SECTION 4
RESOURCE ACQUISITION PROCESS

4.1 INTRODUCTION

The guiding principles for resource acquisition as a part of the Replacement Resources Process are least cost, rate reasonableness to Western's customers, an appropriate level of public review, and process documentation. Any combination of building new resources, leasing existing resources, or purchasing or exchanging power from others are potential candidates for replacement resources.[1] However, surplus generating capacity in Western's marketing area, coupled with the ongoing restructuring and deregulation in the electric utility industry, have made the purchase of power from others a viable, low-cost option now and for the foreseeable future.

This section begins with a discussion of the historical context for Western's power purchasing practices, both before and after the implementation of interim operations at GCD. The major sub-sections which follow cover Western's overall approach to the acquisition process for replacement power, followed by information on the methodology, evaluation criteria, analytic tools, format for replacement power requests, and risk mitigation measures that Western may use in acquiring and evaluating replacement resources.

4.1.1 HISTORICAL CONTEXT

Even prior to interim operations at GCD, SLCA/IP hydroelectric resources did not produce power to exactly match scheduled commitments to SLCA/IP firm power customers. At times, SLCA/IP hydroelectric resources generate either more or less than customers need hourly, monthly, seasonally, or annually because of several factors:

- monthly water releases required to satisfy downstream water rights and demands;
- water conditions beyond the ability of the Colorado River system reservoirs to completely control (including flood control releases); and
- use of the release and storage capability of GCD and other CRSP facilities (within defined limits) to sell in the bulk power market when prices were highest and to purchase when prices were lowest.

In the past, the first two factors above were the principal cause of hydroelectric generation exceeding or falling short of Western's firm commitments for a month, a season, or an entire year. High water conditions or high dam releases meant that hydroelectric generation exceeded Western's commitments, while drought or low water releases meant that hydroelectric generation would fall short of these commitments. Western would normally fill the latter deficits with monthly or seasonal non-firm purchases.

However, monthly water releases and reservoir levels generally have not been the cause of hourly or daily power purchases. Hourly and daily purchases were often dispatcher-initiated according to operating guidelines, or pre-scheduled under existing contracts with regional power pools, and were undertaken to optimize short-term economic operation of GCD (the third factor above).

Recognizing the variation in water conditions and its effect on hydroelectric generation, Western has forecasted the level of long-term capacity and firm energy to market based on the risk of not having enough hydroelectric power (making supplemental power purchases necessary). Long-term firm capacity is marketed for the post-1989 contract period seasonally at a 10 percent risk level (that is, the level that would be equaled or exceeded 90 percent of all future years within the contract term), while long-term firm energy is marketed at the forecasted average energy level (or that level that would be equaled or exceeded in approximately 40 percent of all future years). Both forecasts were based on conditions prior to the current interim operations at GCD. Therefore, prior to interim operations, Western expected that supplemental energy

purchases would be necessary to meet customers' seasonal firm load about 60 percent of the time, and firming capacity purchases would be required one year in ten.

Prior to interim operations at GCD, when water conditions were inadequate to meet customers' firm load, hydroelectric generation was shaped to meet firm load during on-peak periods, limiting power purchases to off-peak periods when the price was lower. As a result of this flexibility to " shape" GCD power to customer loads, SLCA/IP was expected to be energy deficient in six of ten seasons, but deficient during on-peak periods in only one season in ten. This meant that while supplemental energy purchases to meet SLCA/IP monthly or seasonal energy load would have often been needed, supplemental capacity purchases normally would not.

Although supplemental energy purchases for the SLCA/IP were forecasted to be needed about 60 percent of the time, the specific months and seasons when purchases were needed could not generally be projected more than one to two seasons in advance. As a result of this uncertainty, Western generally purchased power using daily, weekly, or seasonal arrangements. Daily and weekly operating flexibility at GCD and other SLCA/IP facilities allowed Western to use hydroelectric generation during peak load periods, and thereby avoid more expensive purchases in the bulk power market, such as on-peak purchases, guaranteed energy, firm energy, and capacity with energy. Instead, Western could use off-peak, non-firm purchases from the spot market at a much lower price.[2]

4.1.1.1 Interim Operations and Future Purchases

With the imposition of research and interim operations at GCD, the mismatch between SLCA/IP hydroelectric resources and customers' firm load described above still occurs. However, interim operations have caused additional hourly and daily mismatches between hydroelectric generation and customer load. Compared with prior operations, the timing of short-term purchases is now reversed, with purchases needed more often during on-peak hours than off-peak hours.

Although short-term purchases are still required for seasonal or annual energy shortfalls (due to low water levels), the resource needs of SLCA/IP have been fundamentally changed by the hourly and daily water release limitations of interim operations. While hourly and daily purchases were once optional and made to increase economic efficiency, purchases are now often needed to make up the hourly shortfall of hydroelectric generation during on-peak load hours created by the operational restrictions at GCD and other SLCA/IP facilities.

When restrictions are adopted and implemented in accordance with the GCD-EIS Record of Decision (ROD), SLCA/IP resource operations and resulting power purchase needs will become more certain. The requirement for supplemental resources will, nonetheless, still be variable with water conditions. During wet years (high water conditions), SLCA/IP hydroelectric generation should be sufficient to meet Western's firm commitments, even during on-peak hours. However, the capacity risk level based on long-term hydrology will be greater than the current level of 10 percent; that is, purchases during on-peak load hours will become the rule rather than the exception (as was the case prior to interim operations).

For most seasons, when purchases are required, variability in water conditions will also affect the number of hours of shortfall. Purchases may be required in 2000 on-peak hours in one season and in only 200 on-peak hours in the next season. Accordingly, while the need for substantially increased on-peak purchases is likely, the amount and timing of purchases will remain variable and hard to predict. Further, there is uncertainty as to the nature of future operating procedures for GCD operations, which could affect the cost and type of purchases needed.

4.2 GENERAL APPROACH TO ACQUISITION

The intent of Section 1809 of the GCP Act was to mitigate the adverse economic and reliability effects on SLCA/IP customers caused by the restrictions on water releases and power generation at GCD. The GCP Act directed the Secretary of Energy to investigate methods of replacing any lost power, including transmission system modifications which might be needed to deliver the replacement power. At the time it was enacted in 1992, the GCP Act may have anticipated that realistic replacement resources might include long-term firm-power purchases, lease or ownership-like entitlements in one or more specific generating units, long-term power exchanges, long-term power integration agreements with other federal hydroelectric projects, and possibly construction of new transmission facilities or upgrades of existing facilities.

There is no implication in the GCP Act or legislative history, however, that power lost at GCD should necessarily be replaced through long-term commitments. **Instead, replacement power will be acquired competitively based on the needs of the SLCA/IP customers.** Western will consult with its customers to define the amount and timing of replacement power as part of Western's SLCA/IP firm-power marketing program through the term of the Amended Contracts, including a potential term extension.

The trade-off for allowing customers to select the amount of replacement resource they need is the requirement that they financially commit to their proportionate share of the costs associated with the replacement resource.[3] Western will be a physical, legal, and financial conduit for the power transaction by which replacement power is acquired for individual customers. At least for the term of the current SLCA/IP power sales agreement as amended, Western will implement the process by which replacement power may be acquired, but the customers will determine the level of resource purchases by Western at the established price.[4]

Given the anticipated arrangements with customers for replacing power lost at GCD, Western's emphasis to date has been on the planning process, the public process, and the decision process between Western and its customers. The

specific characteristics (i.e., type, cost, location, etc.) of prospective replacement resources or contractual arrangements between Western and the seller/developer will be more important later in the implementation phase of the acquisition process. However, the methodology developed in this report must account for a variety of potential resource characteristics.

Western's replacement resource acquisition process will follow these technical steps:

- estimate resource need;
- establish eligibility and minimum standards for the power resource offered, the entity offering the resource to Western, and the financial and legal obligations of Western;
- develop a request for replacement power, which for longer-term replacements may become a formal request for proposals (RFP);
- compile responses to the request for replacement power, and protect the confidential information submitted in proposals;
- determine the availability of transmission capacity to reliably and economically integrate power associated with any proposal;
- evaluate the proposals or power supply offers using pre-determined evaluation techniques, tools, and methods;
- make resource acquisition/power purchase decision(s); and
- negotiate contract terms and conditions for the replacement resource.

4.2.1 RELIANCE ON BULK POWER MARKET

In order to provide replacement power to customers, Western must be able to offer firm resources that match the time period to which it will commit to supply the firm resource. Therefore, Western must be reasonably certain that

economical sources of power supply will be available to supply customers' requests.[5]

Through its own transmission facilities and entitlements in other systems, the SLCA/IP has extensive access to the bulk power market in the Rocky Mountain and Desert Southwest regions of the western United States. Although the transmission system is constrained along certain paths during certain conditions,[6] SLCA/IP can purchase from and sell to a large number of electric utilities, non-utility generators, and power marketers. With both direct transmission access and indirect access through others under " open-access" transmission service tariffs,[7] Western has many options for acquiring economically-priced replacement power on a short-term, mid-term, and long-term basis for the foreseeable future. While existing transmission constraints might at times restrict purchases from the lowest-cost resource, the constraints are not so severe or prolonged to significantly restrict Western's initial acquisition by geographical location or market sector. In summary, Western has widespread access to many competitive sources of replacement power.

4.2.2 RESOURCE REPLACEMENT OPTIONS

The contractual arrangements with SLCA/IP customers will limit Western's obligation to providing only the replacement power specifically requested by individual customers within a range set by Western.[8] The maximum SLCA/IP requirement for replacement power will be the difference between Western's firm-load obligation and hydroelectric power availability. However, customers will likely request only a limited amount of replacement power to be purchased for the long-term. The term of replacement power options could vary from a single month to a long-term purchase up to the term of the customer's SLCA/IP power sales agreement.

If a customer chooses to have Western supply the maximum possible level of replacement power for the remaining term of the power sales agreement, the load to be served by Western from that customer would be known in advance. While some customers may choose from the outset to make

this commitment, most probably will not, leaving the aggregate replacement power resource need uncertain.

Furthermore, even if the replacement resource need was completely determined in advance, the actual need for replacement power for each season would still vary with water conditions. During high water conditions, replacement power purchases would not be needed. During drought conditions, additional replacement power will be needed during summer and winter on-peak hours.

Due to the large variability in replacement power requirements from month-to-month and year-to-year, some customers might adopt a portfolio approach to their requests for replacement power. For example, the amount of replacement power likely to be needed under almost any circumstance might be purchased through long-term commitments to assure availability at a known price. A second tier of replacement power requirements might be met through a mid-term purchase for the amount having a 50 percent probability of occurring. A final tier of replacement power requirements having a relatively low probability of occurrence might be met through short-term (seasonal) purchases, or the customer could decide to take on more risk in hopes of achieving lower costs, and allow Western to continue its current practice of purchasing hourly or monthly on the spot market (with no guarantee of power availability for any given hour).[9]

Other strategies or portfolio structures may be developed by each of Western's customers to meet their specific needs. Western will aggregate the requests of the customers and attempt to secure the requested terms and levels of purchases. In the future, it may also become more common for utilities and power consumers, including Western and its customers, to use electricity options or futures as a part of their resource portfolios in order to hedge price risk.

