alj/neg/dk

Decision 90 09 063 SEP 12 1990

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Investigation on) the Commission's own motion to) implement the Biennial Resource) Plan Update following the California) Energy Commission's Seventh) Electricity Report.)

1.89-07-004 (Filed July 6, 1989)

<u>OPINION</u>

I. <u>Summary</u>

With one exception, we grant the Petition For Modification of Decision (D.) 90-03-060, filed on June 6, 1990 by the Division of Ratepayer Advocates (DRA). Instead of holding additional workshops on the definition of benefit-cost (B/C) ratios, as DRA proposes, we make minor language modifications to correct the problem identified in DRA's Petition.

II. <u>Background</u>

On March 28, 1990, the Commission issued D.90-03-060 in this investigation. Among other things, D.90-03-060 clarified certain implementation aspects of the iterative cost-effectiveness method (ICEM) adopted in D.86-07-004. The ICEM is used to test the cost-effectiveness of potential resource additions to an electric utility's résource plan. The Commission then solicits bids from

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qualifying facilities (QFs) to defer or displace the cost-effective additions identified in the ICEM analysis.¹

On April 18, 1990, Pacific Gas & Electric Company (PG&E) Southern California Edison Company (SCE), and San Diego & Electric Company (SDG&E, collectively respondents) filed their ICEM analyses, in compliance with Ordering Paragraph 1 of D.90-03-060. In response to those filings, DRA filed a Petition For Modification of D.90-03-060 (Petition) on June 6, 1990. Responses to DRA's Petition were filed by PG&E, SCE, SDG&E, and the California Energy Commission (CEC).²

III. Position of the Parties

In its Petition, DRA raises two issues for Commission : consideration. First, DRA requests that the Commission clarify how the ICEM testing procedures should be applied when target reserve margins are met in a given year. Second, DRA recommends that the B/C ratio defined in D.90-03-060 be subject to further workshop discussion. The position of the parties with respect to each of these issues is summarized below.

A. ICEN Testing Procedures

As described in D.90-03-060, the first-year test is used to determine the optimal year for adding a cost-effective resource. With this test, one compares the first-year cost of a resource addition with changes in benefits (i.e., changes in production

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¹ QFs are cogeneration and small power production projects that qualify for certain benefits under the Federal Public Utility Regulatory Policies Act of 1978.

² CEC and SCE responded to only one of the issues raised in DRA's Petition; namely, the ICEM testing procedures. (See Section III.A below.)

costs and system reliability) in a given year. Each potential resource addition is tested for first-year cost-effectiveness, starting with the initial year of the planning horizon. If a resource passes the first-year test in a given year, it is then tested for life-cycle cost-effectiveness, using a B/C ratio. If that resource passes both tests, it is added to the resource plan, and additional resources are similarly tested for that year. If it is cost-effective to add more than one resource in a given year, comparisons of B/C ratios are used as tie-breakers. The analysis then moves to the next year of the planning horizon, and repeats the process.

According to DRA, respondents interpreted D.90-03-060 to mean that the analysis of resource additions should end, for each year of the planning period, whenever the target reserve margin in that year is reached. DRA believes that this interpretation relies on an ambiguity in the description of the sequential testing approach that appeared in the text and appended Figure 2 of the decision. In DRA's view, truncating the analysis in this way contradicts the overall purpose of the test. Moreover, DRA argues that respondents' interpretation is inconsistent with the decision's Conclusions of Law and reliance on the methodology adopted in D.86-07-004. DRA requests that the decision language be clarified to indicate that all resources determined to be costeffective within the planning horizon, based on both the life-cycle and first-year tests, be added to the utility's resource plan. DRA

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submits a revised Figure 2 to illustrate this process. (See Attachment 2.) 3

In support of DRA's Petition, CEC argues that both Commissions intended the principle of cost-effectiveness to supercede a simplistic reserve margin accounting approach to resource planning. Accordingly, CEC urges the Commission to correct Figure 2 and the corresponding text in D.90-03-060 along the lines described by DRA.

