

TPDNO explanatory paper: compliance assessment methodology

August 2022



ENVIRONMENT PROTECTION AUTHORITY

EPA TPDNO COMPLIANCE ASSESSMENT METHODOLOGY

Clear procedures are critical for a smooth transition once a total permissible dissolved nitrogen (N) output (TPDNO) is introduced. It is important for regulators to have a clear understanding of compliance assessment methods, and for these to be communicated to marine finfish farmers and the broader community.

Purpose of this paper

This paper aims to:

- Provide clarification of the principles and methods applied by the EPA when assessing compliance with a specified TPDNO
- Provide information to marine finfish farmers regarding EPA expectations

Definitions

TPDNO: means *Total Permissible Dissolved Nitrogen Output* and refers to the total allowable mass of dissolved nitrogen (in kilogram or tonnes) which may be released over a specified time (i.e. a 12-month rolling period). TPDNO limits the amount of nitrogen which can be released via feed inputs into a defined area.

Dissolved Nitrogen Output: is the portion of nitrogen contained in feed inputs to marine finfish farms which is predicted to be released to the receiving environment in soluble form. Dissolved nitrogen output is a calculated value, using standardised methods to reflect nitrogen content in feed and science-based assumptions on the fate of nitrogen. Dissolved nitrogen is taken to be present in inorganic form.

Actual Nitrogen (N): means the dissolved nitrogen output derived from actual protein content in feed and is a term used to describe the amount of nitrogen released from different feed types used in contemporary aquacultural practices. The amount of actual N corresponds directly to the protein content of feed, whereby N is taken to be 16 % of protein, and protein content of different feed types varies. If protein content is known, then actual N content of feed can be calculated.

12-month rolling sum: means a value determined once each month by summing the dissolved nitrogen output data from the previous 12 months. A new rolling sum is recalculated for each month.

Background

Currently, TPDNOs apply only to finfish farms in the *D'Entrecasteaux Channel and Huon River Marine Farming Development Plan* and *Macquarie Harbour Marine Farming Development Plan* (MFDP) areas. It is envisaged that in future, TPDNOs will also be applicable in relation to marine farms operated in other regions, e.g. Storm Bay, Port Arthur, Okehampton Bay and the Tamar Estuary. In the short term regional TPDNO allocations will continue to be specified under management controls in the respective MFDPs. Associated reporting requirements may be specified in Environmental Licences issued for marine farming activities.

Each lessee (or sub-lessee if applicable) within a region is provided with a specific TPDNO allocation. Allocations are applicable to one or more leases operated by a lease holder within a region; lease-specific allocations are not envisaged at this time. The TPDNO amount is apportioned to each lease holder in accordance with a standardised formula, which may be based on relative proportions of lease area within that region or a more complicated method agreed in advance.

Exceedance of a TPDNO would constitute a breach of a management control and would be dealt with as a breach of section 91(1) of the *Marine Farming Planning Act 1995*. In addition to a fine (not exceeding 200 penalty units and a daily fine not exceeding 20 penalty units), an offence against section 91(1) attracts a special penalty which is a fine of \$150,000 for each tonne of dissolved nitrogen that exceeds the assigned quantity of dissolved nitrogen. Equivalent penalties apply should TPDNO be managed under Environmental Licences in the future.

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Compliance calculation principles

A TPDNO in the form of a rolling annual sum (not median) becomes valid on the date of determination. Compliance with the TPDNO will be assessed in relation to each rolling 12-month period using N output for each of the previous 12 months within the period of the determination

Note that the first formal compliance assessment will be conducted 12 months after the TPDNO is first determined. If the TPDNO limit is exceeded at the end of 12 months, or any subsequent time period, an offence will have occurred. Nitrogen output levels in the period leading up to the first formal compliance assessment point will be closely monitored.

Data submission

Feed and nitrogen reporting requirements to the Aquaculture Branch of the Department of Natural Resources and Environment Tasmania remain unchanged. Generally, these data sets are reported at pen bay level and for each monthly period. Reports are due on a quarterly basis.

