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A GUIDE FOR THE PROPONENT AND OPPONENT OF COMPUTER-BASED EVIDENCE

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INTRODUCTION

Few jurisdictions have altered their statutory or common law rules of evidence in response to the unique problems associated with computer-based evidence. The few reported decisions have relied on traditional statements of authentication, hearsay and best evidence rules, and have given only superficial treatment to the special problems that may arise in assessing the trustworthiness of computer-based evidence.

While only limited guidance can be gleaned from the reported cases, this article will examine the objections that may be made against the use of computer-based evidence, as well as the methods by which the proponent of such evidence may seek to overcome those objections. Each case, however, must be examined for other possible bases of objection and arguments to overcome the objections, in light of the facts of the particular case and the rules of evidence of the particular jurisdiction.

Computer-based evidence may be treated as falling into two general categories. The first is computerized evidence of an act, condition or event. This evidence is usually a substitute for traditional, manual business records. The second is computer simulations of acts, conditions or events. Such evidence takes the form of computerized models of reality, often used to test theories concerning what acts, conditions or events will occur in response to given stimuli. This article will examine each of these types of computer-based evi-

dence, setting forth the objections that can be made to the evidence, followed by suggested methods of overcoming these objections.

I. COMPUTER-BASED EVIDENCE OF AN ACT, CONDITION OR EVENT

Computer-based evidence of an act, condition or event may have either of two sources: (1) evidence from the proponent's or a third party's files, or (2) evidence from the opponent's files. The latter evidence generally does not raise the same authentication, hearsay and best evidence rule problems as the former, but may pose unique privilege and other questions.

A. Evidence Maintained by the Proponent or a Third Party

1. Objection: Lack of Authentication

The proponent of a writing or other tangible thing is generally required to demonstrate that it is a genuine record of an act, condition or event. Authentication may be in the form of direct proof, e.g., by calling the subscribing witness, or in the form of circumstantial proof.[1]

Computer-based evidence is generally offered upon the testimony of a custodian, such as a data processing manager, an accounting manager or a financial officer, or upon the testimony of a person who has access to the computer's data base for a particular purpose, such as a collections manager or bank teller. The qualifying witness may lack personal knowledge of the source of the data, whether that source is a writing or an employee entering the data directly into the computer from a terminal in a branch office, or may lack knowledge of the operation of the computer.

The opponent of computer-based evidence may object on the ground that the proponent has failed to lay a proper foundation. The opponent may argue that there is insufficient proof that the underlying writing or source documentation is genuine, or that there is insufficient proof as to the manner of production of the computer output.[2]

Most jurisdictions, including a majority of those that have considered the issue in the context of computer-based evidence, reject the argument that authentication requires the testimony of a subscribing witness or a witness with direct personal knowledge of the manner of production of the particular output.[3] It is unclear, how-

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1. *See generally* C. MCCORMICK, EVIDENCE, ch. 22 (2d ed. E. Cleary 1972).

2. *See, e.g.,* United States v. Jones, 554 F.2d 251, 252 (5th Cir. 1977); State v. Springer, 283 N.C. 627, 636, 197 S.E. 2d 530, 535-36, 5 CLSR 432, 439-40 (1973).

3. *See, e.g., id.;* Bobbie Brooks, Inc. v. Hyatt, 195 Neb. 596, 598, 239 N.W.2d 782, 784

ever, whether the location of a writing in the files, or an electronic impulse in the computer's data base, is by itself sufficient circumstantial evidence of authenticity.

The proponent seeking authentication by circumstantial evidence should, at a minimum, offer evidence of the business practice regarding the source and manner of producing the computerized records, and offer proof that the only writings placed in relevant files, or data input to the computer, are genuine business records. The proponent may also produce additional proof concerning the means of preparing the record and that further oral testimony would add nothing of substance for the court to consider.[4]

In most of the reported decisions involving computerized, as well as traditional, business records, consideration of the foundational requirement of authenticity has been merged into consideration of the foundation required to invoke the business records exception to the hearsay rule.[5] The unique problems of establishing the identification and mode of preparation of computerized records will be discussed, in that context, more fully below.[6]

2. Objection: Hearsay

Hearsay is a written or oral assertion, other than one made by a declarant while testifying at trial, which is offered to prove the truth of the matter asserted.[7] Unless it comes within the terms of one of the exceptions to the hearsay rule, such an assertion is not admissible evidence.[8]

The most common exception to the hearsay rule, by which proponents seek to introduce computer-based evidence, is the business records exception. To come within the terms of that exception (i) the evidence must consist of a record made in the regular course of business, at or near the time of the act, condition or event which it evidences; (ii) a qualified witness must testify to the identity and mode of preparation of the record; and (iii) the sources of informa-

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(1976); United States v. De Georgia, 420 F.2d 889, 893-94, 2 CLSR 479, 484-85 (9th Cir. 1969); FED. R. EVID. 903.

4. Massachusetts Bonding & Ins. Co. v. Norwich Pharmacal Co., 18 F.2d 934, 938 (2d Cir. 1927); United States v. De Georgia, 420 F.2d 889, 893, 2 CLSR 479, 484 (9th Cir. 1969).

5. *See, e.g.,* Transport Indemnity Co. v. Seib, 178 Neb. 253, 257-58, 132 N.W.2d 871, 874-75, 1 CLSR 368, 371-72 (1965); King v. State *ex rel.* Murdock Acceptance Corp., 222 So. 2d 393, 398, 2 CLSR 180, 185 (Miss. 1969); C. McCORMICK, *supra* note 1, § 224, at 551-52.

6. *See* notes 20-22 *infra* and accompanying text.

7. *See, e.g.,* FED. R. EVID. 801(c).