In general, SDG&E agrees with DRA that the ICEM process should be applied not only until the target reserve margin is achieved, but until no more resources are cost-effective to add. However, SDG&E adds two qualifications to this support. First, SDG&E cannot support DRA's approach if it displaces shortage resources by overbuilding combustion turbines (CTs). According to SDG&E, while CT costs and operating characteristics are a proxy for "shortage resources," the CT size is not a proxy. In other words, SDG&E would add shortage resources other than a CT to exactly meet reserve targets in a given year.⁴

Second, SDG&E is concerned that the potential energy savings that render future base-load and intermediate-load resources cost-effective may not materialize. SDG&E suggests that the Commission provide the utility with the flexibility to make a

4 See: <u>Supplemental Filing of SDG&E</u>, dated June 26, 1990, page 2.

³ In its response to DRA's protest, SCE implies that DRA would continue to add combustion turbines over and above the target reserve margin in the year in question, rather than stopping at target levels. This does not appear to be the case (See Attachment 2.) In other words, while there may not be a perfect match between the size of the generic combustion turbiné and the reserve margin requirement (and hence, target reserve margins could be exceeded), one would not keep adding combustion turbines once reserve margins are met.

showing that, under a particular set of circumstances, DRA's approach would be too speculative.

PG&E and SCE, on the other hand, argue that there is no ambiguity in the decision, and that the Commission's intent is clear. In their view, the Commission purposely adopted a timesequential approach that does not continue to evaluate resources after reserve margins are met. Moreover, SCE asserts that DRA and other parties endorsed the approach that DRA now seeks to modify.

PG&E and SCE also argue that DRA's Petition is procedurally improper, although for different reasons. SCE believes that the relief requested by DRA does not represent a "minor" change, as contemplated under Rule 43 of the Commission's Rules of Practice and Procedure. In PG&E's view, Section 1708 of the California Public Utilities Code requires the Commission to hold hearings and obtain additional evidence before reconsidering the approach adopted in D.90-03-060.

B. <u>Benefit-Cost Ratios</u>

In D.90-03-060, the Commission determined that the lifecycle test of cost-effectiveness should be expressed through the use of a B/C ratio, and adopted a specific formula for that purpose:

> "...the numerator is comprised of the change in shortage costs plus the change in production costs (with and without the [identified deferrable resource] IDR) <u>minus</u> the production costs of the IDR, all expressed in [net present value] NPV. The denominator is comprised of the total fixed costs and production costs of the IDR, in NPV." (D.90-03-060, mimeo. page 93.)

In its Petition, DRA argues that the composition of the B/C ratio must be modified. Based on an analysis contained in the work papers to SDG&E's compliance filing, DRA concludes that application of the adopted formula results in <u>negative</u> ratios for cost-effective additions. DRA recommends that a workshop be

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convened to further discuss this issue, and to provide information upon which to base a modification of D.90-03-060.

PG&E agrees with DRA that the B/C ratio formula should be modified, but disagrees that a workshop is needed to resolve this matter. According to PG&E, the problem arises because the production costs of the IDR are double counted in both the numerator and denominator. PG&E recommends language modifications to correct this problem. Similarly, SDG&E recommends that the Commission adopt the B/C ratio formula proposed in its Phase 1A testimony.

IV. Discussion

In describing the difference between two different ICEN optimization sequences (i.e., time sequential versus nonsequential), D.90-03-060 describes the time sequential approach as follows:

> "Under the time-sequential approach, the firstyear test is used to determine the optimal year for adding a cost-effective resource. Starting with the initial year of the planning horizon, those options passing the first-year test in the initial year of the planning horizon are tested for life-cycle cost-effectiveness and, if cost-effective, added to the resource plan. If it is cost-effective to add more than one resource in a given year, comparisons of lifecycle costs are used as tie-breakers. The evaluation proceeds to subsequent years of the planning horizon, after sufficient costeffective resource additions (including consideration of shortage resources, i.e., gas turbines) have been added to meet reserve margins." (D.90-03-060, mimeo. page 83.)

To illustrate this approach, we included a schematic of the time-sequential approach (Figure 2) in the order. (See Attachment 1.) As SCE and PG&E point out, one could certainly

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infer from these portions of D.90-03-060 that ICEM costeffectiveness testing should end whenever reserve margins are met in a given year.

However, other parties argue that such an interpretation is unreasonable, given the overall purpose of ICEM testing and other determinations made in D.90-03-060. To explore these arguments, we first consider the process by which ICEM-related issues were raised in this investigation and the type of evidence presented on this aspect of cost-effectiveness testing.

