



Submission

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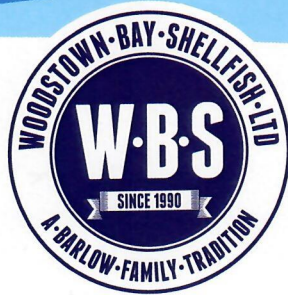
Application

Applicant:	SSE Generation Ireland Limited
Reg. No.:	P0606-04

See below for Submission details.

Attachments are displayed on the following page(s).

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Mr Billy Shanahan,
Environmental Protection Agency (EPA),
Johnstown Castle,
Wexford,
Y35 W821.

24th November 2020

CC: B.Kissane@epa.ie , sweetmanplanning@gmail.com , KDubsky@Coastwatch.org &
grace.osullivan@europarl.europa.eu

RE: Objection in respect of Licence Application P0606-04 made by SSE Great Island Generating Station dated the 29th September 2020.

Dear Mr Shanahan,

Further to my previous correspondence to you in May of this year. It has recently been brought to my attention that SSE Generation Ireland Ltd has applied for a revision to its industrial emissions licence for its power plant at Great Island Generating Station (P0606-04).

The applicant was and still is operating in breach of its current licence P0606-03 by continuing with discharges at SW8 and SW7. Importantly also the applicant has avoided stating another important reason for the application and that is the concern that the EPA had and presumably still have in relation to the scale of Sodium Hypochlorite use at the plant, which is in the order of several hundred times that envisaged when licence P0606-03 was applied for some years ago. This initial application and its environmental assessments dealt with a proposed annual usage of 5 tonnes, which is in stark contrast to the massive 1,300 tonnes usage per annum reality. This the EPA discovered in a chance comment during an inspection and not by an examination of purchase records for sodium hypochlorite. Indeed, maybe the EPA would still consider such a retrospective examination of those records and may even in the future look as a standard inspection protocol. The omission of sodium hypochlorite usage as a reason for review is remarkable considering so much of the accompanying documentation (Natura

Impact Statement, Water Quality Modelling Study and Literature Survey) for the new application 'attempts' to address that very point viz the modelling and impact of sodium hypochlorite in the Waterford Estuary.

It is the very use of such large quantities of sodium hypochlorite, its subsequent fate and the impact of the chlorine produced oxidants (CPO's) on phytoplankton (primary production) that is the most important issue to shellfish producers, as oysters and mussels can only feed on phytoplankton and thus this is imperative to their survival. Secondary to this concern would be direct lethal and sub lethal effects either acute/delayed or chronic on shellfish (mussels and oysters) caused by Chlorine Produced Oxidants (CPO's) and Chlorination By Products (CBP's) , the latter formed with compounds present in estuarine suspended solids. These issues are not dealt with in any serious way in the application and pose a massive threat to the marine ecosystem surrounding this installation. Furthermore the water quality modelling study does state that it deals with modelling Sodium Hypochlorite in a conservative manner :

"The modelling approach in the study has been conservative and representative of the worst-case scenarios. It has purposefully: a. excluded natural free chlorine decay"

It is this very decay into toxic product, CPO's and CBP's of longer lifespan in the ecosystem which has been ignored totally in the modelling study that is of grave concern to us. But it's not just a group of shellfish farmers that have concerns about CPO's. Quite a few Countries hold these concerns equally as strongly as ourselves and have invested time and resources into establishing guideline values for such compounds in the marine environment for the purpose of protecting marine life and ensuring a health marine ecosystem for years to come.

Bately and Simpson 2020 (*Short-Term Guideline Values for Chlorine in Marine Waters*, G.E. Batley and S.L. Simpson *Environmental Toxicology and Chemistry*, 2020;39:754–764) discuss the impact of CPO's in the marine environment and the guideline values that have been set by various Countries. Zero fieldwork on sampling and testing for CPO's or CBP's has been undertaken by the applicant. If the EPA of Ireland are going to live up to their name they will have to ensure that an objective study take place into the levels of CPO's in the Waterford Estuary, to determine that they are not elevated above guideline values. This is a Special Area of Conservation and a Shellfish Designated Waterbody and has protection status as such. Moreover, the health of the ecosystem is also meant to be protected under the Water Framework Directive. There are several studies I could list to demonstrate Countries all around the world that have given serious consideration to guideline values for Chlorine Produced Oxidants. There would be no point adding all of these in this submission, however it is abundantly clear that numerous Countries/jurisdictions have very low guideline values set for CPO's due to the acute and chronic toxicity to marine life and their respective ecosystems. The literature review presented by the applicant is poor in this regard. One would expect the EPA of Ireland to be fully aware of the serious negative implications that the use of sodium hypochlorite has for the receiving marine environment. It's bad enough that the EPA were misinformed by a previous application based on a usage of 5 ton