In future, reporting requirements may be varied to include more frequent data submission and provision of information to support the validity of reported data. Such changes are expected to be introduced through variation of Environmental Licences for marine finfish farming activities with existing TPDNO determinations.

EPA compliance assessment

Compliance is calculated by adding dissolved nitrogen output amounts for 12 consecutive months and comparing the sum calculated in this manner against the TPDNO determination. Compliance is assessed on a monthly basis. Where the TPDNO is determined to be in tonnes of N for any 12 month period commencing on a date, when the determination changes the compliance calculation must recommence as it not possible to set a retrospective determination.

The provision of actual N is the accepted method for compliance assessment as it takes into account different nitrogen content of modern feed formulations which are tailored to particular growth stages. Each company will be required to provide supporting information annually to demonstrate to the Director's satisfaction the accuracy of actual N data submission. The EPA will develop an audit framework to validate company data.

The attachment contains worked examples which illustrate how EPA compliance assessments are performed. The values used are fictional and do not reflect actual measured feed inputs by any particular company or region but were selected to broadly reflect salmon production cycles.

Example 1 shows periods of compliance and non-compliance against a specified TPDNO, as well as the corresponding time periods taken into account in the assessment. In the example, assessments are undertaken in relation to compliance achieved for the months of December 2019 and July 2020 respectively¹. The corresponding monthly nitrogen values are identified by the blue and red text boxes respectively. The shaded cells highlight the overlap period considered under both assessments.

In the example, the first compliance assessment against the TPDNO is undertaken in January 2020 when a full 12-month dataset is available. Compliance with the TPDNO is demonstrated for the rolling period January to December 2019, as the corresponding 12-month sum remains below 1,500 tonnes. The August 2019 to July 2020 period is deemed non-compliant, as are subsequent rolling periods returning values above 1,500 tonnes.

¹ These months were chosen for illustrative purposes only. In reality, compliance assessments will be undertaken each month.

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Variation of TPDNO allocations

What happens when the TPDNO allocation is increased?

Where the TPDNO has been increased (either through an assessed application or a company-to-company transfer) the compliance formula will reset, because it will be a new determination and cannot be applied retrospectively.

Example 2 in the attachment illustrates this situation. A new, increased TPDNO commences in June 2020. Compliance can for the first time be assessed in June 2021 when a full 12-month dataset against the new limit is available. In the interim, cumulative N outputs are calculated for consecutive months.

What happens when the TPDNO allocation is reduced?

Where the TPDNO decreases (either through an assessment reduction by the Director or a company-to-company transfer) the TPDNO calculation for compliance will be reset at the lower level and compliance assessments commence on the 12-month anniversary of the reduction.

Example 3 in the attachment illustrates this situation. A new, decreased TPDNO commences in July 2020. Compliance can for the first time be assessed in July 2021 when a full 12-month dataset against the new limit is available. In the interim, cumulative N outputs are calculated for consecutive months. The example illustrates that production begins to decline during the interim period as a means to become compliant with the new limit from July 2021.

Notes regarding transfer of TPDNO allocations

To ensure that compliance is achievable when TPDNO is varied through an agreed transfer of TPDNO between companies, the transfer must be for a period of at least 2 years.

Should the industry seek a fully transferable system to manage TPDNO into the future, the compliance model will need to change to become a fixed 12-month period model, allowing for planned under-utilisation of N to be traded between companies on an annual basis.