8. *See, e.g., id.* Rule 801-03.

tion and method and time of preparation of the record must be such as to indicate its trustworthiness.[9] The evidence is inadmissible if any of these elements is missing.

In general, an objection to the foundation laid to invoke the business records exception should specifically indicate the portion of the foundation that is absent or defective. For example, if the proponent has failed adequately to establish that the writing was made in the regular course of business, the objecting party should so specify.[10]

a. Business Records Exception: The Evidence Must be a Record

The opponent of computer-based evidence may object on the ground that the computer data, *e.g.*, electronic impulses, cannot qualify as a business "record" as that term has been used in the context of the business records exception. This exception is founded upon the special reliability of traditional business records, which are generally manually prepared in the form of written entries.[11] The reliability of such records is often readily assessable by the trier of fact.

On the other hand, the "record" in the case of computer-based evidence consists of electronic impulses. The opponent may argue that the reliability of the impulses or output from the computer will not be based upon the same considerations as those presented by

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9. *Id.* Rule 803 (6) provides that the following is not hearsay:

A memorandum, report, record, or data compilation, in any form, of acts, events, conditions, opinions, or diagnoses, made at or near the time by, or from information transmitted by, a person with knowledge, if kept in the course of a regularly conducted business activity, and if it was the regular practice of that business activity to make the memorandum, report, record, or data compilation, all as shown by the testimony of the custodian or other qualified witness, unless the source of information or the method of circumstances of preparation indicate lack of trustworthiness.

Similarly, section 1271 of the California Evidence Code provides:

Evidence of a writing made as a record of an act, condition, or event is not made inadmissible by the hearsay rule when offered to prove the act, condition or event if:

(a) The writing was made in the regular course of a business;

(b) The writing was made at or near the time of the act, condition, or event;

(c) The custodian or other qualified witness testifies to its identity and the mode of its preparation; and

(d) The sources of information and method and time of preparation were such as to indicate its trustworthiness.

CAL. EVID. CODE § 1271 (West).

10. *See, e.g.*, People v. Dorsey, 43 Cal. App. 3d 953, 960, 118 Cal. Rptr. 362, 366 (1974).

11. *See generally* C. MCCORMICK, *supra* note 1, §§ 304 *et seq.*

traditional business records; that the trier of fact will have difficulty assessing the trustworthiness of this evidence because of its ephemeral nature; and that this exception to the hearsay rule is not sufficient to deal with the unique problems of computer-based evidence.

Few jurisdictions have statutes that expressly include computerized records within the business records exception.[12] However, courts have generally admitted such evidence under the business records exception, over the objection that the evidence was not a "record."[13] As stated in the leading case of *Transport Indemnity Co. v. Seib*,[14] these courts have reasoned that "[n]o particular mode or form of record is required. The statute was intended to bring the realities of business and professional practice into the courtroom and the statute should not be interpreted narrowly to destroy its obvious usefulness."[15]

b. Business Records Exception: The Qualifying Witness

The opponent may also object to the foundation on the ground that the witness lacks the knowledge or technical qualifications necessary to testify as to the mode of preparation of the records. This objection may be particularly appropriate if the qualifying witness is not the custodian of records, or if he is not from the data processing department.[16]

The cases almost uniformly reject the contention that the qualifying witness must be the custodian of records, as well as the contention that he must have direct personal knowledge of the preparation of the specific record sought to be introduced. For ex-

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12. *But see* FED. R. EVID. 803 (6), note 9 *supra* (allows a "data compilation, in any form").

13. *See* Sears, Roebuck & Co. v. Merla, 142 N.J. Super. 205, 361 A.2d 68, 5 CLSR 1370 (1976) (reversed trial court, which had excluded computer-based evidence "expressing a disdain for computer technology").

14. 178 Neb. 253, 132 N.W.2d 871, 1 CLSR 368 (1965).

15. *Id.* at 259, 132 N.W.2d at 875, 1 CLSR at 372. *See also* Union Elec. Co. v. Mansion House Center N. Redev. Co., 494 S.W.2d 309, 315, 5 CLSR 929, 934 (Mo. 1973); United States v. De Georgia, 420 F.2d 889, 891 n.5, 2 CLSR 479, 481-82 n.5 (9th Cir. 1969).

16. *See* Estate of Buddeke, 49 Ill. App. 3d 431, 364 N.E.2d 446 (1977) (reversing the trial court's admission of computerized records where the qualifying witness testified she did not know the manner of input, nor why there existed an error on the face of the printout; the court indicated that the proponent should produce a qualifying witness who can testify to the correctness of the record); State v. Springer, 283 N.C. 627, 636, 197 S.E.2d 530, 536, 5 CLSR 432, 439 (1973) (a proper foundation must be laid by a witness sufficiently familiar with the computerized records and the methods by which they were made to satisfy the court that the methods, sources of information and time of preparation render the evidence trustworthy).

ample, in *City of Seattle v. Heath*,[17] the court admitted a Department of Motor Vehicle's computer printout reflecting the status of the defendant's drivers license. The foundation was laid by a clerk of the traffic violations bureau of the municipal court who, though not a custodian of the records, had access to the computer by virtue of a terminal located at the municipal court, had knowledge of how the computer operated, and testified that some of the entries on the printout were a product of his input.[18] The court rejected an objection that the qualifying witness was not the custodian of records for the Department of Motor Vehicles, as well as the objection that he did not have personal knowledge of some of the entries.[19]

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17. 10 Wash. App. 949, 520 P.2d 1392 (1974).

18. *Id.* at 955, 520 P.2d at 1396.