For Phase 1A of this investigation, respondents were directed to file ICEN analyses of their resource plans, using demand and resource assumptions from the California Energy Commission's Seventh Electricity Report. It is important to note that Phase 1A was not originally intended to address any issues relating to ICEN cost-effectiveness testing procedures. As discussed in D.90-03-060, our ICEM two-part testing methodology was adopted in D.86-07-004, based on an approach described in the Public Staff Division's 1986 testimony.⁵ However, it became apparent towards the end of Phase 1A evidentiary hearings that parties implemented the adopted ICEM testing procedures in significantly different ways. As described in the Administrative Law Judge's (ALJ) November 30, 1989 ruling, the fundamental difference was in the optimization sequence for applying ICEM tests of cost-effectiveness.⁶

In her November 30 ruling, the ALJ directed parties to hold a workshop to summarize all of the differences in their respective cost-effectiveness testing procedures, and to append a

6 See Reporter's Transcript (TR), Volume 8, pp. 785-791.

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⁵ The Public Staff Division was subsequently named DRA, and will be referred to as such throughout this order.

simplified flow chart reflecting their preferred optimization sequence. The workshop was held on December 5, 1989 and the workshop report was submitted as late-filed Exhibit 51. Parties were directed to brief the Commission on any remaining areas of disagreement concerning ICEX cost-effectiveness testing.⁷

In Exhibit 51, parties identified the following issues for resolution:

- The sequence in which the first-year test and life-cycle test should be applied (i.e., in a time sequential or nonsequential manner);
- How resources should be prescreened before applying the two-part test of costeffectiveness;
- 3. The composition and application of the first-year test to various types of resources; and
- 4. The composition of the life-cycle test.

On January 2, 1990, the ALJ issued a ruling directing respondents to submit additional ICEM analyses, using the specific assumptions, modeling conventions, and cost-effectiveness testing methods outlined in the ruling (January 2 ALJ ruling). As part of this ruling, the ALJ described how respondents should address the ICEM implementation issues identified in late-filed Exhibit 51. Similarly, the ALJ's Proposed Draft Decision and our final decision addressed each of these outstanding issues.

We have reviewed the record in Phase 1A, and have found no mention of the issue argued among parties to this Petition. In other words, whether or not to truncate cost-effectiveness testing when reserve margins are met was <u>not</u> identified or discussed as an

7 TR at 891.

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issue in late-filed Exhibit 51, in any earlier exhibits and crossexamination, or in parties' Phase 1A briefs. Rather, as described below, we believe that the ambiguity in Exhibit 51's description of the time-sequential approach clouded the issue until parties could carefully review respondents' compliance filings.

For example, as SCE points out, the description of DRA's time sequential approach on page 5 of Exhibit 51 is virtually identical to the language used in our order (see above). However, SCE's and PG&E's interpretation of that description <u>contradicts</u> DRA's earlier description of its procedures, as presented in Exhibits 49:

> "DRA's analysis implemented the ICEM sequentially, beginning with the first year of the BRPU planning window (1990). That is, beginning in 1990, resources were added - if cost-effective - to each utilities' generation system until the reserve margin <u>equalled or</u> <u>exceeded</u> those in ER7." (DRA/SDG&E Joint Exhibit 49, page 2; emphasis added.)

Moreover, SCE's own description of the ICEN sequence in Exhibit 51, including Figure 2, is far from unambiguous.⁸ While the figure implies that cost-effectiveness testing ends whenever reserve margins are met, SCE's corresponding text description is considerably less clear:

> "[SCE's] approach to the ICEM is to first screen candidate resources and then to apply the first-year test. This part of the test determines when any resource proves to be costeffective in its first year of operation.

> "Second, if reserve margins were not maintained prior to adding any of the resources that passed the first-year test, <u>combustion turbines</u>

8 Figure 2 of D.90-03-060 originates from SCE's description of the time-sequential approach. (See <u>SCE's Implementation of the</u> ICEM for Phase 1A of Application 1.89-07-004, in Exhibit 51.)

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(CTs) would be added in each year in which there were reserve deficits. New first year tests would be performed with these CTs included in the base case ELFIN data set and the process would begin again." (Exhibit 51, SCE's Implementation of the ICEM, page 2; emphasis added.)