Evaluating the amount and term of the desired portfolio of replacement power will depend on estimates of future hydroelectric generation from SLCA/IP. It will also require estimates of the amount and price of power available in the spot market. Energy purchased on the spot

market (either by Western or by individual customers) can be used to displace energy that would otherwise be scheduled from replacement resources. Excess energy from the replacement resource could also be sold on the spot market. Accordingly, the evaluation of any alternative for replacement power must account for energy displacement and sales opportunities in the spot power market.

4.2.2.1 TYPES OF PURCHASES

Replacement power must provide firm energy during on-peak hours when customers most need to schedule their full CROD capacity. Several types of purchase arrangements would fulfill this requirement, including:

- capacity with reserves and associated energy (system purchase);
- capacity and associated energy without reserves (unit purchase);
- capacity with return of any scheduled energy;
- firm on-peak energy; and
- spot market non-firm energy.

Western will structure purchases to economically meet the customers' requests for replacement power. However, under normal circumstances, Western does not intend to limit the types of purchases to be considered. For example, purchasing capacity and energy or capacity only, could be the best option based on economic, operational, and marketing flexibility. By not limiting responses from suppliers to certain purchase types, a wide range of options will be available to choose from under varying conditions.

Typical types of purchases in the current utility market can be categorized in several ways, such as length of time (hourly, daily, weekly, etc.), or according to shape or schedule, such as:

- block - the amount of capacity or firm energy is constant for a fixed period of time, typically for each month or for a season or year;

- shaped - the amount of capacity and energy varies by month according to a schedule provided to the supplier;
- partial requirements - the amount of capacity and energy varies by month based on the requirements remaining after SLCA/IP hydroelectric resources are used to meet customers' CROD and associated energy.

In addition, the Electric Power Research Institute (EPRI) and the Western System Power Pool (WSPP) are recommending that utilities begin using standardized power purchase " products," according to the following categories:

- Four-hour block power
- Monthly on-peak power
- Weekly energy
- Monthly peak flexible energy
- Monthly non-peak flexible energy

These standard categories were only recently developed by WSPP, and are not currently widely used. They are intended to complement, rather than replace, customized purchase transactions which meet special needs of individual utilities.

4.2.2.2 TERM OF PURCHASE

Customers will have the opportunity to commit to an initial purchase of replacement power from Western on a short-term or seasonal basis. Once the replacement resource acquisition process is fully implemented, customers might select from short-term (seasonal), mid-term (one to five years), or long-term (over five years) replacement power. To reduce the burden of administering the Replacement Resources Process, customers will likely be limited to standard commitment terms (for example, one season, three years, five years, or the remaining term of their current contract). Requests by customers will then be matched by term length and aggregated, and the total requirements satisfied through acquisition of replacement power.

The term of the current power sales agreements with the SLCA/IP customers extends through September 30, 2004.

Until a contract extension is arranged, the maximum initial term of a long-term replacement power purchase by Western would be six years (assuming purchases begin October 1, 1998).[10]

4.2.3 SHORT-TERM (SEASONAL) ACQUISITION

According to current contracts, SLCA/IP customers will have the opportunity to request replacement power for the upcoming season twice per year. The maximum amount that can be requested will be limited to the customer's seasonal CROD, less the total available hydroelectric power (" AHP") and previously acquired long-term replacement power from either Western (" WRP") or the customer (" CDP").[11] Western's Purchase Power Policy for short-term purchases will provide a guideline for the solicitation of short-term replacement power.

4.2.3.1 DECISION PROCESS

The evaluation of short-term purchase resources will include (i) consideration of practical resource options that are capable of supplying at least a portion of the seasonal replacement power requirements, and (ii) determination of the least-cost alternatives using a consistent economic evaluation method which considers integration with other resources and the transmission system. Given the relatively short time between the evaluation of the alternatives and the purchase, the evaluation process will consist of a straightforward determination of the least-cost option(s) through an open competitive process.

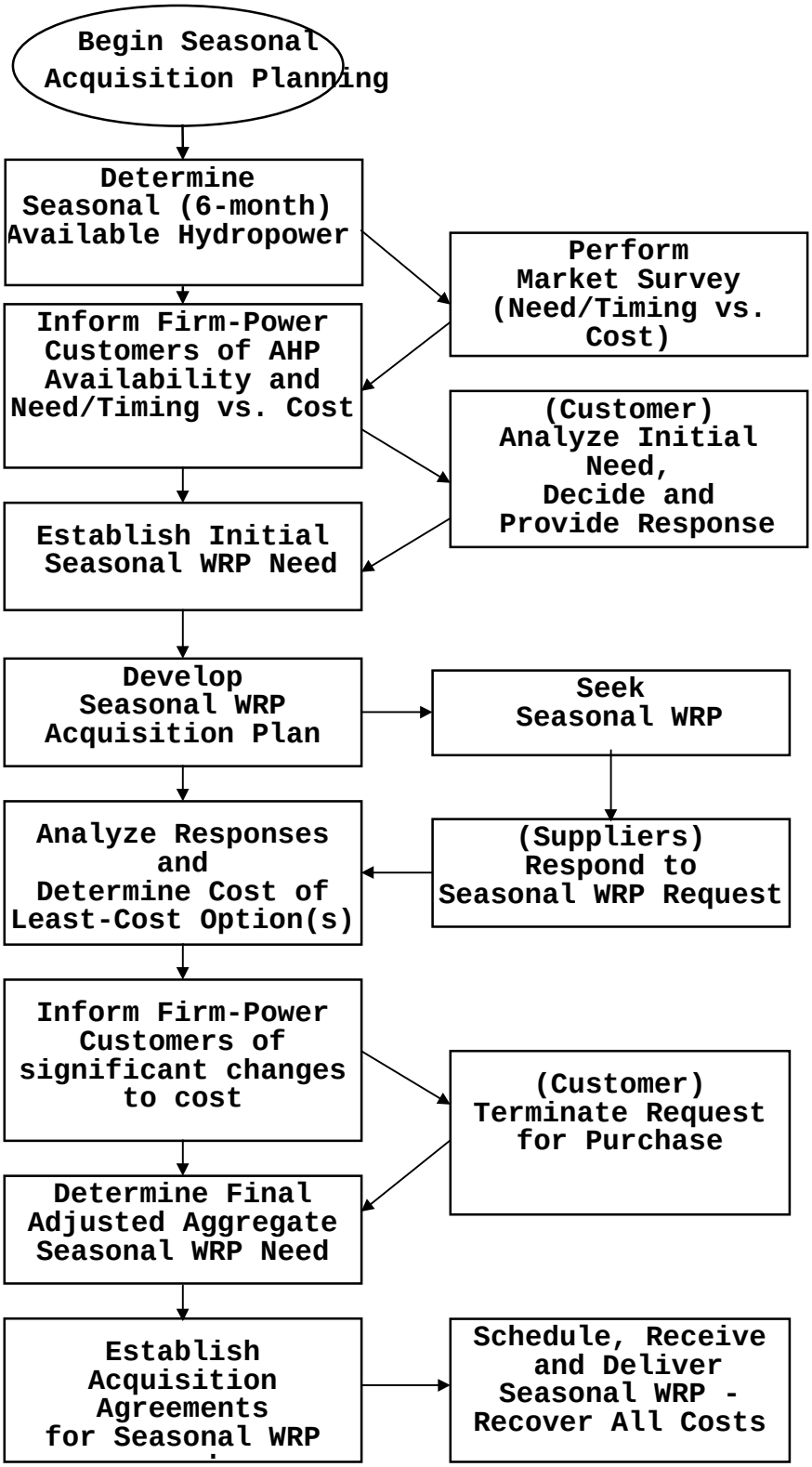
Specific targets in the resource acquisition process have been initially determined through consultation between Western and SLCA/IP customers during implementation of the Amended Contracts. Notice to suppliers of Western's intent to purchase seasonal WRP, and subsequent evaluation and selection of supply offers, must be coordinated with the seasons in the power sales agreements, as well as Western's determination of AHP for the upcoming season. Documentation of the short-term acquisition process will

include, at a minimum, an explanation of the evaluation process and results from the acquisition process.

Figure 4-1 on the following page graphically depicts the expected decision process for short-term (seasonal) WRP acquisitions. The information presented in this figure is a representation of contract provisions from the Contract Amendment.

FIGURE 4-1

SEASONAL WRP DECISION PROCESS



LONG-TERM ACQUISITION

The SLCA/IP firm-power customers will periodically have the opportunity to request that Western purchase long-term replacement power. The frequency of these opportunities will recognize the time and resulting administrative cost of soliciting and evaluating bids. The timing of future customer requests will also reflect the degree to which the maximum requirement for long-term WRP has already been filled by prior commitments.

Long-term WRP as defined in the Contract Amendment corresponds to mid-term and long-term purchases (one to five years, and over five years, respectively) as defined in Western's Purchase Power Policy. The duration of the purchase commitment should provide customers with flexibility, while minimizing the administrative burden for Western. A set of standard length purchases may be set by Western in consultation with the customers, such as one year, three years, five years, and the remaining term of the SLCA/IP power sales agreement. The customer would then be free to request different amounts of replacement power for each of the commitment lengths.[12] As with seasonal WRP, customers will not be allowed to acquire WRP such that the total of AHP, CDP and all WRP will exceed their seasonal CROD.

4.2.4.1 DECISION PROCESS

Western will consult with the customers regarding acceptable price and desired quantities for long-term purchases. This information will then be used to prepare a request for replacement power indicating the approximate amount of power for each commitment period. Western's Purchase Power Policy for mid- and long-term purchases will provide a guideline for this solicitation.

In soliciting and selecting long-term replacement power resources, Western will incorporate its Principles of IRP for resource acquisition.[13] In particular, Western's decision process will include the following:

- consideration of all practical resource options, including renewable and demand-side resources;

- determination of the least-cost alternative(s) using a consistent economic evaluation method, and considering relevant factors affecting the quality of power supply (reliability, risk, etc.); and
- minimization of adverse environmental effects to the extent practicable, based on a qualitative analysis.

Specific targets in the resource acquisition process have been initially determined through consultation between Western and SLCA/IP customers in the Contract Amendment. The key steps in determining time requirements are Western's initial evaluation and ranking of proposals, and the customers' review of Western's information and decision to authorize Western to make the purchase. Estimating the time requirement is difficult without knowing the number of proposals that will be received. For long-term resource acquisitions (i.e., up to 25 years), electric utilities may allow up to four months to evaluate and rank proposals.[14] The time allowed typically varies, however, with the term of the acquisition, with less time being used to evaluate acquisitions of shorter duration. For mid-term acquisitions of five years or less, one month may be a more reasonable target for completion of proposal evaluations.

The typical time allowed for suppliers to respond to an RFP is fairly wide-ranging within common utility practice, reflecting the differences in the information that must be submitted in the proposal. Allowed time responses can range anywhere from 30 days to six months. Given the anticipated requirements for responses to Western's request for replacement power, one month may be a reasonable time allowance for mid-term acquisitions of five years or less, assuming that the request is publicized in advance of its release. For long-term acquisitions of greater than five years, a more reasonable time allowance may be three months. These time allowances should fit well with Western's goal of a one-year time period from giving notice of AHP to customers, to having signed contracts for WRP.

