TR314 Sizewell supplementary water quality monitoring data 2014/2015

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Please note that the red line boundary was amended after this document was finalised, therefore figures in this document do not reflect the boundaries in respect of which development consent has been sought in this application. However, amendments to the red line boundary does not have any impact on the findings set out in this document and all other information remains correct.

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Executive summary

A review of a water quality survey programme conducted at Sizewell in 2009/10 (BEEMS Technical Report TR189) indicated that ammonia data from a contract laboratory analysis was not reliable. The aim of this study was, therefore, to provide data primarily for nutrients including ammonia but also to supplement information on seawater metals concentrations, temperature, salinity and dissolved oxygen. Additional measurements of chlorine produced oxidants present as a result of the existing Sizewell B discharge were also made. Sampling was conducted:

- spatially, over 4 key sites in the Sizewell area; and
- temporally, over two annual seasonal cycles.

This report covers sampling conducted from February 2014 to January 2016.

Water sampling was conducted on a monthly basis in conjunction with BEEMS plankton surveys. Each survey took place during a single day at four different locations in the Sizewell area corresponding to a reference site labelled 'SZ3', the Sizewell B intake, the Sizewell B outfall and the proposed site of the Sizewell C intake and outfall

The measured temperature variation between Sizewell B outfall and the other three sites was more pronounced between March 2014 and February 2015, after which it was broadly similar at all sites. Temperatures reached a maximum of 24.14°C in August 2014 at Sizewell B outfall and a minimum of 4.48˚C in February 2015 at the reference site. Salinity varied seasonally but fell within a relatively narrow range 32.79 – 34.39. During the survey period dissolved oxygen concentrations were between 6.96 and 11 mg l^{-1} which was well above the requirement for High status (5.7 mg l^{-1}). Lowest measured vales were in summer with the lowest values of 6.96 -7.04 mg l^{-1} recorded in July 2015.

With the exception of zinc, the mean measured concentrations of all of the priority metals in the water samples were below their respective environmental quality standards.

Under the Water Framework Directive nutrients assessment, the 99 percentile winter dissolved inorganic nitrogen concentration (425 µg l^{-1}) fell within the Good status boundaries for coastal waters of intermediate turbidity. The mean phosphate concentration during the survey period was 33.48 µg l^{-1} which is used as the site background in support of the Sizewell C H1 report (BEEMS Technical Report TR193). Ammonia concentrations were lower than during earlier Environment Agency surveys but they were of a similar order of magnitude and were considered to be representative of current site conditions. The mean and 95 percentile NH_4-N values together with relevant pH, salinity and temperature data were used to derive a background concentration of unionised ammonia of 0.09 µg l^{-1} NH_3-N which was well below the EQS of 21 µg l^{-1} NH_3-N.

The majority of chlorine produced oxidant concentrations measured (over 80%) were ≤0.04 mg l^{-1}. Unsurprisingly samples taken from the outfall at Sizewell B showed the highest values.

A range of physical and chemical parameters including priority substances and specific pollutants that are of relevance to the Sizewell C planned new build were measured over an almost two-year period at several locations within the Suffolk Waterbody. The background conditions indicated by the range in magnitude and concentration of these parameters indicated that based on these data the waterbody would be judged to be of Good to High status. TRO concentration exceeded the recommended 95 percentile EQS within the influence of the existing Sizewell B discharge as might be expected with some samples taken within the mixing zone for the plume. Dissolved zinc concentrations at all of the sites also exceeded the annual average EQS and this was likely to be due to the influence of elevated zinc concentrations within riverine discharges to the Southern North Sea.

1 Introduction

1.1 Background

EDF Energy operates a nuclear power station at Sizewell B in Suffolk. In addition to the existing facility, Sizewell has been proposed as a potential location for a new nuclear build, Sizewell C. Nuclear power stations require industrial-sized cooling systems, and those located on the coast typically use seawater as coolant. Using a “once-through” system, large quantities of seawater are pumped into the station, run through a condenser to condense the turbine steam for power generation, and then discharged back to sea. Chlorine is used as an anti-foulant to prevent the settlement and growth of marine organisms in the cooling water systems. Chlorine use is favoured over that of other anti-foulants because it decays rapidly (Davis and Coughlan, 1983). As a component of the BEEMS programme, the potential toxicological effects of chlorinated cooling water discharge to the fauna present at Sizewell are being examined. When chlorine is added to seawater, a range of residual oxidants and chlorination by-products (CBPs) are produced, and these may be toxic to non-target marine life in the wider environment (Scott, 1983; Abarnou and Miossec, 1992).

As part of the Sizewell C project, SZC Co has commissioned Cefas to characterise environmental resources in the Sizewell area and to assess the potential sensitivity of key physical, chemical and biological features of the habitat to the proposed Sizewell C power station (the BEEMS programme). This includes looking at the potential effects of the cooling water that is discharged to sea. Therefore, a marine water quality monitoring programme has been established to assess baseline conditions at Sizewell prior to construction and operation of a new power station at this site.

1.2 Aims and objectives

A water quality survey programme was conducted at Sizewell in 2009/10 (BEEMS Technical Report TR189) but ammonia data from a contract laboratory were subsequently considered unreliable and therefore required repeating. Historic Environment Agency data for the Suffolk Coastal waterbody (but with no measurements taken in Sizewell Bay) are available and indicate mean ammonia values of approximately 20 - 27 µg l^{-1} NH_4- N (BEEMS Technical Report TR131). The aim of this study was therefore to provide data primarily for nutrients including ammonia but also to supplement information on seawater concentrations of metals as well as data for temperature, salinity and dissolved oxygen. Opportunity was also taken to acquire additional measurements of chlorine produced oxidants present as a result of the existing Sizewell B discharge. Sampling was conducted;

- spatially, over 4 key sites in the Sizewell area; and
- temporally, over two annual seasonal cycles.

This report covers sampling conducted from February 2014 to January 2016.

1.3 The physical environment near Sizewell

The coastline near Sizewell B consists of a coarse beach of sand and gravel. The shore slopes down to a depth of 7 to 11 m below chart datum. A subtidal sand bank exists approximately 1.5 km offshore. This feature is charted as two separate entities, Sizewell Bank and Dunwich Bank, though in reality it is a single, continuous feature aligned parallel to the shore and with minimum depths of less than 3 m at its southern end. The whole bank extends for approximately 8 km from north to south and isolates the shallow coastal channel from deeper water offshore of the bank where depths fall to below 15 m.
The tides in the area are rectilinear and flood-dominated, with the flood tide currents travelling to the south and the ebb tide currents travelling to the north. Tidal ranges are approximately 3 m during spring tides and 1.5 m during neap tides. Mean tidal current speeds of 0.5 ms^{-1} are experienced and the maximum current speeds are approximately 1.5 ms^{-1}.

Waves at Sizewell come predominantly from the ENE and the SSE. The mean significant wave height is between 0.5 and 1 m with an annual expected maximum wave height of around 4 m. The maximum expected significant wave height during a 100-year period is approximately 5.5 m, rising to approximately 6.5m in 1,000 years.

2 Methods

2.1 Sampling plan

In conjunction with BEEMS plankton surveys, water sampling was conducted on a monthly basis. Each survey took place during a single day at 4 different locations in the Sizewell area. In order to assess any temporal variation surveys took place throughout 2014 and 2015. Surveys were conducted from the vessel FV Our Josie Grace.

2.2 Site locations

Four different sampling locations were chosen and corresponded to the Sizewell B intake, the Sizewell B outfall, the proposed area of the Sizewell C intakes and outfalls and a reference site that BEEMS has labelled SZ3 (Figure 1). The co-ordinates are shown in Table 1. Due to the shallow water depth, the Sizewell B outfall site has been split into 3 separate sites (SZ 142. 143 and 144). Some of these sites were not accessible at certain stages of the tide, so it was necessary to have alternative sites at Sizewell B outfall where sampling could take place. The sites were all very close to one another, so for the purposes of this report they have all been grouped under the heading ‘Sizewell B outfall’.

Table 1 Sizewell sampling locations and their co-ordinates

Site	Site code	Latitude	Longitude
BEEMS (Reference)	SZ3	52º 16’ 0’’N	01º 38’ 30’’E
Sizewell B Intake (Sizewell B intake)	SZ 140	52º 12’ 53’’N	01º 38’ 0’’E
Sizewell B Outfall (Sizewell B outfall)	SZ 142,143 and 144	52º 12’ 55’’N	01º 37’ 36’’E
Sizewell C Intake and Outfall (Sizewell C)	SZ 141	52º 13’ 7’’N	01º 40’ 5’’E

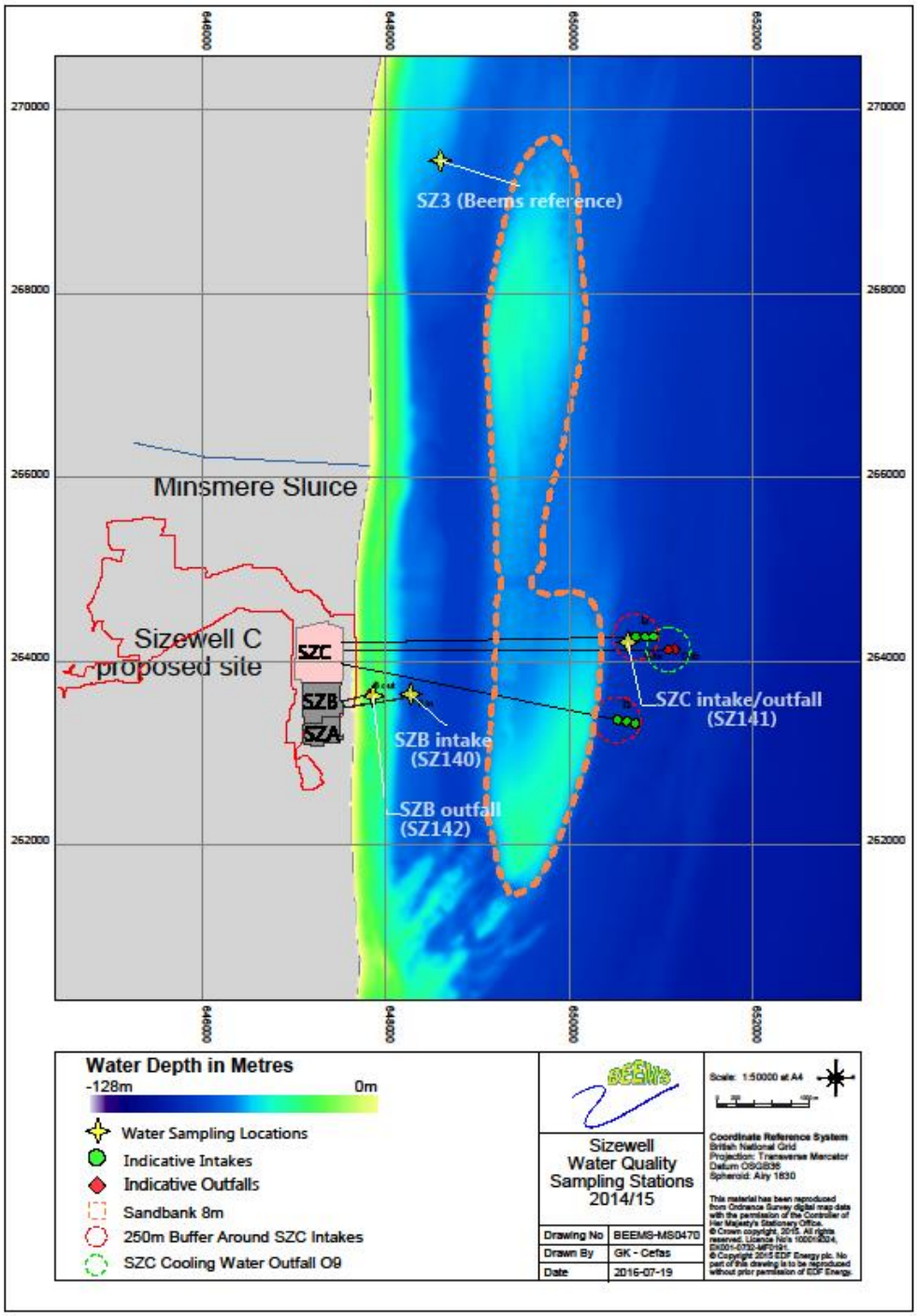

Figure 1 Map showing the marine water quality sampling locations during 2014/15 at Sizewell B intake and outfall, the Sizewell C planned intake/outfall and a BEEMS reference position labelled as 'SZ3'

2.3 Water sampling

At each sampling location a profiler was deployed to determine different environmental parameters in the water column, water samples were taken for subsequent chemistry analysis and TRO levels of the surface water were analysed for chlorine.

For most surveys, a bucket was used to collect surface water samples for analysis of nutrient and chlorophyll a concentration, and of phytoplankton community structure. This method of water sampling is consistent with current WFD guidance (Devlin et al., 2014).

2.3.1 ESM2 profiler

An ESM2 profiler which is a data logger associated with various probes for measuring different physical parameters in the water column was deployed on a winched vertical profile to sample the water column for temperature (^{0}C), salinity (PSS-78) and dissolved oxygen concentration (mg l^{-1}). After the survey the data from the profiler was downloaded, processed and quality checked. Calibration coefficients were applied to the data during processing. The factory coefficients were used for the conductivity data, whilst temperature coefficients were derived from in-house calibrations. Salinity was calculated as per the International Association for Physical Sciences of the Ocean (IAPSO) standard. Any anomalous data, such as resulting from the profiler being out of the water were flagged as bad and discarded. The calculated salinity was compared with in-situ bottle samples to correct for drift and metalwork effects on the conductivity cell using a standard linear model. Oxygen measurements were corrected for pressure and salinity as per the sensor manufacturer's recommendations (Tengberg, 2009).

Differing response speeds of various sensors on the logger can cause a degree of distortion in the co-dependent measurements. The conductivity sensor responds to changes quicker than the temperature sensor and both are significantly quicker than the oxygen sensor. The faster the sensors are dragged through the water, the greater the degree of distortion, therefore the profiler needs extra time to settle to collect accurate readings. During the initial surveys in 2014 the profiler was deployed and recovered too quickly, which caused significant distortion of the oxygen data. As a result of this a mean surface value has been created by defining a 0.2 – 4 m depth band, only using the data where the oxygen sensor was given enough time to settle. Previous monitoring studies showed the water column at Sizewell to be well mixed (BEEMS TR189) and so a single depth averaged mean value is provided here.

2.3.2 Water chemistry

Water chemistry samples were sent to the National Laboratory Service (NLS) for analysis after each survey. The samples were analysed for a range of metals, inorganics and physical parameters and relevant marine water quality standards for these are presented in tabular form below (Table 2). The range of substances and physical parameters measured are shown in Tables 3 – 6 together with the applicable analysis accreditation status. All Minimum Reporting Values displayed are based upon ideal analysis conditions. Matrix contamination present within the sample or insufficient sample volume may cause an elevation in the limit of detection due to dilution.

2.3.3 Nutrient analysis

2.3.3.1 Background

Dissolved inorganic nitrogen (or DIN – ammonia, nitrite and nitrate), phosphorus and silicate are essential for phytoplankton growth. In winter, concentrations of these nutrients in coastal waters are generally at their highest, but phytoplankton growth is limited by low temperatures and low light conditions. In spring, increased temperatures and light availability promote the growth of phytoplankton and the development of so-called 'spring blooms', characterised by high biomass and high total cell abundance.

The Water Framework Directive requires the classification of all surface waterbodies into one of five ecological status classes: High, Good, Moderate, Poor or Bad (UKTAG 2008). Development of the UK nutrient standards was based on the offshore values established for OSPAR and aligned with freshwater reference values assuming conservative behaviour between nutrients and salinity. At present, coastal and transitional waters are assessed using only the winter value for concentrations of dissolved inorganic nitrogen (DIN, the sum of nitrate, nitrite and ammonia, measured in micromoles per litre, µM), as DIN is

recognised as the primary driver of eutrophication. Impacts of dissolved inorganic phosphorus and other limiting nutrients are still under investigation.

