

Table 3.2.2.3.1 Summary of Baseline (Pre Operational) Biota – Sub Programs

Sub Program	Objective	Period	Frequency	Location(s)	Methodology	Parameters	Interpretation & reporting	Other details
Chemical Residues in wild caught Flathead ( <i>Neoplatycephalus aurimaculatus</i> )	Record pre existing levels of residues in seafood associated with (taste) tainting of fish flesh.	3 consecutive samples collected during the same month each year, commencing 2007, or as agreed by the Director	Annual	Outfall (within 1000m radius from proposed diffuser location, or as agreed by the Director) Weymouth region & Bridport region	Sample numbers per location to be as approved by the Director.  Dissection of fish muscle and storage under sterile and secure conditions pending assessment.  "Blind" assessment by an independent Taste Panel.	Taste evaluation panel of 10-12 testers. Use of 9 point hedonic scale for colour, texture, flavour intensity, juiciness & overall acceptability.	Statistical analysis and interpretation by a <i>suitably qualified expert</i> .  Annual return with comparison between Locations and to historic data when collated.	Formal approval of a <i>suitably qualified expert</i> . is required by The Director of Environmental Management before commencement.
	Assess pre existing levels of chemical residues associated with pulp mill effluent in fish muscle and liver.	As Above	As Above	As Above	Sample numbers per location to be as approved by the Director.  Dissection of fish liver and muscle and storage under sterile and secure conditions followed by chemical residue analysis.	Muscle and/or liver tissue residues of:  Analytes discharged as detailed in the DIIS, Supplementary Information Book C Table A1.1 pp290-295 excluding those considered unlikely to bioaccumulate or unnecessary to measure  Or as approved by the Director	Annual Return. Full data set with statistical summaries with comparison of observed values to Aust. Food Standards Code and historical data when collected.	Composite chemical analysis of individual fish tissue samples per analytical sample allowed.  (Gunns to provide rationale and final lists of analytes for approval by the Director before commencement)
Physiological condition of wild caught Flathead (Part A) ( <i>Neoplatycephalus aurimaculatus</i> )	Record pre existing condition indicators of a suitable endemic species.	As Above	As Above	As Above	Sample numbers per location to be as approved by the Director.  Physical macroscopic observations followed by dissection to muscle, liver, gill, kidney and gonad tissues.	Gonadosomatic Index (Male & Female)  Hepatosomatic Index  Fulton's Condition Index	Annual Return. Full data set with statistical summaries with comparison of observed values to historic data when collated.	Records of individual fish to include observations of general gill, eye & fin condition.

Sub Program	Objective	Period	Frequency	Location(s)	Methodology	Parameters	Interpretation & reporting	Other details
						& presence or absence of:  Skin lesions & Ectoparasites  Or as approved by the Director		
Physiological condition of wild caught Flathead (Part B) ( <i>Neoplatycephalus aurimaculatus</i> )	Record pre existing condition indicators of a suitable endemic species.	As Above	As Above	As Above	Sample numbers per location to be as approved by the Director.  Establishment of a tissue bank of preserved histological samples suitable for future reference.	Tissue samples of:  Gill  Kidney  Liver  Gonad	Histological analysis and interpretation by a suitably qualified expert(s) must be undertaken if requested by The Director of Environmental Management.  Appointment of expert(s) to be approved by The Director before commencement.	Sample storage must be undertaken in accordance with a Tissue Sample Bank Management Plan approved by The Director of Environmental Management.
Mussel Watch (Sentinel monitoring – Tissue accumulation indicators)	Establish existing uptake/accumulation of relevant contaminants potentially in the water column within the Mixing Zone, at the boundary of the Mixing Zone, and at selected control sites by controlled deployment of a suitable sentinel species <i>Mytilus edulis</i>	Pre commissioning	Phased deployment every 3 months for 3 month exposure or as required by The Director.	5m from the top of the water column and 2.5m from the bottom at sites defined as EOP, WOP, SW500 and SE500.  5m from the top of the water column at the site defined as D, except when construction activities require the sentinel's removal.	Exposure of cultured mussels for periods of 3 months.  Sample size related to tissue mass required for analytical suites.  Soft tissue chemical residue analysis	Tissue residues:  Analytes discharged as detailed in the DIIS, Supplementary Information Book C Table A1.1 pp290-295 excluding those considered unlikely to bioaccumulate or unnecessary to measure  In addition, general Mussel condition and health indices are to be	Annual Return. Full data set with statistical summaries with comparison of observed tissue residue values to Aust. Food Standards Code and historical data when collected.	Composite chemical analysis of tissue samples per analytical sample allowed.  (Gunns to provide rationale and final lists of analytes for approval by the Director before commencement)  Stock to be: - sourced from a single aquaculture facility. - a standard size range - from a single

