EASA Proposed CM-RTS-001 Issue 01 – Large Helicopter Main Gearbox Certification Requirements - Comment Response Document

Comment				Comment summary	Suggested resolution	Comment is an observation or is a suggestion	Comment is substantive or is an objection	EASA comment disposition	EASA response
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1	*Sikorsky Aircraft Corporation*	Section 2	5/8	The proposed revision to the AC 29.927 and AC 29.927A guidance has been harmonized between the FAA, EASA, and Transport Canada. This separate request for comments seems superfluous given that the FAA has already published its guidance for public comment. A different disposition of comments by EASA and FAA could lead to a significant difference in interpretation and application of §29.927 in Europe and the US. The comments that follow below are identical to those provided to the FAA.	Sikorsky Aircraft requests EASA to coordinate its response with the FAA.	Yes	No	Noted	As many European stakeholders do not actively monitor draft FAA proposals, the initial aim of the EASA CM was to raise awareness of developments taking place, provide additional opportunity to comment, and to ensure that due account would be taken of comments received within the harmonisation process. Furthermore, EASA will not immediately adopt FAA AC revisions, so the CM will provide the basis by which EASA may guide compliance with CS 29.927 in future certification/ validation activities. It is expected that the CM will be withdrawn following adoption by EASA of the next change to AC 29-2C. Disposition of comments has been undertaken jointly by FAA, EASA and TCCA. EASA responses to comments provided below are based on this joint disposition.
2	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A a.(1)(ii)	6/8	The NPRM stipulates that the phrase *"Unless such failures are extremely remote has caused confusion in demonstrating compliance….."* For the S-92A main gearbox the rationale behind its application is fully documented in an Issue Paper. Sikorsky Aircraft is not aware of any confusion in the application, or regarding the intent, of this phrase. The confusion the guidance refers to is of a more recent nature.	It is suggested to reword AC 29.927A a.(1)(ii) to: *(ii) The introductory phrase to the regulation, "Unless such failures are extremely remote" has caused confusion. ~~in demonstrating compliance~~.*	No	Yes	Accepted	The guidance material will be revised accordingly.
3	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A a.(1)(ii)	6/8	The NPRM proposed the following language: *"It must be shown by tests that each rotor drive system, where the probable failure of any element could result in the loss of lubricant, is capable of continued operation, although not necessarily without damage, for a period of at least 30 minutes at a torque and rotational speed prescribed by the applicant for continued flight, after indication to the flightcrew of the loss of lubricant."* Comparing this to the final rule allows for a true understanding of the difference between the two. The final rule states: *"Unless such failures are extremely remote, it must be shown by test that any failure which results in loss of lubricant in any normal use lubrication system will not prevent continued safe operation, although not necessarily without damage, at a torque and rotational speed prescribed by the applicant for continued flight, for at least 30 minutes after perception by the flightcrew of the lubrication system failure or loss of lubricant."* The NPRM proposal required a 30-minute demonstration for *each rotor drive system, where the probable failure of any element could result in the loss of lubricant.* A consideration of the likelihood of failures has therefore been part of the rule from the start. Moreover, a requirement that stipulates that one has to consider *Probable* failures, as proposed by the NPRM, is equivalent to not having to consider *Improbable* failures. The term *Extremely Remote* as it appears in the final rule being nothing more than a further precision of the term *Improbable*. See note below. Note: The following classification is commonly	It is suggested to reword AC 29.927A a.(1)(ii) to: *(ii) The introductory phrase to the regulation, "Unless such failures are extremely remote" has caused confusion ~~in demonstrating compliance~~. The term pertains to the likelihood of failures in the normal use lubrication system that would result in loss of lubricant extensive enough to prevent continued safe operation. An auxiliary lubrication system and/or the use of self lubricating bearings have been cited in the preamble to the final rule (53 FR 34204) as examples of mitigating means for which credit could be taken if demonstrated by test. ~~The NPRM did not contain this expression and the only change documented in the preamble to the final rule (53 FR 34202) explains that the final rule was revised in response to a public comment that the proposed regulation could be interpreted to "preclude credit for auxiliary lubrication systems or to require consideration of lubricant failures to self lubricating bearings." This was not intended and the final rule was "revised to eliminate this ambiguity." The phrase, "unless such failures are extremely remote," was introduced to resolve the public comment to convey that the applicant does not have to consider failures that may exist in the auxiliary lubrication system prior to performing the loss of lubrication testing.