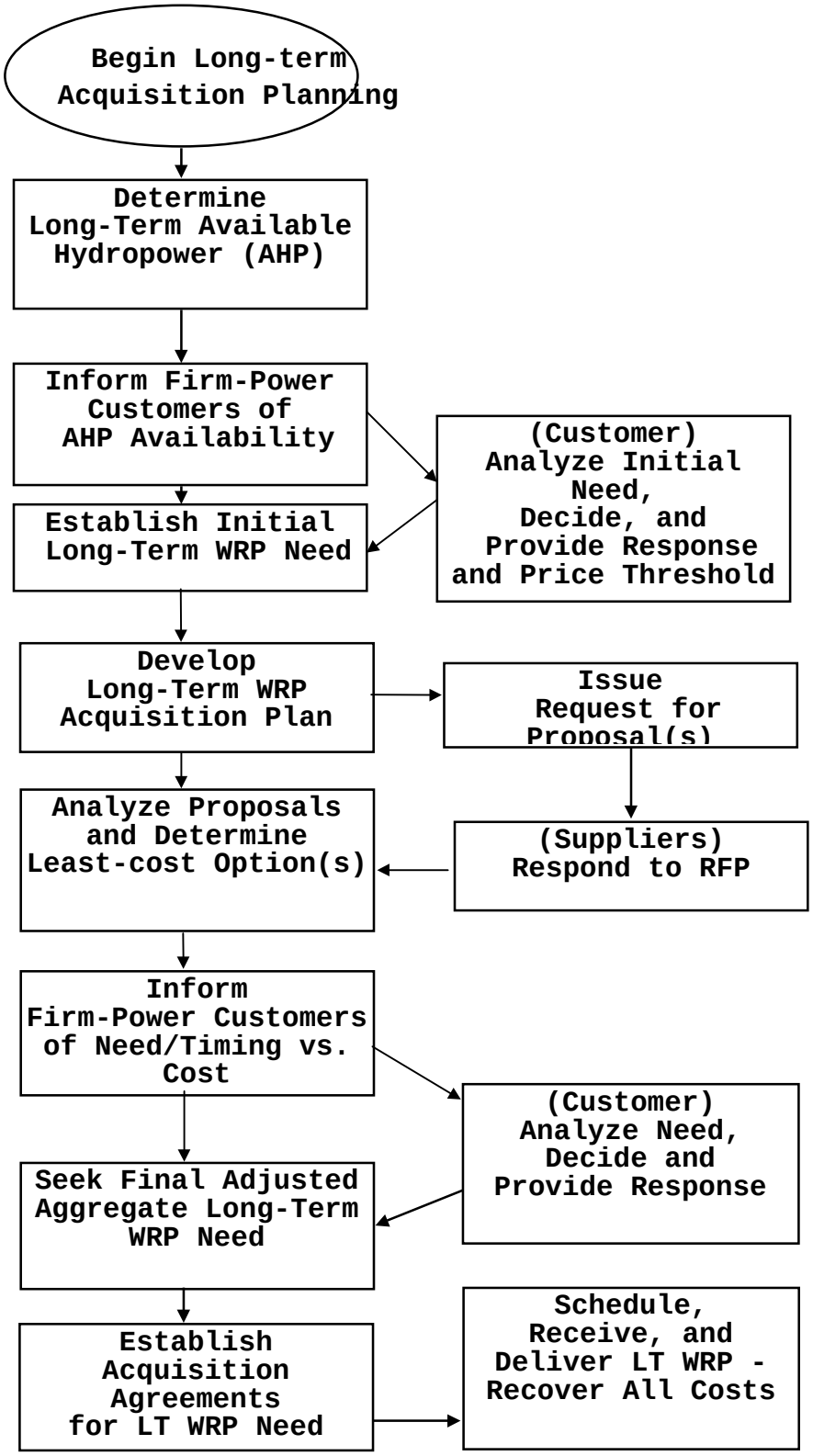
Documentation of the long-term WRP acquisition process will include definition of resource need, solicitation, evaluation results, negotiation, and contract execution. Proprietary information will not be included in the

publicly available documentation. In addition, Western will include participation at appropriate points in the selection process by customers and other interested stakeholders. For mid-term purchases (one to five years), customer participation is expected to be less structured, and may be limited to review of the evaluation and selection of supplier responses. Long-term purchases (more than five years) will include a greater degree of customer involvement and information sharing, including identifying and responding to customer concerns, and reviewing results from the selection process.

Figure 4-2 on the following page graphically depicts the decision process for long-term WRP acquisitions. The information presented in this figure is a representation of contract provisions from the Contract Amendment.

FIGURE 4-2

LONG-TERM WRP DECISION PROCESS



4.2.4.2 PRESENTATION TO CUSTOMERS

Western will present different levels of detail regarding resource evaluation information to the SLCA/IP customers. For short-term purchases, this will include at a minimum, an explanation of the evaluation process and results from the acquisition process.

For long-term purchases, this information will include, at a minimum, (i) the terms of the proposal or power supply offer (except specific confidential information), and (ii) the results of the evaluation of the offers by Western. As described above, the stand-alone analysis of each proposed replacement resource will result in a levelized, per-unit cost based on the screening methodology. For longer-term purchases, those proposals that pass the screening may also undergo a detailed integrated power system analysis. The results of both analyses will be provided for those proposals evaluated under both methodologies.

To the extent that non-cost factors were applied to differentiate among proposals having equal cost, the specific factors utilized and the relative ranking of each proposal with respect to these factors will also accompany the evaluation results. The assumptions used in the screening evaluation, and the key assumptions and data sources used in the integrated analysis, may also be provided. Western will also provide an opportunity for interested customers to review the detailed results in Western's offices.

4.2.4.3 IDENTIFICATION OF INTERNAL OPTIONS

To comply with the intent of its Principles of IRP, Western will consider energy efficiency improvements in SLCA/IP facilities in conjunction with resources proposed in response to Western's request for replacement power.[15] In order to have timely consideration, the identification (i.e., the amount, cost, and timing of energy efficiency improvement) of SLCA/IP's internal resource options may be done separately from the WRP acquisition process. Keeping the two processes independent will ensure the earliest consideration of any energy efficiency options and prevent delay of WRP acquisition process.

The identification process will produce information consistent with that resulting from evaluation of the responses to Western's request for replacement power. This information is presented in detail below (Section 4.3), and would include for each energy efficiency alternative (i) the minimum and maximum amount available in each year and (ii) a levelized cost for each potential acquisition period (e.g., three years, five years, 20 years, etc.).

Since most energy efficiency alternatives have a useful life longer than most of the proposed acquisition periods, the calculation of levelized cost must address the value of the alternative for the period after each acquisition period up through the alternative's useful life. If " acquired" by Western (i.e., Western undertakes the energy efficiency measure or program), the equivalent resource will exist beyond the acquisition period for which customers have committed to purchase the output as WRP. Western would have no assurance that customers will renew their requests for WRP to support the need for the resource beyond the initial acquisition period.

Although it is likely that at least part of the resource would be supported by customer renewals of WRP, or that the equivalent resource could be marketed as firm power outside of the WRP process, the power could be assumed to be sold on the spot market at the estimated average prices available in the last year of each acquisition period based on the time-of-day resource characteristics. This approach is conservative yet reasonable, because it offsets the additional risk created by Western's making a long-term investment in an energy efficiency measure.

4.2.4.4 Preparation of a Request For Replacement Power

The document requesting replacement power (including standard contract terms and conditions) would normally be prepared before Western begins an acquisition cycle. Depending on conditions causing Western's to initiate the acquisition process, the first cycle may be an exception, as the process may need to start while substantial work remains to complete the request. In subsequent cycles, however, a major modification should be completed in

advance, leaving only the entry of specific information, such as amounts and dates, unique to each request.

Western may also issue separate requests for different length acquisitions. For example, one standard request may be developed for long-term acquisitions (more than five years), with another standard request for mid-term acquisitions (one to five years). Having more than one format for a wide range of commitment durations will allow Western to clarify any differences in the information requested, qualifications of the proposal, and contractual terms of the power purchase agreement.

In addition to segmenting the solicitation by intended contract length, the request for long-term replacement power (five years or more) may also be segmented by the amount of power to be supplied. For example, customers may have indicated interest in purchasing 100 MW of WRP for five years. The request may then be structured to solicit proposals to provide power at one or two intermediate levels, such as asking for (i) an amount not to exceed 50 MW, (ii) an amount not to exceed 75 MW, and (iii) an amount not to exceed 100 MW. This segmentation of the bid avoids pricing discontinuities when Western reconciles the total amount of WRP requested by customers with the amounts bid. Segmenting the bid by amount is not as important for mid-term acquisitions (less than five years), since the likely source of supply for such acquisitions would be system purchases, rather than dedicated output from a specific generating unit.

4.2.4.5 INTERACTION WITH CUSTOMERS

Depending on the term of the replacement power solicitation, Western will consult with SLCA/IP customers regarding baseline data, key assumptions and projections, and basic methodology prior to issuing a request, as needed. Incorporating this updated information will refine the proposal, allowing the evaluation process to proceed without major interruptions. Customers will receive Western’s evaluation already understanding the underlying process and, as a result, should be familiar with the methodology used to rank proposals. No amount of advance preparation will eliminate questions regarding specific

results, but these should be straightforward and require minimal additional analysis or effort. More detailed information on the process for issuing requests for replacement power, and interaction with customers as part of this process, is contained in Section 4.5.

4.2.4.6 CONTRACT NEGOTIATION

Western can minimize the time and effort spent in negotiations by preparing standard contracts and attaching them when issuing RFPs. Different contracts may be prepared for short-term versus long-term acquisitions. Proposers would then be required to list any exceptions to Western's standard contract provisions and suggest revised language. This practice is common in the utility industry, and is especially appropriate when time does not allow for extensive negotiations with potential suppliers.

If a proposal selected by Western lists no exceptions, there should be little or no need for negotiation. If a selected proposal lists one or more exceptions, Western will first determine if it can accept the revised language. If not, Western will attempt to negotiate acceptable language. At the same time, Western will identify an alternative proposal that will be selected if negotiations are unsuccessful with the original supplier. If time permits, Western may select a " short-list" of the top two to four proposals and negotiate a " best and final" proposal with each. The final proposals will then be re-evaluated under the same process and criteria used to select the short-list. The negotiation of a " best and final" offer, although time-consuming, may result in more favorable costs or terms than originally proposed by the supplier. For longer-term power purchases, there will be substantial additional effort involved to negotiate the terms of the purchase.

To maintain the acquisition schedule, even in negotiating a " best and final" offer, Western may limit negotiations to a relatively short period. For example for mid-term acquisitions, the negotiation period may be limited to no more than one week and, in the instance of a long-term acquisition, no more than three weeks. After the negotiation period, if acceptable revisions cannot be

reached, Western would reject the proposal and move to an alternative proposal having acceptable terms.

4.2.5 FUTURE CONSIDERATIONS

The power sales agreements between Western and the SLCA/IP customers are neither static nor rigid. At some point in the future, these agreements may be further amended or replaced in a manner that substantially changes the customers' role in selecting replacement resources. If and when customers are not making seasonal and long-term selections of replacement resources and directly responsible for replacement power costs, the emphasis and role for Western with respect to replacement power could change.[16] Western must retain the capability to potentially fulfill a different role in the future acquisition of replacement power.

