Comments on the Variable Operations and Maintenance Cost Straw Proposal Department of Market Monitoring January 22, 2020

The Department of Market Monitoring (DMM) appreciates this opportunity to comment on the ISO's discussions for the Variable Operations and Maintenance Cost Review. DMM continues to support the ISO's effort to clarify definitions of variable operations and maintenance costs, to update the current default variable operations adder, and to establish a default maintenance adder. The following are DMM's comments on specific issues.

DMM supports the ISO's proposal to establish default values for maintenance adders to be included in reference values for both energy and commitment costs.

DMM believes it is feasible and important to develop appropriate default maintenance adder values. There are a number of reasons for this:

- **Maintenance costs are significant for many resources.** In a competitive market, suppliers will submit offers at prices that reflect the marginal costs of supplying the product, i.e., the incremental costs of supplying the product. Therefore, market rules in wholesale electricity markets designed to mitigate market power must allow generators to reflect all costs that are marginal to the decision to start, run, or ramp a generating unit.

- **The ISO is proposing to exclude all maintenance costs from the default operations adder, which would replace the current default operations and maintenance (O&M) value.** The only venue available for resources to incorporate maintenance costs in their reference values would then be a maintenance adder, either default or negotiated.

- **The absence of a default maintenance adder would force any resource wishing to reflect the cost of maintenance in a reference value to negotiate that maintenance adder.** Some resources would have to negotiate maintenance adders for the first time. Others would have to renegotiate or update existing major maintenance adder values. This poses a significant administrative burden to market participants, the ISO and DMM, who currently negotiates MMA values on behalf of the ISO. In addition, numerous market participants have raised this concern in comments on the working groups for this initiative.

- **Many market participants have expressed concern about providing confidential data to the ISO and DMM, particularly as resource ownership, operation, and affiliation changes for units.** There is also an additional challenge and administrative burden of ensuring the MMA values are confidential to the scheduling coordinator for whom they were negotiated. Implementing default values reduces the need for scheduling coordinators and resource owners to provide confidential information and for the ISO to administer this confidential data.

- **Default values offer more equitable treatment of resources within each technology group than negotiations.** Negotiated values are based on information from market participants that is reviewed by the ISO and DMM. Proposed costs may be rejected as unsupported or unreasonable for inclusion in the basis for maintenance adders, but additional potentially legitimate costs are not suggested for inclusion. The resulting maintenance adders are unique to each resource. However, due to the diversity of resource technologies and underlying costs, the diversity of maintenance reference applications, and because some market participants are willing to bear the cost of negotiating maintenance adders and others are not, the negotiation process itself may result in custom maintenance adders that differ across resources despite similar underlying costs. Offering default values would provide more consistent treatment within each technology group.

The proposed default values are below combined operation and maintenance costs for most resources with negotiated major maintenance adders.

Default maintenance adders may either overestimate or underestimate maintenance costs. Under the ISO's proposal, underestimating costs would require resources to negotiate values. In cases when resources are able to exercise market power and are not regulated by a state entity enforcing least cost bidding obligations, a default that overestimates costs would allow a market participant to collect inefficiently high market rents.

The ISO has proposed defaults that represent a portion of technology specific costs estimated from a broad review of literature. Setting appropriate default values requires offsetting the cost of setting a default above cost with the cost of setting a value below cost. The ISO has therefore proposed a default at 60% of estimated cost with an option to negotiate a higher value.

The ISO derived default maintenance adders from estimates of annual variable maintenance costs that were prepared by Nexant in a study commissioned by the ISO.[1] Nexant derived these values from a literature review of publically available studies. These annual amounts, specific to a variety of technology type, were then converted to $ per-hour and $-per-start quantities with an estimate of annual hours and starts. The ISO then determined an allocation towards one, or a combination, of these factors.

With regards to the methodology for calculating default adders, DMM has the following comments: the equipment groups for which defaults are defined appear to require refinement and sensitivities around one of the input assumptions used to calculate defaults may be required (run hours per year and starts per year).

The ISO proposes to set both default variable operations adders and default maintenance adders by technology group. DMM recommends that the aeroderivative group should be split from the equipment groups called 'Advanced' CC and 'Advanced' CT. The costs and sizes of the G/H/J classes do not appear to be similar to that of aeroderivatives such that pooling the groups has merit.

The ISO's proposal assigns a variable operations cost to the advanced CT group based on a technology type that is not common in the ISO's market. The groups used to assign default values should be consistent across default operations and maintenance adders. If the group is not split as DMM recommends above, DMM suggests changing the variable operations value for the category of Advanced CT to Nexant's proposed value for aeroderivative CTs ($1.88). This technology is significantly more common in the ISO market than the H class technology for which the value of $0.82 was derived.