19. *Id. See also* United States v. Fendley, 522 F.2d 181, 187, 6 CLSR 265, 271-72 (5th Cir. 1975) (rejecting the contention that the qualifying witness for a computer printout must have prepared the entry); Kelly v. Wasserman, 5 N.Y.2d 425, 429, 158 N.E.2d 241, 243 (1959) (rejecting the argument that the qualifying witness must have direct personal knowledge of the identity and mode of preparation of the particular output offered); Rogers v. Frank Lyon Co., 253 Ark. 856, 860, 489 S.W.2d 506, 509, 6 CLSR 744, 747 (1973) (qualifying witness' lack of personal knowledge of the transactions purportedly reflected by the evidence affects the weight, not the admissibility, of the testimony); Bobbie Brooks, Inc. v. Hyatt, 195 Neb. 596, 599-600, 239 N.W.2d 782, 785 (1976) (reversing the trial court's exclusion of computer evidence, where the qualifying witness was the present custodian of records, though not the custodian at the time the offered records were prepared); State v. Smith, 16 Wash. App. 425, 432-33, 558 P.2d 265, 270-71 (1976) (vice-president of a bank under whose supervision the computer printouts were prepared was a sufficient qualifying witness); State v. Hodgeson, 305 So.2d 421 (La. 1975) (printouts prepared by a computer service from information furnished to it under the supervision of the qualifying witness were admitted); Endicott Johnson Corp. v. C. M. Golde, 190 N.W.2d 752, 758, 4 CLSR 449, 452-54 (N.D. 1971) (computerized invoices admitted where the qualifying witness was generally familiar with the method of processing such orders, even though the witness had no knowledge of the actual, physical operation of the computer system by which the invoices were prepared); State v. Veres, 7 Ariz. App. 117, 125-26, 436 P.2d 629, 637, 1 CLSR 918, 920-21 (1968) (bank records admitted upon the testimony of a cashier, despite testimony that his sole knowledge of the mode of preparation of the records and the records themselves was his access to them, and that he did not prepare the records or understand the mechanical operation of the equipment); Gassett v. State, 532 S.W.2d 328, 331, 5 CLSR 1309, 1312 (Tex. Crim. App. 1976) (though the witness was not the custodian, he was qualified since he had regular access to the computer terminal, understood how the computer system operated, and knew how to operate the terminal from which access was made); Texas Warehouse Co. v. Springs Mills, Inc., 511 S.W.2d 735, 742, 6 CLSR 1055, 1061 (Tex. Ct. App. 1974) (qualifying witness was found sufficiently knowledgeable of the mechanics of computer use, how to read and interpret computer printouts, and the reliability of the computer); Merrick v. United States Rubber Co., 7 Ariz. App. 433, 440 P.2d 314, 1 CLSR 995 (1968) (in a suit on an open book account, evidence was admitted upon the qualifying witness' testimony that he was previously with the Los Angeles office where the equipment was located, was familiar with the account, and was generally familiar with this aspect of the

c. Business Records Exception: The Identity and Mode of Preparation of the Records

The opponent may also object to the foundation if the qualifying witness fails to provide sufficient proof concerning the identity and mode of preparation of the computer-based evidence. In support of this objection, the opponent may argue that the foundation concerning the mode of preparation should be even more extensive than with traditional business records because of the added difficulty encountered by the trier of fact in assessing the reliability of this type of evidence. In particular, the trier of fact is unlikely to appreciate the various electronic, mechanical and human errors that can cause inaccuracies in output, without the benefit of substantial, foundational testimony.[20]

There is little uniformity or guidance in the reported decisions as to what constitutes sufficient evidence of the mode of preparation of computer-based evidence. While the reported decisions have tended to require only minimal testimony on this issue,[21] the proponent may desire to lay a more substantial foundation. A complete foundation tends naturally to make the evidence more persuasive. In addition, the proponent, rather than the skillful cross-examiner, may then be the one to raise and deal with the uncertainties and opportunities for error present in the particular computer system. For example, the proponent's foundation may include a description of the process used to convert the information into machine-usable data, the procedures utilized to detect and prevent errors at each stage of the process, the manner of storing the data, the protections against tampering or erasure, the methods of retrieval, and the reliance that the business places on the output.[22]

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plaintiff's business, despite the fact that the witness was, at the time of trial, in the Phoenix office and had no knowledge of the actual, physical operation of the equipment); *see also* Transport Indemnity Co. v. Seib, 178 Neb. 253, 258, 132 N.W.2d 871, 873-75, 1 CLSR 368, 370-71 (1965); King v. State *ex rel.* Murdock Acceptance Corp., 222 So.2d 393, 397-98, 2 CLSR 180, 184 (Miss. 1969).

20. *Cf.* Perma Research & Dev. v. Singer Co., 542 F.2d 111, 121, 6 CLSR 98, 99 (2d Cir. 1976) (Van Graafeiland, J., dissenting).

21. *See, e.g.,* King v. State *ex. rel.* Murdock Acceptance Corp., 222 So.2d 393, 398, 2 CLSR 180, 184-85 (Miss. 1969).

22. *See, e.g., id.* at 397-98, 2 CLSR at 182-83 (evidence admitted where the qualifying witness testified, in substance, that the company used a centralized system of accounting maintained at the home office on a standard, commercial computer recognized as an efficient and accurate machine; that all records were maintained on magnetic tapes; that the information was input to the machine by competent and experienced operators by keypunching a card; that the cards were verified by another operator; that the information on the cards was then fed into the computer and recorded on magnetic tape; that the tape constituted the company's permanent record

In some jurisdictions it is a proper objection that the foundation fails to include proof that the person preparing the underlying records or providing the source information has personal knowledge of the act, condition or event the record evidences.[23] In some of these jurisdictions, the objection is based upon express statutory authority.[24] In other jurisdictions, the objection has been rejected.[25]

d. Business Records Exception: Time of Preparation of the Record

Computerized evidence often takes one of three forms: (1) concurrent printout—a printout generated in the regular course of business at or near the time of the event; (2) preprogrammed printout—a printout generated subsequent to the time of the event, from input made at or near the time of the event by the use of preexisting programming; or (3) specially programmed printout—printout prepared for trial by special programs, from input made at or near the time of the event.