4.3 RESOURCE EVALUATION

4.3.1 INTRODUCTION

Various criteria, methodologies and techniques for resource evaluation currently in use in the electric utility industry were reviewed as a part of the research for this report. The review covered technical papers and reports on resource evaluation, including several papers published by Lawrence Berkeley Laboratories, and additional reports and papers published by the National Renewable Energy Laboratory, Western, and Argonne National Laboratory. Information on resource evaluation was also obtained from IRPs developed by electric utilities within WSCC. The resource planning tools, techniques and methodologies used in the GCD-EIS and Western's EPM-EIS were also reviewed in detail. Appendix B contains additional background information on the documents reviewed.

This review indicated that there is no single "correct" way to evaluate resources or "best" evaluation criteria or methodology to use for all circumstances. There is a range of commonly used and generally accepted practices, and the resource evaluation concepts in Western's

Principles of IRP are consistent with this range of practices.

Two major areas of divergence within accepted practices are: (i) the manner in which non-cost factors are considered and (ii) the valuation of environmental effects, commonly referred to as " externalities."

Non-cost factors may be treated in one of three ways: they may be simply described for consideration and whatever weight the decision-maker may choose; they may be evaluated and either ranked or categorized (e.g., low impact, high impact, etc.); or they may be evaluated, an ordinal rank or score given, and the resulting " points" summed after first normalizing and weighting the individual factors.[17] No single methodology is predominant in the utility industry.

The second issue, valuation of environmental effects, is interrelated with the first, since it is a specific type of non-cost factor. There are numerous variations of evaluations including externalities, which fall into two general types: cost of control technology, and " damage" function. Control cost involves estimating the cost of adding equipment or re-designing processes to reduce the particular environment effect (e.g., tons of sulfur dioxide emitted). The second type seeks to estimate the costs incurred by the public as the result of " damage" in the form of reduced production and lost economic utility. The valuation entails substantial subjectivity and the resulting estimates of environmental effects varies so widely that no range of values has found widespread use or acceptance.[18]

Consistent with Western's Principles of IRP, the specific resource acquisition evaluation methodologies and techniques chosen for Western's Replacement Resources Process are described below.

4.3.2 EVALUATION CRITERIA

In evaluating replacement resource options, Western anticipates consideration of the characteristics listed below. The degree to which these characteristics will be

explicitly evaluated will be substantially less for short-term acquisitions, and greater for long-term acquisitions.

Quantitative

- Resource reliability (forced outage and scheduled maintenance)
- Influence of resource location on the ability to deliver power (interaction with transmission-related evaluation criteria)
- Transmission availability
- Net cost at various capacity factors (considering on-peak capacity factor, and evaluated as levelized per-unit cost)
- Net cost at expected level of operation after integration into the SLCA/IP system

Qualitative

- Environmental effects
- Environmental risk - cost and availability impacts from present and potential future environmental regulations, permitting and site environmental risk for new facilities
- Technology risk - stage of development, performance and reliability
- New project development risk - completion delay, securing of project financing, financial viability, non-performance risk
- Transmission effects - losses, relieving constraints (i.e., counter-flow)

Qualitative or Quantitative

- Relative fuel price/power price risk
- Power need risk
- Hydrologic risk

4.3.3 EVALUATION METHODOLOGY

Western anticipates using the five steps listed below to evaluate and rank proposals for mid-term and long-term resource acquisitions (one year or more). A procedure similar to steps one and two will likely be used by Western

to rank proposals for short-term seasonal replacement power.

1. Calculate the levelized, per-unit cost as a function of capacity factor during on-peak hours for each proposal.
   a) Credit any power available during off-peak hours (at the positive difference between the estimated incremental spot market price for off-peak energy and the proposed incremental energy cost to Western)
   b) Add the estimated costs that will be incurred by Western for wheeling on other utility systems and transmission facility upgrades or additions
   c) Adjust for transmission losses to the SLCA/IP transmission system
   d) Credit power available either before or after the intended acquisition period.
2. Rank the proposals based on the levelized per-unit cost.
   a) Select proposals based on lowest weighted average cost across the on-peak period
   b) Determine the number selected based on the relative difference in levelized, per-unit cost (using a bandwidth of cost)
3. Based on the rankings determined in Step 2, select the higher ranked proposals and prepare an integrated analysis simulating Western's use of the resources within the SLCA/IP integrated system and WSCC bulk power market for the intended acquisition period.
   a) Compute a range of total SLCA/IP customer costs using a range of estimated SLCA/IP generation at low, average, and high hydroelectric generation levels, based on probability of exceedance (for example, at 15 percent, 50 percent, and 85 percent)
   b) Where applicable, identify the cost to Western associated with transmission constraints,

including upgrade cost (rerun the analysis with the constraint if economically feasible)

c) Calculate the cost impact to all SLCA/IP customers (both those requesting WRP and those who do not)

d) Re-calculate a levelized, per-unit cost including the adjustments in steps 1b and 1d with (" total costs") and without the savings calculated in step 3c (" SLCA/IP costs")

4. Re-rank the proposals based on levelized, per-unit cost to SLCA/IP customers (as in Steps 1 and 2) using the results from Step 3.

   a) Describe the non-cost factors associated with each proposal, including environmental effects, development risks (e.g., permitting, construction delays, financing, etc.), and operational risks (e.g., relative fuel prices, fuel and equipment availability, and need)

5. Combine the proposal amounts to produce a cost curve relating the amount of power available at the lowest cost (using levelized per-unit cost)

   a) These cost curves will illustrate the cost of the replacement power based on the total purchase amount required to satisfy customer authorizations

When proceeding through the five steps above, two levelized, per-unit cost estimates are calculated; one based primarily on the independent (or " stand-alone") costs of the proposal (steps 1 and 2), and the other based on the interaction (or integration) of the proposed resource with the WSCC power grid (steps 3 and 4). Western will need to judge the need to use both of these methodologies, and if both are used, the accuracy of the two methods relative to each other. In general, short-term (seasonal) acquisitions may require only the stand-alone evaluation, while the full five step evaluation would likely be used for long-term replacement resource evaluations.

Ideally, the integrated analysis will yield the most accurate and reliable results, which will be increasingly important for the evaluation of longer-term purchases. When judged to be necessary, Western will perform an integrated analysis which " backcasts" last year's operations, to confirm the accuracy of the integrated analysis model and give increased credibility to analysis results.

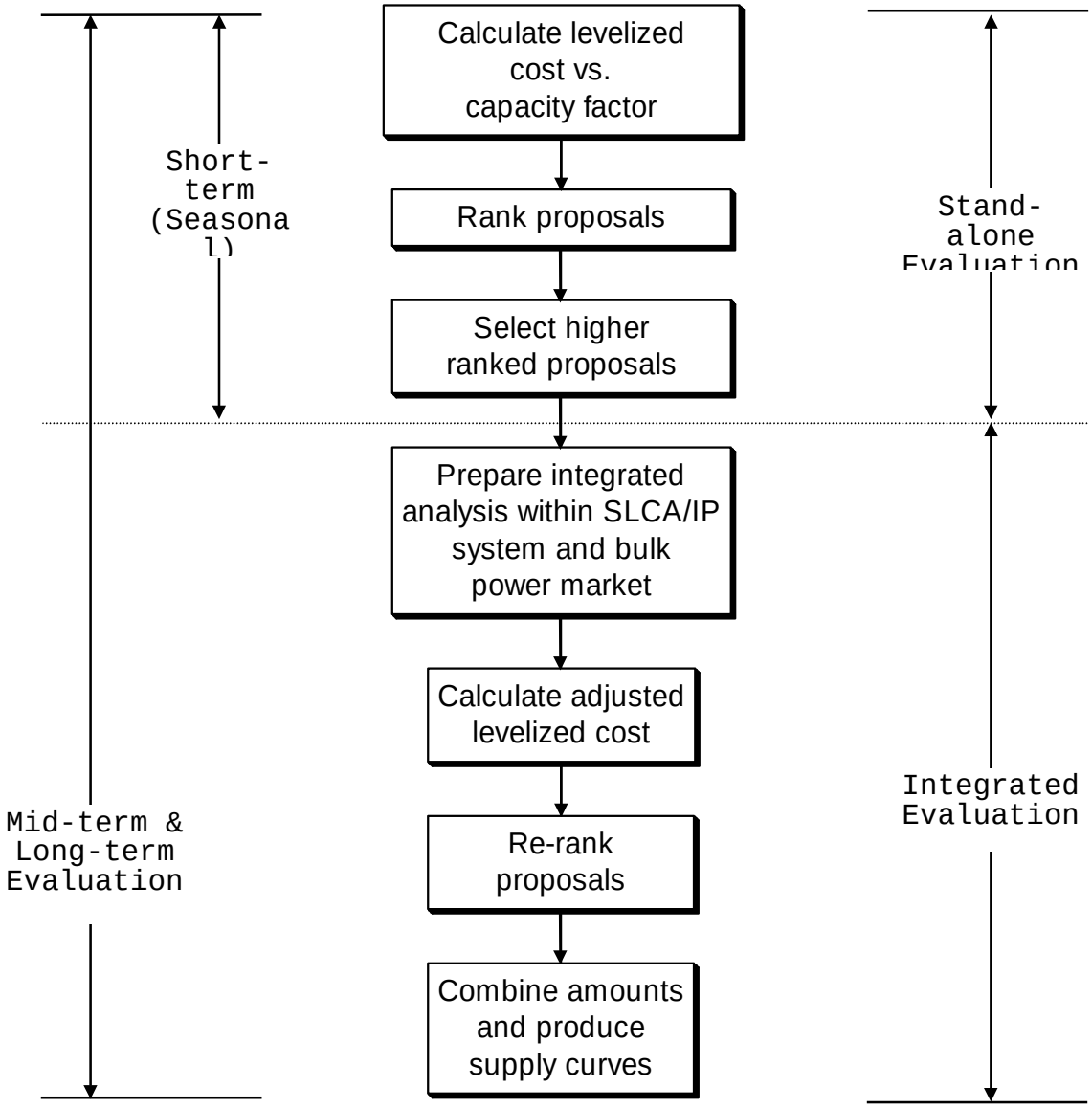
In some cases, proposals may differ significantly in qualitative (non-cost-related) characteristics. Such differences will in some cases be equalized by converting them to qualifications for proposals (e.g., performance bond or acceptable financial guarantee to cover liquidated damages), or the differences will be described and used to distinguish among competing proposals that have a similar levelized, per-unit cost. Proposals with SLCA/IP costs estimated within some tolerance (e.g., 5 percent) of the lowest cost proposal will be determined to be equivalent for analytical purposes.

For acquisitions of more than five years (long-term), steps 1 and 3 above may be modified to include the effects of uncertainty in fuel price and load projections. This could be accomplished using a methodology similar to the methodology which can be used to address uncertainty in SLCA/IP generation (i.e., by using a range of high, medium and low fuel price and load projections).

A flow chart of the resource evaluation methodology above is included in Figure 4-1 on the following page:

FIGURE 4-3

EVALUATION OF PROPOSALS



4.3.4 RESOURCE EVALUATION ASSUMPTIONS

In the context of Western's evaluation, resource screening will serve two purposes. First, it will provide a straightforward calculation of the financial cost of each proposal to Western, through use of a levelized cost analysis. Second, in the case of longer-term acquisitions, it will limit the number of proposals evaluated in detail through an integrated analysis to a manageable number.