~~ Under the current regulation, the extremely remote language means that testing to demonstrate at least 30 minutes continued flight capability (for Category A), following loss of lubrication in the normal lubrication system, is not required if the*	No	Yes	Not Accepted	Paragraph a.(1)(ii) clearly states that, " … language in the final rule means that testing to demonstrate at least 30 minutes continued flight capability (for Category A), following loss of lubrication in the normal lubrication system, is not required if the failures leading to that loss of lubrication condition are determined to be extremely remote." We believe that it is worthwhile to inform applicants that it may be difficult to use the extremely remote approach for showing compliance to the rule. We have emphasized this by stating that, "While this compliance approach is allowed, it may not be achievable due, in part, to the unforeseen variables and complexity associated with predicting potential lubrication failure modes and their associated criticality and frequency of occurrence. This includes considering lubrication failures that may result from improper transmission maintenance and servicing." This is agreed between FAA, Transport Canada and EASA.

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				used in both Europe and the United States: *Probable* (further divided into *Frequent* and *Reasonably Probable*), *Improbable* (further divided into *Remote* and *Extremely Remote*), and *Extremely Improbable*. Sikorsky agrees with the original commenter that the NPRM reference to *probable failure of any element* could have been interpreted to not allow credit for any active or passive back-up to the normal use lubrication system. Auxiliary lubrication system and self lubricating bearings only being particular examples cited in the preamble. This ambiguity was resolved in the final rule by avoiding use of the term *any element* and through its explicit focus on *failures in the normal use lubrication system* and not, as the draft guidance suggests, through the introduction of the term *Extremely Remote*. Per the rules of construction, the term *unless such failures are extremely remote* pertains to *any failure which results in loss of lubricant in any normal use lubrication system* only. Not to failures in an auxiliary lubrication system or to failure of a self-lubricating bearing as the draft guidance suggests. While the Administrator is permitted to interpret its own guidance, the Administrator is not permitted to implement new regulatory standards through non-regulatory means; nor is the Administrator permitted to use advisory guidance to establish new regulatory interpretations that are at odds with the plain language of the existing regulation. Statements that attempt to explain the reason behind the introduction of the phrase *unless such failures are extremely remote* and regarding *the expected compliance approach* are misleading and at odds with the plain language in the final rule; a rule that was purposely formulated to neither require nor preclude any particular mitigating means or compliance approach. See below for the further recommendations and suggested changes to AC 29.927A, a.(1)(ii)	*failures leading to that loss of lubrication condition are determined to be extremely remote…..* ~~*The expected compliance approach has been to assume a failure in the normal lubrication system leading to rapid loss of lubrication and to rely on an auxiliary lubrication system or the robustness of the transmission components to accomplish at least 30 minutes of operation (for Category A) at the prescribed conditions*~~*…..*				

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4	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A a.(1)(ii)	6/8	A significant number of Part 29 and 33 rules require or provide for an assessment of failures, their criticality and frequency of occurrence. Examples are §§29.547, 29.917, 29.695, 29.901, 29.1193, 29.1309, 29.1333, 29.1351, B29 VII, B29 VIII, 33.28, 33.29, and 33.75. This includes components like rotors, engines, transmissions and other flight critical systems. Note, thereby, that failures that may result from improper maintenance and servicing are not unique to lubrication systems either. In lieu of trying to discourage an otherwise valid approach, the FAA has been requested to instead provide constructive guidance that helps the applicant in the identification of failure modes, determination of their criticality and frequency of occurrence. The draft guidance requires the applicant to establish a worst case for a loss of lubrication test (if required) but