In fact, SCE's only specific reference to truncating the cost-effectiveness analysis is when (1) no resources passed the first-year test in a given year, and (2) reserve margins were below the CEC target. In this instance, SCE stated "that combustion turbines would be added to raise the reserve margin to the target level."⁹

Viewed in this context, our decision language and Figure 2 require additional clarification. Did we intend to truncate the analysis for every tested resource, or only for CTs in any year when they were needed to raise reserve margins to their target? While PG&E now argues that the decision language is "unambiguous", we note that PG&E must not have thought so earlier in this proceeding. The January 2 ALJ ruling included the same description of the time-sequential approach, and the same figure, as we

9 We also note that PG&E's description of the time-sequential approach, as presented in Exhibit 51, makes no mention of truncating the analysis when reserve margins are met. In fact, PG&E notes in its workshop filing that the CEC target reserve margin was exceeded in all years of the planning horizon. Hence, contrary to SCE's assertions, there was no apparent unanimity on this issue. See PG&E's <u>ICEM Workshop</u>, dated December 5, 1989; appended to Exhibit 51, page 4.

included in D.90-03-060. ¹⁰ However, in response to the January 2 directive, PG&E conducted its ICEM analysis <u>without</u> truncating the first-year testing procedure when target reserve margins were met.¹¹ In response to the same language in our final order, PG&E did truncate the analysis. Hence, while it may be reasonable to infer one or the other interpretation of D.90-03-060, we conclude that there exists sufficient ambiguity to warrant further clarification.

In considering such clarification, we turn to other portions of D.90-03-060. Had we intended for the costeffectiveness testing to be truncated, we would not expect to find other sections of D.90-03-060 that speak to circumstances where reserve margins might be exceeded. However, as DRA points out, we speak to such circumstances in our discussion of energy-related capital costs (ERCCs) in Section VI of D.90-03-060, and in Conclusion of Law 70.

ERCCs designate that portion of a resource option's fixed costs that a utility incurs because of anticipated benefits to its operating efficiency (i.e., energy savings). In D.90-03-060 we describe how our testing procedures will indicate if a resource with no ERCCs is needed as a shortage resource, or if there are base-load or intermediate-load resources that should be added instead for both reliability and energy savings purposes. In the

10 See <u>Administrative Law Judge's Ruling on Additional Phase 1A</u> <u>ICEM Analysis</u>, January 2, 1990, page 8 and Figure 1. In its January compliance filing to this ruling, SCE presented an updated version of the figure submitted for Exhibit 51. This updated version was used in D.90-03-060. It makes no substantive changes to the version used in Exhibit 51 and in the above ruling.

11 Per ALJ's phone confirmation with John Guardalebene, Attorney for PG&E, on July 6, 1990.

latter situation, it is common for reserve margins to be <u>exceeded</u> by the addition of a cost-effective base-load or intermediate-load resource. In these circumstances, the energy savings compensate for the relatively low shortage value assigned to additional capacity.

In order to identify circumstances where resources with ERCCs are preferable to those without, we directed respondents to test the cost-effectiveness of base-load and intermediate-load resources in addition to resources with no ERCCs, for each year of the planning horizon. This directive would be undermined if utilities stopped the first-year testing procedures whenever reserve margins are equalled. Koreover, in Ordering Paragraph 1 of D.90-03-060, we direct respondents to include in their compliance filings "a description of any year(s) in which the target reserve margins are not met or exceeded." Hence, PG&E's and SCE's interpretation of the time-sequential approach is clearly inconsistent with other sections of our orders.

PG&E's and SCE's interpretation is also inconsistent with the description of the ICEM methodology adopted in D.86-07-004. The process was described in DRA's 1986 testimony as follows:

> "The first resource that becomes cost-effective is added to the utility system, marginal cost redetermined, and other resources reevaluated. This process continues <u>until no more resources</u> <u>are cost-effective to add</u> (i.e., resource costs are greater than system marginal cost)." (Reference Exhibit A, page 102, emphasis added.)

We agree with DRA and CEC that, as originally proposed and adopted, the purpose of the ICEM testing procedure is to develop the most cost-effective resource plan. SCE's and PG&E's interpretation of D.90-03-060 would effectively undermine that purpose. As described above, we did not receive evidence on the issue of truncating the ICEM testing procedures adopted in D.86-07-004, other than the ambiguous Figure 2 and accompanying

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text presented by SCE and others in Exhibit 51. Hence, the record in this proceeding does not support an approach that is inconsistent with the methodology adopted in D.86-07-004. On the contrary, the evidence in this proceeding supports the interpretation put forth by DRA in its Petition.