Some of the key assumptions in the screening calculation will be:

- the estimated value of surplus power during off-peak hours;
- the estimated value of power before and after the intended acquisition period;
- the discount rate used in levelizing costs; and
- transmission-related cost adjustments (for wheeling power to the SLCA/IP system).

The first two of these can be estimated from Western's recent non-firm energy transactions, published market surveys and indices. The annual pattern of prices and resulting annual costs will likely vary significantly among proposals received by Western, so the discount rate used to levelize the costs calculated for each proposal will be an important analytic parameter. Western will follow the generally accepted utility industry practice of using a utility's cost of funds as its discount rate in evaluating resource options.[19] Cost of funds will also be adjusted for the underlying inflation rate assumed in the projection, to produce a real cost rate estimate. Development of a nominal, as well as real, discount rate will allow comparisons between all potential suppliers regardless of the approach used in their proposal.

Table 4-1 illustrates a composite cost of capital estimate to be used as the discount rate. In this illustration, the resulting cost of capital/discount rate is 7.02 percent.

TABLE 4-1

ESTIMATE OF COMPOSITE COST OF CAPITAL

Composite Cost of Capital:	Percent of SLCA/IP Contractors	Cost of Funds	Weighted Cost of Funds
Long-Term Debt:			
Taxable --			
Equivalent AA-rated	5.0%	0.0750	0.0038
Equivalent A-rated	10.0%	0.0790	0.0079
Tax-exempt --			
Equivalent AA-rated	25.0%	0.0590	0.0148
Equivalent A-rated	50.0%	0.0610	0.0305
Equity:			
Equivalent to common stock	3.0%	0.1150	0.0035
Consumer borrowing rate	7.0%	0.1400	0.0098
Other:	0.0%		
Total	**100.0%**		**0.0702**

4.3.4.1 TREATMENT OF CAPACITY

Due in part to the interim operating agreement, Western previously relied largely on non-firm energy purchases (rather than capacity with energy purchases) to meet SLCA/IP on-peak load during interim operations.[20] However, with the newly implemented GCD operating criteria, Western may need to rely more heavily on firm purchases that provide a guarantee of on-peak deliveries. The maximum rate of delivery during on-peak hours will be an important part of the offers to supply replacement power, as will the "capacity" cost for each kilowatt of maximum on-peak capacity delivered. The specific characteristics of the purchase offers may also vary with respect to reliability and the provision of reserves.

During resource screening, differences between proposals regarding reliability can be treated either by describing the differences, or by equalizing costs with additional assumptions. In the absence of similar operating procedures, the latter approach would be necessary to ensure that adequate reliability could be obtained from all

proposals. Cost differences caused by the availability of on-peak power could be equalized by applying an estimated curtailment, or interruption, rate for the purchase during periods when purchases from the on-peak energy spot market would be required. Since the on-peak energy price should be greater than the incremental energy price contained in the proposal, less reliable purchases will be penalized accordingly. As long as Western retains the ability to operate GCD up to maximum output during emergency conditions, adjustments may not be required for additional backup capacity or reserves for less reliable purchases.

4.3.5 COST OF REPLACEMENT POWER

The evaluation process described above looks at the net costs of Western's replacement resource alternatives on both a stand-alone basis (steps 1 and 2) and an integrated basis (step 3, 4, and 5). Integrated analysis means integration of the replacement resource into the interconnected power system in which the SLCA/IP and their customers operate.

The stand-alone analysis uses the costs in the supplier's proposal to determine the net costs. However, even in the stand-alone analysis, adjustments need to be made for transmission costs incurred by Western in delivering the power to the SLCA/IP system, and also for the value of power received off-peak, or before or after the intended acquisition period. However, for the stand-alone analysis, these adjustments will be based on estimates rather than a detailed analysis of Western's operation of the proposed resource.

In contrast, the integrated analysis will be performed on an integrated basis, providing a direct estimate of the financial effects on Western's SLCA/IP customers. Further, by including the interaction of the major regional utility systems within the SLCA/IP marketing area, Western will be able to accurately simulate the operation of the replacement resource as it would actually be used. The simulation will accurately project the replacement resource utilization level (capacity factor) based on the principles of economic dispatch. This methodology is representative

of the true operation of the interconnected power system, and may result in spot-market energy purchases displacing replacement resource energy at certain times, and replacement resource energy being sold on the spot-market at other times, which can significantly affect the true cost of the replacement resource.

4.3.5.1 Cost Pass-Through

Western will recover the cost of each replacement resource by passing it through to SLCA/IP customers. Based on the Contract Amendment, costs associated with each separate long-term WRP purchase will be accounted for in a specific cost pool, and will be recovered only from the SLCA/IP customers purchasing this power in proportion to their commitment level. The total pool costs would be reduced for any revenues derived from Western's sales of surplus replacement power to those not in the pool.

Sales of surplus replacement power will be made at market conditions, and revenues will accrue whenever the price received by Western is greater than the incremental price to Western of replacement power from the supplier.[21] At times, Western may also use surplus generation from replacement resources to avoid or reduce their spot-market purchases when SLCA/IP is energy deficit (when hydroelectric energy for a month or season is less than average firm load), and credit the avoided purchase cost to the appropriate cost pool.

Dividing the net costs in a particular cost pool by the amount of replacement power scheduled by customers in that pool will produce a per-unit cost that represents the average rate for the replacement power. This WRP pass-through rate for a specific cost pool could be higher or lower than the base SLCA/IP firm-power rate, and will have no relation to it.

The estimated WRP pass-through rate does not represent the total actual cost to SLCA/IP customers, however, because it does not account for the actual scheduling of the replacement power alternative. For example, two replacement resource alternatives may have the same estimated pass-through rate at a certain on-peak capacity

factor, but one of the two may have a higher fixed charge and lower incremental energy rate than the other, which would likely cause it to be scheduled differently, resulting in different actual costs.[22] The cost effect of the interaction of the replacement power alternative with SLCA/IP customers' resources and spot market energy options may be substantial, but will not be part of Western's pass-through rate.

4.3.5.2 SLCA/IP Base Firm-Power Rate Effects

As explained above, because the costs for replacement power resources will be passed through to the SLCA/IP customers in proportion to their share of replacement power, there will be no direct effect on the base SLCA/IP wholesale firm-power rate. However, Western's firm-power rate could be indirectly affected by replacement power transactions. The rate would decrease if surplus energy from a replacement resource can be used economically to firm SLCA/IP resources, thereby reducing spot-market purchases. Conversely, WRP could cause the firm-power rate to increase in certain circumstances because of transmission-related effects.

WRP could affect transmission costs in several ways, including:

- cost-effective additions or upgrades to the SLCA/IP transmission system to accommodate replacement power acquisitions;
- foregone revenues from third-party transmission service due to use of available transmission capacity on the SLCA/IP system for WRP; and
- increased transmission system losses.

These potential adverse effects are case-specific and cannot be estimated in advance of evaluating specific proposals for WRP. However, these effects will be quantified during Western's evaluations of specific resources using the transmission analysis methods discussed below.

4.3.6 TRANSMISSION ANALYSIS

In evaluating longer-term replacement resources, Western will use transmission power flow analysis in cases where replacement resources are identified to significantly affect key transmission paths. Transmission analysis can be used:

- to determine the effect of WRP resources on Western's transmission system;
- to identify transmission system modifications that would be cost-effective with respect to a particular resource, and if modifications are selected;
- to examine the operation of replacement power alternatives.

In addition, potential wheeling arrangements with other entities could be examined instead of modifications to Western's transmission system if this is a more cost-effective method of transmitting WRP.

Transmission analysis results may also be used to develop evaluation criteria for screening and ranking potential replacement resources. For example, adjustments to life-cycle costs or net present value can be made to include the positive or negative impacts of the replacement resource on the transmission system capability, system dispatch, and non-firm energy marketing capability. In addition, certain transmission-related information (e.g., losses and line capacity) can be used directly in modeling resource options.

4.3.6.1 TRANSMISSION EVALUATION METHODS

The transmission planning reliability criteria Western will use in its transmission evaluation of replacement resource alternatives is outlined in Western's recent FERC 715 filing.[23] A general outline of the process Western may use for transmission evaluation of replacement power alternatives includes the following:

Step 1: Model and evaluate Western's existing system under peak load conditions and selected other load

levels that are known to potentially limit optimal generation dispatch or non-firm energy transactions

Step 2: Investigate modifications and estimate the cost to increase transfer capability associated with each limit and the economic impact of non-optimal generation dispatch

Step 3: Develop specific evaluation criteria related to the transmission system to use in the resource screening process, and identify transmission characteristics to use in modeling resource options

Step 4: Reevaluate the transmission system with selected resources (as necessary)

The first step involves a detailed evaluation of Western's existing transmission system using system operating data and load flow analysis, similar to analyses Western has conducted in the past. From this analysis, the existing line and transformer loadings for various resource scenarios are determined, identifying capability and constraints on the transmission system. The analysis also determines areas that would benefit by the addition of local generation to relieve constraints.

Based on the results of the first step, a cost estimate for increasing the transfer capability of the transmission system is prepared in the second step. In addition, the economic impact of less-than-optimal generation dispatch due to limitations on the transmission system is identified. This will identify opportunities for cost-effective additions or upgrades to the transmission system, irrespective of the effects of Western's acquiring replacement power.

In the third step, the results from the evaluation of the existing system can be used to develop evaluation criteria to use in screening or ranking replacement resources. As a result, replacement resources that may otherwise have been eliminated due to economics or other reasons, may be selected because of the positive impact on the transmission system.

The production cost modeling used to evaluate the resource alternatives included some consideration of the

transmission system capability between load centers, losses, and the ability to market non-firm transactions. To expand upon the base set of transmission constraints identified in the initial resource modeling, the transmission system can be re-evaluated with each selected replacement power alternative (or combination of alternatives) in the fourth step. This re-evaluation process will provide both a methodology to review the transmission system capability with the selected replacement resources and an opportunity to refine the cost estimates of the transmission enhancements identified.

4.3.6.2 SCREENING CRITERIA

Although transmission-related resource evaluation criteria will need to be tailored to the specific situation and the results of the transmission analysis and investigations, the following list provides examples of the type of screening criteria which may be developed:

- Resource " transmitability"
- Resource location relative to existing transmission constraints
- Resource potential to improve transmission system transfer capability
- Resource ability to respond to fluctuations in load (flexibility)
- Resource potential to improve transmission system stability
- Estimated cost for transmission system enhancements required for replacement resource
- Estimated economic impact on non-firm transactions from replacement resource
- Estimated wheeling cost and 3rd party requirements to transmit power from replacement resource

The detailed evaluation of Western's transmission system will require the use of sophisticated analytical tools as described below.

4.3.6.3 POWER FLOW ANALYSIS

In power flow analysis, transmission system capability is evaluated with a power flow model representing one snapshot in time, usually at either seasonal peak (heavy) or off-peak (light) load levels. Since Western is located in the WSCC region, appropriate power flow case(s) can be selected from the WSCC data-bank, from which Western can develop its own case, or a previously developed case can be used. The WSCC data-bank consists of various cases with load levels ranging from off-peak load to peak load. These cases are developed for selected years and seasons with input from electric systems in the region with generation dispatch and system configuration adjusted to match the season and load condition. By modifying control area loads and generation dispatch, additional cases can be created to study the feasibility of altering generation or transfer levels between control areas.