WFD assessments of nutrients are based on winter (November to February inclusive) values of DIN, taking account of mitigation of impacts by light limitation. The concentration of suspended particulate matter (SPM) is used as a surrogate for light (Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.), and is used to designate waterbodies as "clear" or "not clear". For transitional and coastal water:

- "Clear waters" are described as waters with an annual mean of SPM of <10 mg l^{-1}. The average winter DIN concentration from waterbodies designated as clear is assigned to one of five classes with four defined WFD boundaries (high/good, good/moderate, moderate/poor, poor/bad) based on the value of the normalised winter DIN.

- "Not clear" waters are described as waterbodies with an annual mean SPM of >10 mg l^{-1}. Not clear waters are grouped further by the mean annual SPM value, and described along a continuous gradient of "intermediate" (10<SPM<100 mg l^{-1}), "turbid" (100<SPM<300 mg l^{-1}) or "very turbid" (>300 mg l^{-1}) conditions. For not clear water bodies the 99th percentile of winter DIN is assigned to one of four boundary conditions which separate the five classes of waterbody designation.

2.3.3.1 Methods

Seawater samples were filtered through Whatman™ glass fibre filter papers (GF/F). Sub-samples (60 ml) of the filtrate were transferred to polycarbonate containers, and preserved with 0.1 ml of 16 g l^{-1} mercuric chloride solution (final concentration 20 µg ml^{-1}). The polycarbonate containers were then stored in a fridge at 4^0 C until analysis. Nutrient analyses were performed using a SKALAR™ San++ continuous flow analyser (CFA) via conventional colorimetric assays (Kirkwood, 1996). All analyses were completed within two weeks of sample collection.

Samples were analysed for the following dissolved inorganic nutrients: total oxidised nitrogen (TOxN; nitrate+nitrite), nitrite, phosphate, silicate and ammonia. Nitrite and ammonia levels are both often much lower than nitrate due to being energetically less expensive to assimilate. Nitrate and ammonia range from undetectable to 2 µmoles in coastal waters, compared with typical nitrate levels of up to 600 µmoles (except in polluted regions). Hence, for the purposes of this assessment, nitrate and TOxN are considered to be approximately equivalent. (Collos & Berges, 2003). All results are expressed in µmoles per litre.

2.3.4 TRO analysis

Surface water samples at each site were analysed for TRO in situ by the survey staff. TRO water sampling was conducted every 3 months. The Camlab colorimeter (model CW1000, which uses a LED and wavelength of 528 nm) was calibrated using chlorine reference standards purchased from Lovibond. A zero reading for absorbance was obtained using a 0.2 µm filtered sub-sample of the test solution. The detection limit was 0.02 mg l^{-1}.

From each site 3 separate samples of surface water were obtained for analysis, with triplicate samples from each of these, resulting in a total of 9 samples. Each measurement required a 10 ml sample of seawater to be taken with a mechanical pipette and added to a test tube containing Hach® DPD total chlorine reagent. The water samples were mixed with DPD as soon as possible to arrest any decay of TRO. After a reaction time of 3 minutes the sample was filtered through a syringe fitted with a 0.2 µm filter into a 10 ml reading cell and analysed with the colorimeter.

2.3.5 Marine water quality standards and guidelines

Various chemical and physical standards have been developed to form the basis of a risk-based approach to the management of water quality. Standards relevant to marine environment and to the chemical parameters expected within discharges from the EPR units during all phases of the development are shown in Table 2. The dissolved inorganic nitrogen (DIN) value referenced in Table 2 is based on the 99th percentile of the winter DIN values for 'Not clear' waterbodies for classification of waterbodies as High, Good, Moderate, or Poor. The threshold value shown in Table 2 is based on an annual suspended particulate matter (SPM)

concentration of between 10 - 100 mg l^{-1} which places the site in the 'intermediate' category. The annual mean measured SPM at the site in 2010 was 74 mg l^{-1} (BEEMS Technical Report TR131).

Table 2 Marine water quality standards referenced in assessment of planned discharges during the Sizewell C development – these represent Environmental Quality Standards (EQS) for other surface waters (TraC Waters) for priority hazardous substances and other pollutants (Directive 2013/39/EU) and (Defra, 2014)

Determinands	**WFD EQS Annual average values (µg l^{-1})**	**WFD EQS Maximum Allowable Concentration (MAC) values (as 95 percentile) (µg l^{-1})**
Cadmium and its compounds	0.2	1.5
Lead and its compounds	1.3	14
Nickel and its compounds	8.6	34
Chromium VI (dissolved)	0.6	32
Mercury and its compounds	-	0.07[1]
Arsenic (dissolved)	25	Not applicable
Copper (dissolved)	3.76 (2.677 x ((DOC/2) - 0.5)) µg/l dissolved, where dissolved organic carbon (DOC) > 1 mg l^{-1}	Not applicable
Iron (dissolved)	1000	Not applicable
Zinc	6.8 (plus ambient background 1.1 in salt water)	Not applicable
Boron (Total)	7000 (pre Water Framework recommended standard)[2]	-
Chlorine	-	10
Unionised ammonia (NH_3)	21	-
Winter dissolved inorganic nitrogen		980[3]

[1] A biota EQS of 20 µg kg-1 of tissue wet weight is also available and relates specifically to fish; [2]Mance et al, 1988; [3]EQS for nitrogen is based on WFD 99 percentile standard for Good status at suspended solids of 50 mg l^{-1}

Table 3, priority analytes MRV- minimum reporting values, UKAS accredited to ISO/IEC 17025

Test	Analyte	MRV	Units	Accreditation
Arsenic Dissolved µg/l	Arsenic Dissolved	1	µg l^{-1}	UKAS
ICPMS Saline Dissolved µg/l	Cadmium, Dissolved	0.03	µg l^{-1}	UKAS
	Copper, Dissolved	0.2	µg l^{-1}	UKAS
	Nickel, Dissolved	0.3	µg l^{-1}	UKAS
	Zinc, Dissolved	0.4	µg l^{-1}	UKAS
OES Saline Dissolved	Iron, Dissolved	100	µg l^{-1}	UKAS
Mercury Dissolved µg	Mercury, Dissolved	0.01	µg l^{-1}	UKAS
Chromium Saline Dissolved µg/l	Chromium, Dissolved	0.5	µg l^{-1}	UKAS

Table 4, environmental parameters MRV- minimum reporting values, UKAS accredited to ISO/IEC 17025

Test	Analyte	MRV	Units	Accreditation
BOD mg/l	BOD 5 Day ATU[1]	1	mg l^{-1}	UKAS
Chloride Saline mg l^{-1}	Chloride	10	mg l^{-1}	None
Dissolved Organic Carbon mg l^{-1}	Carbon, Organic, Dissolved as C :- {DOC}	0.2	mg l^{-1}	UKAS
Phosphate Total mg l^{-1}	Phosphate : Total as P	0.02	mg l^{-1}	UKAS
Fluoride mg/l	Fluoride	0.05	mg l^{-1}	UKAS
pH conductivity & turbidity	pH	0.05	pH units	UKAS
Bromide + Bromate mg/l	Bromide	0.005	mg l^{-1}	None
Suspended Solids (with high total diss solids)	Solids, Suspended at 105 C	3	mg l^{-1}	UKAS

[1] Allylthiourea (ATU) is used in this method to suppress nitrification

Table 5 Other metals 1 MRV- minimum reporting values, UKAS accredited to ISO/IEC 17025

Test	Analyte	MRV	Units	Accreditation
Arsenic Total	Arsenic	1	µg l^{-1}	UKAS
Selenium Dissolved	Selenium Dissolved	1	µg l^{-1}	UKAS
Selenium Total	Selenium	1	µg l^{-1}	UKAS
ICPMS NR Saline Dissolved µg/l	Aluminium, Dissolved	40	µg l^{-1}	None
	Cobalt, Dissolved	10	µg l^{-1}	UKAS
	Molybdenum, Dissolved	30	µg l^{-1}	UKAS
ICPMS NR Saline Total	Cobalt	10	µg l^{-1}	UKAS
	Molybdenum	30	µg l^{-1}	UKAS
ICPMS Saline Total	Cadmium	0.03	µg l^{-1}	UKAS
	Copper	0.2	µg l^{-1}	UKAS
	Lead	0.04	µg l^{-1}	UKAS
	Nickel	0.3	µg l^{-1}	UKAS
	Zinc	0.4	µg l^{-1}	UKAS

Table 6 Other metals 2 and 3 MRV- minimum reporting values, UKAS accredited to ISO/IEC 17025

Test	Analyte	MRV	Units	Accreditation
OES Saline Dissolved	Boron, Dissolved	700	µg l^{-1}	UKAS
	Calcium, Dissolved	10	mg l^{-1}	UKAS
	Magnesium, Dissolved	3	mg l^{-1}	UKAS
	Manganese, Dissolved	20	µg l^{-1}	UKAS
	Potassium, Dissolved	10	mg l^{-1}	UKAS
	Sodium, Dissolved	20	mg l^{-1}	UKAS
	Strontium, Dissolved	200	µg l^{-1}	UKAS
	Sulphate, Dissolved as SO4	5	mg l^{-1}	UKAS
	Barium	100	µg l^{-1}	UKAS
OES Saline Total	Boron	700	µg l^{-1}	UKAS
	Calcium	10	mg l^{-1}	UKAS
	Iron	100	µg l^{-1}	UKAS
	Magnesium	3	mg l^{-1}	UKAS
	Potassium	1	mg l^{-1}	UKAS
	Strontium	200	µg l^{-1}	UKAS
Mercury Total	Mercury	0.01	µg l^{-1}	UKAS
Chromium Saline Total	Chromium	0.5	µg l^{-1}	UKAS

3 Results and Discussion

3.1 ESM2 profiler

The results from the ESM2 profiler are shown in section 3 and have been split into sections relating to temperature, salinity and dissolved oxygen. The spatial and temporal variation in all three parameters are shown in figures 3, 4 and 5. Omitted results indicate no data due to adverse weather conditions. Considerable variation in temperature between Sizewell B Outfall and all the other sites is evident in Figure 2 and is generally around ~3ºC. This is due to the discharge of heated seawater from Sizewell B power station. The temperature variation between Sizewell B outfall and the other three sites is more pronounced between March 2014 and February 2015, after which it is broadly similar at all sites. Temperatures reached a maximum of 24.14°C in August 2014 at Sizewell B outfall and a minimum of 4.48°C in February 2015 at the reference site SZ3. Figure 3 shows the seasonal variation in salinity for the four sampling locations. Salinity varies seasonally but falls within a relatively narrow range 32.79 – 34.39. Figure 4 shows the seasonal dissolved oxygen concentration variation across the four sample sites. In the marine environment acute and chronic oxygen deficiency occurs when levels fall between 2.0 and 6.0 mg l^{-1} O_2. During the survey period water samples remained at high oxygen concentrations throughout the whole season with lowest values 6.96 -7.04 mg l^{-1} in July 2015. Tables 16 – 23, 24 -32 and 25 – 41 in the Appendix show the mean temperature, salinity and dissolved oxgen, concentrations respectively measured at each site throughout the survey period.

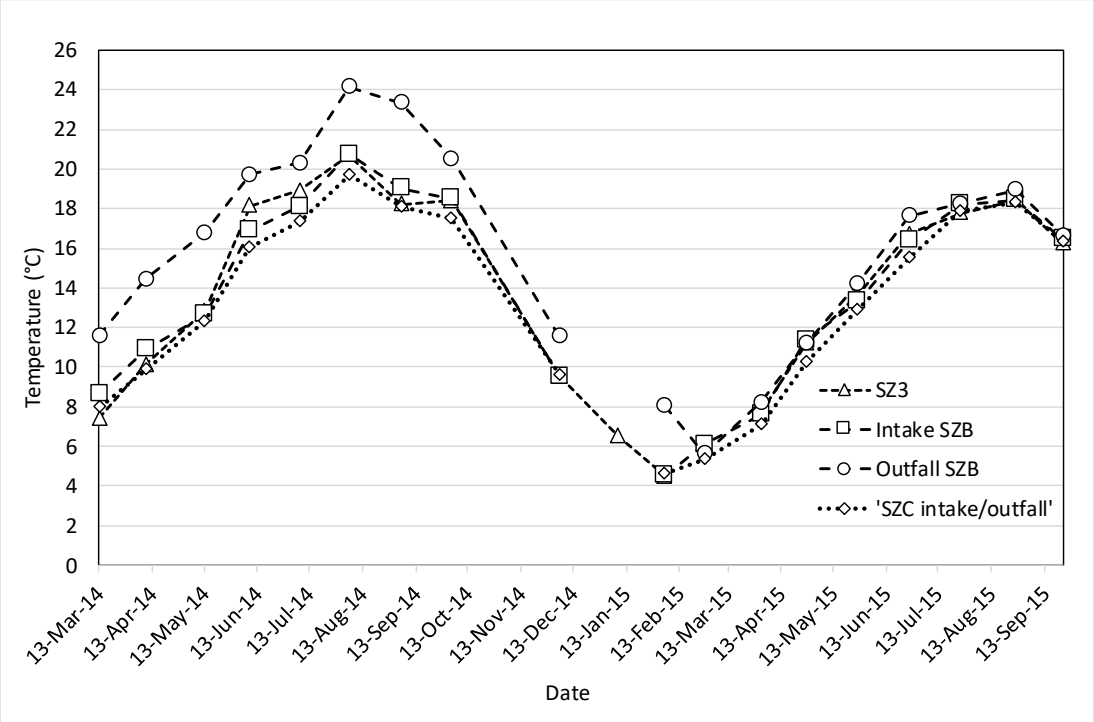

Figure 2 Spatial and temporal variation in temperature throughout the survey period, units are (°C)

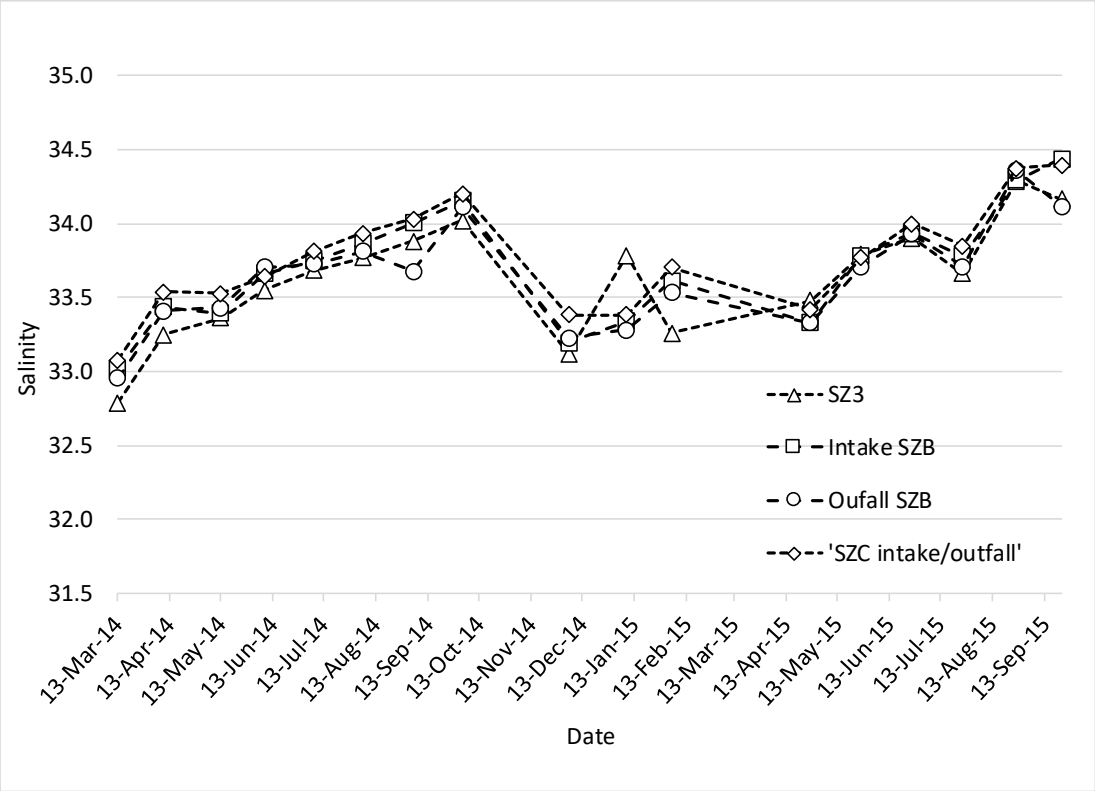

Figure 3 Spatial and temporal variation in salinity throughout the survey period, units are (PSS-78)