In sum, we conclude that the description of the timesequential approach in D.90-03-060 requires clarification. As currently crafted, the language and illustrative schematic is ambiguous, and can be interpreted in a manner that is inconsistent with other aspects of our orders. Accordingly, we will reconcile the inconsistent decision language and Figure 2 by making the modifications presented in Attachment 3.¹² We consider these changes to represent minor language modifications for the purpose of clarifying our intent, and removing ambiguities that result in inconsistent interpretations of our orders. As discussed above, Exhibits 49, 51, and Reference Exhibit A provide us with sufficient evidence upon which to base today's determinations, and PG&E has alleged no additional facts which require hearing.

We note that there is still apparent disagreement over what type of "shortage resource" should be added to meet reserve margins in any year when candidate resources do not pass the firstyear test. Per ALJ Gottstein's June 8, 1990 ruling, interested parties should address this issue in their Phase 1B testimony, along with any other issues that were raised in comments to the Phase 1A compliance filings, but remain unresolved to date. Any party proposing to use a shortage resource other than a CT for this purpose, should also present its rationale for not <u>also</u> using

12 DRA's revised Figure 2 is modified in response to comments filed on July 16, 1990 (See Attachment 3).

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that shortage resource in the calculation of shortage values and ${\rm ERCCs}\,^{13}$

Finally, on the issue of B/C ratios, we agree with PG&E and SDG&E that minor language modifications can and should be made to correct the problem. We note that PG&E's proposed modification is consistent with the definition presented in the ALJ's January 2 Ruling and Proposed Decision. Our final decision modified the earlier version in response to DRA's comments on the Proposed Decision. 14 Since DRA no longer finds its alternate definition workable, we see no reason not to adopt the one used by all parties earlier in the proceeding.

<u>**Findings of Fact</u>**</u>

1. In D.86-07-004, we adopted the ICEM two-part testing methodology presented by DRA in their 1986 testimony (Reference Exhibit A).

2. The ICEM is used to test the cost-effectiveness of potential resource additions to an electric utility's resource plan.

3. In Pháse 1A of this investigation, respondents were directed to file ICEN analyses of their resource plans.

4. The Commission did not originally intend to address issues related to ICEN cost-effectiveness procedures in Phase 1A.

13 With regard to SDG&E's concern over the "speculative" nature of future energy savings, we note that there is also uncertainty over the future availability of resources with no ERCCs to meet reliability requirements. As we discussed in D.90-03-060, we prefer to adopt a consistent method of cost-effectiveness testing for use by all parties. SDG&E's request for additional discretion in applying the adopted ICEM procedures is denied.

14 See <u>Comments By The Division of Ratepayer Advocates On</u> <u>Proposed Decision (Phase 1A)</u>, dated March 8, 1990, page 3.

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5. Towards the end of Phase 1A evidentiary hearings, it became apparent that parties implemented the adopted ICEM testing approaches in significantly different ways.

6. The assigned ALJ directed parties to hold a workshop to discuss and summarize all of the differences in their respective cost-effectiveness testing procedures.

7. The workshop report on ICEM Implementation was filed as late-filed Exhibit 51.

8. Whether or not to truncate cost-effectiveness testing when reserve margins are met was not identified or discussed as an issue in late-filed Exhibit 51, in any earlier exhibits and crossexamination or in parties' Phase 1A Concurrent Briefs.

9. The text description of the time-sequential approach in D.90-03-060 was taken from the description of DRA's procedures, as described in Exhibit 51.

10. The flow-chart description of the time-sequential approach in D.90-03-060 was taken from SCE's description of the time-sequential approach, as appended to Exhibit 51.

11. Workshop participants did not identify any difference between DRA's and SCE's time-sequential approach, as it relates to truncating (or not truncating) the analysis when reserve margins are met. Parties did not identify this issue in earlier exhibits, during cross-examination or in their in Concurrent Briefs.

12. The text description of SCE's and DRA's time-sequential approach, as presented in Exhibit 51, is unclear with regard to the testing of resources when reserve margins are met.

13. DRA's own description of its time-sequential approach, as presented in Exhibit 49, states that cost-effective resources are added in any given year until reserve margins are equalled or exceeded.

14. Reference Exhibit A states that cost-effective resources are added to the resource plan "until no more resources are costeffective to add."