The heavy-load summer cases will likely be among those chosen, since the region is generally summer peaking. A heavy-load winter case may also be selected in order to address selected regional issues. Once the WSCC cases are selected, Western may also need to incorporate additional regional detail not included in the WSCC case model.

Western can perform the load flow analysis using any power flow analysis program capable of handling over 5,000 buses. The three most commonly used programs are WSCC, Power Technologies' PSS/E or General Electric's EPC program, any of which capable of interchanging data compatible with the other programs.

To examine the region near GCD, Western may select cases illustrating issues created by acquiring replacement power resources. These issues include:

- reduced availability of GCD generation;
- impacts on existing contractual wheeling and/or displacement obligations such as the SRP Exchange Agreement;
- the desirability of selling surplus replacement power in the highest priced regional markets; and

- the ability to deliver replacement power to SLCA/IP customers under both low and high water conditions.

Western would begin the power flow analysis by using selected case(s) to evaluate the existing system under various single and selected multiple contingency conditions.[24] The baseline power flow analysis will be used as the reference case to evaluate other alternatives. From this case, Western can benchmark line and transformer loadings, bus voltage levels, losses, area interchange flows, etc. Western can also estimate the cost of potential transmission additions and enhancements, using Western's standard engineering practices for cost estimating, that would be required to locate new generation in areas with limited transmission capability.

4.4 ANALYTICAL TOOLS

Several analytic tools will be required for evaluating replacement power alternatives, including (i) a hydroelectric simulation model for projecting power availability from the SLCA/IP hydroelectric facilities, (ii) a spreadsheet for screening resource alternatives, (iii) a production cost simulation model for integrated analysis, and (iv) spreadsheet and database models for pre- and post-processing of data. In selecting analytical tools, Western balanced several key goals:

- Accuracy and technical viability
- Implementation and future upgrade costs
- Availability of technical support for the model
- Understanding and acceptance by SLCA/IP customers
- Flexibility (including limited need for reliance on confidential data)
- Complexity and ease of use

Details of the analytic modeling tools selected for use in replacement resource evaluations are reviewed below.[25]

4.4.1 SLCA/IP HYDROELECTRIC GENERATION MODELING

Western has relied on Reclamation, through its use of the Colorado River Simulation System (" CRSS") model, for

simulating and projecting monthly SLCA/IP hydroelectric generation. This model projects monthly water releases at SLCA/IP (and other Colorado River system) plants, reservoir elevations, hydroelectric energy, and hydroelectric capacity, as well as other system information. Alternatives to CRSS are currently limited. Reclamation is supporting the development of PRYSM, which may offer an alternative when completed and tested.

While Western will continue to monitor the availability of hydroelectric modeling options, use of the CRSS model is satisfactory. The results have been widely used and generally accepted for a number of years. Reclamation has in the past provided technical support and limited enhancements of the model to reflect changes in Colorado River operating restrictions.

The use of the water scheduling model, WATERWAY,™ was also considered, but its use was not considered appropriate.[26] This model would have to be used in conjunction with, rather than a replacement of, CRSS.

4.4.2 SPOT-MARKET TRANSACTIONS

With or without the long-term acquisition of replacement power, the SLCA/IP will have to purchase and sell power in the spot energy market. Estimating the price and the location of these spot energy transactions is a significant part of the effort of evaluating purchased power costs for the SLCA/IP. In evaluating replacement resource acquisitions, the need to estimate the economic effects of this interaction with the spot market is equally important.

Several strategies could be used to evaluate these interactions. The simplest is to use historical prices paid and received for spot energy transactions during on-peak and off-peak periods to estimate with a spreadsheet the number of hours that a replacement power alternative will be scheduled. Based on this estimate, the net purchased power cost of the alternative could also be derived. While this methodology is straightforward, it fails to capture several important factors affecting actual power costs, including:

- hour-to-hour price variations;
- changes in spot energy prices with the level of transactions;
- the effect of transmission constraints; and
- the influence of changing load and resource conditions.

Perhaps most important, such a methodology becomes increasingly inaccurate in predicting future spot-market conditions beyond the following season or year, as loads and resource costs change.

4.4.3 MODELING APPROACH

Several modeling approaches were considered for evaluating replacement power alternatives. These ranged from production cost models, to capacity expansion models based on linear or dynamic programming. Use of a spreadsheet to calculate levelized-costs was also considered as a simplified modeling approach. Each of the modeling approaches offers relative advantages and disadvantages with respect to time and personnel requirements, likely accuracy, flexibility, satisfying management concerns and the ability to comply with the requirements of Western's Principles of IRP.[27]

4.4.3.1 CAPACITY EXPANSION MODELS

Capacity expansion models considered were:

- EGEAS, developed and marketed by Stone & Webster;
- PROVIEW, developed and marketed by Energy Management Associates/EDS;
- UPLAN, developed and marketed by Lotus Consulting Group;
- MAPS, developed and marketed by General Electric (" GE"); and
- PACE, developed by Argonne National Laboratories.

4.4.3.2 PRODUCTION COST SIMULATION

To capture the complex interaction of spot energy transactions and prices over a longer period, a production cost simulation model can be used. Models of this type use hourly load information, available resources, and the operating costs of resources at various loading levels. As the name implies, this type of model estimates production costs by simulating the actual economic dispatch of resources performed by utilities.

A production cost model can evaluate the operation of a single electric system as a single area, a single electric system divided into multiple areas, or a group of electric systems divided into multiple areas. When simulating the operation of a single area interconnected electric system, a production cost model typically represents the transactions available through the interconnections with other electric systems as potential purchase and sales for spot energy transactions and as emergency generation for reliability effects. The problem with representation of a single area is that it is not significantly more accurate than the use of a simple spreadsheet model.[28]

The multi-area representation of a single system accounts for internal transmission constraints and location-dependent pricing. It cannot, however, represent the effect of external transmission constraints or the dynamic effects of load and resources on spot energy transactions. To consider these last effects, a production cost model must represent multiple electric systems divided among multiple load/resource areas (also referred to as “ transmission” areas).

A production cost model may also be integrated with other computer software to provide a generation planning or integrated resource planning model that develops a least-cost plan for future resource development. Capacity expansion models develop and test alternative plans on an iterative basis to satisfy user-defined constraints regarding system reliability and the type and availability of resource alternatives. The production cost module is then used to estimate the operational costs of each plan.[29]

4.4.3.3 PREFERRED APPROACH

The preferred modeling approach identified in this report is use of a spreadsheet model for resource screening and a production cost model for integrated analysis. This approach was chosen for several reasons, as reviewed below.

Replacement power decisions will be performed sequentially to satisfy specific, current requests. Western will not be performing a long-term capacity expansion planning function as a part of the Replacement Resources Process, either for the SLCA/IP or for its customers. Accordingly, there is no need to balance current resource decisions with the effects of potential future resource acquisitions for the SLCA/IP through use of a capacity expansion model.[30]

The economic dispatch modules of capacity expansion models are inferior in representing resource operation (especially the more complex characteristics of hydroelectric resources, such as limits on up-ramp and down-ramp rates, which are critical to GCD operation), impacts due to resource location, and transmission constraints. Since the GCP Act emphasizes evaluation of transmission requirements associated with replacement power, the ability to integrate the modeling of replacement power alternatives within the SLCA/IP transmission system was considered an important feature for selecting a model.

Using a capacity expansion model would entail either receiving detailed resource planning and capacity expansion information from each major SLCA/IP customer individually, or applying generic capacity expansion assumptions. The first option would be time consuming and might raise confidentiality concerns, while the second option would raise concerns regarding the likely inconsistency of the resulting resource plans with those developed by individual SLCA/IP customers.

Based on the foregoing considerations, it was judged that a capacity expansion model would be more costly to maintain, would not address certain issues associated with replacement power acquisition, and would not improve the resulting selection of the least-cost replacement power alternatives.

At the other extreme, use of a spreadsheet “ screening” model by itself was judged to be too simplistic. Resource interaction, transmission constraints, and economic dispatch cannot be accurately simulated with a spreadsheet model. In addition, as discussed above, Western’s ranking of the replacement power alternatives must accurately account for spot energy transactions and transmission constraints that will affect the net price paid for replacement power, which cannot be accomplished accurately with a spreadsheet model. Given the potential financial magnitude of the purchase (as much as $20 million annually), use of a simplified and less accurate approach was not judged to be appropriate.

4.4.3.4 PRODUCTION COST OPTIONS

The MAPS (Multiple Area Production Simulation) model was reviewed and considered for use in the production cost modeling,. The review indicated, however, that the capabilities of the model with respect to hydroelectric generation are limited, and probably inappropriate for evaluating the SLCA/IP system. The model developer, General Electric, is reportedly looking into improving MAPS’ hydroelectric generation modeling capability. General Electric is also in the process of updating the MAPS data set of the WSCC system to 1995. Currently, the WSCC has several task forces looking into the modeling capabilities of MAPS. Their findings will provide additional information.

The Transmission Oriented Production Simulation (TOPS) model is a production cost modeling program under development by Power Technologies, Inc. (PTI). TOPS will be a production cost modeling program that also includes transmission system modeling capabilities, making it similar in concept to the GE MAPS program. Western and several other utilities are funding development of TOPS, and will have licenses to use the program when it is completed. Since the model is under development, and Western has a confidentiality agreement with PTI during the development phase, details of the program’s features and capabilities are not yet available. Western is currently evaluating a beta version of TOPS.

4.4.3.5 MULTISYM™

The production cost model, MULTISYM, was selected for performing the integrated analysis of replacement power alternatives because it offered several advantages, as follows:

- Western's CRSP Customer Service Center in Salt Lake City has already licensed the software and received training on its use. This greatly reduces the time and cost in implementing the model compared with a new software package.
- The model provides the key features important for the production cost modeling to be undertaken. It can be used to model a single system as a single area, a single system with multiple areas, and multiple systems with multiple areas. The first two configurations can be modeled with the PROSYM model version. The third configuration requires the MULTISYM version.
- The program is developed, marketed commercially, and supported by a third-party, The Simulation Group/Henwood Energy. This reduces time requirements and increases the likely understanding and acceptance of the model by SLCA/IP customers.

An additional description of PROSYM/MULTISYM model is provided in Appendix B

4.4.4 MODELING TOPOLOGY

A production cost model allows grouping of load and resources into separate areas, referred to in MULTISYM as " transmission" areas. Transmission areas may have load, resources, or both, and may be linked to one another with transmission links. While MULTISYM has the capability to model numerous transmission areas and links, it is not feasible even in MULTISYM to represent every electric system in the WSCC individually. Accordingly, the largest SLCA/IP customers can be represented, along with non-customers having major effect on spot energy transactions. Small SLCA/IP customers will be aggregated with larger

customers or with one another by sub-region to preserve the load profile information of these utilities.

Those electric systems farthest from the SLCA/IP and its customers in terms of geography and spot-market effects will not be included directly. Instead, the limited effects of these other systems can be represented by potential purchases and sales, the characteristics of which are estimated from historical data. More detailed information on the modeling topology developed for the proof-of-concept evaluations is included in Section 5.