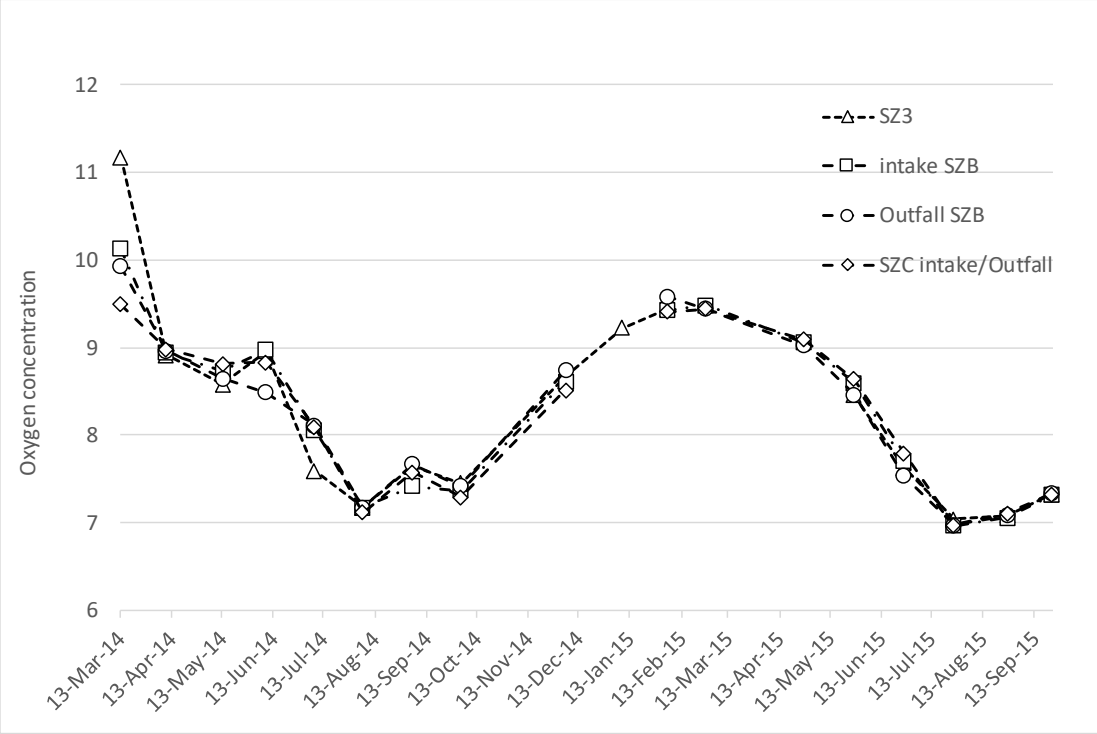

Figure 4 Spatial and temporal variation in oxygen throughout the survey period, units are (mg l^{-1})

3.2 Water chemistry

The water chemistry analyses were separated by site and into several categories; priority analytes, environmental parameters and other metals. Priority analytes include dissolved and total arsenic, cadmium, copper, nickel, zinc, iron, mercury and chromium. Environmental parameters include Biochemical Oxygen demand (BOD 5 Day ATU), chloride, carbon, organic (dissolved as C {DOC}), phosphate (total as P), fluoride, pH, bromide and solids (Suspended at 105°C). Other dissolved metals and inorganics include aluminium, manganese, sodium and sulphate (dissolved as SO_4). Other metals and inorganics measured as both dissolved and total include selenium, cobalt, molybdenum, boron, calcium, magnesium, potassium, strontium, boron. Barium was measured as total only. Omitted results indicate no data, due to adverse weather conditions.

The mean concentration of each analyte and the measure of variance around the mean from each site across the whole survey period is summarised below (Table 7). Values listed below the limits of detection for that particular analyte have been recorded as 0.5 x detection limit for calculating averages.

Table 7, Survey mean and standard deviation of priority analytes at SZ3, Sizewell C intake/outfall and Sizewell B outfall

Analyte	*Units*	EQS	All sites	SZ3		Sizewell C intake/outfall		Sizewell B Outfall	
		Annual average	Annual average	Mean	St dev	Mean	St dev	Mean	St dev
Arsenic Dissolved	µg l^{-1}	25	1.07	1.1	0.32	1.11	0.3	0.99	0.32
Cadmium, Dissolved	µg l^{-1}	0.2(1.5)[1]	0.05	0.03	0.03	0.05	0.03	0.08	0.10
Copper, Dissolved	µg l^{-1}	3.76	2.15	2.00	1.29	1.90	0.94	2.58	2.58
Nickel, Dissolved	µg l^{-1}	8.6(34) [1]	0.79	0.69	0.14	0.78	0.20	0.90	0.38
Zinc, Dissolved	µg l^{-1}	6.8(7.9)[2]	15.12	11.21	7.76	14.36	11.51	20.44	13.96
Iron, Dissolved	µg l^{-1}	1000	<100	<100	-	<100	-	203	446
Mercury, Dissolved	µg l^{-1}	(0.07)[1]	0.02(0.02) [1]	0.01	0.01	<0.01	-	0.03	0.12
Chromium VI Dissolved	µg l^{-1}	0.6(32) [1]	0.57	0.4	0.49	0.88	1.72	0.44	0.51

[1] These values in brackets are maximum allowable concentrations (MACs) set as a 95 percentile EQS, for mercury there is only a 95 percentile defined, [1]The EQS of zinc is adjusted by addition of 1.1 to account for ambient background for saltwater

With the exception of zinc, the mean measured concentrations of all of the priority metals in the water samples were below their respective environmental quality standards (Table 7). Summary data for total metals and inorganics are shown in Tables 8 to 10.

Tables 42 - 56 in the Appendix show the individual measured values for each parameter in the water quality assessment.

Table 8, Survey averages and standard deviation of environmental parameters at SZ3, Sizewell C intake/outfall and Sizewell B outfall.

Analyte	*Units*	SZ3		Sizewell C intake/outfall		Sizewell B Outfall	
		Mean	**St dev**	**Mean**	**St dev**	**Mean**	**St dev**
BOD 5 Day ATU	mg l^{-1}	1.02	0.41	1.04	0.51	1.31	0.55
Chloride	mg l^{-1}	18476.19	605.73	18572.22	507.36	18516.67	499.71
Carbon, Organic, Dissolved as C {DOC}	mg l^{-1}	1.07	0.21	1.04	0.21	1.15	0.26
Fluoride	mg l^{-1}	1.26	0.08	1.25	0.09	1.24	0.08
pH	pH Units	8.01	0.06	8.01	0.07	8.01	0.07
Bromide	mg l^{-1}	63.59	1.94	64.28	1.39	64.08	1.52
Solids, Suspended at 105 C	mg l^{-1}	52.43	46.53	55.50	39.77	90.56	72.98

The BOD measure is the biochemical oxygen demand. BOD is defined as the mass of oxygen required by a specific volume of liquid for the process of biochemical oxidation over a 5-day period at 20°C in the dark. The result is expressed as milligrams of oxygen per litre of sample. Allyl thiourea (ATU) is added to suppress nitrification hence the name of this specific method. The mean values measured across all of the sites are between 1.02 – 1.31 mg l^{-1} and the 90 percentile value is 1.7 mg l^{-1} which indicates that there is no evidence of the presence of substances at concentrations that are likely to influence significantly the natural background concentrations of oxygen. For riverine water samples a BOD of 3 – 4 as a 90 percentile is associated with High status.

Table 9, Survey averages and standard deviation of total metals at SZ3, Sizewell C intake/outfall and Sizewell B outfall.

Analyte	*Units*	SZ3		Sizewell C intake/outfall		Sizewell B Outfall	
		Mean	**St dev**	**Mean**	**St dev**	**Mean**	**St dev**
Arsenic	µg l^{-1}	2.37	1.21	2.44	1.05	3.40	1.72
Cadmium	µg l^{-1}	0.03	0.02	0.05	0.03	0.07	0.09
Copper	µg l^{-1}	2.60	1.49	1.90	0.94	3.68	2.91
Nickel	µg l^{-1}	1.43	0.53	0.78	0.20	2.11	0.93
Zinc	µg l^{-1}	14.64	7.97	14.36	11.51	25.90	14.76
Iron	µg l^{-1}	1236.00	1066.17	1378.00	887.81	2012.72	1347.75
Mercury	µg l^{-1}	0.03	0.02	0.01	0.02	0.07	0.20
Chromium	µg l^{-1}	1.46	1.25	1.73	1.26	2.60	1.61
Lead	µg l^{-1}	1.82	1.10	1.91	0.94	2.88	1.82
Selenium Dissolved	µg l^{-1}	<1	0	<1	0	<1	0
Selenium	µg l^{-1}	<1	0	<1	0	<1	0
Aluminium, Dissolved	µg l^{-1}	22.09	9.56	<40	0	21.59	6.74
Cobalt, Dissolved	µg l^{-1}	<10	0	<10	0	<10	0
Cobalt	µg l^{-1}	<10	0	<10	0	<10	0
Molybdenum , Dissolved	µg l^{-1}	<30	0	<30	0	16.04	4.43
Molybdenum	µg l^{-1}	<30	0	<30	0	<30	0

Table 10, Survey averages and standard deviation of other metals and inorganics at SZ3, Sizewell C intake/outfall and Sizewell B outfall.

Analyte	*Units*	SZ3		Sizewell C intake/outfall		Sizewell B Outfall	
		Mean	**St dev**	**Mean**	**St dev**	**Mean**	**St dev**
Boron, Dissolved	µg l^{-1}	4236.67	177.35	4193.33	232.76	4216.67	158.75
Boron	µg l^{-1}	4187.62	280.68	4272.78	309.66	4210.00	238.25
Calcium, Dissolved	mg l^{-1}	1240.95	74.49	399.28	20.71	401.39	14.71
Calcium	mg/l	399.38	22.47	407.61	26.36	405.89	17.36
Magnesium, Dissolved	mg l^{-1}	1.09	5.00	1256.11	51.12	1237.78	81.06
Magnesium	mg l^{-1}	1237.14	69.44	1258.33	61.86	1230.56	73.84
Sulphate, Dissolved as SO_4	mg l^{-1}	1240.95	74.49	2553.89	101.53	2589.44	186.94
Potassium, Dissolved	mg l^{-1}	10038.57	592.75	394.00	19.57	392.28	26.67
Potassium	mg l^{-1}	396.81	33.51	398.83	34.44	385.83	21.49
Sodium, Dissolved	mg l^{-1}	7261.43	274.01	10196.67	371.89	10060.00	626.10
Strontium, Dissolved	µg l^{-1}	2595.24	134.08	7192.78	278.54	7245.00	223.48
Strontium	µg l^{-1}	7123.33	388.33	7271.11	468.79	7190.00	262.77
Manganese, Dissolved	µg l^{-1}	393.24	28.55	<20	0	2.65	7.80
Barium	µg l^{-1}	<100	0	<100	0	<100	0

3.3 Nutrient including ammonia data

Nitrogen (N) and phosphorus (P) are both essential nutrients in the marine environment for primary production. Table 11 provides a summary of the phosphate, dissolved inorganic nitrogen (DIN) and ammonia concentrations measured at Sizewell. At present, coastal and transitional waters are assessed using only the winter value for concentrations of DIN (the sum of nitrate, nitrite and ammonia, measured in micromoles per litre, µM), as it is recognised as the primary driver of eutrophication. Impacts of dissolved inorganic phosphorus and other limiting nutrients are under investigation. Under the Water Framework Directive, the 99 percentile winter (November-February) DIN is derived for a given site and is compared to a standard value which takes account of the light penetration based on suspended particulate matter concentration. For coastal waters of intermediate turbidity (defined as 10 - <100 mg l^{-1} of solid particulate matter) the 99 percentile DIN is 980 µg l^{-1} and 1470 µg l^{-1} for Good and Moderate status respectively (Water Framework Directive Standards and Classification Directions 2015). Therefore, the measured DIN for the sites surveyed in this report (425 µg l^{-1}) falls within the Good status boundaries value that is applied for not clear waterbodies (annual average SPM >10 mg l^{-1}), to assess status under WFD. The measured phosphate concentration (33.48 µg l^{-1}) is the site background value which is used in the H1 assessment as is the ammonia data (mean and 95 percentile) which together with relevant pH, salinity and temperature data is used to derive the background concentration of unionised ammonia. The average winter DIN to dissolved inorganic phosphorus (DIP) ratio is identified under the OSPAR Common Procedure (COMP, OSPAR Commission 2005), as another indicator of undesirable disturbance. Ratios outside of 8:1 – 24:1 are considered to indicate potential undesirable disturbance. The average ratio for all Sizewell sites was just over this value at 26:1 with values at the SZ3 site and Sizewell C intake/outfall below 24:1 and the other sites above.

Table 11, Survey averages and standard deviation of nutrients at WFD, Sizewell C intake/outfall and Sizewell B outfall.

Analyte	*Units*	All sites	SZ3		Sizewell C intake/outfall		Sizewell B Outfall		Sizewell B Intake	
		Annual average	Mean	Std dev	Mean	Std dev	Mean	Std dev	Mean	Std dev
Phosphate PO_4 - P	µg l^{-1}	33.48	45.02	48.26	26.47	20.21	29.50	20.52	37.73	43.39
Phosphate	µmol	1.56	1.45	1.56	0.85	0.65	0.95	0.66	1.22	1.4
DIN (winter)	µg l^{-1}	306.8	313.6	82.39	273.8	88.76	368.9	28.75	297.6	86.40
DIN (winter)	µmol	21.9	22.40	5.88	19.56	6.34	26.35	2.05	21.26	6.17
DIN 99 percentile (winter)	µg l^{-1}	425	423.64	-	395.3	-	407.46	-	414.98	-
DIN 99 percentile (winter)	µmol	30	30.26	-	28.24	-	29.10	-	29.64	-
NH_4-N	Mean	11.38	11.27	7.75	12.01	6.03	12.08	6.80	11.93	8.07
NH_3-N*	Mean 95%	0.09 0.19								

*The unionised ammonia concentration is derived using the raw data for total ammonia NH_4- N measured at each of the sites together with the respective pH, temperature and salinity the equivalent unionised ammonia concentration is then derived using the Environment Agency calculator (Clegg and Whitfield, 1995).

3.4 TRO data

Table 12-15 and Figure 5 show the measured TRO concentrations at Sizewell in the vicinity of Sizewell B outfall and the proposed Sizewell C intake/outfall as well as at the SZ3 sampling point to the north of Sizewell B. Survey data from April has not been included due to an error in the measurement protocol. The majority of the measurements (over 80%) were ≤0.04 mg l^{-1}. Unsurprisingly samples taken from the outfall at Sizewell B show some of the highest values. However, when TRO values are ≤0.04 mg l^{-1} Sizewell B does not always show the highest values for all sampling dates (e.g. April 2015). The replicated TRO measurements are shown in Tables 12 – 15.