Sub Program	Objective	Period	Frequency	Location(s)	Methodology	Parameters	Interpretation & reporting	Other details
						recorded pre and post exposure including but not limited to: - wet:dry weight ratio - wet flesh: total weight ratio - byssal thread attachment assay  Or as approved by the Director		cohort - sub sampled and tested for the same parameters prior to deployment
Mussel Watch (Sentinel monitoring – Chronic condition indicators)	Establish baseline environmental conditions as indicated by growth, mortality and condition of suitable sentinel species via controlled deployment.  <i>Mytilus edulis</i> & triploid <i>Crassostrea gigas</i> .	As above	Annual samples 2 years pre commissioning	NW500, SE500, NE500, SW500, 2X EOP, 2X WOP 5m from the top of the water column and 2.5 m above the bottom	Expose cultured mussels in socks and oysters in cages for 18-24 months  or as otherwise required by The Director	Condition & health indicators:  Growth Rate, Condition Index Survival rates	Annual Return. Full data set with statistical summaries	Stock to be: - sourced from a single aquaculture facility - a standard size range - from a single cohort
Higher Predator pollutant accumulation.	To assess the baseline tissue burden of relevant persistent pollutants in higher predators endemic to the vicinity of the outfall.  <i>Eudiptula minor</i> and <i>Arctocephalus pusillus doriferus</i>	As required by the Director	As required by the Director	As required by the Director	As required by the Director	Persistent accumulative pollutants as required by the Director	As required by the Director	

Table 3.2.2.3.2 Summary of Post Construction Biota – Sub Programs

Sub Program	Objective	Period	Frequency	Location(s)	Methodology	Parameters	Interpretation & reporting	Other details
Chemical Residues in wild caught Flathead ( <i>Neoplatycephalus aurimaculatus</i> )	Test for the presence of residues in seafood associated with (taste) tainting of fish flesh.	3 sample runs collected during the same month as the corresponding pre operational Sub Program for years 1, 2 & 4 after release of process effluent commences.	Annual	Outfall (within 500m radius from diffuser location)  Weymouth region & Bridport region	Sample numbers per location to be as approved by the Director.  Dissection of fish muscle and storage under sterile and secure conditions pending assessment.  "Blind" assessment by an independent Taste Panel.	Taste evaluation panel of 10-12 testers. Use of 9 point hedonic scale for colour, texture, flavour intensity, juiciness & overall acceptability.	Statistical analysis and interpretation by a <i>suitably qualified expert</i> .  Annual return with comparison between Locations and to corresponding pre operational data.	Formal approval of a <i>suitably qualified expert</i> . is required by The Director of Environmental Management before commencement.
	Test for the accumulation of chemical residues associated with pulp mill effluent in fish muscle and liver.	As Above	As Above	As Above	Sample numbers per location to be as approved by the Director.  Dissection of fish liver and muscle and storage under sterile and secure conditions followed by chemical residue analysis.	Muscle and/or liver tissue residues of:  Analytes discharged as detailed in the DIIS, Supplementary Information Book C Table A1.1 pp290-295 excluding those considered unlikely to bioaccumulate or unnecessary to measure  Or as approved by the Director	Annual Return. Full data set with statistical summaries with comparison of observed values to Aust. Food Standards Code and corresponding pre operational data.	Composite chemical analysis of individual fish tissue samples per analytical sample allowed.  (Gunns to provide rationale and final lists of analytes for approval by the Director before commencement)