4.5 REQUEST FOR REPLACEMENT POWER

Current practices of some regional utilities in developing formal requests for proposals (RFPs) for power supply resources were reviewed as a part of the research for this report.[31] Requests for replacement power issued by Western for mid-term and long-term replacement resource acquisition will present three areas of information:

- relevant background;
- the process, including estimates and assumptions which will be used to evaluate and rank proposals; and
- the information and document requirements for proposals.

4.5.1 BACKGROUND

For longer-term purchases, Western's request for replacement power will summarize the GCP Act and the replacement power process. It will contain basic system descriptions, including a physical description of the hydrology and generation limitations of SLCA/IP plants and available transmission system capacity. Also included will be SLCA/IP's hourly firm load for the most recent year, and historical information on monthly, on-peak and off-peak SLCA/IP generation, purchases, and sales. This information, coupled with the description of the evaluation process, will allow entities to define and refine the type of purchase (e.g., the level of a minimum take requirement) being proposed without individually contacting Western.

To the extent that a significant change is expected in the physical description of the SLCA/IP system (such as a change in an operational limitation at GCD), the expected effect of the change on the background information would be provided. Finally, the request will briefly describe the evaluation process, including the data and analytical steps to be used in the evaluation and subsequent ranking, the factors to be considered in the cost evaluation, and how non-cost factors may be used in breaking ties between proposals ranked equal based on costs.

4.5.2 QUALIFICATION OF SUPPLIERS

For short-term (seasonal) purchases, qualifications of suppliers can be less restrictive and given somewhat less weight in the overall evaluation process. The majority of power supply offers will likely be received from large electric utility systems and power marketers, for which meeting standard qualifications will not generally be an issue.

For mid-term and long-term purchases, standard qualifications (which can become exclusionary) and information relevant to the general qualifications of the entity making the proposal will be developed. The majority of proposals will probably be received from large electric utility systems and power marketers, for which meeting standard qualifications will not generally be an issue. However, even with the length of the initial purchase term limited to five or six years, Western could also receive proposals from entities planning development of “merchant” generating plants and other speculative arrangements. Accordingly, Western will develop its qualifications to anticipate proposals from a wide range of respondents.

4.5.3 DATA REQUIREMENTS

The data to be supplied with a proposal will vary with the length of the proposed acquisition period; the longer the acquisition, the greater the data. Table 4-2 and Table 4-3 below summarize general data requirements for suppliers responding to requests for supply of mid-term and long-term

WRP, respectively. Western will judge the appropriate level of detail needed for individual requests, and the requirements will be refined further to correspond with specific requests.

TABLE 4-2

Suggested Contents for Mid-Term Requests for Power	
Description of Proposer	Name, address, legal description of entity
Description of Proposed Sale	Capacity, scheduling restriction/requirements, term, points(s) of delivery conditions on term extension or cancellation
Type of Sale	Energy only, capacity with reserves, unit contingent
Pricing Terms	Basic rates and charges, escalation factors, adjustment factors, penalties for failure to deliver, rates/escalation for term extension
Source(s) of Power	Units or systems serving as primary supply
Transmission Agreements	Third-party service, team, curtailment provisions.

TABLE 4-3

Suggested Contents for Long-Term Requests for Power	
Description of Proposer	Name, address, legal description of entity
Description of Proposed Sale	Capacity, scheduling restriction/requirements, term, points(s) of delivery conditions on term extension or cancellation
Type of Sale	Energy, capacity with reserves, unit contingent
Pricing Terms	Basic rates and charges, escalation factors, adjustment factors, penalties for failure to deliver, rates/escalation for term extension
Source(s) of Power	Units or systems serving as primary supply
Transmission Agreements	Third-party service, team, curtailment provisions, upgrade/additions required
Financial Security	Type of arrangement, credit references, financial statement
If power from specific unit(s): **Description of Units**	Capacity; type; design or major systems; year constructed; outage history; projected scheduled maintenance, additions
Ownership	Owner and lessee (if any) of capacity entitlement supporting the sale; other unit owners and amount owned
Site Description	Current ownership and easements and planned changes
Regulatory	Current permits and licenses, plans for new/extension of permits/licenses, required regulatory approvals for sale
Environmental	Water supply and discharge rates, air emissions rates, description of pollution control systems and monitors, environmental restrictions on operations (if any)
Management	Operator, membership and voting of operating committee
If power from unit(s) not yet in operation:	
Status of financing	Current creditors/mortgage holders, planned re-financings debt/equity ratio
Status of design and construction	Unit architect/engineer; prime contractor; type of development; all milestones reached and

	planned for permits, design, construction, and commissioning; contractor/developer warranties on unit performance or commissioning date (if any)

4.6 TREATMENT OF RISK

Western will commit to purchase replacement power only in the amounts and under the terms that have been authorized in advance by SLCA/IP customers. Financial risks will be assumed by those customers purchasing replacement power, as Western cannot guarantee the availability of replacement power or its price. Western also cannot guarantee delivery of WRP at times when the sum of AHP and WRP exceeds the customer's CROD (unless transmission service is available and arranged for separately). Although the customers purchasing WRP will assume the financial risks of the WRP, Western is in the best position to describe the relative risks associated with each WRP proposal as it prepares its evaluation and ranking of WRP alternatives.

4.6.1 CONSULTATION WITH CUSTOMERS

Western will consult with customers in advance of issuing a request for replacement power to discuss the treatment of risk for a particular mid-term or long-term replacement resource solicitation. This consultation will occur prior to issuing the request so that potential suppliers will be aware of how risks will be treated before preparing a proposal. The alternative, negotiating changes to terms after proposals have already been submitted, is unacceptable. Principal areas of risks are reviewed below.

4.6.2 HYDROLOGY RISK

The amount of WRP needed to fill the resource deficiency between a customer's CROD and AHP will vary with water conditions, especially the monthly quantities released at GCD. If a customer purchases long-term WRP based on AHP at average water conditions, the customer will have monthly surplus power above its CROD about half of the time on average. Western may or may not have transmission capacity to deliver the WRP above CROD to the customer. Even if

deliverable, WRP above CROD will essentially be a seasonal firm resource, not a long-term firm resource. Therefore, at the margin, WRP that exceeds CROD will generally be less valuable than the portion of WRP used to meet CROD. It will be up to each customer to determine the level of WRP at which the combination of price and frequency of surplus decreases the overall value of the purchase.

As described previously, one way customers may mitigate this risk is by requesting a portfolio of WRP with varying amounts and terms. Long-term WRP could fill only a portion of a customer's total WRP need. Short-term seasonal WRP could be used to fill the balance of WRP requirements, which could be requested after customers have better current information on AHP levels. Committing less than the full projected SLCA/IP resource deficit to long-term WRP may also provide some customers with the additional benefit of a hedge against the risk of their load falling below projected levels.

4.6.3 FUEL AND ENERGY PRICE RISK

Fuel price is central to the risk analysis and risk mitigation associated with resource alternatives. Risk is affected by the pricing terms of the purchase relative to the prices of other resources and, especially, the spot energy market. This risk is either totally absorbed by the seller, shared between the seller and the purchaser, or absorbed by the purchaser.

Contractually, balancing risk between buyer and seller is accomplished by adjusting the purchase price based on the fuel price(s) paid by the seller, a price index based on or related to fuel price, or the per-unit energy cost experienced by the seller at one or more generating facilities. The purchaser may want to avoid any fuel price risk since the seller may not have the financial resources to absorb all the risk of adverse fuel prices. In such instances, the purchaser may insist that the price risk be shifted further back the production chain to the fuel supplier/producer, assuming that other fuel sources can be found if the supplier/producer is rendered insolvent. Of

course, shifting the risk away from the purchaser will cause an increase in cost to the purchaser.

One approach to mitigating price risk is to adjust the purchase price based on indices that follow the value of power to customers. Such indices include the following:

- Inflation - risk protection: poor
- Fuel prices, general - risk protection: fair
- Natural gas prices - risk protection: fair-good
- Electric futures prices - risk protection: good

The proposed evaluation methodology does not incorporate price risk as a cost factor in ranking proposals. Accordingly, to the extent that customers want to limit their price risk, Western recommends that potential suppliers be required to adjust future purchase price levels based on either natural gas prices or electric futures prices, as measured at an appropriate location.

Another risk for any utility system is having resources that exceed their market, or "competitive", value.[32] Price risk is not avoided by having a resource that costs a constant $50 per MWh if the market price for power similar to that derived from the resource falls to $35 per MWh in the bulk power market. Indexing purchase prices to the GNP deflator does nothing to guard against this risk.

If a purchaser wants to avoid or limit risk with regard to purchase price, there are two options: (i) the purchase price can be tied directly or through an index to spot market power prices or to average wholesale prices or (ii) the purchase price can be determined to be so low compared with projections of future bulk power prices as to have little inherent price risk.

Western will allow proposers to address how fuel price and energy price risk would be apportioned between the purchaser (the customers) and the seller. In fully describing the pricing terms and conditions of each proposal, Western can apprise customers of the relative risk inherent in each proposal. Customers can best decide what is acceptable given the proposed prices and other relevant terms of each proposal. Western will support

SLCA/IP customers in evaluating their fuel and energy price risks by providing projections of spot energy prices under various scenarios, subject to the time constraints of the process.[33]

4.6.4 RESOURCE AVAILABILITY

A purchase could potentially be unavailable for delivery to the SLCA/IP transmission system due to physical or financial factors. Possible physical limitations include forced outage of key generation or transmission equipment, or fuel supply interruptions. Power may also be unavailable due to owner or operator financial problems, or physical problems induced by financial problems.

The risks of physical unavailability have various causes, which will be addressed separately. One approach to mitigate availability risk would be to allow proposals based only on " system" sales, rather than unit purchases, greatly reducing the risk of generation unavailability. This would tend to limit the number of proposals received and could increase the price.

Another approach to mitigate availability risk is to require that any charges or rates in a proposal be adjusted to reflect resource availability. For example, fixed or demand charges could be reduced in proportion to the purchase availability if it falls below a threshold, such as 90 percent. This would have the effect of maintaining the unit price of the purchase, even if the amount of available power was curtailed. SLCA/IP customers would still have the risk of Western's being unable to quickly find power to substitute for replacement power, but customers would not have to pay for unavailable power.

The risks associated with financial problems are usually mitigated using a combination of approaches, most of which aim at ensuring the initial and continued financial viability of the seller. For longer-term acquisitions, each potential supplier could be required to submit a projected financial statement showing the annual cash flow associated with the sale and the internal rate of return for the transactions during the period of the sale. A requirement for the entity to financially support

performance under the contract, such as payment of any liquidated damages, can also be included.

Requiring minimum levels of liability and property insurance is also typically required, especially in instances of a " unit purchase." For a unit purchase, periodic inspection of equipment and review of maintenance practices is sometimes also required.

The financial viability of a sale can also be undermined by fuel unavailability. To mitigate this risk with " unit purchase" arrangement, a proposal can be required to have part or all of the necessary fuel delivered under firm contract. The operating economics from the seller's viewpoint are equally important. The biggest risk is the fuel component of operating cost relative to the purchase price. It does no good for Western to have locked-in a preferential purchase price if fuel price escalation bankrupts the seller.

