ensuring a robust monitoring program is followed to understand effects to MNO VCs and areas of interest	• Continue with annual VC Citizen survey to add to the baseline, particularly in support of the perceptive aspects of MNO VCs • Identify training and capacity needs for	TBD

MNO AMP tasks	Desired Outcome	Activity	Timeline
		MNO to implement new biophysical monitoring or participate in existing monitoring	
Develop/identify program to train environmental monitors or create oversight role for MNO	• Provide confidence to MNO Citizens that the monitoring results are accurate and/or have MNO oversight	• MNO to identify hiring need • BP to provide required training and/or capacity for training	TBD
Identify adaptive management measures should predictions and mitigation measures prove to be incorrect or unanticipated effects occur	• Ensure the MNO AMP is a living and robust program which provides efficient response to emergent situations	• BP to host regular/annual follow up meetings with MNO representatives • BP and MNO to identify responses and actions to results of monitoring program (e.g. education sessions/tours in response to perception issues)	Continuous

2. MNO Specific Diet Survey

MNO AMP tasks	Desired Outcome	Activity	Timeline
Co-designing MNO-specific survey/study to understand any Project impacts on MNO Citizens' health	• To ensure that a MNO-specific survey contains appropriate plant and animal species as well as accounts for unique Métis attributes (e.g. parts of animals consumed, preparation of traditional foods/medicines, etc.	• BP to host working sessions with MNO representatives to revise existing BP human health/diet survey • The MNO to draft survey, BP to review and provide feedback • BP to provide	Fall to winter 2018

	seasons)	training/software for the MNO to conduct survey and analyze data	
Complete MNO-specific data gathering	• Ensure appropriate selection of participants and delivery of survey in a manner appropriate to the MNO	• The MNO to identify participants and outreach protocol • The MNO to conduct in-person surveys or outreach to MNO participants to complete online surveys	TBD
Analyze survey results	• Ensure survey results are communicated as well as incorporated and assessed in the next ERA	• The MNO to analyze survey results • The MNO to provide results to BP • The MNO to present results to Citizens • BP to analyze a subset of the survey data (scope to be agreed to with the MNO) • BP to incorporate and assess MNO-specific survey results in next ERA filing	TBD

3. MNO Emergency Communications and Management Plan

MNO AMP tasks	Desired Outcome	Activity	Timeline
Develop a notification protocol for emergency	• To ensure that MNO representatives and Citizens receive information around any emergency or unplanned event in a	• BP and MNO to host working session to identify appropriate contacts at MNO	At regular MNO-BP meeting. Community meeting to coincide

	timely manner	• BP to present current process to the MNO representatives • The MNO to identify communication protocol for information distribution to MNO Citizens • The MNO and BP to identify type of information that should be provided to MNO - The MNO and BP to define what constitutes "emergency" to each party • The MNO to provide information at community meetings	with ongoing VC workshops

During the meeting, there was also a discussion of the Fisheries Act Authorization and a presentation on offset projects was provided. Bruce Power explained the current offset plan and how the projects will be monitored. The MNO indicated that the stocking of Lake Trout does not benefit their citizens because it is not a fish that they can access without a large fishing vessel. The MNO would like stocking of fish that will come near the shore or to stock inland lakes or rivers. Bruce Power indicated that the Ontario Ministry of Natural Resources and Forestry ("MNRF") determines which fish can be stocked. Bruce Power advised the MNRF during a meeting on April 18, 2018 that both the MNO and the SON have concerns about Lake Trout stocking. The MNRF indicated that they have heard these concerns from the SON and the MNO previously and they intend to discuss these issues with both groups further.

In addition, the MNO also raised concerns with the fact that the offset programs are not providing a like for like replacement of species. Bruce Power indicated that since their impact is low and dispersed across different species of fish it remains a challenge to find suitable offset projects. Bruce Power again welcomed the MNO to provide offset project ideas. Bruce Power explained that they had worked with knowledgeable individuals and organizations including the MNRF to help determine whether there were projects or opportunities to create projects that would repair, improve or enhance degraded habitats along the shore or the near shore of Lake Huron. It was indicated by these individuals and organizations that the shore and near shore of Lake Huron is not degraded particularly relative to the

other Great Lakes and these types of projects do not exist. It was also communicated to Bruce Power that if they were to go and create a project then it would create an unnatural habitat.

This meeting also included discussions about MNO economic/business development opportunities from the Site. This included discussions to finalize the Economic Development MOU, which is further detailed in Section 3.2, and a discussion about potential next steps on a specific business opportunity for the MNO which Bruce Power is attempting to facilitate.

2.5 Bruce Power-MNO Thermal Meeting – April 30, 2018

On April 30, 2018, Bruce Power and the MNO met to discuss the Thermal ECA Application. This was attended by 5 representatives of Bruce Power (including the Manager of Environment, Community & Indigenous Relations, three technical experts, and one administrative support), a representative of the OCNI, members of the GBTTCC, the MNO-Bruce Power Consultation Coordinator (newly appointed), the MNO Head Office Energy Policy Analyst and a representative from PGL consulting. PGL was the consulting firm retained by the MNO to conduct a review of the application for the Thermal ECA Approval.

On April 27, 2018, the MNO provided Bruce Power with a report from PGL that outlined issues and recommendations following their technical review. During the two hour meeting on April 30, the PGL consultant provided a broad overview of their technical review, and the MNO indicated that they were targeting mid-May to provide their input to the MOECC on the Thermal ECA Application and asked Bruce Power to provide any comments on the PGL Report to the MNO in the upcoming weeks. During the discussion, the MNO recommended:

- **Bruce Power provide a more detailed explanation on the combined impact of the Bruce A and Bruce B thermal plume** – Bruce Power provided a high level overview of the thermal plume modelling that has been completed, and offered to sit with PGL to go over this in more detail, noting that Bruce Power has previously answered similar questions from MOECC.

- **Incorporate and evaluate MNO specific interests into the analysis** – the MNO proposed the inclusion of additional information on how the thermal plume shrinks and grows in the lake and what that means to the near shore aquatic environment with respect to MNO species of interests. Bruce Power sought clarification on what the MNO envisioned for this, and indicated that this type of evaluation would be better incorporated into the next ERA. After a discussion about avoiding duplication, Bruce Power suggested that the MNO include this in their recommendations to the MOECC about having this included within the next ERA.

At this meeting, Bruce Power and the MNO also briefly discussed the climate change study. The MNO indicated that they will be meeting with the Council of the Great Lakes Region on May 29th. Bruce Power clarified that the meeting is an initial scoping meeting as the scope has yet to be set for the study, and indicated to the MNO that the study will cover both socio-economic as well as environmental areas.

Bruce Power looks forward to continuing progress on the recommendations following the Hearing Process as well as continuing to advance business and employment opportunities for the MNO from the Site.

3.0 BRUCE POWER INDIGENOUS RELATIONS PROGRAM

In the MNO CI, Bruce Power provided a detailed overview of its Indigenous Relations Program and the various programs and initiatives that it has in place to support investment in local Indigenous communities and increase Indigenous employment, training, and business opportunities from the Site. The information below is intended to supplement the information provided in the MNO CI.

3.1 Indigenous Community Investment Fund

In 2016, Bruce Power launched a $1.2 million Indigenous Community Investment Fund ("ICIF") that focuses on supporting initiatives in local Indigenous communities from 2016-2020 in four areas:

- **Community Initiatives** focused on health and wellness and the environment;
- **Youth Leadership** through education and sports programs;
- **Cultural Events** through awareness activities and celebrations; and
- **Community Infrastructure** as it pertains to public works and recreation.

In 2018, Bruce Power provided additional funding to the MNO to support community initiatives, including:

- The expansion of programs focusing on health and wellness, education and training, and cultural activities for the Georgian Bay Traditional Territory Consultation Committee; and
- 2018 Sponsorship of the MNO Annual General Assembly.

3.2 Economic Development MOU

On May 6, 2018 Bruce Power and the MNO finalized and signed an economic development MOU that focuses on increasing employment, procurement, and business opportunities for the MNO citizens (the "Bruce Power-MNO MOU").

The Bruce Power-MNO MOU identifies specific objectives and action items to advance training, employment, and business development opportunities. As part of this, Bruce Power and the MNO are looking to expand the existing local (Region 7 specific) and Regional (MNO wide) Business Directory that identifies MNO businesses for Bruce Power suppliers. Bruce Power is also continuing to discuss a specific business opportunity for the MNO and how Bruce Power can help to facilitate this opportunity.

3.3 Bruce Power Indigenous Relations Suppliers Network

The Bruce Power Indigenous Relations Suppliers Network was launched in June 2017 as part of Bruce Power's commitment to increase Indigenous employment and create new economic opportunities for Indigenous communities. This is a network of all major suppliers to Bruce Power with a commitment to:

- Hiring programs and commitments;

- Enabling community investment opportunities; and
- Partnering with Indigenous communities on business opportunities that will provide community benefit.

There are over 25 companies participating in the network, including but not limited to AECON, AMEC Foster Wheeler, Bird Construction, Black & MacDonald Limited, BWX Technologies, Cameco, GE Power, Hatch Ltd, Kinectrics Inc., Sargent & Lundy Canada Company, Sierra Systems, SNC-Lavalin Nuclear Inc.

On March 21, 2018, the IRSN opened an office in Port Elgin with the Organization of Canadian Nuclear Industries (OCNI), which is representative of more than 200 suppliers to the Canadian nuclear industry. The opening of this office is part of Bruce Power's work to increase supplier presence in the region and to increase opportunities for local Indigenous groups with these suppliers.

In order to build community capacity and to generate wealth through sustainable and long-term business ventures, Bruce Power plans to support the following strategies:

- To develop and implement a comprehensive Indigenous Procurement Policy;
- To work through the IRSN to increase the engagement between suppliers and the local Indigenous communities, including exploring opportunities in procurement processes;
- To enhance key reporting metrics in order to track progress and improvements; and
- To support Indigenous business development initiatives that will provide economic opportunities to the SON, HSM, and MNO.

Indigenous procurement policies will drive the implementation of a local Indigenous modifier in order to evaluate proposals and to promote local Indigenous businesses. The modifier, planned to be in place by May 30, 2018, will favour proposals that involve local Indigenous ownership through the Bruce Power's IRSN and/or value-added work performed by local Indigenous peoples. The modifier will result in a benefit to local Indigenous communities through direct contracts from Bruce Power and through contracts issued by Bruce Power's IRSN.

The OCNI also recently created a First Nations, Métis, and Inuit (FNMI) committee to assist with Indigenous hiring strategies in the greater nuclear industry across the country. Bruce Power is represented on the committee by members from the Indigenous Relations Team and the IRSN to ensure that local interests are represented and promoted.

3.4 Employment, Education & Training

Bruce Power is committed to providing training, education and employment opportunities to Indigenous peoples. We are committed to creating a work environment in which Indigenous peoples' cultures, beliefs and values are acknowledged and respected.

Bruce Power has hired 2 full time resources that are dedicated to increasing Indigenous employment at Bruce Power and with Bruce Power suppliers and building trades. They are supported by the Section Manager of Talent Management as well as the Department Manager of Talent Management and have full support from the Human Resources Team and the whole organization for additional resources when required. In addition, Bruce Power has introduced a number of measures designed to address barriers to increasing Indigenous employment through various education and training initiatives.

As noted in the MNO CI, one of these initiatives is the financial support and placements that Bruce Power provides for the MNO's Skilled Employment Energy Stream program. This program provides Indigenous students with a fully funded 8-month training program at Georgian College in an energy sector field followed by an 8 week work placement in the energy sector. The program is open to Métis, First Nations, and Inuit people, with a focus on women.

Bruce Power participates in this 4 year partnership which gives participants exposure to the business and employment opportunities for an 8 week job shadow placement, once completed their 1 year Georgian College program. We are anticipating that a MNO student will join Bruce Power for an 8-week placement later this year through this program.

Bruce Power is looking forward to working with the MNO to achieve further progress on the employment, education, and training front through the implementation of further strategies that are being developed pursuant to the Bruce Power-MNO MOU.

4.0 CONCLUSIONS AND NEXT STEPS

Bruce Power is committed to continuing to build and maintain a positive relationship with the MNO and ensuring that the Métis way of life is not impacted by the Site and can be sustained for generations to come.

The MNO has previously participated in reviews relating to the Site and Bruce Power has been providing information to the MNO about the Application since December 2015. The MNO were provided with a copy of the Application in July 2017 and capacity funding from Bruce Power and the CNSC to support their review. Bruce Power has engaged with the MNO about the Application through a series of meetings and exchange of correspondence to discuss any concerns or questions. Bruce Power has heard the concerns raised by the MNO and has agreed to implement a number of measures to respond to their recommendations on a path forward, including the co-development of a MNO monitoring program, a MNO-specific diet survey, and a MNO Emergency Communications and Management Plan. The MNO have also agreed to participate in a 3-year climate change study that is being conducted in partnership by Bruce Power and the Council for the Great Lakes Region.

Bruce Power is very grateful for the input that it has received from the MNO and the time that they have taken to engage in this process. Bruce Power looks forward to continuing to work with the MNO on these joint measures to ensure that the Métis way of life is not impacted by the Site and to advance other initiatives that will increase MNO employment, training, and business opportunities relating to the Site and with Bruce Power's suppliers.

Enclosure 3

B-REP-03443-15MAY2018

Bruce Power Indigenous Community Interests: Historic Saugeen Métis (Supplementary Report)

NK21-CORR-00531-14428
NK29-CORR-00531-15130
NK37-CORR-00531-02989

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Bruce Power Indigenous Community Interests – Historic Saugeen Métis

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UPDATE MAY 15, 2018

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1.0 EXECUTIVE SUMMARY

On June 30, 2017, Bruce Power applied to the Canadian Nuclear Safety Commission (the "CNSC" or "Commission") to renew its Nuclear Power Reactor Operating Licence for the Bruce Nuclear Generating Stations (the "Site") for 10 years and to undertake certain life extension activities, including Major Component Replacement ("MCR") for six reactors (the "Application"). The Application builds on the work that Bruce Power has undertaken since assuming responsibility for the operations of the Site in 2001 from Ontario Power Generation ("OPG") pursuant to a long-term lease of the Site. This includes a prior refurbishment of two reactors completed in 2012 which extended the life of these reactors to 2043. The life extension activities contemplated in the Application have all been previously carried out on the Site and have been the subject of previous licencing reviews and environmental assessments.

The Site is located within the traditional territory of the Saugeen Ojibway Nation ("SON") and the traditional harvesting territories of the Historic Saugeen Métis ("HSM") and the Métis Nation of Ontario ("MNO"). Since December 2015, Bruce Power has been providing information about the Application to the SON, the HSM, and the MNO. It provided a copy of the Application to each community in July 2017 and has had meetings with the SON, the HSM, and the MNO to discuss any concerns and answer any questions that they have. In January 2018, Bruce Power filed three Indigenous Community Interest documents which provide further information about each community, including their asserted and/or established Aboriginal and treaty rights and how the potential impacts of the continued operation and life extension of the Site on each community were assessed. These documents also detail the issues that the SON, the HSM, and the MNO have raised about the Site in past regulatory reviews, how these issues were assessed and taken into account in the Application, and Bruce Power's efforts to engage and share information with each community about the Application.

This document is intended to supplement *Bruce Power Indigenous Community Interests – Historic Saugeen Métis* B-REP-03443-17JAN2018 (the "HSM CI"). As noted in the HSM CI, the HSM have participated in numerous prior licencing reviews and environmental assessments relating to the Site since 2001 and Bruce Power has been providing information to the HSM about the Application since December 2015. The purpose of this document is to provide further information about the discussions that have taken place since January 1, 2018 between Bruce Power and the HSM about the Application, the Fisheries Act Authorization, and employment, training and business opportunities relating to the site. This has included four meetings and a tour of the Truax Dam which is one of the proposed offset projects in the Fisheries Act Authorization. These meetings are in addition to discussions that the HSM have had with CNSC staff about the Application.

Through meetings with Bruce Power and the HSM's written submission to the Commission (CMD 18-H4.55 (E-DOCS-#5509267-CMD-H4.55)), the HSM indicated that they support the Application and have a significant interest in ongoing environmental monitoring and profound need for ongoing involvement and engagement throughout the licence period given their traditional use of the lands and waters surrounding the Site. The HSM have concluded based on current assessments that there is no anticipated adverse effects to their harvesting rights, culture, or way of life in their traditional territory, which includes Lake Huron and the lands and waters in the counties of Bruce, Grey and Huron. They have stated that through ongoing monitoring and open communications they hope to continue to have confidence that the operations of the Site will either (a) not adversely impact HSM's traditional harvesting activities or (b) if adverse impacts arise, the parties will work together in a timely manner to identify measures to mitigate these impacts.

Bruce Power remains committed to continuing to share information with the HSM on Bruce Power's operations and monitoring measures throughout the licence period and to engage the HSM on any changes to Bruce Power's monitoring programs. Bruce Power will also continue to engage the HSM on the Fisheries Act Authorization and its Environmental Compliance Approval application.

As part of the Fisheries Act Authorization, Bruce Power has invited the HSM to Identify alternative fisheries offset projects for impacts from impingement and entrainment and other ideas for general fisheries improvement projects that can be considered outside of the Fisheries Act Authorization application. It has also invited the HSM to tour the Truax Dam Removal Project later this month. In addition, Bruce Power has also invited the HSM to participate in and shape the scope of a 3-year climate change study that was recently announced by Bruce Power and the Council of the Great Lakes Region. This study will provide insight into, among other things:

- The state of climate change science in the Great Lakes Region;
- The impact of a changing climate on various ecosystems and sectors in the Great Lakes, including the region's aquatic environment, fisheries and Bruce Power's operations;
- The knowledge and decision-making systems companies and communities need to better manage changing risks as a result of climate; and
- The role that Bruce Power and other sectors might play in tackling climate change on a local and regional level, and how companies can adjust their corporate sustainability strategies to limit their impact.

Beyond its engagement on the Application, Bruce Power has continued to make efforts to increase HSM employment, training, education, and business opportunities from the Site and support HSM priorities. Since January 1, 2018, this has included:

- Discussions about ways to enhance HSM employment and business opportunities relating to the Site, including with Bruce Power's suppliers;
- Opening an office for the Indigenous Relations Supplier Network in Port Elgin in March 2018, which is designed to increase Indigenous employment and economic opportunities with Bruce power suppliers; and
- Providing funding to support the HSM's 10th Annual HSM Rendezvous and the 200th anniversary of the Piché Wampum.

Discussions with the HSM about ways to increase HSM employment and business opportunities from the Site are ongoing. Bruce Power is committed to working with the HSM to advance these discussions and to continue to engage the HSM throughout the licence period to ensure that the Métis way of life is not impacted and work to monitor and mitigate any future impacts from the Site on HSM rights and interests.

2.0 CONSULTATION AND ENGAGEMENT WITH THE HSM

As noted in their written submission to the Commission, the HSM has been engaging with Bruce Power

on the Application since early 2016. Since January 1, 2018, Bruce Power and the HSM have had four meetings to discuss items relating to the Application, the Fisheries Act Authorization, ECA Application, and employment and business development opportunities.

2.1 HSM/Bruce Power Meeting re Application and Engagement Plan – January 25, 2018

On January 25, 2018, Bruce Power and the HSM met to discuss the Application and the proposed engagement plan. The meeting took place from approximately 9:00-10:30am and was attended by 3 individuals from Bruce Power (including the Manager of Environment, Community & Indigenous Relations, a Senior Technical Officer for Community and Indigenous Relations, and an administrative support staff) and 4 individuals from the HSM (including the Secretary/Treasurer, the Lands & Resources Consultation Coordinator, and 2 administrative support staff).

During this meeting, Bruce Power provided an update on the Application including recent public engagement sessions. The HSM indicated that they would be doing their own community engagement meetings and would be disseminating information to their members about the Application. Bruce Power offered to attend and provide support for the HSM community engagement meetings but HSM advised that this would not be necessary.

The HSM advised Bruce Power that they did not require any further technical clarification or information as the Application contained all of the information needed to complete their review. Bruce Power previously provided the HSM with capacity funding in September 2017 to support their review of the Application. This funding is in addition to the regular annual capacity funding that Bruce Power provides to the HSM through a participation agreement between Bruce Power and the HSM which was renewed in 2017.

The HSM did not raise any concerns about the Application in this meeting and indicated that they are proud of the positive relationship that has been established with Bruce Power and that the annual 5-year Look Ahead have been very helpful for forecasting and planning their efforts.

During the meeting, HSM was provided a hard copy of the HSM Community Interest document and they raised questions about the confidentiality of the document and expressed concerns about the need to ensure that their traditional knowledge and land use information remains confidential.

2.2 HSM-Bruce Power Quarterly Meeting – February 14, 2018

On February 14, 2018, Bruce Power and the HSM met from approximately 9:00am to 11:00am for their first quarterly meeting. The meeting was attended by 3 members of Bruce Power (including the Manager Environment Community & Indigenous Relations, the Manager of Communications and Media Relations, and one other Bruce Power team member) and 6 individuals from the HSM (including three councillors, the Lands & Resources Consultation Coordinator, the assistant Lands & Resource Consultation Coordinator, one administrative support staff).

The HSM indicated that their MCR community engagement session and open house would take place as a luncheon at the end of February or early March. HSM informed Bruce Power that they will be providing a presentation during the community session and requested that Bruce Power provide copies of the licence renewal booklets and fact sheets. This material was provided on February 16, 2018.

The HSM subsequently advised Bruce Power that this engagement session was held on March 6, 2018. As set out in their written submission to the CNSC, the HSM staff provided a presentation at this session along with an opportunity for those in attendance to ask questions. The HSM indicates that the overall response to the Application was supportive, noting that ongoing environmental monitoring and continued engagement were important to the community.

During this meeting, Bruce Power also provided the HSM with a copy of the ECA Approval application and discussed the Fisheries Act Authorization, including the proposed Truax Dam Removal. Bruce Power communicated to the HSM that the CNSC has asked Bruce Power to submit their Fisheries Act Authorization application prior to the Part II hearings. Bruce Power also discussed the offset projects the Company is planning to include in the application. As part of this discussion, Bruce Power asked the HSM if they would be interested in speaking with GSS Engineering, the consultant leading the proposed Truax Dam Removal offset project. It was explained that the project was being led by the Lake Huron Fishing Club in conjunction with the Municipality of Brockton and that Bruce Power was the sole funder. HSM agreed that Bruce Power could share their contact information with GSS Engineering. A more detailed discussion on the Truax Dam occurred on March 28, 2018 and following this meeting a date was set for the HSM to tour the Truax Dam, which took place on April 24, 2018.

HSM used this meeting as an opportunity to further educate Bruce Power on the history of the Métis people of the area, with a particular focus on the annual Rendezvous that will celebrate 200 years of HSM history in the area. HSM described the Wampum treaty and their goal of educating the public on their culture and traditions.

2.3 HSM-Bruce Power Meeting re Employment and Business Opportunities - February 16, 2018

On February 16, 2018, Bruce Power and the HSM met to discuss ways to enhance HSM employment and business opportunities relating to the Site. The meeting took place from 1:00-3:00pm and was attended by 4 individuals from Bruce Power (including the Manager of Environment, Community & Indigenous Relations, the Manager of Communications & Media Relations, and two other Bruce Power team members) met with 4 individuals from the HSM (including one councillor, the Lands & Resources Consultation Coordinator, assistant Lands & Resources Consultation Coordintor and administrative support personnel).

Bruce Power provided more information about the Bruce Power Indigenous Relations Suppliers Network (IRSN) at this meeting explaining that it is a network designed to expand upon the employment and business opportunities available to local Indigenous communities. HSM asked about the types of jobs that might be available through the IRSN and Bruce Power explained that they would be more diverse than the jobs traditionally hired for at Bruce Power. The Company also explained that one of the goals of the IRSN is to educate suppliers on the local Indigenous communities and to share best practices on ways to increase Indigenous employment.

HSM indicated that they were very interested in increasing HSM employment through the IRSN and creating an HSM specific business directory to benefit from business development opportunities that will come from Bruce Power and the IRSN. As part of this meeting, Bruce Power proposed the development of an Economic Development MOU with the HSM to help enhance employment and business opportunities relating to the Site.

2.4 HSM-Bruce Power Truax Dam Removal Meeting – March 28, 2018

On March 28, 2018, Bruce Power met with the HSM along with GSS Engineering to discuss the Truax Dam Removal, an offset project that is part of Bruce Power's Fisheries Act Authorization Offsetting plan. During this two hour meeting from 9:00am to 11:00am, GSS Engineering provided an overview of the Truax Dam Removal project and showed the models of what the existing river flowpath looks like and what improvements are predicted following removal of the dam. Bruce Power also took the opportunity during this meeting to provide the HSM with information on the other components of the overall offsetting plan which include MNRF Lake Trout Stocking as well as the Shebeshekong River Rehabilitation. Bruce Power invited the HSM for a tour of the dam on April 24, 2018 which the HSM attended.

During this meeting, Bruce Power and the HSM also reviewed and signed the engagement log that the HSM had prepared for the Application.

2.5 HSM Letter of Support for the Application

On April 11, 2018, the HSM sent a letter to Bruce Power confirming their support for the Application. In the letter, the HSM confirmed that Bruce Power had provided sufficient information to the HSM to enable them to assess any potential impacts of the Application on Métis rights and interests. The letter further states that:

> "…Bruce Power has worked with the HSM and elected community representative to consider these potential impacts.
>
> The information received from Bruce Power did not identify any Significant Adverse Environmental Impacts or Significant Public Concerns. All potential environmental impacts identified during the exchange of information can be mitigated with known technology.
>
> The consultation and review process has indicated that there are no anticipated adverse impacts to Metis rights, culture or way of life and that the duty to consult has been fulfilled.
>
> We are pleased to notify you of our support for the Application."

In their written submission to the Commission, the HSM emphasized that they have profound need for involvement over the licence period and that they must be part of any process that determines what is being done to monitor and ensure the safe operation of the Site. Bruce Power respects HSM's need for involvement during the licence period and shares its interest in the safe operation of the Site. Bruce Power is committed to regular and ongoing engagement of the HSM throughout the licence period and for the life of the Site.

The HSM maintains that through established monitoring/reporting processes and open communication.

3.0 BRUCE POWER INDIGENOUS RELATIONS PROGRAM

In the HSM CI, Bruce Power provided a detailed overview of its Indigenous Relations Program and the various programs and initiatives that it has in place to support investment in local Indigenous

communities and increase Indigenous employment, training, and business opportunities from the Site. The information below is intended to supplement the information provided in the HSM CI.

3.1 Indigenous Community Investment Fund

In 2016, Bruce Power launched a $1.2 million Indigenous Community Investment Fund ("ICIF") that focuses on supporting initiatives in local Indigenous communities from 2016-2020 in four areas:

- **Community Initiatives** focused on health and wellness and the environment;
- **Youth Leadership** through education and sports programs;
- **Cultural Events** through awareness activities and celebrations; and
- **Community Infrastructure** as it pertains to public works and recreation.

In 2018, Bruce Power is proud to provide funding to the HSM to support their Annual Rendezvous. This year's Rendezvous is particularly important as it is 10th Annual HSM Rendezvous and the 200th anniversary of the Piché Wampum. This is a significant cultural celebration that acknowledges the Piché Wampum where the local Ojibwe and the Métis agreed to jointly inhabit the traditional Saugeen territory for the mutual protection and benefit of the indigenous people. The Rendezvous is a traditional gathering where items such as furs, kettles, fish, corn, sugar and medicine were traded before trips and the winter months.

3.2 Bruce Power Indigenous Relations Suppliers Network

The Bruce Power Indigenous Relations Suppliers Network was launched in June 2017 as part of Bruce Power's commitment to increase Indigenous employment and create new economic opportunities for Indigenous communities. This is a network of all major suppliers to Bruce Power with a commitment to:

- Hiring programs and commitments;
- Enabling community investment opportunities; and
- Partnering with Indigenous communities on business opportunities that will provide community benefit.

There are over 25 companies participating in the network, including but not limited to AECON, AMEC Foster Wheeler, Bird Construction, Black & MacDonald Limited, BWX Technologies, Cameco, GE Power, Hatch Ltd., Kinectrics Inc., Sargent & Lundy Canada Company, Sierra Systems, and SNC-Lavalin Nuclear Inc.

On March 21, 2018, the IRSN opened an office in Port Elgin with the Organization of Canadian Nuclear Industries (OCNI), which is representative of more than 200 suppliers to the Canadian nuclear industry. The opening of this office is part of Bruce Power's work to increase supplier presence in the region and to increase opportunities for local Indigenous groups with these suppliers.

In order to build community capacity and to generate wealth through sustainable and long-term business ventures, Bruce Power plans to support the following strategies:

- To develop and implement a comprehensive Indigenous Procurement Policy;
- To work through the IRSN to increase the engagement between suppliers and the local Indigenous communities, including exploring opportunities in procurement processes;
- To enhance key reporting metrics in order to track progress and improvements; and
- To support Indigenous business development initiatives that will provide economic opportunities to the SON, HSM, and MNO.

Indigenous procurement policies will drive the implementation of a local Indigenous modifier in order to evaluate proposals and to promote local Indigenous businesses. The modifier, planned to be in place by May 30, 2018, will favour proposals that involve local Indigenous ownership through the Bruce Power's IRSN and/or value-added work performed by local Indigenous peoples. The modifier will result in a benefit to local Indigenous communities through direct contracts from Bruce Power and through contracts issued by Bruce Power's IRSN.

The OCNI also recently created a First Nations, Métis, and Inuit (FNMI) committee to assist with Indigenous hiring strategies in the greater nuclear industry across the country. Bruce Power is represented on the committee by members from the Indigenous Relations Team and the IRSN to ensure that local interests are represented and promoted.

4.0 CONCLUSIONS AND NEXT STEPS

Bruce Power is committed to continuing to build and maintain a positive relationship with the HSM and ensuring that the Métis way of life is not impacted by the Site and can be sustained for generations to come.

The HSM have participated in numerous prior reviews relating to the Site since 2001 and Bruce Power has been providing information to the HSM on the Application since December 2015. The HSM were provided a copy of the Application in July 2017 and capacity funding from Bruce Power to support their review. The HSM have had meetings with Bruce Power about the Application and been given the opportunity to ask questions and raise any concerns. The HSM have also met with CNSC about the Application. The HSM have concluded based on current assessments that there is no anticipated adverse effects to their harvesting rights, culture, or way of life from the continued operation and proposed life extension of the Site. Bruce Power is proud to have the HSM's support for the Application and is committed to continuing to engage the HSM throughout the life of the Site.

Bruce Power is very grateful for the input that it has received from the HSM and the time that they have taken to engage in this process. Bruce Power looks forward to continuing to work with the HSM to ensure that the Métis way of life is not impacted by the Site and to advance other initiatives that will increase HSM employment, training, and business opportunities relating to the Site and with Bruce Power's suppliers.

Enclosure 4

Comment Disposition Record for SON comments received via email 07 Aug 2012 from Dr. Stephen Crawford

Excerpt from:

Email, F. Saunders to J. Stevenson and E. Cameron, "I&E Comments Review", December 4, 2013, NK21-CORR-00531-11001.

Comment Disposition Record for SON comments received via email 07Aug2012 from Dr. Stephen Crawford

Document: *Bruce A Refurbishment for Life Extension and Continued Operations Environmental Assessment Follow-up Program: Operations Phase Impingement and Entrainment Monitoring Plan*