provides no guidance on how to establish this worst case scenario. Here too, a design assessment that is supported by test evidence should prove to be a valuable tool. Sikorsky Aircraft recently gained FAA acceptance of a lubrication system design assessment for its current S-92A main gearbox that evaluated any failure that could lead to loss of lubrication, established the criticality and frequency of occurrence for each as well as demonstrated the validity of compensating provisions. Tests were conducted in support of the analysis to validate assumed leakage rates and component failure end effects. Sikorsky Aircraft proposes that such an approach now be included in the guidance as a means to establish that failure modes are extremely remote and/or define a worst case entry point for the 30-minute loss of lubrication demonstration.	It is proposed to remove the following statement from AC 29.927A a.(1)(ii): *~~…..While this approach is allowed, it may not be achievable due, in part, to the unforeseen variables and complexity associated with predicting potential lubrication failure modes and their associated criticality and frequency of occurrence. This includes considering lubrication failures that may result from improper transmission maintenance and servicing…..~~* and replace it with: *…..A design assessment should be conducted to substantiate that the normal use lubrication system is of a safe design and that compensating provisions are made available to either prevent or mitigate the effect of any failure that would result in a loss of lubricant that could prevent continued safe operation. The design assessment should be supported by certification ground tests to validate critical assumptions, including presumed leakage rates. Previous service experience with similar designs should also be taken into account (see also §29.601(a)). Failures to be considered include component failure/ malfunction, manufacturing defects and maintenance errors. Examples of probable maintenance errors are:* *a) Failure to restore oil system integrity after routine maintenance (chip detector inspection or oil filter replacement);* *b) Untorqued fasteners;* *c) Misinstalled or missing o-rings;* *d) Damaged seals, etc* *……*	No	Yes	Not Accepted	We agree that a design assessment would be useful to understand system failure modes and reliability (e.g. extremely remote). However, due to the complexity and unforeseen variables associated with predicting lubrication failure modes, a design assessment may not be capable of predicting all potential lubrication failure modes and their associated criticality and frequency of occurrence. This includes considering lubrication failures that may result from improper transmission maintenance and servicing. We have emphasized this in the proposed guidance material by stating that, "While this compliance approach [using extremely remote] is allowed, it may not be achievable due, in part, to the unforeseen variables and complexity associated with predicting potential lubrication failure modes and their associated criticality and frequency of occurrence." EASA agrees with Sikorsky that some form of lubrication system failure analysis would be useful and this is currently being considered for future rulemaking. However, we consider that such material would be better linked to 29.917 or 29.901.

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5	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A a.(1)(ii)	7/8	Sikorsky Aircraft considers that an auxiliary lubrication system and self-lubricating bearings are a means to mitigate the effect of failures in the normal lubrication system, but not the only means. Sikorsky Aircraft agrees the 14 CFR 29.1309 does not apply to transmission systems, but 14 CFR 29.1309 does apply to any system/ equipment required for the auxiliary lubrication system to function. This should be emphasized.	It is proposed to change the following statement in AC 29.927A a.(1)(ii) to: *~~With this approach,~~ Should the applicant choose to utilize an auxiliary lubrication system to mitigate the effects of a loss of lubricant from the normal use lubrication system, the design assessment should be extended to analyze it with an emphasis on common mode and latent failures that could cause the auxiliary system to be ineffective. ~~the normal and auxiliary systems must be independent in order to preclude common loss of lubrication failure points and possible cross contamination.~~ The auxiliary lubrication system must ~~also~~ be ~~designed, constructed, and~~ functionally tested to show that it can perform its intended function. ~~However, compliance with § 29.1309 is not a requirement.~~ Section 29.1309 does not apply to an auxiliary lubrication system that is part of the rotor drive system. However, section 29.1309 does apply to any system/ equipment required for this auxiliary lubrication system to function.*	No	Yes	Partially Accepted	Section 29.1309 would apply to the electrical design aspects of the auxiliary lubrication system. The CM will be revised accordingly.