The default $-per-start and $-per-run-hour values are dependent on the estimated run-hours per year and starts per year, which are used to allocate the annual costs prepared by Nexant to default maintenance adders. DMM requests additional details for how actual ISO and EIM meter data was used to estimate run hours-per year and starts-per-year for each of the technology types. DMM also recommends that the ISO consider the impact of using resource-level meter data to allocate annual costs to hours or starts for multi-stage generating resources. This approach, for example, may fail to properly account for transitions costs that are incurred with the start of additional gas turbines.

DMM finds that currently negotiated values, inclusive of current default or negotiated operations and maintenance values, exceed the proposed combination of maintenance and variable operation defaults for most gas fired resources. Two thirds of gas-fired resources have negotiated major maintenance adders in the ISO or energy imbalance market. Of these, current values exceed the proposed default for 96 percent of advanced CT's (aeroderivative), 98

[1] Nexant, Variable Operations and Maintenance Costs Report Submitted to: California Independent System Operator, December 21, 2018.
http://www.caiso.com/Documents/VariableOperationsandMaintenanceCostReport-Dec212018.pdf.

percent of standard combustion turbines and all standard combined cycles, advanced CC's (aeroderivative) and reciprocating engines. The current negotiated values for steam exceeds the proposed default for 35 percent of these resources.[2] Of hydro-electric resources with negotiated major maintenance adders, only 21 percent have negotiated a value above the proposed benchmark. The ISO may wish to consider a lower default value in for groups with relatively few negotiated values above the default, including hydro-electric resources.

The proposed default values for gas-fired resources do not appear to exceed cost for resources with negotiated major maintenance adders, with the exception of steam-fired resources. For non-steam-fired gas resources with negotiated values, the default values the ISO has proposed will not result in higher combined operating and maintenance costs, than the current market design.

DMM supports the ISO's effort to clarify the definitions of operations and maintenance related costs eligible for inclusion in reference levels. DMM suggests further refinement of those definitions.

DMM agrees that it is worthwhile to clarify the definitions of operations and maintenance related costs included in reference cost calculations. Doing so in a transparent manner will provide clarity to market participants, improve equity of treatment between market participants, facilitate operations and maintenance adder negotiation, and help ensure that any default values utilized in reference calculations are appropriate and well understood.

DMM encourages the ISO to rely on existing, public, and commonly understood frameworks as it develops refined definitions. The definitions included in the FERC Uniform System of Accounts and the ISO's current RMR framework may be applied to add clarity to many issues, such as capital replacements and upgrades.

The following comments relate to capital costs:

> ***The ISO should provide greater specification and clarify of the circumstances in which various types of 'capital costs' may be considered variable for inclusion in reference levels.*** First, the current definition in Appendix A is too broad and the categorization of capital costs needs specificity. The term 'capital cost' is applied to a number of different costs in the industry. DMM agrees that the up-front capital costs of bringing a facility to commercial operation are fixed costs and not eligible for inclusion in reference levels. Capital costs can also include the replacement cost of a minor item of property which would be considered a variable cost. The ISO should not broadly define all capital costs as fixed, but distinguish types of costs that may be considered capital and which of those are fixed versus variable. For example, capital replacement of large, key equipment as fixed, capital replacement of minor equipment items which do not constitute an upgrade or 'betterment' as variable.

[2] For some of the steam multi-stage generating resources, the conclusion whether higher or lower than proposed defaults varies across configurations for the same resource. This statistic is weighted by the size of the configuration.

The discussion of capital replacement costs versus upgrades should be separated. More detail is needed to define what types of replacements or upgrades are variable. The appropriate rule should not be 'all upgrades' or 'all replacements'. Per the FERC Uniform System of Accounts, "[w]hen a minor item of depreciable property is replaced independently of the retirement unit of which it is a part, the cost of replacement shall be charged to the maintenance account appropriate for the item, except that if the replacement effects a substantial betterment (the primary aim of which is to make the property affected more useful, more efficient, of greater durability, or of greater capacity), the excess cost of the replacement over the estimated cost at current prices of replacing without betterment shall be charged to the appropriate electric plant account."[3]

DMM suggests distinguishing which components or equipment should be considered maintenance and which replacement and therefore excluded. This could be done by adopting the terminology used by the FERC Uniform System of Accounts. FERC provides the definition of a retirement unit and minor item of capital as follows:

- "*Retirement units* means those items of electric plant which, when retired, with or without replacement, are accounted for by crediting the book cost thereof to the electric plant account in which included."

- *"Minor items of property* means the associated parts or items of which retirement units are composed."[4]

Capital replacement costs should be defined within the equipment context of a retirement unit and the anticipated lifespan of that retirement unit- not the entire plant and its apparatus. For example, if a gas turbine is a retirement unit, its replacement is not a maintenance cost, but a capital cost. Replacement of minor items are maintenance costs.