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
1	There is no reference in the draft E/I Monitoring Plan to the WINGS Project that was undertaken by Nawash-OPG-BP at the University of Guelph, specifically to scope the theory and available knowledge regarding the effects of nuclear generating stations generally and the BNGS specifically on fish populations generally, and the whitefish populations of Lake Huron specifically. Entrainment and impingement feature prominently in the WINGS reports, and these should be reviewed and incorporated in the draft E/I Monitoring Plan where appropriate. **BP Response:** None	Entrainment and impingement feature prominently in the WINGS reports, and these should be reviewed and incorporated in the draft E/I Monitoring Plan where appropriate.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan states that the EA FUP has taken into account "a wide range of research and field studies by the Whitefish Interactions with Nuclear Generating Stations Project (1999-2002), Technical Working Group on Whitefish (2003-2006), International Lake-Wide Whitefish Studies (2004-present) including mark and recapture and genetics assessments, substrate temperature studies (2004-2005), and several EAs and associated follow-up programs for the Bruce Power site (1997-present)" [p. 15]. Additionally, the I&E Plan states that it is "not intended to provide a detailed review of the historical research and field studies" [p. 15]. The intent is to provide a work plan of sufficient detail for agency and stakeholder review. Bruce Power and its stakeholders will continue to evaluate scientific and technical reports in designing, implementing, and interpreting research and field studies. The Bruce Power response should be considered "Satisfactory."
2	There is no reference in the document to the Saugeen Ojibway Nation-Bruce Power Collaborative Whitefish Research Program generally, or the University of Guelph research program with specific research projects for Bruce Power on (a) Lake Huron whitefish population discrimination, (b) BNGS whitefish entrainment, and (c) whitefish population modeling to integrate BNGS entrainment mortality with other natural human-nonBNGS and BNGS sources of mortality. **BP Response:** None	Given the high degree of overlap between the SON-BP Collaborative Research Program and the draft E/I Monitoring Plan, there should be a much higher level of coordination and integration between these two initiatives.	**No additional change to the I&E Plan is required.** The intent of the I&E Plan is to provide a work plan of sufficient detail for agency and stakeholder review. Additionally, the EA FUP is intended to test the conclusions of the EA. The Collaborative Whitefish Research Program is intended specifically to test whether BNPD operations may have an impact on Lake Whitefish populations. While the Lake Whitefish was selected as a VEC for the EA, the EA FUP must consider impacts on other VECs as well. The I&E Plan will be implemented to monitor for impacts on other species besides Lake Whitefish. At this time, Bruce Power has not received scientific results from the UG research program which may be incorporated into the I&E Plan or the subsequent analysis. Results from the Collaborative Whitefish Research Program will be evaluated by Bruce Power, when available.
3	The report identifies several statistical methods that might be used. These are not described in detail. It is suggested that the data are clearly tested to indicate that they satisfy the necessary assumptions of the models. Further, in the case of a Generalized Linear Model, a log link has been suggested. This is the canonical link for the Poisson distribution (for example). This is a good candidate model for count data (which could be offset by the population at risk, if need be). However, in the case of zero-inflated data, a zero-inflated Poisson (ZIP) model, or Negative-Binomial model might prove beneficial. Other Generalized Linear Models should be investigated. Further, based on the sampling design, a Mixed Model might prove beneficial. **BP Response:** Minor updates to text were made to now read (italics emphasis on text differing from draft report): "*Where sufficient data exists to allow for defensible statistical analysis*, options that will be considered for comparing annual estimates of entrainment and impingement pre- and post-Operations Phase will include the non-parametric Mann-Whitney Utest, the Generalized Linear Model with a log link, or an Analysis of Covariance (ANCOVA) with month and flow as possible covariates." [p. 35] **UG Team Evaluation of Bruce Power Response:** Unsatisfactory. The updated text suggests that analyses will be performed after consideration of the data. However, it is necessary for evaluation that the methods to be used are clearly stated, including any and all assumptions. The Mann-Whitney U-test will test the hypothesis that one sample has (on average) larger values than another. It assumes the observations within each sample are independent of the other. Depending on the data being studied, this assumption may not be valid.	It is necessary for evaluation that the methods to be used are clearly stated, including any and all assumptions.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The reviewer has requested specific methods and related assumptions for statistical tests to be made with the collected data. However, specific statistical methods to be used during the analysis will depend on the distribution of the data. Bruce Power is therefore not able to commit, in advance, to specific statistical tests required for analysis of two years' worth of data. The I&E Plan was clarified to indicate that statistical analysis would be performed after the data is considered, with proper regard for the assumptions of the statistical test. Additional discussion may be warranted at annual stakeholder meetings and following annual reports. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
4	While a number of methods have been proposed for the analysis of the data collected in the Follow-Up monitoring program (pre and post Operations Phase), it is unclear how the results will be synthesized and communicated in order to answer the questions set forth in the document. That is, the purpose of the analyses were to 1) "determine if the environmental and cumulative effects of the project are as predicted in the EA study report.", and 2) "confirm whether the mitigation measures are effective or if additional or modified mitigation measures are required to confirm the prediction of no significant residual impacts." Referring to point 1), there is no mention of cumulative effects anywhere in the document. How are these being addressed/tested? How do the data and analyses address this important issue? Referring to point 2), the mitigation measures are not described. Have data been collected pre and post mitigation measure to determine if the measures are sufficient/effective? **BP Response:** Added discussion on residual adverse entrainment and impingement effects in Section 2.0 ("Overview of EA Study Report Findings"). Specifically stating: "Evaluation of the residual adverse entrainment and impingement effects was based on the criteria outlined in the EA Study Report [Bruce Power 2005]. Assessments for residual adverse entrainment and impingement effects are summarized in Table 2 and Table 3, respectively. The results of these assessments predicted that entrainment and impingement effects to the Aquatic Environment would result in minor adverse effects (not significant)." [p. 9] Expanded upon Section 4.62 ("Endpoints for Follow-Up Monitoring") to include: "Entrainment and impingement will be assessed both as individual effects and cumulative effects. Following an initial two years of Operations Phase entrainment and impingement sampling, data will be analyzed to determine if the annual entrainment and impingement impacts fall below the agreed upon thresholds for effect. If so, entrainment and impingement sampling will cease. If not, Bruce Power will consult with and provide agencies and stakeholders with options for future sampling and/or possible additional mitigation measures and feasibility." Added Section 2.0 ("Overview of EA Study Report Findings") which mentions that: "no feasible mitigation measures for impingement and entrainment by modifying the CCW flow volume were identified in the EA Study Report." [p. 8] **UG Team Evaluation of BP Response:** Unsatisfactory. Cumulative effects have not been adequately addressed within the document despite the goal to "determine if the environmental and cumulative effects of the project are as predicted". What is meant by "Entrainment and impingement will be assessed both as individual effects and cumulative effects"? This statement seems to suggest that "cumulative" refers to an aggregation of individuals, and not for example, the cumulative effect that a constant perturbation might have over time on a population. A perturbation on its own might seem inconsequential, but in the face of constant perturbations, a small force becomes of great concern (think *death by a thousand* cuts). Cumulative effects are not the same as population level effects.	Cumulative effects have not been adequately addressed within the document despite the goal to "determine if the environmental and cumulative effects of the project are as predicted".	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Cumulative effects, under the CEAA, refer to environmental effects of an action when combined with other past, present, and future actions. In this case (impingement & entrainment of aquatic organisms), "cumulative effects" include not merely impingement & entrainment due to operation of Bruce A Units 1 and 2 (the actions under consideration in the EA), but also due to operation of Bruce A Units 3 and 4 (additional past, present, and future actions). Residual effects refer to effects that remain after mitigation options are considered. No feasible mitigation options for impingement & entrainment were identified during the EA. The minor adverse environmental effects predicted by the EA include the cumulative impact of Bruce Power operations. The predicted minor adverse effects to be monitored as part of the I&E Plan are considered both cumulative and residual. Bruce Power has clarified the I&E Plan to include the predicted effects, as given in Tables 2 and 3 in the I&E Plan [pp. 10-11]. No further change is necessary. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
5	The velocity and flow of water through the system are important factors that determine risk of entrainment/impingement, residency in the forebay, probability of being samples, probability of being impinged, and mortality at the level of individual organisms. It is important for the E/I Monitoring Plan to have a good quantitative description of water flow regimes, how these regimes vary across different states of pump activity, and how the regimes affect the performance of E/I sampling. It does not appear that the draft E/I Monitoring Plan takes these important variables explicitly into account in an appropriate manner. **BP Response:** Section 4.2 ("Source Water Sampling Plan") adds: "For the purpose of this Plan, the area of influence representing increased intake water velocities will be determined using a Hydraulic Zone of Influence (HZI) analysis. The general area where larvae may encounter the predicted Bruce A station intake will be sampled; however they may come into contact with the intake and their origin is a complex question." [p. 21] "For the purposes of this study, the HZI represents the instantaneous three-dimensional water volume, the margins of which represent the spatial threshold within which larval fishes have a higher probability to be drawn into the Bruce A station intake rather than escape into the lake. The HZI is estimated by established hydraulic models in a spreadsheet format. The size and shape of the HZI are highly variable, dependent upon prevailing wind direction and velocity, as well as other environmental and operational factors such as water currents, seiche, and the Bruce A station cooling water intake flow. The HZI will be estimated using environmental data from each sampling date and the results included in applicable Operations Phase monitoring reports." [p. 20] **UG Team Evaluation of BP Response:** Unsatisfactory. Further details on the spreadsheet format hydraulic models that are proposed are required. Are there references to support the use of the Hydraulic Zone of Influence methodology? How is the model going to be calibrated, validated and verified? How will the model take into consideration swimming abilities of non-larval fish? No details on evaluating the hydrodynamics in the forebay or the variation of the hydrodynamic patterns in the forebay associated with changing operating capacities of the pumps are provided.	Further details on the spreadsheet format hydraulic models that are proposed are required. Are there references to support the use of the Hydraulic Zone of Influence methodology? How is the model going to be calibrated, validated and verified? How will the model take into consideration swimming abilities of non-larval fish? No details on evaluating the hydrodynamics in the forebay or the variation of the hydrodynamic patterns in the forebay associated with changing operating capacities of the pumps are provided.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Additional details regarding the HZI model will be provided through annual reports. Impingement will be monitored through analysis of fish retained on the travelling screens at Bruce A (Section 4.4). The presence of larval fish in the intake forebay will be monitored through entrainment sampling (Section 4.3). The data will provide estimates of larval fish in the intake forebay, which in turn will provide an estimate of the impact of entrainment on larval fish. Finally, the presence of larval fish near the intake will be monitored through source water sampling (Section 4.2). The data will provide estimates of larval fish densities near the intake. We assume that any organism present in the forebay will ultimately be impinged or entrained, as we believe the water flow through the intake tunnel is sufficient to prevent egress. Therefore, hydrodynamic conditions in the forebay are not relevant with respect to our analysis at this point. However, Bruce Power agree that hydrodynamic conditions in Lake Huron may affect the number and nature of aquatic organisms that may be drawn into the intake structure. However, the HZI model will be used to provide context to the source water sampling data—but the sampling data by itself will be suitable for determination of the potential impacts of impingement and entrainment. Additional details on the HZI model will be provided through annual reports. If the results are ambiguous (the data is not sufficient to support or reject the hypothesis of minor adverse effect, with respect to a to-be-determined threshold), additional refinement of the HZI model may be required. At such time, Bruce Power would undertake additional discussion with stakeholders. Therefore, the Bruce Power response should be considered "Satisfactory."
6	It should be noted that Andrew Binns (UofG Post-Doctoral Fellow, SON-BP Collaborative Whitefish Research Program) has been assigned responsibility to develop and undertake hydrodynamic mapping of the waters adjacent to the BNGS to quantitatively identify and describe entrainment and impingement risk zones, and the forebay waters to test assumptions about representivity of sampling locations. The spatio-temporal definition of these risk and flow zones is essential for the E/I plan, but they are not included in this plan. **BP Response:** Section 4.2 ("Source Water Sampling Plan") has added: "The size and shape of the HZI are highly variable, dependent upon prevailing wind direction and velocity, as well as other environmental and operational factors such as water currents, seiche, and the Bruce A station cooling water intake flow. The HZI will be estimated using environmental data from each sampling date and the results included in applicable Operations Phase monitoring reports." [p.21] **UG Team Evaluation of BP Response:** Unsatisfactory. Further details on the collection of environmental data (parameters sampled, sampling frequency and magnitude) are required. The parameters presented in Section 4.3.2.6 (Water Quality) on p. 29 are not sufficient to accomplish this goal.	Further details on the collection of environmental data (parameters sampled, sampling frequency and magnitude) are required. The parameters presented in Section 4.3.2.6 (Water Quality) on p. 29 are not sufficient to accomplish this goal.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** As discussed in our reply to Comment #5, Bruce Power's analysis of potential impact (impingement & entrainment) will not depend on computational modeling. Rather, the analysis will be based on sampling conducted within source water (near the intake structure), the intake forebay, and with respect to organisms retained on the travelling screens. Bruce Power has specified the environmental data required for the HZI modeling: "wind direction and velocity… water currents, seiche, and the Bruce A station cooling water intake flow" [p. 21]. Data source and frequency are described in Section 4.3.2.6 on p. 29. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
7	Reference of "cumulative effects" in this context means that the E/I Monitoring Plan must explicitly consider three different meanings of "cumulative": (a) the accumulation of entrainment effects over time on the affected population, (b) the accumulation of impingement effects over time on the affected population, and (c) the accumulation of entrainment and impingement and other sources of population mortality (e.g. natural, BNGS thermal, BNGS contaminants, fisheries). **BP Response:** Expanded upon Section 4.62 ("Endpoints for Follow-Up Monitoring") to include: "Entrainment and impingement will be assessed both as individual effects and cumulative effects. Following an initial two years of Operations Phase entrainment and impingement sampling, data will be analyzed to determine if the annual entrainment and impingement impacts fall below the agreed upon thresholds for effect. If so, entrainment and impingement sampling will cease. If not, Bruce Power will consult with and provide agencies and stakeholders with options for future sampling and/or possible additional mitigation measures and feasibility." [p. 40] **UG Team Evaluation of BP Response:** Unsatisfactory. It is unclear if the phrase "cumulative effects" is understood. This statement suggests that cumulative effects refers to the aggregation of individuals. See comment UG-004.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** See our reply to Comment #4: "Cumulative effects, under the CEAA, refer to environmental effects of an action when combined with other past, present, and future actions. In this case (impingement & entrainment of aquatic organisms), "cumulative effects" include not merely impingement & entrainment due to operation of Bruce A Units 1 and 2 (the actions under consideration in the EA), but also due to operation of Bruce A Units 3 and 4 (additional past, present, and future actions)." Therefore, the Bruce Power response should be considered "Satisfactory."
8	The plan needs to explicitly re-state the predictions of the EA Study Report. **BP Response:** Added Section 2.0 ("Overview of EA Study Report Findings"), describing the findings (and predictions) of the EA Study Report and stating: "The results of these assessments predicted that entrainment and impingement effects to the Aquatic Environment would result in minor adverse effects (not significant)." [p. 9] See also the additions of Tables 2 and 3 on p. 10 and p. 11, respectively, which describe assessments for residual adverse entrainment and impingement effects on Valued Ecosystem Component (VEC) species (based on findings of EA Study Report). **UG Team Evaluation of BP Response:** Satisfactory	n/a	n/a
9	Use of the word "confirm" is problematic in this context, since it carries the meaning of 'prove to be true'. A neutral scientific wording would read something like: "*Second the Follow-up Program will [confirm] determine whether the mitigation measures are effective or if additional or modified mitigation measures are required to [confirm] test the prediction of no significant residual impacts.*" **BP Response:** No removal of the word "confirm" from the sentence. Sentence was altered to now read (italics emphasis added to highlight altered part of sentence): "Second, the Follow-up Program will confirm whether the mitigation measures as provided in the EA are effective, *or if these cannot be confirmed*, recommend what additional or modified mitigation measures are proposed to maintain the original predictions of no significant residual impacts." [p. 1] **UG Team Evaluation of BP Response:** Unsatisfactory. If the predictions of no significant effects are proven false, then the EA must reflect that the activities are resulting in significant effects. Once the extent of these significant effects has been determined, then proposed mitigation can be evaluated to determine the extent to which the effects can be reduced. Reference to "maintain the original predicitions" is very awkward and misleading. If mitigation can not reduce the effects below a significant level, then the activity must be terminated.	If the predictions of no significant effects are proven false, then the EA must reflect that the activities are resulting in significant effects. Once the extent of these significant effects has been determined, then proposed mitigation can be evaluated to determine the extent to which the effects can be reduced. Reference to "maintain the original predicitions" is very awkward and misleading. If mitigation can not reduce the effects below a significant level, then the activity must be terminated.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** We disagree that the use of the word *confirm* is inappropriate. In this context, the original and modified sentences both clearly indicate that hypotheses will be tested (and may be found to be true or false). Additionally, the I&E Plan as a whole is very clear that data will be collected, tested against hypotheses, and the hypotheses may be accepted or rejected. The predicted residual adverse effects have been listed in Tables 2 and 3 [pp. 10-11]. If significant effects are found to occur, additional mitigation options will be considered. This is consistent with the adaptive management process, and corrective action could be required by the responsible authority (CNSC). Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
10	Reference is made to "significant residual effects," yet neither the concepts of "significance" nor "residual effects" are defined. **BP Response:** Neither concepts of "significance" nor "residual effects" are defined in this section. "Residual effects" is defined in newly added Section 2.6 ("Residual adverse effects") as "Residual effects include those effects that will be present after mitigation options are considered." [p. 8] Added Section 2.6.3 "Significance of residual adverse effects", stating "The results of these assessments predicted that entrainment and impingement effects to the Aquatic Environment would result in minor adverse effects (not significant)." [p. 9] No additional statistical definition of "significance" is discussed in the report. **UG Team Evaluation of BP Response:** Unsatisfactory. It does not appear that "significance" has been defined. The definition of significance, both from a biological and a statistical point of view should be highlighted. If significance is based on a quantification of some parameter, that should be stated. If significance is based on committee, the method by which the committee determines significance should be completely transparent, accountable, and reproducible.	The definition of significance, both from a biological and a statistical point of view should be highlighted. If significance is based on a quantification of some parameter, that should be stated. If significance is based on committee, the method by which the committee determines significance should be completely transparent, accountable, and reproducible.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** *Significance* and *residual adverse effects* are standard terms used within the Environmental Assessment process. *Significance* does not refer to a statistical threshold. All predicted adverse effects were listed in the EA Study Report. Effects were classified as significant based on a framework which included: magnitude, geographic extent, timing/duration, frequency, degree of reversibility, and probability [EA Study Report, Chapter 9]. Professional judgment was required for assessment of the significance of potential adverse effects, based on the metric given. The EA process is public, transparent, accountable, and reproducible. The predictions in the EA were provided to the responsible authority (CNSC) for assessment by staff members, public input, and consideration by the Commission. The CNSC accepted that the project was "not likely to cause significance adverse effects" [EA Screening Decision]. Therefore, the Bruce Power response should be considered "Satisfactory."
11	It is important to stress "Bruce Power's commitment to the continuation of separate forums to resolve technical and design details where and as they arise." The plan should explicitly identify the SON-BP Collaborative Whitefish Research Program at UofG/McMaster as an important component of this commitment, especially as it relates specifically to the evaluation of BNGS entrainment and impingement effects on one of the identified VEC (lake whitefish). **BP Response:** None.	The plan should explicitly identify the SON-BP Collaborative Whitefish Research Program at UofG/McMaster as an important component of this commitment, especially as it relates specifically to the evaluation of BNGS entrainment and impingement effects on one of the identified VEC (lake whitefish).	**No additional change to the I&E Plan is required.** The commitment to resolve technical and design details is an important part of the adaptive management process with respect to the EA FUP. However, the SON-BP collaborative whitefish research program–including both University of Guelph and McMaster University researchers–is not explicitly included within the scope of the EA FUP. Data from the SON-BP collaborative whitefish research program will be evaluated and may be used to inform the EA FUP when available.
12	Use of the word "validate" is problematic in this context, since it also carries the meaning of 'prove to be true.' A neutral scientific wording would read something like: "*to [~~validate~~] test predicted effects on Valued Ecosystem Components.*" **BP Response:** This part of the paragraph is removed from this section in the updated document. **UG Team Evaluation of BP Response:** Unsatisfactory. Given the obvious and important relationship of the SON-BP Collaborative Whitefish Research Program at UofG/McMaster, the relationship of these research programs to the E/I Monitoring Program remains essential.	Given the obvious and important relationship of the SON-BP Collaborative Whitefish Research Program at UofG/McMaster, the relationship of these research programs to the E/I Monitoring Program remains essential.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Although we disagree that *validate* is used inappropriately in this context (see response to comment #9), the sentence was removed during the revision process. Therefore, the Bruce Power response should be considered "Satisfactory".
13	The objectives of each phase of the whitefish monitoring plan presented as a key question (see Section 8.1 of the 2008 Work Plan in Bruce Power 2008) need to be explicitly re-stated in this document, so the reader can evaluate the appropriateness of the objectives. **BP Response:** Added Section 3.0 ("Overview of the 2008 Work Plan") in the March 2012 document. Section describes the tasks involved in the three programs, including "Entrainment of Lake Whitefish" (Section 3.1), "Deepwater Sculpin Population Review (Section 3.2), and "Impingement of Spottail Shiner and Lake Whitefish" (Section 3.3) [p. 13, 14]. **UG Team Evaluation of BP Response:** Satisfactory.	n/a	n/a

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
14	"*Based on studies through to 2008, and additional studies to date, genetically distinct populations of lake whitefish have not been identified.*" This statement is misleading and inappropriate - for several reasons. First, the document does not provide references to the 'studies' being cited. Second, there have been no genetic studies yet undertaken that were designed in a manner that would have allowed the determination of 'genetic distinction' among lake whitefish populations affected by BNGS. Third, the absence of evidence must not be confused with evidence of absence. **BP Response:** Bruce Power and Golder references were added and the sentence now reads: "Based on studies through 2008 [Bruce Power 2008], and additional studies to date [Golder Associates 2010], genetically distinct populations of lake whitefish have not been identified in the vicinity of the Bruce Power site." [p. 15]. The sentence has been moved as is now in Section 4.0 ("Operations Phase Impingement and Entrainment Monitoring Plan"). **UG Team Evaluation of BP Response:** Unsatisfactory. Bruce Power has still confused the absence of evidence, with evidence of absence. Population discrimination remains a key uncertainty for the E/I Monitoring Plan, and this is one of the reasons why SON and BP agreed to sponsor research by the UG Team to help resolve this issue. Reference to the SON Collaborative Whitefish Research Program, and especially the UG research is essential in this regard.	Reference to the SON Collaborative Whitefish Research Program, and especially the UG research is essential in this regard.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** As requested, we have provided citations. We disagree that Bruce Power conflates absence of evidence with evidence of absence. However, Bruce Power has committed to a partnership with SON in part to address this potential issue (population discrimination). When research data is available from that initiative, it will be evaluated and may be used to inform the EA FUP. Bruce Power has partnered with the University of Regina to perform genetic analysis and stable isotope analysis of captured Lake Whitefish. The objectives and analytical techniques of the University of Regina research program were described in the revised I&E Plan on p. 15. Data obtained so far has not revealed the presence of locally distinct populations. However, the research program is ongoing. Results will be summarized in the EA FUP annual reports. Additionally, the thresholds for effect with respect to potentially affected fish populations have not yet been determined through discussion with stakeholders and the responsible authority. The potential for local populations of Lake Whitefish will be considered when deciding upon the endpoints for monitoring. Therefore, the Bruce Power response should be considered "Satisfactory."
15	It is not clear which studies "through 2008" are being referenced. The conclusions of the 2009 study are not explained with respect to the importance of the shoals, or to quantifying habitat within and outside the effected area. **BP Response:** See comment assessment for UG-014 for updated references included with this statement in the 2012 document. The following addition (new text in italics) was made with regard to potential lake whitefish spawning habitat in the potentially affected area in Section 4.0 ("Operations Phase Impingement and Entrainment Monitoring Plan"): "A 2009 Lake Whitefish Monitoring Program was carried out to determine the importance of the shoals near the Bruce Power site to the spawning success of lake whitefish [Golder Associates 2010]. The 2009 Lake Whitefish Monitoring Program quantified potential whitefish spawning habitat within the area potentially affected by Bruce Power operations [Bruce Power 2005] and outside the potentially affected area. *The potentially affected area was defined as the area encompassing the aerial extent of the 2° C thermal plume in winter conditions emanating from the Bruce A station. The thermal plume area stretches approximately 5 km southwest of Bruce B (to McCrae Point) and 6 km northeast of Bruce A (to north of Scott Point, including Loscombe and Welsh banks). The unaffected area selected extended from approximately 2 km southwest of McCrae Point and approximately 3 km northeast of Welsh Bank and includes Scougall Bank. The results of Phase 1 of the Program found approximately 9.22 km2 of potential lake whitefish spawning habitat (defined as boulder and cobble substrates) in the potentially affected area, and approximately 5.77 km2 of potential lake whitefish spawning habitat in the unaffected area (combining the southern and northern unaffected areas). Potential lake whitefish spawning habitat represents approximately 69% of the potentially affected area*." [p. 15] **UG Team Evaluation of BP Response:** Unsatisfactory. BP continues to withhold the cited data/reports from the UG Team, despite repeated requests. Without this information, it is not possible to determine if the characterization and quantification of habitat is appropriate.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Bruce Power has provided citations, as requested. Bruce Power has explained the conclusions of the study, as requested. Bruce Power has explained the definition of potential spawning habitat, as requested. We disagree that Bruce Power is withholding data and/or reports from the University of Guelph team. The original comment #15 did not include a request for either data or reports, but rather was a request for the I&E Plan to be modified with the citations, conclusions, and explanation as requested. We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
16	Spatio-temporal population structure of lake whitefish is a key uncertainty for the draft E/I Monitoring Plan. It should be explicitly noted that this same key uncertainty was explicitly recognized by the SON-BP Collaborative Whitefish Research Program, and was assigned as a PhD research project (Clayton Coppaway) for the UofG Team. The E/I Monitoring Plan should explicitly incorporate the research and analyses being conducted by the SON-BP Research Program. **BP Response:** None.	It should be explicitly noted that this same key uncertainty was explicitly recognized by the SON-BP Collaborative Whitefish Research Program, and was assigned as a PhD research project (Clayton Coppaway) for the UofG Team. The E/I Monitoring Plan should explicitly incorporate the research and analyses being conducted by the SON-BP Research Program.	**No additional change to the I&E Plan is required.** Bruce Power has committed to a partnership with SON to address scientific questions with respect to potential impacts of BNPD operations on Lake Whitefish populations. This research initiative is separate from the follow-up monitoring requirements of the EA process. When research data is available from the SON-BP initiative, it will be evaluated and may be used to inform the EA FUP.
17	"A study in 2009 (the 2009 Lake Whitefish Monitoring Program) was carried out to determine the importance of the shoals near the Bruce Power site to the spawning success of lake whitefish [Golder Associates 2010]." The UofG Team has repeatedly requested BP to provide "all relevant data/documentation associated with the historic and ongoing assessments related to the Bruce Power facility/region for (a) entrainment, (b) impingement, and (c) lake whitefish ecology." Despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation that have been produced for the ongoing EA and Follow-Up Monitoring Programs. The 2009 Golder study on the importance of lake whitefish spawning shoals is an example of the type of existing evidence that the UofG Team has requested, but has not been provided with. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests. Note that the 2009 Golder study was provided to the University Guelph team via email and CD (August, 2011).
18	Reference is made to a Golder assessment of the lake whitefish spawning shoals, however there is no linkage between the results of this assessment and the E/I Monitoring Plan. **BP Response:** None.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** As noted in the reviewer's disposition of Bruce Power's revisions with respect to Comment #15, Bruce Power has provided citations and explanatory details with respect to the habitat study. Therefore, the Bruce Power response should be considered "Satisfactory".
19	Reference is made to "the potentially affected area" however there is no explanation to where this area is located, or how the area of affect was determined. **BP Response:** See UG-015. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG- 015.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Bruce Power has included a description of the potentially affected area and has defined how it was determined. In fact, the reviewer has quoted the relevant text in describing Bruce Power's response to Comment #15. Additionally, substrate mapping methods and results are summarized in the Lake Whitefish Investigations 2009 Summary (available publicly on the Bruce Power website). Comment #15 was reviewed, and the Bruce Power response should be considered "Satisfactory." Therefore, the Bruce Power response to Comment #19 should be considered "Satisfactory".

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
20	It should be noted that Andrew Binns (UofG Post-Doctoral Fellow, SON-BP Collaborative Whitefish Research Program) has been assigned responsibility to develop and undertake hydrodynamic mapping of the waters adjacent to the BNGS to quantitatively identify and describe entrainment and impingement risk zones. The spatio-temporal definition of these risk zones is essential for the E/I plan, but they are not included in this plan. **BP Response:** See UG-006. **UG Team Evaluation of BP Response:** Unsatisfactory. Further details on how the proposed Hydraulic Zone of Influence (HZI) analysis will take into consideration variation of hydrodynamic conditions in the near shore Lake Huron waters due to various driving mechanisms in the lake are required. How will the results of the hydraulic model be calibrated, verified and validated? What equipment will be used to measure the "environmental data" from each sampling date?	Further details on how the proposed Hydraulic Zone of Influence (HZI) analysis will take into consideration variation of hydrodynamic conditions in the near shore Lake Huron waters due to various driving mechanisms in the lake are required.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Bruce Power has committed to a partnership with SON to address scientific questions with respect to potential impacts of BNPD operations on Lake Whitefish populations. This research initiative is separate from the follow-up monitoring requirements of the EA process. When research data is available from the SON-BP initiative, it will be evaluated and may be used to inform the EA FUP. As discussed in our reply to Comment #5 and Comment #6, Bruce Power's analysis of potential impact (impingement & entrainment) will not depend primarily on computational modeling. Rather, the analysis will be based on sampling conducted within source water (near the intake structure), the intake forebay, and with respect to organisms retained on the travelling screens. Therefore, the Bruce Power response should be considered "Satisfactory."
21	Despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation associated with Bruce Power's whitefish gillnetting assessment program, as had been requested. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests. Note that relevant reports were provided by email and CD in August, 2011. Additional reports are publicly available online.
22	It is not clear what conclusion, if any, is being drawn from the reported variability of CPUE for spawning condition lake whitefish, with regard to the E/I Monitoring Plan. **BP Response:** Text was altered to include: "Gillnetting, conducted in 2009, 2010, and 2011 to document the occurrence, relative abundance and reproductive condition of whitefish, showed that whitefish in spawning condition were present in the vicinity of the Bruce Power site. The abundance of whitefish, based on catch per unit effort, was highly variable between sampling locations with Area 1 (Scougall Bank) and Area 8 (McRae Point) generally having the highest abundance of lake whitefish. The numbers of ripe female lake whitefish increased in mid-November and declined by the end of the November. Spent female lake whitefish were found in low abundance (n<=5) across the sites," [p.15] **UG Team Evaluation of BP Response:** Unsatisfactory. BP continues to withhold the cited data/reports from the UG Team, despite repeated requests. Without this information, it is not possible to evaluate the characterization and conclusions made about CPUE and spawning condition.	No change recommended.	**No additional change to the I&E Plan is required.** We disagree that Bruce Power is withholding data and/or reports from the University of Guelph team. The original comment #22 did not include a request for either data or reports. Note that relevant reports were provided by email and CD in August, 2011. Additional reports are publicly available online. We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests.
23	Despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation associated with Bruce Power's whitefish egg air lift assessment program, as had been requested. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** The requested study (2009 Lake Whitefish Field Studies Summary) was provided by email and CD in August, 2011. We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
24	The lack of lake whitefish eggs collected during Bruce Power's air lift assessment program could have resulted from a wide variety of biological and sampling design factors. It is not clear what conclusion, if any, is being drawn from the lack of collected eggs, with regard to the E/I Monitoring Plan. **BP Response:** The following addition (italics to denote added text) was made to the text in Section 4.0 ("Operations Phase Impingement and Entrainment Monitoring Plans"): "Further, despite observed areas of suitably sized spawning substrates and of ripe female whitefish captured at the eight sampling locations by gillnetting immediately preceding spawning, egg collection efforts in 2009 using air lift suction devices resulted in no lake whitefish eggs being collected. *A total 579 m^2, or approximately 0.6 ha of substrate was assessed over five field days. Airlift sampling duration, timing and location selection, was impeded by weather throughout the period coinciding with the presence of ripe female lake whitefish. It was expected that, should egg sampling be repeated in the future, that the same weather related issues would hamper egg collection efforts. Given the large area of potential spawning habitat that exists within the study area, the small area that can realistically be sampled in any given year and the effort that may be required to confirm actual spawning locations, the only practical way of estimating habitat use was to use the presence and numbers of spawning adults as a surrogate for spawning activity and egg deposition. It was recommended that airlift sampling effort not be repeated in the future as a method to measure egg deposition near the Bruce Power site [Golder 2010].*" [p. 16] **UG Team Evaluation of BP Response:** Unsatisfactory. BP continues to withhold the cited data/reports from the UG Team, despite repeated requests. It is not clear how the the failure of airlift sampling relates to the E/I Monitoring Plan.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The revisions to the I&E Plan indicated that sampling was hampered by weather and that only a small area was sampled. The revisions clearly indicate that the limited airlift sampling data are superseded by data reflecting the presence and absence of spawning adults. The Bruce Power response should be considered "Satisfactory". We disagree that Bruce Power is withholding data and/or reports from the University of Guelph team. The original comment #24 did not include a request for either data or reports. Note as well that the study in question (2009 Lake Whitefish Field Studies Summary) was provided by email and CD in August, 2011. We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests.
25	It is not clear what the variability in catch-per-unit effort was attributed to and there is no indication of how much effort was given to collecting eggs, or if this is an acceptable methodology. **BP Response:** None.	It is not clear what the variability in catch-per-unit effort was attributed to and there is no indication of how much effort was given to collecting eggs, or if this is an acceptable methodology	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** In the context of the I&E Plan, no conclusions have yet been drawn with respect to variability in CPUE. Method and effort have been summarized in the I&E Plan, as quoted by the reviewer in Comment #24. Therefore, the Bruce Power response should be considered "Satisfactory."
26	"*Based on the results of the 2009 study, a scope of work and timeline for a 2011/2012 Bruce Power funded University of Regina whitefish genetics study is currently in development.*" Despite previous requests for relevant documentation, the UofG Team has not been provided with the 2009 study. The UofG Team was also very surprised to learn that BP has already funded a Regina study on whitefish genetics; neither BP nor the McMaster/Regina team have provided any information on this funded study. This arrangement is especially problematic given that the SON-BP Collaborative Research Program had previously identified the UofG Team as responsible for the population discrimination, including genetics, mark-recapture and other analyses. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** As noted on p. 16 of the revised I&E Plan, the "[r]esults of the 2009 lake whitefish monitoring program were presented to agencies and stakeholders at a workshop hosted by Bruce Power in August, 2010. We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests. We assume that the reviewer's "relevant documentation" refers to: Golder Associates. 2010. *2009 Lake Whitefish Field Studies Summary*. Bruce A Refurbishment Follow-up Program. 38pp. This study has previously been provided to the University of Guelph team as reference #20 (of 29 sent on CD by R. Catalan to S. Crawford, August 2011). Bruce Power continues to support the SON-BP collaboration, but is also pleased to partner with additional researchers. Research results from both programs, when available, will be used to inform the EA FUP process.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
27	"*Additionally, entrainment monitoring during the Operations Phase is recommended, consistent with the 2008 work plan, to validate the EA predictions pertaining to lake whitefish entrainment.*" The UofG Team sees entrainment monitoring as essential to the E/I Monitoring Plan, rather than simply 'recommended.' **BP Response:** Paragraph is moved to Section 4.0 (Operations Phase Impingement and Entrainment Monitoring Plan) to write: "Additional Operations Phase studies related to lake whitefish will involve entrainment monitoring, as proposed in the 2008 Work Plan, to validate the EA Study Report predictions pertaining to lake whitefish entrainment." [p. 16] **UG Team Evaluation of BP Response**: Unsatisfactory. The revision makes no sense.	The UofG Team sees entrainment monitoring as essential to the E/I Monitoring Plan, rather than simply 'recommended.	**No additional change to the I&E Plan is required.** The word *recommended* referred to the 2008 Work Plan. As noted by the reviewer, this sentence was removed. The Impingement & Entrainment Monitoring Plan includes 2 years of entrainment monitoring for Lake Whitefish, as well as other species. Entrainment monitoring is therefore a fundamental aspect of the plan. Therefore, the Bruce Power response should be considered "Satisfactory".
28	Use of the word "validate" is problematic in this context, since it also carries the meaning of 'prove to be true.' A neutral scientific wording would read something like: *"... to [~~validate~~] test the EA predictions pertaining to lake whitefish entrainment.*" **BP Response:** None.	A neutral scientific wording would read something like: *"... to [~~validate~~] test the EA predictions pertaining to lake whitefish entrainment.*"	**No additional change to the I&E Plan is required.** We disagree that *validate* is used inappropriately in this context. In this context of the EA FUP, hypotheses will be tested and may be found to be true or false. Additionally, the I&E Plan itself is very clear that data will be collected, tested against hypotheses, and the hypotheses may be accepted or rejected. The predicted residual adverse effects have been listed in Tables 2 and 3 [pp. 10-11].
29	"*This document ... proposes a monitoring investigation to effectively measure entrainment of lake whitefish during the Operations Phase.*" Reference to 'effectiveness' of the entrainment monitoring plan does not appear in the 'Goal and Objectives' of this document, but is an important factor and should be explicitly stated there. **BP Response:** Additional text has been added to Section 1.3 (Study Goal and Objectives): "The assessment of the proposed objectives of impingement and entrainment monitoring during the Operations Phase will be carried out until identified endpoints are achieved. Further details on these proposed objectives and endpoints are discussed in Sections 4.3 (Entrainment) and 4.4 (Impingement). Where meaningful, the results of Operations Phase sampling will be compared to data collected prior to the Operations Phase. The Operations Phase data will be used to determine if proposed thresholds for effect and monitoring endpoints have been met and will further aid in recommending if additional, longer term or periodic impingement and entrainment monitoring should be undertaken." [p. 2] **UG Team Evaluation of BP Response**: Unsatisfactory. The issues of "effectively measure entrainment" remains an important outstanding issue.	The issues of "effectively measure entrainment" remains an important outstanding issue.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** As noted in the revised text, entrainment monitoring will be carried out until endpoints have been achieved. These endpoints will be determined through future discussion with stake-holders. The draft I&E Plan was provided to stakeholders for review. Stakeholder concerns were addressed, and the revised I&E Plan was provided to stakeholders. No other comments have been received on the revised I&E Plan, which take to indicate that other stakeholders have not identified any gaps in the monitoring plan as proposed. The reviewer's comment does not identify any gaps in the monitoring plan, and therefore no additional change to the I&E Plan is required. The I&E Plan is therefore expected to be "effective", and the Bruce Power response should be considered "Satisfactory". Note as well that annual reports will be provided during the two-year monitoring period. Bruce Power will address any as-yet-unidentified deficiencies through the adaptive management process, in consultation with stakeholders and the responsible authority (CNSC). Therefore, the Bruce Power response should be considered "Satisfactory."
30	"This document "Operations Phase Impingement and Entrainment Sampling Plan" proposed modifications to the impingement monitoring protocols outlined in the 2008 Work Plan to improve the consistency in data collection and reporting to aid in determining appropriate impingement effects thresholds and endpoints." Despite previous requests for relevant documentation, the UofG Team has not been provided with the 2008 Work Plan. **BP Response:** None. Note: this part of the text has been moved to Section 4.0 (Operations Phase Impingement and Entrainment Monitoring Plan) starting on p. 15.	No change recommended.	**No additional change to the I&E Plan is required.** The 2008 Work Plan is not required for review of the I&E Plan, which is considered a stand-alone document. However, we will consider the reviewer's comment as a request for the following: Bruce Power. 2008. *Proposed Work Plans Bruce A Refurbishment for Life Extension Follow-up Monitoring Program*. December 2008.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
31	The document needs to explicitly identify the specific issues previously identified regarding consistency of impingement data collection and reporting, in order for the reader to evaluate if the draft E/I Monitoring Plan is appropriate. **BP Response:** None.	The document needs to explicitly identify the specific issues previously identified regarding consistency of impingement data collection and reporting, in order for the reader to evaluate if the draft E/I Monitoring Plan is appropriate.	**No additional change to the I&E Plan is required.** Planned revisions to the impingement sampling protocol are noted on p. 31 of the I&E Plan.
32	It seems reasonable to suspect that specific issues were also previously identified regarding consistency of entrainment data collection and reporting, however no comment is made in this regard. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** The Reviewers have not requested a change or identified a specific issue of concern. Planned sampling methods are described beginning on p. 23 of the I&E Plan.
33	The document needs to explicitly identify the specific issues previously identified regarding consistency of entrainment data collection and reporting, in order for the reader to evaluate if the draft E/I Monitoring Plan is appropriate. **BP Response:** None.	The document needs to explicitly identify the specific issues previously identified regarding consistency of entrainment data collection and reporting, in order for the reader to evaluate if the draft E/I Monitoring Plan is appropriate.	**No additional change to the I&E Plan is required.** No relevant issues have been identified by the Reviewer (see Comment #32). Planned sampling methods are described beginning on p. 23 of the I&E Plan.
34	"*Impingement data from 2004-2010 have shown that VEC species impingement has been low (≤90 spottail shiner, ≤1 deepwater sculpin, and ≤10 lake whitefish annually).*" Despite previous requests for relevant documentation, the UofG Team has not been provided with the historical time series for entrainment or impingement data. **BP Response:** None.	Despite previous requests for relevant documentation, the UofG Team has not been provided with the historical time series for entrainment or impingement data.	**No additional change to the I&E Plan is required.** The request for data is not relevant to the I&E Plan. Whitefish impingement data is available via the Whitefish Investigations Summaries available publicly through the Bruce Power website.
35	"*However, Operations Phase monitoring is recommended because additional impingement relative to only having two units in operation would be assumed with the restart of Units 1 and 2 and the associated increase in flow volume.*" The UofG Team sees impingement monitoring as essential to the E/I Monitoring Plan, rather than simply 'recommended.' **BP Response:** None.	The UofG Team sees impingement monitoring as essential to the E/I Monitoring Plan, rather than simply 'recommended.'	**No additional change to the I&E Plan is required.** Impingement monitoring is a major component of the I&E Plan.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
36	The UofG Team has previously been advised that there is an additional system pump that is not associated with the pumphouses and travelling screens. A complete model of all potentially operating pumps, across various levels of individual pump activity, is required for an effective hydrodynamic model of entrainment/impingement risk regions in the waters adjacent to BNGS, and for an effective hydrodynamic model of forebay water flow and entrainment/impingement. **BP Response**: Text has been updated as follows: "Water is pumped from the forebay into four pumphouses, one for each of the four Bruce A station units. The volume of water pumped and flow rates vary and are proportional to the number of condenser cooling water (CCW) pumps and/or the number of units in service at the Bruce A station." [p.1] **UG Team Evaluation of BP Response:** Unsatisfactory. There is no information in the Plan addressing how the entrainment/impingement sampling program will take into account the various hydraulic conditions present in the forebay due to the variation in operating capacities of the pumps. How will the various operating conditions affect the hydrodynamics in the forebay? How will these hydrodynamics affect the patterns of distribution and abundance of fish in the forebay? How can the hypothesis that the forebay waters are well-mixed be verified for all pump operating conditions? There is no mention of the fifth pump (maintenance pump) in the revised Plan.	There is no information in the Plan addressing how the entrainment/impingement sampling program will take into account the various hydraulic conditions present in the forebay due to the variation in operating capacities of the pumps. How will the various operating conditions affect the hydrodynamics in the forebay? How will these hydrodynamics affect the patterns of distribution and abundance of fish in the forebay? How can the hypothesis that the forebay waters are well-mixed be verified for all pump operating conditions? There is no mention of the fifth pump (maintenance pump) in the revised Plan.	**No additional change to the I&E Plan is required.** The design of the CCW pumps is not relevant to the I&E Plan. The hydrodynamics of the intake forebay are not fundamental to the I&E Plan. Entrainment monitoring is planned within the intake forebay at various locations within a cross-section of the forebay. Bruce Power staff are not familiar with the "maintenance pump" referred to by the Reviewer. The Reviewer may be referring to the Unit 0 pumps. Note that Bruce A consists of 4 nuclear generating units (Units 1, 2, 3 and 4), with each unit corresponding to a pumphouse. Some water is drawn from the intake forebay and used to provide common services throughout the entire Bruce A facility. Common services are provided by "Unit 0". The Unit 0 intake screens and pumps are located within the Unit 3 pumphouse. Impingement monitoring at all 4 unit pumphouses therefore also includes monitoring of the Unit 0 intake as well.
37	Previous experience by the SON biologists who participated in BP entrainment/impingement sampling showed that the timing of travelling screen washes was not appropriately recorded, for a variety of reasons: (a) pressure differential and operator over-ride of scheduled washes, (b) lack of records for operator over-ride washes, (c) lack of independent records for screen washes, and (d) unscheduled transfer of collection bins to the waste landfill. SON biologists had previously requested that screen washes be more rigorously recorded, however there was no further information provided by BP in this regard. If the historical time series for screen wash sampling does not take into account of the complete screen was activity, then the data associated with these assessments will be difficult if not impossible to interpret **BP Response:** None.	Screen washes [should] be more rigorously recorded.	**No additional change to the I&E Plan is required.** Note that basket contents will not be discarded even if automatic or unscheduled sampling screen washes occur between formal monitoring events (planned for 3x/week).

