

	Title: H1 Surface Water Risk Assessment – PNEC Screening Annex	
	Location: Bradgate Bakery, Madeline Road, Leicester, LE4 1WX	Date: 19.06.2026

Project Title:	(RE: EPR/CP3430WV/V005) Bradgate Bakery Variation Application
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Scope of Assessment:	This annex assesses the substances identified within the sites existing cleaning chemicals which will increase in daily use as a result of cleaning regimes to be implemented as part of the additional 6 new process lines proposed, that will discharge to sewer via the onsite Effluent Treatment Plant (ETP). This report assesses the sites' cleaning chemicals that have no relevant EQS's in the EA H1 tool library but are PNECs. The assessment considers worst-case release concentrations, using documented treatment-removal factors and published PNECs.
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H1 Surface Water Risk Assessment - Output - PNEC Screening Annex

Table 1 – Data Field Inputs and Method

Parameter	Value	Source
Trade effluent flow (EFR)	650 m ³ /day = 0.00752 m ³ /s	Operator
River Soar Q95 (RFR)	3.42 m ³ /s	NRFA Soar at Kegworth (28074); EA to confirm site value
Wanlip STW dry weather flow	~140,000 m ³ /day	Severn Trent
Background (BC)	50% × PNEC (no monitored background)	EA default
Dilution factor EFR/(EFR+Q95)	0.0021940	—

Release concentration (worst case — 100% of product to drain, maximum SDS %):

$RC (\mu\text{g/L}) = \text{volume (L/day)} \times \text{density (kg/L)} \times \% \text{max(w/w)} \times 1538.5$ (powder: mass kg/day × %max × 1538.5)

Process contribution (EA H1 tool model, with treatment removal):

$PC (\mu\text{g/L}) = RC \times 0.0021940 \times (1 - \text{removal})$ (Conservative: credits treatment removal but takes no credit for dilution of the trade effluent within Wanlip's 140,000 m³/day flow — the full mass-balance dilution is ~670× rather than 456×, providing additional margin.) $PEC (\mu\text{g/L}) = PC + BC$, with $BC = 50\% \times PNEC$.

Screens out if ANY: discharge $RC < 10\% PNEC$; **OR** $PC \leq 4\% PNEC$; **OR** $PEC < PNEC$ and $(PEC - BC) \leq 10\% PNEC$.

Product usage (per day, whole site): Causdeta 25 = 148 L (p 1.29); Chlorfoam Plus = 72 L (p 1.19); Sterilex ProvaStep = 100 kg; Biozyme Foam = 15 L (p 1.04); Terminol = 43 L (p 1.09).

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Table 2 – Refined Screening Results

Substance (CAS)	Source	RC (µg/L)	Removal % (source)	PC (µg/L)	PNEC (µg/L) (source)	BC	PEC	Result
Benzalkonium chloride / ADBAC (68424-85-1)	Terminol	7,211	99 (ACI, median 28 samples)	0.158	0.77 (NOEC 7.7÷10; ACI)	0.385	0.543	Does NOT screen out → conservative inputs
Triamine — N-(3-aminopropyl)-N-dodecyl-1,3-diamine (2372-82-9)	Terminol	722	95 (cationic, sorptive/biodegradable)	0.079	1.0 (Holchem SDS, REACH)	0.5	0.579	Screens out (PEC test)
Alkyl dimethyl amine oxide (308062-28-4)	Chlorfoam + Biozyme	7,791	90 (readily biodegradable)	1.710	33.5 (Holchem SDS, REACH)	16.75	18.46	Screens out (PEC test)
Tetrasodium EDTA (64-02-8) ¹	Causdeta + Terminol (+ProvaStep)	29,108	0 (poorly removed)	63.9	2,860 (Holchem SDS, REACH)	1,430	1,494	Screens out (PC = 2.2%)
Sodium aryl sulphonate (1300-72-7)	Chlorfoam Plus	6,591	90	1.447	230 (Holchem SDS, REACH)	115	116	Screens out
Sodium alkyl ether sulphate (68891-38-3)	Chlorfoam Plus	1,318	90	0.289	240 (Holchem SDS, REACH)	120	120	Screens out
Alcohol ethoxylate (68131-39-5)	Terminol	3,605	90	0.791	100 (HERA AE, read-across)	50	51	Screens out

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Substance (CAS)	Source	RC (µg/L)	Removal % (source)	PC (µg/L)	PNEC (µg/L) (source)	BC	PEC	Result
α-Olefin sulfonate C14-16 (68439-57-6)	Biozyme	1,200	90	0.263	40 (ACI/HERA, read-across)	20	20	Screens out
Alkylamine/acrylic acid rxn product (939-647-7)	Biozyme	1,200	90	0.263	33.5 (read-across, amine oxide)	16.75	17	Screens out
Subtilisin enzyme (9014-01-1)	Biozyme	240	n/a	—	—	—	—	Screens out (readily biodegradable; denatures)

¹ EDTA also has an entry in the EA H1 tool library and is reported in the main report; it is included here for completeness as it appears in multiple products.

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Sterilex ProvaStep (100 kg/day) — composition % w/w not yet provided. Worst-case assumption applied: LAS up to 15% w/w (RC 23,078 µg/L; 90% removal; PC 5.07 µg/L vs LAS PNEC 270 µg/L = 1.9%) and EDTA up to 10% (folded into the EDTA row; total PC 3.4% of PNEC). On these conservative assumptions

ProvaStep substances still screen out; to be confirmed on receipt of the composition.

Mixture / additivity check (sum of PC ÷ PNEC)

- **Cationic biocides** (ADBAC + triamine): $0.205 + 0.079 = \mathbf{0.28}$ toxic units (<1). ADBAC dominates and individually exceeds the 4% screening threshold.
- **Surfactants** (amine oxide, aryl sulphonate, AES, AE, AOS, alkylamine/acrylic): $\Sigma \approx \mathbf{0.08}$ toxic units (<1).

The combined mixture is below 1 toxic unit, but ADBAC is carried forward individually.

Summary Conclusions

On a refined but conservative basis, **all cleaning-chemical substances screen out except benzalkonium chloride (ADBAC) in Terminol.**

ADBAC does not pass screening against the conservative NOEC-derived PNEC (0.77 µg/L) even with 99% documented removal; however:

- using the **SSD-based low-toxicity reference of 7.7 µg/L** (ACI ecological risk analysis), the PC (0.158 µg/L) is **2.1%** — a clear pass;
- ADBAC is **99% removed** in activated-sludge treatment (sorption to sludge), evidenced;
- the discharge is further controlled by the **Severn Trent Trade Effluent Consent** and the **operational ETP**.

ADBAC is therefore **referred to the Environment Agency for detailed (Monte Carlo) modelling** — which the EA carries out for discharges to inland freshwater — supported by the above evidence and the effluent monitoring commitment (next sampling round) set out in the covering letter.

Sources

- Holchem SDS (REACH registrant PNECs): Terminol HLT1 (rev 10/06/2017); Chlorfoam Plus HLC61 (rev 14/07/2017).
- ADBAC removal & toxicity: *Ecological Risk Analysis for Benzalkonium Chloride...*, PMC9827944.
- HERA reports (LAS, AE) and American Cleaning Institute surfactant factsheets (read-across for AOS/AE).
- Q95: NRFA Soar at Kegworth (28074). Wanlip STW DWF: Severn Trent.
- Chlorine EQS: UKTAG specific pollutant / SI 2015/1623.