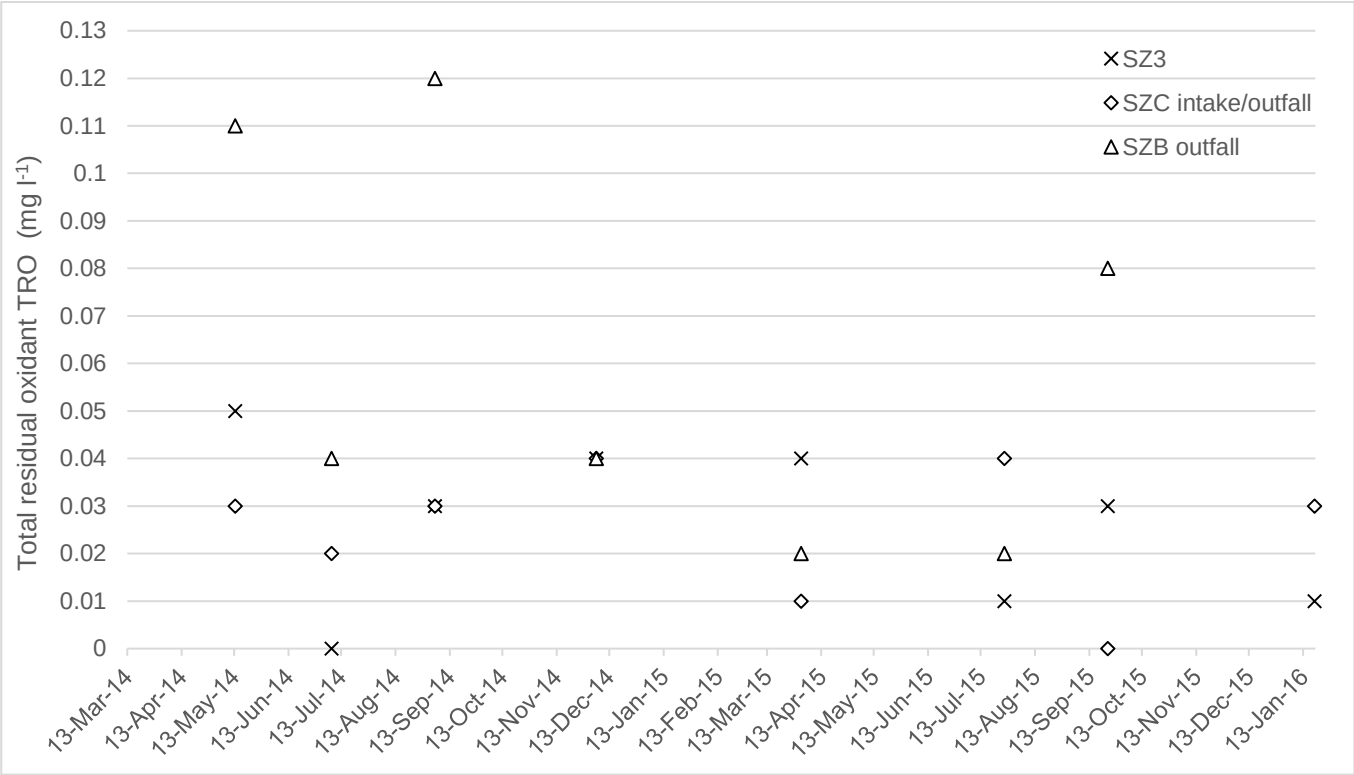

Figure 5 Spatial and temporal variation in mean total residual oxidant concentration expressed as mg l^{-1} chlorine equivalent.

The total residual oxidant concentrations measured at the reference site and at the planned Sizewell C intake/outfall have 95 percentiles of 0.07 and 0.06 TRO as mg l^{-1} chlorine respectively and at the Sizewell B discharge a 95 percentile of 0.14 mg l^{-1}. These values represent the background values at Sizewell with those measured at Sizewell B heavily influenced by proximity to the discharge plume and the values at the other two sites falling below the EQS for TRO in seawater.

Table 11 SZ3 reference site TRO results (mg l^{-1})

Date	Survey	Replicate	Mean concentration	St dev	Survey mean concentration
May 14	3_14	Sample 1	0.04	0.03	0.05
		Sample 2	0.06	0.02	
		Sample 3	0.04	0.02	
July 14	5_14	Sample 1	0.00	0.00	0.00
		Sample 2	0.00	0.00	
		Sample 3	0.00	0.00	
September 14	7_14	Sample 1	0.03	0.02	0.03
		Sample 2	0.02	0.02	
		Sample 3	0.03	0.02	
December 14	11_14	Sample 1	0.03	0.03	0.04
		Sample 2	0.01	0.01	
		Sample 3	0.08	0.03	
April	6_15	Sample 1	0.03	0.01	0.04
		Sample 2	0.04	0.01	
		Sample 3	0.05	0.02	
July	13_15	Sample 1	0.02	0.01	0.01
		Sample 2	0.01	0.01	
		Sample 3	0.00	0.01	
September	15_15	Sample 1	0.00	0.00	0.03
		Sample 2	0.01	0.02	
		Sample 3	0.07	0.03	
January		Sample 1	0.01	0.02	0.01
		Sample 2	0.01	0.01	
		Sample 3	NA	NA	

Table 12 Sizewell C intake and outfall TRO results (mg l^{-1})

Date	Survey	Replicate	Mean concentration	St dev	Survey mean concentration
May 14	3_14	Sample 1	0.03	0.01	0.03
		Sample 2	0.02	0.01	
		Sample 3	0.03	0.01	
July 14	5_14	Sample 1	0.00	0.00	0.02
		Sample 2	0.07	0.12	
		Sample 3	0.00	0.00	
September 14	7_14	Sample 1	0.03	0.01	0.03
		Sample 2	0.02	0.02	
		Sample 3	0.03	0.01	
December 14	11_14	Sample 1	0.05	0.02	0.04
		Sample 2	0.04	0.03	
		Sample 3	0.03	0.04	
April	6_15	Sample 1	0.01	0.01	0.01
		Sample 2	0.01	0.02	
		Sample 3	0.01	0.01	
July	13_15	Sample 1	0.03	0.01	0.04
		Sample 2	0.04	0.01	
		Sample 3	0.05	0.01	
September	15_15	Sample 1	0.00	0.00	0.00
		Sample 2	0.00	0.00	
		Sample 3	0.00	0.00	
January		Sample 1	0.02	0.01	0.03
		Sample 2	0.07	0.06	
		Sample 3	0	0	

Table 13 Sizewell B outfall TRO results, May - December (mg l^{-1})

Date	Survey	Time	Replicate	Mean concentration	St dev	Survey mean concentration
May 14	3_14	08:36	Sample 1	0.08	0.01	0.11
			Sample 2	0.09	0.01	
			Sample 3	0.11	0.01	
		13:52	Sample 1	0.10	0.01	
			Sample 2	0.13	0.01	
			Sample 3	0.16	0.02	
July 14	5_14	08:20	Sample 1	0.05	0.01	0.04
			Sample 2	0.13	0.14	
			Sample 3	0.04	0.03	
		13:52	Sample 1	0.00	0.00	
			Sample 2	0.00	0.00	
			Sample 3	0.00	0.00	
September 14	7_14	Time not recorded	Sample 1	0.08	0.07	0.12
			Sample 2	0.10	0.02	
			Sample 3	0.11	0.06	
		15:36	Sample 1	0.10	0.04	
			Sample 2	0.13	0.11	
			Sample 3	0.18	0.17	
December 14	11_14	11:15	Sample 1	0.07	0.02	0.04
			Sample 2	0.04	0.01	
			Sample 3	0.04	0.01	
		15:20	Sample 1	0.04	0.03	
			Sample 2	0.03	0.01	
			Sample 3	0.02	0.00	

Table 14 Sizewell B outfall TRO results TRO results, April - January (mg l-1)

Date	Survey	Time	Replicate	Mean concentration	St dev	Survey mean concentration
April 15	6_15	08:59	Sample 1	0.03	0.02	0.02
			Sample 2	0.00	0.00	
			Sample 3	0.01	0.01	
		10:15	Sample 1	0.02	0.02	
			Sample 2	0.01	0.01	
			Sample 3	0.04	0.02	
July	13_15	05:20	Sample 1	0.01	0.01	0.02
			Sample 2	0.04	0.07	
			Sample 3	0.00	0.00	
		06:43	Sample 1	0.03	0.03	
			Sample 2	0.02	0.02	
			Sample 3	0.03	0.02	
September	15_15	06:31	Sample 1	0.00	0.00	0.08
			Sample 2	0.06	0.09	
			Sample 3	0.12	0.08	
		07:45	Sample 1	0.08	0.11	
			Sample 2	0.08	0.12	
			Sample 3	0.15	0.13	
January		Site not sampled				

4 Summary and Conclusions

4.1 Summary

Temperature data indicate that during 2014 samples taken in the vicinity of the Sizewell B outfall were ~3˚C higher than at the other sampling locations. During 2015 this difference was not so apparent, probably due to differences in the timing of the sampling in relation to the location of the Sizewell B discharge plume. Temperature across the sites was between 4.48 and 24.14˚C over the period of the survey. The calculated 98 percentile value was 22.2˚C which was within the boundaries for Good status for transitional and coastal waters (20 – 23˚C). Salinity measurements across the sites fell in a relatively narrow range between 32.5 and 34.5 and dissolved oxygen concentrations were between 7 and 11 mg l^{-1} which was well above the requirement for High status (5.7 mg l^{-1}). The biochemical oxygen demand of samples taken at all sites over the survey were low and indicative of no or low influence of the presence of substances likely to impact natural oxygen background concentrations.

In a previous water quality survey at Sizewell (2009/10, BEEMS TR189) ammonia concentration data were found be unreliable i.e. values were exceptionally high (420 µg l^{-1} NH_4- N) at all sites surveyed in comparison to Environment Agency data for sites immediately to the north and south of Sizewell. In this study the mean NH_4- N concentration for all four sites surveyed was 11.38 µg l^{-1} and the 95 percentile was 26.3 µg l^{-1}. Water quality data from Environment Agency surveys carried out between 1992 – 2007 gave a higher mean range of 24 - 35 µg l^{-1} NH_4- N for four sites within the Suffolk Waterbody (BEEMS TR131). Whilst total ammonia concentrations in the present study were lower than those measured in earlier Environment Agency surveys they are of a similar order of magnitude and are considered to be representative of current site conditions. Using the raw data for total ammonia NH_4- N measured at each of the sites included in this report together with the respective pH, temperature and salinity, the equivalent unionised ammonia concentration can be derived using the Environment Agency calculator (Clegg and Whitfield, 1995). The derived mean and 95 percentile unionised ammonia concentrations across all sites were 0.09 and 0.19 µg l^{-1} NH_3-N respectively. These values were considerably lower than the 95 percentile EQS for unionised ammonia of 21 µg l^{-1} NH_3-N and provide the background source term against which to assess any station discharges containing ammonia.

The 99 percentile dissolved inorganic nitrogen concentration (winter period, 1st November- 28th February) measured across all sites surveyed in this report was 425 µg l^{-1}. For transitional and coastal waters of intermediate turbidity (defined as 10 - <100 mg l^{-1} of solid particulate matter) the 99 percentile is 980 µg l^{-1} and 1470 µg l^{-1} for Good and Moderate status respectively (Water Framework Directive Standards and Classification Directions 2015). Therefore, the measured DIN value corresponds to a Good status.

Overall mean and 95 percentile dissolved concentrations of the priority metals cadmium and nickel for all sites were below their respective annual average EQS values. For dissolved mercury there is only a 95 percentile standard and this was not exceeded by the 95 percentile value calculated across sites. For metals defined as specific pollutants (arsenic, copper, iron, chromium) the annual average values across all sites were also below their respective EQS. Chromium also has an EQS MAC defined as a 95 percentile and the calculated 95 percentile dissolved chromium concentration across all sites was below this standard. The chromium EQS is set specifically for chromium VI and, as the analysis conducted did not discriminate between different chromium species, the conservative assumption was made that the measurement was entirely of chromium VI. For lead, only total concentrations were measured during this sampling programme and these values exceeded the dissolved EQS for lead. However, dissolved concentrations of lead measured at Sizewell in a previous sampling campaign (BEEMS TR189) indicated all values at the intake and outfall of Sizewell B and the planned intake and outfall for Sizewell C to be <1 µg l^{-1} and hence below the annual average EQS.

The total residual oxidant concentrations measured at the reference site and at the planned Sizewell C intake/outfall had 95 percentiles of 0.07 and 0.06 TRO as mg l^{-1} chlorine respectively and at the Sizewell B

discharge a measured 95 percentile of 0.14 mg l^{-1}. These values represent the background values for Sizewell with those values measured at Sizewell B heavily influenced by proximity to the discharge plume and measurements at the other two sites falling below the EQS for TRO in seawater.

4.2 Conclusions

A range of physical and chemical parameters including priority substances and specific pollutants that are of relevance to the proposed Sizewell C new build were measured over an almost two-year period at several locations within the Suffolk Waterbody. The background conditions indicated by the range in magnitude and concentration of these parameters indicated that based on these data the waterbody would be judged to be of Good to High status.

The TRO concentration exceeds the recommended 95 percentile EQS within the influence of the existing Sizewell B discharge as might be expected with some samples taken within the mixing zone for the plume.

Dissolved zinc concentrations at all of the sites also exceed the annual average EQS and this is likely to be due to the influence of elevated zinc concentrations within riverine discharges.to the Southern North Sea region.

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5 Appendix A

5.1 Temperature

5.1.1 2014

Table 15, ESM2 profiler 2014 temperature data, March – April, 0-4m depth

Date (14)		Site	Site code	Station	Mean	Count	St Dev
13th March	SZ 1/14	Reference site	SZ3	1	7.42	26	0.01
		Sizewell B Intake	SZ 140	7	7.74	89	0.01
				20	9.29	92	0.03
				26	8.94	100	0.02
		Sizewell C Intake and Outfall	SZ 141	4	7.64	104	0.01
				22	8.37	84	0.04
				28	7.91	95	0.07
		Sizewell B Outfall	SZ 142	9	10.59	89	0.67
				15	12.27	100	0.85
				17	11.86	99	0.91
9th April	SZ 2/14	Reference Site	SZ3	33	10.13	194	0.01
		Sizewell B Intake	SZ 140	10	9.92	225	0.02
				18	11.93	170	1.26
				28	10.83	190	0.02
		Sizewell C Intake and Outfall	SZ 141	11	9.66	167	0.02
				22	9.92	210	0.14
				31	9.97	254	0.04
		Sizewell B Outfall	SZ 142	1	14.67	204	0.67
				16	14.32	142	0.16
				24	14.37	20	0.45

Table 16, ESM2 profiler 2014 temperature data, May – June, 0-4m depth

Date (14)		Site	Site code	Station	Mean	Count	St Dev
13th May	SZ 3/14	Reference site	SZ3	30	12.84	168	0.07
		Sizewell B Intake	SZ 140	5	12.73	210	0.02
				10	12.45	171	0.02
				15	12.28	225	0.03
				24	13.15	159	0.02
		Sizewell C Intake and Outfall	SZ 141	1	12.03	134	0.06
				11	12.24	152	0.03
				14	12.31	201	0.05
				22	12.74	180	0.06
		Sizewell B Outfall	SZ 142	8	17.08	145	0.75
				19	16.82	139	1.02
				28	16.47	210	1.06
8th June	SZ 4/14	Reference Site	SZ3	30	18.16	146	0.84
		Sizewell B Intake	SZ 140	6	17.08	31	0.21
				14	17.13	166	0.14
				25	16.46	133	0.10
		Sizewell C Intake and Outfall	SZ 141	1	16.12	99	0.02
				13	16.39	152	0.13
				20	15.54	143	0.02
		Sizewell B Outfall	SZ 142	10	17.63	214	0.85
				19	20.48	166	0.99
				28	21.00	185	0.31

Table 17, ESM2 profiler 2014 temperature data, July – August, 0-4m depth

Date (14)		Site	Site code	Station	Mean	Count	St Dev
7th July	SZ 5/14	Reference Site	SZ3	21	18.91	37	0.01
		Sizewell B Intake	SZ 140	4	18.45	34	0.03
				14	17.79	38	0.01
		Sizewell C Intake and Outfall	SZ 141	8	17.47	26	0.01
				16	17.20	17	0.02
		Sizewell B Outfall	SZ 142	2	19.36	78	0.71
				10	22.27	25	0.12
				19	19.33	45	0.19
5th August	SZ 6/14	Reference Site	SZ3	30	20.69	167	0.02
		Sizewell B Intake	SZ 140	4	19.76	162	0.03
				14	21.90	179	0.49
				23	20.53	193	0.18
		Sizewell C Intake and Outfall	SZ 141	9	19.49	171	0.06
				18	19.83	163	0.02
				21	19.80	167	0.03
		Sizewell B Outfall	SZ 142	2	24.42	173	0.76
				12	24.48	270	0.50
				27	23.52	190	0.44

Table 18, ESM2 profiler 2014 temperature data, September – October, 0-4m depth

Date (14)		Site	Site code	Station	Mean	Count	St Dev
4th September	SZ 7/14	Reference Site	SZ3	27	18.20	161	0.03
		Sizewell B Intake	SZ 140	3	18.73	27	0.16
				13	18.90	151	0.15
				21	19.41	143	0.34
		Sizewell C Intake and Outfall	SZ 141	7	18.17	177	0.02
				15	17.96	186	0.02
				19	18.04	146	0.03
		Sizewell B Outfall	SZ 142	2	22.19	247	1.48
				9	24.21	249	0.55
				25	23.58	34	0.36
3rd October	SZ 9/14	Reference Site	SZ3	27	18.40	108	0.01
		Sizewell B Intake	SZ 140	4	18.18	158	0.04
				15	17.63	158	0.04
				20	19.70	140	1.01
		Sizewell C Intake and Outfall	SZ 141	9	17.36	138	0.01
				16	17.47	175	0.02
				21	17.63	119	0.02
		Sizewell B Outfall	SZ 142	3	21.28	130	1.29
				10	20.18	178	2.03
				26	20.09	210	1.39