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
38	No references are provided for these definitions. It is important that the definitions of entrainment and impingement in the E/I monitoring plan be consistent with definitions used for previous assessments at the BNGS, and that any major distinctions with other definitions be explicitly identified. **BP Response**: Note: this section of the text has been move to Section 1.4 (Definitions of Impingement and Entrainment) starting on p. 3. The following text is added to the definition of impingement: "For reference, the USEPA defines impingement as the entrapment of all life stages of fish and shellfish on the outer part of an intake structure or against a screening device during periods of intake water withdrawal [USEPA 2002]. Further, the USEPA defines impingement mortality as the death of fish or shellfish due to impingement (as defined above) [USEPA 2002]. Using USEPA guidance, impingement mortality does not need to occur immediately; impingement may cause harm to the organism, which results in mortality several hours after the impingement event. For purposes of the proposed Section 316(b) Rule, impingement is defined as organisms collected or retained by the traveling screens." [p. 3] The following text is added to the definition of entrainment: "For reference, the USEPA defines entrainment as the incorporation of all life stages of fish and shellfish with intake water flow entering and passing through a cooling water intake structure and into a cooling system. Entrainment mortality is defined as the death of fish or shellfish due to entrainment, which also includes the death of those fish and shellfish due to fine mesh screens or other technologies used to exclude the organisms from entrainment (USEPA 2002). For purposes of the proposed Section 316(b) Rule, entrainment is defined as organisms passing through the traveling screens." [p. 3] **UG Team Evaluation of BP Response:** Unsatisfactory. The qualifier 'For reference' does not mean that the stated definitions have been adopted for this E/I Monitoring Plan. As approved under terms of the SON-BP Collaborative Whitefish Research Program, the UG Team has critically analysed the theoretical and practical problems with defining these terms, and the result of that analysis needs to be recognized and incorporated into this E/I Monitoring Plan.	As approved under terms of the SON-BP Collaborative Whitefish Research Program, the UG Team has critically analysed the theoretical and practical problems with defining these terms, and the result of that analysis needs to be recognized and incorporated into this E/I Monitoring Plan.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Definitions of *impingement* and *entrainment* have been clarified. Differences between these definitions and the US EPA definitions have been noted in the I&E Plan. Therefore, Bruce Power's response should be considered "Satisfactory." Research results from the collaborative Whitefish Research Program are not yet available for review by Bruce Power. When these results are available, they will be evaluated and may be considered for informing the EA FUP program.
39	"*Impingement will be defined as the process by which organisms which are generally larger than or equal to either the Bruce A (Units 1-4) cooling water pump intake screens or the cooling water travelling screens are held against the screens by the through-flow.*" This definition is too vague for operationalization, specifically: the size condition "generally larger" and "larger than or equal to" and "either ... intake screens or travelling screens" **BP Response:** Definition of impingement is slightly altered to read: "For the purposes of this Plan, impingement is defined as the process of organisms within the intake cooling water flow being held against the travelling screens. The typical size of these organisms is larger than or equal to the specific Bruce A Unit (1-4) cooling water pump intake screen or cooling water travelling screen through which the cooling water is being carried." [p. 3] **UG Team Evaluation of BP Response:** Unsatisfactory. This plan does not account for organisms that encounter the travelling screens, yet are not held against them in a manner that leads to the current screen flush sampling.	This plan does not account for organisms that encounter the travelling screens, yet are not held against them in a manner that leads to the current screen flush sampling.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The definition of *impingement* is specific and aligns with the need for operationalization. As quoted by the reviewer, "Impingement [is] defined as the process by which organisms… are held against the [travelling] screens…" Based on the water flow within the intake forebay, we assume that all organisms that enter the forebay will either by impinged (held against the screen) or entrained. Entrainment sampling will be used to take into account organisms that may encounter the travelling screens but may not be retained during sampling. Therefore, the Bruce Power response should be considered "Satisfactory."
40	This definition of 'impingement' states that an essential condition is that the organism is "held against the screens by through-flow." This condition does not include the organisms which are carried into the forebay environment and die without having their (recognizable) bodies held against the travelling screens (and potentially be carried up into the screenhouse and flushed with a screen wash). The definition of 'impingement' for the E/I Monitoring plan needs to be much more explicit and rigorous than the definition provided. **BP Response:** None.	The definition of 'impingement' for the E/I Monitoring plan needs to be much more explicit and rigorous than the definition provided.	**No additional change to the I&E Plan is required.** According to the definitions selected for the I&E Plan, such organisms will be entrained. Entrainment sampling (sampling in the intake forebay) will be used to monitor for these organisms.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
41	"*Entrainment will be defined as the process by which organisms that are generally smaller than either the Bruce A (Units 1-4) pump intake screens or cooling water traveling screens are drawn through the screens by the through-flow.*" This definition is too vague for operationalization, specifically: the size condition "generally smaller" and "smaller than" and "either ... intake screens or travelling screens" **BP Response:** Definition slightly altered to read: "For the purposes of this Plan, entrainment is defined as the process by which organisms within the intake cooling water flow are drawn through the Bruce A station intake travelling screens. The typical size of the organisms are generally smaller than the specific Bruce A Unit (1-4) cooling water pump intake screen or cooling water travelling screen through which the cooling water and the organism is being carried." [p. 3] **UG Team Evaluation of BP Response:** Unsatisfactory. The qualifier "generally smaller" has no meaning in this context. This definition does not account for organisms that encounter the travelling screens, yet are not held against them in a manner that leads to the current screen flush sampling. This definition does not account for larger (i.e. juvenile, adult) fish that entrained into the forebay, but do not encounter the screens.	This definition does not account for organisms that encounter the travelling screens, yet are not held against them in a manner that leads to the current screen flush sampling.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The definition is specific and suitable for operationalization. As quoted by the reviewer, "Entrainment [is] defined as the process by which organisms… are drawn through the screens…" Definitions based on size will not be suitable, due to the tendency of organisms to flex and change shape, whether alive or dead. We assume that all organisms which enter the forebay will ultimately be entrained or impinged. Larger fish are occasionally observed within the forebay. However, these fish will not be able to return to the lake. Therefore, they will eventually die and their bodies will either be impinged or entrained. Therefore, the Bruce Power response should be considered "Satisfactory."
42	It should be noted that Lauren Overdyk (UofG Grad Student, Whitefish Entrainment Research Project, SON-BP Collaborative Whitefish Research Program), has undertaken a comprehensive review and evaluation of various definitions for entrainment that have been proposed/employed in the primary and technical literature. This review/evaluation should be considered when developing operational definitions of entrainment/impingement for the EI Monitoring Plan. **Bruce Power Response**: None.	This review/evaluation should be considered when developing operational definitions of entrainment/impingement for the EI Monitoring Plan.	**No additional change to the I&E Plan is required.** Research results from the collaborative Whitefish Research Program are not yet available for review by Bruce Power. When these results are available, they will be evaluated and may be considered for informing the EA FUP program.
43	"The Operations Phase impingement and entrainment monitoring will be performed because previous studies to estimate potential Operations Phase impingement and entrainment impacts to lake whitefish through source water and spawning habitat assessments were not definitive." It is not clear what is meant by "definitive" estimates of entrainment and impingement, nor how it was determined that the unreferenced previous studies failed to provide such "definitive" estimates. It is not clear what the relationship is between the unreferenced "source water and spawning habitat assessments" and the estimates of entrainment and impingement. **BP Response**: This sentence has been removed from Section 1.3 (Study Goal and Objectives). The opening paragraph of this section now reads: "The goal of Operations Phase impingement and entrainment monitoring is to evaluate the validity of the effects predictions set forth in the EA Study Report [Bruce Power 2005], specific to impingement and entrainment. As noted, Section 2 of this Operations Phase Impingement and Entrainment Monitoring Plan (the Plan) provides a review of the Aquatic Environment component of the EA Study Report for the Project with a focus on impingement and entrainment. The effects predictions specific to impingement and entrainment from the EA Study Report are provided in Section 2.6.3. [p.2]. **UG Team Evaluation of BP Response:** Satisfactory	n/a	n/a

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
44	"*As with previous studies, the goal of this study will be to evaluate if the effects predictions set forth in the 2005 EA, specific to impingement and entrainment, are valid.*" Reference to "previous studies" and "effects predictions set forth in the 2005 EA" are not clear; these need to be explicitly identified. If the unreferenced previous studies failed to evaluate the unreferenced effects predictions, then it is not clear how it will be demonstrated that the current E/I Monitoring will avoid the same failures. **BP Response:** Section 2.0 (Overview of EA Study Report Findings) has been added to the Plan. **UG Team Evaluation of BP Response:** Satisfactory to include new Section 2.0. Unsatisfactory conclusions drawn from 'Overview of EA Study Report Findings.'	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The Reviewers have acknowledged that the I&E Plan, as revised, satisfactory addressed the concern initially raised with Comment #44. However, the Reviewers disagree with the summary of the EA Study Report findings. All predicted adverse effects were listed in the EA Study Report. Effects were classified as significant based on a framework which included: magnitude, geographic extent, timing/duration, frequency, degree of reversibility, and probability [EA Study Report, Chapter 9]. Professional judgment was required for assessment of the significance of potential adverse effects, based on the metric given. The EA process is public, transparent, accountable, and reproducible. The predictions in the EA were provided to the responsible authority (CNSC) for assessment by staff members, public input, and consideration by the Commission. The CNSC accepted that the project was "not likely to cause significance adverse effects" [EA Screening Decision]. Therefore, the Bruce Power response should be considered "Satisfactory."
45	Use of the word "valid" is problematic in this context, since the term means that a prediction is 'logically possible' -the reference should identify the states of prediction (i.e. true/false) that need to be determined through a test of the prediction. It is unlikely that Goal of the E/I Monitoring Plan is to evaluate if the predictions are 'valid,' but rather to develop a program that will generate the data necessary to determine if the predictions are true. This may seem like semantics, but it is vital that the Goal of the E/I Monitoring Plan be explicitly stated with accuracy and precision. **BP Response:** Wording slightly changed: "The goal of Operations Phase impingement and entrainment monitoring is to evaluate the validity of the effects predictions set forth in the EA Study Report [Bruce Power 2005],..." [p. 2] **UG Team Evaluation of BP Response:** Satisfactory.	n/a	n/a
46	"*Appendix A includes a timeline for the Project, including the milestones related to the acceptance of the EA Study Report for the Project, progression of the Follow-up Program Work Plan, and workshops focused on developing aspects of the 2008 Work Plan.*" It is not clear why the deliverable for this report (i.e. activities, timeline, milestones) presented in Appendix A is incorporated within the statement of Goal and Objectives. **BP Response:** There is no longer any reference to Appendix A in Section 1.3 and Appendix A has been removed from the Plan. **UG Team Evaluation of BP Response:** Satisfactory.	n/a	n/a
47	This statement explicitly identifies plural "effects predictions" rather than the single prediction provided in the Goal statement. It is not clear if there are multiple predictions to be tested, and if so what the specific predictions are. **BP Response:** Sentence now reads: "The effects predictions specific to impingement and entrainment from the EA Study Report are provided in Section 2.6.3." [p. 2] In Section 2.6.3 it now reads: "The results of these assessments predicted that entrainment and impingement effects to the Aquatic Environment would result in minor adverse effects (not significant)." [p. 9] **UG Team Evaluation of BP Response:** Unsatisfactory. It is still not clear what is meant by the phrase "minor". Is this a biological or statistical "minor"?	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** All predicted adverse effects were listed in the EA Study Report. Effects were classified as *significant* or *minor (not significant)* based on a framework which included: magnitude, geographic extent, timing/duration, frequency, degree of reversibility, and probability [EA Study Report, Chapter 9]. Professional judgment was required for assessment of the significance of potential adverse effects, based on the metric given. The EA process is public, transparent, accountable, and reproducible. The predictions in the EA were provided to the responsible authority (CNSC) for assessment by staff members, public input, and consideration by the Commission. The CNSC accepted that the project was "not likely to cause significance adverse effects" [EA Screening Decision]. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
48	2005 EA prediction: "*Impingement and entrainment at the Bruce A station due to operation of the condenser cooling water system will have no significant adverse effect on the three VEC species (lake whitefish, spottail shiner, and deepwater sculpin).*" It is not clear that this is actually the prediction as stated in 2005 EA. It is necessary to quote directly from the EA report to ensure that no interpretation errors have occurred. **BP Response:** See UG-047 (no direct quote from 2005 EA). **UG Team Evaluation of BP Response:** Unsatisfactory. This does not appear to have been addressed. Further, the term "significant" appears without being adequately defined.	It is necessary to quote directly from the EA report to ensure that no interpretation errors have occurred. The term "significant" appears without being adequately defined.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The summary of the EA findings, as provided in Table 2 (pp. 10-11), are quoted directly from the EA Study Report (see Table 9.3.2-2). All predicted adverse effects were listed in the EA Study Report. Effects were classified as *significant* or *minor (not significant)* based on a framework which included: magnitude, geographic extent, timing/duration, frequency, degree of reversibility, and probability [EA Study Report, Chapter 9]. Professional judgment was required for assessment of the significance of potential adverse effects, based on the metric given. The EA process is public, transparent, accountable, and reproducible. The predictions in the EA were provided to the responsible authority (CNSC) for assessment by staff members, public input, and consideration by the Commission. The CNSC accepted that the project was "not likely to cause significance adverse effects" [EA Screening Decision].
49	Reference to the terms "entrainment" and "impingement" are clearly essential for determining the appropriate tests of this prediction. As indicated above, the definitions provided in this document and not sufficiently explicit and rigorous for the E/I Monitoring Plan. **BP Response:** See UG-038-042. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG-038-042	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The definitions of *entrainment* and *impingement* are explicit and rigorous. As quoted by the reviewers, "Impinged [is] defined as the process by which organisms… are held against the [travelling] screens…" Also as quoted by the reviewers, "Entrainment [is] defined as the process by which organisms… are drawn through the screens…" We have addressed each of Comments #38 through #42 above and found that no additional change to the I&E Plan is required. Therefore, the Bruce Power response to Comment #49 should be considered "Satisfactory."
50	Reference to the term "*significant adverse effect on the ... species*" is problematic for several reasons. First, there is no indication what is meant by 'significant' in this context. Second, the term "adverse" is undefined, and can lead to ambiguity in the identification and measurement of effects. Third, it is unlikely that the EA prediction is actually made at the level of the selected species, but rather at some other biologically-meaningful level that is appropriate to the EA -most likely at the level of biological population. These terms are essential to the interpretation and design of the E/I Monitoring Plan. **BP Response**: Wording for "significant adverse effect" has changed to "residual adverse effects". Section 2.6.3 now reads: "Evaluation of the residual adverse entrainment and impingement effects was based on the criteria outlined in the EA Study Report [Bruce Power 2005]." [p.9] See UG-047. Wording has changed to "….minor adverse effects (not significant)." [p.9] No definition of the term "significant" is provided. No definition of the term "adverse" is provided. See UG-047. Instead of citing the three VEC species (lake whitefish, spottail shiner, and deepwater sculpin), wording has changed to put the effects to the "Aquatic Environment." [p.9] **UG Team Evaluation of BP Response**: Unsatisfactory. This issues has not been adequately addressed. It is still unclear what "significant" and "adverse" mean.	It is still unclear what "significant" and "adverse" mean.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** All predicted adverse effects were listed in the EA Study Report. Effects were classified as *significant* or *minor (not significant)* based on a framework which included: magnitude, geographic extent, timing/duration, frequency, degree of reversibility, and probability [EA Study Report, Chapter 9]. Professional judgment was required for assessment of the significance of potential adverse effects, based on the metric given. The EA process is public, transparent, accountable, and reproducible. The predictions in the EA were provided to the responsible authority (CNSC) for assessment by staff members, public input, and consideration by the Commission. The CNSC accepted that the project was "not likely to cause significance adverse effects" [EA Screening Decision]. Therefore, the Bruce Power response should be considered "Satisfactory."
51	The proposed entrainment and impingement objectives do not explicitly refer to determination of "significant adverse effects" as stated in the asserted 2005 EA prediction. As a result, it is possible that the objectives could be satisfied without achieving the stated Goal. **BP Response:** None.	The proposed entrainment and impingement objectives do not explicitly refer to determination of "significant adverse effects" as stated in the asserted 2005 EA prediction	**No additional change to the I&E Plan is required.** Residual adverse effects from the EA report are given in Section 2.6.3 of the I&E Plan. The goals are clearly stated on p. 2 of the I&E Plan. Thresholds for effect have not been agreed to at this time, but discussion will continue.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
52	Reference is made to 'identified endpoints' however there is no explanation of what these are, or how they came to be determined. **BP Response:** None.	There is no explanation of what these are, or how they came to be determined.	**No additional change to the I&E Plan is required.** Endpoints are clearly stated in Section 4.6.2 (p. 40) of the I&E Plan. Some thresholds have not been determined at this time, but additional discussion will continue to address these points. It is not necessary to identify the historical process behind selection of endpoints.
53	"*Impingement and entrainment of lake whitefish at the Bruce A station exceeds a threshold for effect (to be agreed to), established as the proportion of equivalent adult annual lake whitefish entrainment losses relative to the MNR proposed quota of lake whitefish in MNR quota management area (QMA) 4-4 in which the Bruce Power site resides.*" Reference is made to "threshold[s] for effects" however there is no explanation of what these are, or how they came to be or will be determined. **BP Response:** None.	There is no explanation of what these are, or how they came to be or will be determined.	**No additional change to the I&E Plan is required.** As stated in Section 4.6.2 (p. 40), thresholds have not been determined at this time, but additional discussion will continue.
54	"*threshold of effect ... established as the proportion of equivalent adult annual lake whitefish entrainment losses relative to the MNR proposed quota of lake whitefish in MNR quota management area (QMA) 4-4 in which the Bruce Power site resides.*" The proposed measure of effect is problematic, for several reasons. First, according to the statement, both entrainment and impingement effects will be measured as "equivalent adult annual lake whitefish entrainment losses" - this is illogical for the impingement effects. Second, the term "losses" is not defined; depending on whether this is interpreted as mortality or some other form of effect will have important implications for the design of the E/I Monitoring Plan. Third, it is not clear why the conversion of entrainment or impingement mortality to "equivalent adult ... losses" is appropriate, or feasible to employ. Fourth, the selection of MNR quota management areas is highly inappropriate as a unit of biological organization of lake whitefish in Lake Huron - especially given the facts that this zone was created primarily as an administrative zone for management of commercial fishing licenses for multiple species, has little or no support as representing a natural biological unit of lake whitefish. Fifth, given the inappropriateness of the MNR quota management area as biological unit to evaluate "adverse effects" on lake whitefish, it is even more inappropriate to assume that an undefined "quota" (presumably a MNR commercial fishery TAC=total allowable catch) would provide some meaningful representation of abundance for the lake whitefish population(s) supporting commercial harvests in the MNR quota management area. **BP Response:** Sentence has been changed to read (italics emphasis added to highlight change): **"**Impingement and entrainment of lake whitefish at the Bruce A station relative to a yet to be agreed to threshold for effect, established in this Plan as the proportion of equivalent adult lake whitefish *entrainment and impingement mortality estimates compared regionally* to the MNR quota of lake whitefish in MNR Quota Management Area (QMA) 4-4 and *compared locally to test populations values representing the percentage* of QMA 4-4 *distinct to the EA Local Study Area boundaries*." [p. 2] **UG Team Evaluation of BP Response:** Unsatisfactory. BP is still skirting the issue rather than acknowledging it as a key uncertainty.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Any fish which is entrained and/or impinged is assumed to be unable to return to Lake Huron. Use of the EAM model permits quantitative assessment of potential effects. Bruce Power acknowledges that the QMA does not necessarily represent a unit of biological organization. However, the selection of the QMA "provides a means against which lake whitefish data and EAM/FFYM and future direct, indirect or non-use benefits can be calculated and compared" (p. 37). Bruce Power acknowledges the uncertainty regarding assessment of potential effects on Lake Whitefish. The I&E Plan has proposed feasible, quantitative endpoints (with some thresholds to be discussed). Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
55	How is the proposed quota determined? What is the probability that the quota itself, if met, might have a negative impact on the population? This seems to assume that the quota, as established, will have no negative impact. It isn't clear how "the proportion of equivalent adult annual lake whitefish entrainment losses relative to the MNR proposed quota of lake whitefish in MNR quota management area (QMA) 4-4" will provide the necessary information to assess whether impingement and entrainment of lake whitefish exceeds a threshold for effect. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** The use of the MNR QMA "provides a means against which lake whitefish data and EAM/FFYM and future direct, indirect or non-use benefits can be calculated and compared" (p. 37). While we acknowledge the uncertainty inherent in this analysis, the proposed plan offers an approach to assessing the potential impact.
56	Generally speaking the QMAs are geopolitical in nature. That is, they do not necessarily reflect biology or behaviour of the fish population(s) within the QMA. As such, the results of any analyses that artificially separate fish in this way could compromise the ability to adequately test any scientific/statistical hypotheses. The management units could be included in any model (for example, as a random effect) to account for any unobserved geopolitical differences in harvest. While the entrainment and impingement data to be analyzed will be obtained completely within the boundaries of a region, the quota described above should be based on estimates obtained from a model that is not restricted to regional data only (unless it can be shown that the fish never leave the region at any time in their history; that is, the region represents an isolated body of water with geographically locked individuals). **BP Response:** See UG-054. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG- 054.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** No population model of Lake Whitefish in Lake Huron is available for use in hypothesis testing. It is our understanding that the University of Guelph team is planning to develop such a model. If a model of Lake Whitefish populations is available to Bruce Power in the future, we can consider it at that time. As this model is not complete, it is not appropriate to include in the I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory."
57	It should be noted that Michael Chegahno (UofG Grad Student, Whitefish Population Modelling Research Project, SON-BP Collaborative Whitefish Research Program, is currently undertaking a comprehensive review of the options and selection factors for the representation and evaluation of population-level effects for fishes, with a specific focus on assessment of cumulative effects associated with power plants. This review/evaluation should be considered when developing operational definitions of lake whitefish populations for the E/I Monitoring Plan. **BP Response:** None.	This review/evaluation should be considered when developing operational definitions of lake whitefish populations for the E/I Monitoring Plan.	**No additional change to the I&E Plan is required.** To our knowledge, this review has not been published. It is not appropriate to commit to incorporating conclusions from an unpublished student paper in the I&E Plan.
58	It should be noted that Clayton Coppaway (UofG Grad Student, Whitefish Population Discrimination Research Project, SON-BP Collaborative Whitefish Research Program, is currently undertaking a comprehensive review of all available information regarding population spatio-temporal distribution of lake whitefish in Lake Huron. This review/evaluation should be considered when developing operational definitions of lake whitefish populations for the E/I Monitoring Plan. **BP Response:** None.	Incorporate University of Guelph's review with respect to spatio-temporal distribution of Lake Whitefish.	**No additional change to the I&E Plan is required.** To our knowledge, this review has not been published. It is not appropriate to commit to incorporating conclusions from an unpublished student paper in the I&E Plan.
59	"*Impingement of lake whitefish within the 2005 EA local study area exceeds test threshold for effect values of 0.50%, 20%, 50%, and 100%, based on the assumption that 0.50%, 20%, 50% and 100% of impinged lake whitefish are from a population which is distinct within the EA local study area.*" Reference is made to "the 2005 EA local study area" however there is no specification of what this area is, and whether this area is appropriate for use in the E/I Monitoring Plan. **BP Response:** This bullet point has been removed from this section. **UG Team Evaluation of BP Response:** Satisfactory.	n/a	n/a

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
60	Reference is made to evaluation of whether the adult equivalent impingement estimates exceeds some (undefined) "threshold for effect" at four pre-selected levels, however there is no specification of what this area is, and whether this area is appropriate for use in the E/I Monitoring Plan. **BP Response:** See UG-059. **UG Team Evaluation of BP Response:** Satisfactory.	n/a	n/a
61	"*the assumption that ... impinged lake whitefish are from a population which is distinct within the EA local study area.*" This assumption is inappropriate for the E/I Monitoring Plan for several reasons. First, depending on definition of the (undefined) "EA local study area," it is highly unlikely that this will be the same as MNR quota management area 4-4, thus leading to a major inconsistency in measurements and interpretation of effects. Second, there is no evidence upon which to attribute or assume the population origin of the impingement lake whitefish, especially the specific condition that impinged fish are from an (undefined) local population rather than existing hypotheses about larger or migratory populations of lake whitefish in Lake Huron. Third, this assumption is contrary to previous statements in this document about the importance of identifying "distinct populations" in order to properly evaluate whether the Bruce A Restart is having "significant adverse effect on the ... species." **BP Response:** See UG-054. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG054.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The EA study area was defined in the EA Study Report. This is also shown in Figure 2 of the I&E Plan. Assumption of a potential local population of Lake Whitefish is conservative. Bruce Power is continuing to sponsor research in order to determine Lake Whitefish population structure in Lake Huron. Until such time as the population structure is known, we are unable to commit to using that knowledge in the I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory."
62	"*Further details on these proposed objectives are discussed in their respective sections below.*" It is appropriate that details regarding the objectives should be presented in the following subsections. However, as discussed above, the objectives present a wide variety of assumptions and presumptions which have not been supported – some of which are very questionable. **BP Response:** Paragraph was altered to now read: "The assessment of the proposed objectives of impingement and entrainment monitoring during the Operations Phase will be carried out until identified endpoints are achieved. Further details on these proposed objectives and endpoints are discussed in Sections 4.3 (Entrainment) and 4.4 (Impingement). Where meaningful, the results of Operations Phase sampling will be compared to data collected prior to the Operations Phase. The Operations Phase data will be used to determine if proposed thresholds for effect and monitoring endpoints have been met and will further aid in recommending if additional, longer term or periodic impingement and entrainment monitoring should be undertaken." [p. 2] **UG Team Evaluation of BP Response:** Unsatisfactory. The assumptions and presumptions remain outstanding.	No change recommended.	**We disagree with the reviewer's disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Comment #62 states that the University of Guelph reviewers disagree with the assumptions. These assumptions have been noted in other comments by the University of Guelph reviewers. Therefore, no separate disposition of Comment #62 will be provided here.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
63	"*These analyses will be performed for the assessment of potential changes in impingement and entrainment impacts from those during the pre-Operations Phase.*" It is not clear that the "pre-Operations Phase" and "Operations Phase" E/I assessments have been undertaken in a manner that will allow for statistical comparison; this is an important factor that must be considered in the E/I Monitoring Plan. **BP Response:** Sentence has been changed to read: "Where meaningful, the results of Operations Phase sampling will be compared to data collected prior to the Operations Phase." [p. 2] **UG Team Evaluation of BP Response:** Unsatisfactory. While the text has been revised to consider the comparability of the data (pre and post operations phase), any future monitoring must be developed with appropriate statistical expertise so that data pre and post are comparable.	Any future monitoring must be developed with appropriate statistical expertise so that data pre and post are comparable.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The need for comparability in data has been considered in the I&E Plan. Therefore, Bruce Power's response should be considered "Satisfactory."
64	"This data will be used in conjunction with proposed thresholds for effect and endpoints of follow-up monitoring to aid in determining *the path forward for Bruce Power following this study, in relation to impingement and entrainment monitoring.*" These (rather than this) data – presumably both the E/I pre-Operations and Operations Phases – may or may not be comparable to the undefined "thresholds for effect and endpoints." It would be unwise to assume that such a comparison will be possible until (a) the "thresholds for effect and endpoints" have been appropriately defined, and (b) statistical evaluation of the data sets concludes that such a comparison is possible. **BP Response:** Sentence has been changed to now read: "The Operations Phase data will be used to determine if proposed thresholds for effect and monitoring endpoints have been met and will further aid in recommending if additional, longer term or periodic impingement and entrainment monitoring should be undertaken." [p. 2] **UG Team Evaluation of BP Response:** Unsatisfactory. The thresholds for effect should be clearly identified, including all assumptions made to develop the effect. It is advisable to consider the effect of evaluation the sensitivity of outcomes given changes to the threshold levels.	The thresholds for effect should be clearly identified, including all assumptions made to develop the effect. It is advisable to consider the effect of evaluation the sensitivity of outcomes given changes to the threshold levels.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Thresholds for effect cannot be included in the I&E Plan until they have been agreed to by stakeholders. However, proceeding with monitoring is critical for ensuring that data is available following the onset of the Operations Phase. Note that expected sampling effort has been addressed (see Table 4 on p. 28). Therefore, the Bruce Power response should be considered "Satisfactory."
65	"*… to aid in determining the path forward for Bruce Power following this study.*" It is not clear what this statement means. There should be some clear and explicit understanding of BP's actions that would result from the contingency of possible outcomes from this study. **BP Response:** Sentence has been reworded to read: **"…**will further aid in recommending if additional, longer term or periodic impingement and entrainment monitoring should be undertaken." [p. 2] **UG Team Evaluation of BP Response:** Unsatisfactory. This statement is still unclear.	There should be some clear and explicit understanding of BP's actions that would result from the contingency of possible outcomes from this study.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The University of Guelph reviewers have asked for an explicit statement of Bruce Power's future decisions regarding potential outcomes of the EA FUP program. It is inappropriate to make a commitment at this point. The EA FUP is intended to address whether or not the EA predictions are valid. (Note that the EA predicted no significant adverse effects.) Future commitments by Bruce Power will depend on the results of the monitoring program as well as consultation with stakeholders.
66	"*The proposed study approach will assess potential residual effects of impingement and entrainment on three EA VEC fish species …*" It is not clear what is meant by "residual effects." **BP Response:** This section has been moved to Section 4.1 (Adoption of Specific USEPA Section 316(b) Methods) on p. 17. Residual effects were discussed in Section 2.6.3 (Significance of Residual Adverse Effects) on p. 9. Also refer to Tables 2 and 3 on pages 10 and 11, respectively, for significance of residual adverse entrainment and impingement effects. **UG Team Evaluation of BP Response:** Unsatisfactory. The concept of residual effects has been defined. Significance, significant, and adverse have not. It is important to note that residual has a different interpretation from a statistical point of view, and as such definitions of terms that overlap the biological and statistical world need to be clearly defined	The concept of residual effects has been defined. Significance, significant, and adverse have not.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan discusses the significance of residual adverse effects in Section 2.6.3. The metric used for evaluation of significance is given in Table 2. As these terms are standard with respect to environmental assessments generally, no additional clarification is required. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
67	*"... comparing species and life stages of fish impinged or entrained to their relative densities in source waters."* This is awkwardly worded, and needs to be explicit about the comparison of life-history-specific relative abundance in source water estimates and entrainment/impingement estimates. It is at this point that the E/I Monitoring Plan's problems with defining "entrainment" and "impingement" could have major consequences. **BP Response:** None.	This is awkwardly worded, and needs to be explicit about the comparison of life-history-specific relative abundance in source water estimates and entrainment/impingement estimates.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The sentence in question now reads: "The proposed study approach will assess potential residual adverse effects of impingement and entrainment on three EA VEC fish species, namely lake whitefish, spottail shiner, and deepwater sculpin, comparing species and age classes of fish impinged or entrained to their relative densities in source waters." (p. 17) We trust that this statement is more clear. Additionally, significant methodological detail is given in Section 4.1. Therefore, the Bruce Power response should be considered "Satisfactory."
68	"*This document proposes to adopt certain approaches and methodologies that are used when undertaking similar impingement and entrainment studies in the United States regulated under Section 316(b) of the United States Environmental Protection Agency (USEPA) Clean Water Act (CWA).*" The UofG Team strongly supports use of USEPA Section 316(b) in the development of this E/I Monitoring Plan. It is not clear which of the "certain approaches and methodologies" will be adopted from USEPA 316(b), and which will not be adopted. The document should explicitly identify these adoptions, and rationale for the "approaches and methodologies" that were not adopted. **BP Response:** None.	Indicate which approaches and methodologies of USEPA Section 316(b) will be incorporated into the I&E Plan.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The selected approaches are indicated in Section 4.1. Therefore, the Bruce Power response should be considered "Satisfactory."
69	"*Similar analyses of the potential impacts of impingement and entrainment by power plant intakes on fish populations within the Great Lakes has and continues to be performed in the United States.*" The document should provide references to identify which Great Lakes power plants have been conducting "similar analyses of the potential impacts of impingement and entrainment by power plant intakes on fish populations." **BP Response:** None.	Provide citations for similar impingement & entrainment studies performed by power plants in the Great Lakes.	**No additional change to the I&E Plan is required.** The quoted statement refers to impingement and entrainment analyses conducted by power plants located in the United States. These plants are required by law to follow the US EPA approach.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
70	"*... the USEPA set forth guidelines for performing source water baseline biological characterizations (Federal Register vol.66, no.243, page 65316).*" The E/I Monitoring Plan needs to explicitly identify the USEPA 316(b) "National Pollutant Discharge Elimination System: Regulations Addressing Cooling Water Intake Structures for New Facilities; Final Rule" requirements for information to "*characterize the biological community in the vicinity of the cooling water intake structure as well as the operation of the cooling water intake structures.*" (p.65316) "*This supporting information must include existing data (if available), which may be supplemented with new field studies if the applicant so chooses. The applicant must submit the following specific data:* *1. a list of the data that are not available and efforts made to identify sources of the data* *2. if available, a list of species (or relevant taxa) in the vicinity of the cooling water intake structure, and identification of the species and life stages that would be most susceptible to impingement and entrainment (including both nekton and meroplankton) (Species identified should include the range of species in the system including the forage base);* *3. if available, identification and evaluation of the primary period of reproduction, larval recruitment, and period of peak meroplankton abundance for relevant taxa;* *4. if available, information sufficient to provide data representative of the seasonal and daily biological activity in the vicinity of the cooling water intake structure;* *5. if available, identification of all threatened or endangered species that might be susceptible to impingement and entrainment at your cooling water intake structures* *6. documentation of any public participation or consultation with Federal or State agencies undertaken in collecting the data* *7. if the above data are supplemented with data collected in actual field studies, a description of all methods and quality assurance procedures for data collection, sampling, and analysis, including a description of the study area; identification of the biological assemblages to be sampled or evaluated (both nekton and meroplankton); and data collection, sampling, and analysis methods. The sampling or data analysis methods used must be appropriate for a quantitative survey and based on a consideration of methods used in other biological studies performed within the same source waterbody. The study area should include, at a minimum, the area of influence of the cooling water intake structure.*" (p.65316) The E/I Monitoring Plan should make specific reference to the data identified above (existing data and proposed sampling data) for each of the selected VEC species. **BP Response:** None.	The E/I Monitoring Plan should make specific reference to the data identified above (existing data and proposed sampling data) for each of the selected VEC species.	**No additional change to the I&E Plan is required.** The US EPA requires United States power plants to perform an extensive characterization of source water. However, in the context of the Bruce Power Unit 1&2 EA FUP, there is very little that will be gained through a characterization of all species in the source water. The source water larval trawling component of the I&E Plan is intended to give additional information, regarding the area of the intake, in order to inform the EA FUP. Field plans have been proposed (i.e., the I&E Plan), as well as reviewed and discussed with stakeholders. Annual reporting will continue to take place through the EA FUP process.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
71	It is important to note that the USEPA 316(b) section on "Source Water Baseline Biological Characterization Data" makes strong reference to the quality and quantity of the data collection and analyses that will be conducted on these data. The E/I Monitoring Plan will need to be much more explicit in it's treatment of these important statistical considerations. **BP Response:** Text has been changed to read (italics emphasis added to highlight change): "The PFM is *used to express impingement and entrainment mortality as biomass*, and may be used in conjunction with a trophic transfer model (TTM) to *further estimate equivalent adult biomass of piscivorous (fish eating) species based upon the impinged/entrained biomass of forage fish species*. Because the focus of this study is restricted to lake whitefish, deepwater sculpin and spottail shiner, none routinely prey on the others, *and because the endpoints/thresholds for this study are anticipated to be based upon numbers of individuals rather than biomass*, neither the PFM or TTM will be utilized." [p. 17] **UG Team Evaluation of BP Response:** Unsatisfactory. The quality and quantity of the data collection and analyses remain key uncertainties.	The quality and quantity of the data collection and analyses remain key uncertainties.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The reviewer's original comment #71 referred to the source water sampling plan. The source water sampling plan is discussed in Section 4.2 of the I&E Plan. The reviewer has not requested any change to this section. The response identified in comment #71 is not associated with the source water sampling plan. Rather, this text is associated with the impingement and entrainment estimates of mortality (as stated in the revised text). The Reviewers' evaluation of Bruce Power's response is incorrect. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
72	It is also important to realize that the two previous sections of the same USEPA 316(b) document makes explicit reference to the requirement for "Source Water Physical Data" that are "*needed to characterize the facility and evaluate the type of waterbody and species affected by the cooling water intake structure*" and "Cooling Water Intake Structure Data" that are needed "*characterize the cooling water intake structure and evaluate the potential for impingement and entrainment of aquatic organisms. Information on the design of the intake structure and its location in the water column will allow the permit writer to evaluate which species or life stages would potentially be subject to impingement and entrainment.*" (p.65316): With specific reference to "Source Water Physical Data": 1. "a narrative description and scale drawings showing the physical configuration of all source waterbodies used by the facility, including areal dimensions, depths, salinity and temperature regimes, and other documentation: 2. an identification and characterization of the source waterbody's hydrological and geomorphological features, as well as the methods used to conduct any physical studies to determine the intake's zone of influence and the results of such studies; and 3. locational maps." (p. 65316) With specific reference to "Cooling Water Intake Structure Data: "A diagram of the facility's water balance would be used to identify the proportion of intake water used for cooling, make-up, and process water. The water balance diagram also provides a picture of the total flow in and out of the facility, allowing the permit writer to evaluate compliance with the Track I flow reduction requirements (if applicable). Specific data on the intake structure include 1. a narrative description of the configuration of each of your cooling water intake structures and where it is located in the waterbody and in the water column; 2. latitude and longitude in degrees, minutes, and seconds for each of your cooling water intake structures; 3. a narrative description of the operation of each of your colling water intake structures, including design intake flows, daily hours of operation, number of days of the year in operation, and seasonal changes, if applicable: 4. a flow distribution and water balance diagram that includes all sources of water to the facility, recirculating flows, and discharges; 5. engineering drawings of the cooling water intake structure." As discussed above, the UofG Research Program has a strong emphasis on the collection and analyses of hydrodynamic data to support the kinds of requirements for information about water flow and entrainment/impingement risks for fishes, including the three identified VEC species. The E/I Monitoring Plan will need to be much more explicit in it's treatment of these hydrodynamic analyses. **[continued on next page]**	There are no details describing how the variation in operating conditions of the pumps in the forebay will affect the proposed Hydraulic Zone of Influence (HZI) analysis. Further details on the cooling water intake structure and how it interacts with the nearshore Lake Huron environment is also required.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan states that the operating capacity of the intake pumps will be considered in determining the Hydraulic Zone of Influence (p. 21). Bruce Power has provided additional details regarding the source water sampling plan. The description of the cooling water intake structure is not required for review of the I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
72	**[continued from previous page]** **BP Response**: The following sentence was added to the end of the second paragraph: "Section 4.2 of this work plan provides details on proposed source water sampling. [p. 17] New text in Section 4.2 includes: "Figure 3 shows the proposed locations for sampling of source waters in the vicinity of the Bruce Power site. The figure is illustrative and the direction of travel from the consistent start point will vary across weeks of sampling based on wind direction, weather and wave conditions at the time of survey which will affect the direction of travel. To collect suspended eggs and larval fish, larval tows will be performed at the sampling stations placed in the vicinity of the Bruce A station intake sing a 1.0 by 2.0 m neuston net with a 500 µm mesh. For the purposes of this Plan, the area of influence representing increased intake water velocities will be determined using a Hydraulic Zone of Influence (HZI) analysis. The general area where larvae may encounter the predicted Bruce A station intake will be sampled; however they may come into contact with the intake and their origin is a complex question. For the purposes of this study, the HZI represents the instantaneous three-dimensional water volume, the margins of which represent the spatial threshold within which larval fishes have a higher probability to be drawn into the Bruce A station intake rather than escape into the lake. The HZI is estimated by established hydraulic models in a spreadsheet format. The size and shape of the HZI are highly variable, dependent upon prevailing wind direction and velocity, as well as other environmental and operational factors such as water currents, seiche, and the Bruce A station cooling water intake flow. The HZI will be estimated using environmental data from each sampling date and the results included in applicable Operations Phase monitoring reports." [p. 21] **UG Team Evaluation of BP Response**: Unsatisfactory. There are no details describing how the variation in operating conditions of the pumps in the forebay will affect the proposed Hydraulic Zone of Influence (HZI) analysis. Further details on the cooling water intake structure and how it interacts with the nearshore Lake Huron environment is also required.	**[see previous page]**	**[see previous page]**
73	"*In USEPA 316(b) studies, the equivalent number of adults that are impinged or entrained are calculated using a suite of established models utilized by the USEPA during development of the Section 316(b) Rule (USEPA 2002)"* The UofG Team strongly endorses the USEPA (2002) "Case Study Analysis for the Proposed Section 316(b) Phase II Existing Facilities Rule" because of the rigorous scientific and quantitative approach to evaluating cumulative effects of mortality associated with power plants, including entrainment and impingement mortality. The conceptual approach adopted by USEPA in this regard is very similar to the approach adopted by the UofG Research Program, especially with regard to life-history population modeling and quality the partitioning of mortality (see Background of this document and Section A5-2.3 in USEPA (2002). **BP Response:** None.	The UofG Team strongly endorses the USEPA (2002) "Case Study Analysis for the Proposed Section 316(b) Phase II Existing Facilities Rule" because of the rigorous scientific and quantitative approach to evaluating cumulative effects of mortality associated with power plants, including entrainment and impingement mortality.	**No additional change to the I&E Plan is required.** US EPA methods were reviewed in the I&E Plan (see p. 17).
74	The UofG Team supports the use of the Equivalent Adult Model (EAM) and Foregone Fishery Yield Model (FFYM) for lake whitefish, as described by the USEPA (2002) case study document, however it is important to note that many of the required data/parameters for these models may not be readily available. In these cases, the E/I Monitoring Plan will need to explicitly describe and justify decisions about how to deal with important missing information. **BP Response:** None.	Explicitly describe and justify decisions about how to deal with important missing information.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response.. No additional change to the I&E Plan is required.** The I&E Plan includes the requested discussion. Sources and priorities for parameter data are discussed on p. 20 of the I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
75	"*The PFM is used in conjunction with a trophic transfer model (TTM) to estimate equivalent adults of piscivorous (fish eating) species. Because the focus of this study is restricted to lake whitefish, deepwater sculpin and spottail shiner, and none routinely prey on the others, the PFM/TTM will not be utilized*." The UofG Team has serious concerns regarding the decision not to use Production Foregone Model (PFM) and trophic transfer model (TTM) in the E/I Monitoring Plan, for several reasons. First, the author has incorrectly suggested that PFM is limited to piscivorous (fish eating) species – when in fact the USEPA document makes no such constraint "*The foregone production of forage species (those species not harvested for recreational or commercial fisheries) is used to estimate the subsequent reduction in harvested species yield that results from a decrease in the food supply*" (USEPA 2002, p.A5-6). Second, lake whitefish are known to be piscivorous (fish eating) and there is no evidence that the lake whitefish in the area of affect are not relying on other fish as prey. Third, the PFM/TTM methods are not constrained to whether the three selected VEC species feed on each other, but rather that they feed on prey (nonfish or fish) that have biologically significant entrainment/impingement risk exposure. Taken as whole, it is clear to the UofG Team that the PFM/TTM remains a potentially important tool for assessing effects of entrainment and impingement, and must be reconsidered in a much more rigorous manner for the E/I Monitoring Plan. **BP Response**: Text has been altered to include further justification for not including PFM/TTM to read: "The PFM is used to express impingement and entrainment mortality as biomass, and may be used in conjunction with a trophic transfer model (TTM) to further estimate adult biomass of piscivorous (fish eating) species based upon the impinged/entrained biomass of forage fish species. Because the focus of this study is restricted to lake whitefish, deepwater sculpin and spottail shiner, none routinely prey on the others, and because the endpoints/thresholds for this study are anticipated to be based upon numbers of individuals rather than biomass, neither the PFM or TTM will be utilized." [p. 17]. **UG Team Evaluation of BP Response**: Unsatisfactory. The PFM/TTM remains a potentially important tool for assessing effects of entrainment and impingement, and must be reconsidered in a much more rigorous manner for the E/I Monitoring Plan.	The PFM/TTM remains a potentially important tool for assessing effects of entrainment and impingement, and must be reconsidered in a much more rigorous manner for the E/I Monitoring Plan.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The PFM and TTM models were re-considered during the review of the Draft I&E Plan. As noted by the reviewers, Bruce Power re-considered the PFM and TTM models and rejected their use based on the anticipation that endpoints will be determined by numbers of individuals that have been impinged or entrained. The Reviewers' evaluation of Bruce Power's response has provided no additional reasons to consider the PFM and TTM models again. Therefore, Bruce Power's response should be considered "Satisfactory."
76	"*For the study, the effects of impingement and entrainment will be assessed by comparing the number of equivalent adult fish killed as a result of impingement or entrainment at the Bruce A station to an estimate of adult fish of the same species found in the source water.*" It is very unclear what is meant by "*an estimate of adult fish of the same species found in the source water*." The "source water" is undefined with regard to spatial distribution of the lake whitefish population(s) being affected. Previously, the document referred to the assumption that MNR quota management area 4-4 as the corresponding representation of the whitefish population distribution. Aside from serious flaws in this assumption (see above) the source water region and the MNR quota management area are very different from each other. The E/I Monitoring Program will need to seriously reconsider this factor in assessment of entrainment and impingements effects. **BP Response**: Sentence has been altered to read (italics emphasis added): "Effects of impingement and entrainment will be assessed by comparing the modelled number of equivalent adult fish mortalities as a result of impingement or entrainment at the Bruce A station to estimates of adult fish of the same species found in source waters *in the vicinity of the Bruce Power site, based on agency reports and data*." [p. 18] **UG Team Evaluation of BP Response:** Unsatisfactory. The concept "in the vicinity" is still an undefined area.	The concept "in the vicinity" is still an undefined area.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan is clear that the MNR QMA 4-4 will be used for assessment of impingement and entrainment effects. "The boundary for describing entrainment and impingement that is proposed is the MNR boundary for QMA 4-4… This QMA 4-4 boundary is a well-defined and established management boundary for Lake Huron commercial fisheries in Ontario and provides a means against which lake whitefish data and EAM/FFYM and future direct, indirect or non-use benefits can be calculated and compared." (p. 37) Therefore, Bruce Power's response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
77	"*When practicable, a comparison will be made between Bruce A station impingement and entrainment data by life stage to similar life stage estimates or indices of source water fish populations.*" It is not clear what this sentence means with regard to the sampling program and analyses. What is meant by "practicable"? What is the distinction between "life stage estimates" and "indices"? **BP Response:** None.	What is meant by "practicable"? What is the distinction between "life stage estimates" and "indices"?	**No additional change to the I&E Plan is required.** The sentence is intended to indicate that comparisons will be made between impingement and entrainment data to other sources of data regarding source water fish populations, if such data is available.
78	What exactly is being defined as a "source water fish population?" Is the author assuming that the lake whitefish in waters adjacent to BNGS are structured as a localized population with spatial distribution corresponding to the (undefined) "source water"? It seems that the E/I Monitoring Plan is becoming mired down with a host of different and very poorly defined meanings of the term "population." **BP Response:** See UG-076. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG 076.	What exactly is being defined as a "source water fish population?" Is the author assuming that the lake whitefish in waters adjacent to BNGS are structured as a localized population with spatial distribution corresponding to the (undefined) "source water"?	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan makes no assumptions regarding the population structure. The I&E Plan proposes the use of QMA 4-4 for determination of effect thresholds. This management unit may have one or multiple populations of fish. Therefore, the Bruce Power response should be considered "Satisfactory."
79	The UofG Team supports the EAM as proposed/described by USEPA. **BP Response**: None.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The use of the EAM is discussed in Section 4.1.1. As this is incorporated into the I&E Plan, no change to the I&E Plan is required. Therefore, the Bruce Power response should be considered "Satisfactory."
80	"*The target age of equivalency value for each of the species will be discussed with the responsible fisheries management agencies and Bruce Power and may be refined prior to undertaking analysis based on that consultation.*" It is not clear what is meant by this sentence, but there are a couple of important issues that emerge. First, it is not clear what is meant by "responsible fisheries management agencies," although it must be stressed that the Saugeen Ojibway Nation actively manages its own fisheries in its traditional waters of Lake Huron – which includes the BNGS site; thus SON must be consulted on this and all issues related to the effects of the BNGS on Lake Huraon lake whitefish. Second, the "target age of equivalency" for lake whitefish should be determined prior to the E/I Monitoring Plan. **BP Response:** This sentence has been removed from the Plan. **UG Team Evaluation of BP Response:** Unsatisfactory. The requirement for consultation with SON and Federal/Provincial fisheries management agencies can not simply be ignored.	The requirement for consultation with SON and Federal/Provincial fisheries management agencies can not simply be ignored.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan proposes an age of equivalency for use of the EAM with respect to Lake Whitefish (age-4; see p. 18). Therefore, the target age of equivalency has been determined, as requested by the Reviewers. This revision was considered "Satisfactory" by the Reviewers with respect to Comment #81. Therefore, Bruce Power's response should therefore be considered "Satisfactory." In addition, Bruce Power conducts the EA FUP through a consultative process. SON, as well as federal and provincial agencies, have the opportunity to comment on EA FUP plans, as well as attend the annual planning workshop hosted by Bruce Power. Consultation will continue to be an important part of the EA FUP process.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
81	*In order to better relate the impinged and entrained fishes to the available populations in Lake Huron, the age of equivalency proposed for lake whitefish is age-4, the age at which the species has been documented by MNR to first enter the commercial fishery. The age of equivalency proposed for lake whitefish is age-4. Age-4 was selected as it is the youngest age cohort reported as being harvested commercially in Canadian Waters of the Lake Huron main basin in MNR Quota Management Area 4-4 in the MNR report Lake Huron Commercial Fishing Summary for 2010 [MNR 2011].*" It is not clear what is meant by "available populations in Lake Huron." As a point of correction, MNR data actually show that lake whitefish in Lake Huron typically begin to enter the commercial fishery at the age of 3 years, rather than 4 years. However, the use of age-4 for "*The EAM requires life-stage-specific impingement and entrainment counts and life-stage-specific mortality rates from the life stage at which impingement/entrainment took place to the life stage of equivalency. The cumulative survival rate from age at impingement/entrainment until the age of equivalency is the product of all stage-specific survival rates to the age of equivalency [USEPA 2002]. … The components of Equation 1 represent survival rates during the different life stages between life stage **j** , when a fish is impinged or entrained, and age x, the age of equivalency. Survival through the stage at which impingement/entrainment occurs, **j** , is treated as a special case because the amount of time spent in that* equivalency is appropriate as a representation of fish that would be fully recruited to the fishery. **BP Response:** This sentence has been altered to read: "In order to better relate the impinged and entrained fishes to the available populations in Lake Huron, the age of equivalency proposed for lake whitefish is age-4. Age-4 is proposed as it is the youngest age cohort reported in the Lake Huron Commercial Fishing Summary for 2010 [MNR 2011] to have been harvested commercially in Canadian Waters of the Lake Huron main basin in MNR QMA 4-4." [p. 18] **UG Team Evaluation of BP Response:** Satisfactory.	n/a	n/a