It will be important in reviewing the proposals to ensure that the purchase prices being proposed and the operating costs of the seller are consistent with financial viability for the duration of the transaction. Since the customers will ultimately bear any financial risks of replacement power unavailability, Western will be guided by the customers' preferences with regard to risk mitigation.

4.6.5 CONTRACTUAL RISK

Western expects to provide standard provisions for the contract it expects to execute. Specific information on the amount of power to be purchased, rates for purchase, interconnection requirements, and other information particular to a purchase transaction would be covered in exhibits to the standard contract.

The terms and conditions for longer-term purchases will be developed considering the wider variety of proposals that may be received. For example, a mid-term (one to five year) purchase can be supplied from a system sale, an existing generating plant, or a power marketer. For a five-year or longer purchase, the proposal could be based on a single generating plant, which may be under

construction or in an earlier phase of development. Terms for conditions such as force majeure, property and liability insurance, performance guarantees, and dispute resolution need to be quite different in these cases.

With longer-term purchases there can be the additional problem of financial security/contract performance. Discounting or levelizing costs is a common practice in evaluating resource alternatives to represent the differences in the shape of the price or payment streams. The difficulty occurs when the proposal with the higher initial price has the lower present value.[34] In this instance, SLCA/IP customers pay a higher price during the early years of the agreement in the expectation that the lower prices in later years of the agreement will more than offset the higher price in the early years. However, the offset will only occur if the seller is able to deliver the power in the later years of the contract. If disruption in fuel supply, poor equipment performance, or catastrophic equipment failure results in reduced power availability in the later years of the agreement, customers will pay more than planned.

The financial risk associated with continued, reliable performance by the seller can be managed in a variety of ways, including:

- requirements for the seller to provide performance bonds or other forms of financial security;
- requirements to maintain property insurance and guarantee the purchaser the right to make repairs and operate a non-performing project;
- requirements for periodic inspections of generating equipment by independent third-parties; and
- performance of any indicated remediation.

For shorter-term purchases, liability insurance, indemnification, and demonstration of a minimum amount of financial assets are normally adequate to manage the purchaser’s financial risk. For longer-term purchases (five years or more), the simplest approach is to establish levels of liquidated damages in each year of the agreement for non-performance in subsequent years, and require that

funds be retained in escrow or another acceptable form of security equivalent to the liquidated damages. This provides maximum flexibility for the seller in structuring the payment stream while providing an essentially uniform level of risk to the purchaser with regard to project performance through the term of the purchase agreement.[35] Liquidated damages provisions would provide protection to SLCA/IP customers; however, the protection will likely cause a substantial increase in proposed prices by limiting the number of proposals and increasing the seller's direct costs. Accordingly, this approach will likely be limited to special circumstances such as longer-term acquisitions based on unit purchases.

ENDNOTES:

[1] Purchases can include a variety of structures, including capacity and energy exchanges. Also, Western's authority to build new generating capacity or own existing capacity is limited by its legal authority, as discussed herein.

[2] See Section 4.2.2.1 for a more complete discussion of types of power purchases.

[3] In contrast to the direct cost responsibility for replacement power, the base rates charged SLCA/IP customers for other firm power may over- or under-recover the annual costs of the federal hydroelectric projects and associated transmission system.

[4] Although the Methods Report focuses on Western acquiring replacement power, customers will also be able to directly acquire replacement power (see the discussion of CDP, or customer displacement power in Section 2.3). CDP may be transmitted over the SLCA/IP transmission system, subject to Western approval based on available transmission capacity.

[5] If future availability of firm power was expected to be restricted, either due to demand exceeding supply or an inability to deliver available supply to load centers, Western would be faced with three alternatives with respect to replacement power: (i) making an immediate, long-term purchase commitment, (ii) no longer offering replacement power, or (iii) having to participate, potentially as the sole sponsor, in development of new generating capacity. The chance that Western will be faced with such a choice is unlikely under current circumstances in the regional power supply market, as most regional utilities anticipate that the capacity surplus will exist for at least the next few years.

[6] See the discussion of Western's transmission system and the SRP Exchange Agreement in Section 3.3.1.

[7] See Section 2 of this report regarding FERC Order 888, Section 211 of the Energy Policy Act and Western's participation in WRTA and SWRTA.

[8] See the discussion of the Contract Amendment in Section 2.3.3.

[9] The illustration describes three tiers, but does not exclude two tiers or more than three tiers. A customer's selection of the numbers of tiers would depend on several factors and vary over time. In addition, the figures in the illustration do not imply that the probability of an amount of replacement power being required is constant over time. For example, for one year there might be an 80 percent probability that replacement power requirements will exceed 100 MW; while for another year in the future, the probability of requiring 100 MW or more of replacement power may only be 30 percent.

[10] As part of its Record of Decision for the Energy Planning and Management Program (" EPAMP"), and after public consultation, Western may offer customers 20-year extensions

to the term of the existing power sales agreements under the Power Marketing Provision. See the discussion in Section 2 of this report for additional details.

[11] These terms are formally defined in the Contract Amendment, as discussed in Section 2.3.4.

[12] See the discussion regarding customers acquiring a " portfolio" of WRP purchases of different lengths in Section 4.2.2.

[13] See Appendix A and Section 2.5.1.

[14] The time needed to evaluate proposals can vary widely. Often, a utility may prepare an evaluation resulting in a preliminary ranking, which is subject to clarification or modification of certain key provisions of a proposal (e.g., obtaining a firm transportation contract for fuel delivery). The evaluation process is then entwined with contract negotiations. If the negotiations are unsuccessful, some re-evaluation may be necessary. As a result, the time between receipt of proposals and final selection of winning proposals may 12 months or more. This additional time, however, is due to an RFP allowing proposals to contain terms that are unacceptable that the utility attempts to eliminate in after-the-fact negotiations. The process can be streamlined by making clear in the proposal what terms are unacceptable or to what degree a proposal will be penalized for containing certain provisions (e.g., " front-end loading" of the payment stream).

[15] See Section 3.3.4 of this report.

[16] For example, changes could cause Western to evaluate a wider range of resource options with respect to contractual rights and length of the acquisition term. If individual customers are no longer directly responsible for paying the costs of replacement power, Western would likely adopt a more traditional utility approach of evaluating the least-cost method of meeting its projected load requirements.

[17] In the latter approach, the scoring system and weighting factors are typically developed in advance based on a variety of approaches and techniques ranging from " delphi" surveys to application of damage functions (for environmental impacts) to production cost modeling (for risk assessment).

[18] See the review of regional utility IRPs and RFPs in Appendix B.

[19] Rates for various funding sources will be estimated using published projections of long-term interest rates, adjusted to the equivalent risk level (e.g., from " Aaa" rating to " A" rating).

[20] See the discussion of operations in Section 2.

[21] Within transmission limits, Western may market surplus replacement power on behalf of the customers whenever the incremental price of replacement power passed-through by Western is less than the estimated net price (i.e., less any

wheeling charges, losses, and scheduling costs) available to a customer from an off-system sale.

[22] For example, two replacement resource alternatives may have the same net cost and estimated pass-through rate at a given use level (e.g., 70 percent on-peak capacity factor). One of the two, however, may have a higher fixed charge and lower incremental energy rate relative to the other. It is likely that the alternative with the lower incremental energy rate will be scheduled more than the other, displacing more of the customer's higher cost resources and producing a lower net cost during actual use of the resource.

[23] Part IV of Western's FERC 715 filing, dated April 1, 1996, a copy of which is included in Appendix A to this report.

[24] If a WSCC case is selected for the power flow analysis, based on the coordinating council's planning criteria, the initial analysis should result in no single contingency violations of the planning criteria for any lines or transformer loadings or buses voltage levels included in the bulk system (i.e., 230 kV and higher). This stems from the fact that each utility is required to plan its system to adhere to the minimum WSCC criteria, and since these cases are designed with joint effort from all utilities in the region, each utility must sign off on the case prior to it being finalized. However, this does not mean that some regional areas could not experience problems as indicated from this analysis, or that Western will not see areas of the system that are approaching maximum transfer capability, or minimum voltage levels.

[25] The demonstration of how the modeling tools are utilized together to evaluate replacement resources is the subject of Section 5 of this report.

[26] This model is marketed by Henwood Energy Services Inc., Sacramento, California.

[27] The EGEAS (" Electric Generation Expansion Analysis System") model was one of three modeling approaches used by Stone & Webster in preparing the power system impact evaluation of potential changes in GCD operations for the GCES. This model was used to estimate the least-cost resource plan, under varying input scenarios, for each of seven large SLCA/IP customers. One or more additional, interconnected electric systems was included with each of the seven to represent the effects of inter-system transactions on resource selection and operations.

The PACE (" Production and Capacity Expansion") model was used by Argonne in preparing the power system impact evaluation for the EPM-EIS. This model was used to estimate the least-cost resource plan, under varying input scenarios, for each of 12 large SLCA/IP customers. In contrast to EGEAS' capabilities in modeling multiple, interconnected systems, PACE models a single system. To account for inter-system transactions, the amount and price of incremental spot energy transactions was

modeled separately and input to the PACE modeling of each system.

[28] Like the spreadsheet model, historical transactions are used to estimate an amount and price for on-peak and off-peak power. While these estimates can be differentiated to a degree by amount and price, historical data is a limited source for deriving such estimates, since at any point in time it gives no indication of the associated price if a utility had purchased or sold more power than it actually did. Also like the spreadsheet model, the estimated amounts and prices of spot energy are static and there is no consideration of location effects and transmission constraints.

[29] Because of the need to test many alternative plans, most capacity expansion models limit the representation of the electric system to a single electric system operating within a single area. Accordingly, there is a tradeoff for the user between accuracy in estimating system operating costs, and finding a least-cost plan given the modeling assumptions and methodology used.

[30] While it could be argued that there would be benefit in considering replacement power acquisitions that best fit with the least-cost resource plans of individual SLCA/IP customers, the development of such plans by Western for individual SLCA/IP customers is ill-advised from a policy perspective and would be extremely burdensome in terms of time and staffing requirements.

[31] See Appendix B.

[32] The regulatory policy struggle at the FERC and state regulatory agencies regarding " stranded investment" is evidence of the real price risk associated with generating plant whose prices may not have changed but, nonetheless, are uneconomical because cheaper resources have become available.

[33] Again, Western's goal is to avoid the necessity of reimbursement by customers for such services.

[34] " Present value" is an economic and financial term representing the discounting of future costs, or benefits, based on the time value of money which can be invested and earn a return in the interim. (Using a 10 percent discount rate, $1.10 to be paid next year is equivalent to a cost today of $1; $1.21 to be paid in two years is equivalent to a cost today of $1, etc.) For example, one proposal may provide a uniform price of $40 per MWh for 10 years, while another provides an initial price of $31 per MWh which increases by $2 per year. The average price paid under each is the same, but the proposal beginning at $31 is superior if it has a lower present value.

[35] In the case of longer-term acquisitions, Western will also require that proposals be accompanied with a forecasted financial statement for the transaction or project, demonstrating its associated cash flow and internal rate of return. This helps ensure Western will properly interpret key

provision’s of the proposal and, in turn, that the proposal is based on proper interpretation of the RFP and standard contract terms (for example, with regard to financial security for any “ overpayment” received in the early years of the purchase agreement).