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Sub Program	Objective	Period	Frequency	Location(s)	Methodology	Parameters	Interpretation & reporting	Other details
Physiological condition of wild caught Flathead (Part A) ( <i>Neoplatycephalus aurimaculatus</i> )	Test for a change in condition indicators of a suitable endemic species.	As Above	As Above	As Above	Sample numbers per location to be as approved by the Director.  Dissection of fish liver and muscle and storage under sterile and secure conditions followed by chemical residue analysis.	Gonadosomatic Index (Male & Female)  Hepatosomatic Index  Fulton's Condition Index  & presence or absence of:  Skin lesions &  Ectoparasites	Annual Return. Full data set with statistical summaries with comparison of observed values to corresponding pre operational data.	Records of individual fish to include observations of general gill, eye & fin condition.
Physiological condition of wild caught Flathead (Part B) ( <i>Neoplatycephalus aurimaculatus</i> )	Test for a change in condition indicators of a suitable endemic species.	As Above	As Above	As Above	Sample numbers per location to be as approved by the Director.  Establishment of a tissue bank of preserved histological samples suitable for future reference.	Tissue samples of:  Gill  Kidney  Liver  Gonad	Histological analysis and interpretation by a suitably qualified expert(s) must be undertaken if requested by The Director of Environmental Management.  Appointment of expert(s) to be approved by The Director before commencement.	Sample storage must be undertaken in accordance with a Tissue Sample Bank Management Plan approved by The Director of Environmental Management.
Mussel Watch (Sentinel monitoring – Tissue accumulation indicators)	Test for the accumulation of chemical residues associated with pulp mill effluent in bivalves by controlled deployment of suitable sentinel species ( <i>Mytilus edulis</i> )	3 years post commissioning	Phased deployment every 3 months for 3 month exposure or as required by The Director.	<Approximately 5m from the top and 2.5m from the bottom of the water column at sites defined as D (surface only), EOP, WOP, SW250, SW500, SE250, SE500, NW250, NW500, NE250, NE500, S250, S500	Exposure of cultured mussels for periods of 3 months.  Sample size related to tissue mass required for analytical suites.  Soft tissue chemical residue analysis	Tissue residues:  Analytes discharged as detailed in the DIIS, Supplementary Information Book C Table A1.1 pp290-295 excluding those considered unlikely to bioaccumulate	Quarterly and annual return. Full data set with statistical summaries with comparison of observed tissue residue values to Aust. Food Standards Code and historical data when collected.	Composite chemical analysis of tissue samples per analytical sample allowed.  Stock to be: - sourced from a single aquaculture facility  - a standard size range

Sub Program	Objective	Period	Frequency	Location(s)	Methodology	Parameters	Interpretation & reporting	Other details
						or unnecessary to measure - In addition, general Mussel condition and health indices are to be recorded pre and post exposure including but not limited to: wet: dry weight ratio - wet flesh: total weight ratio - byssal thread attachment assay  Or as approved by the Director		- from a single cohort - sub sampled and tested for the same parameters prior to deployment  (Gunns to provide rationale and final lists of analytes for approval by the Director before commencement)
Mussel Watch (Sentinel monitoring – Chronic condition indicators)	Monitor environmental conditions as indicated by growth, mortality and condition of suitable sentinel species via controlled deployment..  <i>Mytilus edulis</i> & triploid <i>Crassostrea gigas</i> .	As above	Annual samples , or as required by the Director	NW500, SE500, NE500, SW500, 2X EOP, 2X WOP 5m from the top of the water column and 2.5 m above the bottom	Expose cultured mussels in socks and oysters in cages for 18-24 months  or as otherwise required by The Director	Condition & health indicators:  Growth Rate, Condition Index Survival rates	Annual Return. Full data set with statistical summaries	Stock to be: - sourced from a single aquaculture facility - a standard size range - from a single cohort
<i>Higher Predator pollutant accumulation.</i>	To assess the tissue burden post commencement of outfall, of relevant persistent pollutants in higher predators endemic to the vicinity of the outfall.	As required by the Director	As required by the Director	As required by the Director	As required by the Director	Persistent accumulative pollutants as defined by the Director.	As required by the Director	

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