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
82	"*For reference purposes, and subject to availability from MNR, size at age will use data reported in annual quota allocation reports of the Upper Great Lakes Management Unit with size at age comparisons with Bruce Power data made where aging has been conducted.*" SON has previously identified serious concerns regarding the MNR age determination for lake whitefish in Lake Huron, and these issues should be reconciled before using age data from the Upper Great Lakes Management Unit. SON currently deploys the only active commercial fishery in the waters adjacent to the BNGS, and arrangements should be made with the SON Fisheries Assessment Unit regarding assessment of biological samples – as has been the practice between BP and SON for some time. While the age structure comparisons are not discouraged, this seems to assume that the individual whitefish near Bruce Power Generating Station (BPGS) belong to the same population of whitefish that have been studied by the UGLMU. Again, a sensitivity analysis should be conducted to determine how the size at age values might change the estimates of the Foregone Fishery Yield Model (FFYM). Furthermore, size-at-age estimates are likely to involve substantial uncertainty. How are these uncertainties being addressed? **BP Response:** The sentence has been altered to read: "For reference purposes, and subject to availability from MNR, *models will use* the most up to date size-at-age data reported in annual quota allocation reports of the Upper Great Lakes Management Unit. *If deemed necessary*, comparisons with Bruce Power size-at-age data will be made where such data exist." [p. 18] **UG Team Evaluation of BP Response:** Unsatisfactory. The key uncertainty for this issue has been ignored. What models are being referred to? BP is once again ignoring the fact that the UG Team has been tasked under terms of the SON-BP Collaborative Whitefish Research Program to develop mathematical models of the late whitefish population(s) and associated fisheries. In addition, how will it be determined if a comparison is *deemed necessary?* Uncertainties in the age estimates has not been addressed.	What models are being referred to? BP is once again ignoring the fact that the UG Team has been tasked under terms of the SON-BP Collaborative Whitefish Research Program to develop mathematical models of the late whitefish population(s) and associated fisheries. In addition, how will it be determined if a comparison is *deemed necessary?* Uncertainties in the age estimates has not been addressed.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Bruce Power does not propose to distinguish populations. Rather, effects comparisons will be made using species-level data within the QMA 4-4 management unit. The models proposed are described in the I&E Plan, beginning on p. 18. The University of Guelph models have not provided to Bruce Power. At such time as they are available for consideration, Bruce Power will consider whether to incorporate the models into the EA FUP. Bruce Power will evaluate the available data for incorporation into the models and make a further decision regarding size-at-age data comparisons at that time. Therefore, the Bruce Power response should be considered "Satisfactory."
83	It is recommended that a sensitivity analysis be performed to determine how the EAM outcomes might change if the age of equivalency is different than age-4. **BP Response:** None.	It is recommended that a sensitivity analysis be performed to determine how the EAM outcomes might change if the age of equivalency is different than age-4.	**No additional change to the I&E Plan is required.** Age-4 is the size at which Lake Whitefish typically enter the commercial fishery, according to MNR data. A sensitivity analysis will not provide benefit.
84	How are uncertainties associated with impingement and entrainment counts handled? Similarly, how are the uncertainties associated with stage-specific mortality rates addressed? **BP Response:** None.	No change recommended.	**We disagree with the reviewer's disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Potential sampling bias will be minimized through QA/QC oversight of data collection. Parameter uncertainty has been recognized in the I&E Plan. As noted by the Reviewers in Comment #92, the I&E Plan includes the following statement: "to further aid data selection for model parameters, sensitivity analyses may be run on the FFYM to provide a comparison of size-at-age values and the associated model outputs… Results of sensitivity analyses will be summarized in applicable future reports on Operations Phase monitoring." (p. 20) Therefore, the Bruce Power response should be considered "Satisfactory."
85	The EAM appears to be a discrete model, lacking statistical assumptions. Are the impingement and entrainment counts assumed to follow a particular distribution? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Impingement and entrainment counts will be reported as numbers impinged/entrained. Distributions of the data will be evaluated when available.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
86	The EAM does not appear to consider or explicitly incorporate uncertainty regarding the estimates of the cumulative survival rate. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Parameter uncertainty has been recognized in the I&E Plan. As noted by the Reviewers in Comment #92, the I&E Plan includes the following statement: "to further aid data selection for model parameters, sensitivity analyses may be run on the FFYM to provide a comparison of size-at-age values and the associated model outputs… Results of sensitivity analyses will be summarized in applicable future reports on Operations Phase monitoring." (p. 20)
87	The EAM aggregates the data at the annual level. Are there risks associated with aggregating (i.e., Simpson's Paradox)? How might these be addressed? Aggregation could mask patterns, or completely change the direction of a relationship. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Aggregate data will be compared to the annual quota. Trends will be addressed during analysis of the data.
88	Larvae are expected during certain seasons. Does it make sense to estimate AEX at the annual level? Perhaps the AEX should be modified to account for seasonal age-x equivalents, with subsequent season specific estimates of mortality and counts of individuals killed. **BP Response:** None.	Perhaps the AEX should be modified to account for seasonal age-x equivalents, with subsequent season specific estimates of mortality and counts of individuals killed.	**No additional change to the I&E Plan is required.** The I&E Plan does not propose extrapolation or averaging of data over seasons. Impingement and entrainment counts will be reported as total numbers impinged/entrained.
89	The literature has suggested that "Instead of an adult-equivalent (forward projection) approach, the impact assessments should use an egg-equivalent (fecundity or hindcasting) approach, in which total entrainment losses of ichthyoplankton are related to losses of egg production at the population level" – Exponent 2005, pg viii & ix **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** We thank the Reviewers for the reference and may consider this type of analysis for the future.
90	Are other methods of analyses being considered? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Other methods of analysis are not proposed at this time. Following collection of data from Year 1, Bruce Power may reconsider alternate methods of analysis at that time.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
91	*For this Study, only primary fishery losses based upon the direct impingement and entrainment of lake whitefish will be considered. Secondary fishery yield losses, which use sport fish equivalents that have been converted from forage fish biomass, will not be considered because forage fish represent very little of the lake whitefish diet*." There are several serious problems with this statement. First, the focus should not be on "fishery losses" but rather on population losses=population mortality, of which fishery mortality must be combined in a cumulative manner with natural mortality, entrainment mortality, impingement mortality, thermal mortality, contaminant mortality, etc. Second, the so-called "secondary … yield losses" are incorrectly associated with "sport fish equivalents" when there is no such need or justification. Third, as discussed above, the UofG Team has serious concerns regarding the decision not to use Production Foregone Model (PFM) and trophic transfer model (TTM) in the E/I Monitoring Plan. Fourth, the claim that "forage fish represent very little of the lake whitefish diet" has not been investigated for the affected population(s). Fifth, as discussed above, the PFM/TTM methods are not constrained to whether the three selected VEC species feed on each other, but rather that they feed on prey (non-fish or fish) that have biologically significant entrainment/impingement risk exposure. Taken as whole, it is clear to the UofG Team that the PFM/TTM remains a potentially important tool for assessing effects of entrainment and impingement, and must be reconsidered in a much more rigorous manner for the E/I Monitoring Plan. **BP Response:** References have been added to the final sentence in this excerpt: "Secondary fishery yield losses, which use sport fish equivalents that have been converted from forage fish biomass, will not be considered because forage fish represent very little of the lake whitefish diet [Pothoven et al. 2001; McNickle et al. 2006]." [p. 19] **UG Team Evaluation of BP Response:** Unsatisfactory. Other than the addition of a couple of references, the key uncertainties and concerns of this issue have not been addressed.	No change recommended.	**No additional change to the I&E Plan is required.** The PFM and TTM models were re-considered during the review of the Draft I&E Plan. As noted by the reviewers, Bruce Power re-considered the PFM and TTM models and rejected their use based on the anticipation that endpoints will be determined by numbers of individuals that have been impinged or entrained. Therefore, no additional change is required, and the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
92	Since the FFYM incorporates the results of the EAM, there is a risk of further compounding the effects due to ignoring uncertainty. The EAM is not a point estimate (as the components used to calculate the EAM are themselves subject to variability), and as such will introduce further variability to the estimates of Y. A full study of all uncertainties should be included in this particular research. That is, incorporation of uncertainties of yearly survival, total stage specific mortality, age-x equivalents, average weights at age, etc., are necessary to fully understand the potential foregone yield due to impingement and entrainment. The FFYM should be investigated on alternate time scales (i.e., monthly, seasonally) to determine if there are significant effects that are masked by aggregating the data at an annual level. The results could indicate month, or season specific opportunities to reduce entrainment and impingement. **BP Response:** The following addition was made to this section: "When parameterizing both the EAM and FFYM, preference will be given to life-history data for each of the VEC species resulting from studies in the area of Lake Huron in the vicinity of the Bruce Power site. In the event that life-history data is available from multiple sources, priority for sources will be given as follows: 1) Management Agencies (e.g. MNR, DFO, USGS); 2) Peer-reviewed literature; 3) Gray literature; and 4) Unpublished data from academic or professional studies, industry, and personal communications. Priority is given to the MNR data due to their legal mandate in managing freshwater fish populations in Ontario and as one regulatory stakeholder that will be reviewing the results of the Follow-up Program. To further aid data selection for model parameters, sensitivity analyses may be run on the FFYM to provide a comparison of size-at-age values and the associated model outputs. This may identify those data values most suited for use in future analyses. Results of sensitivity analyses will be summarized in applicable future reports on Operations Phase monitoring." [p. 20] **UG Team Evaluation of BP Response:** Unsatisfactory. The use of sensitivity analyses is encouraged. However, the use of data should not be determined based on *legal mandate* or *stakeholder review*. It should be based on data quality, data availability, etc.	The use of data should not be determined based on *legal mandate* or *stakeholder review*. It should be based on data quality, data availability, etc.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** As the reviewers noted, if data is available from multiple sources, Bruce Power has proposed a priority for various sources. While Bruce Power agrees that data quality is paramount, at this planning stage, we are not in a position to evaluate the quality of life-history data. Bruce Power assumes that management agencies, which have a legal mandate to manage freshwater fish populations, have conducted quality assurance and quality control, and that this is reflected in the resulting data. Should this assumption appear to be problematic in the future, then Bruce Power will consider alternative approaches subject to consultation with stakeholders. Therefore, the Bruce Power response should be considered "Satisfactory."
93	The FFYM (and the AEX) lump impingement and entrainment into one model. It might be beneficial to study the effects of impingement and entrainment separately, especially if there is a monthly or seasonally specific risk. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power may consider this in the future, but studies of monthly or seasonal risks is not a goal of the I&E Plan.
94	While not explicitly described, at what levels will AEX and Y be considered significant, or detrimental to the population of whitefish? Furthermore, how are significant effects going to be measured? What are they going to be compared against? **BP Response:** None.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Effect test and endpoints are described in Section 4.6 of the I&E Plan. As these are described in the I&E Plan, no additional change is necessary. Therefore, the Bruce Power response should be considered "Satisfactory."
95	The AEX and FFYM do not consider potential covariates to explain survival rates, etc. Furthermore, spatial and temporal correlations are ignored. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** The I&E Plan proposes analysis with actual totals of impinged/entrained fish, with comparison to the MNR QMA 4-4 quota. Bruce Power does not propose explanation of survival rates.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
96	How are instantaneous fishing and total mortality derived? Are these stage specific? Do they vary by year/season/etc.? **BP Response:** See UG-092. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG092.	Indicate how instantaneous fishing and total mortality are derived. Indicate whether these are stage-specific. Indicate whether these vary temporally.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** As noted by the Reviewers in Comment #92, Bruce Power has proposed a priority for various sources. While Bruce Power agrees that data quality is paramount, at this planning stage, we are not in a position to evaluate the quality of life-history data. Bruce Power assumes that management agencies, which have a legal mandate to manage freshwater fish populations, have conducted quality assurance and quality control, and that this is reflected in the resulting data. Should this assumption appear to be problematic in the future, then Bruce Power will consider alternative approaches subject to consultation with stakeholders. Therefore, the Bruce Power response should be considered "Satisfactory."
97	Despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation associated with Bruce Power's 2007 and 2009 egg/embryo/larval sampling, as had been requested. **BP Response:** None. The section has been moved to Section 4.2 (Source Water Sampling Plan) starting on p. 20.	No change recommended.	**No additional change to the I&E Plan is required.** We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests. Note that Bruce Power has previously provided a copy of the 2009 airlift sampling study report ("2009 Lake Whitefish Field Studies Summary: Bruce A Refurbishment Follow-Up Program. Report No. 09-1112-0038. 47 pgs.")
98	It should be noted that, given the importance of lake whitefish early life history in this environmental assessment, the term 'eggs' refers to female (unfertilized) gametes, while the term 'embryo' refers to post-activation/fertilization, 'free embryo' refers to post-hatching but pre-feeding, 'larva' refers to post-feeding but pre-definitive morphology, 'juvenile' refers to post-definitive morphology but presexual maturity, 'adult' refers to post-sexual maturity. In this sense the air lift sampling was targeting eggs and or embryos, while trawl sampling was targeting free-embryos and/or larvae. **BP Response:** None.	It should be noted that, given the importance of lake whitefish early life history in this environmental assessment, the term 'eggs' refers to female (unfertilized) gametes, while the term 'embryo' refers to post-activation/fertilization, 'free embryo' refers to post-hatching but pre-feeding, 'larva' refers to post-feeding but pre-definitive morphology, 'juvenile' refers to post-definitive morphology but pre-sexual maturity, 'adult' refers to post-sexual maturity. No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power agrees that "air life sampling was targeting eggs and/or embryos, while trawl sampling was targeting free-embryos and/or larvae."
99	How were these data collected? Were they collected in the same manner as described below, or do the additional source water sampling compliment the findings of the original work? If so, how are the findings going to be incorporated into the study? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power has planned improvements to the trawling methods employed previously. For example, bongo nets were employed previously, which have a much smaller opening size, thereby reducing the likelihood of capturing larval fish (for equal effort). The proposed source water sampling plan envisions the use of a 1 m by 2 m net, as well as increasing the effort expended. Therefore, the likelihood of capturing larval fish has increased substantially.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
100	"*Additional source water sampling targeting lake whitefish, spottail shiner and deepwater sculpin, but recording all species and life stages captured, will be performed in the vicinity of the Bruce A station intake to assist in the estimation of impingement and entrainment following the USEPA Section 316(b) protocol.*" This sentence is not clear – "additional source water sampling" in addition to what? How will the target sampling strategy differ across target species? What specific aspects of the USEPA 316(b) protocol are being referred to in this sense? **BP Response:** This sentence has been altered to now read: "During the Operations Phase, source water sampling to detect larval lake whitefish, larval spottail shiner and larval deepwater sculpin (but recording all species and life stages captured during the period of source water sampling), will be performed in the vicinity of the Bruce A station intake to determine relative abundance of egg and larval stages of these species and provide context for the estimation of entrainment using the USEPA models previously described." [p. 20-21] **UG Team Evaluation of BP Response:** Unsatisfactory. How will the target sampling strategy differ across target species? What specific aspects of the USEPA 316(b) protocol are being referred to in this sense?	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The source water sampling strategy is fully described in Section 4.2. US EPA methods are described in Section 4.1. Therefore, the Bruce Power response should be considered "Satisfactory." The sampling strategy will not vary across species.
101	"*Figure 2 shows the proposed locations for sampling of source waters in the vicinity of the Bruce Power site.*" Figure 2 shows a purple line drawn around the BNGS entitled "EA Study Report Local Study Area Boundary." Is this supposed to define some operational are for use in the E/I Monitoring Plan? If so, how was it determined to be an appropriate area for this plan? **BP Response:** This sentence has been changed to now read: "Figure 3 shows the proposed locations for sampling of source waters in the vicinity of the Bruce Power site. The figure is illustrative and the direction of travel from the consistent start point will vary across weeks of sampling based on wind direction, weather and wave conditions at the time of survey which will affect the direction of travel." [p. 21] **UG Team Evaluation of BP Response:** Unsatisfactory. The appropriateness of the study area has not been justified. No further justification on EA Study Report Local Study Area Boundary is provided.	The appropriateness of the study area has not been justified. No further justification on EA Study Report Local Study Area Boundary is provided.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The Local Study Area was defined by the EA Study Report. As this report has been completed and accepted, no further justification is required. Therefore, the Bruce Power response should be considered "Satisfactory."
102	Figure 2 shows four green lines entitled "Proposed Source Water Sampling Locations." There is no justification provided for either the number or the location of these four sampling locations. It is inclear if they are intended to provide adequate targeting for the different VEC fish species. **BP Response:** None.	There is no justification provided for either the number or the location of these four sampling locations.	**No additional change to the I&E Plan is required.** The lines were removed from the Figure. Source water trawls will start at the locations given and proceed in a direction that may vary based on prevailing environmental conditions (wind, waves).
103	"*To collect suspended egg and larval fish (targeting primarily lake whitefish) sampling will be performed using a neuston net with a 300 µm mesh. Sampling for source water larval density will take place in the vicinity of the plant intake using a neuston net with 300 µm mesh.*" Does "vicinity of the plant intake" refer to the four sampling locations identified in Figure 2, or some other sampling that is not described by the identified locations? **BP Response:** The sentence has been changed to now read: "To collect suspended eggs and larval fish, larval tows will be performed at the sampling stations placed in the vicinity of the Bruce A station intake using a 1.0 m by 2.0 m neuston net with a 500 µm mesh." [p. 21] **UG Team Evaluation of BP Response:** Unsatisfactory. The concept of "in the vicinity of the plant intake" remains undefined.	The concept of "in the vicinity of the plant intake" remains undefined.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The transect starting locations are clearly shown in Figure 3, as recognized by the Reviewers (see Comment #101). No further definition is required. Bruce Power's response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
104	"*Sampling will proceed at a rate of once per week for ten consecutive weeks, encompassing the period where lake whitefish and deepwater sculpin larval entrainment were highest (April through mid-June)*" It is not clear how this sampling frequency came to be determined: What data were analysed? How do we know that the temporal bounds of the sampling season are appropriate? How do we know that the sampling frequency is appropriate? **BP Response:** This sentence has been altered to now read: "Larval fish sampling will proceed at a rate of once per week for ten consecutive weeks, encompassing the period from April through mid-June where lake whitefish and deepwater sculpin larval entrainment has been highest in historic entrainment samples and where larval life stages of development would most likely occur based on species life history." [p. 21] **UG Team Evaluation of BP Response:** Unsatisfactory. It is still unclear how the sampling rate was determined, or whether it is appropriate.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The sampling rate was determined primarily through application of professional judgment. Effort has been substantially increased with respect to previous source water trawling events. The I&E Plan includes longer tows, more tows, and a larger net. Therefore, the Bruce Power response should be considered "Satisfactory."
105	How were the proposed locations for sampling source waters in the vicinity of the Bruce Power site selected? Are these locations representative of the entire offshore location? How will the results from the sampling be extrapolated over the entire offshore location? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** The source water sampling locations were selected to be on both sides of the intake and to be within a reasonable distance from the intake. It is not known whether these locations are representative of the entire offshore location. Results will not be extrapolated.
106	How was the sampling frequency selected? Does sampling once per week effectively capture the temporal variability of the patterns of distribution and abundance of the targeted species? Should sampling be conducted at a higher frequency for critical periods (i.e., for hatching times, early stages of life, etc.)? Will the influence of lake circulation and hydrodynamics on patterns of distribution and abundance of larval fish be considered when analyzing the results from the sampling program? How will the results from the sampling be extrapolated statistically over the entire water column (with depth) and the overall offshore location? How will these results be related to assess probability of entrainment in BNGS? **BP Response:** With regards to influence of lake circulation and hydrodynamics on patterns of distribution and abundance of larval fish, the following text has been added: "For the purpose of this Plan, the area of influence representing increased intake water velocities will be determined using a Hydraulic Zone of Influence (HZI) analysis. The general area where larvae may encounter the predicted Bruce A station intake will be sampled; however they may come into contact with the intake and their origin is a complex question. For the purposes of this study, the HZI represents the instantaneous three-dimensional water volume, the margins of which represent the spatial threshold within which larval fishes have a higher probability to be drawn into the Bruce A station intake rather than escape into the lake. The HZI is estimated by established hydraulic models in a spreadsheet format. The size and shape of the HZI are highly variable, dependent upon prevailing wind direction and velocity, as well as other environmental and operational factors such as water currents, seiche, and the Bruce A station cooling water intake flow. The HZI will be estimated using environmental data from each sampling date and the results included in applicable Operations Phase monitoring reports." [p. 21] **UG Team Evaluation of BP Response**: Unsatisfactory. References are required to support this methodology. How will the hydrodynamics of the source water be sampled to calibrate/validate/verify the spreadsheet model? What governing equations are included in the spreadsheet model? How will the results from the Hydraulic Zone of Influence (HIZ) analysis be incorporated with the source water larval sampling? Further details on this aspect of the Monitoring Plan are required.	References are required to support this methodology. Further details on this aspect of the Monitoring Plan are required.	**No additional change to the I&E Plan is required.** The hydrodynamics of the source water will not be sampled. This type of measurement is very costly and will offer little to support the I&E Plan. Source water trawling will be used to determine the number of captured larvae per unit volume. The HZI will be used to develop a worst-case scenario for comparison: assuming the larval density is constant over the entire HZI volume, a total number of potentially entrained larvae can be determined. Refinement of this scenario may take place during the analysis stage; methods and results will be presented in the EA FUP report, along with appropriate citations.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
107	*"During each weekly larval and egg sampling event, eight samples will be collected along with a series of four transects. Sampling will be performed during daylight and night-time hours, with one day and one night sample collected along each of the four transects. Based on the above, the total number of samples is 80. During daytime and night-time sampling, two of the four samples will be collected at the surface, and two will be collected at mid-depths.*" How do we know that eight samples per transect is appropriate? What is the basis for day and night sampling? What will be the timing of the day and night samples, and why will that be appropriate? Why are both surface and sub-surface samples being collected? What is mid-depth, why is only one sub-surface stratum being sampled, and how do we know that this design is appropriate? **BP Response:** Text has been altered (italics emphasis added) to read: During each weekly larval fish and egg sampling event, ten samples will be collected along a series of five transects. Sampling will be performed during daylight and night-time hours *occurring either from 2-3 hours before and after dawn, or two to three hours before and after dusk*. One day and one night sample will be collected along each of the *five* transects. Based on level of sampling effort, the *total number of samples will be 100. All tows will be completed at or within 3 m of the surface*." [p. 21] **UG Team Evaluation of BP Response:** Unsatisfactory. The increase from eight to ten transects does not satisfy the questions raised in the comment. The appropriateness of this number is still unjustified.	The increase from eight to ten transects does not satisfy the questions raised in the comment. The appropriateness of this number is still unjustified.	**No additional change to the I&E Plan is required.** Sampling plans have been developed through professional judgment and by taking into account the logistics of two crews needed for the monitoring. Effort has been substantially increased from previous studies.
108	"*To the extent possible under the prevailing wind and wave conditions, samples will be taken perpendicular to shore.*" Why are shore-perpendicular samples preferred to shore-parallel or wind-oriented samples? **BP Response:** Text has been altered to now read (italics emphasis added): "To the extent possible under the prevailing wind and wave conditions, samples will be taken *roughly* perpendicular to shore *to incorporate sampling over multiple lake depths.*" [p. 21] **UG Team Evaluation of BP Response:** Unsatisfactory. It still remains unclear as to why shore-perpendicular samples are preferred. Furthermore, it is unclear why shore-perpendicular samples allow for the incorporation of sampling over multiple lake depths.	It still remains unclear as to why shore-perpendicular samples are preferred. Furthermore, it is unclear why shore-perpendicular samples allow for the incorporation of sampling over multiple lake depths.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Depth contour lines are typically, though not exclusively, parallel to shore. Shore-perpendicular tows will therefore tend to sample multiple lake depths. The Bruce Power response should be considered "Satisfactory."
109	"*The tow will also be conducted in a broad arc rather than a straight line such that the tow net will remain outside of the boat propeller wash area.*" If the tows are intended to be curved, then why are the 'transects' depicted on Figure 2 as straight lines? **BP Response:** See UG-102 **UG Team Evaluation of BP Response:** Unsatisfactory. See UG102.	Justify the number and location of transects.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Figure 2 in the Draft I&E Plan was revised to remove the straight lines in question. Therefore, Bruce Power has addressed the concern in the original Comment #109. The Reviewers' disposition should therefore have been "Satisfactory". The reviewer references Comment #102, which requests a justification for number and location of transects. As this is not related to the original Comment #109, no reply will be given here.
110	Has a power analysis been performed to determine if this adequately provides the statistical power required to answer the specific hypotheses of the experiment? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** A power analysis has not been conducted.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
111	Are the transects sufficient to estimate impingement and entrainment in the vicinity of Bruce A station intake? The identified transects do not completely surround the water intake. Are there considerations for larvae being carried to the intake in a manner that bypasses that proposed transects? What type of statistical analyses will be used to estimate the distribution and abundance of larvae? Will spatial and temporal correlations be considered? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Due to prevailing wind conditions, the transect directions will likely vary. Transect directions will be plotted as part of the analysis. Results will be considered on a transect-by-transect basis. Analysis will be conducted as described on p. 35 of the I&E Plan. Spatial and/or temporal trends may be identified during the analysis, but correlations are not required for consideration of the calculated variables as given on p. 35 of the I&E Plan.
112	"*During each weekly larval and egg sampling event, eight samples will be collected along a series of four transects. Sampling will be performed during daylight and night-time hours, with one day and one night sample collected along each of the four transects.*" What time of day will the day and night sampling be conducted? How will the results from the day and night sampling be extrapolated over the entire day? How does the vertical distribution of larval fish vary during the day? Will the sampling program be able to capture this variation? **BP Response:** Text has been altered to now read (italics emphasis added): "During each weekly larval fish and egg sampling event, ten samples will be collected along a series of five transects. Sampling will be performed during daylight and night-time hours *occurring either from 2-3 hours before and after dawn, or two to three hours before and after dusk*. One day and one night sample will be collected along each of the five transects." [p. 21] **UG Team Evaluation of BP Response:** Unsatisfactory. See UG107.	No change recommended.	**No additional change to the I&E Plan is required.** Sampling times have been described in the I&E Plan, as quoted by the Reviewers. Day and night sampling data will not be "extrapolated" over the entire day, but the sampling data will be assumed to be representative of daytime and nighttime larval densities. The vertical distribution of larval Lake Whitefish is not known at this time. The sampling data will be assumed to be representative of larval densities in the vertical direction. Comment #107 was reviewed, and no additional change to the I&E Plan is required.
113	"*During daytime and night-time sampling, two of the four samples will be collected at the surface, and two will be collected at mid-depths.*" How were the sampling depths (surface and mid-depth locations) selected? Are these representative of the entire water column? How will the results from the two points be extrapolated for the entire water column? What statistical measures, if any, will be applied? **BP Response:** Sentence has been reworded to read: "All tows will be completed at or within 3 m of the surface." [p. 21] **UG Team Evaluation of BP Response:** Unsatisfactory. The uncertainties and concerns raised remain outstanding.	No change recommended.	**No additional change to the I&E Plan is required.** Mid-depth sampling has been removed from the I&E Plan due to logistical challenges. Near-surface larval densities will be assumed to be representative of densities throughout the water column.
114	As discussed above, the UofG Team has identified serious problems with the proposed definition of entrainment. **BP Response:** Section is now located in Section 4.3 (Entrainment) starting on p. 22. The definition is appears slightly re-worded in the Plan as follows: "As described in Section 1.4, entrainment is defined as the process by which organisms that are generally smaller than either the Bruce A (Units 1-4) cooling water pump intake screens or the cooling water traveling screens are drawn through the screens by the intake cooling water flow." [p. 22] **UG Team Evaluation of BP Response:** Unsatisfactory. Outstanding concerns remain with the definition. See UG 038-041.	Outstanding concerns remain with the definition.	**No additional change to the I&E Plan is required.** The Reviewers have not identified any additional concerns with this Comment. Comments #38-41 were reviewed, and no additional change to the I&E Plan is required.
115	As discussed above, not all entrained organisms will pass through the travelling screens. **BP Response:** See UG-114. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG114.	No change recommended.	**No additional change to the I&E Plan is required.** The Reviewers have not identified any additional concerns with this Comment. Comment #114 was reviewed, and no additional change to the I&E Plan is required.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
116	As discussed above, EAM and FFYM are appropriate for lake whitefish assessment. **BP Response:** None.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The EAM and FFYM are integral to the I&E Plan. The Bruce Power response should not be considered "None", but should instead be considered "Satisfactory."
117	As discussed above, it is clear to the UofG Team that the PFM/TTM remains a potentially important tool for assessing effects of entrainment and impingement, and must be reconsidered in a much more rigorous manner for the E/I Monitoring Plan. **BP Response:** None.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The PFM and TTM models were re-considered during the review of the Draft I&E Plan. As noted by the reviewers in Comment #75, Bruce Power re-considered the PFM and TTM models and rejected their use based on the anticipation that endpoints will be determined by numbers of individuals that have been impinged or entrained. Therefore, the Bruce Power response should be considered "Satisfactory."
118	"As shown in Appendix B, Table 8.1.1-1 from the 2008 Work Plan indicates that the Operations Phase monitoring objective for Element 3.1 is to determine the relative abundance of lake whitefish eggs and larvae present that are susceptible to entrainment, and to confirm the EA finding of no significant adverse effects to larval lake whitefish due to entrainment from the condenser cooling water system operation during the Operations Phase." As discussed above, the E/I Monitoring plan should use proper terminology when referring to target life-history stages of the target species (eggs, embryos, free-embryos, larvae, juveniles, adults). **BP Response:** This section has been removed – largely incorporated into Section 1.3 (Study Goal and Objectives). **UG Team Evaluation of BP Response:** Satisfactory. (but see concerns on Study Goal and Objectives)	n/a	n/a
119	It is very important to note that "susceptible to entrainment" necessarily involves an understanding of hydrodynamic flow and characterization of entrainment risk zones associated with the water intake. This feature seems to be absent from the E/I Monitoring Plan, but is a major focus of the UofG Research Program **BP Response:** See UG-106. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG106.	No change recommended.	**No additional change to the I&E Plan is required.** The Reviewers have not identified any additional concerns with respect to hydrodynamic characterization. Comment #106 was reviewed, and no additional change to the I&E Plan is required.
120	Use of the word "confirm" is problematic in this context, since it also carries the meaning of 'prove to be true.' A neutral scientific wording would read something like: "… to [confirm] test the EA [finding] prediction of no significant adverse effects to larval lake whitefish due to entrainment from the condenser cooling water system operation during the Operations Phase." **BP Response:** None.	A neutral scientific wording would read something like: "… to [confirm] test the EA [finding] prediction of no significant adverse effects to larval lake whitefish due to entrainment from the condenser cooling water system operation during the Operations Phase."	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** This sentence was removed from the I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
121	Entrainment and sampling has previously been performed at both the Bruce A and Bruce B stations. Entrainment sampling has been performed at the Bruce A station in 1977, 1985-86, and again in 2004." Despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation associated with Bruce Power's 1977, 1985-86, 2004 entrainment sampling, as had been requested. **BP Response:** References were added to this sentence. It now reads: "Entrainment sampling has previously been performed at both the Bruce A and Bruce B stations. Entrainment sampling has been performed at the Bruce A station in 1977, 1985-86, and again in 2004 [Dunstall 1978; McKinley 1988; Bruce Power 2005]." [p. 22] **UG Team Evaluation of BP Response:** Unsatisfactory. Other than the addition of a few references, the issues and concerns remain outstanding. BP continues to withhold the requested data/information.	No change recommended.	**No additional change to the I&E Plan is required.** Entrainment sampling data is not required for review of the I&E Plan. We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests.
122	"*When feasible, the most recent data (2004) will be used to provide historic context relating to sampling techniques and schedules, and to the extent possible to compare with new sample results to be obtained as part of this program.*" How do we know that the most recent data are most appropriate for representing a historical context relating to sampling techniques and schedule? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Comparison with historical data, where available, will be challenging. In particular, we note that Lake Huron has undergone major changes in the last 10 years, associated with the invasion of zebra mussels. Bruce Power will address the challenge of comparison with historical data through the analysis and reporting of data obtained from the I&E Plan. Note that in Comment #273, the Reviewers agreed that "it seems logical that more recent data would be more useful to the analyses."
123	"*Although multiple years of entrainment data has been compiled, a review of the data as part of this work plan indicates that monitoring activities (i.e., frequency, level of detail, etc.) have varied between years, which is anticipated to limit the ability to draw comparisons between previous years of sampling and subsequently predict future entrainment trends at the Bruce A station.*" This is not a sentence. On one hand, it states that a review of the data is part of the proposed workplan, and other the other hand conclusions are already drawn from the review. If the historical time series of entrainment data will not allow rigorous restrospective and prospective analyses, is it necessary for a new sampling design that will allow for comparison of results across years? How will we know if this is needed, and what conditions such a sampling design will need to satisfy? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** The sentence is grammatically correct. Comparisons will be made, where possible, between larval densities in terms of numbers per volume (an "apples-to-apples" comparison). These comparisons, and any associated limitations, will be determined during analysis and reported.
124	"*The limitations of historical data will be further explored as part of the proposed study. Following the more rigorous Operations Phase monitoring,statistical comparisons of pre-and post-Operations Phase monitoring to earlier historical data may be possible. However, due to the variability in historical monitoring, some data may be of limited utility, multiple years of data may need to be pooled, and the analyses may have limited statistical power to detect differences between some pre-and post-Operations Phase variables.*" This seems to be a rehash of the previous (unclear) statement – the bottom line seems to be that statistical analyses will be attempted but are not likely to be informative. As discussed above, should the E/I Monitoring Plan ensure the creation of a meaningful sampling design leading to a useful entrainment time series? **BP Response:** The last two sentences have been reworded to now read: "However, due to the variability in historical monitoring, some data may be of limited utility, and certain data may need to be pooled or omitted. As a result, certain analyses may have a limited statistical power to detect differences between some pre-and post-Operations Phase variables." [p. 23] **UG Team Evaluation of BP Response:** Unsatisfactory. Notwithstanding the caveats about poor historical data, the statistical analyses will be attempted but are not likely to be informative.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power is aware that limitations may be present in historical data. Comparisons with historical data will be attempted, and the results as well as associated limitations will be reported.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
125	Variation in monitoring will have an impact on the ability to compare previous studies to the existing project. Further, comparisons need to be balanced against the possibility that the population of whitefish has changed since the original studies were performed. How are the limitations of historical data going to be addressed in the study? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power is aware that limitations may be present in historical data. Comparisons with historical data will be attempted, and the results as well as associated limitations will be reported.
126	What statistical comparisons will be made? What assumptions are required to perform the necessary statistical analyses? Are these comparisons going to consider one variable at a time (i.e., are they univariate analyses)? Will appropriate Time Series methods be used? While pooling may be necessary, is there any concern that trends may be affected by Simpson's Paradox? How will the results be interpreted and communicated if the statistical power is limited? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Statistical comparisons are discussed in Sections 4.5.2 and 4.53. Each variable will be tested one at a time. Results, assumptions, limitations and interpretations will be identified in the annual report. Time series methods will be considered during the analysis phase, but at this time, it is not expected that they will be utilized.
127	As discussed above, the E/I plan should use appropriate life-history terminology (i.e. eggs, embryos, free-embryos, larvae, juveniles, adults) for the entrainment sampling program **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Appropriate terminology will be used during data collection and reporting.
128	"ichthyoplankton *... in the intake water that have passed through the intake screening systems and are entrained through the cooling water system during normal plant operations.*" As discussed above, this does not account for the ichthyoplankton that is entrained but does not pass through the cooling water system. **BP Response:** The sentence has been re-worded as follows: "Entrainment sampling will identify and quantify the ichthyoplankton (i.e., eggs and larvae) in the intake water that has passed through the intake into the forebay and that is assumed will be swept downstream through the traveling screens and entrained through the cooling water system during normal plant operations." [p. 23] **UG Team Evaluation of BP Response:** Unsatisfactory. The proposed sampling will not account for entrained juveniles/adults that are entrained into the forebay, yet not imping on the screens.	The proposed sampling will not account for entrained juveniles/adults that are entrained into the forebay, yet not imping on the screens.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan assumes that all fish that enter the forebay will either be impinged or will pass through the travelling screens. Entrainment sampling in the forebay will not target fish of sufficient size to be impinged. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
129	"*To the extent possible entrainment sampling will be conducted using methods adopted from the 2004 study [Bruce Power 2005b]. This includes conducting sampling at the upstream end of the forebay using a pump-in-net design.*" As discussed above, the UofG has serious concerns regarding the appropriateness of previous entrainment sampling protocols, especially the assumptions regarding representivity of the sampling location **BP Response:** This sentence has been re-worded to now read (italics emphasis added): "To the extent possible, entrainment sampling will be conducted using sampling methods adopted from studies in 2004 [Bruce Power 2005b]; *however, two methods are currently under evaluation to ensure that they meet Bruce Power sampling and health and safety requirements (see Section 4.3.2.1.1). Entrainment sampling gear size, number of nets, and sampling duration may be modified as a result of field sampling data and ability to capture the coefficient of variation. The two sampling methods under consideration are: -Pump-in-net design, similar to 2004 entrainment sampling but at a different location within the forebay ; and -Plankton/bongo net tow*." [p. 23] **UG Team Evaluation of BP Response:** Unsatisfactory. The concerns regarding the appropriateness of previous entrainment sampling protocols, especially the assumptions regarding representivity of the sampling location, remain outstanding. It is unclear if the new sampling methods have been statistically vetted. It is also unclear if the old protocols are comparable to current or newly developed standards.	The concerns regarding the appropriateness of previous entrainment sampling protocols, especially the assumptions regarding representivity of the sampling location, remain outstanding. It is unclear if the new sampling methods have been statistically vetted. It is also unclear if the old protocols are comparable to current or newly developed standards.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Both proposed methods are described in the I&E Plan. We may be able to sample at various locations in one cross-section of the intake forebay, in order to address concerns about the appropriateness of the sampling location. This will be determined as entrainment sampling protocols are developed and revised through in-field experience. However, the primary factors that determine the sampling location are safety and feasibility. Differences in protocols will be discussed during reporting. Bruce Power is aware that this may be a limitation, which will be addressed during reporting. Therefore, the Bruce Power response should be considered "Satisfactory."
130	Despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation associated with Bruce Power's 2004 entrainment sampling, as had been requested. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests.
131	The UofG Team has serious concerns regarding the representivity of spatial sampling of entrainment in the forebay. To our knowledge there have never been any hydrodynamic assessments of water flow in the forebays to determine in there are regions of hyper-or hypo-representivity of entrainment, with which to evaluate the assumption that upstream end of the forebay is a well-mixed and appropriate location for sampling. It should be noted that hydrodynamic assessment of the forebays is a major component of the UofG Research Program. **BP Response:** None.	It should be noted that hydrodynamic assessment of the forebays is a major component of the UofG Research Program.	**No additional change to the I&E Plan is required.** Bruce Power has committed to a partnership with SON to enhance and extend research related to potential impacts on Lake Whitefish. When research data is available from that initiative, it will be evaluated and may be used to inform the EA FUP.
132	It should be noted that Andrew Binns (UofG Post-Doctoral Fellow, SON-BP Collaborative Whitefish Research Program) has been assigned responsibility to develop and undertake hydrodynamic mapping of the BNGS forebays to quantitatively identify and describe water flow patterns that must be taken into account when selecting representative forebay sampling location(s). The spatio-temporal definition of these representative sampling locations needs to be considered in the E/I plan. **BP Response:** None.	It should be noted that Andrew Binns (UofG Post-Doctoral Fellow, SON-BP Collaborative Whitefish Research Program) has been assigned responsibility to develop and undertake hydrodynamic mapping of the BNGS forebays to quantitatively identify and describe water flow patterns that must be taken into account when selecting representative forebay sampling location(s).	**No additional change to the I&E Plan is required.** Bruce Power has committed to a partnership with SON to enhance and extend research related to potential impacts on Lake Whitefish. When research data is available from that initiative, it will be evaluated and may be used to inform the EA FUP.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
133	As discussed above, the UofG Team has serious concerns regarding the representivity of spatial sampling of entrainment in the forebay – and specifically the assumption that "samples are representative of the actual larval fish composition in the forebay due to mixing of the cooling water between the intake and the forebay." **BP Response:** Note Section 4.3.2.1.1 (Collection Method) is now split into two sub-sections dealing with 'pump-in-net' and "plankton/bongo net", respectively. Text has been re-worded to now read: "In the 2004 entrainment study [Bruce Power 2005b], entrainment sampling was conducted at the upstream end of the forebay, using a pump-in-net design, with water withdrawn by pump from approximately 3 m below water surface. *During Operations Phase entrainment sampling, pump-in-net samples will be collected from an engineered catwalk located approximately 250 meters from the upstream end of the forebay.* Figure 4 shows the location of the Bruce A station intake entrainment sampling point. *The engineered catwalk was originally constructed as a survey point to obtain water temperature data from the intake forebay. Samples collected at the engineered catwalk location will be assumed to be representative of the larval fish composition in the forebay due to mixing of the cooling water between the intake tunnel outlet and the forebay.* Cooling water enters the forebay from an underground intake tunnel via a vertical riser, causing turbulent upwelling. Because of the intake channel design and large water volumes, cooling waters are well-mixed and velocities are predicted to exceed the swimming capability of larval fish. Therefore, vertically stratified sampling techniques are not proposed. *Sampling at the end of the forebay in the vicinity of the vertical riser, as conducted in 2004, is not currently planned as a health and safety risk analysis completed by Golder and Bruce Power indicated that sampling from the catwalk is the safer option.*" [p. 23] **UG Team Evaluation of BP Response:** Unsatisfactory. The concerns regarding representivity of spatial sampling of entrainment in the forebay remain outstanding.	The concerns regarding representivity of spatial sampling of entrainment in the forebay remain outstanding.	**No additional change to the I&E Plan is required.** Safety concerns have resulted in Bruce Power revising the sampling location. We now expect to conduct entrainment sampling from a catwalk further downstream. This catwalk spans the entire forebay. We may be able to sample at various locations in one cross-section of the intake forebay, in order to address concerns about the appropriateness of the sampling location. This will be determined as entrainment sampling protocols are developed and revised through in-field experience. However, the primary factors that determine the sampling location are safety and feasibility.
134	"*Because of the intake channel design and large water volumes, cooling waters are well-mixed thereby negating the need for stratified sampling techniques.*" This assumption is critical to the representivity of entrainment sampling, and must be tested before relying on it as a truth. **BP Response:** None.	This assumption is critical to the representivity of entrainment sampling, and must be tested before relying on it as a truth.	**No additional change to the I&E Plan is required.** To our knowledge, the assumption that the intake waters are well-mixed is a reasonable one, due to the water velocity being substantially greater than larval swimming speeds. Testing the assumption is extremely challenging due to safety concerns when working near the intake forebay. Safety concerns have resulted in Bruce Power revising the sampling location. We now expect to conduct entrainment sampling from a catwalk further downstream. This catwalk spans the entire forebay. Based on the current planned location of entrainment sampling, we may be able to sample at various locations in a single cross-section. This will be determined as entrainment sampling protocols are developed and revised through in-field experience.
135	"*…a pump-in-net design, and withdrew water from one point in the water column (approximately 3 m below water surface).*" Crawford (UofG) served as an SON participant in the 2004 entrainment study, and has first-hand knowledge that the pump intake was moving vigorously near the upper waters of the forebay, and was not consistently sampling "approximately 3 m below water surface." **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power understands that vibration was an issue with the previous entrainment study. The I&E Plan proposes improvements on the previous entrainment protocol.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
136	Sampling in one location may not be representative. Furthermore, assuming that sampling in one location is representative, sampling at 3m below the surface only should be reconsidered. Samples taken at the surface, and at multiple levels below the surface are recommended. The existing structure will only inform the study as to the expected entrainment associated with larvae that pass through the water column at 3m below the surface. **BP Response:** None.	Samples taken at the surface, and at multiple levels below the surface are recommended.	**No additional change to the I&E Plan is required.** Safety concerns have resulted in Bruce Power revising the sampling location. We now expect to conduct entrainment sampling from a catwalk further downstream. This catwalk spans the entire forebay. Based on the current planned location of entrainment sampling, we may be able to sample at various locations in a single cross-section. This will be determined as entrainment sampling protocols are developed and revised through in-field experience.
137	The assumption that the cooling waters are well-mixed should be verified. If this is already known, what statistical methods were used to verify/support this statement?	No change recommended.	**No additional change to the I&E Plan is required.** Safety concerns have resulted in Bruce Power revising the sampling location. We now expect to conduct entrainment sampling from a catwalk further downstream. This catwalk spans the entire forebay. Based on the current planned location of entrainment sampling, we may be able to sample at various locations in a single cross-section. This will be determined as entrainment sampling protocols are developed and revised through in-field experience.
138	"*In the 2004 entrainment study [Bruce Power 2005b], entrainment sampling was conducted at the upstream end of the forebay, using a pump-in-net design, and withdrew water from one point in the water column (approximately 3 m below water surface).*" How was the location of sampling (upstream end of the forebay) selected for the 2004 study? How come only one location in the water column will be sampled? How do the hydrodynamics in the forebay affect the vertical distribution of larval fish? If there is hydrodynamic influence on distribution of fish larvae with depth, how will this one sampling point be extrapolated for the entire water column? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** It is our understanding that the 2004 sampling location was chosen in order to ensure sampling was done at a location which had sufficient turbulence to ensure no vertical stratification of larval fish. At this time, Bruce Power has safety concerns regarding revisiting the location selected previously. We assume that intake forebay waters are well-mixed. However, based on the current planned location of entrainment sampling, we may be able to sample at various locations in a single cross-section. This will be determined as entrainment sampling protocols are developed and revised through in-field experience.
139	"*Cooling water enters the forebay from an underground intake channel via a vertical riser, causing turbulent upwelling. Because of the intake channel design and large water volumes, cooling waters are well-mixed thereby negating the need for stratified sampling techniques.*" Are the cooling waters throughout the entire intake forebay well-mixed? How has this been confirmed through hydrodynamic sampling or modeling? Does the mixing of the cooling water infer that the distribution of larval fish with depth is relatively uniform? Are there any "dead zones" in the forebay where fish with sufficient swimming ability could persist? Do the hydrodynamic patterns in the forebay vary depending on the number of pumps operating and their pumping rates? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** We assume that the intake forebay water is well-mixed throughout. However, based on the current planned location of entrainment sampling, we may be able to sample at various locations in a single cross-section. This will be determined as entrainment sampling protocols are developed and revised through in-field experience. It is possible for large fish to persist within the intake forebay. However, we assume that these fish will eventually die and be impinged.
140	"*Volume of circulating water or flow rate (based on the number of circulating water pumps in operation, and the pumping rates);*" Is it possible to gain more accurate assessment of the flow dynamics in the forebay through conducting measurements of velocity fields (i.e., with use of an acoustic Doppler current profiler)? Are there any other factors besides the number of pumps in operation and pumping rates that could affect the hydrodynamic patterns in the forebay? How could these be accounted for in sampling design? If the pump operating conditions are variable then this needs to be accounted for in sampling design in order to conduct entrainment sampling for the diverse hydrodynamic regimes in the forebay (i.e., conduct sampling for all different pump operating conditions/combinations). **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** We agree that an ADCP could conceivably be used to measure water velocity. However, safety concerns make it extremely unlikely that Bruce Power would be able to complete a study of water velocity throughout the entire volume of the intake forebay. Pumps and pumping rates are the primary determinants of water velocity in the intake. Pump operating conditions will vary throughout the entrainment sampling. These conditions will be noted and taken into account during the analysis. Bruce Power will not commit to deliberately varying pumping rates for the purposes of entrainment sampling.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
141	"*Air temperature and weather conditions at the beginning, mid-point, and end of the 24-hour sampling period;*" How are air temperatures and weather conditions being recorded? Is it possible to obtain a recording of the weather conditions throughout the entire duration of the 24-hour sampling period to gain greater accuracy for daily variation of these conditions? **BP Response:** None. This point has been moved to Section 4.3.2.6 (Water Quality) on p. 29.	No change recommended.	**No additional change to the I&E Plan is required.** Air temperature will be measured with a thermistor. Weather conditions will be provided from a Bruce Power meteorological station. Bruce Power does not expect to add value to the collected data by considering more fine-grained meteorological data with respect to the I&E Plan.
142	"*Water temperature, wave height, wind direction, and wind speed for a period of 2 days prior to and during a sampling event.*" The proposed source for water temperature, wave height, wind direction and wind speed (i.e., at a buoy located in the middle of Lake Huron) is not likely representative of the conditions in the region directly offshore of the Bruce Power nuclear generating station Hydrodynamic and meteorological data at the site should be obtained in order to accurately quantify conditions at the site and relate those conditions to observed patterns of distribution and abundance of larval and adult fish Deploying appropriate instrumentation in the region directly offshore of the facility will more accurately evaluate these conditions and produce more meaningful results **BP Response:** This point has been moved to Section 4.3.2.6 (Water Quality) on p. 29. The sentence has been changed as follows: "Water temperature, wave height, wind direction, and wind speed for a period of *3 days* prior to and during the sampling event;" [p. 29] Source for weather and wind data has been re-worded as being from: "Weather and wind data will be obtained from online sources (e.g., Environment Canada and WindFinder). Water quality data will be used during data analysis to determine if patterns exist between the measured abiotic parameters and impingement, entrainment, or source water data." [p. 29] There is no longer a link to the buoy located in the middle of Lake Huron. **UG Team Evaluation of BP Response:** Unsatisfactory. The geographic location of the data from the "online sources" remains unclear. Where are these data located geographically? Is Are the data representative of the conditions at site?	No change recommended.	**No additional change to the I&E Plan is required.** The data proposed to be collected is expected to be reliable and representative, despite not being collected in close proximity to Douglas Point. Bruce Power does not expect to add value to the data collected by deploying a wave monitoring buoy near Douglas Point.
143	As discussed above, the USEPA 316(b) document makes explicit reference to the requirement for "Source Water Physical Data" that are "*needed to characterize the facility and evaluate the type of waterbody and species affected by the cooling water intake structure*" and "Cooling Water Intake Structure Data" that are needed "*characterize the cooling water intake structure and evaluate the potential for impingement and entrainment of aquatic organisms. Information on the design of the intake structure and its location in the water column will allow the permit writer to evaluate which species or life stages would potentially be subject to impingement and entrainment.*" **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** The US EPA requirements were reviewed during preparation of the I&E Plan. The Reviewers have not proposed a specific change to the I&E Plan.
144	As discussed above, the UofG Research Program has a strong emphasis on the collection and analyses of hydrodynamic data to support the kinds of requirements for information about water flow and entrainment/impingement risks for fishes, including the three identified VEC species. The E/I Monitoring Plan will need to be much more explicit in it's treatment of these hydrodynamic analyses. **BP Response:** None.	The E/I Monitoring Plan will need to be much more explicit in it's treatment of these hydrodynamic analyses.	**No additional change to the I&E Plan is required.** Bruce Power has committed to a partnership with SON to enhance and extend research related to potential impacts on Lake Whitefish. When research data is available from that initiative, it will be evaluated and may be used to inform the EA FUP.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
145	Assessing the data at multiple scales is highly recommended. It is suggested that relevant Time Series methods be used to determine/account for any autocorrelation, and to potentially determine annual, seasonal, diel level patterns. Further, the data might best indicate the temporal scale that is most appropriate, and this may include other scales. A full temporal analysis is recommended. It is also recommended that temporal analysis incorporate variables to account for fish presence variability. This should include main effects, and tests for interactions between variables (i.e., simple effects). **BP Response:** None.	A full temporal analysis is recommended. It is also recommended that temporal analysis incorporate variables to account for fish presence variability.	**No additional change to the I&E Plan is required.** Relevant temporal analysis will be considered during the analysis phase.
146	"*It is assumed that larval fish populations will fluctuate on an annual basis due to a number of biotic and abiotic factors, including adult year-class variations, weather patterns and lake-wide water movement, and changes to habitat or the fish community composition (e.g., new invasive species, increases/decreases in predators). These inter-annual fluctuations can lead to large differences in annual entrainment at a given plant intake*" While these seem to be reasonable hypotheses, the E/I plan should provide references in support. **BP Response:** None.	While these seem to be reasonable hypotheses, the E/I plan should provide references in support.	**No additional change to the I&E Plan is required.** Appropriate citations will be included during reporting.
147	"*therefore, it is important to have more than one year of baseline data to better estimate baseline annual entrainment.*" The length of baseline time series needs to be considered by more rigorous statistical methods that consider variation of the data and the intended use of the time series. A much higher level of rigour is required on this issue. **BP Response:** This sentence was altered slightly (removing the word baseline) to read: "therefore, it is important to have more than one year of data to better estimate annual entrainment." [p. 26] **UG Team Evaluation of BP Response:** Unsatisfactory. The length of baseline time series needs to be considered by more rigorous statistical methods that consider variation of the data and the intended use of the time series. A much higher level of rigour is required on this issue.	The length of baseline time series needs to be considered by more rigorous statistical methods that consider variation of the data and the intended use of the time series.	**No additional change to the I&E Plan is required.** Entrainment effort was planned according to the method described on p. 28. Note that the EA FUP includes substantially more effort than previous entrainment monitoring program. Results will be reported annually. The ultimate duration of the entrainment program will be based on those results, subject to endpoints to be determined in consultation with regulators and stakeholders.
148	"*an initial two years of entrainment monitoring is recommended following the start of the Operations Phase. If entrainment of lake whitefish larvae is greater than the threshold effect following two years of monitoring, and in consultation with agencies and stakeholders, entrainment monitoring could continue for additional years until an index of population size/entrainment impacts are established.*" How do we know that an initial two years is sufficiently long to establish a baseline upon which to make sampling design decisions? As discussed above, there are serious concerns with the undefined "threshold effect." As discussed above, there are important issues for determining who (i.e. SON) will be consulted for these kinds of in-program design decisions. It is not clear what is meant by "an index of population size/entrainment impacts" or why this index would be an appropriate measure of entrainment effect. How will we know how many additional years of sampling would be appropriate to achieve the objective? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Note that the EA FUP includes substantially more effort than previous entrainment monitoring program. Results will be reported annually. The ultimate duration of the entrainment program will be based on those results, subject to endpoints to be determined in consultation with regulators and stakeholders.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
149	"*It is assumed that larval fish populations will fluctuate on an annual basis due to a number of biotic and abiotic factors, including adult year-class variations, weather patterns and lake-wide water movement, and changes to habitat or the fish community composition (e.g., new invasive species, increases/decreases in predators).*" In order to be able to be able to predict what impact future hydrodynamic/water circulation patterns in the lake (i.e., such as those brought about by climate change) will have on patterns of distribution and abundance of fish it is necessary to directly relate fish sampling results with accurate hydrodynamic measurements in the direct region. Application of a computational model (such as ELCOM-CAEDYM for the offshore hydrodynamics or FLOW-3D for forebay hydrodynamics) would allow for more accurate assessment of variation of hydrodynamic pattern, such as variation due to variability in wind-induced currents, storm surge or seiche events and thermal (density-driven) flows (such as the influence of the thermal discharge plume on nearshore lake movement). Different climatic scenarios could be simulated from the application of such a model, allowing for extrapolation to future weather and hydrodynamic conditions. **BP Response:** None.	In order to be able to be able to predict what impact future hydrodynamic/water circulation patterns in the lake (i.e., such as those brought about by climate change) will have on patterns of distribution and abundance of fish it is necessary to directly relate fish sampling results with accurate hydrodynamic measurements in the direct region.	**No additional change to the I&E Plan is required.** EA FUP monitoring is intended to determine whether the predictions of the EA are valid. Future weather and hydrodynamic conditions, caused by climate change or other impacts, may be considered by other Bruce Power programs. However, these concerns are outside the scope of the EA FUP.
150	"*According to Becker [1983], lake whitefish spawns from October to December in the Great Lakes, with larvae emerging in March or early April and deepwater sculpin likely spawn year-round in the Great Lakes.*" There is a much more literature regarding life-history and ecology of lake whitefish (including for Lake Huron) that should be considered in this regard. As discussed above, the E/I Monitoring "*Diel, meaning daily, variability in larval fish populations may be due to the distribution of food resources, water temperatures, and weather/water movement patterns. Two important factors to consider are diel vertical migration (DVM) and larval drift. DVM describes the process where many larval fishes and zooplankton (an important larval fish food source) will migrate to different depths throughout the day, with larval fish often found near the surface at night and lower in the water column during the day [Hensler and Jude 2007]. Larval drift refers to larval fish movement in flowing water. As observed by Winnell and Jude [1991], larval drift is often greater at night than during the day as well. These studies show that larval fish movement within the water column varies throughout the day in all types of systems and therefore, entrainment sampling both during the day and at night is recommended to provide the best estimate of entrainment.*" (p.11) Plan should make much more extensive use of the OPG-Nawash-BP WINGS Project which has already compiled and interpreted most of this literature: Holmes, J.A., Noakes, D.L.G., Crawford, S.S., and Wismer, D.A. 2002. Lake whitefish and round whitefish biology: a review of ecological factors important to growth, survival, and reproduction, Report prepared in support of Whitefish Interactions with Nuclear Generating Stations (WINGS) for Ontario Power Generation Nuclear, Chippewas of Nawash First Nation and Bruce Power. Axelrod Institute of Ichthyology, University of Guelph, Guelph, Ontario, Canada., Guelph, ON **BP Response:** None.	Plan should make much more extensive use of the OPG-Nawash-BP WINGS Project which has already compiled and interpreted most of this literature.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The WINGS report was considered during the development of the plan, as noted on p. 15. Therefore, the Bruce Power response should be considered "Satisfactory."
151	It should be noted that Clayton Coppaway and Lauren Overdyk (UofG Grad Student, Whitefish Population Discrimination and Entrainment Research Projects respectively, SON-BP Collaborative Whitefish Research Program), are undertaking comprehensive reviews of lake whitefish life-history and ecology, specifically associated with BNGS entrainment and impingement. These review/evaluation should be considered when developing operational definitions of entrainment/impingement for the E/I Monitoring Plan. **BP Response:** None.	These review/evaluation should be considered when developing operational definitions of entrainment/impingement for the E/I Monitoring Plan.	**No additional change to the I&E Plan is required.** Bruce Power has committed to a partnership with SON to enhance and extend research related to potential impacts on Lake Whitefish. When research data is available from that initiative, it will be evaluated and may be used to inform the EA FUP.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
152	"*Limited historic entrainment data from Bruce A and Bruce B stations for both species indicates that ... lake whitefish larvae appear most susceptible to entrainment in May and early June.*" It is important to cite specifically which limited data were analysed to reach this conclusion. Despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation associated with the historical Bruce A and Bruce B entrainment sampling, as had been requested. **BP Response:** None.	It is important to cite specifically which limited data were analysed to reach this conclusion.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The relevant studies are cited on p. 27. Therefore, the Bruce Power response should be considered "Satisfactory." We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests.
153	"*Based upon these historic entrainment results and the life history of lake whitefish and deepwater sculpin, entrainment sampling is recommended throughout the year, with increased frequency in the spring and early summer when lake whitefish and deepwater sculpin are most likely to be present in the vicinity of the Bruce A station intake structure.*" This aspects of the entrainment sampling design needs to be based on a more rigorous consideration of existing information regarding lake whitefish life history and previous entrainment sampling (no matter how limited) at the BNGS. How will we know how much "increased frequency" of sampling in spring and early summer will be appropriate? **BP Response:** None.	This aspects of the entrainment sampling design needs to be based on a more rigorous consideration of existing information regarding lake whitefish life history and previous entrainment sampling (no matter how limited) at the BNGS.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The weighting of effort for entrainment sampling is in consideration of Lake Whitefish, as well as other spring spawners that may be in the source water. Additionally, cost was a factor. Therefore, the Bruce Power response should be considered "Satisfactory."
154	"*Diel, meaning daily, variability in larval fish populations may be due to the distribution of food resources, water temperatures, and weather/water movement patterns. Two important factors to consider are diel vertical migration (DVM) and larval drift. DVM describes the process where many larval fishes and zooplankton (an important larval fish food source) will migrate to different depths throughout the day, with larval fish often found near the surface at night and lower in the water column during the day [Hensler and Jude 2007].*" It is inappropriate to use ther term 'populations' with regard to larval fish, since this represents only one developmental component of a biological population in question. How do we know that DVM is an important factor in lake whitefish larval ecology (Hensler and Jude is a paper on round goby ecology)? As discussed above, a more rigorous treatment of the literature, including the WINGS reviews and current UofG reviews, is required. **BP Response:** The word "populations" was removed from the first sentence. The sentence now reads: "Diel, meaning daily, variability in larval fish may be due to the distribution of food resources, water temperatures, and weather/water movement patterns." [p. 27] No response with regard to importance of DVM in lake whitefish larval ecology, or mention of WINGS and/or current UofG reviews. **UG Team Evaluation of BP Response:** Unsatisfactory. Simply removing the word 'populations' has done nothing to address the issues and concerns that remain outstanding on this issue.	Simply removing the word 'populations' has done nothing to address the issues and concerns that remain outstanding on this issue.	**No additional change to the I&E Plan is required.** The statement questioned by the Reviewers is intended to mention, in a broad sense, that diel vertical migration exists. The sampling plan includes daytime and nighttime sampling in order to capture potential variation.
155	"*Larval drift refers to larval fish movement in flowing water. As observed by Winnell and Jude [1991], larval drift is often greater at night than during the day as well. These studies show that larval fish movement within the water column varies throughout the day in all types of systems and therefore, entrainment sampling both during the day and at night is recommended to provide the best estimate of entrainment.*" The Winnell and Jude (1991) study was performed in a large river (St. Marys) and did not capture larvae for lake whitefish (or any of the other VEC species for BNGS). How do we know that lake whitefish larvae exhibit larval drift or "movement in the water column" (diel or otherwise)? How do we know that it is important to sample during both day and night? Once again, a much more rigorous treatment of the literature is required. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** The presence of larval drift is general knowledge, and specific citations for Lake Whitefish or other specific species are not required.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
156	"*Diel, meaning daily, variability in larval fish populations may be due to the distribution of food resources, water temperatures, and weather/water movement patterns.*" How will the influence of weather/water movement patterns be related to results from the larval fish sampling? In order to gain inference about the influence of daily variation in hydrodynamics/water patterns on patterns of distribution and abundance of fish it is imperative to have direct sampling of hydrodynamics concurrent with entrainment sampling, or a numerical model of the hydrodynamics in the forebay, to be able to understand how hydrodynamics would vary due to water movement, weather conditions, number of pumps in operation, pumping rate, etc. **BP Response:** None.	In order to gain inference about the influence of daily variation in hydrodynamics/water patterns on patterns of distribution and abundance of fish it is imperative to have direct sampling of hydrodynamics concurrent with entrainment sampling, or a numerical model of the hydrodynamics in the forebay, to be able to understand how hydrodynamics would vary due to water movement, weather conditions, number of pumps in operation, pumping rate, etc.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Environmental variables will be considered when analyzing results for larval fish densities, as noted in the Plan. Therefore, the Bruce Power response should be considered "Satisfactory." Hydrodynamic modeling is outside the scope of the EA FUP.
157	"*Two important factors to consider are diel vertical migration (DVM) and larval drift. DVM describes the process where many larval fishes and zooplankton (an important larval fish food source) will migrate to different depths throughout the day, with larval fish often found near the surface at night and lower in the water column during the day [Hensler and Jude 2007]. Larval drift refers to larval fish movement in flowing water. As observed by Winnell and Jude [1991], larval drift is often greater at night than during the day as well. These studies show that larval fish movement within the water column varies throughout the day in all types of systems and therefore, entrainment sampling both during the day and at night is recommended to provide the best estimate of entrainment.*" How will BP gain a better understanding of the diel vertical migration and larval drift in order to extrapolate sampling results for the entire water column as well as for horizontal dispersal? Application of a coupled hydrodynamic-ecological numerical model (such as ELCOM-CAEDYM) would assist in gaining a better understanding of the relationship between hydrodynamics and biological behaviour of the fish in order to produce more accurate extrapolations for the entire water column. **BP Response:** None.	Application of a coupled hydrodynamic-ecological numerical model (such as ELCOM-CAEDYM) would assist in gaining a better understanding of the relationship between hydrodynamics and biological behaviour of the fish in order to produce more accurate extrapolations for the entire water column.	**No additional change to the I&E Plan is required.** Conducting larval tows at different depths in the water column is difficult. For practical considerations, Bruce Power therefore assumes that larval tows will have an equal chance of capturing larval fish at all depths in the water column. It is not expected that numerical modeling will provide additional value to the data collected through the I&E Plan.
158	"*Neither lake whitefish nor deepwater sculpin were present in Bruce A station entrainment samples in 2001 or 2004. However, deepwater sculpin has been present in entrainment samples at the Bruce A station historically (i.e., 1977 and 1985/86) and both species were present during an entrainment study conducted in 1989 at the Bruce B station [King 1992]. Six lake whitefish larvae were also captured during entrainment sampling at the Bruce B station in 2001 [Patrick et al. 2002].*" Despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation associated with the 1977, 1985/86, 1989, 2001, 2004 Bruce entrainment data, as had been requested. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests.
159	As discussed above, the lack of lake whitefish larvae in previous entrainment samples may be associated with lack of representivity in the sampling design/effort. A comprehensive review of these previous sampling programs is required before making any conclusions about future entrainment sampling designs. **BP Response:** None.	A comprehensive review of these previous sampling programs is required before making any conclusions about future entrainment sampling designs.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Previous sampling programs were reviewed in development of the I&E Plan. The relevant reports have been cited in the I&E Plan. Therefore, Bruce Power's response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
160	"*Following these studies, and in review of the 2008 Work Plan, the CNSC inquired about the likelihood of detecting deepwater sculpin and lake whitefish in entrainment samples if they are truly present in the Bruce A station intake. Because lake whitefish and deepwater sculpin larval densities are not currently known for Lake Huron in the vicinity of the Bruce Power site, an evaluation of several possible scenarios to determine the estimated amount of sampling needed to detect larvae of these species at various assumed densities are provided below.*" The CNSC inquiry is based on the same sampling design issues that the UofG Team has expressed. It is important to incorporate a statistically-defensible sampling program for larvae in source waters, and this in turn requires hydrodynamic modelling of entrainment risk regions -as discussed above and as incorporated into the UofG Research Program. **BP Response:** None.	It is important to incorporate a statistically-defensible sampling program for larvae in source waters, and this in turn requires hydrodynamic modelling of entrainment risk regions -as discussed above and as incorporated into the UofG Research Program.	**No additional change to the I&E Plan is required.** A sampling frequency analysis was undertaken for source water sampling, which included a review of relevant literature (Cyr, *et al.*, 1992; EPRI 2004; EPRI 2005). In order to achieve a target coefficient of variation of 0.2 (20%), a minimum of 100 larval tow samples will be required. Hydrodynamic modeling is outside the scope of the EA FUP. Bruce Power has committed to a partnership with SON to enhance and extend research related to potential impacts on Lake Whitefish. When research data is available from that initiative, it will be evaluated and may be used to inform the EA FUP.
161	"*an evaluation of several possible scenarios to determine the estimated amount of sampling needed to detect larvae of these species at various assumed densities are provided below.*" The UofG Team is highly skeptical of any such 'scenarios' that are based on the results of previous entrainment sampling programs that are in turn highy questionable. BP Response: None	No change recommended.	**No additional change to the I&E Plan is required.** The Reviewers have not proposed a specific modification to the I&E Plan. However, we note that the sampling effort in this plan is substantially greater than in previous monitoring programs.
162	Despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation associated with the 1988/89, 2001, 2004 Bruce entrainment data, as had been requested. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests.
163	The UofG Team is highly skeptical of the accuracy and precisions of these estimated entrainment larval densities, and the assumptions used in the calculation of water volume required to be sampled per individual larva. A much more rigourous review and analysis of previous entrainment sampling programs would be required before any such projections could be considered. **BP Response:** None.	A much more rigourous review and analysis of previous entrainment sampling programs would be required before any such projections could be considered.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The previous programs were considered in developing the I&E Plan and have been cited in the text. Therefore, the Bruce Power response should be considered "Satisfactory."
164	"*In 2004, an estimated 3,120 m3 of the Bruce A station intake water was sampled during entrainment studies, resulting in the collection of 12 larval fish [Golder Associates 2005]. Overall, this is a larval density of 3.8x10-3 fish per m3.*" How were these data collected? How does 3,120 m3 compare to the total intake? That is, were the samples representative? Given that previous sampling occurred at one point in the water column, how might the estimated time requirements (highlighted in Table 1) change? Since the data collection method described involves one point in space, over several time periods, the data that are collected will not be representative of the entire water column. The data will be longitudinal in nature, with inherent autocorrelation structures; how are these to be addressed? Further, should the sampling method be updated to include multiple points in the water column, a spatial and temporal structure will exist. How might this spatial and temporal structure be addressed? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power assumes that the 2004 data is representative in terms of time and space. The current sampling effort will be adequate to capture larval fish even if total larval densities are 50 times less than measured previously. The intake for Bruce A with all 4 units operational is approximately 175 m^3/s. Very approximately, the volume sampled in 2004 corresponds to one-millionth ($6x10^{-7}$) of the annual intake volume with all 4 units operational at Bruce A. Temporal and spatial effects may be considered during the analysis. However, the primary goal is to estimate the total numbers of fish that may be impinged or entrained per unit time.
165	"*Because no lake whitefish or deepwater sculpin larvae were actually captured in 2004, it is assumed that the actual lake whitefish and deepwater sculpin larval density was less than 7.6x10-4 larvae per m3.*" This may not be valid. The observed result might be a case where sampling occurred when larvae were not present, but other non-sampled times could have had a much greater density than this. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power is aware of the potential limitations of the data. We have therefore increased sampling effort. Additionally, limitations and assumptions will be described in the annual report.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
166	As discussed above, this approach to sample design is extraordinarily weak, due to (a) high dependence on questionable sampling effort projections, (b) arbitrary stratification of sampling periods, and (c) arbitrary allocation of sampling effort per sampling period. A much more rigourous approach is required to develop a biologically-and statistically-defensible entrainment sampling program. **BP Response:** None	A much more rigourous approach is required to develop a biologically-and statistically-defensible entrainment sampling program.	**No additional change to the I&E Plan is required.** The Reviewers have not identified additional points of concern or proposed changes with Comment #166. As noted previously, Bruce Power sampling efforts are based on previous data (with substantial increase in effort) and allocation of effort based on biological considerations (i.e., spring spawning).
167	As discussed above, this approach to sample design is extraordinarily weak, due to (a) high dependence on questionable sampling effort projections, (b) arbitrary stratification of sampling periods, and (c) arbitrary allocation of sampling effort per sampling period. A much more rigourous approach is required to develop a biologically-and statistically-defensible entrainment sampling program. **BP Response:** None.	A much more rigourous approach is required to develop a biologically-and statistically-defensible entrainment sampling program.	**No additional change to the I&E Plan is required.** Comment #167 is identical to Comment #166. The Reviewers have not identified additional points of concern or proposed changes with Comment #166. As noted previously, Bruce Power sampling efforts are based on previous data (with substantial increase in effort) and allocation of effort based on biological considerations (i.e., spring spawning).
168	"*If additional entrainment monitoring will be required beyond the first two years (e.g., if entrainment impacts are greater than the determined effect threshold), the number of annual entrainment sampling events may be modified based upon the results of the first two years.*" As discussed above, the E/I Monitoring Plan needs to be much more explicit about the process whereby the duration of entrainment sampling is determined and/or extended. **BP Response:** None.	The E/I Monitoring Plan needs to be much more explicit about the process whereby the duration of entrainment sampling is determined and/or extended.	**No additional change to the I&E Plan is required.** The I&E Plan is clear that discussion of thresholds and endpoints will continue with regulators and stakeholders.
169	"*The proposed sampling events will provide a more comprehensive picture of larval entrainment throughout the year, with increased sampling occurring during portions of the year where historic entrainment has occurred and decreased sampling during portions of the year when little to no egg or larval entrainment is expected.*" This sentence does not make much sense. Simply because the proposed sampling effort is greater (presumably compared to historical entrainment sampling programs), does not mean that the proposed sampling effort is sufficient to satisfy the program objective(s). Decreasing sampling effort based on 'expectations' based on questionable previous sampling efforts is not appropriate. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Sampling effort must balance effort (cost) with the value of the data obtained. It is not biologically plausible that significant numbers of embryos will be entrained at certain times of year, so sampling effort has been reduced for those times. Note that, overall, sampling effort is substantially increased in comparison to previous studies.
170	"*For documentation purposes, it is important to sample even in periods where no entrainment is anticipated.*" This statement suggest that there has been a fundamental misunderstanding of statistical sampling design in the E/I Monitoring Plan. The distribution of sampling effort is much more important than simply satisfying the need for 'documentation.' A much more rigorous approach is required to develop a biologically-and statistically defensible entrainment sampling program. **BP Response:** None.	A much more rigorous approach is required to develop a biologically-and statistically defensible entrainment sampling program.	**No additional change to the I&E Plan is required.** Sampling effort must balance effort (cost) with the value of the data obtained. It is not biologically plausible that significant numbers of embryos will be entrained at certain times of year, so sampling effort has been reduced for those times. Note that, overall, sampling effort is substantially increased in comparison to previous studies.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
171	How does the author figure that the daily sampling times (0400, 1000, 1600, 2000) are "evenly spaced" when self-evidently they are not evenly spaced? How do we know that four samples per day and these specific times of day are appropriate for the entrainment sampling program? How do we know that 2 hours of pumping is appropriate for each sample? **BP Response:** The sentence has been slightly altered to include the word "relatively", now reading (italics added to emphasize change): "our entrainment samples are scheduled to be collected during each 24-hour period (i.e., each sampling event) at approximately 0400, 1000, 1600, and 2000, *and relatively* evenly spaced during the day to provide two samples during daytime and two samples during night-time hours." [p. 29] **UG Team Evaluation of BP Response:** Unsatisfactory. The BP Response address the scheduling portion of the comment. However, it is still unclear whether or not this level of sampling is appropriate.	No change recommended.	**No additional change to the I&E Plan is required.** The text has been amended to indicate that the sampling times are approximately evenly spaced. Note that spacing is determined in part by scheduling considerations. It is not known which specific times of day, if any, are most appropriate for entrainment sampling. However, the times chosen will provide sampling during daytime and nighttime. Pumping will not be used.
172	"*Sampling effort may depend on the amount of extraneous material being pumped into the collection net and where the sampling period must be decreased then the period of pumping and volume pumped will be determined.*" This is not a sentence. What is meant by "extraneous material?" Why does the amount of "extraneous material" require decrease in sampling effort (time?). **BP Response:** Sentence has been altered slightly to include the two sampling methods, now reading: "Sampling effort may depend on the amount of extraneous material being pumped into *or filtered through* the collection net and where the sampling period must be decreased then the period of *collection and volume sampled* will be determined." [p. 29] **UG Team Evaluation of BP Response:** Unsatisfactory. The issues and concerns regarding sampling effort remain outstanding.	No change recommended.	**No additional change to the I&E Plan is required.** If the net is clogged with extraneous material (i.e., algae), then the net will no longer function as an effective means of capturing larval fish. Therefore, sampling time may need to be reduced if extraneous material is a concern.
173	How do we know that 250 – 450 m3 of water collected during each sampling event will be appropriate to satisfy the entrainment sampling objective? **BP Response:** None. This section has now been moved to Section 4.3.2.5 (Sampling Magnitude) on p. 29.	No change recommended.	**We disagree with the reviewer's disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Sampling effort was determined using scenarios presented on p. 28. Therefore, the Bruce Power response should be considered "Satisfactory."
174	Sampling magnitude is a function of several variables, including weather conditions, water flow, etc. Since this value will vary throughout the sampling efforts, it should be recorded as a potential covariate, and used to standardize the findings. **BP Response:** None.	Since this value will vary throughout the sampling efforts, it should be recorded as a potential covariate, and used to standardize the findings.	**No additional change to the I&E Plan is required.** The weather conditions and water flow will be recorded. See, for example, p. 29: "Water quality data will be used during data analysis…" The sampling magnitude is function of water volume. It is not a function of weather.
175	Are there *a priori* hypotheses about cause-effect relationships between abiotic factors (water quality, environmental conditions) in the source water or forebay, and entrainment and/or impingement of fishes? What patterns would be predicted? How would the existence of patterns affect the E/I Monitoring Plan or its conclusions? **BP Response:** None. This section has been moved to Section 4.3.2.6 (Water Quality) on pg. 29.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power has not developed *a priori* hypotheses regarding relationships between abiotic factors and impingement/entrainment. These potential relationships will be explored through statistical analysis.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
176	How do we know that the first entrainment sampling period of each sampling event (is the 0400 sample?) is the most appropriate sample for survival studies? **BP Response:** Entrainment survival studies have been replaced by live/dead determinations. This now forms Section 4.3.2.1.3 (Live/Dead Determinations) on p. 25. "For entrainment sampling in 2012, live/dead determinations will replace entrainment survival studies that were originally proposed at the discharge due to the possibility that all larval fish and eggs entering the forebay do not survive their trip through the intake structure. If results from live/dead determinations reveal that a portion of the entrained larvae/eggs are still alive/viable upon reaching the intake forebay, the inclusion of entrainment survival studies at the discharge, after passing through the plant, will be re-evaluated for 2013." [p. 25] **UG Team Evaluation of BP Response:** Unsatisfactory. It is unclear what is meant by a live/dead determination. The scheduling and sampling of mortality assessments remains a major uncertainty.	It is unclear what is meant by a live/dead determination. The scheduling and sampling of mortality assessments remains a major uncertainty.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan provides a very detailed explanation of the methodology for live/dead determination (see p. 25). Live/dead determinations will be performed on all larval fish and eggs. Therefore, the Bruce Power response should be considered "Satisfactory."
177	"*Due to the potential challenge of collecting adequate larval fish from both the forebay and the discharge during a given event, survival studies will be attempted during likely peak entrainment periods with the goal of completing at least three successful survival studies for fish from the discharge channel and from the intake forebay at the locations shown on Figure 3.*" This sentence does not make sense, and is problematic for several reasons. First, the "potential challenge" of sampling the forebay and discharge should be taken into account with the workplan, rather that artificially constraining the sampling design. Second, as discussed above, how do we know when "peak entrainment periods" are really likely to be? Third, how do we know that three "survival studies" will be appropriate to satisfy the objective? Fourth, both the forebay and discharge "sampling points" shown in Figure 3 are at the most extreme upstream positions possible. How do we know that these are the most appropriate sampling locations? **BP Response:** See UG-176. Details on live/dead determinations are given by: "Live/dead determinations will be completed on all larval fish and eggs captured during entrainment sampling. Live/dead determinations will be performed on fish/eggs captured from either of the entrainment sampling methods (i.e., pump-in-net and plankton/bongo net)." [p. 25] **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan provides a very detailed explanation of the methodology for live/dead determination (see p. 25). Live/dead determinations will be performed on all larval fish and eggs. Therefore, the Bruce Power response should be considered "Satisfactory."
178	Andrew Binns (UofG Post-Doctoral Fellow, SON-BP Collaborative Whitefish Research Program) has been assigned responsibility to develop and undertake hydrodynamic mapping of the BNGS forebays and discharge channels to quantitatively identify and describe water flow patterns that must be taken into account when selecting representative forebay and discharge sampling location(s). The spatio-temporal definition of these representative sampling locations needs to be considered in the E/I plan. **BP Response:** None.	The spatio-temporal definition of these representative sampling locations needs to be considered in the E/I plan.	**No additional change to the I&E Plan is required.** Bruce Power has committed to a partnership with SON to enhance and extend research related to potential impacts on Lake Whitefish. When research data is available from that initiative, it will be evaluated and may be used to inform the EA FUP.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
179	"*Larval fish will be collected for survival studies using a 300 µm mesh plankton net deployed in the upstream end of the intake forebay for approximately 10 minutes at a time, if possible. If flow rates prohibit the use of a plankton net in the upstream end of the forebay, alternate locations within the forebay or alternate collection methods will be pursued (e.g., pump-in-net).*" The issue of whether plankton nets can be effectively deployed in the forebay/disharge needs to be identified as a separate key uncertainty, in conjunction with the forebay/discharge hydrodynamic mapping requirements discussed above. The E/I plan must provide a more explicit and justified explanation of whether and how "alternate" sites would be "pursued" and what the consequences would be for relating the survival studies back to the regular entrainment samples. In this regard, the design of the survival study sampling design must be rigourously reconsidered. **BP Response:** See UG-176. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176.	The design of the survival study sampling design must be rigourously reconsidered.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Hydrodynamic mapping is outside the scope of the EA FUP. Deployment of the plankton net has since been tested with an in-field trial. It is expected that a plankton net will be adequate for sampling. The Bruce Power response referenced as Comment #176 refers to live/dead determinations. This is not relevant to the selection of alternate sites. The Reviewers' evaluation referenced as Comment #176 refers to live/dead determinations. This is not relevant to the selection of alternate sites. Therefore, the Bruce Power response should be considered "Satisfactory."
180	How do we know that the proposed sampling protocol (location, time, processing) are appropriate for collecting live fish larvae in good condition (rather than killing them and confusing this source of mortality with pre-sampling mortality)? **BP Response:** See UG-176. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176.	No change recommended.	**No additional change to the I&E Plan is required.** The use of a net eliminates the mechanical death that may be caused by the pump. However, Bruce Power understands that transport through the intake pipe may affect mortality. Live/dead determinations will be used to evaluate whether an organism is recently or long dead. Therefore, the Bruce Power response should be considered "Satisfactory."
181	"*If no fish are collected following five consecutive 10-minute deployments, the forebay entrainment survival study may be discontinued until the next sampling period or event. This decision will be made in the field based upon the expected likelihood of collecting sufficient larvae during that event, and the amount of time available for performing additional sampling.*" This decision-making process is highly questionable, for several reasons. First, how do we know that five deployments as described is appropriate? Second, how is the "expected likelihood of collecting sufficient larvae during that event" a valid factor in deciding whether sampling should continue? Third, what does "sufficient larvae" mean, and how is this value determined? Fourth, the time allocation for sampling should be incorporated into the workplan, and not allowed to be such a major factor in determining whether additional sampling is required. **BP Response:** See UG-176. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176 and UG-177.	The time allocation for sampling should be incorporated into the workplan, and not allowed to be such a major factor in determining whether additional sampling is required.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The statement quoted by the Reviewers has been removed from the I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory." Note that it is expected that a minimum of 250 m^3 of water will be sampled during each entrainment event. The effort may be increased if logistics permit. Comments #176 and #177 refer to live/dead determinations and are not relevant for to Comment #181.
182	"*If larval fish of any species are collected, they will be transferred to a small glass aquarium for observation, and a determination will be made as to whether the larval fish are dead or alive. If larval fish of any species are collected, they will be transferred to a small glass aquarium for observation, and a determination will be made as to whether the larval fish are dead or alive.*" How do we know that observations in the field will provide a reliable method for determining presence/absence, enumeration and evaluation (live/dead) of the samples? **BP Response:** See UG-176. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176 and UG-177.	No change recommended.	**No additional change to the I&E Plan is required.** Analysis will be undertaken by qualified staff, including staff experienced with conducting similar analyses in the United States.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
183	"*If dead larval fish are collected, long-dead (Fish was dead prior to encountering the cooling system. Body may be soft with obvious decomposition, eyes glazed over, and gills lacking red color) determinations will be made to determine if larval fish mortality occurred in the Bruce A station intake or previously in Lake Huron.*" This evaluation protocol is highly questionable, for several reasons. First, the term "long-dead (Fish was dead prior to encountering the cooling system)" is highly misleading, and vulnerable to gross misinterpretation. Second, how does the protocol distinguish between recently "long-dead" fish and fish that were killed as a result of forebay entrainment? Third, the assignment of "long-dead" status is based on body conditions that "may be" observed, thus posing unacceptable risks of misapplication. Fourth, how do we know that the sampling method does not itself transform larvae with "obvious decomposition" into unrecognizable mash. Fifth, how do we know that the proposed morphological indicators apply to the fish species being targeted. **BP Response:** See UG-176. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The live/dead determination protocol is summarized in Section 4.3.2.1.3 of the I&E Plan. Larvae classified as "long dead" will be assumed to have been dead prior to encountering the intake system. The live/dead determination protocol is based on protocols that have been applied at other facilities in the US and Canada. Assumptions, limitations, and conclusions will be presented in the annual report. Comment #176 has been reviewed. No additional change to the I&E Plan is required. Therefore, the Bruce Power response should be considered "Satisfactory."
184	"*Larval fish have high natural mortality rates relative to other life phases, and a portion of the entrained larvae may have died prior to becoming entrained in the Bruce A station cooling water intake system. During normal entrainment sampling events, long-dead determinations will not be made due to the specialized staffing and equipment needs required.*" How do we know that the survival study samples will be representative of the "normal entrainment sampling events" to the extent that pre-forebay and forebay mortality rates can be applied? **BP Response:** See UG-176. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The statement quoted does not appear in the I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory." Comment #176 was reviewed, and the Bruce Power response should have been considered "Satisfactory" as well.
185	"*If live larval fish are collected, up to five live larval fish will be placed in each observation aquarium. The aquaria will be placed in a larger, opaque container that will serve as a water bath, with source water continuously flowing through it to maintain the source water temperature in the aquaria. When observations are not being made, an opaque lid will cover the aquaria.*" How do we know that "up to five larval" fish will serve as a representative subsample? How do we know that the observation aquaria, opaque water bath and water flow regime will serve as an effective environment for holding live fish and making survival observations? **BP Response:** See UG-176. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176 and UG-177.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The statement does not appear in the I&E Plan. As indicated on p. 25 (Section 4.3.2.1.3: Live/dead determinations), "Live/dead determinations will be completed on all larval fish and eggs captured during entrainment sampling." Therefore, the Bruce Power response should be considered "Satisfactory."
186	Throughout this protocol, only larvae were described – how does this protocol apply to eggs and embryos? **BP Response:** See UG-176. "Live/dead determinations will be completed on *all larval fish and eggs* captured during entrainment sampling. Live/dead determinations will be performed on *fish/eggs* captured from either of the entrainment sampling methods (i.e., pump-in-net and plankton/bongo net)." [p. 25] **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The live/dead determination protocol was summarized in Section 4.3.2.1.3 (Live/dead determinations; p. 25). The protocol applies to larvae and eggs. Therefore, the Bruce Power response should be considered "Satisfactory." Comment #176 has been reviewed. No additional change to the I&E Plan is required.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
187	"*The fish should then be observed again at approximately 1-2 hour intervals throughout the remainder of the sampling event.*" This statement reveals a bias against longer survival observations for samples that are taken later in the sampling event. **BP Response:** See UG-176. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176 and UG-177	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The live/dead determination protocol was summarized in Section 4.3.2.1.3 (Live/dead determinations; p. 25). The statement quoted by the Reviewer has been removed. Therefore, the Bruce Power response should be considered "Satisfactory." Both Comments #176 and #177 were reviewed, and the Bruce Power response for each should be considered "Satisfactory."
188	"*During each observation, the above items should be recorded.*" This sentence is very poorly worded; it is not clear what survival observations are meant by "the above items." **BP Response:** See UG-176. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The live/dead determination protocol was summarized in Section 4.3.2.1.3 (Live/dead determinations; p. 25). The statement quoted by the Reviewer has been removed. Therefore, the Bruce Power response should be considered "Satisfactory." Comment #176 has been reviewed. No additional change to the I&E Plan is required.
189	"*Fish held for more than 12 hours in the aquaria will be provided with wild-caught zooplankton for food.*" This aspect of the protocol is highly questionable, for several reasons. First, what is the objective for artificially providing a food supply to the fish? Second, what is the consequence of not adding a food supply? How do we know that 12 hours is an appropriate time to begin feeding the fish? How do we know that wild-caught zooplankton (captured during undefined sampling) would actually represent a viable food source for the fish? How do we know that the fish will eat the food provided? How do we know that food provision does not increase mortality? **BP Response:** See UG-176. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The live/dead determination protocol was summarized in Section 4.3.2.1.3 (Live/dead determinations; p. 25). The statement quoted by the Reviewer has been removed. Therefore, the Bruce Power response should be considered "Satisfactory." Comment #176 has been reviewed. No additional change to the I&E Plan is required.
190	"*Due to the need for a continuous supply of source water for the water bath and the possible effects of stress associated with transporting the larvae, it is likely not feasible to continue the larval survival studies beyond the completion of each sampling event.*" This statement is problematic, for several reasons. First, if the survival study needs to occur and be continued beyond the completion of a sampling event, then this requirement should be satisfied in the workplan; 'feasibility' of continuing the study is not determined by pre-set entrainment sampling duration. The supply of continuous water supply should not constrain or determine the feasibility of continuing survival observations. Second, how do we know that stress of transportation is a major factor in mortality for the sampled fish? Third, if stress of transportation is a potential factor of mortality, how does the study account for the stress of sampling in the first place? **BP Response:** See UG-176 **UG Team Evaluation of BP Response:** Unsatisfactory. See UG176.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The live/dead determination protocol was summarized in Section 4.3.2.1.3 (Live/dead determinations; p. 25). The statement quoted by the Reviewer has been removed. Therefore, the Bruce Power response should be considered "Satisfactory." Comment #176 has been reviewed. No additional change to the I&E Plan is required.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
191	"*Throughout the larval survival study, condition will be described using one of the three following general categories, with additional notes taken to describe why the fish was classified as such: •Alive and Apparently Healthy (AAH) – fish appears normal, is swimming upright and apparently without hindrance, is active. •Alive but Stressed (AS) – Fish is alive, but not acting normal. This may mean an unusual swimming pattern, spending a lot of time on the bottom inactive. •Recently Dead (RD) – Fish is dead, no response upon being prodded, no opercular movement, may have begun turning opaque.*" Is this one of the observations that was referenced in the mis-worded statement "During each observation, the above items should be recorded"? How do we know that the categories are appropriate for evaluating survival condition of the sampled fish? what does "appears normal" mean, and how do we know that what "appears normal" is appropriate for the survival study? Where did the classification of these categories derive from, and how do we know it is appropriate for the sampled species? **BP Response:** See UG-176. These same classifications are also used in the new live/dead determinations. They remain largely unchanged (except for the addition of the Long Dead category) form the draft report with no further clarification of "appears normal" and no reference for the derivation of these categories. Text now reads: "If fish/eggs are determined to be alive, they will be classified as either: -Alive and Apparently Healthy (AAH): Fish/egg appears normal, is swimming upright and apparently without hindrance, is active, has no apparent damage; or -Alive but Stressed (AS): Fish/egg is alive, but not acting normal. This may mean an unusual swimming pattern, spending a lot of time on the bottom – inactive, potentially with signs of physical damage. Likewise, if fish/eggs are determined to be dead, they will be classified as either: -Recently Dead (RD): Fish/egg is dead, no response upon being prodded, no opercular movement or heartbeat, may have begun turning opaque; or – Long Dead (LD): Fish/egg is dead, tissues are soft and degraded, fins are degraded, body is opaque, signs of mold are present on the fish/egg." [p.25-26] **UG Team Evaluation of BP Response:** Unsatisfactory. The concerns regarding assessment of condition remain outstanding.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The live/dead determination protocol, and associated classifications, has been clarified (pp. 25-6). The live/dead determination protocol is based on protocols that have been applied at other facilities in the US and Canada. Assumptions, limitations, and conclusions will be presented in the annual report. The Bruce Power response should therefore be considered "Satisfactory."
192	How do we know that non-concurrent (i.e. sequential) forebay and discharge sampling will not have an important effect on the comparison of samples and survival estimates? **BP Response:** See UG-176 **UG Team Evaluation of BP Response:** Unsatisfactory. See UG-176 and UG-177.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Discharge sampling was considered but has been removed from the I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory." Both Comments #176 and #177 were reviewed, and the Bruce Power response for each should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
193	"*All entrainment samples will be analyzed in a larval fish laboratory by an ichthyologist experienced in larval fish identification and enumeration. For all species except lake whitefish and deepwater sculpin, fish eggs and larvae will be removed from the samples, identified to the lowest taxon possible and counted. For lake whitefish and deepwater sculpin only, larvae will be categorized into prolarvae (yolk-sac larvae) and postlarvae (post yolk-sac larvae).*" This aspect of the entrainment sampling is highly problematic, for several reasons. First, it is implied that the identification of larval fish is conducted completely on the basis of visual observations – despite the enormous challenges associated with larval fish species identification in this manner. Even with an "experienced ichthyologist" how do we know that the species identification is reliable – especially in terms of distinguishing lake whitefish from other coregonids? Second, how will eggs and embryos within egg envelopes be identified? Third, what is the importance of distinguishing between larvae with remaining yolk and those with without yolk; and how do we know that the visual observations of yolk presence would be reliable? Fourth, how will the observer distinguish between free-embryos (pre-feeding) and larvae (postfeeding)? **BP Response:** This section is now located in Section 4.3.2.7 (Identification and Enumeration) on p. 30. Text has been altered slightly, now reading: "All entrainment samples will be analyzed in a larval fish laboratory by a qualified individual experienced in larval fish identification and enumeration. For all species fish eggs and larvae will be removed from the samples, identified to the lowest taxon possible and counted. Lake and round3 whitefish and deepwater sculpin larvae will be further categorized into prolarvae (yolk-sac larvae) and postlarvae (post yolk-sac larvae) and the total length (TL) for up to 30 lake whitefish, round whitefish and deepwater sculpin larvae per life stage per sample will be measured to the nearest 0.1 mm. Additionally, up to 30 of each observed sport and commercially targeted species, excluding baitfish, will be measured." [p. 30] **UG Team Evaluation of BP Response:** Unsatisfactory. The issues and concerns regarding the entrainment sampling methods remain outstanding.	No change recommended.	**No additional change to the I&E Plan is required.** Entrainment samples will be preserved and identified in the laboratory, by qualified personnel with a dissecting microscope. Larval fish species identification is challenging, and identifications will be made to the lowest taxon possible. Larvae without yolk sacs may be less susceptible to entrainment. Distinguishing between additional lifestages is not planned at this time.
194	It should be noted that Lauren Overdyk (UofG Grad Student, Whitefish Entrainment Research Project, SON-BP Collaborative Whitefish Research Program) is developing an innovative method for evaluating the effectiveness of high throughput genetic barcoding for larval fish species identification, in comparison to conventional genetic and visual methods of species identification. This research project should be considered when developing entrainment larval fish species identification protocols for the E/I Monitoring Plan. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power has committed to a partnership with SON to enhance and extend research related to potential impacts on Lake Whitefish. When research data is available from that initiative, it will be evaluated and may be used to inform the EA FUP.
195	"*Total length (TL) for up to 30 larvae per life stage will be measured to the nearest 0.1 mm in each sample.*" How do we know that "30 larvae per life stage" is representative for the developmental subsample? **BP Response:** The following sentence was added with regards to measurements of sport and commercially targeted species: "Additionally, up to 30 of each observed sport and commercially targeted species, excluding baitfish, will be measured." [p. 30] **UG Team Evaluation of BP Response:** Unsatisfactory. The additional samples do nothing to address the representivity of developmental subsamples.	No change recommended.	**No additional change to the I&E Plan is required.** Only egg, yolk-sac larvae, and post yolk-sac larvae will be identified. Other stages of embryogenesis will not be identified at this time. Samples will be selected randomly within each life stage, in order to ensure representivity.
196	"After each sample has been analyzed, all larvae in that sample will *be preserved and retained for future reference.*" How do we know that the samples will be preserved in a manner that would allow subsequent (e.g. genetic) analyses **?** **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power plans to use ethanol in order to ensure the samples may be available for genetic analysis in the future.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
197	As discussed above, the UofG Team is seriously concerned about the appropriateness of historical entrainment data for statistical analyses. **BP Response:** This section has been moved to Section 4.5 (Data Compilation and Statistical Analyses – Pre-Operations Phase Versus Operations Phase) and Section 4.5.1 (Statistical Analyses on p. 34. This paragraph has been expanded to now read (italics added to emphasis additional text): "Where possible, based upon the completeness and reliability of historical entrainment and impingement data, statistical analyses are proposed for comparing the multiple entrainment and impingement variables listed in Section 4.5.2 prior to and during the Operations Phase. Additional variables may be considered *where sufficient and reliable historic data or information collected as part of this program is available. Due to the variability in sampling methods of certain historic data, and in consideration of the time elapsed from a fish population perspective (i.e. many of these fish would have succumbed by this time), more recent data collected as part of this Plan is anticipated to be of greater utility than historic information. Where sufficient data exists to allow for defensible statistical analysis,* options that will be considered for comparing annual estimates of entrainment and impingement pre-and post-Operations Phase will include the non-parametric Mann-Whitney U-test, the Generalized Linear Model with a log link, or an Analysis of Covariance (ANCOVA) with month and flow as possible covariates. Data may be log-transformed as needed to meet the normality assumption and bootstrapping procedures may be performed to accommodate for insufficient sample sizes of historic data. An alpha level of 0.10 will be used during statistical analyses. *Statistical techniques described here should be considered as initial approaches. Consistent with an adaptive management approach and the possibility of identifying new factors to be considered as a result of Operations Phase monitoring, additional statistical analysis or inclusion of additional covariates may be considered and included in reporting, at the discretion of Bruce Power and in consideration of consultation with regulatory agencies and stakeholders.*" [p. 34-35] With regards to appropriateness of historical entrainment data, the text has been updated to read: "Due to the variability in sampling methods of certain historic data, and in consideration of the time elapsed from a fish population perspective (i.e. many of these fish would have succumbed by this time), more recent data collected as part of this Plan is anticipated to be of greater utility than historic information." [p. 34-35] **UG Team Evaluation of BP Response: Satisfactory**. The revisions reflect a consideration of data quality and utility, and the statistical basis. However, the selection of data should be explicitly defined, including full justification for its use or non-use.	n/a	n/a