hypochlorite per annum which was licensed only to discover (by chance) an actual usage of 1,300 tonnes /annum on their watch, but to now subsequently despite all of that history and in the full knowledge of the negative ecosystem impacts, attempt to licence the use of even a 1,000 tonnes of hypochlorite per annum defies belief.

A further point to note is that flow through experiments normally don't extend beyond 96hrs. Therefore in reality because the power station is continuously generating a supply of CPO to the Waterford Estuary it is possible that marine life in the Estuary are being exposed on a much longer term to chlorine produced oxidants. The applicant admits to this scenario for mussels close to the discharge point based on modelling of sodium hypochlorite, but as stated before it's the distribution of CPO's which travel further and last for longer than hypochlorite that is the major concern. The applicant has not determined the impact of CPO's in the seawater.

Roosenburgl et al 1980 showed that straight hinged larvae of the eastern oyster had LC50 values of 0.3 ppm CPO at 48 h, 0.08 ppm at 72 h, and 0.06 ppm at 96 h. They also clearly demonstrated that the higher the concentration and/or the longer the exposure time resulted in higher mortalities. (*Effects of Chlorine-Produced Oxidants on Survival of Larvae of the Oyster Crassostrea virginica** Mar Ecol. Prog. Ser. Vol 3: 93-96, 1980). Hence some jurisdictions set even more stringent guideline values for chronic exposure. More worrying is that exposure to CPO's in the marine environment doesn't get any more chronic than in Waterford Estuary. Scott, G. et al 1980 studied the physiological effects of chlorine-produced oxidants and uptake of chlorination by-products in the American oyster, *Crassostrea virginica* (gmelin) and results of the study indicated that oysters may be stressed in areas adjacent to chlorinated effluent outfalls. Summer exposure of oysters to high concentrations of CPO (0.66 to 1.23 mg/l) proved very toxic.

Issues with the Application and Associated Documents:

In the application form for this licence the applicant states that the current surface water usage is 201993000 cubic metres per year and a future usage per annum if the licence is granted of 2890800000 Cubic metres per year. So that is 14.3 times increase in surface water abstraction from the estuary from current usage and 10 times the maximum limit allowed for under the current licence per annum. (The current licence limit for discharge is 33000 m³/hr, 792000 m³/day and 289080000 m³ per annum.) So, is this a typographical error or not? If it is a typo and an extra zero has been erroneously added then the proposed usage will be 1.43 times the current usage which in itself then begs the question will the proposed sodium hypochlorite usage be 1.43 times that currently used? Given that recent sodium hypochlorite usage figures per annum have gone up towards 1,300 tonnes one could logically assume that maybe in the future 1.43 times this value will have to be used which would bring us to 1,859 tonnes/annum. If this is not correct, then could you explain why it is not correct?

Of course, it will depend on the concentration of the sodium hypochlorite used. Will the company be sticking with a 14-15% concentration solution (as stated in the raw materials and intermediates document) or will the licence allow for flexibility to use a more concentrated solution of sodium hypochlorite e.g 1,000 tonnes of an even stronger solution of sodium hypochlorite whereby the proposed 1,000 tonnes/annum licence limit is not breached as there is no licence limit on the strength of the solution of sodium hypochlorite? Will the EPA be including a concentration limit on the sodium hypochlorite also? If it is not a typo then one could assume that the current usage rate of sodium hypochlorite would need to be increased by a factor of 14.3 to match the proposed future water intake. Could the applicant/EPA clarify which is correct? Will the EPA be setting a maximum daily/weekly/monthly/annual usage rate (tonnes/litres per time period) of sodium hypochlorite at a set concentration of solution e.g it is currently used at 14-15% solution. A situation cannot exist again whereby the licensee was able to use sodium hypochlorite at a level 230 times beyond what was originally conceived for many years and even after this was discovered by chance, the licensee is still not in breach of licence for this as it wasn't a stated licence condition. This cannot ever be allowed to happen again.