The opponent may object to evidence in the form of a preprogrammed printout on the ground that the printout is the record, but was not prepared at or near the time of the event. He may object to evidence in the form of a specially programmed printout on the ground that the printout was neither generated in the regular course of business nor made at or near the time of the event.[26] The proponent of a pre-programmed printout or specially programmed printout may respond that the entry into the computer, as opposed to the printout, is the "record," and thus, the "record" was prepared in the regular course of business at or near the time of the event, regardless of when the printout was prepared. In addition, the pro-

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of the customer's account; that as payments were made at branch offices they were recorded on receipt blocks and sent to the home office, where there were verification procedures; and that the information was received by the home office daily, fed into the machine and processed in the ordinary course of business); City of Seattle v. Heath, 10 Wash. App. 949, 520 P.2d 1392 (1974); Matthews Estate, 47 Pa. D.&C.2d 529, 531-36, 4 CLSR 163, 165-68 (1969).

23. *See, e.g.,* Arnold D. Kamen & Co. v. Young, 466 S.W.2d 381, 387, 4 CLSR 444, 449 (Tex. Ct. App. 1971), where computer printouts were held inadmissible since there was no proof that the person who prepared the record from which the keypunch cards were prepared or the person who prepared the keypunch cards had personal knowledge of the information input to the computer.

24. *See, e.g.,* TEX. REV. CIV. STAT. ANN. art. 3737e, § 2 (Vernon) (affects the weight and credibility of the evidence, but not its admissibility).

25. *See* City of Seattle V. Heath, 10 Wash. App. 949, 955, 520 P.2d 1392, 1395 (1974); *cf.* Wheeler v. Cain, 459 S.W.2d 618, 623-24, 3 CLSR 646, 649 (Tenn. 1970).

26. *See also* Harned v. Credit Bureau, 513 P.2d 650, 653, 5 CLSR 394, 397-98 (Wyo. 1973) (summary of printouts was rejected in part on the ground that the printouts were not prepared in the regular course of business at or near the time of the event).

ponent of the pre-programmed printout may assert that, whatever constitutes the "record," the special reliability records made in the regular course of business at or near the time of the event is present as long as the input to the computer was made under such conditions.

In *United States v. Russo*,[27] the court admitted evidence in the form of a preprogrammed printout on the ground that the input was made at or near the time of the act, condition or event, despite the fact that the printout itself was not generated until some time later. In admitting the evidence, the court indicated that the printout was merely a presentation, in an organized and structured manner, of a mass of individual items of data. The court went on to say:

> It would restrict the admissibility of computerized records too severely to hold that the computer product, as well as the input upon which it is based, must be produced at or within a reasonable time after each act or transaction to which it relates.

> The Federal Business Records Act was adopted for the purpose of facilitating the admission of records into evidence where experience has shown them to be trustworthy.[28]

On the other hand, a specially programmed printout may not have the same guarantees of reliability as traditional business records made in the ordinary course of business at or near the time of the event. Depending on the nature of the program, it may not be fully tested by experience with errors having been corrected during its use in the regular course of business. To the extent that the reliability of the programming can be established, however, the proponent may assert that the evidence produced therefrom has the traditional guarantees of reliability and should be admitted.[29]

e. Business Records Exception: Trustworthiness of the Record

The opponent may object to the admissibility of the evidence if

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27. 480 F.2d 1228, 5 CLSR 687 (6th Cir. 1973).

28. *Id.* at 1240, 5 CLSR at 698. *See also* Transport Indemnity Co. v. Seib, 178 Neb. 253, 260, 132 N.W.2d 871, 875, 1 CLSR 368, 373 (1965) (the contrary argument "exalts the form over the substance"); King v. State *ex rel.* Murdock Acceptance Corp., 222 So.2d 393, 398, 2 CLSR 180, 184-85 (Miss. 1969); State v. Springer, 283 N.C. 627, 636, 197 S.E.2d 530, 536, 5 CLSR 432, 439 (1973); City of Seattle v. Heath, 10 Wash. App. 949, 955-56, 520 P.2d 1392, 1395 (1974); Matthews Estate, 47 Pa. D.&C.2d 529, 536, 4 CLSR 163, 169 (1969).

29. The proponent may also try to avoid the problem of a printout not being produced at or near the time of the event by seeking admission under the voluminous records exception to the hearsay rule. In support of admission under this exception, the proponent may argue that the printouts constitute summaries of voluminous records. The requirements for admission on this basis are discussed at notes 57-59 *infra* and accompanying text.

the sources of information and methods and time of preparation are not such as to indicate the trustworthiness of the records. In light of the tendency of courts to test computer-based evidence under traditional formulations of the business records exception, and their unwillingness to accept technical arguments against admission, this issue will probably be the focus of foundational examination. Nevertheless, because of the superficial examination of the unique problems associated with computerized records in the decisions reported to date, neither the proponent nor the opponent can find much guidance concerning the necessary qualifying testimony or the types of computer-based evidence that are sufficiently trustworthy.