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
198	The list of possible statistical analyses is fine. However, given the temporal and potentially spatial correlations that might exist in the data, appropriate time series or spatial analyses should be investigated **BP Response:** See UG-197. Additional text has been added to this paragraph: "Statistical techniques described here should be considered as initial approaches. Consistent with an adaptive management approach and the possibility of identifying new factors to be considered as a result of Operations Phase monitoring, additional statistical analysis or inclusion of additional covariates may be considered and included in reporting, at the discretion of Bruce Power and in consideration of consultation with regulatory agencies and stakeholders." [p. 35] **UG Team Evaluation of BP Response:** Unsatisfactory. Initial approaches or preliminary studies should be considered very carefully. That is, the results from such studies can be highly questionable given uncertainties in the data, inappropriate methods, violated assumptions, etc. This is not to discourage any initial approach – so long as the results are used to inform more appropriate analyses. Decisions should be made using the best methods for analysis. This could help to eliminate such issues as ecological fallacy, atomistic fallacy, and Simpson's paradox.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** As noted by the Reviewer, "additional statistical analysis… may be considered and including in reporting." This consideration will be made during the analysis phase and may be reconsidered following reporting and consultation with regulators and other stakeholders. Therefore, the Bruce Power response should be considered "Satisfactory."
199	A Generalized Linear Model (GLM) with log link (which could include Poisson regression) should identify an offset variable, thus providing estimates of relative risk. The model should also incorporate spatial and temporal correlations. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Statistical techniques described in the I&E Plan "should be considered as initial approaches" (p. 35). Statistical analyses, including assumptions and limitations, will be reported and discussed with regulators and other stakeholders.
200	A GLM with logit link (i.e., Logistic regression) is also recommended. The model could identify the probability of observing a 'success' (i.e., presence of whitefish larvae in a sample) to a 'failure' (i.e., presence of other fish larvae in a sample). Again, the model should incorporate spatial and temporal correlations. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Statistical techniques described in the I&E Plan "should be considered as initial approaches" (p. 35). Statistical analyses, including assumptions and limitations, will be reported and discussed with regulators and other stakeholders.
201	"Throughout the study, it is recognized that uncertainty may be added to the data at many levels…" This part of the sentence does not make sense. Uncertainty (in different forms) is an inherent component of any sample data – in does not have to be "added". **BP Response**: This sentence has been changed to read: "Throughout the monitoring and reporting as part of this Plan, it is recognized that uncertainty exists within the data due to such factors as variability in subsampling procedures, varying historic sampling regimes, human error/oversight, natural biotic and abiotic factors." [p.35] **UG Team Evaluation of BP Response:** Satisfactory. The comment has been adequately addressed.	n/a	n/a
202	It should be noted that the discharge sampling is used only to contribute samples for the proposed survival study. How do we know that the larval densities estimated for the forebay entrainment samples would correspond to the larval densities estimated for the discharge entrainment samples? What would it mean for the E/I Monitoring Plan if there were major discrepancies in these different larval density estimates? **BP Response:** None.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Discharge sampling is no longer present in the I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
203	There needs to be some explicit description of how these variables are going to be used to determine potential significance of BNGS on Lake Huron lake whitefish population(s). **BP Response:** None.	There needs to be some explicit description of how these variables are going to be used to determine potential significance of BNGS on Lake Huron lake whitefish population(s).	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Effect tests and endpoints are discussed in Section 4.6. Therefore, the Bruce Power response should be considered "Satisfactory."
204	"*daily, monthly, and annual lake whitefish and deepwater sculpin egg and larval densities within the source water in the vicinity of the plant intake*" As discussed above, these estimated densities need to be interpreted within the context of a hydrodynamic model of entrainment risk regions for the (undefined) "vicinity of the plant intake." **BP Response:** None. (the "vicinity of the plant intake" has simply been changed to "in the vicinity of the Bruce A station intake")	No change recommended.	**No additional change to the I&E Plan is required.** The I&E Plan includes a hydrodynamic zone of influence (HZI) model, instead of a full hydrodynamic model. The estimated densities will be interpreted within the context of the HZI model.
205	"*annual entrainment expressed as total larval fish/fish eggs, and as total equivalent adults (age-1 fish).*" This statement is factually incorrect with regard to age equivalency for lake whitefish (i.e. not age-1 years). **BP Response:** This sentence has been altered to include age-4 fish. It reads as follows: "Daily Bruce A station intake flow and annual entrainment expressed as total larval fish/fish eggs, and as total equivalent adults (age-1 or age-4 fish)." [p. 35] **UG Team Evaluation of BP Response:** Satisfactory.	n/a	n/a
206	"*Plant entrainment rates expressed as number of fish per million litres of intake flow (no. fish/L) will also be calculated.*" As discussed above, the UofG Team is seriously concerned about the appropriateness of assumptions and data collection for estimation of fish entrainment estimates. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Comment #206 does not provide recommendations for change.
207	It is recommended that all point estimates be accompanied by either 95% confidence intervals, or in the case of Bayesian analysis, 95% credible intervals. **BP Response:** None.	It is recommended that all point estimates be accompanied by either 95% confidence intervals, or in the case of Bayesian analysis, 95% credible intervals.	**No additional change to the I&E Plan is required.** Appropriate confidence intervals will be reported.
208	"*Additional variables will be calculated as needed.*" This statement does not mean anything. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Comment #208 does not provide any additional recommendation for change.
209	These hypotheses are satisfactory if the variables are being considered independently. However, if that is the case, a problem with multiple testing arises. How is this being addressed? **BP Response:** This section has been moved to Section 4.5.3 (Hypotheses) on p. 36. The text has been altered to now read: "Before/after statistical analyses will be completed where sufficient and reliable historical data exists. The following hypotheses for each of the entrainment and impingement variables listed above will be tested to compare historic (pre) and current Operations Phase data, where possible:" [p. 36] Besides the addition of "where possible" there are No response. **UG Team Evaluation of BP Response:** Unsatisfactory. The issue of multiple testing still exists.	No change recommended.	**No additional change to the I&E Plan is required.** Any limitations of the analysis will be discussed during the reporting.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
210	Testing the differences between daily and monthly values should necessitate the use of time series analyses. This should be made explicit. **BP Response:** None.	Testing the differences between daily and monthly values should necessitate the use of time series analyses.	**No additional change to the I&E Plan is required.** Time series analysis may be considered during the analysis phase. Limitations of the proposed analysis for daily and monthly values will be discussed during reporting.
211	At what level are the hypotheses being tested to determine 'significance'? What are the risks of Type II error? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** As noted in the I&E Plan, the alpha level will be 0.10. The risk of a Type II error is that the follow-up monitoring will fail to reject a false null hypothesis. The null hypothesis here refers to no difference in pre- and post-operations impingement and/or entrainment. Therefore, a Type II error would be the failure to determine that a statistically significant difference exists. The alpha level, appropriate confidence intervals, and risks of Type I and Type II errors will be reported.
212	"*Specific quantifiable effects thresholds due to entrainment of lake whitefish or deepwater sculpin have not been identified nor agreed to with agencies and stakeholders and there is no specific regulatory guidance specific to Ontario that is available for determining entrainment thresholds.*" As discussed above, the E/I Monitoring Plan cannot achieve its stated Goal until such time as an appropriate entrainment effect threshold has been explicitly defined. Until such time as this threshold has been established, the E/I Monitoring Plan should not be finalized or approved. **BP Response:** None. This section has been moved to Section 4.6 (Effect Tests and Endpoints for Follow-up Monitoring) and 4.6.1 (Effects Tests) on p. 36-37.	No change recommended.	**No additional change to the I&E Plan is required.** As noted in the plan, discussion of thresholds and endpoints will continue to take place.
213	Beyond thresholds, an identification of a risk map should be investigated. For example, if the proportion of equivalent adult annual lake whitefish entrainment losses relative to some abundance estimate were set at 5%, this does not suggest that anything less than 5% is low risk, and anything about 5% is high risk. How does 5.1% compare to 7%, or 20%, for example. **BP Response:** None.	An identification of a risk map should be investigated.	**No additional change to the I&E Plan is required.** The scenarios to be considered for potential effects on lake whitefish within the local study area cover a very broad range. As discussed on p. 38 of the I&E Plan, a certain (hypothetical) percentage of the entrained lake whitefish will be assumed to derive from a genetically distinct population within the local study area. Four potential scenarios will be considered: 0.5%, 20%, 50%, and 100%. As this range is very broad (0.5% - 100%), Bruce Power will be able to report potential impacts (with respect to a possible local population of lake whitefish) even if all entrained or impinged lake whitefish derive from a local population. Consultation on an appropriate effect test will continue.
214	"*The effect test that was stated for Element 3.1 (lake whitefish) in the 2008 Work Plan proposed that entrainment be compared with a threshold for effect to regional abundance with regional referring to the regional study boundaries provided in the 2005 EA.*" The concept of "regional abundance" is not appropriate for evaluating entrainment effects unless the "region" refers to spatial distribution of the lake whitefish population(s) in Lake Huron that are receiving the entrainment effects, especially mortality. **BP Response:** None.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan states that the term *regional* will not be used to determine thresholds or endpoints for the Lake Whitefish effects monitoring. As stated on p. 37, "The term regional as it pertains to entrainment and impingement estimates is not to be used going forward. The boundary for describing entrainment and impingement that is proposed is the MNR boundary for QMA 4-4 which is a fisheries management unit boundary…" As the I&E Plan will not be using the term *regional*, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
215	"*Per the CNSC's comments on the 2008 Work Plan, the threshold for effect was to also be applied to the local population of lake whitefish. Though it requires verification, it is presumed that CNSC's interpretation of local is related to a distinct local population of lake whitefish.*" This statement is problematic for several reasons. First, an entrainment effect threshold makes sense only with application to a biological population – there is no "also" alternative application. Second, CNSC's comments should be explicitly re-stated to minimize misinterpretation of those comments. Third, "verification" of the CNSC's comments should have been undertaken before this draft of the E/I Monitoring Plan, rather than being "presumed" or presented as an uncertainty. Fourth, it would be inappropriate to "presume" that lake whitefish in waters adjacent to BNGS structured as a "distinct local population." **BP Response:** None**.**	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Effect thresholds will be based on the QMA 4-4 quota. The QMA 4-4 boundary provides a "defined and established management boundary for Lake Huron commercial fisheries in Ontario and provides a means against which lake whitefish data and EAM/FFYM and future direct, indirect or non-use benefits can be calculated and compared." Discussion with the CNSC and other stakeholders is on-going. Interpretation of the 2008 Work Plan is consistent with adaptive management. The CNSC has not raised any concerns regarding the proposed effect thresholds, with specific values to be discussed further. Population discrimination is a major objective of the research partnership between Bruce Power and the Saugeen Ojibway Nation (with University of Guelph). Bruce Power has not received any research results regarding potential population structure of lake whitefish within Lake Huron. Additionally, Bruce Power has partnered with the University of Regina to determine population structure of lake whitefish. Note that at this time, Bruce Power does not make any assumptions regarding lake whitefish population structure. Instead, potential scenarios will be considered, in which entrained and/or impinged lake whitefish are considered to derive from a genetically-distinct population within the local study area. Between 0.5% and 100% of the impinged and/or entrained lake whitefish will be assumed to derive from this putative distinct population, and potential impacts on this putative population will be evaluated and reported. This is <u>not</u> an assumption regarding the actual population structure, but is instead a means of evaluating <u>potential</u> impacts on a <u>potential</u> distinct population (though no such population has yet been identified). The Bruce Power response should therefore be considered "Satisfactory."
216	As discussed above, it is clear that the spatio-temporal population structure of lake whitefish is a key uncertainty for the draft E/I Plan. It should be explicitly noted that this same key uncertainty was explicitly recognized by the SON-BP Collaborative Whitefish Research Program, and was assigned as a PhD research project (Clayton Coppaway) for the UofG Team. The E/I Monitoring Plan should explicitly incorporate the research and analyses being conducted by the SON-BP Research Program. **BP Response:** None**.**	It should be explicitly noted that this same key uncertainty was explicitly recognized by the SON-BP Collaborative Whitefish Research Program, and was assigned as a PhD research project (Clayton Coppaway) for the UofG Team. The E/I Monitoring Plan should explicitly incorporate the research and analyses being conducted by the SON-BP Research Program.	**No additional change to the I&E Plan is required.** Bruce Power is committed to the partnership with the Saugeen Ojibway Nation (and partner University of Guelph). Research results, when available, will be evaluated by Bruce Power and considered for inclusion with respect to the EA FUP.
217	"*The terms regional and local have in some cases been a source of confusion as these terms may relate to a spatial boundary (i.e., a local study area, fish within a certain jurisdictional or management boundary) an ecological boundary (e.g., fish that inhabit a certain regional or local ecosystem with boundaries defined using natural features), fish "stocks" that have been captured within a certain management unit boundary (e.g., MNR quota management areas), or finally, genetically identified fish stocks or populations which have an affinity to any of the aforementioned spatial, ecological or management unit boundaries.*" It is true that there has been widespread uncertainty about the meaning of terms and concepts associated with population discrimination, especially as they relate to the need for population-level risk assessment for the BNGS. It should be noted that Clayton Coppaway (UofG Grad Student, Whitefish Population Discrimination Research Project, SON-BP Collaborative Whitefish Research Program), is currently undertaking comprehensive reviews of: (a) operational definitions of 'population' which emphasis on fishes, and (b) all available information regarding population spatio-temporal distribution of lake whitefish in Lake Huron. These reviews/evaluations should be considered when developing operational definitions of lake whitefish populations for the E/I Monitoring Plan. **BP Response:** None**.**	It should be noted that Clayton Coppaway (UofG Grad Student, Whitefish Population Discrimination Research Project, SON-BP Collaborative Whitefish Research Program), is currently undertaking comprehensive reviews of: (a) operational definitions of 'population' which emphasis on fishes, and (b) all available information regarding population spatio-temporal distribution of lake whitefish in Lake Huron. These reviews/evaluations should be considered when developing operational definitions of lake whitefish populations for the E/I Monitoring Plan.	**No additional change to the I&E Plan is required.** Bruce Power is committed to the partnership with the Saugeen Ojibway Nation (and partner University of Guelph). Research results, when available, will be evaluated by Bruce Power and considered for inclusion with respect to the EA FUP.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
218	"*For the purpose of this study, the boundaries and approaches for describing regional and local have been revised, as identified below, and are to be discussed and agreed to by Bruce Power, regulatory agencies and stakeholders in terms of how they may be applied to any proposed thresholds.*" As discussed above, the proposed boundaries for the lake whitefish population(s) receiving BNGS entrainment effects, should based on rigorous consideration of population biology and the available information for lake whitefish populations in Lake Huron. Discussions between BP, regulatory agencies, SON and other interested parties should occur only after this rigorous consideration has been completed and presented in a manner that is meaningful for the E/I Monitoring Plan. **BP Response:** None**.**	The proposed boundaries for the lake whitefish population(s) receiving BNGS entrainment effects, should based on rigorous consideration of population biology and the available information for lake whitefish populations in Lake Huron.	**No additional change to the I&E Plan is required.** At this time, no information is available regarding lake whitefish population structure in Lake Huron. As this information is not available, the I&E Plan includes consideration of potential scenarios, in which a certain percentage of impinged and/or entrained lake whitefish are considered to derive from a putative distinct population within the local study area. These hypothetical percentages cover a broad range (0.5%-100%) of the total impinged and entrained lake whitefish. Therefore, Bruce Power will be able to evaluate the potential impact on potential distinct population.
219	"*The term regional as it pertains to entrainment estimates is not proposed for use going forward.*" This sentence does not make any sense, going forward or backward. The term "regional" is not related to "entrainment estimates" but rather to the hypothesis that lake whitefish population(s) are structured with a spatial distribution at the "regional" (local < regional < basin) scale. **BP Response:** This section has now moved to Section 4.6.1.1 (Lake Whitefish – Within QMA 4-4 (Entrainment and Impingement) starting on p. 37. The sentence was altered slightly to now read: "The term regional as it pertains to entrainment and impingement estimates is not to be used going forward." [p. 37] **UG Team Evaluation of BP Response:** Unsatisfactory. The issues and concerns regarding spatial context of entrainment sampling and analyses remain outstanding.	No change recommended.	**No additional change to the I&E Plan is required.** Comment #219 does not provide any additional recommendations for change.
220	"*The proposed boundary for describing entrainment that is proposed is the MNR boundary for QMA 4-4 which is a fisheries management unit boundary that resides entirely within Canadian waters of Lake Huron within the main basin. This QMA 4-4 boundary is proposed as it is within a defined and established management boundary for Lake Huron commercial fisheries in Ontario and provides a means against which lake whitefish data and EAM/FFYM and future direct, indirect or non-use benefits can be calculated and compared.*" This statement is highly problematic, for several reasons. First, the boundary in question is not a "boundary for describing entrainment," but rather a boundary for describing the spatial distribution of the population that receives the effects of entrainment. Second, as discussed in detail above, the MNR quota management area 4-4 is highly inappropriate as a boundary for describing the spatial distribution of the population that receives the effects of BNGS entrainment. Third, whatever population(s) are explicitly hypothesized as receiving entrainment effects from the BNGS, data for the lake whitefish in the associated population boundaries will be organized for population modeling (EAM/FFYM as well as PFM/TTM) and any "future direct, indirect or non-use benefits" (whatever these might be). **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** Comment #220 does not identify any additional recommendations for change. Concerns regarding the use of QMA 4-4 have been raised in other comments by the Reviewers. Those concerns are addressed with each respective comment.
221	"*Though a threshold for effect has not been determined or agreed to, it is proposed for the purpose of this study (pending further consultation) that the threshold for effect is established as a proportion of equivalent adult annual lake whitefish entrainment losses relative to the MNR proposed quota of lake whitefish in QMA 4-4.*" As discussed in detail above, it is highly inappropriate to use MNR commercial fisheries quotas as a meaningful metric of lake whitefish population abundance. **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** As noted in the I&E Plan, the quota for QMA 4-4 is determined by the MNR. Bruce Power is not in a position to estimate lake whitefish population levels, but the MNR does have responsibility for understanding lake whitefish population dynamics. Therefore, the QMA 4-4 quota represents a justifiable and quantitative value for comparison of entrainment and impingement effects. The Reviewers have not suggested an alternate "metric" for evaluating lake whitefish population abundance.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
222	"*It is assumed that the regulatory agencies that determine the commercial catch quota understand the population dynamics of the regional lake whitefish population and have developed a rigorous estimate of acceptable annual catch.*" The first assumption is highly questionable, especially given the administrative origin of the boundaries for MNR quota management area 4-4. The second assumption rests on the first assumption, and is irrelevant when the MNR quota decision-making process is taken into account. **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** The Reviewers have noted objections to the use of the MNR QMA 4-4 for comparison of entrainment and impingement effects. However, the Reviewers have not provided any alternatives for evaluation. The QMA 4-4 quota represents a justifiable and quantitative value for comparison of entrainment and impingement effects.
223	"*It is also assumed, based on information provided by the MNR [MNR 2011], that this commercial catch quota takes into account the natural mortality and recreational fishing mortality rates of lake whitefish.*" This assumption is irrelevant when the MNR quota decision-making process is taken into account. **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** Comment #223 does not identify any additional recommendations for change.
224	"*As such, it is assumed that an annual equivalent adult entrainment greater than an agreed-upon percentage of the lake whitefish regional commercial catch quota for QMA 4-4 for the current monitoring year will represent an effect on the population which inhabits QMA 4-4 and is subject to exploitation by the commercial fishery.*" As discussed in detail above, this assumption is based on numerous errors in logic and is highly inappropriate for the E/I Monitoring Plan. **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** Comment #224 does not identify any additional recommendations for change.
225	"*For the purpose of this analysis it will be assumed that all potential genetic populations that may reside in QMA 4-4 have an equal chance of occurring within the waters subject to the intake influence and therefore possess an equal chance of being entrained and/or impinged.*" As discussed in detail above, this assumption is based on numerous errors in logic and is highly inappropriate for the E/I Monitoring Plan. **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** Comment #225 does not identify any additional recommendations for change. Bruce Power has identified that the analysis is based on an assumption. It is necessary to make at least some assumptions in order to proceed with comparison of potential impacts of impingement and entrainment. The Reviewers have not identified any improvements over the assumption made as quoted here.
226	"*The percentage of the lake whitefish regional commercial catch quota for QMA 4-4 that will represent an effect on the population that inhabits QMA 4-4 for the current monitoring year will be decided based on further consultation with agencies and stakeholders.*" As discussed in detail above, this assumption is based on numerous errors in logic and is highly inappropriate for the E/I Monitoring Plan. **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** Comment #226 does not identify any additional recommendations for change. The quoted statement is not an assumption but rather identifies the planned threshold and endpoint for monitoring (with exact value to be discussed further).