6	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927 c.(1)(iii) AC 29.927A a.(1)(iv)	6/8 7/8	Failure of an internal lubrication pump would cause an effective loss of lubricant to the normal lubrication system it serves. As mentioned previously, there is nothing in the rule that limits its application to external leaks only.	It is proposed to change the following statement in AC 29.927A a.(1)(iv) to: *…A loss of lubrication may result from both internal and external failures ~~that include failures of~~. Failures include, but are not limited to, oil lines, fittings, seal plugs, sealing gaskets, valves, ~~external~~ pumps, oil filters, oil coolers, accessory pads, etc.*	No	Yes	Accepted	The guidance material will be revised accordingly.
7	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927 c.(1)(iii) AC 29.927A a.(1)(iv)	6/8 7/8	It is stated that *A leak caused by a crack in the transmission outer case need not be considered as a source of a loss of lubrication since the structural substantiation and durability of the case must satisfy the requirements of §§ 29.307, 29.923, and 29.927(a) and (b).* The service life of the transmission outer case is normally established under §§ 29.307 and 29.571, not 29.927(a) and (b). §§29.923(m) stipulates that service lives be established through *fatigue tests or by other acceptable methods*, but only for components that are affected by *maneuver and gust loads*. Not all parts of the outer case may be affected by maneuver and gust loads or otherwise be considered structural. 14 CFR 29.571 Flaw/ damage tolerant techniques, with a special focus on gross maintenance errors, may nonetheless be used to establish a likelihood of failure that is extremely remote. The two-piece filter bowl on the S-92A MGB is a prime example of this approach.	Please reword the current statement to: *…A leak caused by a crack in the transmission outer case need not be considered as a source of a loss of lubrication, if ~~since the~~ its structural substantiation ~~and durability of the case must satisfy~~ satisfies the requirements of §§ 29.307, 29.923(m), and ~~29.927(a) and (b)~~ 29.571…*	No	Yes	Accepted	The guidance material will be revised accordingly.

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8	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A a.(1)(v)	7/8	This paragraph mixes the required aircraft level capability to be able to continue safe operation and transmission level test requirements in a way that may be construed as requiring consideration of the transmission only (e.g. ignoring gearbox driven accessories failing under thermal stress, etc). The proposed guidance therewith deviates from both the explanation in the preamble regarding the intent of the final rule as well as the language in the rule itself. Again, there is nothing in the rule that limits it to external leaks only either. Depending on the lubrication system failure encountered and the mitigation employed, continued flight may require a land as soon as practicable, land as soon as possible, or land immediately action. Sikorsky Aircraft considers that no emergency procedure should include a reference to 30 minutes or whatever time demonstrated during a single bench test. However, to limit the response to all lubrication system failures to what would amount to a land as soon as possible seems excessive.	Please revise c.(1)(v) to: *The intent of the rule change ~~Category A rotorcraft~~ was to assure that ~~these rotorcraft~~ Category A rotorcraft have significant continued flight capability after a lubrication system failure ~~the loss of lubricant to any single transmission~~ in order to optimize eventual landing opportunities. The rule requires a minimum of 30 minutes continued safe operation of the aircraft but extending this beyond 30 minutes ~~Extending the bench testing beyond 30 minutes~~, although not required, is considered highly desirable. Accomplishing this would further improve the capability of the rotorcraft to reach a suitable landing ~~location~~ site ~~in order to improve~~ and increase occupant safety when operating in remote geographic areas ~~that include~~ and/or harsh environmental conditions. Indefinite flight with a lubrication system failure is not expected. ~~however, and a capability beyond 30 minutes should not be assumed when prescribing emergency procedures.~~*	No	Yes	Partially Accepted	Although the rule does not limit loss of lubrication to external leaks, the FAA, bilateral aviation authorities, and industry have understood that a significant external leak in a pressurized main gearbox could eventually have catastrophic consequences. This was the basis for establishing the test procedures in the guidance material. The test procedures have been in effect and used by industry for several years and are recognized as an acceptable means of compliance by the FAA and other aviation authorities. We do not believe that the flight manual emergency procedures should be based on a single bench test demonstration. However, we do believe it is acceptable to include a time interval in the emergency procedures that would allow the flight crew to find a suitable landing location. That time interval should be reduced sufficiently to allow for an adequate safety margin since inflight demonstration is not required to show compliance with the rule. Note: The relationship between test duration and a safe emergency procedure is dependent upon specific test results, gearbox design and potential for health monitoring of impending failure following loss of lubrication.