The ISO's proposal defines 'lifespan' as the period up to the point when a resource has notified the ISO that it will retire. This definition is not appropriate. Under this definition, a maintenance action could only be beyond the life of the unit if that unit has informed the ISO of its retirement. If a turbine reasonably has 5 remaining years, but has not informed the ISO of this, a maintenance item that is 40 years away could not be excluded using the proposed definition.

The status of a change as a Material Modification is useful but not sufficient to define a cost as eligible for inclusion in reference values because major modifications are likely to be fixed costs. The ISO tariff and business process manuals do not define Material Modification as a variable or fixed cost. The definition of a Material Modification may include upgrades or replacements of equipment that are not variable maintenance costs.

[3] FERC Uniform System of Accounts, section on Electric Plant Instructions, Additions and Retirement of Electrical Plant: https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=054f2bfd518f9926aac4b73489f11c67&rgn=div5&view=text&node=18:1.0.1.3.34&idno=18

[4] FERC Uniform System of Accounts, first section called Definitions: https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=054f2bfd518f9926aac4b73489f11c67&rgn=div5&view=text&node=18:1.0.1.3.34&idno=18

DMM reiterates the importance of excluding capital replacement costs from maintenance costs included in market reference values. These costs may overlap with the going forward fixed costs which form the basis for backstop capacity procurement references in the ISO's market (the CPM soft offer cap) and bilateral capacity contracts, including resource adequacy contracts. DMM comments on this subject can be found in DMM's previous variable operations and maintenance cost working group comments.[5]

The following comments relate to the ISO's proposed distinctions to categorize costs eligible for inclusion in maintenance adders. DMM suggests that the ISO strive to make clear delineations between fixed and variable costs where possible, listing minimal exceptions.

Corrective cost exceptions should be recognized. Some corrective costs are variable and others are not. There are situations where corrective maintenance is not related to normal wear and tear. For example, a design flaw in a piece of equipment, or an accident where the equipment is damaged not related to it running. It is DMM's understanding that some maintenance manuals will notice service bulletins to address design issues. Such items should not be considered variable with respect to producing electricity. The ISO should clarify whether historical corrective maintenance can be used as a proxy for future corrective maintenance.

Preventative and predictive maintenance definitions may confuse market participants. Preventative and predictive maintenance is a specific industry term used by some market participants but not all. Major maintenance inspections and activities can be thought of as preventative or predictive in nature, even though they fit the conditions of the variable maintenance definition. The distinguishing factor for the type of preventative and predictive maintenance the ISO is referencing is the routine, calendar time-based nature of these costs, not that they are preventative or predictive in nature. If the ISO intends that the purely preventative or predictive nature of costs make them sunk costs or fixed, then that provision should be incorporated into the core definition.

Labor costs accounting should be discussed in detail. Should participants be allowed to include an estimate of labor for major maintenance by regular, salaried staff? The current proposal would include the cost of only supplemental crews.

Some cost categories require further discussion with stakeholders including Electrical Equipment, Balance of Plant items, and Production-Based Fees. The ISO should clarify its reason for categorizing these items as listed in the proposal. Multiple stakeholders commented in the working group process with conflicting opinions about how to categorize these items. For example, some agreed that electrical and balance-of-plant were fixed while others disagreed and commented that they could be variable. The ISO should strive for consistency across participants and clarify final decisions of these categories.

[5] DMM Comments on VOM Working Group: http://www.caiso.com/Documents/DMMComments-VariableOperations-MaintenanceCostReview-WorkingGroups.pdf

DMM provides the following comments and questions regarding the proposed implementation of the proposal:

The ISO proposed allowing scheduling coordinators to negotiate components of the methodology of the default values, while keeping others (e.g. negotiate the annual cost while keeping the run hours used in the calculation). Rather than allowing selective negotiation, the ISO should require the maintenance adders to be negotiated as a package, consistent with the practice for negotiating major maintenance adders in place today. Negotiating separate components could have adverse impacts.

DMM requests that the ISO clarify the status of existing negotiated values under the proposal. Will all negotiated values in place require reevaluation and renegotiation upon implementation? Does the responsibility for initiating any renegotiation fall on the ISO or on market participants?

The ISO's proposal includes provisions that reduce the administrative burden of negotiating maintenance adders in anticipation of a likely increase in applications. In particular, the ISO is proposing to extend the current 15 calendar day deadline for an application response. DMM supports this extension, but recommends consideration of additional restrictions on the frequency with which negotiated maintenance adders may be updated. Currently, a scheduling coordinator may apply for a new negotiated maintenance adder any time after 30 days after a negotiated maintenance adder has been approved. The ISO may consider extending this period to reduce administrative costs.

Finally, the scheduling coordinators for some resources do not have access to the documentation necessary to apply for negotiated maintenance reference values. Typically, this is because these resources are held under a Power Purchase Agreement. As in prior comments on this issue, DMM suggests that a default value would be appropriate in this case. The ISO should consider including language regarding these situations in this proposal.