ATTACHMENT – WORKED EXAMPLES OF COMPLIANCE CALCULATIONS

Example I: Generic compliance calculation

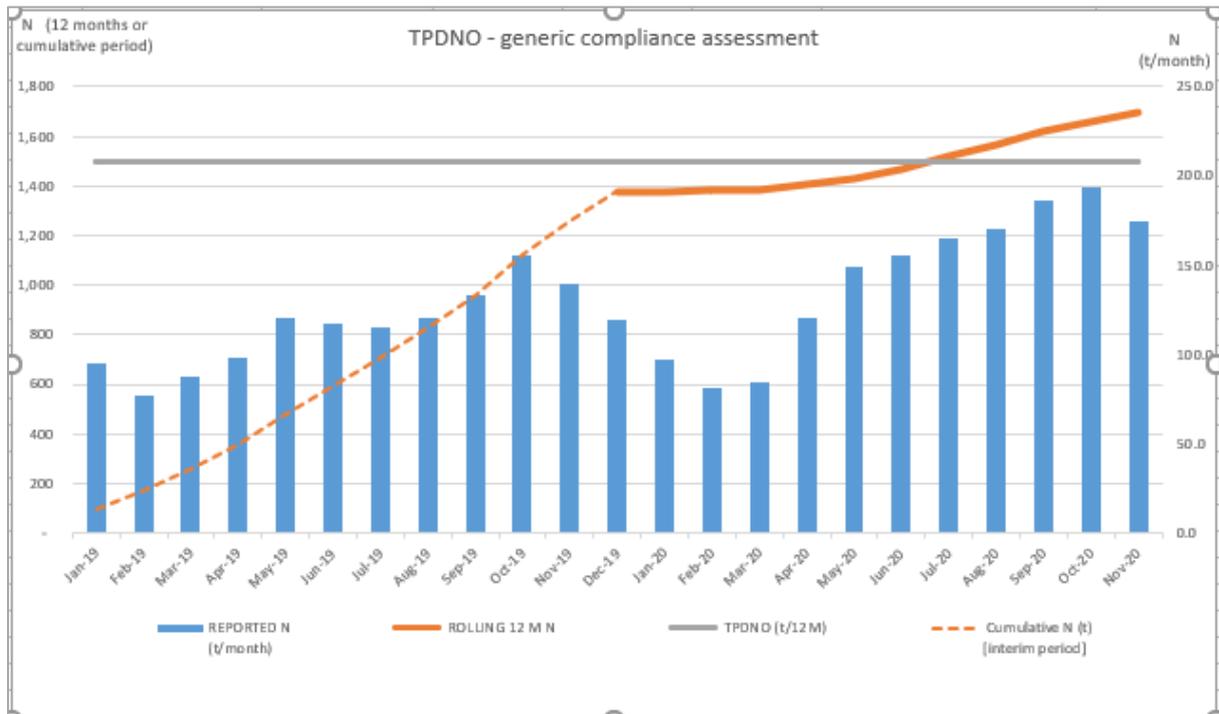
	A	B	C	D	E	F	G	H	I	J	K	L	M
	MONTH	YEAR	Start of ROLLING PERIOD	REPORTED N (t/month)	ROLLING 12 M N	Cumulative N (t) [interim period]	TPDNO (t/12M)	Determination Date	Compliance evaluation	Assessment			
1													
2	Jan-19	2019		94.6		95	1,500	January 2019		n/a			
3	Feb-19	2019		76.7		171	1,500			n/a			
4	Mar-19	2019		88.0		259	1,500			n/a			
5	Apr-19	2019		97.8		357	1,500			n/a			
6	May-19	2019		120.5		478	1,500			n/a			
7	Jun-19	2019		117.2		595	1,500			n/a			
8	Jul-19	2019		115.0		710	1,500			n/a			
9	Aug-19	2019		120.0		830	1,500			n/a			
10	Sep-19	2019		133.0		963	1,500			n/a			
11	Oct-19	2019		155.0		1,118	1,500			n/a			
12	Nov-19	2019		140.0		1,258	1,500			n/a			
13	Dec-19	2019	Jan-19	119.0		1,377	1,500		123.20	under			
14	Jan-20	2020	Feb-19	97.00	1,379		1,500		120.80	under			
15	Feb-20	2020	Mar-19	81.00	1,384		1,500		116.50	under			
16	Mar-20	2020	Apr-19	84.00	1,380		1,500		120.50	under			
17	Apr-20	2020	May-19	121.00	1,403		1,500		97.30	under			
18	May-20	2020	Jun-19	148.90	1,431		1,500		68.90	under			
19	Jun-20	2020	Jul-19	155.00	1,469		1,500		31.10	under			
20	Jul-20	2020	Aug-19	165.00	1,519		1,500		- 18.90	over			
21	Aug-20	2020	Sep-19	170.00	1,569		1,500		- 68.90	over			
22	Sep-20	2020	Oct-19	186.30	1,622		1,500		- 122.20	over			
23	Oct-20	2020	Nov-19	193.60	1,661		1,500		- 160.80	over			
24	Nov-20	2020	Dec-19	175.00	1,696		1,500		- 195.80	over			