In *People v. Gauer*,[30] the State sought admission of records purporting to reflect calls from defendant's telephone to that of the complaining witness. The State called two witnesses. One testified generally as to how the call tracer worked; the other, who was the custodian of records of the telephone company, testified in a conclusory manner that the company considered the records reliable and placed great faith in them.[31] The court rejected the records on the ground that there was an insufficient foundation as to their reliability and trustworthiness.[32] The court distinguished another decision, which had admitted tracing records upon the testimony of a qualifying witness that he was familiar with the equipment and had been with the technician while the technician tested the accuracy of the tracing mechanism.[33] The *Gauer* court indicated that in the previous decision there had been sufficient testimony concerning the method of preparation and the meaning of the records to assess their trustworthiness, while both of these factors were missing in the case before it.[34]

In *Railroad Commission v. Southern Pacific Co.*,[35] the court affirmed the Railroad Commission's rejection of evidence in the form of computer records. The court determined that there was an insufficient foundation concerning the reliability of the printouts, since the qualifying witness did not have sufficient knowledge of the computer records to prove their legitimacy and accuracy.[36] The court specifically pointed out that the railroad offered no witness who had charge of the data processing department and under whose supervi-

30. 7 Ill. App. 3d 512, 288 N.E.2d 24, 4 CLSR 477 (1972).
31. *Id.* at 513-14, 288 N.E.2d at 25, 4 CLSR at 478.
32. *Id.* at 514-15, 288 N.E.2d at 25, 4 CLSR at 479.
33. *Id.* at 514, 288 N.E.2d at 25, 4 CLSR at 478-79.
34. *Id.*
35. 468 S.W.2d 125, 3 CLSR 720 (Tex. Ct. App. 1971).
36. *Id.* at 128, 3 CLSR at 722.

sion the computerized accounting records were maintained to testify to the type of computer employed, the permanent nature of the record storage, or how the daily processing of input led to the permanent records.[37]

The court stated that to come within the business records exception, the computerized records must meet the following criteria: (1) the particular computing equipment must be recognized as standard equipment; (2) the records must be kept and stored electronically in the regular course of business; (3) the records must be based on information within the personal knowledge of the individual whose duties include the collection of such information; and (4) the records must be prepared by persons who understand the operation of the equipment and whose regular duties include such operation.[38]

In *Department of Mental Health v. Beil*,[39] the court rejected computer-based records, though finding that admission of the records was not reversible error, where the qualifying witness did not testify concerning the operation or capability of the computer equipment. The court stated that the proponent must establish, among other things, that the equipment involved is recognized as standard equipment.[40] In *State v. McGee*,[41] computer evidence was rejected since the proponent failed to show how and when the information was input to the computer, who programmed the computer and how it was done, how the data was retrieved, and the level of competence of those who operated the computer.[42]

On the other hand, the court found computerized records sufficiently trustworthy in *D & H Auto Parts, Inc. v. Ford Marketing Corp.*[43] In that case, the plaintiff-jobber in a contract action objected to the admission of a computer printout containing the monthly summary of sales to the plaintiff, on the ground that there was insufficient proof of the accuracy of the computer.[44] The quali-

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37. *Id.*

38. *Id.* at 129, 3 CLSR at 723.

39. 44 Ill. App. 3d 402, 357 N.E.2d 875 (1976).

40. *Id.* at 409, 357 N.E. 2d at 880.

41. 131 N.J. Super. 292, 329 A.2d 581 (1974).

42. *Id.* at 298, 329 A.2d at 584-85. *See also* the dissenting opinion of Judge Van Graafeiland in Perma Research & Dev. v. Singer Co., 542 F.2d 111, 6 CLSR 98 (2d Cir. 1976), in which he discussed some of the problems of reliability in utilizing computer evidence and the need for an extensive foundation. He concluded that "[a]s one of the many who have received computerized bills and dunning letters for accounts long since paid, I am not prepared to accept the product of a computer as the equivalent of Holy Writ." *Id.* at 121, 6 CLSR at 100 (Van Graafeiland, J., dissenting).

43. 3 CLSR 856 (E.D.N.Y. 1973).

44. *Id.* at 859.

fying witness was the assistant controller in charge of Ford's field accounting department, general office accounting department, credit departmennt and incentive control and analysis department. Ford produced no one, however, from its data processing department.

The foundation included testimony that the summaries resulted from data input from punch cards prepared each day in Ford's regional office which reflected the individual orders received that day; that the punch cards were double punched to eliminate errors; that the punch cards were shipped from the regional office to the central office where the information was input to a computer; that the summaries were prepared each month for internal use by Ford; that the monthly printouts were circulated to the regional office where they were checked to insure conformity with the regional office records; that errors occurred on rare occasions; that the monthly summaries were produced for inspection by the plaintiff in the course of pretrial discovery; and that the sales information in the computer was used to prepare monthly statements of account, which were sent to customers including the plaintiff.[45]

The court, in admitting the summaries, found the evidence of trustworthiness sufficient. It particularly stressed the fact that the opponent had had copies of the summaries in his possession for more than six months preceding trial, but failed to point to any inaccuracies in the printouts.[46] The court also noted that the printouts were prepared from information supplied in the regular course of business by the opponent himself, and that at one point the opponent had offered into evidence summaries from one year of operation, though it had subsequently withdrawn those summaries.[47]

45. *Id.* at 858-59.

46. *Id.* at 861.