Table 19, ESM2 profiler 2014 temperature data, December, 0-4m depth

Date (14)		Site	Site code	Station	Mean	Count	St Dev
5th December	SZ 11/14	Reference Site	SZ3	28	9.52	142	0.02
		Sizewell B Intake	SZ 140	4	9.44	141	0.01
				14	9.51	148	0.02
				22	9.62	160	0.03
		Sizewell C Intake and Outfall	SZ 141	2	9.55	143	0.01
				10	9.59	150	0.03
				20	9.72	41	0.06
		Sizewell B Outfall	SZ 142	8	11.28	164	0.25
				16	10.55	136	0.40
				26	12.82	65	0.70

5.1.2 2015

Table 20, ESM2 profiler 2015 temperature data, January - April

Date (15)		Site	Site code	Station	Mean	Count	St Dev
8th January	1/15	Reference Site	SZ3	1	6.51	116	0.02
				3	6.52	141	0.03
4th February	2/15	Reference Site	SZ3	11	4.47	133	0.01
				12	4.48	105	0.01
				13	4.48	127	0.01
		Sizewell B Intake	SZ 140	4	4.53	101	0.01
		Sizewell C Intake and Outfall	SZ 141	9	4.60	119	0.02
		Sizewell B Outfall	SZ 142	2	8.03	109	0.65
27th February	3/15	Sizewell B Intake	SZ 140	14	5.40	26	0.03
				19	6.73	20	0.64
				25	6.13	18	0.03
		Sizewell C Intake and Outfall	SZ 141	17	5.31	41	0.04
				23	5.33	27	0.13
		Sizewell B Outfall	SZ 143	2	6.16	136	0.08
				7	5.31	85	0.02
				11	5.35	24	0.05
1st April	6/15	Reference Site	SZ3	29	7.71	15	0.06
		Sizewell B Intake	SZ 140	5	7.46	45	0.01
				21	8.00	22	0.03
				27	7.36	22	0.01
		Sizewell C Intake and Outfall	SZ 141	2	7.00	125	0.01
				17	6.99	14	0.01
				24	7.25	13	0.02
		Sizewell B Outfall	SZ 143	8	8.37	29	0.72
				11	8.26	22	0.84
				14	8.05	21	0.07

Table 21, ESM2 profiler 2015 temperature data, April - May

Date (15)		Site	Site code	Station	Mean	Count	St Dev
27th April	8/15	Reference Site	SZ3	30	11.18	14	0.15
		Sizewell B Intake	SZ 140	11	11.81	48	0.59
				17	10.91	16	0.08
				23	11.39	15	0.01
		Sizewell C Intake and Outfall	SZ 141	15	10.51	12	0.02
				21	10.21	31	0.02
				28	9.97	28	0.07
		Sizewell B Outfall	SZ 143	3	11.35	74	0.94
				6	11.01	20	0.14
				9	11.25	23	0.22
27th May	10/15	Reference Site	SZ3	30	13.69	22	0.25
		Sizewell B Intake	SZ 140	13	13.25	44	0.03
				19	13.71	36	0.02
				25	12.95	43	0.03
		Sizewell C Intake and Outfall	SZ 141	16	13.42	30	0.06
				22	12.83	23	0.08
				28	12.50	19	0.02
		Sizewell B Outfall	SZ 143	3	13.32	69	0.01
				6	15.36	55	0.37
				9	13.98	46	0.07

Table 22, ESM2 profiler 2015 temperature data, June - July

Date (15)		Site	Site code	Station	Mean	Count	St Dev
26th June	12/15	Reference Site	SZ3	29	16.73	37	0.13
		Sizewell B Intake	SZ 140	12	17.11	30	0.16
				18	16.44	35	0.02
				24	15.60	27	0.02
		Sizewell C Intake and Outfall	SZ 141	15	15.84	17	0.04
				21	15.67	77	0.01
				27	14.97	78	0.03
		Sizewell B Outfall	SZ 143	3	17.61	55	0.32
				6	18.41	42	0.91
			SZ 144	9	16.84	38	0.20
26th July	13/15	Reference Site	SZ3	1	17.52	17	0.01
				36	18.01	75	0.02
		Sizewell B Intake	SZ 140	16	18.09	54	0.03
				22	18.26	17	0.05
				28	18.31	43	0.08
		Sizewell C Intake and Outfall	SZ 141	19	17.78	22	0.01
				25	18.01	76	0.01
				31	17.90	30	0.01
		Sizewell B Outfall	SZ 143	5	18.38	19	0.43
			SZ 144	10	18.32	38	0.04
				13	18.07	28	0.03

Table 23, ESM2 profiler 2015 temperature data, August - September

Date (15)		Site	Site code	Station	Mean	Count	St Dev
27th August	14/15	Reference Site	SZ3	2	18.43	100	0.01
				34	18.51	35	0.01
				36	18.41	40	0.01
		Sizewell B Intake	SZ 140	15	18.40	35	0.02
				21	18.36	176	0.01
				27	18.53	67	0.03
		Sizewell C Intake and Outfall	SZ 141	18	18.37	27	0.02
				24	18.30	24	0.01
				30	18.31	58	0.02
		Sizewell B Outfall	SZ 143	6	18.45	206	0.01
				9	19.46	31	0.70
23rd September	15/15	Reference Site	SZ3	2	15.81	34	0.02
				4	15.81	305	0.02
				33	16.67	117	0.02
				35	16.64	8	0.04
		Sizewell B Intake	SZ 140	18	16.66	98	0.01
				24	16.32	79	0.01
				30	16.34	22	0.01
		Sizewell C Intake and Outfall	SZ 141	15	16.33	23	0.01
				21	16.29	11	0.01
				27	16.30	12	0.01
		Sizewell B Outfall	SZ 144	6	16.01	136	0.15
				9	16.42	121	0.10
				12	17.53	40	0.25

5.2 Salinity

5.2.1 2014

Table 24, ESM2 profiler 2014 salinity data, March - April

Date (14)		Site	Site code	Station	Mean	Count	St Dev
13th March	SZ 1/14	Reference Site	SZ3	1	32.79	26	0.02
		Sizewell B Intake	SZ 140	7	32.92	89	0.02
				20	33.04	92	0.02
				26	33.09	100	0.03
		Sizewell C Intake and Outfall	SZ 141	4	32.94	104	0.03
				22	33.09	84	0.02
				28	33.20	95	0.09
		Sizewell B Outfall	SZ 142	9	32.96	89	0.32
				15	32.98	100	0.64
				17	32.92	99	0.56
9th April	SZ 2/14	Reference Site	SZ3	33	33.25	194	0.02
		Sizewell B Intake	SZ 140	10	33.49	225	0.02
				18	33.52	170	0.13
				28	33.29	190	0.02
		Sizewell C Intake and Outfall	SZ 141	11	33.54	167	0.03
				22	33.61	210	0.06
				31	33.46	254	0.04
		Sizewell B Outfall	SZ 142	1	33.23	204	0.40
				16	33.52	142	0.08
				24	33.48	20	0.14

Table 25, ESM2 profiler 2014 salinity data, May - June

Date (14)		Site	Site code	Station	Mean	Count	St Dev
13th May	SZ 3/14	Reference Site	SZ3	30	33.36	168	0.06
		Sizewell B Intake	SZ 140	5	33.38	210	0.04
				10	33.45	171	0.02
				15	33.35	225	0.04
				24	33.48	159	0.09
		Sizewell C Intake and Outfall	SZ 141	1	33.59	134	0.07
				11	33.57	152	0.03
				14	33.46	201	0.05
				22	33.49	180	0.02
		Sizewell B Outfall	SZ 142	8	33.39	145	0.14
				19	33.38	139	0.27
				28	33.52	210	0.21
8th June	SZ 4/14	Reference Site	SZ3	30	33.55	146	0.07
		Sizewell B Intake	SZ 140	6	33.48	31	0.05
				14	33.75	166	0.04
				25	33.75	133	0.03
		Sizewell C Intake and Outfall	SZ 141	1	33.48	99	0.03
				13	33.66	152	0.04
				20	33.78	143	0.02
		Sizewell B Outfall	SZ 142	10	33.61	212	0.31
				19	33.78	166	0.22
				28	33.72	185	0.14

Table 26, ESM2 profiler 2014 salinity data, July – September

Date (14)		Site	Site code	Station	Mean	Count	St Dev
7th July	SZ 5/14	Reference Site	SZ3	21	33.68	37	0.03
		Sizewell B Intake	SZ 140	4	33.67	34	0.01
				14	33.82	38	0.03
		Sizewell C Intake and Outfall	SZ 141	8	33.76	26	0.01
				16	33.86	17	0.02
		Sizewell B Outfall	SZ 142	2	33.74	78	0.28
				10	33.77	25	0.06
				19	33.66	45	0.06
5th August	SZ 6/14	Reference Site	SZ3	30	33.77	167	0.04
		Sizewell B Intake	SZ 140	4	33.90	162	0.02
				14	33.88	179	0.06
				23	33.81	193	0.04
		Sizewell C Intake and Outfall	SZ 141	9	34.07	171	0.07
				18	33.87	163	0.03
				21	33.87	167	0.03
		Sizewell B Outfall	SZ 142	2	33.77	173	0.21
				12	33.85	270	0.09
				27	33.82	190	0.11
4th September	SZ 7/14	Reference Site	SZ3	27	33.88	161	0.03
		Sizewell B Intake	SZ 140	3	33.90	27	0.03
				13	34.10	151	0.05
				21	34.01	143	0.06
		Sizewell C Intake and Outfall	SZ 141	7	34.00	177	0.04
				15	34.06	186	0.03
				19	34.03	146	0.03
		Sizewell B Outfall	SZ 142	2	33.76	246	0.52
				9	33.35	244	3.74
				25	33.92	34	0.27

Table 27, ESM2 profiler 2014 salinity data, October - December

Date (14)		Site	Site code	Station	Mean	Count	St Dev
3rd October	SZ 9/14	Reference Site	SZ3	27	34.02	108	0.03
		Sizewell B Intake	SZ 140	4	34.12	158	0.02
				15	34.19	158	0.02
				20	34.15	140	0.06
		Sizewell C Intake and Outfall	SZ 141	9	34.16	138	0.01
				16	34.26	175	0.02
				21	34.19	119	0.02
		Sizewell B Outfall	SZ 142	3	34.07	130	0.40
				10	34.17	178	0.26
				26	34.10	210	0.35
5th December	SZ 11/14	Reference Site	SZ3	28	33.12	142	0.04
		Sizewell B Intake	SZ 140	4	33.23	141	0.02
				14	33.05	148	0.03
				22	33.31	160	0.04
		Sizewell C Intake and Outfall	SZ 141	2	33.32	143	0.03
				10	33.37	150	0.04
				20	33.45	41	0.06
		Sizewell B Outfall	SZ 142	8	33.11	164	0.09
				16	33.15	136	0.20
				26	33.42	65	0.23

5.2.2 2015

Table 28, ESM2 profiler 2015 salinity data, January - April

Date (15)		Site	Site code	Station	Mean	Count	St Dev
8th January	1/15	Reference Site	SZ3	1	33.83	116	0.03
				3	33.74	141	0.07
4th February	2/15	BEEMS reference	SZ3	11	33.27	133	0.03
				12	33.25	105	0.03
				13	33.26	127	0.02
		Sizewell B Intake	SZ 140	4	33.34	101	0.02
		Sizewell C Intake and Outfall	SZ 141	9	33.38	119	0.02
		Sizewell B Outfall	SZ 142	2	33.28	109	0.20
27th February	3/15	Sizewell B Intake	SZ 140	14	33.55	26	0.02
				19	33.71	20	0.14
				25	33.58	18	0.04
		Sizewell C Intake and Outfall	SZ 141	17	33.53	41	0.03
				23	33.88	27	0.08
		Sizewell B Outfall	SZ 143	2	33.54	136	0.03
				7	33.52	85	0.03
				11	33.57	24	0.06
1st April	6/15	Reference Site	SZ3	29	NA	NA	NA
		Sizewell B Intake	SZ 140	5	NA	NA	NA
				21	NA	NA	NA
				27	NA	NA	NA
		Sizewell C Intake and Outfall	SZ 141	2	NA	NA	NA
				17	NA	NA	NA
				24	NA	NA	NA
		Sizewell B Outfall	SZ 143	8	NA	NA	NA
				11	NA	NA	NA
				14	NA	NA	NA

Table 29, ESM2 profiler 2015 salinity data, April - May

Date (15)		Site	Site code	Station	Mean	Count	St Dev
27th April	8/15	Reference Site	SZ3	30	33.48	14	0.09
		Sizewell B Intake	SZ 140	11	33.33	48	0.17
				17	33.31	16	0.07
				23	33.35	15	0.04
		Sizewell C Intake and Outfall	SZ 141	15	33.32	12	0.02
				21	33.39	31	0.02
				28	33.55	28	0.04
		Sizewell B Outfall	SZ 143	3	33.41	74	0.20
				6	33.30	20	0.09
				9	33.27	23	0.05
27th May	10/15	Reference Site	SZ3	30	33.79	22	0.06
		Sizewell B Intake	SZ 140	13	33.80	44	0.03
				19	33.76	36	0.04
				25	33.79	43	0.02
		Sizewell C Intake and Outfall	SZ 141	16	33.72	30	0.02
				22	33.79	23	0.02
				28	33.80	19	0.02
		Sizewell B Outfall	SZ 143	3	33.68	69	0.02
				6	33.74	55	0.07
				9	33.71	46	0.03

Table 30, ESM2 profiler 2015 salinity data, June - July

Date (15)		Site	Site code	Station	Mean	Count	St Dev
26th June	12/15	Reference Site	SZ3	29	33.90	37	0.03
		Sizewell B Intake	SZ 140	12	33.92	30	0.05
				18	33.91	35	0.01
				24	33.98	27	0.05
		Sizewell C Intake and Outfall	SZ 141	15	33.94	17	0.01
				21	33.96	77	0.04
				27	34.09	78	0.04
		Sizewell B Outfall	SZ 143	3	33.91	55	0.13
				6	33.97	42	0.17
			SZ 144	9	33.91	38	0.04
26th July	13/15	Reference Site	SZ3	1	33.61	17	0.03
				36	33.71	75	0.02
		Sizewell B Intake	SZ 140	16	33.73	54	0.02
				22	33.77	17	0.03
				28	33.84	43	0.03
		Sizewell C Intake and Outfall	SZ 141	19	33.78	22	0.02
				25	33.85	76	0.02
				31	33.91	30	0.01
		Sizewell B Outfall	SZ 143	5	33.78	19	0.08
			SZ 144	10	33.67	38	0.02
				13	33.67	28	0.02

Table 31, ESM2 profiler 2015 salinity data, August - September

Date (15)		Site	Site code	Station	Mean	Count	St Dev
27th August	14/15	Reference Site	SZ3	2	34.29	100	0.01
				34	34.29	35	0.01
				36	34.28	40	0.02
		Sizewell B Intake	SZ 140	15	34.28	35	0.03
				21	34.28	176	0.02
				27	34.32	67	0.03
		Sizewell C Intake and Outfall	SZ 141	18	34.38	27	0.02
				24	34.35	24	0.01
				30	34.39	58	0.02
		Sizewell B Outfall	SZ 143	6	34.31	206	0.02
				9	34.41	31	0.12
23rd September	15/15	Reference Site	SZ3	2	34.09	34	0.02
				4	34.11	305	0.01
				33	34.21	117	0.02
				35	34.24	8	0.01
		Sizewell B Intake	SZ 140	18	34.40	98	0.01
				24	34.46	79	0.01
				30	34.46	22	0.01
		Sizewell C Intake and Outfall	SZ 141	15	34.28	23	0.03
				21	34.41	11	0.01
				27	34.49	12	0.01
		Sizewell B Outfall	SZ 144	6	34.06	136	0.04
				9	34.08	121	0.05
				12	34.21	40	0.05