Compliance is assessed by comparing value in column E against value in column G.
E<G = compliant;
E>G = non-compliant

Limit applicable: Dec-19
Relevant data period: Jan-19 to Dec-19
Date of assessment: Jan-20
Assessment outcome: compliant
(123 tonnes under limit)

Limit applicable: Jul-20
Relevant data period: Aug-19 to Jul-20
Date of assessment: Aug-20
Assessment outcome: non-compliant
(18.9 tonnes over limit)

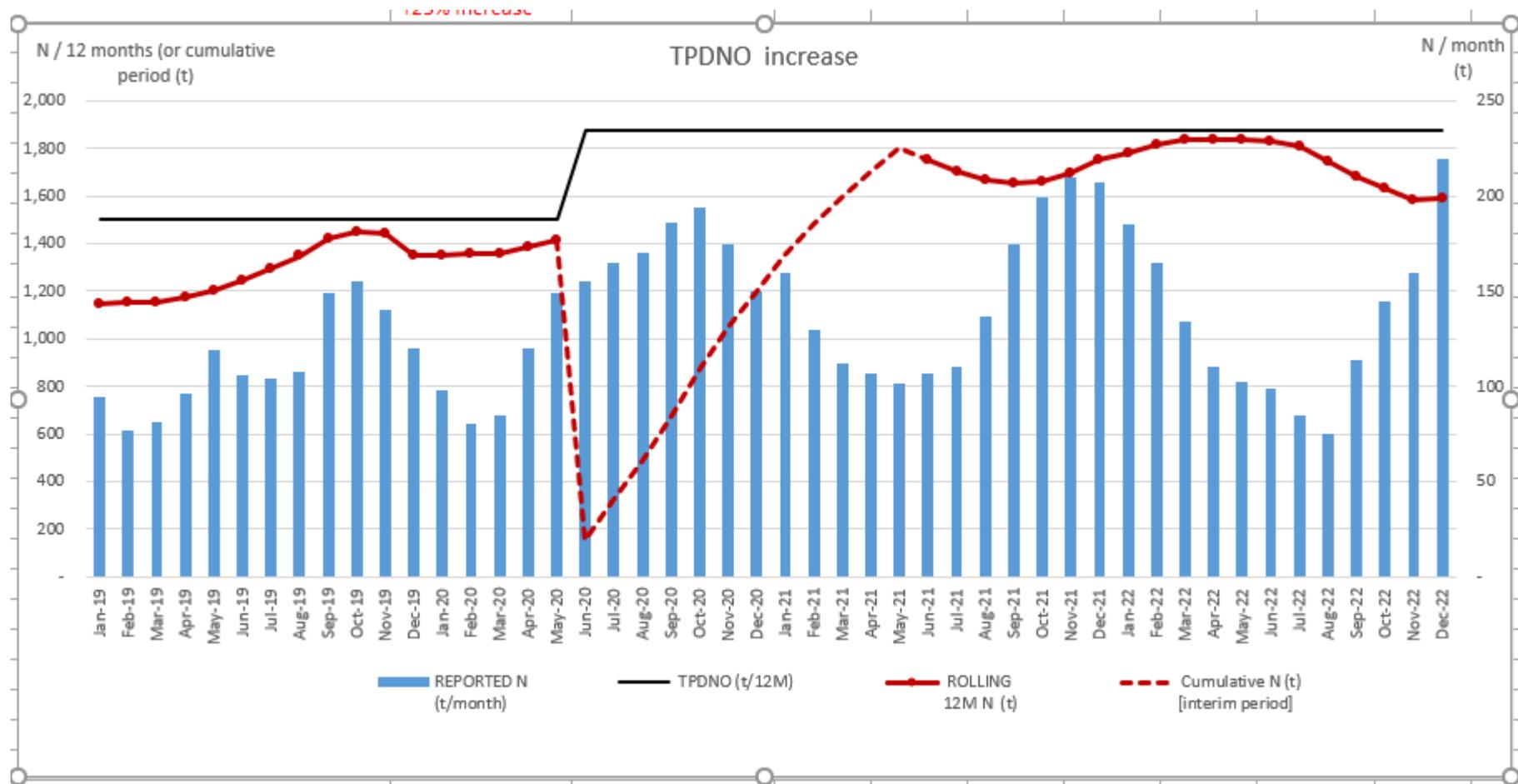
Column D: 'reported N' refers to dissolved nitrogen output values reported by the licence holder for each month
Column E: 'rolling 12M N' refers to the sum of reported N over the corresponding 12-month period