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15. In D.90-03-060, Conclusion of Law 70, we directed respondents to test the cost-effectiveness of base-load and intermediate resources in addition to resources with no ERCCs, in order to identify circumstances where resources with ERCCs are preferable to those without.

16. Adding a cost-effective base-load or intermediate-load resource to the resource plan can raise reserve margins above target levels.

17. Ordering Paragraph 1 of D.90-03-060 directs respondents to include in their compliance filings "a description of any year(s) in which the target reserve margins are not mot or exceeded".

18. Truncating the analysis of cost-effective resources when target reserve margins are met would undermine our directives in Conclusion of Law 70 in D.90-03-060.

19. Truncating the analysis of cost-effective resources when target reserve margins are met is inconsistent with Ordering Paragraph 1 of D.90-03-060 and the ICEM testing procedures adopted in D.86-07-004.

20. The B/C ratio formula adopted in D.90-03-060 can result in negative ratios for cost-effective resources.

21. D.90-03-060 modified an earlier version of the B/C ratio formula, in response to DRA's comments on the ALJ's Proposed Decision.

22. In its Petition, DRA requests minor language modifications for the purpose of clarifying our intent and removing ambiguities that result in inconsistent interpretations of our orders.

23. Parties still disagree over what type of shortage resource should be added to meet reserve margins in any year when candidate resources do not pass the first-year test.

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24. In her June 8, 1990 Ruling, the ALJ directed parties to address any remaining issues raised in comments to the Phase 1A compliance filings in Phase 1B testimony.

Conclusions of Law

1. The description of the time-sequential approach in D.90-03-060 is ambiguous and can be interpreted in a manner that is inconsistent with other aspects of our orders.

2. The language and Figure 2 of D.90-03-060 should be modified to reconcile inconsistencies.

3. The B/C ratio formula in D.90-03-060 should be modified to be consistent with the definition presented in the ALJ's January 2 Ruling and Proposed Decision.

4. The modifications to D.90-03-060 set forth in Attachment 3 should be adopted.

5. The issue of what type of shortage resource should be added when candidate resources do not pass the first-year test should be addressed in Phase 1B. Any party proposing to use a shortage resource other than a combustion turbine should present their rationale for not also using that shortage resource in the calculation of shortage values and energy-related capacity costs.

6. DRA's Petition is procedurally proper.

7. In order to enable parties to effectively prepare for Phase 1B of this proceeding, this order should be effective today.

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<u>ORDER</u>

IT IS ORDERED that Decision 90-03-060 shall be modified as set forth in Attachment 3 to this order.

This order is effective today. Dated _________, at San Francisco, California.

> G. HITCHELL WILK President FREDERICK R. DUDA STANLEY W. HULETT PATRIGIA H. ECKERT Commissioners

Commissioner John B. Ohanian, being necessarily absent, did not participate.

I CERTIFY THAT THIS DECISION WAS APPROVED BY THE FLOOR COMMISSIONLES YOUNY

15.51 ULMAN, Executive Director NB

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(END OF ATTACHMENT 1)



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ATTACHNENT 3 - Page 1

<u>Adopted Nodifications to D.90-03-060</u> Deleted portions are stricken; additions are underlined.

in this proceeding. DRA, SCE, SF/U/F, and IEP/IPC would apply the ICEM in a time-sequential, or chronological manner.¹¹¹

Under the time-sequential approach, the first-year test is used to determine the optimal year for adding a cost-effective resource. Starting with the initial year of the planning horizon, those options passing the first-year test in the initial year of the planning horizon are tested for life-cycle cost-effectiveness and, if cost-effective, added to the resource plan. If it is costeffective to add more than one resource in a given year, comparisons of life-cycle costs are used as tie-breakers. The evaluation proceeds to subsequent years of the planning horizon, after-sufficient until all cost-effective resource additions fineluding-consideration-of-shortage-resources, ivery-gas-turbines} have been added.to-meet-reserve-margins. If no candidate resources pass the first-year test in a given year, and reserve margins are below target levels, than shortage resources are added to meet reserve margins. Figure 2 illustrates this approach.