9	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A	7/8	Sikorsky Aircraft recommends that a new definition section be inserted between proposed AC 29.927A c.(1) and c.(2) to clarify some of the terms encountered in the rule as well as the draft guidance. In particular the terms *extremely remote, normal use lubrication system, auxiliary lubrication system,* and *loss of lubricant*. Sikorsky Aircraft objects to the primary focus on external leaks in the draft guidance. Nothing in the rule limits its application to external leaks only. Please clarify what is meant by the draft guidance statement *oil temperature that is at the highest limit for normal operation*, i.e. is this at the top of the "green" or the "yellow" range.	Please include a new AC 29.927A c.(2): *(2) <u>Definitions</u>* *(i) <u>Extremely remote</u>. Extremely remote events are not expected to occur during the total operational life of a random single rotorcraft of a particular type, but may occur a few times during the total operational life of all rotorcraft of a particular type.* *(ii) <u>Normal use lubrication system</u>.* *The normal use lubrication system provides lubrication to and facilitates cooling of a rotor drive system during normal aircraft operation.* *(iii) <u>Auxiliary lubrication system</u>. An auxiliary lubrication system provides lubrication to essential areas of a rotor drive system in the event of a failure of the primary lubrication system. It must be sufficiently independent of the primary lubrication system such that common failure modes are extremely remote. (Merriam Webster defines the term auxiliary as supplementary to, or to constitute a reserve).* *(iv) <u>Loss of lubricant</u>. Loss of lubricant means the loss of lubricant from any portion of the normal use lubrication system as a result of leaks internal or external to the outer casing, or due to the loss of function of one or more lubrication pumps in a pressurized system.* *(v) <u>Normal Oil Temperature and Pressure</u>. Normal oil temperature and pressure are defined as the conditions under which continued flight is allowed per the RFM with no corrective action required (i.e. flight to planned destination is allowed).*	No	Yes	Partially Accepted	A discussion of terms is included in the guidance material as necessary to accomplish the test procedures. The introduction of the proposed definitions is unnecessary. The guidance material will be revised to reflect that highest limit for normal oil temperature applies to continuous operation.

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10	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A c.(2)(i)	7/8	It is stated that *section 29.927(c) prescribes a test,* which is not a true reflection of the rule. Moreover, the focus should be on the ability of the aircraft to continue safe operation, not just its transmission.	Please revise this to: *Section 29.927(c) prescribes a test which is intended to demonstrate that no hazardous failure or malfunction will occur in the event of a major rotor drive system lubrication failure, unless such failure can be demonstrated to be extremely remote. The lubrication failure should not impair the ability of the crew to continue safe operation of Category A rotorcraft ~~to demonstrate that the effects of a loss of lubrication will not impair the ability of category A rotorcraft to continue safe powered operation~~ for at least 30 minutes after perception of the failure by the flight crew. For Category B rotorcraft, tests for safe operation under autorotative conditions must continue for at least 15 minutes.*	No	Yes	Not Accepted	The rule along with the associated AC / CM were interpreted for the last two decades as a test requirement. The transmission torque and rotor speeds that are prescribed in the test procedures were established to ensure that rotorcraft will be able to achieve continuous safe operation following a loss of lubrication. This paragraph will be clarified to emphasize that it applies to a rotor drive system level test.