Example I - chart

Example 2: TPDNO increase

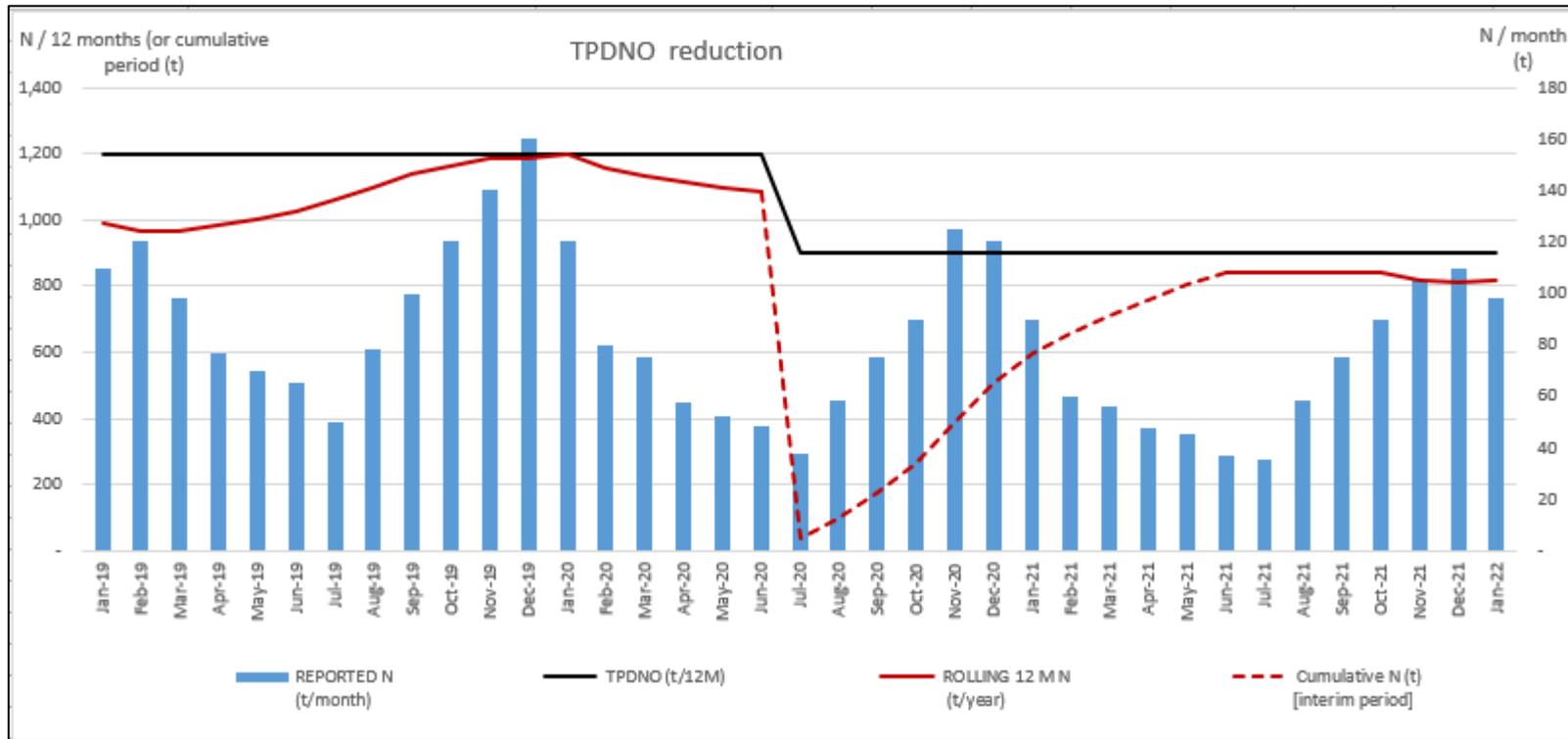
	A	B	C	D	E	F	G	H	I	J
	MONTH	YEAR	START OF ROLLING PERIOD	REPORTED N (t/month)	ROLLING 12M N (t)	(t) [interim period]	TPDNO (t/12M)	Determination Date	Compliance evaluation	Assessment
1										
2	Jan-19	2019	Feb-18	94.6	1,150		1,500	already established	350	under
3	Feb-19	2019	Mar-18	76.7	1,153		1,500		347	under
4	Mar-19	2019	Apr-18	81.0	1,156		1,500		344	under
5	Apr-19	2019	May-18	96.0	1,177		1,500		323	under
6	May-19	2019	Jun-18	119.1	1,202		1,500		298	under
7	Jun-19	2019	Jul-18	106.2	1,243		1,500		257	under
8	Jul-19	2019	Aug-18	104.1	1,295		1,500		205	under
9	Aug-19	2019	Sep-18	107.8	1,348		1,500		152	under
10	Sep-19	2019	Oct-18	149.0	1,420		1,500		80	under
11	Oct-19	2019	Nov-18	155.0	1,450		1,500		50	under
12	Nov-19	2019	Dec-18	140.0	1,442		1,500		58	under
13	Dec-19	2019	Jan-19	120.0	1,350		1,500		151	under
14	Jan-20	2020	Feb-19	98.0	1,353		1,500		147	under
15	Feb-20	2020	Mar-19	80.0	1,356		1,500		144	under
16	Mar-20	2020	Apr-19	85.0	1,360		1,500		140	under