Not much is revealed in the application regarding the mode of use of sodium hypochlorite e.g continuous feed into the intake water at what volume/weight per hour? What is the target biocidal concentration of free chlorine in the coolant water that the applicant is aiming for? What is the residual concentration of chlorine being aimed for in the cooling water? It also states in the application that usage rate is dependent on river water temperature. So if there is a cut-off point in river temperature below which it is not used e.g industry norm is don't use biocide below 10 degrees intake water temperature then how many months of the year would that be? May to November? The effect of this would then be to concentrate the use of sodium hypochlorite in the remainder of the year its impact presumably into the important growing period within the ecosystem March-October.

Also are higher 'booster' doses of sodium hypochlorite given on top of the continuous feed (again another industry practice that is employed) and if so what would the booster dose be? Does testing at the SW2 discharge point happen after booster dosing if booster dosing is used or does it happen before booster dosing? The weekly test of discharge water for chlorine is not only almost pointless the chlorine has already reacted, but it could miss peaks in chlorine usage.

Marine Ecological Survey provided by applicant:

In relation to the Marine Ecological Survey I would like to point out several issues of concern which I believe render the report useless:

- There are no benthic, intertidal transects, and phytoplankton sampling locations on the western side of the estuary from Cheekpoint Southwards. This is remarkable considering the bathymetry of the estuary where the main flow of water hugs the

western side of the estuary south of Cheekpoint. Therefore, the sampling stations are not representative with the main flow of water and hence the movement of chlorine produced oxidants and chlorinated by products.

- The study does not actually quantify phytoplankton data but rather uses a qualitative scale and thus we cannot determine if phytoplankton quantities are suppressed below what one would expect from an estuary on the south coast. A quick look at the phytoplankton data from the Marine Institute weekly samples across oyster production areas in the southeast shows that phytoplankton levels in Waterford Estuary are many times lower than in Youghal, Dungarvan and Bannow Bays and this is exacerbated in the summers months.
- The spatial range of phytoplankton samples is so narrow (clustered close to the discharge location) and as such does not rule out that all the samples are very similar in that they all have been impacted.
- To say that the thermal plume prevents impact on benthic habitats may not be correct as particulates present in the water column can react with Free Chlorine/Chlorine produced oxidants to produce Chlorination By Products attached to particulate matter which can settle out to the benthic layer. The upper estuary has elevated suspended solids in part due to the high frequency dredging at Cheekpoint undertaken by the Port.
- What was the level of use of sodium hypochlorite use in the months preceding the Marine Ecology sampling dates?
- The report is based on a snapshot one-to day study and does not reflect seasonal impact. The profile of phytoplankton will change throughout the year and science has already demonstrated that different species of phytoplankton e.g dinoflagellates are more sensitive to CPO's. Also, species like oysters are more sensitive during the summer to additional stresses.

Water Modelling Report:

- Condition 5.7 in the existing licence dealing with emissions states that the mixing zone shall not exceed 25% of the estuarine cross-sectional area at any point. Figure 5.5 of the Water Modelling report submitted with this application showing the modelled Maximum chlorine concentrations (mg/l) throughout neap tides would appear to show a mixing zone greater than 25%. Indeed, it should be a prerequisite that sampling and testing for CPO's and CBP's should be undertaken across the full width of the estuary north and south of Cheekpoint. In addition, a dye release study from the discharge location SW2 should be undertaken to verify discharged water movement throughout the estuary. It would be our contention that water does move across the width of the estuary from east west following the main channel on an ebb tide and also from west to east following the main channel on flooding tides.

Furthermore, weather could exacerbate the spread of discharged water across the estuary, thus we also contend that it is impossible to meet condition 5.7 requiring the mixing zone to be less than 25%. Thus, fish passing up and down the estuary will at times have to pass through a curtain of CPO's or be prevented from passage as a result of avoidance of such chemicals. Also at high and low water movement is slack and we would contend also that discharged water from the power plant will traverse across the estuary from east to west in the line of the discharge and with its force. A full dye and drogoue study would be required across and full neap and a full spring tidal cycle to verify the movement of discharged waters in the upper estuary and indeed to determine levels of the dye that making it to other locations in the estuary. We would advocate that dosing with hypochlorite not take place during the course of those recommended studies in case the hypochlorite has any impact on the dye.