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
227	It should be noted that Michael Chegahno (UofG Grad Student, Whitefish Population Modelling Research Project, SON-Collaborative Whitefish Research Program), has been assigned the responsibility of developing a biologically- and mathematically/statistically-defensible population model and decision-support system for understanding the population dynamics of Lake Huron lake whitefish population(s) and the cumulative effect of mortality associated with the BNGS (entrainment, impingement, thermal, contaminant, etc.) and the commercial fishery. This research project should be considered when developing the sampling design and analyses of data for the E/I Monitoring Plan. **BP Response**: None.	It should be noted that Michael Chegahno (UofG Grad Student, Whitefish Population Modelling Research Project, SON-Collaborative Whitefish Research Program), has been assigned the responsibility of developing a biologically- and mathematically/statistically-defensible population model and decision-support system for understanding the population dynamics of Lake Huron lake whitefish population(s) and the cumulative effect of mortality associated with the BNGS (entrainment, impingement, thermal, contaminant, etc.) and the commercial fishery.	**No additional change to the I&E Plan is required.** Bruce Power is committed to the partnership with the Saugeen Ojibway Nation (and partner University of Guelph). Research results, when available, will be evaluated by Bruce Power and considered for inclusion with respect to the EA FUP.
228	"*Local effects at the level of genetically distinct populations can not be determined until such time that genetically distinct populations are identified and the actual proportion of these populations within a broader populations grouping can be discerned. Genetically distinct populations will be determined based upon the results of DNA studies (see Section 1) to confirm the presence of and determine the size and contribution of distinct, populations relative to the total captured for DNA analysis within a specific area.*" This statement is highly problematic, for several reasons. First, as discussed above, the phrase "local effects at the level of genetically distinct populations" is misguided – the term "local" refers to one hypothesized scale of population discrimination, not the effects. Second, as discussed above, it is highly unlikely population discrimination research will identify "genetically distinct" populations; it is much more likely that multiple sources of available information about lake whitefish population distribution will be combined to identify meaningful population scenarios for use in the E/I Monitoring Plan. Third, BP needs to reconcile the "DNA studies (see Section 1)" and the Population Discrimination Research Project that was assigned to UofG under the SON-BP Collaborative Whitefish Research Program. Fourth, the final sentence is illogical and seems to misunderstand the biological insight that can be provided by genetic analyses. **BP Response:** None**.**	BP needs to reconcile the "DNA studies (see Section 1)" and the Population Discrimination Research Project that was assigned to UofG under the SON-BP Collaborative Whitefish Research Program.	**No additional change to the I&E Plan is required.** The quoted sentences are awkward but do not require a formal change to the I&E Plan. As is made clear from context in the I&E Plan (see p. 38), thresholds and endpoints are with respect to lake whitefish population(s) within the EA Local Study Area. It is not known at this time whether one or more genetically distinct populations are present within the Local Study Area. As this knowledge is not available, the I&E Plan proposes comparison with respect to certain hypothetical percentages of the QMA 4-4 quota. The test values (0.5%-100% of the QMA 4-4 quota) that represent a potential distinct population within the Local Study Area) cover a broad range, which will allow for evaluation of potential impact on as-yet-unidentified populations. Other approaches could be considered if information were available regarding lake whitefish population structure within the Local Study Area. It is not known what the Reviewers have requested with the recommendation to "reconcile" multiple research partnerships. Bruce Power is committed to partnership with SON (and partner University of Guelph) as well as to University of Regina. Information regarding population structure will be evaluated for potential incorporation into the EA FUP when such information becomes available.
229	"*To contribute to this or future genetics studies, lake whitefish eggs and larvae collected during entrainment sampling will be preserved for possible DNA analysis to determine which population or stock they may belong to.*" This provision is reasonable, however it will require careful selection of the preservative conditions for the samples. **BP Response:** None**.**	This provision will require careful selection of the preservative conditions for the samples.	**No additional change to the I&E Plan is required.** Bruce Power plans to use ethanol in order to ensure the samples may be available for genetic analysis in the future.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
230	"*Prior to or in lieu of completion of the DNA studies, and subject to further consultation with fishery agencies, the following scenarios will be assumed: •0.5% of entrained lake whitefish are from a population which is distinct within the EA local study area; •20% of entrained lake whitefish are from a population which is distinct within the EA local study area (as shown on Figure 2); •50% of entrained lake whitefish are from a population which is distinct within the EA local study area; and •100% of entrained lake whitefish are from a population which is distinct within the EA local study area.*" This statement is highly problematic, for several reasons. First, how do we know that the "EA local study area" (presumably that depicted in Figure 2) is an appropriate spatial boundary for this evaluation? Second, it is unclear why these "scenarios" should be assumed "prior to or in lieu of" population discrimination; this seems highly arbitrary and illogical. Third, how do we know that the prespecified population percentages (0.5%, 20%, 50%, 100%) provide a reasonable representation of the actual representations. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** All EA hypotheses utilize EA study boundaries. Unit 4-4 was selected in order to represent the regional area. As the spatial boundaries of lake whitefish population(s) within the regional area are not known, it is necessary to make assumptions regarding possible populations within the Local Study Area. The specified percentages reflect a very large range of potential entrainment and impingement impacts (between 0.5%-100% of all entrained or impinged fish are derived from a population within the Local Study Area).
231	"*Based upon these four scenarios the number entrained in each of the four above scenarios will be converted into estimates of equivalent adults at age-4. The equivalent adult estimates will then be compared to historic gill net sampling results taken from nearby sites within the EA local study area (Figure 2) and the EA Regional study area (see Figure 2.3.3-1 of the Aquatic Environment Technical Support Document [Bruce Power 2005b]).*" This statement is highly problematic, for several reasons. First, as discussed in detail above, the UofG Team is seriously concerned about the appropriateness of assumptions and data collection for estimation of fish entrainment estimates. Second, as discussed in detail above, the UofG Team is seriously concerned about the appropriateness of assumptions and data collection for estimation of lake whitefish abundance in the "local EA study area" based on historic gill net sampling. Third, despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation associated with Bruce Power's historic whitefish gillnetting assessment program, as had been requested. **BP Response:** The second sentence from this excerpt has been removed from the Plan. **UG Team Evaluation of BP Response:** Unsatisfactory. The minor editorial change does not address the outstanding issues and concerns.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Comment #231 does not identify any additional recommendations for change with respect to data collection for entrainment. Comment #231 does not identify any additional recommendations for change with respect to estimating lake whitefish abundance within the Local Study Area. Additionally, the sentence which prompted this concern has been removed. Therefore, the Bruce Power response should be considered "Satisfactory." Finally, Bruce Power whitefish research results have been posted online. It is unclear what additional information the Reviewer is seeking. Note that Bruce Power will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
232	"*Until the results of the DNA studies are published, and an understanding of the movements of individual stocks of these species is better understood, forming a more reliable estimate of an entrainment effect to a population that is distinct within the local study area will continue to be limited. A benefit of the EAM model is that the results are scalable for comparison to estimated populations sizes from spatial areas deemed appropriate by fisheries managers.*" This statement is highly problematic, for several reasons. First, it seems that the author has confused "movement of individual stocks" (whatever those are), with movement of individuals within a population. Second, DNA studies are unlikely to provide much "understanding of the movements" of individuals with a whitefish population; this is the type of insight that is more likely derived from mark-recapture and fishery (dependent/independent) assessments – all of which are included in the UofG Research Program. Third, the author repeats the illogical mistake of assuming "a population that is distinct within the local study area." Fourth, based on the inappropriateness of MNR quota management area 4-4 as a representation of a whitefish population distribution in Lake Huron, it would be unwise to reply on what fisheries managers "deem appropriate" for population discrimination. **BP Response:** The last sentence was altered slightly to read: "A benefit of the EAM is that the results can be compared against any population estimate from any spatial area for the same period of time, in the event that new information specific to the population of interest becomes available."[p.39] **UG Team Evaluation of BP Response:** Unsatisfactory. The issues and concerns regarding population-level analyses remain outstanding.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power is not tracking individual fish, nor specific stocks. Bruce Power is not applying DNA studies to study movements of individual fish within whitefish populations. Bruce Power is assuming that an as-yet-unidentified distinct population may exist within the Local Study Area.
233	"The endpoint of follow-up for Element 3.1 (Lake Whitefish) is proposed to be the point where entrainment numbers fall below the agreed upon threshold (to be determined) for effect to regional abundance with all four units in operation." This statement is problematic, for several reasons. First, it is not clear why the term "endpoint" is required if it is effectively synonymous with the (undefined) threshold that must not be exceeded. Second, the phrase "effect to regional abundance" makes no sense when not related to the concept of "population abundance." Third, it seems inconsistent to refer explicitly to "regional" population abundance for the threshold, yet refer explicitly to "EA local study area" for the scenarios (see above). Fourth, the phrase "with all four units in operation" is illogical; the threshold would be in effect regardless of the number of units in operation (it is simply most likely that the threshold would be exceeded with the maximum number of units operating). **BP Response:** This section is now located in Section 4.6.2 (Endpoints for Follow-up Monitoring) on p. 40. The sentence has been altered to now read: "The endpoint of follow-up for Element 3.1 (Entrainment of Lake Whitefish) and Element 3.4 (Impingement of Lake Whitefish) is proposed to be the point where entrainment and impingement of age-4 lake whitefish fall below the agreed upon threshold (to be determined) for effect, which will be represented by a percentage of the lake whitefish regional commercial catch quota for QMA 4-4." [p. 40] **UG Team Evaluation of BP Response:** Unsatisfactory. The editorial change does not address the outstanding issues and concerns regarding population-level thresholds.	No change recommended.	**We disagree with the reviewer's disposition of Bruce Power's response. No additional change to the I&E Plan is required.** *Endpoint* and *threshold* are not synonymous. *Threshold* refers to an effect level, while *endpoint* refers to a condition that must be met in order to cease monitoring. The phrase "effect to regional abundance" was removed from the I&E Plan (as noted by the Reviewers when quoting Bruce Power's response). Therefore, the Bruce Power response should be considered satisfactory. The EA FUP effect tests for entrainment and impingement include both regional effects and local effects (see p. 37 of the I&E Plan for discussion of CNSC comments on the proposed EA FUP Work Plan). Therefore, the I&E Plan proposes the QMA 4-4 spatial boundary for determination of "regional" effects and the I&E Plan proposes the use of test values (percentages of the QMA 4-4 quota) for determination of potential "local" effects. The phrase "all four units in operation" was removed. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
234	"*Following the initial two years of entrainment sampling, data will be analyzed to determine if the annual entrainment impacts fall below the agreed upon thresholds for effect. If so, entrainment sampling will cease at this point. If not, Bruce Power will consult with and provide agencies and stakeholders with their opinion on options for future sampling and possible additional mitigation measures.*" This statement is highly problematic, for several reasons. First, as discussed in detail above, the UofG Team is seriously concerned about the appropriateness of assumptions and data collection for estimation of fish entrainment estimates. Second, as discussed in detail above, the threshold must be explicitly defined and approved before the E/I Monitoring Plan is approved. Third, how do we know that two years of sampling is appropriate for this evaluation? Fourth, how do we know that entrainment thresholds are not likely to be exceeded after the second year of sampling? **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** Comment #234 does not identify any additional recommendations for change with respect to entrainment data collection. It is not necessary to explicitly define the threshold before implementing monitoring. Bruce Power will continue to consult on the issue of thresholds and endpoints. Two years of sampling has been proposed based on professional judgment. This was open for discussion at the I&E Plan workshop (August 3, 2011). No other stakeholders indicated any concern with this time frame (see Appendix A, I&E Plan). Results will be reported annually, and future concerns can be discussed at the appropriate time.
235	"*The thresholds for effect to the QMA 4-4 lake whitefish population and the lake whitefish from a population which is distinct within the EA local study area (based on the 0.50, 20, 50 and 100 % test values) will each be analyzed separately; proxies for determining populations within the local study area may be derived from sampling data though the ongoing genetics studies will likely be the ultimate determinant of whether or not local populations exist.*" As discussed in detail above, the entire approach to representing lake whitefish populations in the proposal (quota management area boundary, "genetic distinctness", "EA local study area", percentage association to "EA local study area") taken as a whole is highly inappropriate for the E/I Monitoring Plan. Aside from the fact that BP has not advised the UofG Team that it has made undefined plans for "genetic studies" in addition to the SON-BP Collaborative Whitefish Research Program, it is highly unlikely that "the ongoing genetics studies will likely be the ultimate determinant of whether or not local populations exist." **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** Comment #235 does not identify any additional recommendations for change.
236	"*If Bruce power falls below the threshold for effect to one of these effect tests, but not the others, Bruce Power will provide recommendations for adjustments/alterations to the current monitoring plan to address only impacts to the respective populations being studied.*" This statement makes no sense – grammatically or logically. **BP Response:** The sentence was re-worded as follows: "If entrainment and impingement numbers fall below the threshold for effect to one of these effect tests, but not the others, Bruce Power will provide recommendations for adjustments/alterations to this Plan to address only impacts to the respective populations being studied." [p. 40] **UG Team Evaluation of BP Response:** Unsatisfactory. The statement remains illogical.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power has reviewed the revised statement and has not identified any issues with grammar, logic, or clarity.
237	Since patterns of larval fish entrainment may fluctuate on temporal scales beyond the proposed 2 year sampling period of this project, it is not advised to cease entrainment sampling. To the contrary, sampling should continue to ensure that entrainment is not significantly affecting the lake whitefish population(s). That is, it should not be assumed that the aquatic ecosystem is static. Cumulative effects, climate change, etc., all may have an influence on the relative effect of BNGS. Further, since population abundance estimates can change from year to year, the relative impact of BNGS might also change. As such, entrainment sampling should be an ongoing program which serves to determine potential future significant effects, as well as to inform or highlight potential future problems. **BP Response:** None**.**	Sampling should continue to ensure that entrainment is not significantly affecting the lake whitefish population(s).	**No additional change to the I&E Plan is required.** Bruce Power acknowledges that the aquatic ecosystem is not static, and entrainment effects could vary on annual temporal scales. However, the goal of the EA FUP is to test the conclusions made in the EA. Specifically, the EA concluded that the restart of Units 1 and 2 would have a minor adverse effect on lake whitefish populations. It is not necessary to maintain a monitoring program indefinitely for the purpose of testing this statement.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
238	"*As noted above, impingement is defined as the process by which organisms which are generally larger than or equal to either the Bruce A (Units 1-4) cooling water pump intake screens or the cooling water travelling screens are held against the screens by the through-flow.*" As discussed above, the UofG Team has identified serious problems with the proposed definition of impingement. It is important to note the distinction between the juvenile/adult forebay entrainment and the juvenile/adult forebay impingement = the portion of those adults that become impinged on the travelling screens and flushed into a sample bin. **BP Response:** This section has been moved to Section 4.4 (Impingement) starting on p. 30. The definition of impingement has been reworded as follows: "As described in Section 1.4, impingement is defined as the process by which organisms that are generally larger than or equal to the Bruce A (Units 1-4) cooling water pump intake screen mesh are held against the screens by the intake cooling water flow." [p. 30] **UG Team Evaluation of BP Response:** Unsatisfactory. See UG-038-041.	It is important to note the distinction between the juvenile/adult forebay entrainment and the juvenile/adult forebay impingement = the portion of those adults that become impinged on the travelling screens and flushed into a sample bin.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The definition of impingement has been clarified as noted by the Reviewer. This definition is specific and suitable for operations. Therefore, the Bruce Power response should be considered "Satisfactory." Comments #38-41 have been reviewed, and no required changes to the I&E Plan were identified.
239	"*The impingement component of this follow-up monitoring study will consist of: Impingement monitoring to identify the species, quantity and sizes of fish impinged on the Bruce A (Units 1-4) pump intakes and travelling screens during normal plant operations.*" The UofG Team has serious concerns that assessment of travelling screens grossly underestimates the juvenile/adult forebay entrainment of lake whitefish. **BP Response:** The sentence has been re-worded to remove "travelling screens" as follows: "Impingement monitoring to identify the species, quantity and sizes of fish impinged on the Bruce A (Units 1-4) pump intake screens during normal Bruce A station operations; and," [p. 30] **UG Team Evaluation of BP Response:** Unsatisfactory. Editorial change of the term "travelling screen" does not address the outstanding concerns regarding assessment of impingement.	No change recommended.	**No additional change to the I&E Plan is required.** The Reviewers have not identified any recommendations for change to the I&E Plan. Concerns with respect to impingement monitoring have been raised in other comments, and Bruce Power has replied to each of those comments.
240	"*Impingement sampling will monitor and calculate if there is a statistically significant change in impingement quantities and rates coincident with the Operations Phase, and the biological relevance of the impingement on the target VEC species.*" If juvenile/adult forebay entrainment assessments during both Pre-Operations and Operations Phases are indeed grossly underestimated by juvenile/adult forebay impingement samples, the between-Phase differences in impingement samples would be largely irrelevant. **BP Response:** The sentence has been re-worded to read: "Impingement sampling will provide a pathway to monitor direct impacts to VEC species." [p. 30] **UG Team Evaluation of BP Response:** Unsatisfactory. The updated change does not identify how "impingement sampling will provide a pathway". Concerns regarding juvenile/adult forebay entrainment assessments remain outstanding.	No change recommended.	**No additional change to the I&E Plan is required.** The Reviewers have not identified any recommendations for change to the I&E Plan. Concerns with respect to impingement and entrainment monitoring have been raised in other comments, and Bruce Power has replied to each of those comments.
241	"*As with past impingement studies, collected data will be used to identify temporal trends in impingement. To the extent that prior methods were successful and repeatable it is proposed that impingement sampling methods follow prior sampling protocols, previously developed by Bruce Power, to maximize the likelihood that past studies and the proposed Operations Phase impingement sampling can be statistically compared.*" How do we know that methodology employed in past impingement studies is appropriate for estimating juvenile/adult forebay entrainment? The issue of statistical comparison is secondary to the establishment of reliable methodology for accurate and precise estimates of juvenile/adult forebay entrainment. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Comment #241 does not identify any recommendations for change. Note that the proposed impingement and entrainment monitoring methods are discussed in the I&E Plan.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
242	"*As outlined in the established Bruce Power impingement protocols, sampling is proposed to occur three times per week per unit [Howes 2004a; Howes 2004b]. All impinged fishes, with a primary focus on lake whitefish and spottail shiner as these are the impingement target species, will be identified and recorded during this study. As necessary, ongoing efforts will be made to improve monitoring protocols and guidelines on impingement procedures and fish collection/identification techniques.*" How do we know that impingement sampling three times per week per unit is appropriate for the E/I Monitoring Plan? What specifically are the deficiencies that need to be improved in the existing "monitoring protocols and guidelines on impingement procedures and fish collection/identification techniques"? How will we know when these improvements are sufficient for the E/I Monitoring Plan? **BP Response**: None.	No change recommended.	**No additional change to the I&E Plan is required.** The collection baskets will be emptied (and contents analyzed) at least three times per week. Although screen washes may occur in between sampling events, the collection baskets will retain the contents until the next sampling event. Bruce Power is implementing a QA plan to ensure operator training in fish identification and ensure adequacy/completeness of data collected. At this time, operators are assisted by a Golder Associates technician during sampling events (three times per week) to ensure that fish identifications are accurate.
243	"*Table 8.4.1-1 of the 2008 Work Plan (Appendix B) indicates that the Operations Phase monitoring objective for Element 3.4, lake whitefish and spottail shiner impingement, is to determine the relative abundance of lake whitefish and spottail shiner juveniles and adults susceptible to impingement, and to confirm the EA finding of no significant adverse effects to lake whitefish and spottail shiner due to impingement from condenser cooling water system operation during the Operations Phase.*" There are several key aspects of this statement that require attention. First, the focus on determining "relative abundance" of juveniles/adults that are "susceptible to impingement" requires clarification. Second, the term "relative abundance" means a correlate index rather than an absolute estimate of the number of individuals -this is inconsistent with the approach proposed for entrainment assessment and the objective of the E/I Monitoring Plan. Third, the term "susceptible to impingement" could refer to the number of juveniles/adults in the entrainment risk regions surrounding the water intake, or it could refer to the number of juveniles/adults already in the impingement risk regions in the forebay. These terms of reference must be more rigorously defined in the E.I Monitoring Plan. **BP Response:** This section has been removed – largely incorporated into Section 1.3 (Study Goal and Objectives). **UG Team Evaluation of BP Response:** Satisfactory. But see concerns regarding Study Goal and Objectives.	n/a	n/a
244	"*Table 8.4.1-1 of the 2008 Work Plan (Appendix B) indicates that the Operations Phase monitoring objective for Element 3.4, lake whitefish and spottail shiner impingement, is to determine the relative abundance of lake whitefish and spottail shiner juveniles and adults susceptible to impingement, and to confirm the EA finding of no significant adverse effects to lake whitefish and spottail shiner due to impingement from condenser cooling water system operation during the Operations Phase.*" There are several key aspects of this statement that require attention. First, the focus on determining "relative abundance" of juveniles/adults that are "susceptible to impingement" requires clarification. Second, the term "relative abundance" means a correlate index rather than an absolute estimate of the number of individuals -this is inconsistent with the approach proposed for entrainment assessment and the objective of the E/I Monitoring Plan. Third, the term "susceptible to impingement" could refer to the number of juveniles/adults in the entrainment risk regions surrounding the water intake, or it could refer to the number of juveniles/adults already in the impingement risk regions in the forebay. These terms of reference must be more rigorously defined in the E.I Monitoring Plan. **BP Response:** This section has been removed – largely incorporated into Section 1.3 (Study Goal and Objectives). **UG Team Evaluation of BP Response:** Satisfactory. But see concerns regarding Study Goal and Objectives.	n/a	n/a