5.3 Oxygen

5.3.1 2014

Table 32, ESM2 profiler 2014 oxygen data, March - April

Date (14)		Site	Site code	Station	Mean	Count	St Dev
13th March	SZ 1/14	Reference Site	SZ3	1	11.17	2	0.63
		Sizewell B Intake	SZ 140	7	11.06	8	0.09
				20	10.35	9	0.60
				26	8.96	9	0.01
		Sizewell C Intake and Outfall	SZ 141	4	10.16	9	0.41
				22	9.07	7	0.01
				28	9.23	8	0.01
		Sizewell B Outfall	SZ 142	9	10.63	8	0.25
				15	10.00	9	0.25
				17	9.16	9	0.22
9th April	SZ 2/14	Reference Site	SZ3	33	8.91	15	0.02
		Sizewell B Intake	SZ 140	10	8.95	18	0.01
				18	8.95	13	0.07
				28	8.90	15	0.01
		Sizewell C Intake and Outfall	SZ 141	11	8.96	13	0.01
				22	9.01	16	0.02
				31	8.96	21	0.01
		Sizewell B Outfall	SZ 142	1	8.82	17	0.13
				16	9.10	11	0.02

Table 33, ESM2 profiler 2014 oxygen data, May - June

Date (14)		Site	Site code	Station	Mean	Count	St Dev
13th May	SZ 3/14	Reference Site	SZ3	30	8.58	13	0.04
		Sizewell B Intake	SZ 140	5	9.35	17	0.83
				10	8.46	13	0.01
				15	8.52	19	0.01
				24	8.57	13	0.02
		Sizewell C Intake and Outfall	SZ 141	1	9.63	10	0.93
				11	8.53	12	0.01
				14	8.53	16	0.01
				22	8.55	15	0.02
		Sizewell B Outfall	SZ 142	8	8.55	12	0.08
				19	8.60	10	0.08
				28	8.79	17	0.08
8th June	SZ 4/14	Reference Site	SZ3	30	8.95	10	0.86
		Sizewell B Intake	SZ 140	6	7.93	1	NA
				14	8.40	6	0.76
				25	10.59	10	3.22
		Sizewell C Intake and Outfall	SZ 141	1	8.03	8	0.02
				13	10.39	11	3.36
				20	8.07	10	0.01
		Sizewell B Outfall	SZ 142	10	7.99	18	0.12
				19	8.65	10	0.51
				28	8.81	15	0.66

Table 34, ESM2 profiler 2014 oxygen data, July - September

Date (14)		Site	Site code	Station	Mean	Count	St Dev
7th July	SZ 5/14	Reference Site	SZ3	21	7.59	1	NA
		Sizewell B Intake	SZ 140	4	7.84	3	0.01
				14	8.28	4	0.02
		Sizewell C Intake and Outfall	SZ 141	8	8.09	1	NA
		Sizewell B Outfall	SZ 142	2	7.81	5	0.03
				10	8.26	1	NA
				19	8.26	2	0.03
5th August	SZ 6/14	Reference Site	SZ3	30	7.17	17	0.02
		Sizewell B Intake	SZ 140	4	7.11	15	0.01
				14	7.17	17	0.03
				23	7.22	19	0.05
		Sizewell C Intake and Outfall	SZ 141	9	7.06	17	0.01
				18	7.12	15	0.03
				21	7.15	16	0.02
		Sizewell B Outfall	SZ 142	2	7.16	16	0.08
				12	7.19	26	0.03
				27	7.17	17	0.05
4th September	SZ 7/14	Reference Site	SZ3	27	7.64	15	0.03
		Sizewell B Intake	SZ 140	3	7.46	2	0.01
				13	7.46	14	0.03
				21	7.33	14	0.56
		Sizewell C Intake and Outfall	SZ 141	7	7.39	17	0.02
				15	7.40	18	0.02
				19	7.93	14	1.92
		Sizewell B Outfall	SZ 142	2	7.58	24	0.11
				9	7.75	22	1.47
				25	7.67	2	0.03

Table 35, ESM2 profiler 2014 oxygen data, October - December

Date (14)		Site	Site code	Station	Mean	Count	St Dev
3rd October	SZ 9/14	Reference Site	SZ3	27	7.45	10	0.02
		Sizewell B Intake	SZ 140	4	7.34	14	0.02
				15	7.34	15	0.02
				20	7.40	13	0.05
		Sizewell C Intake and Outfall	SZ 141	9	7.23	12	0.01
				16	7.28	17	0.01
				21	7.34	11	0.01
		Sizewell B Outfall	SZ 142	3	7.29	11	0.15
				10	7.44	16	0.11
				26	7.50	20	0.10
5th December	SZ 11/14	Reference Site	SZ3	28	8.67	13	0.01
		Sizewell B Intake	SZ 140	4	8.58	13	0.01
				14	8.65	14	0.01
				22	8.60	15	0.01
		Sizewell C Intake and Outfall	SZ 141	2	8.54	13	0.01
				10	8.52	14	0.01
				20	8.47	3	0.01
		Sizewell B Outfall	SZ 142	8	8.79	15	0.04
				16	8.70	13	0.04
				26	8.73	6	0.11

5.3.2 2015

Table 36, ESM2 profiler 2015 oxygen data, January - February

Date (15)		Site	Site code	Station	Mean	Count	St Dev
8th January	1/15	Reference Site	SZ3	1	9.20	2	0.01
				3	9.25	13	0.02
4th February	2/15	BEEMS reference	SZ3	11	9.44	12	0.01
				12	9.44	10	0.01
				13	9.44	12	0.02
		Sizewell B Intake	SZ 140	4	9.42	10	0.01
		Sizewell C Intake and Outfall	SZ 141	9	9.41	11	0.01
		Sizewell B Outfall	SZ 142	2	9.58	10	0.07
27th February	3/15	Sizewell B Intake	SZ 140	14	9.45	2	0.01
				19	9.55	1	NA
				25	9.44	1	NA
		Sizewell C Intake and Outfall	SZ 141	17	9.45	3	0.01
				23	9.43	1	NA
		Sizewell B Outfall	SZ 143	2	9.39	13	0.02
				7	9.45	7	0.02
				11	9.49	1	NA

Table 37, ESM2 profiler 2015 oxygen data, April

Date (15)		Site	Site code	Station	Mean	Count	St Dev
1st April	6/15	Reference Site	SZ3	29	NA	NA	NA
		Sizewell B Intake	SZ 140	5	NA	NA	NA
				21	NA	NA	NA
				27	NA	NA	NA
		Sizewell C Intake and Outfall	SZ 141	2	NA	NA	NA
				17	NA	NA	NA
				24	NA	NA	NA
		Sizewell B Outfall	SZ 143	8	NA	NA	NA
				11	NA	NA	NA
				14	NA	NA	NA
27th April	8/15	Reference Site	SZ3	30	NA	NA	NA
		Sizewell B Intake	SZ 140	11	9.11	4	0.10
				17	9.10	1	NA
				23	8.96	1	NA
		Sizewell C Intake and Outfall	SZ 141	15	NA	NA	NA
				21	9.02	3	0.01
				28	9.15	2	0.01
		Sizewell B Outfall	SZ 143	3	9.15	7	0.09
				6	9.01	1	NA
				9	8.90	1	NA

Table 38, ESM2 profiler 2015 oxygen data, May - June

Date (15)		Site	Site code	Station	Mean	Count	St Dev
27th May	10/15	Reference Site	SZ3	30	8.45	2	0.04
		Sizewell B Intake	SZ 140	13	8.40	3	0.01
				19	8.64	3	0.02
				25	8.74	3	0.01
		Sizewell C Intake and Outfall	SZ 141	16	8.55	2	0.01
				22	8.67	2	0.00
				28	8.68	1	NA
		Sizewell B Outfall	SZ 143	3	8.45	5	0.01
				6	8.41	5	0.03
				9	8.53	4	0.00
26th June	12/15	Reference Site	SZ3	29	7.62	3	0.02
		Sizewell B Intake	SZ 140	12	7.58	2	0.01
				18	7.67	2	0.01
				24	7.84	2	0.00
		Sizewell C Intake and Outfall	SZ 141	15	7.72	1	NA
				21	7.77	6	0.01
				27	7.89	7	0.02
		Sizewell B Outfall	SZ 143	3	7.52	5	0.04
				6	7.50	3	0.03
			SZ 144	9	7.56	3	0.01

Table 39, ESM2 profiler 2015 oxygen data, July - August

Date (15)		Site	Site code	Station	Mean	Count	St Dev
26th July	13/15	Reference Site	SZ3	1	6.98	1	NA
				36	7.09	6	0.09
		Sizewell B Intake	SZ 140	16	6.94	5	0.01
				22	NA	NA	NA
				28	6.98	2	0.00
		Sizewell C Intake and Outfall	SZ 141	19	6.97	1	NA
				25	6.94	7	0.01
				31	7.00	2	0.00
		Sizewell B Outfall	SZ 143	5	6.92	1	NA
			SZ 144	10	7.01	2	0.01
				13	6.97	2	0.04
27th August	14/15	Reference Site	SZ3	2	7.07	9	0.01
				34	7.07	2	0.01
				36	7.08	3	0.01
		Sizewell B Intake	SZ 140	15	7.07	3	0.01
				21	7.03	16	0.01
				27	7.07	5	0.01
		Sizewell C Intake and Outfall	SZ 141	18	7.11	1	NA
				24	7.13	2	0.01
				30	7.08	5	0.01
		Sizewell B Outfall	SZ 143	6	7.08	20	0.01
				9	7.07	3	0.02

Table 40, ESM2 profiler 2015 oxygen data, September

Date (15)		Site	Site code	Station	Mean	Count	St Dev
23rd September	15/15	Reference Site	SZ3	2	7.29	3	0.01
				4	7.30	30	0.01
				33	7.37	11	0.01
				35	NA	NA	NA
		Sizewell B Intake	SZ 140	18	7.30	9	0.01
				24	7.33	7	0.01
				30	NA	NA	NA
		Sizewell C Intake and Outfall	SZ 141	15	7.32	2	0.00
				21	NA	NA	NA
				27	NA	NA	NA
		Sizewell B Outfall	SZ 144	6	7.37	12	0.03
				9	7.33	11	0.02
				12	7.30	3	0.01

6 Appendix B

6.1 Water chemistry

6.1.1 Priority analytes

Table 41 SZ3 water chemistry results for priority analytes, units are in µg l^{-1}

Analyte	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Arsenic Dissolved	1.15	1.15	1.26	1.03	1.35	1.3	1.15	1.35	1.2	1.19	1.32	1.33	1.51	<1	<1	1.1	1.11	1.21	<1	<1	1.37
Cadmium, Dissolved	<0.03	<0.03	0.03	0.043	0.037	0.03	0.041	0.036	0.03	0.115	<0.03	<0.03	<0.03	<0.06	<0.03	<0.03	0.03	<0.03	0.097	<0.03	<0.03
Copper, Dissolved	4.74	4.74	1.06	1.36	2.75	1.66	1.58	2.04	1.34	1.43	0.724	0.698	1.15	1.34	1.19	0.908	2.11	1.48	4.82	2.84	2.07
Nickel, Dissolved	0.762	0.762	0.555	0.709	0.83	0.639	0.574	0.781	0.578	0.595	0.507	0.69	0.636	<0.6	0.501	0.711	0.955	0.648	0.625	0.753	1.02
Zinc, Dissolved	8.11	8.11	2.7	16.2	32.9	7.78	14.4	16.6	9.25	9.07	2.15	6.21	26.9	6.86	5.1	6.19	20.4	10.8	8.86	5.42	11.5
Iron, Dissolved	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Mercury, Dissolved	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0134	<0.01	0.0137	<0.01	<0.01	0.0434
Chromium, Dissolved	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.08	2.22	<0.5	<0.5	<0.5	1.47	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Table 42 Sizewell C intake/outfall water chemistry results for priority analytes, units are in µg l^{-1}

Analyte	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Arsenic Dissolved	1.35	1.35	1.42	NA	1.16	1.23	NA	1.26	1.19	NA	1.25	<1	1.28	1.03	<1	<1	1.1	1.07	1.07	1.34	1.36
Cadmium, Dissolved	0.034	0.034	0.123	NA	<0.03	0.068	NA	0.039	0.038	NA	<0.03	0.09	0.065	<0.03	0.045	<0.03	<0.03	<0.03	0.118	0.038	0.035
Copper, Dissolved	1.88	1.88	2.14	NA	1.93	2.47	NA	2.43	1.42	NA	0.734	2.05	1.57	1.12	1.61	0.922	1.56	1.16	4.17	4.05	1.18
Nickel, Dissolved	0.72	0.72	0.703	NA	0.716	0.746	NA	0.861	0.679	NA	0.5	1.03	1.17	0.532	1.16	0.574	0.72	0.67	0.646	1.09	0.812
Zinc, Dissolved	6.08	6.08	10.5	NA	12.2	17.9	NA	16.4	54.1	NA	2.25	19.2	8.05	21.5	9.91	3.16	11.2	13.2	20.5	17.6	8.57
Iron, Dissolved	<100	<100	<100	NA	<100	<100	NA	<100	<100	NA	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Mercury, Dissolved	<0.01	<0.01	<0.01	NA	0.011	<0.01	NA	<0.01	<0.01	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium, Dissolved	<0.5	<0.5	<0.5	NA	<0.5	<0.5	NA	<0.5	<0.5	NA	<0.5	7.32	<0.5	<0.5	<0.5	0.617	2.69	<0.5	<0.5	1.06	0.984

Table 43 Sizewell B outfall water chemistry results for priority analytes, units are in µg l^{-1}

Analyte	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Arsenic Dissolved	1.19	1.19	1.35	<1	1.17	1.27	1.05	1.17	<1	NA	1.12	1.16	NA	<1	<1	<1	1.08	1.16	NA	1.14	1.34
Cadmium, Dissolved	0.032	0.032	0.09	0.411	0.046	0.179	0.037	0.055	0.047	NA	<0.03	0.031	NA	0.062	0.056	<0.03	0.04	<0.03	NA	0.186	0.03
Copper, Dissolved	1.42	1.42	0.918	1.87	1.23	8.82	2.01	2.71	0.954	NA	0.762	1.34	NA	3.81	3.92	1.59	1.74	1.24	NA	9.65	1.09
Nickel, Dissolved	0.925	0.925	0.603	0.599	0.706	1.13	0.654	0.827	0.573	NA	0.564	0.956	NA	1.16	1.15	0.777	0.859	0.654	NA	2.19	0.941
Zinc, Dissolved	25.7	25.7	4.47	20.5	17	47	13.2	16.1	16.3	NA	1.94	19.6	NA	47	27.3	11.8	7.78	15	NA	45.5	6.02
Iron, Dissolved	1430	1430	<100	<100	<100	<100	<100	<100	<100	NA	<100	<100	NA	<100	<100	<100	<100	<100	NA	<100	<100
Mercury, Dissolved	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA	<0.01	<0.01	NA	0.018	<0.01	<0.01	<0.01	<0.01	NA	<0.01	0.516
Chromium, Dissolved	<0.5	<0.5	1.36	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NA	<0.5	2.17	NA	<0.5	<0.5	<0.5	<0.5	<0.5	NA	0.65	<0.5

6.1.2 Environmental parameters

Analyte	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
BOD 5 Day ATU	<2.92	<2.92	<1.00	1.59	<2.92	<1.00	1.2	1.25	<1.00	<2.92	<1.00	1.11	1.28	<1.00	1.03	1	1.1	<1.00	<1.00	1.35	1.19
Chloride	18300	18300	18800	18900	19000	18800	19100	18900	19100	19400	18700	18600	18000	18700	18300	16900	18100	18500	17200	18100	18300
Carbon, Organic, Dissolved as C {DOC}	1	1	1.34	1.19	1.2	1.4	1.19	1.19	1.22	1.17	1	1.2	1.06	0.73	1.07	0.87	0.64	1.15	0.9	0.65	1.22
Phosphate: Total as P	0.12	0.12	<0.02	<0.02	0.0464	0.0315	0.0278	0.0375	0.239	0.0917	0.0935	0.181	0.0417	0.0415	0.0217	0.0722	0.0978	0.0378	0.0312	0.0618	0.0974
Fluoride	1.17	1.17	1.18	1.27	1.51	1.24	1.31	1.34	1.28	1.26	1.25	1.21	1.16	1.27	1.26	1.31	1.25	1.22	1.27	1.17	1.3
pH	7.99	7.99	8.11	8.03	8.04	8.06	8.03	7.98	7.89	7.97	7.93	7.91	7.97	8.1	8.02	8	8.09	8.05	7.97	8.03	8.05
Bromide	60.2	60.2	64.2	64.1	64.5	61.7	64.3	62.1	62.1	61.3	62.6	63.7	64.1	65.7	64.5	63.7	65.2	62.6	64.1	67.7	66.7
Solids, Suspended at 105 C	111	111	8.9	9.6	21.5	21.2	9.9	11.6	54.9	75.9	74.2	195	29.8	34.1	17.6	55	89.8	26.2	18.8	47.3	77.8