SDG&E, on the other hand, contends that resources should be added to the resource plan in a non-sequential manner, based on a two-part decision rule. First, for a given iteration, SDG&E would determine which resource is most cost-effective based on life-cycle costs and benefits. Second, that resource which is found most cost-effective over its life is then added to the resource plan in the first year in which it passes the first-year test. The evaluation then proceeds to the next cost-effective resource until sufficient cost-effective additions (including

¹¹¹ PG&E originally applied the time-sequential approach, but apparently modified its position during the workshops. At the workshop, and in its brief, PG&E proposes a compromise approach in which the time-sequential approach would be used to develop a preliminary resource plan. This approach would allow the utility to modify this preliminary plan using any methodology, provided the utility stayed within the confines of the first-year test, the life-cycle test and minimum reserve requirements. (Exh. 51, p. 12; PG&E Brief, pp. 24-26.)

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reasons, we adopt the B/C ratio as the ICEM measure of relative life-cycle cost-effectiveness.

More specifically, a resource is considered costeffective over its lifetime if the NPV of the change in total costs (i.e., fixed costs of the option, plus changes in production and shortage costs) is positive over the resource life. Relative costeffectiveness should be determined using B/C ratios, computed by dividing the NPV of life-cycle benefits by the NPV of life-cycle costs of the option. More specifically, the numerator is comprised of the change in shortage costs plus the change in production costs (with and without the IDR) <u>minus</u>-the-preduction-costs-ef-the-IDR, all expressed in NPV. The denominator is comprised of the total fixed costs and-preduction-costs of the IDR, in NPV. This-is consistent-with-the-B/C-ratios-defined-fer-DSN-(Total-Resource-Costs test),-where-total-benefits-are-divided-by-total-resource-costs.

We also concur with SDG&E and others that a life-cycle test of cost-effectiveness, by definition, requires some form of extrapolation of benefits and costs beyond the ER7 20-year planning horizon. Several extrapolation methods were discussed at the ICEM workshops. (Exh. 51, pp. 7-8.) Some parties supported extension of the ER7 data sets, which would require extrapolation of demand forecasts, DSM impacts, and other resource planning assumptions. We agree with SDG&E and SCE that this effort would be extremely speculative, as well as unduly arduous.

At the ICEM workshop, SDG&E proposed a middle ground between DRA's position of truncating the life-cycle test and the

122 - See-<u>Standard-Praetice-Manualy-Beeneite-Analysis-of-Demand-Side</u>-<u>Management-Pregrams</u>-December-1987y-Appendix-E.

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122. In D.89-09-093, we directed PG&E to use the variable O&M estimates it filed in CEC's CFM-7 proceeding for the 1989 ECAC case.

123. Respondents' estimates of variable O&M costs, as filed with the CEC in CFX-7, provide reasonable base case values, in light of the limited purpose and record of this proceeding, of each operational generating unit's marginal O&M costs.

124. Only PG&E recommends changing the ELFIN "COMMT" feature to "NCOMMT", which would base model commitment on rated capacity, instead of derated capacity.

125. SCE and SDG&E recommend a number of relatively minor adjustments to the modelling conventions presented in the ER7 data set, none of which were challenged as being incorrect or unreasonable.

126. In D.86-07-004, we adopted DRA's two-part test of costeffectiveness, the first-year and life-cycle tests, for our ICEM analysis of potential resource additions.

127. Parties to this proceeding disagree over the appropriate sequence for applying the ICEM tests of cost-effectiveness to potential resource additions.

128. The time-sequential approach starts with the initial year of the planning horizon, and tests those options passing the firstyear test in that year for life-cycle cost-effectiveness. If it is cost-effective to add more than one resource in a given year, comparisons of life-cycle tests are tie-breakers. The evaluation proceeds to subsequent years of the planning horizon after sufficient until all cost-effective resource additions have been added.te-meet-reserve-margins. If no candidate resources pass the first-year test in a given year, and reserve margins are below target levels, than shortage resources are added to meet reserve margins.

129. The non-sequential approach first ranks all resource options based on life-cycle cost-effectiveness, and then adds the most cost-effective resource in the year it first passes the firstyear test. The evaluation then proceeds to the next cost-effective

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Footnotes to Flow Chart

- * For each candidate resource, the iteration represents two production model runs: one without the candidate resource (but with all previous costeffective resources included) in the resource plan, and one with the candidate resource included.
- (1) This refers to any remaining candidates within a given iteration (e.g., if there are 3 candidates, you make 3 production costs runs).
- (2) This refers to those candidates remaining after the addition of cost effective resources (e.g., if there are 3 candidates in iteration #1, and only one is found to be cost-effective and added to the resource plan, only two candidates remain to test for iteration #2).