Alternatives that could be considered to reduce the impact of the applicant's activities on the marine environment:

Under the Natura Directive Stage 3 requires Alternative Solutions. Has the applicant done this and explained why the alternatives are not appropriate? Other power stations/researchers are looking at alternatives for example chlorine dioxide.

Chlorine dioxide as antifouling biocide results in reduced Trihalomethanes in condenser effluents at a coastal power station. Indian Journal of Geo Marine Sciences. Volume 45 (12), December 2106, pp, 1638-1644. Rajamohan, R. et al.

The Environment Agency for England and Wales in their evidence document looking at cooling water options for the next generation of nuclear power plants discuss the use of ablating hydrophilic polymer films and low free surface-energy polymer films the former requiring fast intake flows and the latter not as dependant on flow. Silicone-based coatings have been used in Japan with intake pipes being repainted every two to 4 years Trials in the US and Denmark silicone coatings continued to be protective in the fourth year after application. Imagine 4 years with no CPO's impacts. cupro-nickel coating system (paint) CuproprotectTM. Cupro-nickel paint This has minute (50 to 100 µm) cupro-nickel spheres is claimed to have a 20-year service life. Other studies have been done on low level voltage applied to intake piping and cooling water pipes to reduce biofouling.

Habitats Directive and Environmental Impact Assessment Directive

The applicant and the application documents fail to demonstrate beyond reasonable scientific doubt that there will not be significant impacts on the river Barrow and River Nore SAC. On a preview of the Natura Impact Statement the following failings and/or omissions are evident:

1. The NIS has failed to assess the impact of the known and admitted annual usage of sodium hypochlorite on the conservation objectives of the SAC.
2. The NIS has failed to assess the impact of the unlawful discharges from SW7 and SW8 on the SAC.
3. The NIS has failed to assess the cumulative impact of the development with other planned, permitted or existing developments within the estuary and in particular the ongoing dredging works by the Port of Waterford and the discharge of treated and untreated sewage by Irish Water into the estuary..

It is also notable that the application has not been accompanied by an EIS and it is respectively submitted that an EIS is required for this project where it is evident that the project is likely to and is having significant effects on the surrounding environment. For example, impacts relating to water quality, air quality, marine environment, biodiversity, human beings and cumulative impacts with other developments on the SAC have not been assessed and/or properly assessed in the within application and it is submitted that these are all matters that the EPA must have regard to and assess in its consideration of the within application.

Summary

In summary I object to this application on the basis of the scientifically known negative environmental consequences of the use of sodium hypochlorite in the marine/estuarine environment and the lack of,

- a dye and drogue study to validate water movement across a full spring and neap tide,
- a lack of a sampling programme for CPO's and CBP's,
- a lack of wider and inclusive sampling points for phytoplankton (quantification of), sediment and transects,
- the lack of looking at alternatives such as those mentioned in my reply,
- the lack of accounting for in combination effects particularly with dredging activities in the port,
- Waterford County Council should be consulted too given the fact that the estuary is a shared waterbody.

I am also objecting to this application for a revision of the licence on the basis that the applicant has failed to comply with the provisions of the Habitats Directive and Environmental Impact Assessment Directive in the following respects.

- The NIS has failed to assess the impact of the known and admitted annual usage of sodium hypochlorite on the conservation objectives of the SAC.
- The NIS has failed to assess the impact of the unlawful discharges from SW7 and SW8 on the SAC.
- The NIS has failed to assess the cumulative impacts from all the developments within the estuary and in particular the ongoing dredging works but the Port of Waterford.

- The Applicant has failed to have regard to the provisions of the EIA Directive.

The above and the unknowns that I have asked questions about would surely invoke the precautionary principle. I would like answers to the questions posed. All of the signs are pointing to the fact that something isn't well in the ecosystem in Waterford Estuary e.g the disappearance of mussels on rocks and structures, the lack of mussel bed recruitment within the estuary, the very low phytoplankton levels, the abnormally high oyster mortalities compared to neighbouring bays in the southeast and the concerns of inshore fishermen. The Environmental Protection Agency must surely ask the applicant to commission objective further studies into the above and also must put this application to the public for consultation.

I await your comprehensive reply on the above very important concerns, as a matter of urgency.

Yours Sincerely,



Mr Paul Barlow

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