Table 44 SZ3 water chemistry results for environmental parameters, units are in mg/l, except pH, which is in pH units

Table 45 Sizewell C intake/outfall water chemistry results for environmental parameters, units are in mg/l, except pH, which is in pH units

Analyte	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
BOD 5 Day ATU	<2.92	<2.92	1.39	NA	<2.92	1.3	NA	1.5	1.71	NA	<1.00	1.79	1.29	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	1.29	<1.00
Chloride	19100	19100	18900	NA	19200	19000	NA	19200	18800	NA	18800	18200	17900	18400	18600	17300	18200	18400	18200	18300	18700
Carbon, Organic, Dissolved as C {DOC}	0.94	0.94	1.46	NA	1.02	1.46	NA	0.93	1.29	NA	1.07	1.31	1.13	0.86	1.01	0.84	0.68	0.94	1.01	0.9	1.01
Phosphate: Total as P	0.0937	0.0937	<0.02	NA	0.0565	0.115	NA	0.0515	0.0735	NA	0.152	0.129	0.0446	0.0257	<0.02	0.0618	0.0515	0.0955	0.0448	0.0736	0.111
Fluoride	1.16	1.16	1.22	NA	1.49	1.24	NA	1.39	1.21	NA	1.19	1.18	1.26	1.32	1.31	1.24	1.31	1.18	1.22	1.2	1.28
pH	7.97	7.97	8.07	NA	8.1	8.06	NA	7.99	7.86	NA	7.94	7.84	8	8.07	8.03	8.02	8.12	8.03	7.99	8.01	8.07
Bromide	63.8	63.8	64.8	NA	64.3	62.5	NA	63	63.1	NA	62.1	64.3	63.8	65.9	64.5	64.2	64.5	63.3	64.7	67.4	67
Solids, Suspended at 105 C	80	80	4.1	NA	23.2	41	NA	29.1	68	NA	135	137	27.6	22.9	9.7	33.1	36.2	70.7	32	66.4	103

Table 46 Sizewell B outfall water chemistry results for environmental parameters, units are in mg/l, except pH, which is in pH units

Analyte	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
BOD 5 Day ATU	<2.92	<2.92	1.04	1.75	<2.92	2.22	1.86	1.19	1.25	NA	<1.00	1.65	NA	2	<1.00	1.22	1.08	<1.00	NA	1.99	<1.00
Chloride	18600	18600	18800	18500	19100	18700	19100	19300	18700	NA	19000	18600	NA	18400	18500	17400	18200	17600	NA	18100	18100
Carbon, Organic, Dissolved as C {DOC}	1.11	1.11	1.53	1.22	1.2	1.95	1.27	0.86	1.21	NA	0.96	1.19	NA	1.13	1.05	1.04	0.75	0.99	NA	1.04	1.09
Phosphate: Total as P	0.228	0.228	0.0491	<0.02	0.0732	0.0612	0.0365	0.0391	0.0793	NA	0.176	0.164	NA	0.0415	0.0392	0.0935	0.0975	0.0548	NA	0.146	0.115
Fluoride	1.17	1.17	1.13	1.22	1.38	1.23	1.2	1.41	1.21	NA	1.3	1.24	NA	1.14	1.2	1.29	1.26	1.2	NA	1.24	1.32
pH	7.97	7.97	8.08	8.11	8.05	7.98	8.05	8	7.91	NA	7.94	7.88	NA	8.02	8.01	7.98	8.1	8.03	NA	7.93	8.08
Bromide	63.6	63.6	64.8	64.9	64.4	61.8	64.6	63.2	61.5	NA	63.1	63.9	NA	65.5	64.1	63.5	64.5	62.3	NA	66.7	67.4
Solids, Suspended at 105 C	240	240	40.7	10.4	42.9	62.8	22	32.9	94	NA	172	171	NA	36.6	33.7	49.7	91	47.5	NA	146	96.9

6.1.3 Other metals

Analyte	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Arsenic	3.99	3.99	1.17	1.14	1.73	1.66	1.47	1.49	2.53	2.96	2.92	5.96	1.71	1.59	1.22	2.65	3.07	1.53	1.4	2.48	3.06
Selenium Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aluminium, Dissolved	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	63.8	<40	<40	<40
Cobalt, Dissolved	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Molybdenum, Dissolved	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Cobalt	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Molybdenum	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Cadmium	<0.03	<0.03	0.03	0.042	0.042	0.03	0.045	0.04	<0.03	0.095	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.091	<0.03	<0.03
Copper	5.79	5.79	1.04	1.65	2.9	2.01	2.07	2.57	1.95	2.44	1.24	2.01	1.57	1.66	1.37	1.37	2.95	2.06	5.98	3.41	2.83
Lead	3.66	3.66	0.846	1.38	1.25	1.02	1.09	0.704	2.49	2.69	2.44	4.34	1.18	0.963	0.597	1.69	2.7	0.965	0.816	1.5	2.19
Nickel	2.15	2.15	0.864	0.707	1.29	1.12	0.796	1.09	1.52	1.69	1.53	2.52	1.17	1.1	0.764	1.59	2.04	1.13	0.982	1.75	2
Zinc	13.4	13.4	3.6	17.4	33.8	9.98	17.8	18.7	13.1	15.4	6.48	12.7	31.7	8.72	6.48	10.4	27.8	12.5	9.73	8.7	15.6

Table 47 SZ3 water chemistry results for other metals 1, units are in µg/l

Analyte	*Unit*	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Boron, Dissolved	µg/l	4370	4370	4300	4100	4100	4260	4280	4220	4070	4390	4480	4250	4080	4320	4290	4340	4310	4010	4500	3720	4210
Calcium, Dissolved	mg/l	400	400	412	384	391	413	405	398	381	397	431	412	380	401	402	412	398	368	427	372	430
Magnesium, Dissolved	mg/l	1300	1300	1080	1100	1220	1260	1110	1300	1190	1230	1220	1230	1220	1220	1270	1280	1270	1250	1310	1370	1330
Manganese, Dissolved	µg/l	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	22.9	<20	<20	<20	<20	<20	<20	<20
Potassium, Dissolved	mg/l	408	408	357	351	389	414	478	407	369	368	375	397	365	377	386	396	394	370	413	411	425
Sodium, Dissolved	mg/l	10400	10400	9110	9070	9970	10200	8590	10500	9590	9900	9880	10200	9730	9870	10200	10300	10300	10100	10500	11000	11000
Strontium, Dissolved	µg/l	7670	7670	7180	6930	7100	7290	7150	7250	7000	7250	7610	7210	7040	7350	7300	7460	7450	6780	7310	6770	7720
Sulphate, Dissolved as SO4	mg/l	2670	2670	2270	2470	2480	2630	2890	2690	2530	2540	2560	2680	2570	2540	2630	2650	2730	2440	2700	2440	2720
Barium	µg/l	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Boron	µg/l	3730	3730	4370	3980	4140	4150	4130	4510	4000	4540	4000	4240	3950	4450	4320	4380	4810	4240	4350	3770	4150
Calcium	mg/l	368	368	411	375	389	386	388	426	381	421	394	430	377	405	395	413	448	389	403	387	433
Iron	µg/l	2150	2150	226	184	408	582	243	304	1280	1910	1610	4380	641	727	365	2110	2060	513	503	1110	2500

Table 48 SZ3 water chemistry results for other metals 2

Analyte	*Unit*	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Magnesium	mg/l	1190	1190	1270	1090	1120	1270	1070	1300	1260	1260	1210	1240	1250	1280	1270	1250	1310	1250	1310	1290	1300
Potassium	mg/l	375	375	488	339	351	413	463	397	393	380	367	398	419	392	383	389	412	376	412	398	413
Strontium	µg/l	6380	6380	7250	6800	7100	6850	6940	7750	6840	7640	6870	7270	6780	7470	7230	7310	7220	7160	7370	7150	7830
Mercury	µg/l	0.0219	0.0219	<0.01	<0.01	<0.01	<0.01	0.0116	0.0128	<0.01	<0.01	<0.01	0.0287	0.0162	0.0128	<0.01	0.0187	0.0143	0.063	0.0222	<0.01	0.0864
Chromium	µg/l	3.08	3.08	<0.5	<0.5	0.86	0.87	<0.5	0.9	1.5	2.25	1.91	4.76	0.975	0.84	<0.5	1.51	3.02	0.68	0.64	1.67	2.1

Table 49 SZ3 water chemistry results for other metals 3

Analyte	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Arsenic	2.86	2.86	1.06	NA	1.67	2.14	NA	2.01	3.11	NA	4.45	4.4	1.89	1.05	1.12	1.97	2.06	2.83	1.67	2.96	3.8
Selenium Dissolved	<1	<1	<1	NA	<1	<1	NA	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Selenium	<1	<1	<1	NA	<1	<1	NA	<1	<1	NA	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aluminium, Dissolved	<40	<40	<40	NA	<40	<40	NA	<40	<40	NA	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40
Cobalt, Dissolved	<10	<10	<10	NA	<10	<10	NA	<10	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Molybdenum, Dissolved	<30	<30	<30	NA	<30	<30	NA	<30	<30	NA	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Cobalt	<10	<10	<10	NA	<10	<10	NA	<10	<10	NA	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Molybdenum	<30	<30	<30	NA	<30	<30	NA	<30	<30	NA	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Cadmium	<0.03	<0.03	0.121	NA	<0.03	0.055	NA	0.039	0.032	NA	<0.03	0.059	0.065	<0.03	0.061	<0.03	<0.03	<0.03	0.102	0.031	<0.03
Copper	2.83	2.83	2.5	NA	2.52	2.74	NA	4.02	2.33	NA	1.53	2.68	2.21	1.48	2.48	1.32	2.04	2.35	5.76	4.23	2.13
Lead	2.58	2.58	0.734	NA	1.24	1.64	NA	1.67	3.35	NA	3.36	3.36	1.39	0.718	0.554	1.14	1.23	2.64	1.36	2.13	2.63
Nickel	1.75	1.75	0.798	NA	1.11	1.57	NA	1.57	1.86	NA	2.05	2.31	1.94	0.999	1.46	1.15	1.34	1.82	1.21	1.97	2.14
Zinc	10.9	10.9	11.9	NA	13.6	20.8	NA	20.8	61.2	NA	8.63	21.6	12	26.5	13.1	7.64	14.4	32.7	22.7	22.3	14.5

Table 50 Sizewell C intake/outfall water chemistry results for other metals 1, units are in µg/l

Analyte	*Unit*	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Boron, Dissolved	µg/l	3980	3980	4280	NA	3990	4050	NA	4210	4160	NA	4580	4420	3890	4270	4320	4370	4330	4250	4550	3680	4170
Calcium, Dissolved	mg/l	386	386	418	NA	389	396	NA	388	383	NA	437	418	365	402	403	414	392	383	431	370	426
Magnesium, Dissolved	mg/l	1290	1290	1110	NA	1220	1300	NA	1230	1230	NA	1260	1240	1190	1250	1260	1250	1270	1280	1290	1320	1330
Manganese, Dissolved	µg/l	<20	<20	<20	NA	<20	<20	NA	<20	<20	NA	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Potassium, Dissolved	mg/l	416	416	366	NA	395	430	NA	375	382	NA	389	396	357	389	385	385	395	382	403	405	426
Sodium, Dissolved	mg/l	10300	10300	9430	NA	9880	10500	NA	9880	9990	NA	10200	10200	9560	10200	10100	10200	10400	10400	10300	10700	11000
Strontium, Dissolved	µg/l	6960	6960	7310	NA	7050	6970	NA	7090	7000	NA	7740	7320	6780	7360	7290	7460	7330	7030	7420	6760	7640
Sulphate, Dissolved as SO4	mg/l	2580	2580	2270	NA	2520	2480	NA	2570	2550	NA	2600	2610	2480	2610	2630	2600	2640	2440	2620	2460	2730
Barium	µg/l	<100	<100	<100	NA	<100	<100	NA	<100	<100	NA	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Boron	µg/l	3890	3890	4340	NA	4200	4210	NA	4950	4100	NA	4180	4180	4020	4410	4240	4590	4910	4210	4530	3890	4170
Calcium	mg/l	374	374	415	NA	388	394	NA	470	395	NA	414	413	383	406	396	426	455	389	415	393	437
Iron	µg/l	1450	1450	185	NA	517	1180	NA	905	1910	NA	3300	2570	721	554	188	1380	1060	1960	984	1560	2930

Table 51 Sizewell C intake/outfall water chemistry results for other metals 2

Analyte	*Unit*	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Magnesium	mg/l	1250	1250	1310	NA	1040	1290	NA	1240	1290	NA	1240	1230	1270	1260	1310	1290	1290	1220	1320	1260	1290
Potassium	mg/l	385	385	497	NA	321	414	NA	385	395	NA	389	396	445	383	393	394	401	372	417	401	406
Strontium	µg/l	6560	6560	7320	NA	7110	6950	NA	8550	7110	NA	7150	7030	6870	7530	7220	7540	7510	7130	7600	7260	7880
Mercury	µg/l	<0.01	<0.01	0.0131	NA	<0.01	<0.01	NA	0.013	<0.01	NA	0.0157	0.021	<0.01	0.0139	<0.01	<0.01	<0.01	0.0129	0.064	0.0161	0.0422
Chromium	µg/l	1.97	1.97	<0.5	NA	<0.5	1.74	NA	1.09	2.26	NA	3.18	5.37	1.35	1.34	<0.5	0.799	1.07	2.41	1.01	1.89	2.94

Table 52 Sizewell C intake/outfall water chemistry results for other metals 3

Analyte	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Arsenic	6.66	6.66	2.04	<1	2.09	2.69	1.38	2.2	3.58	NA	5.15	5.37	NA	1.82	1.73	2.49	3.4	2.18	NA	4.71	3.58
Selenium Dissolved	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	<1	<1	NA	<1	<1	<1	<1	<1	NA	<1	<1
Selenium	<1	<1	<1	<1	<1	<1	<1	<1	<1	NA	<1	<1	NA	<1	<1	<1	<1	<1	NA	<1	<1
Aluminium, Dissolved	<40	<40	<40	<40	<40	<40	<40	<40	<40	NA	<40	<40	NA	<40	<40	<40	<40	48.6	NA	<40	<40
Cobalt, Dissolved	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	<10	<10	NA	<10	<10	<10	<10	<10	NA	<10	<10
Molybdenum, Dissolved	<30	<30	<30	<30	<30	<30	<30	<30	<30	NA	<30	<30	NA	<30	<30	<30	<30	<30	NA	<30	33.8
Cobalt	<10	<10	<10	<10	<10	<10	<10	<10	<10	NA	<10	<10	NA	<10	<10	<10	<10	<10	NA	<10	<10
Molybdenum	<30	<30	<30	<30	<30	<30	<30	<30	<30	NA	<30	<30	NA	<30	<30	<30	<30	<30	NA	<30	<30
Cadmium	<0.06	<0.06	0.081	0.387	0.046	0.17	0.036	0.047	0.036	NA	<0.03	<0.03	NA	0.085	0.051	<0.03	0.03	<0.03	NA	0.111	<0.03
Copper	3.87	3.87	1.28	2.16	1.76	8.27	2.49	3.55	1.85	NA	1.59	2.98	NA	3.63	12.4	2.35	2.32	2.02	NA	7.7	2.1
Lead	7.21	7.21	1.4	1.46	1.96	3.31	1.08	1.61	3.32	NA	3.97	3.92	NA	1.5	1.72	1.75	2.42	1.83	NA	3.5	2.59
Nickel	3.82	3.82	1.21	0.764	1.48	2.22	1.04	1.54	1.79	NA	2.27	2.8	NA	1.69	3.28	1.6	1.82	1.39	NA	3.23	2.21
Zinc	39	39	6.57	22.9	20.3	61.4	15.1	21.1	21.6	NA	9.09	23.2	NA	48.2	32.1	20.4	13.8	19	NA	42.1	11.3