47. *Id.* at 860. *See also* Transport Indemnity Co. v. Seib, 178 Neb. 253, 259-60, 132 N.W.2d 871, 875, 1 CLSR 368, 372-73 (1965), where the court admitted the evidence, stressing the fact that the entries were made in the regular course of business, as part of a systematic procedure for processing the information flowing daily into the office; that the original source of information was the opponent; and that, despite the fact that the opponent had the information prior to trial, it failed to make any specific objections to the accuracy of the printouts. *See also* MANUAL FOR COMPLEX LITIGATION § 2.716, at 76-80 (1977) (proponent must demonstrate that the program that generated the printout has been thoroughly checked, particularly where the program has been developed to generate a particular printout for litigation purposes; additionally, a disinterested party's records are less likely to be altered), *reprinted infra* in this issue; People v. Dorsey, 43 Cal. App. 3d 953, 960-61, 118 Cal. Rptr. 362, 366-67 (1974) (considered the fact that the computer evidence was generated by a third party); King v. State *ex rel.* Murdock Acceptance Corp., 222 So.2d 393, 398, 2 CLSR 180, 185 (Miss. 1969) (considered the fact that the electronic computing equipment was standard equipment); Olympic Ins. Co. v. H. D. Harrison, Inc., 418 F.2d 669, 670, 2 CLSR 344, 344 (5th Cir. 1969) (considered the facts that the printouts were produced in the

Other than to note the indicia of trustworthiness considered by these courts, as well as the extreme differences between the foundational testimony rejected in cases like *Gauer* and accepted in cases like *D & H Auto Parts*, little guidance can be gleaned from the reported decisions as to what is sufficient evidence of the trustworthiness of computer-based evidence. The proponent of such evidence is thus well-advised to be prepared to lay a full foundation for the records he seeks to introduce. Additionally, laying such a foundation will tend to persuade the trier of fact that the proponent's evidence should be given great weight, and will also present an opportunity for the proponent to limit potentially effective cross-examination by raising the ever-present possibilities of error and by enumerating the protections employed to prevent such error.

On the other hand, a skillful cross-examiner may attempt, among other things, to exploit the opportunities for error and the corresponding uncertainties inherent in computerized records. The possible errors in programming, the manner in which such errors may be compounded, the chances of a dust speck preventing the program from correctly reading data from a magnetic tape or disc, the lack of evidence of falsification when it occurs, and the possibility of human error, are only a few of the problems raised by computer-based evidence. The cross-examiner should be prepared to raise these credibility problems, particularly because of the infallability with which many people view computer output.

The following are areas into which the proponent and opponent may go to support or attack the trustworthiness of computer-based evidence. From the opponent's point of view, it is very important to

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ordinary course of business and the opponent failed to make any specific objections to their accuracy); United States v. De Georgia, 420 F.2d 889, 893 n.11, 2 CLSR 479, 484-85 n.11 (9th Cir. 1969) (leaves open the question of whether there would be an adequate foundation where the proponent produces no expert testimony concerning the mechanical accuracy of the computer, though the proponent does produce testimony of reliance upon the accuracy of the computer in the conduct of its business); United States v. Russo, 480 F.2d 1228, 1240, 5 CLSR 687, 692-93 (6th Cir. 1973) (considered the procedures for testing the accuracy and reliability of the information fed into the computer); State v. Watson, 192 Neb. 44, 48, 218 N.W.2d 904, 907 (1974) (factors considered may include any motive to misrepresent, as well as whether the input was provided by a party to the litigation); State v. Smith, 160 Wash. App. 425, 558 P.2d 265 (1976) (considered the fact that the business depended upon the accuracy of the printout); State v. Vogt, 130 N.J. Super. 465, 327 A.2d 672 (1974) (considered the equipment and the qualifications of the operator); United States v. Fendley, 522 F.2d 181, 6 CLSR 265 (5th Cir. 1975) (found an adequate foundation upon the facts); State v. Stapleton, 29 N.C. App. 363, 224 S.E.2d 204 (1976) (foundation held sufficient); Cotton v. John W. Eshelman & Sons, Inc., 137 Ga. App. 360, 365, 223 S.E.2d 757, 760-61, 5 CLSR 1287, 1291 (1976) (admitted records).

have properly conducted discovery, so that cross-examination does not simply reinforce the inviolate nature of the evidence.

Input: Through what stages does the information pass before it becomes part of the data base? Is the initial input based upon personal knowledge? Was the input made or reviewed by an employee with a duty to report such information? How many manual stages are involved (with each increasing the chance for error), and what are the characteristics of the persons who take part in each stage (*e.g.*, education, other responsibilities, employment)? What are the chances for error? What are the procedures employed to protect against error, and are they followed? What are the types, number and location of the mechanical media employed for input? Who has access to that media, and what are the error characteristics of such media? What are the technical qualifications of the operators? Is the equipment standard? How long has it been in operation? Are all industry standard error detection procedures utilized (if there are any)?

Storage: What is the medium of storage, *e.g.*, magnetic tape, drum, disc? What are the error characteristics of the medium? Are there any standard procedures to protect against error, *e.g.*, parity bits? What are the safeguards to protect against loss or change? What precautions exist to prevent tampering or falsification of records, and are these precautions followed? Do the precautions themselves suggest to the trier of fact that the proponent is concerned with the possibility of tampering? Is a log maintained of everyone using the equipment? How many and which persons have access to the computer? Are programmers permitted to operate the equipment?

Operation: Is the equipment appropriate, as well as the type customarily used, for the application? How long has the equipment been used in the business for that application? How complex is the programming, and is it standard? What are the program "debugging" procedures, and were they followed? How badly can a single error be compounded? Who performed the programming, and what are his or her qualifications? Were proper design procedures followed? How long has the program been in use? Was adequate documentation prepared, *e.g.*, flow charts, program descriptions, program logic user instructions, file definitions, test data and source code, and is it properly maintained? What is the competence of the data processing department personnel, including the operators? What are the procedures employed in utilizing the equipment, and

are they followed? Is the program sufficient to prepare the data offered? What preventative maintenance is utilized, and does it meet industry standards?

Output: To what extent is reliance placed on the output in the ordinary course of business? What measures are taken to verify the accuracy of the output? What is the time and mode of preparation of the printouts?