11	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A c.(2)(ii)	7/8	This paragraph requires that a critical entry point be established for the bench test, which requires consideration of a worst case leak. In order to arrive at such a worst case test definition an analysis needs to be conducted that identifies all failure modes that may result in loss of lubricant. The term undrainable oil has a specific meaning. Running a test with undrainable oil only would be overly conservative if the failure of, for instance, a drain plug can be demonstrated to be extremely remote.	Please revise c.(2)(ii) to: *…. Typically, a bench test (transmission test rig) is used to demonstrate compliance with this rule for failure modes that cannot be demonstrated to be extremely remote. Since this is essentially a durability test of the transmission to operate with residual oil, ~~that is~~ i.e. the minimum ~~undrainable oil or the~~ oil remaining after a ~~severe pressure leak~~ failure in the transmission's normal use lubrication system~~, whichever is less (i.e. results in a greater loss of oil in the transmission's normal use lubrication system)~~, a critical entry point for the test should be established, see paragraph a.(2)(iii) below….*	No	Yes	Not Accepted	The test procedures do not indicate or imply that a lubrication failure, such as the failure of a drain plug, cannot be shown to be extremely remote. FAA, EASA, TC consider that the text "undrainable oil or the oil remaining after a severe pressure leak" will cater for both types of oil leak which can be simulated for the test, i.e. rapid pressurized leak of leakage from the sump of the gearbox. If individual failures can be shown to be extremely remote then such a failure would not need to be justified by test. However, justification of extremely remote for relatively complex failure modes may be difficult to achieve.
12	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927 c.(2) AC 29.927A c.(2)(iii)	6/8 7/8	The bench test definition has changed quite significantly, the need for which is not understood. The test entry point is changed from an average condition requiring nominal cruise torque to an extreme condition requiring the torque associated with maximum continuous power. Moreover, the draft guidance would introduce a requirement to apply a shaft bending moment and therewith further complicates the test setup. Aircraft previously certified to both Part 27 (Cat A) and Part 29 showed compliance to a less stringent requirement. Without a clearly demonstrated need, the test definition should not be altered to include rotor forces and moments other than main rotor thrust as currently required. This test is conservative as is because it does not account for a number of effects that would be encountered in real life, e.g. fuel burn and airflow cooling. Note that the requirement to apply a mast bending moment is not included in proposed AC 29.927c.(2) either.	Please revise c.(2)(iii) to: *…The transmission should be stabilized at the nominal cruise torque ~~associated with maximum continuous power~~ (reacted as appropriate at the main mast and tail rotor output quills) at a normal main rotor mast speed, oil temperature that is at the highest limit for normal operation, and oil pressure that is within the normal operating range.~~, and corresponding mast bending moment~~.* …	No	Yes	Partially Accepted	The use of maximum continuous torque is permitted under normal operations. As such, an operator may elect to operate the helicopter for an extended period of time at that torque level. Furthermore, maximum continuous torque is only used as an entry point for the test and is reduced immediately after crew recognition of a loss of oil pressure. It is agreed that mast bending should not be included and would only have a negligible effect on the loss of lube test results since it is typically reacted by the lower speed upper transmission components (primarily upper mast bearing). These components are not nearly as vulnerable to "loss of lube" frictional damage as are the high speed lower transmission components.

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13	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A c.(2)(iii)	8/8	The guidance requires the entire test to be run simulating maximum gross weight. Sikorsky Aircraft suggests that fuel burn should be considered for the duration of the test since this may have a considerable effect on thrust and torque required.	Please revise c.(2)(iii) to: *…A vertical load should be applied at the mast, equal to the maximum gross weight of the rotorcraft at 1g. The effect of fuel burn on thrust and therewith torque may be taken into account for the duration of the test….*	Yes	No	Not Accepted	This part of the test procedures was not changed as part of this revision and these procedures have been effectively used by industry for many years.