Table 53 Sizewell B outfall water chemistry results for other metals 1, units are in µg/l

Analyte	*Unit*	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Boron, Dissolved	µg/l	4180	4180	4070	4220	4090	4320	4340	4170	4220	NA	4450	4170	NA	4430	4160	4360	4430	4170	NA	3790	4150
Calcium, Dissolved	mg/l	396	396	394	396	395	416	405	388	391	NA	439	407	NA	406	399	406	402	380	NA	382	427
Magnesium, Dissolved	mg/l	1280	1280	1060	1110	1200	1400	1140	1200	1230	NA	1200	1210	NA	1250	1270	1280	1260	1260	NA	1330	1320
Manganese, Dissolved	µg/l	<20	<20	<20	<20	<20	<20	<20	<20	<20	NA	<20	<20	NA	27.2	<20	<20	<20	<20	NA	20.5	<20
Potassium, Dissolved	mg/l	410	410	349	352	383	460	426	369	378	NA	378	386	NA	394	393	392	386	373	NA	406	416
Sodium, Dissolved	mg/l	10300	10300	9000	9130	9720	11300	9010	9600	9970	NA	9750	10000	NA	10300	10200	10400	10200	10200	NA	10800	10900
Strontium, Dissolved	µg/l	7280	7280	6900	7150	7140	7310	7180	7080	7160	NA	7780	7170	NA	7390	7220	7310	7490	6990	NA	6960	7620
Sulphate, Dissolved as SO4	mg/l	2650	2650	2290	2310	2420	2950	2970	2400	2550	NA	2520	2620	NA	2620	2630	2650	2680	2460	NA	2480	2760
Barium	µg/l	<100	<100	<100	<100	<100	<100	<100	<100	<100	NA	<100	<100	NA	<100	<100	<100	<100	<100	NA	<100	<100
Boron	µg/l	3970	3970	4340	3990	4210	4250	4140	4460	4220	NA	3920	4140	NA	4340	4180	4510	4840	4320	NA	3910	4070
Calcium	mg/l	398	398	414	380	387	404	392	419	406	NA	397	421	NA	402	391	419	453	397	NA	400	428
Iron	µg/l	4450	4450	796	266	977	1670	567	865	2350	NA	3500	3400	NA	946	751	2020	2450	961	NA	2910	2900

Table 54 Sizewell B outfall water chemistry results for other metals 2

Analyte	*Unit*	*Apr-14*	*May-14*	*Jun-14*	*Jul-14*	*Aug-14*	*Sep-14*	*Oct-14*	*Nov-14*	*Dec-14*	*Jan-15*	*Feb-15*	*Mar-15*	*Apr-15*	*May-15*	*Jun-15*	*Jul-15*	*Aug-15*	*Sep-15*	*Oct-15*	*Nov-15*	*Dec-15*
Magnesium	mg/l	1190	1190	1320	1120	1090	1320	1110	1170	1220	NA	1210	1230	NA	1270	1290	1290	1320	1250	NA	1300	1260
Potassium	mg/l	371	371	403	352	340	420	409	369	378	NA	371	394	NA	392	388	391	413	379	NA	411	393
Strontium	µg/l	6810	6810	7260	6870	7080	7120	7010	7630	7230	NA	6830	7180	NA	7460	7130	7400	7280	7340	NA	7300	7680
Mercury	µg/l	0.0339	0.0339	0.0136	<0.01	<0.01	0.0149	0.0102	<0.01	0.0148	NA	0.0121	0.0318	NA	0.0367	0.0131	0.0624	<0.01	<0.01	NA	0.0341	0.877
Chromium	µg/l	5.16	5.16	1.15	0.55	1.28	2.61	<0.5	1.06	2.25	NA	4.61	5.36	NA	1.32	2.63	1.37	2.21	1.25	NA	3.54	2.75

Table 55 Sizewell B outfall water chemistry results for other metals 3

7 Appendix C

7.1 Nutrient chemistry

Survey	*Sample Date*	NH_4-N µg l^{-1}	NH_4 µmol	DIN-N µg l^{-1}	DIN-N µmol	PO_4-P µg l^{-1}	PO_4-P µmol	N:P ratio
SIZE01/14	13/03/2014	-	<0.1	468	33	71	2.3	15
SIZE01/14	13/03/2014	-	<0.1	441	32	61	2.0	16
SIZE01/14	13/03/2014	-	<0.1	441	32	121	3.9	8
SIZE02/14	09/04/2014	-	<0.1	367	26	33	1.1	24
SIZE02/14	09/04/2014	-	<0.1	358	26	110	3.5	7
SIZE02/14	09/04/2014	-	<0.1	379	27	27	0.9	31
SIZE03/14	13/05/2014	-	<0.1	349	25	19	0.6	42
SIZE03/14	13/05/2014	2.80	0.2	322	23	19	0.6	37
SIZE03/14	13/05/2014	-	<0.1	287	21	17	0.6	37
SIZE04/14	08/06/2014	19.60	1.4	213	15	1	0.0	-
SIZE04/14	08/06/2014	4.20	0.3	190	14	6	0.2	68
SIZE04/14	08/06/2014	-	<0.1	179	13	9	0.3	46

Table 56 Nutrient concentrations Sizewell B Intake, March – June 2014

Table 57 Nutrient concentrations Sizewell B Intake July 2014 to December 2014 with additional data from February 2015. Shaded cells are those considered to represent winter values used to make various nutrients assessments

Survey	***Sample Date***	**NH_4-N µg l^{-1}**	**NH_4 µmol**	**DIN-N µg l^{-1}**	**DIN-N µmol**	**PO_4-P µg l^{-1}**	**PO_4-P µmol**	**N:P ratio**
SIZE05/14	07/07/2014	9.80	0.7	57	4	42	1.4	3
SIZE05/14	07/07/2014	2.80	0.2	29	2	210	6.8	0
SIZE06/14	05/08/2014	51.80	3.7	106	8	30	1.0	8
SIZE06/14	05/08/2014	25.20	1.8	81	6	79	2.5	2
SIZE06/14	05/08/2014	16.80	1.2	78	6	13	0.4	13
SIZE07/14	04/09/2014	5.60	0.4	116	8	19	0.6	14
SIZE07/14	04/09/2014	1.40	0.1	120	9	17	0.6	15
SIZE07/14	04/09/2014	4.20	0.3	118	8	17	0.6	15
SIZE09/14	03/10/2014	11.20	0.8	91	7	18	0.6	11
SIZE09/14	03/10/2014	7.00	0.5	71	5	13	0.4	12
SIZE09/14	03/10/2014	7.00	0.5	76	5	13	0.4	13
SIZE10/14	04/11/2014	16.80	1.2	200	14	22	0.7	20
SIZE10/14	04/11/2014	12.60	0.9	213	15	19	0.6	25
SIZE10/14	04/11/2014	12.60	0.9	217	16	22	0.7	22
SIZE11/14	05/12/2014	15.40	1.1	337	24	24	0.8	31
SIZE11/14	05/12/2014	14.00	1.0	358	26	26	0.9	30
SIZE11/14	05/12/2014	15.40	1.1	339	24	26	0.9	28
SIZE02/15	04/02/2015	14.00	1.0	419	30	28	0.9	33

Survey	*Sample Date*	NH_4-N µg l^{-1}	NH_4 µmol	DIN-N µg l^{-1}	DIN-N µmol	PO_4-P µg l^{-1}	PO_4-P µmol	N:P ratio
SIZE01/14	13/03/2014	<0.1	-	463	33	99	3.2	10
SIZE01/14	13/03/2014	<0.1	-	462	33	60	2.0	17
SIZE01/14	13/03/2014	<0.1	-	462	33	56	1.8	18
SIZE01/14	13/03/2014	<0.1	-	427	31	71	2.3	13
SIZE02/14	09/04/2014	<0.1	-	385	28	28	0.9	31
SIZE02/14	09/04/2014	<0.1	-	357	26	27	0.9	29
SIZE02/14	09/04/2014	<0.1	-	357	26	25	0.8	31
SIZE03/14	13/05/2014	<0.1	-	316	23	23	0.7	31
SIZE03/14	13/05/2014	<0.1	-	312	22	21	0.7	33
SIZE03/14	13/05/2014	0.3	4.20	287	21	20	0.6	32
SIZE04/14	08/06/2014	1.2	16.80	211	15	4	0.1	126
SIZE04/14	08/06/2014	0.1	1.40	188	13	11	0.3	39
SIZE04/14	08/06/2014	0.1	1.40	182	13	10	0.3	39

Table 58 Nutrient concentrations Sizewell B Outfall, March – June 2014

Table 60 Nutrient concentrations Sizewell B Outfall, July 2014 – December 2014, and including data from February 2015–shaded cells are those considered to represent winter values used to make various nutrients assessments

Survey	*Sample Date*	NH_4-N µg l^{-1}	NH_4 µmol	DIN-N µg l^{-1}	DIN-N µmol	PO_4-P µg l^{-1}	PO_4-P µmol	N:P ratio
SIZE05/14	07/07/2014	5.60	0.4	64	5	64	2.1	2
SIZE05/14	07/07/2014	8.40	0.6	43	3	36	1.2	3
SIZE05/14	07/07/2014	2.80	0.2	42	3	4	0.1	25
SIZE06/14	05/08/2014	23.80	1.7	85	6	44	1.4	4
SIZE06/14	05/08/2014	28.00	2.0	88	6	39	1.3	5
SIZE06/14	05/08/2014	26.60	1.9	92	7	17	0.6	12
SIZE07/14	04/09/2014	25.20	1.8	134	10	21	0.7	14
SIZE07/14	04/09/2014	4.20	0.3	130	9	21	0.7	13
SIZE07/14	04/09/2014	18.20	1.3	134	10	20	0.7	15
SIZE09/14	03/10/2014	8.40	0.6	94	7	16	0.5	13
SIZE09/14	03/10/2014	12.60	0.9	95	7	14	0.5	15
SIZE09/14	03/10/2014	15.40	1.1	90	6	17	0.6	11
SIZE10/14	04/11/2014	5.60	0.4	190	14	25	0.8	17
SIZE10/14	04/11/2014	12.60	0.9	218	16	23	0.7	21
SIZE10/14	04/11/2014	11.20	0.8	217	16	23	0.7	21
SIZE11/14	05/12/2014	18.20	1.3	364	26	26	0.8	31
SIZE11/14	05/12/2014	14.00	1.0	363	26	26	0.9	30
SIZE11/14	05/12/2014	16.80	1.2	340	24	27	0.9	28
SIZE02/15	04/02/2015	4.20	0.3	409	29	27	0.9	33

Table 61 Nutrient concentrations Sizewell C Intake/Outfall, March – June 2014

Survey	*Sample Date*	NH_4-N µg l^{-1}	NH_4 µmol	DIN-N µg l^{-1}	DIN-N µmol	PO_4-P µg l^{-1}	PO_4-P µmol	N:P ratio
SIZE01/14	13/03/2014	<0.1	-	447	32	46	1.5	22
SIZE01/14	13/03/2014	<0.1	-	440	31	42	1.4	23
SIZE02/14	09/04/2014	<0.1	-	349	25	29	0.9	27
SIZE02/14	09/04/2014	<0.1	-	346	25	38	1.2	20
SIZE02/14	09/04/2014	<0.1	-	364	26	26	0.8	31
SIZE03/14	13/05/2014	<0.1	-	280	20	20	0.6	32
SIZE03/14	13/05/2014	<0.1	-	307	22	20	0.7	33
SIZE03/14	13/05/2014	<0.1	-	307	22	18	0.6	37
SIZE04/14	08/06/2014	0.4	5.60	199	14	-	-	
SIZE04/14	08/06/2014	2.5	35.00	227	16	4	0.1	116
SIZE04/14	08/06/2014	0.8	11.20	192	14	8	0.3	51

Table 62 Nutrient concentrations Sizewell B Outfall, July 2014 – December 2014, and including data from February 2015–shaded cells are those considered to represent winter values used to make various nutrients assessments

Survey	*Sample Date*	NH_4-N µg l^{-1}	NH_4 µmol	DIN-N µg l^{-1}	DIN-N µmol	PO_4-P µg l^{-1}	PO_4-P µmol	N:P ratio
SIZE05/14	07/07/2014	18.20	1.3	53	4	37	1.2	3
SIZE05/14	07/07/2014	8.40	0.6	34	2	33	1.1	2
SIZE06/14	05/08/2014	23.80	1.7	77	6	116	3.7	1
SIZE06/14	05/08/2014	22.40	1.6	76	5	13	0.4	13
SIZE06/14	05/08/2014	19.60	1.4	70	5	12	0.4	13
SIZE07/14	04/09/2014	2.80	0.2	120	9	33	1.1	8
SIZE07/14	04/09/2014		<0.1	116	8	18	0.6	15
SIZE07/14	04/09/2014		<0.1	113	8	17	0.6	15
SIZE09/14	03/10/2014	11.20	0.8	87	6	17	0.5	11
SIZE09/14	03/10/2014	11.20	0.8	78	6	12	0.4	15
SIZE09/14	03/10/2014	7.00	0.5	63	5	11	0.4	13
SIZE10/14	04/11/2014	4.20	0.3	183	13	24	0.8	17
SIZE10/14	04/11/2014	2.80	0.2	183	13	22	0.7	18
SIZE10/14	04/11/2014	21.00	1.5	185	13	23	0.7	18
SIZE11/14	05/12/2014	22.40	1.6	337	24	26	0.9	28
SIZE11/14	05/12/2014	15.40	1.1	316	23	25	0.8	28
SIZE11/14	05/12/2014	5.60	0.4	312	22	25	0.8	28
SIZE02/15	04/02/2015	7.00	0.5	399	29	26	0.9	34

Table 63 Nutrient concentrations SZ3 site, March – June 2014

Survey	***Sample Date***	**NH_4-N µg l^{-1}**	**NH_4 µmol**	**DIN-N µg l^{-1}**	**DIN-N µmol**	**PO_4-P µg l^{-1}**	**PO_4-P µmol**	**N:P ratio**
SIZE01/14	13/03/2014	2.80	0.2	483	35	47	1.5	23
SIZE02/14	09/04/2014		<0.1	399	29	32	1.0	28
SIZE03/14	13/05/2014	1.40	0.1	321	23	22	0.7	32
SIZE04/14	08/06/2014	1.40	0.1	183	13	11	0.4	35

Table 64 Nutrient concentrations SZ3 site, July 2014 – December 2014, and including data from February 2015–shaded cells are those considered to represent winter values used to make various nutrients assessments

Survey	***Sample Date***	**NH_4-N µg l^{-1}**	**NH_4 µmol**	**DIN-N µg l^{-1}**	**DIN-N µmol**	**PO_4-P µg l^{-1}**	**PO_4-P µmol**	**N:P ratio**
SIZE05/14	07/07/2014	18.20	1.3	85	6	127	4.1	1
SIZE06/14	05/08/2014	26.60	1.9	109	8	100	3.2	2
SIZE07/14	04/09/2014	7.00	0.5	99	7	18	0.6	12
SIZE07/14	04/09/2014	16.80	1.2	111	8	20	0.6	13
SIZE09/14	03/10/2014	8.40	0.6	95	7	17	0.6	12
SIZE09/14	03/10/2014	5.60	0.4	88	6	15	0.5	13
SIZE10/14	04/11/2014	12.60	0.9	214	15	27	0.9	17
SIZE10/14	04/11/2014	7.00	0.5	206	15	25	0.8	18
SIZE11/14	05/12/2014	16.80	1.2	367	26	189	6.1	4
SIZE11/14	05/12/2014	23.80	1.7	371	27	38	1.2	22
SIZE01/15	08/01/2015	4.20	0.3	298	21	24	0.8	27
SIZE01/15	08/01/2015	11.20	0.8	312	22	25	0.8	28
SIZE02/15	04/02/2015	8.40	0.6	427	31	29	0.9	33