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
245	"*As described for entrainment, the presence or absence of lake whitefish and spottail shiner early life stages (eggs and larvae) in ambient waters will be assessed during the source water sampling proposed in Section 3.*" This statement does not belong in this section. **BP Response:** See UG-243. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG-243.	This statement does not belong in this section.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** This sentence was removed from the I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory." Bruce Power has reviewed Comment #243. However, the Reviewers considered the Bruce Power response to Comment #243 to be "satisfactory." Therefore, the Bruce Power response to Comment #245 should be considered "Satisfactory" as well.
246	*For juvenile and adult life stages the presence and abundance of these species will be obtained from USGS/MNR trawl data, where available, coupled with any relevant (previous or future) fishery work that is occurring as part of other Bruce Power programs. This may be complemented by data from MNR index netting, the commercial fishery and/or the recreational fishery, to the extent available and applicable.*" These statements are so sweeping and conditional as to mean nothing at all. A much more rigorous approach is required to define explicitly how the abundance of juvenile/adult abundance in source water will be undertake -with an explanation of why the proposed methodology is appropriate for the E/I Monitoring Plan. **BP Response:** See UG-243. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG 243.	A much more rigorous approach is required to define explicitly how the abundance of juvenile/adult abundance in source water will be undertake -with an explanation of why the proposed methodology is appropriate for the E/I Monitoring Plan.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The identified phrase is not present in the final I&E Plan. Therefore, the Bruce Power response should be considered "Satisfactory." Additionally, source water trawling methodology is described in Section 4.2. Finally, Bruce Power has reviewed Comment #243. However, the Reviewers considered the Bruce Power response to Comment #243 to be "satisfactory." Therefore, the Bruce Power response to Comment #246 should be considered "Satisfactory" as well.
247	Despite previous requests for relevant documentation, the UofG Team has not been provided with the data/documentation associated with Bruce Power's 1977-1981, 2004-present impingement assessment program, as had been requested. **BP Response:** None. This section has been moved to Section 4.4.1 (Review of Historical Data) on p. 31.	No change recommended.	**No additional change to the I&E Plan is required.** We will consider requests for information made through appropriate channels. Bruce Power has provided the University of Guelph research team with a point-of-contact for such requests.
248	As discussed above, the UofG Team has serious that assessment of travelling screens grossly underestimates the juvenile/adult forebay entrainment of lake whitefish. How do we know that the impingement assessment methodology will satisfy the needs of the E/I Monitoring Plan? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Comment #248 does not identify additional recommendations for change. The Reviewers' concerns with respect to impingement have been addressed with the appropriate comments.
249	While this section deals explicitly with impingement data, the questions/comments are the same as those described for the section on entrainment data. Specifically, how are the findings going to be compared, and to what extent will the results of the comparison inform the proposed study? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Comment #249 does not identify additional recommendations for change. Note that statistical analyses are described in Section 4.5.
250	Will comparisons be balanced against the possibility that the population of whitefish has changed since the original studies were performed? How are the limitations of historical data going to be addressed in the study? What statistical comparisons will be made? What assumptions are required to perform the necessary statistical analyses? Are these comparisons univariate? Will appropriate Time Series, Spatial or Spatio-temporal methods be used? Has Simpson's Paradox been considered? How will the results be interpreted and communicated if the statistical power is limited? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Comment #250 does not identify additional recommendations for change. Proposed statistical analyses are described in Section 4.5. As noted on p. 35, the "statistical techniques… should be considered as initial approaches. Consistent with an adaptive management approach and the possibility of identifying new factors to be considered as a result of Operations Phase monitoring, additional statistical analysis or inclusion of additional covariates may be considered and included in reporting…" Potential limitations of the analysis will be discussed during the reporting.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
251	It should be noted that Lauren Overdyk (UofG Grad Student, Whitefish Entrainment Research Project, SON-BP Collaborative Whitefish Researach Program) is undertaking a comprehensive review of the historical BNGS impingement assessment methodologies and data, with the purpose of evaluating the value of these data in future assessment of impingement and juvenile/adult forebay entrainment. This research project should be considered when developing juvenile/adult forebay entrainment assessment protocols for the E/I Monitoring Plan. **BP Response:** None.	This research project should be considered when developing juvenile/adult forebay entrainment assessment protocols for the E/I Monitoring Plan.	**No additional change to the I&E Plan is required.** Bruce Power is committed to the partnership with the Saugeen Ojibway Nation (and partner University of Guelph). Research results, when available, will be evaluated by Bruce Power and considered for inclusion with respect to the EA FUP.
252	As discussed above, the UofG Team has serious that assessment of travelling screens grossly underestimates the juvenile/adult forebay entrainment of lake whitefish. How do we kow that the "existing Bruce Power impingement protocols" will satisfy the needs of the E/I Monitoring Plan? **BP Response**: Paragraph has been altered slightly to now read (italics added to emphasize new text): "Impingement sampling will identify and quantify the adult and juvenile fishes in the intake cooling water that are captured on the pump intake screens. Impingement sampling will be conducted using existing Bruce Power impingement protocols [Howes 2004a; Howes 2004b]. Protocols are currently being revised and developed, as needed." [p.31]. **UG Team Evaluation of BP Response:** Unsatisfactory. The editorial changes do not address the outstanding issues and concerns regarding juvenile/adult forebay entrainment sampling.	No change recommended.	**No additional change to the I&E Plan is required.** Comment #248 does not identify additional recommendations for change. The Reviewers' concerns with respect to impingement have been addressed with the appropriate comments.
253	"*Impinged fish will be collected for a 24-hour period at each of the Bruce A station pumphouses (Units 1-4)…. Prior to each 24-hour impingement sampling event, the travelling screens will be rinsed to remove debris and organic material. Following the 24-hour impingement sampling event, the screens will again be rinsed and the impinged material will be washed into a collection apparatus….*" "*The traveling screens are currently set to operate based on differential pressure, as well as on a time. If a large amount of impinged material is collected during a sampling event, the travelling screens may need to be washed dung the 24-hour period. If this occurs, all collected impingement sampling material will be combined at the end of the 24-hour sampling period to represent one sampling event.*" As discussed in detail above previous BNGS impingement assessment did not record or take into account pressure differential or operator over-ride screen washes and unscheduled bin transfers to the onsite landfill, thus reducing or eliminating the utility of the impingement assessment data. How do we know that these problems will not continue in the E/I Monitoring Plan? **BP Response**: The following text has been added to the paragraph (italics added to emphasize new text): "The pump intake screens are currently set to operate based upon differential pressure, as well as on a timer. It is noted that the bins which receive fish vary somewhat between the units, with Unit 3 and 4 having more recently upgraded collection methods installed. For this reason, all data will be cross referenced to the specific collection apparatus / bin from which it is obtained. If a large amount of impinged material is collected during a sampling event, the pump intake screens may need to be washed during the 24-hour period. If this occurs, all collected impingement sampling material will be combined at the end of the 24-hour sampling period to represent one sampling event. *The duration between screen rinses and sampling events will be recorded to the extent this is feasible with existing technology already installed.*" [p. 31] **UG Team Evaluation of BP Response:** Unsatisfactory. Recording of screen rinses should not be constrained by technology that has already been installed.	No change recommended.	**No additional change to the I&E Plan is required.** Bruce Power operators have received additional training on impingement protocols. Unscheduled sampling of the collection baskets is not expected to be a concern. However, any time the baskets are emptied, operators will conduct the required impingement sampling.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
254	"*Following each travelling screen wash, the contents of the collection apparatus will be removed and all fish will be identified to the lowest practicable taxonomic level, sorted, and enumerated, as described in the existing Bruce Power impingement sampling protocol [Howes 2004a].*" How do we know that the (undefined) existing BP impingement sampling protocol will satisfy the needs of the E/I Monitoring Plan? **BP Response:** The following text was added after this sentence: "In addition to these parameters, protocols will be revised to include the collection of weights and lengths for all individuals of a fish species up to a total of 50 (per species) during a 24-hour impingement sampling event. New protocols will include a "priority assessment list" documenting the species of greatest importance to weigh and measure in the event that sufficient time/resources are not available to assess all fishes during a given event." [p. 31-32] **UG Team Evaluation of BP Response:** Unsatisfactory. The new protocols need to be explained and justified in this proposal, especially the sampling design and the undefined "priority assessment list."	No change recommended.	**No additional change to the I&E Plan is required.** Comment #254 does not identify additional recommendations for change. The sampling design does not require additional justification. Bruce Power protocols are undergoing review and minor revisions. Substantive changes, if any, will be communicated to the regulator at the appropriate time.
255	"*Should a large impingement event occur such that sub-sampling becomes necessary, the sub-sampling will proceed following the techniques described below in Section 2.3.6.*" This sentence does not make any sense -there is no section 2.3.6. **BP Response:** The cross-reference has been revised and the sentence now reads: "Should a large impingement event occur such that sub-sampling becomes necessary, the sub-sampling will proceed following the techniques described below in Section 4.4.2.5." [p. 32] **UG Team Evaluation of BP Response:** Unsatisfactory. The sub-sampling described in Section 4.4.2.5 is ill-defined and not justified statistically.	No change recommended.	**No additional change to the I&E Plan is required.** It is not anticipated that sub-sampling will be routinely required. However, any limitations in the data which may result from potential sub-sampling will be reported and discussed.
256	"*Fish populations fluctuate on an annual basis due to a number of factors, including year-class strength, weather patterns, spawning cycles, commercial and sport harvest rates, and disease. This variability in fish populations may also be reflected in annual impingement results. Because of inter-annual variation in composition and abundance of the fish community, it is important to have multiple years of data. As such, two years of impingement monitoring is recommended following the start of the Operations Phase.*" This statement is problematic, for several reasons. First, it underscores the importance of understanding the dynamics of a biological population, although the E/I Monitoring Plan utilizes artificial representations (i.e. MNR quota management area 4-4, "EA local study area") which are highly unlikely to correspond to the population structure of lake whitefish in Lake Huron. Second, the E/I Monitoring Plan has already recognized that the previous impingement data sets are unlikely to be useful as part of an integrated time series for statistical analyses. How do we know that the impingement assessment for the E/I Monitoring Plan will not suffer the same fate? Third, why is the focus shifter from distribution and abundance of fish populations to "composition and abundance of the fish community"? Fourth, how do we know that two years is an appropriate period of time ("multiple years") for Operations Phase impingement monitoring to be able to satisfy the objectives of the E/I Monitoring Plan? **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** The MNR QMA 4-4 was selected in order to represent the regional area. Bruce Power is confident that impingement data collected as part of the I&E Plan will be suitable for the plstatistical anned analyses. If limitations are apparent during analysis, these will be reported and discussed. Bruce Power will not be analyzing the composition and abundance of fish populations (although planned genetic analysis may provide insight into population structure). Two years of sampling has been proposed based on professional judgment. This was open for discussion at the I&E Plan workshop (August 3, 2011). No other stakeholders indicated any concern with this time frame (see Appendix A, I&E Plan).