17	Apr-20	2020	May-19	120.0	1,384		1,500		116	under
18	May-20	2020	Jun-19	148.9	1,414		1,500		86	under
19	Jun-20	2020		155.0		155	1,875	Jul-20		n/a
20	Jul-20	2020		165.0		320	1,875			n/a
21	Aug-20	2020		170.0		490	1,875			n/a
22	Sep-20	2020		186.3		676	1,875			n/a
23	Oct-20	2020		193.8		870	1,875			n/a
24	Nov-20	2020		175.0		1,045	1,875			n/a
25	Dec-20	2020		150.0		1,195	1,875			n/a
26	Jan-21	2021		160.0		1,355	1,875			n/a
27	Feb-21	2021		129.4		1,484	1,875			n/a
28	Mar-21	2021		112.5		1,597	1,875			n/a
29	Apr-21	2021		106.9		1,704	1,875			n/a
30	May-21	2021	Jun-20	101.3	1,805		1,875		70	under
31	Jun-21	2021	Jul-20	106.9	1,757		1,875		118	under
32	Jul-21	2021	Aug-20	110.3	1,702		1,875		173	under
33	Aug-21	2021	Sep-20	136.4	1,669		1,875		206	under
34	Sep-21	2021	Oct-20	175.0	1,657		1,875		218	under
35	Oct-21	2021	Nov-20	199.0	1,663		1,875		212	under
36	Nov-21	2021	Dec-20	210.0	1,698		1,875		177	under
37	Dec-21	2021	Jan-21	207.0	1,755		1,875		120	under
38	Jan-22	2022	Feb-21	185.0	1,780		1,875		95	under