In any particular case or particular jurisdiction, there may be other exceptions to the hearsay rule under which the evidence may be admissible. For example, there is a common law exception for written statements of public officials acting under an official duty to accurately report the recorded events.[48] Similarly, Federal Rules of Evidence, Rule 803(8) provides for the admission of reports of matters observed pursuant to a duty imposed by law, unless the sources of information or other circumstances indicate a lack of trustworthiness.[49]

3. Objection: Not the Best Evidence

The opponent may object that the computer printout is not the best evidence or original writing of the act, condition or event. The basis for the objection is the best evidence rule, which provides in most jurisdictions that no evidence other than the original of a writing is admissible to prove the content of that writing.[50] The opponent of the evidence may argue that any source documentation for the data input to the computer, or the data base of the computer it-

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48. Wong Wing Foo v. Mc Grath, 196 F.2d 120, 123 (9th Cir. 1952); Chesapeake & Delaware Canal Co. v. United States, 250 U.S. 123, 128-29 (1919).

49. FED. R. EVID. 803 (8) provides:

The following are not excluded by the hearsay rule, even though the declarant is available as a witness:

* * *

(8) *Public Records and Reports*. Records, reports, statements, or data compilations, in any form, of public offices or agencies, setting forth (A) the activities of the office or agency, or (B) matters observed pursuant to duty imposed by law as to which matters there was a duty to report, excluding, however, in criminal cases matters observed by police officers and other law enforcement personnel, or (C) in civil actions and proceedings and against the government in criminal cases, factual findings resulting from an investigation made pursuant to authority granted by law, unless the sources of information or other circumstances indicate lack of trustworthiness.

50. The California Evidence Code provides, for example:

Except as otherwise provided by statute, no evidence other than the original of a writing is admissible to prove the content of a writing. This section shall be known and may be cited as the best evidence rule.

CAL. EVID. CODE § 1500 (West).

self, is the original writing for the purpose of the rule.[51]

On the other hand, the proponent may assert that the computer printout is the original record.[52] Federal Rules of Evidence, Rule 1001(3) provides, for example:

> An 'original' of a writing or recording is the writing or recording itself or any counterpart intended to have the same effect by a person executing or issuing it.* * * If data are stored in a computer or similar device, any printout or other output readable by sight, shown to reflect the data accurately, is an 'original.'[53]

Alternatively, the proponent may be able to rely upon one of the exceptions to the best evidence rule. One common exception is that secondary evidence of the contents of a writing is admissible if the original writing is lost or destroyed.[54] The proponent of computer-based evidence may argue that the original records are stored in machine language and are thus unavailable. In *King v. State ex rel. Murdock Acceptance Corp.*,[55] the court accepted such an argument, where the initial entries were made in books at the branch office, copies of which were sent to the home office for input to the computer. Despite the fact that the branch office records were not destroyed, the court held that the original records consisted of the computerized entries on magnetic tape, and that "[r]ecords stored on magnetic tape by data processing machines are unavailable and useless except by means of the print-out sheets such as those admitted in evidence in this case.[56]

The proponent may also assert that the printout is admissible under the voluminous writings exception to the best evidence rule. This exception, available in most jurisdictions, allows for the admission of a summary of voluminous writings if the underlying writings could not conveniently be examined in court and the opponent is provided a reasonable opportunity to inspect them.[57] To invoke the

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51. *Cf.* Harned v. Credit Bureau, 513 P.2d 650, 652, 5 CLSR 394, 395 (Wyo. 1973) (rejected summary of computer printouts where the invoices used to prepare the printouts were available but not produced).

52. *See* notes 26-28 *supra* and accompanying text concerning possible hearsay implications.

53. *See* United States v. Russo, 480 F.2d 1228, 1240-41, 5 CLSR 687, 699 (6th Cir. 1973) (held that the printout was the original record). *But cf.* Harned v. Credit Bureau, 513 P.2d 650, 652, 5 CLSR 394, 395-96 (Wyo. 1973). Few states have statutes providing such a rule.

54. *See, e.g.*, CAL. EVID. CODE §§ 1501 (lost or destroyed writings), 1502 (writings not reasonably procurable by available means) & 1504 (writing of which it is inexpedient to require production of the original) (West).

55. 222 So.2d 393, 2 CLSR 180 (Miss. 1969).

56. *Id.* at 398, 2 CLSR at 185.

57. FED. R. EVID. 1006 provides:

The contents of voluminous writings, recordings, or photographs which can-

voluminous writings exception, the proponent may argue that the "writings" consist either of the documentation from which the input was prepared or the data base of the computer itself.[58] The proponent may even argue that any printout is, by its nature, a summary, since it is an abstraction from the computer's data base.[59]

4. Objection: Lack of Pre-Trial Availability of the Evidence to the Opponent

The opponent may object to the introduction of computer-based evidence if the relevant input, output and programming have not been made available for examination prior to trial. The objection may be based upon the trial court's discretion to insure the trustworthiness of the evidence. As set forth in the *Manual for Complex Litigation*:

> Because electronically recorded and processed data often must be specially treated and analyzed well in advance of trial in order to insure that it is used fairly, to allow opposing counsel to ascertain its reliability, and to avoid surprise and delay, it is important that the possibility of computer evidence be disclosed to the court and counsel at the earliest possible time.[60]
>
> *   *   *
>
> It is essential that the underlying data used in the analyses, pro-

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not conveniently be examined in court may be presented in the form of a chart, summary, or calculation. The originals, or duplicates, shall be made available for examination or copying, or both, by other parties at a reasonable time and place. The court may order that they be produced in court.