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
257	"*As with annual variability, fish communities also exhibit seasonal fluctuations in abundance and composition. Seasonal fluctuations may be caused by spawning cycles, changes in water temperature, distribution of food resources, or a combination of these and other interrelated factors. Based upon historic impingement results from the Bruce Power site and the life histories of lake whitefish and spottail shiner, impingement sampling throughout the year is recommended to better quantify the seasonal variability in impingement rates.*" This statement is problematic, for several reasons. First, the reference to abundance and composition of "fish communities" is once again inappropriate in this population assessment context. Second, how do we know that previous impingement assessments support sampling throughout the year? Third, how do we know that seasonal variability in impingement rates need to be better quantified? **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** Comment #257 does not identify any additional recommendations for change.
258	"*In order to account for diel variability, it is recommended that a composite 24-hour sample is collected during each impingement sampling event.*" This sentence does not make sense. How can a "composite 24-hour sample" provide any meaningful insight into diel (day-night) impingement variability? **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** The I&E Plan does not intend to determine diel variability. Rather, the quoted statement indicates that sampling for less than 24 hours may result in bias due to diel variability. Therefore, 24 hr sampling periods were recommended for the plan. The collection baskets will be emptied (and contents analyzed) at least three times per week. Although screen washes may occur in between sampling events, the collection baskets will retain the contents until the next sampling event. Operators will perform sampling and content analysis every time a basket is emptied. Therefore, all contents retained since the last sampling event will be counted. Sampling events may reflect times greater than 24 hours. This is a minor operational improvement to the plan, which will allow for counts of all impinged fish .
259	Assessing the data at multiple scales is highly recommended. It is suggested that relevant Time Series methods be used to determine/account for any autocorrelation, and to potentially determine annual, seasonal, diel level patterns. Further, the data might best indicate the temporal scale that is most appropriate, and this may include other scales. A full temporal analysis is recommended. It is also recommended that temporal analysis incorporate variables to account for fish presence variability. This should include main effects, and tests for interactions between variables (i.e., simple effects). **BP Response:** None**.**	A full temporal analysis is recommended.	**No additional change to the I&E Plan is required.** Relevant temporal analysis will be considered during the analysis phase.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
260	The first sentence in this statement is very cryptic. How do we know that the (undefined) "preliminary sampling frequency analysis" was appropriate for the (poorly defined) objective of the analysis. The second sentence does not make any sense. **BP Response**: None. This section is now located in 4.4.2.3. (Sampling Frequency) starting on p. 33.	No change recommended.	**No additional change to the I&E Plan is required.** Comment #260 refers to the following quoted text (included here for completeness): "In development the impingement sampling methods proposed within this plan, a preliminary sampling frequency analysis was completed to determine whether changes in impingement rates following the start of Operations Phase would be statistically detectable at various scales. Since all intake water for the Bruce A station cooling system will be drawn from the same forebay, it is desirable to determine if potential impingement changes due to the re-start of Units 1 and 2 are related to the predicted increase in intake flow." This text was updated with minor editorial changes (I&E Plan, p. 33) as follows: "In developing the impingement sampling methods proposed within this Plan, a preliminary sampling frequency analysis was completed to determine whether changes in impingement rates following the start of the Operations Phase would be statistically detectable at various scales. Since all intake cooling water for the Bruce A station will be drawn from the same forebay, it is desirable to determine if potential impingement changes due to the restart of Units 1 and 2 are related to the predicted increase in intake cooling water flow." Bruce Power has reviewed the relevant text in the I&E Plan and has not identified any issues with clarity. The statement refers to a preliminary analysis of impingement rates, based on historical data, with respect to intake flow. As indicated in the Plan, "Bruce A station intake cooling water flow had no statistically significant relationship to impingement… there is no ability to predict future impingement following the start of the Operations Phase based on prior impingement and Bruce A station intake cooling water flow data."
261	It is not clear if the data satisfy the assumptions of ANCOVA. For example, the text seems to indicate that the data were zero-inflated, which would suggest the possibility of non-normality. **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** We have reviewed the ANCOVA test described on p. 33 of the I&E Plan and determined that the assumptions of ANCOVA (normality, homogeneity of variances, and homogeneity of regression slopes) were not met. Nonetheless, the sampling plan was not designed based on the determination of whether the rate of impingement is related to intake cooling water flow. The intent of the I&E plan is to "provide a rigorous estimate of annual impingement (and entrainment) during the Operations Phase" and is not intended to "provide a before-and-after study" (I&E Plan, p. 34). It is not necessary to revise the I&E Plan or re-analyze the data with an appropriate non-parametric statistical test. As noted in the Plan, "before/after statistical analysis will be completed where sufficient and reliable historical data exists" (I&E Plan, p. 36). Assumptions and limitations of any further statistical testing will be discussed through the Annual Reports.
262	How were the data grouped by month? If aggregation occurs, are there subsequent analyses to test for issues associated with Simpson's Paradox? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** We have reviewed the ANCOVA test described on p. 33 of the I&E Plan and determined that the assumptions of ANCOVA (normality, homogeneity of variances, and homogeneity of regression slopes) were not met.
263	Do the data grouped by month, which seemingly suffer from zero-inflated data, satisfy the homoscedastic requirement of the ANCOVA? **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** We have reviewed the ANCOVA test described on p. 33 of the I&E Plan and determined that the assumptions of ANCOVA (normality, homogeneity of variances, and homogeneity of regression slopes) were not met.
264	ANCOVA assumes a linear relationship between outcome (impingement level) and the explanatory covariate flow. Is this valid? Do the residuals support this? **BP Response:** None**.**	No change recommended.	**No additional change to the I&E Plan is required.** We have reviewed the ANCOVA test described on p. 33 of the I&E Plan and determined that the assumptions of ANCOVA (normality, homogeneity of variances, and homogeneity of regression slopes) were not met.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
265	"*Since no relationship to flow was detectable, we assumed an overall increase in numerical impingement of 25% following the start of the Operations Phase and equal variances during the Refurbishment Phase and the Operations Phase.*" Were the analyses repeated using other increases in overall numerical impingement? Were decreases considered? How were the increases applied? Were they applied to the monthly impingement results, or were the analyses conducted using the aggregated yearly data? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Analyses were repeated with other increases in overall numerical impingement. (In fact, the relevant text was quoted by the Reviewers between Comment #267 and #268.) Increases of 25%, 50%, and 100% were considered. Decreases were not considered.
266	Are other sampling methods available that might provide the same power for a smaller increase in impingement? That is, the report suggests that the proposed sampling method would only identify a statistically significant difference if the total impingement increases by more than 160% of the 2005 levels. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** The Reviewers have not provided suggestions or recommendations for other sampling methods.
267	While it is not obvious, it seems that the power study was conducted using annual data. It may prove beneficial to consider this on a monthly or seasonal scale, so as to address differences in fish movement and behaviour throughout the year. This would likely inform the sampling strategy – increasing sampling when and where necessary. How was the 25% value determined? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Monthly analysis will be considered during the analysis phase (see p. 35). Impingement analysis will be conducted each time the baskets are emptied. This will allow Bruce Power to provide a "rigorous estimate of annual impingement" (p. 34, I&E Plan).
268	As discussed in detail above, the UofG Team has serious concerns about the utility of data from previous BNGS impingement sampling programs to serve as a basis for determining future sampling designs. How do we know that averaging of the 2005/2006 datasets is a reasonable option for design of the E/I Monitoring Plan? Taken as a whole, the UofG Team is highly skeptical about the rationale, assumptions, and calculations used in the E/I Monitoring plan to propose impingement sampling effort. **BP Response**: The following sentences were added to the last paragraph: "However, the intent of this Plan is not to provide a before-and-after study. These analyses will be completed if possible, but the intent of this Plan is to provide a rigorous estimate of annual impingement (and entrainment) during the Operations Phase." [p.34] **UG Team Evaluation of BP Response**: Unsatisfactory. The goals of the plan should be clearly sated. Each hypotheses should be clearly stated. Each statistical method used to test the hypotheses should be clearly stated (including assumptions). If the plan is not to provide a before-and-after study, what is the goal? Do the methods in the document support the hypotheses created to satisfy the goals?	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Comment #268 does not identify any new recommendations for change. However, the goals and methods have been clearly indicated in the I&E Plan. Indeed, the Reviewers quoted the following text: "the intent of this Plan is to provide a rigorous estimate of annual impingement… during the Operations Phase." The Bruce Power response should be considered "Satisfactory." The I&E Plan is not based on the "averaging of the 2005/2006 datasets" as indicated by the Reviewers.
269	As discussed in detail above, the UofG Team has serious concerns regarding the timing and recording of screen washes and bin sampling, as well as inaccurate statements in the E/I Monitoring Plan about the ability to account for diel variability in a 24-hour composite sample. **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Comment #269 does not identify any new recommendations for change. Basket contents will not be discarded without analysis. Impingement sampling is not intended to quantify diel variability.
270	Sampling intensity should attempt to maximize the power of the analysis. For that reason, it is suggested that more than 3 sampling events occur per week per each of the intakes. **BP Response:** None.	It is suggested that more than 3 sampling events occur per week per each of the intakes.	**No additional change to the I&E Plan is required.** Bruce Power considers that 3 sampling events is a reasonable choice given the need to balance effort and expense with quality data. However, basket contents will not be discarded between sampling events. All samples retained in the baskets will be analyzed.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
271	Since the operation of one intake may influence impingement at other intakes (as it is assumed the water dynamics might change), specific details describing the flow of intake at each of the intake sites should be identified (even for those that are not in operation) and incorporated into any statistical analyses. **BP Response:** None.	Specific details describing the flow of intake at each of the intake sites should be identified and incorporated into any statistical analyses.	**No additional change to the I&E Plan is required.** The intake flow for each Unit is being recorded, so the requested analysis may be possible. However, the goal is to quantify total annual impingement. Therefore, the requested analysis is not planned at this time.
272	"*Sampling magnitude refers to the amount of impinged material sampled relative to the total plant impingement during a sampling event. Sampling magnitude during Operations Phase impingement sampling will follow existing Bruce Power impingement protocols, which require sampling all impinged fishes from all of the units at the Bruce A station. The only exception to impingement sampling at all four units at the Bruce A station will be during periods where a given unit is not in operation [Howes 2004a]. Such occurrences will be clearly noted in a sample log.*" There are several issues in this statement that require comment. First, while not explicitly explained, it is implied that "total plant impingement" refers to all juvenile/adult forebay entrainment; "impinged material sampled" means the portion of juvenile/adult forebay entrainment that comes into contact with the travelling screens and is transported into the pumphouse, washed off the screens, and flushed into a collection bin that is assessed. Second, as discussed in detail above, the UofG Team has serious that assessment of travelling screens grossly underestimates the juvenile/adult forebay entrainment of lake whitefish. How do we know that the "existing Bruce Power impingement protocols" will satisfy the needs of the E/I Monitoring Plan? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** Impingement and entrainment definitions are clearly indicated on p.3 of the I&E Plan. Comment #272 does not identify any additional recommendations for change. However, the I&E Plan does address concerns regarding the impacts of entrainment through the proposed entrainment sampling. This will allow quantification of fish which are entrained into the forebay but are too small to be collected in the travelling screen collection baskets.
273	"*Where possible, based upon the completeness and reliability of historical impingement data, statistical analyses will be used to compare multiple impingement variables listed below prior to and during the Operations Phase.*" The E/I Monitoring Plan has already recognized that the previous impingement data sets are unlikely to be useful as part of an integrated time series for statistical analyses. **BP Response:** This section was moved and is now in Section 4.5.1 (Statistical Analyses) starting on p. 34. The following sentence was added: "Due to the variability in sampling methods of certain historic data, and in consideration of the time elapsed from a fish population perspective (i.e. many of these fish would have succumbed by this time), more recent data collected as part of this Plan is anticipated to be of greater utility than historic information." [p. 34-35] **UG Team Evaluation of BP Response:** Unsatisfactory. While it seems logical that more recent data would be more useful to the analyses, the reference to "time elapsed from a fish population perspective" does not make sense.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan recognizes that there may be limitations with historic data. As noted on p. 34, "the intent of this Plan is not to provide a before-and-after study. These analyses will be completed if possible, but the intent of this Plan is to provide a rigorous estimate of annual impingement (and entrainment) during the Operations Phase." Bruce Power has reviewed the updated sentence (pp. 34-35) and not identified any issues with respect to clarity. Both Bruce Power and the Reviewers agree that more recent data will be more useful to the analysis. Therefore, the Bruce Power response should be considered "Satisfactory."
274	"*Additional variables will be considered as necessary.*" This sentence does not mean anything. **BP Response:** The sentence was changed to now read: "Additional variables may be considered where sufficient and reliable historic data or information collected as part of this program is available." [p. 34] **UG Team Evaluation of BP Response:** Unsatisfactory. The statement still means very little. The use of the phrase "may be" does not suggest that anything will be done.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan is specific with respect to the variables which will be considered during the analysis phase (see pp. 35-36). It may be possible to consider additional variables, but Bruce Power is not able to commit in advance to additional analysis that may not be possible without "sufficient and reliable historic data". Therefore, Bruce Power will may consider additional analyses at a future time. The Bruce Power response should therefore be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
275	A Mann-Whitney U-test assumes independent data. The independence assumption may be in question given temporal and spatial correlations that might exist in the data. The assumptions should be explicitly tested to verify the use of this statistical method. **BP Response:** None**.**	The assumptions should be explicitly tested to verify the use of [the Mann-Whitney U-test].	**No additional change to the I&E Plan is required.** Bruce Power concurs that statistical assumptions should be verified. This will be done as appropriate for the relevant statistical comparisons. Assumptions and limitations will be discussed through the annual reports.
276	Generalized Linear Models are recommended. Other links might include the logit, for logistic type regression. Additionally, spatial and temporal correlations should be considered, as well as the introduction of explanatory covariates. Finally, mixed models should be investigated (to accommodate sub-sampling). **BP Response:** None**.**	Generalized Linear Models are recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The I&E Plan notes that the GLM will be considered during the analysis (p. 35). Covariates will be considered. As noted in the Plan and quoted by the Reviewers in Comment #278, "additional statistical analysis or inclusion of additional covariates may be considered and included in the reporting" (p. 35). Therefore, the Bruce Power response should be considered "Satisfactory."
277	Log-transforming the data does not necessarily address autocorrelation or other correlations inherent to Time Series data. Generalized Linear Models are more appropriate. **BP Response:** None**.**	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Generalized linear models will be considered during the analysis (p. 35). Therefore, the Bruce Power response should be considered "Satisfactory."
278	"*Consistent with an adaptive management approach and the possibility of identifying new factors to be considered as a result of the study, additional statistical analysis or inclusion of additional covariates may be considered and included in reporting, at the discretion of Bruce Power and in consideration of consultation with applicable agencies.*" This statement is problematic, for several reasons. First, "adaptive management" is about reducing uncertainty (learning) about key uncertainties by taking a scientific approach to strategically deploying management options. "The possibility of identifying new factors to be considered" should not be considered a directly related to "adaptive management." Second, there is little of value in the broad and undefined reference to "additional statistical analysis or inclusion of additional covariates" that "may be considered." **BP Response:** None**.**	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Bruce Power concurs that adaptive management is "about reducing uncertainty… about key uncertainties by taking a scientific approach…" As noted in the 2008 Work Plan, "adaptive management accounts for periodic updates and adjustments to the Refurbishment and Operations Phase works and activities to ensure that the work is appropriately managed… The Follow-Up Program will be routinely re-evaluated and, if appropriate, the scope will be adjusted to consider factors such as…issues of uncertainty or concern." (2008 Work Plan, p. 2) Annual reporting, consultation, and potential incorporation of changes or new approaches is consistent with adaptive management. Therefore, it is not required to identify all statistical analyses or potential covariates at this time. Additional analyses of covariates will be considered during the analysis phase, and results will be reported annually. This is consistent with adaptive management, and therefore the Bruce Power response should be considered "Satisfactory."
279	"*It is recognized that uncertainty may be added to the data at many levels throughout the study…*." This part of the sentence does not make sense. Uncertainty (indifferent forms), is an inherent component of any sample data – it does not have to be "added". **BP Response**: The sentence has been changed to now read: "Throughout the monitoring and reporting as part of this Plan, it is recognized that uncertainty exists within the data due to such factors as variability in subsampling procedures, varying historic sampling regimes, human error/oversight, natural biotic and abiotic factors." P. 35 **UG Team Evaluation of BP Response**: Satisfactory.	n/a	n/a
280	Aggregating historical data for analysis to limit the effects of single year or single event anomalies is not recommended. Models should be developed that will account for these fluctuations without affecting the overall ability of the model to determine differences year over year (or month over month, etc.). Mixed models are suggested, as anomalies can be captured in a random effect. That is, year specific (for example) anomalies can be captured while still retaining the ability to estimate *population-averaged* effects (here the term population refers to a statistical population, and not a biological one). **BP Response:** None**.**	Mixed models are suggested.	**No additional change to the I&E Plan is required.** Bruce Power will consider additional statistical analyses during the analysis phase. Limitations of the completed analyses will be discussed in annual reports. However, the goal is not to determine differences within months. Instead, the goal is to determine total annual impingement (and entrainment).

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
281	A quick comparison to the entrainment sampling design reveals a fundamental difference – and weakness – in the impingement sampling design for the E/I Monitoring Plan. There is no effort devoted to the estimation of abundance of juvenile/adult fish in the source water, for direct comparison to the abundance of juvenile/adult fish that are entrained in the forebay (regardless of whether they were sampled in the impingement assessment. The E/I Monitoring Plan must seriously reconsider these major omissions in its sampling design. **BP Response:** This section has moved to Section 4.5.2 (Variables) starting on p. 35. The following sentence was added addressing this point: "Daily, monthly, and annual lake whitefish and deepwater sculpin egg and larval densities within the source water in the vicinity of the Bruce A station intake;" [p.35] Note: in this section there are several instances where the term "entrainment" is incorrectly used instead of "impingement". **UG Team Evaluation of BP Response**: Unsatisfactory. The numerous concerns and issues related to entrainment sampling design remain outstanding.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The Draft I&E Plan which was initially reviewed included source water sampling for eggs and larval fish. In fact, Comments #97-113 refer directly to the source water sampling component of the I&E Plan. The 2012 I&E Plan still includes source water sampling (Section 4.2). However, the source water sampling does not include sampling for adult fish. Note that adult lake whitefish and adult deepwater sculpin do not utilize habitat in the vicinity of the Bruce A intake, with the possible exception of spawning lake whitefish (November-December). Sampling for adult deepwater sculpin and adult lake whitefish, outside of spawning times, will be futile. Therefore, sampling for adult fish will be provide little to no benefit at great cost. Additionally, impacts on adult fish will be determined through impingement sampling as these individuals are large enough to be retained by the travelling screens and collection baskets. Finally, the goal is not to determine quantities of fish entrained and impinged relative to source densities, but rather is to quantify totals of fish entrained and impinged. Therefore, source water sampling for juvenile fish, but not adult fish, is an appropriate component of the I&E Plan. The Bruce Power response should be considered "Satisfactory."
282	It is important to note that there is no reference to "fish impinged or entrained to their relative densities in source waters," or "relative densities in source waters" or "relative abundance of lake whitefish and spottail shiner juveniles and adults susceptible to impingement." The E/I Monitoring Plan focuses on absolute estimates of abundance/densities in both source water and BNGS system water. **BP Response:** See UG-281. **UG Team Evaluation of BP Response:** Unsatisfactory. See UG-281.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Bruce Power concurs that the I&E Plan "focuses on absolute estimates" of impingement and entrainment. Comment #281 was reviewed, and the Bruce Power response should be considered "Satisfactory." Therefore, the Bruce Power response for Comment #282 should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
283	The list of variables is satisfactory, however, there needs to be some explicit description of how these variables are going to be used to determine potential significance of BNGS on Lake Huron lake whitefish populations. **BP Response:** The text in this section has been expanded as follows: "Following the completion of the impingement and entrainment field sampling program outlined in this Plan, it is anticipated that the following variables will be calculated: Daily, monthly, and annual lake whitefish and deepwater sculpin egg and larval densities within the forebay; Daily, monthly, and annual lake whitefish and deepwater sculpin egg and larval densities within the source water in the vicinity of the Bruce A station intake; Daily, monthly, and annual lake whitefish and deepwater sculpin egg and larval live/dead ratios within the forebay; and Daily Bruce A station intake flow and annual entrainment expressed as total larval fish/fish eggs, and as total equivalent adults (age-1 or age-4 fish). Plant entrainment rates expressed as number of fish per million litres of Bruce A station cooling water intake flow (no. fish/ML) will also be calculated. Additional variables will be calculated as needed. Upon completion of the impingement field sampling program in this Plan, it is anticipated that the following variables will be calculated: Daily, monthly, and annual lake whitefish and spottail shiner juvenile and adult densities within the Bruce A station forebay; Daily Bruce A station intake flow and annual impingement expressed as total juvenile/adult fish, and as total age-4 (lake whitefish) or adult (spottail shiner) equivalents. Plant impingement rates expressed as number of fish per million litres of Bruce A station intake cooling water flow (# fish/ML) will also be calculated. Additional variables will be calculated as needed." [p. 35-36] **UG Team Evaluation of BP Response:** Unsatisfactory. Despite the elaboration, there is still no explicit description of how these variables are going to be used to determine potential significance of BPGS on Lake Huron lake whitefish populations.	There needs to be some explicit description of how these variables are going to be used to determine potential significance of BNGS on Lake Huron lake whitefish populations.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Effect levels and endpoints have not been determined at this time, but will be determined following additional discussion and consultation. Section 4.6 describes the approach that will be taken for effect tests and endpoints (with specific values to be determined). Therefore, the Bruce Power response should be considered "Satisfactory."
284	It is recommended that all point estimates be accompanied by either 95% confidence intervals, or in the case of Bayesian analysis, 95% credible intervals. **BP Response:** None**.**	It is recommended that all point estimates be accompanied by either 95% confidence intervals, or in the case of Bayesian analysis, 95% credible intervals.	**No additional change to the I&E Plan is required.** Appropriate confidence intervals will be reported.
285	The hypotheses are satisfactory if the variables are being considered independently. However, if that is the case, a problem with multiple testing arises. How is this being addressed? **BP Response:** This section has moved to Section 4.5.3 (Hypotheses) on p. 36. Text has been altered to read (italics emphasis added): "*Before/after statistical analyses will be completed where sufficient and reliable historical data exists*. The following hypotheses for each *of the entrainment and impingement* variables listed above will be tested *to compare historic (pre) and current Operations Phase data, where possible*:" [p. 36] **UG Team Evaluation of BP Response:** Unsatisfactory. The multiple comparison issue still exists.	No change recommended.	**No additional change to the I&E Plan is required.** Any limitations of the analysis will be discussed during the reporting.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
286	Testing the differences between daily and monthly values should necessitate the use of time series analyses. This should be made explicit. **BP Response:** None.	Testing the differences between daily and monthly values should necessitate the use of time series analyses.	**No additional change to the I&E Plan is required.** Time series analysis may be considered during the analysis phase. Limitations of the proposed analysis for daily and monthly values will be discussed during reporting.
287	At what level are the hypotheses being tested to determine 'significance'? What are the risks of Type II error? **BP Response:** None.	No change recommended.	**No additional change to the I&E Plan is required.** As noted in the I&E Plan, the alpha level will be 0.10. The risk of a Type II error is that the follow-up monitoring will fail to reject a false null hypothesis. The null hypothesis here refers to no difference in pre- and post-operations impingement and/or entrainment. Therefore, a Type II error would be the failure to determine that a statistically significant difference exists. The alpha level, appropriate confidence intervals, and risks of Type I and Type II errors will be reported.
288	The first sentence does not appear to be meaningful. The second sentence mistakenly presumes that there are both "local" and "regional" fish populations that will receive effects of juvenile/adult forebay entrainment. The second sentence also seems to contradict the previous statement that "the term regional as it pertains to impingement estimates is not proposed for use going forward." **BP Response:** This section is now located in Section 4.6 (Effects Tests and Endpoints for Follow-up Monitoring) on p. 36. This section has been expanded and altered. Approximate corresponding text now reads: **"**Results of the pre-Operations versus Operations Phase statistical analyses described in Section 4.5 will be used to differentiate statistically significant changes in entrainment and impingement rates. These analyses will allow for a comparison of entrainment and impingement rates with a maximum of two units (pre-Operations and historic data) versus four units (Operations Phase) in operation at the Bruce A station" [p. 36] **UG Team Evaluation of BP Response:** Unsatisfactory. Despite eliminating the confusing terminology regarding "local" and "regional" effects, the statistical basis for the proposed tests is not presented or justified.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The original Comment #288 refers to the following text (included here for completeness): "Results of the statistical analyses are expected to aid assessment of impingement impacts following the expected change in take flow associated with the Operations Phase. Actual Operations Phase impacts will be assessed by contextualizing the impacts on the local and regional fish populations and comparing them to existing metrics, as described below." The 2012 I&E Plan has made clear that "the term regional as it pertains to entrainment and impingement estimates is not to be used going forward. The boundary for describing entrainment and impingement that is proposed is the MNR boundary for QMA 4-4 which… provides a means against which lake whitefish data… can be calculated and compared." (p. 37) Effects on Lake Whitefish within QMA 4-4 are described in Section 4.6.1.1. Effects on Lake Whitefish within the Local Study Area are described in Section 4.6.1.2. It is not clear what the Reviewers refer to with respect to the "statistical basis for the proposed tests". As noted in the I&E Plan, limitations of the analyses will be discussed and reported. Therefore, the Bruce Power response should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
289	Thresholds should be determined in advance. As described in the comments pertaining to impingement, the identification of a risk map should be considered. **BP Response:** Text in this section has been changed to now read: "The effects tests and endpoints predictions will rely on the collective information obtained through the EAM and FFYM, coupled with Operations and Pre-Operations phase impingement and entrainment monitoring, including source water sampling. The EAM/FFYM analysis and pre-Operations versus Operations Phase analysis are mutually exclusive. Results of the pre-Operations versus Operations Phase statistical analyses described in Section 4.5 will be used to differentiate statistically significant changes in entrainment and impingement rates. These analyses will allow for a comparison of entrainment and impingement rates with a maximum of two units (pre-Operations and historic data) versus four units (Operations Phase) in operation at the Bruce A station. Analysis of entrainment and impingement rates over time, will determine if the increase in the number of units in operation has resulted in a significant statistical increase in impingement rates for the target VEC species and will yield an improved understanding of the factors which influence impingement and entrainment. If there is no statistically significant difference in the analyzed variables between the pre-Operations and Operations Phase then the determination of endpoints will rely solely on Operations Phase data. If statistical differences are observed (reject null hypothesis) then the possible reasons why, and the effect on the population using EAM and FFYM will be further investigated for both the pre-Operations and Operations phase, for that specific variable. Operations Phase effects at a population level will be assessed regardless of pre-Operations and Operations Phase comparisons will relate the observed Operations Phase impingement and entrainment rates to the proportional reduction in the population for that species within the MNR QMA 4-4 management unit and within the EA Local Study Area boundaries using test values which relate to the assumed proportion of the QMA 4-4 population within the EA Local Study Area. The effect tests and endpoints are discussed in Section 4.6.1 and 4.6.2, respectively." [p. 36] **UG Team Evaluation of BP Response:** Unsatisfactory. It is recommended that instead of proceeding as described in the following sentence: "If there is no statistically significant difference in the analyzed variables between the pre-Operations and Operations Phase then the determination of endpoints will rely solely on Operations Phase data." the data should be pooled in the event of no statistical significance. Further, how exactly are endpoints determined? How are the thresholds determined? While the updated plan is far more explicit, it seems that some of the initial questions are still unanswered/unaddressed. Finally. How is a reduction proportion calculated? This assumes that the population is known, and that only one population exists.	Thresholds should be determined in advance. The identification of a risk map should be considered. The data should be pooled in the event of no statistical significance.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** As noted in the plan, discussion of thresholds and endpoints will continue to take place. At this time, the I&E Plan focuses on quantifying the operational impacts. A risk map is not seen as beneficial at this time, but may be considered again in the future. Pooling pre-Operations and Operations Phase data is not seen as beneficial. Impacts should be determined based on expected operational conditions (i.e., all 4 units in commercial operation). Therefore, the Bruce Power response should be considered "Satisfactory."
290	"*Similar to entrainment, specific quantifiable effects thresholds due to impingement of lake whitefish and spottail shiner have not been identified nor agreed to with agencies and stakeholders and there is no specific regulatory guidance specific to Ontario that is available for determining impingement thresholds.*" As discussed above, the E/I Monitoring Plan cannot achieve its stated Goal until such time as an appropriate impingement effect threshold has been explicitly defined. Until such time as this threshold has been established, the E/I Monitoring Plan should not be finalized or approved. **BP Response:** None.	Until such time as this threshold has been established, the E/I Monitoring Plan should not be finalized or approved.	**No additional change to the I&E Plan is required.** Discussion of effect tests and endpoints will continue to take place. Bruce Power recognizes that monitoring will continue until endpoints have been defined, agreed to, and met.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
291	"*The effect test that was stated for Element 3.4 in the 2008 Work Plan (Appendix B) proposed that estimated impingement be compared with a threshold for effect to regional abundance. Per the CNSC's comments on the 2008 Work Plan, the threshold for effect was also to be applied to the presumed local population of lake whitefish. It has been previously described in this work plan that confusion regarding the terms regional and local may have occurred in the past. For the purpose of the impingement monitoring the boundaries and approaches for describing regional and local have been revised to be consistent with that described in the entrainment section and are to be discussed and agreed to by Bruce Power, regulatory agencies and stakeholders in terms of how they may be applied to any proposed thresholds.*" This statement is problematic for several reasons. First, as discussed above, "regional abundance" does not mean anything unless it is directly associated with the abundance of a "regional population" -and this is a presumption that neither CNSC nor BP should make. Second, an impingement effect threshold makes sense only with application to a biological population – there is no "also" alternative application. Third, CNSC's comments should be explicitly restated to minimize misinterpretation of those comments. Fourth, as discussed above, there are serious problems with the proposed revision of "the boundaries and approaches for describing regional and local" populations in the context of both entrainment and impingement assessment. **BP Response:** The following sentence was added: "Though it requires verification, it is presumed that CNSC's interpretation of local is related to a distinct local population of lake whitefish. The terms regional and local have in some cases been a source of confusion as these terms may relate to a spatial boundary (i.e., a Local Study Area, fish within a certain jurisdictional or management boundary) an ecological boundary (e.g., fish that inhabit a certain regional or local ecosystem with boundaries defined using natural features), fish "stocks" that have been captured within a certain management unit boundary (e.g., MNR quota management areas), or finally, genetically identified fish stocks or populations which have an affinity to any of the aforementioned spatial, ecological or management unit boundaries. For the purpose of this Plan, the boundaries and approaches for describing regional and local have been revised, as identified below, in terms of how they may be applied to any proposed thresholds." [p. 37] **UG Team Evaluation of BP Response:** Unsatisfactory. The CNSC's interpretation of population discrimination must be considered prior to proposal of this E/I Monitoring Plan. As discussed above, under terms of the SON-BP Collaborative Whitefish Research Program, the UG Team is tasked with the key uncertainity of population discrimination; this work must be incorporated into the E/I Monitoring Plan. The "boundaries and approaches for describing regional and local" in this plan remain suspect in both theory and evisence	The CNSC's interpretation of population discrimination must be considered prior to proposal of this E/I Monitoring Plan. Under terms of the SON-BP Collaborative Whitefish Research Program, the UG Team is tasked with the key uncertainity of population discrimination; this work must be incorporated into the E/I Monitoring Plan.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Effect thresholds will be based on the QMA 4-4 quota. The QMA 4-4 boundary provides a "defined and established management boundary for Lake Huron commercial fisheries in Ontario and provides a means against which lake whitefish data and EAM/FFYM and future direct, indirect or non-use benefits can be calculated and compared." (p. 37) Note that at this time, Bruce Power does not make any assumptions regarding lake whitefish population structure. Instead, potential scenarios will be considered, in which entrained and/or impinged lake whitefish are considered to derive from a genetically-distinct population within the Local Study Area. Between 0.5% and 100% of the impinged and/or entrained lake whitefish will be assumed to derive from this putative distinct population, and potential impacts on this putative population will be evaluated and reported. This is <u>not</u> an assumption regarding the actual population structure, but is instead a means of evaluating <u>potential</u> impacts on a <u>potential</u> distinct population (though no such population has yet been identified). Interpretation and incorporation of all stakeholder feedback, including the CNSC, is an ongoing process of the EA FUP. For example, stakeholder comments from the 2011 EA FUP workshop are indicated in Appendix A of the 2012 I&E Plan. Bruce Power has received no additional comments from the CNSC regarding the I&E Plan. Population discrimination is a major objective of the research partnership between Bruce Power and the Saugeen Ojibway Nation (with University of Guelph). Bruce Power has not received any research results regarding potential population structure of lake whitefish within Lake Huron. When the research results are available, those results will be evaluated and considered for incorporation into the EA FUP. Therefore, the Bruce Power response should be considered "Satisfactory."
292	Since patterns of whitefish impingement may fluctuate on temporal scales beyond the proposed 2 year sampling period of this project, it is not advised to cease impingement sampling. The reasons for this follow the same as those that are described for the entrainment follow-up monitoring program. **BP Response:** None**.**	It is not advised to cease impingement sampling.	**No additional change to the I&E Plan is required.** Bruce Power acknowledges that the aquatic ecosystem is not static, and entrainment effects could vary on annual temporal scales. However, the goal of the EA FUP is to test the conclusions made in the EA. Specifically, the EA concluded that the restart of Units 1 and 2 would have a minor adverse effect on lake whitefish populations. It is not necessary to maintain a monitoring program indefinitely for the purpose of testing this statement.

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
293	This statement has been largely copied/pasted verbatim from Section 4.5.1,1 and is highly problematic for exactly the same reasons as discussed for that section. **BP Response**: See UG-291. **UG Team Evaluation of BP Response**: Unsatisfactory. See UG-291.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The statement referred to by the original Comment #293 is as follows (included here for completeness): "The term regional as it pertains to impingement estimates is not proposed for use going forward. The proposed boundary for describing impingement that is proposed is the MNR boundary for QMA 4-4 which is a fisheries management unit boundary that resides entirely within Canadian waters of Lake Huron within the main basin. This QMA 4-4 boundary is proposed as it is within a defined and established management boundary for lake Huron commercial fisheries in Ontario and provides a means against which lake whitefish data and EAM/FFYM and future direct, indirect or non-use benefits can be calculated and compared." (p. 25) Comment #291 was reviewed, and Bruce Power's response should be considered "Satisfactory." Therefore, the response to Comment #293 should be considered "Satisfactory."
294	This statement has been largely copied/pasted from Section 4.5.1.1 and is highly problematic for exactly the same reasons as discussed for that section. **BP Response**: See UG-291 **UG Team Evaluation of BP Response**: Unsatisfactory. See UG-291.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The statement referred to by the original Comment #294 is as follows (included here for completeness): "Though a threshold for effect has not been determined or agreed to, it is proposed for the purpose of this study (pending further consultation) that the threshold for effect is established as the proportion of equivalent adult annual lake whitefish impingement losses relative to the MNR proposed quota of lake whitefish in QMA 4-4. It is assumed that the regulatory agencies that determine the commercial catch quota understand the population dynamics of the regional lake whitefish population and have developed a rigorous estimate of acceptable annual take. Other assumptions regarding the reliability of the MNR data will be consistent with that defined for entrainment. For the purpose of this analysis it will be assumed that all potential genetic populations that may reside in QMA 4-4 have an equal chance of occurring within the waters subject to the intake influence and therefore possess and equal chance of impingement. The percentage of the lake white-fish regional commercial catch quota for QMA 4-4 that will represent an effect on the population that inhabits QMA 4-4 for the current monitoring year will be decided based on further consultation with agencies and stakeholders." Comment #291 was reviewed, and Bruce Power's response should be considered "Satisfactory." Therefore, the response to Comment #294 should be considered "Satisfactory."

#	Reviewers' Comment and Disposition of Bruce Power's Response	Reviewers' Proposed Change	Bruce Power Disposition
295	This statement has been largely copied/pasted from Section 4.5.1.2 and is highly problematic for exactly the same reasons as discussed for that section. **BP Response**: See UG-291. **UG Team Evaluation of BP Response**: Satisfactory. See UG-291.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** Although Comment #295 indicates that the Bruce Power response is "Satisfactory," we assume from context that this is a typographical error and the Reviewers intended to consider the Bruce Power response to be "Unsatisfactory." The statement referred by the original Comment #295 is as follows (included here for completeness): "For lake whitefish, local effects at the level of genetically distinct populations can not be determined until such time that genetically distinct populations are identified and the actual proportion of these populations within a broader populations grouping can be discerned. Genetically distinct populations will be determined based upon the results of ongoing DNA studies to confirm the presence of and determine the size and contribution of distinct populations relative to the total captured for DNA analysis within a specific area. To contribute to genetics studies, lake whitefish eggs and larvae collected during impingement sampling will be preserved for possible DNA analysis to determine which population or stock they may belong to. Prior to or in lieu of completion of the DNA studies, the following scenarios will be assumed: • 0.5% of impinged lake whitefish are from a population which is distinct within the EA local study area; • 20% of impinged lake whitefish are from a population which is distinct within the EA local study area; • 50% of impinged lake whitefish are from a population which is distinct within the EA local study area; • 100% of impinged lake whitefish are from a population which is distinct within the EA local study area. Based upon these four scenarios, the number impinged in each of the four above scenarios will be converted into estimates of equivalent adults at age four. The equivalent adult estimates will then be compared to historic gill net sampling results taken from nearby sites within the EA local study area (figure 2) and the EA Regional study area (see Figure 2.3.3-1 of the Aquatic Environment Technical Support Document [Bruce Power 2005b]). As noted previously, until the results of the DNA studies are published, it is assumed that the best estimate of a local population will come from the annual gill net sampling program." (p. 26) Comment #291 was reviewed, and Bruce Power's response should be considered "Satisfactory." Therefore, the response to Comment #295 should be considered "Satisfactory."
296	This statement has been largely copied/pasted from Section 4.5.2, and is highly problematic for exactly the same reasons as discussed for that section. **BP Response**: See UG-291. **UG Team Evaluation of BP Response**: Unsatisfactory. See UG-291.	No change recommended.	**Bruce Power disagrees with the reviewers' disposition of Bruce Power's response. No additional change to the I&E Plan is required.** The statement referred to by the original Comment #296 is as follows (included here for completeness): "The endpoint of follow-up for Element 3.4 (Lake Whitefish) is proposed to be the point where impingement numbers fall below the agreed upon threshold for effect (to be determined) to regional abundance with all four units in operation. Following the initial two years of impingement sampling, data will be analyzed to determine if the annual impingement impacts fall below the agreed upon thresholds for effect. If so, impingement sampling will cease at this point. If not, Bruce Power will consult with and provide agencies and stakeholders with their opinion on options for future sampling, and possible additional mitigation measures. The thresholds for effect to the QMA 4-4 lake whitefish population and lake whitefish from a population which is distinct within the EA local study area, will each be analyzed separately. If Bruce Power falls below the threshold for effect to one of these effect tests, but not the others, Bruce Power will provide recommendations for adjustments/alterations to the current monitoring plan to address only impacts to the respective species being studied." (p. 26) Comment #291 was reviewed, and Bruce Power's response should be considered "Satisfactory." Therefore, the response to Comment #296 should be considered "Satisfactory."

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