Example 2: chart

Example 3: TPDNO decrease

	A	B	C	D	E	F	G	H	I	J
	MONTH	YEAR	START OF ROLLING PERIOD	REPORTED N (t/month)	ROLLING 12 M N (t/year)	Cumulative N (t) [interim period]	TPDNO (t/12M)	Determination Date	Compliance evaluation	Assessment
1										
2	Jan-19	2019	Feb-18	110.0	989		1,200	already established	211.0	under
3	Feb-19	2019	Mar-18	120.0	968		1,200		231.6	under
4	Mar-19	2019	Apr-18	98.0	966		1,200		234.4	under
5	Apr-19	2019	May-18	77.0	982		1,200		218.1	under
6	May-19	2019	Jun-18	70.0	1,002		1,200		198.2	under
7	Jun-19	2019	Jul-18	65.0	1,028		1,200		171.8	under
8	Jul-19	2019	Aug-18	50.0	1,063		1,200		136.8	under
9	Aug-19	2019	Sep-18	78.0	1,098		1,200		101.8	under
10	Sep-19	2019	Oct-18	100.0	1,136		1,200		64.5	under
11	Oct-19	2019	Nov-18	120.0	1,163		1,200		37.4	under
12	Nov-19	2019	Dec-18	140.0	1,187		1,200		12.9	under
13	Dec-19	2019	Jan-19	160.0	1,188		1,200		12.0	under
14	Jan-20	2020	Feb-19	120.00	1,198		1,200		2.0	under
15	Feb-20	2020	Mar-19	80.00	1,158		1,200		42.0	under
16	Mar-20	2020	Apr-19	75.00	1,135		1,200		65.0	under
17	Apr-20	2020	May-19	57.75	1,116		1,200		84.3	under
18	May-20	2020	Jun-19	52.50	1,098		1,200		101.8	under
19	Jun-20	2020	Jul-19	48.75	1,082		1,200		118.0	under
20	Jul-20	2020		37.50		38	900	Jul-20		n/a
21	Aug-20	2020		58.50		96	900			n/a
22	Sep-20	2020		75.00		171	900			n/a
23	Oct-20	2020		90.00		261	900			n/a
24	Nov-20	2020		125.00		386	900			n/a
25	Dec-20	2020		120.00		506	900			n/a
26	Jan-21	2021		90.00		596	900			n/a
27	Feb-21	2021		60.00		656	900			n/a
28	Mar-21	2021		56.25		712	900			n/a
29	Apr-21	2021		48.00		760	900			n/a
30	May-21	2021		45.00		805	900			n/a
31	Jun-21	2021	Jul-20	37.00	842		900		57.8	under
32	Jul-21	2021	Aug-20	35.00	840		900		60.3	under
33	Aug-21	2021	Sep-20	58.50	840		900		60.3	under
34	Sep-21	2021	Oct-20	75.00	840		900		60.3	under
35	Oct-21	2021	Nov-20	90.00	840		900		60.3	under
36	Nov-21	2021	Dec-20	105.00	820		900		80.3	under
37	Dec-21	2021	Jan-21	110.00	810		900		90.3	under
38	Jan-22	2022	Feb-21	98.00	818		900		82.3	under
39	Feb-22	2022	Mar-21	80.00	838		900		62.3	under
40	Mar-22	2022	Apr-21	77.00	859		900		41.5	under
41	Apr-22	2022	May-21	57.75	868		900		31.8	under



Example 3: chart