14	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927 c.(2) AC 29.927A c.(2)(iii)	6/8 8/8	This paragraph requires consideration of a worst case leak. In order to arrive at such a worst case test definition an analysis needs to be conducted that identifies all failure modes that may result in loss of lubricant.	Please revise c.(2)(iii) to: *…Once the transmission oil temperature is stabilized, initiate a leak in the normal use lubrication system of a severity that is commensurate with the worst case failure mode identified by the design assessment. ~~disconnect the oil drain plug or cause a severe pressure leak in the normal use lubrication system, whichever is considered to be worse~~…..*	No	Yes	Not Accepted	A design assessment may not be necessary if the worst case leak is obvious and can easily be identified. Applicants will be responsible for providing the rational they used to determine the worst case leak. This information should be included as part of the applicant's proposed method of compliance. Note: A fast leak leads to rapid loss of oil but an immediate warning to the crew. A slow leak means more oil for longer in the gearbox, but a longer time running on partially depleted oil before the warning. These different scenarios will need to be considered by the applicant before the method of compliance will be agreed.
15	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A c.(2)(iii)	8/8	The 30-minutes should start when the crew receives a low pressure indication that notifies it that future action is required, i.e. land as soon as possible.	Please revise c.(2)(iii) to: *… Upon illumination of the low oil pressure alert (generated by the low pressure warning device required by § 29.1305), requiring the crew to be prepared for future action (land as soon as possible)…*	No	Yes	Not Accepted	This part of the test procedures was not changed as part of this revision. Given that procedures have been effectively used by industry for several years EASA do not consider it necessary to adopt this proposed change.
16	*Sikorsky Aircraft Corporation*	Section 3.1 AC 29.927A c.(2)(iii)	8/8	14 CFR 29.927 stipulates that the test be conducted at a torque and rotational speed prescribed by the applicant. The draft guidance is too prescriptive. More importantly, the torque selected for the test should be commensurate with RFM emergency procedure instructions.	Please revise c.(2)(iii) to: *…reduce the torque for ~~C~~category A rotorcraft to the torque selected for continued flight (as reflected in the RFM emergency procedures) ~~to the minimum torque necessary to sustain flight~~ and continue the test for at least 30 minutes ~~at the maximum gross weight and the most efficient flight conditions~~.*	No	Yes	Not Accepted	The guidance material provides one means of compliance, which describes a minimum level to comply with the rule. Application of more stringent test conditions in lieu of what is prescribed in the guidance material would be acceptable to the regulator.
17	*UK CAA*			No comments				Noted	
18	*Agusta Westland*			The sentences "A leak caused by a crack in the transmission outer case need not be considered as a source of a loss of lubrication…" on para (iii) page 6 etc. "The likelihood of loss of lubrication is significantly greater for transmissions that use pressure lubrication and external cooling.." on para (ii) page 5 is interpreted that the requirement is applicable to pressure lubricated gearboxes and not to splash lubricated gearboxes. It is my opinion that this interpretation should be made more clear.				Accepted	The guidance material will be revised to reflect that the rule applies to pressurized lubricated systems and not to splash lubricated systems. Future rulemaking for 29.927(c) is already planned which will address this issue.
19	*Agusta Westland*			The sentence "…capability beyond 30 minutes should not be assumed when prescribing emergency procedures." could be interpreted as a limit to the credit achievable by a test exceeding the prescribed 30 minutes minimum duration. It is my opinion that the main gearbox capability to be prescribed in the emergency procedures should take into account the actual test results.				Partially Accepted	We do not believe that the flight manual emergency procedures should be based on a single bench test demonstration. However, we do believe it is acceptable to include a time interval in the emergency procedures that would allow the flight crew to find a suitable landing location. That time interval will be influenced by the gearbox design, test results, and the possibility of health monitoring to warn of imminent failure. The guidance material will be revised.