See also Fed. R. Evid. 1001(3) (text accompanying note 34 *supra*). California law similarly provides:

> Secondary evidence, whether written or oral, of the content of a writing is not made inadmissible by the best evidence rule if the writing consists of numerous accounts or other writings that cannot be examined in court without great loss of time, and the evidence sought from them is only the general result of the whole; but the court in its discretion may require that such accounts or other writings be produced for inspection by the adverse party.

CAL. EVID. CODE § 1509 (West). *See generally* Associated Metals & Minerals Corp. v. Dixon Chem. & Research, Inc., 82 N.J. Super. 281, 307-10, 197 A.2d 569, 583-84, 1 CLSR 236, 241 (1963) (summary prepared for trial admitted, though underlying books not offered into evidence, where books were made available to the opponent in advance of trial and convenience required the use of a summary); Union Elec. Co. v. Mansion House Center N. Redev. Co., 494 S.W.2d 309, 314, 5 CLSR 929, 933-34 (Mo. 1973) (underlying records made available during a continuance granted to review them); Regents of Univ. of Colo. v. K.D.I. Precision Prods., Inc., 488 F.2d 261, 268, 6 CLSR 748, 750 (10th Cir. 1973); Ed Guth Realty, Inc. v. Gingold, 34 N.Y.2d 440, 452, 315 N.E.2d 441, 445-46, 358 N.Y.2d 367, 374, 5 CLSR 880, 885 (1974).

58. *But see* text accompanying notes 52-53 *supra*.

59. *But cf.* United States v. Russo, 480 F.2d 1228, 1240-41, 5 CLSR 687, 699 (6th Cir. 1973).

60. MANUAL FOR COMPLEX LITIGATION § 2.70, at 70 (1977), *reprinted infra* in this issue.

grams and programming method and all relevant computer inputs and outputs be made available to the opposing party far in advance of trial. This procedure is required in the interest of fairness and should facilitate the introduction of admissible computer evidence. This procedure provides the adverse party and the court with an opportunity to test and examine the underlying data on which the machine analysis is based, the program and all outputs prior to trial.[61]

In an appropriate case, this objection may also be based upon the best evidence rule. The opponent may argue that the printout is a summary of records, and that the summary and underlying data must therefore be produced in advance of trial under the voluminous writings exception to the best evidence rule.[62] For this purpose, the opponent may wish to argue that the printout is inherently or otherwise a summary of data.[63]

To insure that the computer-based evidence will not be rejected, the proponent of such evidence should provide the opposing party with notice of his intention to use the evidence prior to its attempted introduction. The various jurisdictions have different pre-trial procedures that may lend themselves to such notice.[64]

5. Trial Court Discretion

As with other forms of evidence, appeal may be made to the discretion of the trial court to either admit or exclude computer-based evidence. For example, depending upon the particular case, a printout may be objected to as interjecting collateral issues or creating a danger of confusing the jury. In *Huber, Hunt & Nichols, Inc. v. Moore*,[65] an action by a contractor against an architect for construction costs allegedly caused by the architect's negligence, the trial

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61. *Id.* § 2.717, at 81. *See also* C. McCORMICK, *supra* note 1, § 314, at 734; United States v. Russo, 480 F.2d 1228, 1241, 5 CLSR 687, 700-02 (6th Cir. 1973); United States v. Kelly, 420 F.2d 26, 28-29 (2d Cir. 1969); City of Seattle v. Heath, 10 Wash. App. 949, 955 n.1, 520 P.2d 1392, 1396 n.1 (1974); United States v. De Georgia, 420 F.2d 889, 893 n.11, 2 CLSR 479, 484-85 n.11 (9th Cir. 1969). *But see* Perma Research & Dev. v. Singer Co., 542 F.2d 111, 115, 6 CLSR 98, 99 (2d Cir. 1976); United States v. Greenlee, 380 F. Supp. 652, 657 (E.D. Pa. 1974).

62. *See* FED. R. EVID. 1006 (requires making records available "at a reasonable time and place"); Union Elec. Co. v. Mansion House Center N. Redev. Co., 494 S.W.2d 309, 314, 5 CLSR 929, 933 (Mo. 1973) (the records should be made available prior to trial upon notice); Associated Metals & Minerals Corp. v. Dixon Chem. & Research, Inc., 82 N.J. Super. 281, 310, 197 A.2d 569, 583-84, 1 CLSR 236, 238 (1963). *But see* text accompanying notes 50-53 *supra*.

63. *See* note 59 *supra* and accompanying text.

64. *See* text accompanying notes 72-89 *infra* for a discussion of some of the problems that may arise in making the computer system available for inspection.

65. 67 Cal. App. 3d 278, 136 Cal. Rptr. 603 (1977).

court excluded a computer printout purporting to show cost over-runs. The court concluded that the printout would be unintelligible to the jurors, at least without further foundational evidence to explain it.[66] The court marked the printout as an exhibit and indicated to the contractor that it would permit a qualified witness to testify from the document, but would not permit the document to go into evidence.

> And I do that for this reason: that a lay juror is not qualified, and I so find, to interpret a computer printout; that by allowing that document to go to the jury, that the Court would take the risk that the jury would misinterpret the document, just as the same reasoning that has been applied by the Court with reference to x-ray films, for example.[67]

The court of appeal affirmed, relying on California Evidence Code, section 352,[68] since the exhibit was unintelligible without oral evidence explaining how it related to the issues in the case.[69] The court stated that aside from the obvious difficulties a lay jury would have in reading and understanding such a complex document, there was a great risk of misinterpretation. The document not only failed to specify the causal relationship between the cost overruns and the architect's alleged negligence, but also failed to distinguish between the various costs for which the architect would and would not be liable.[70]

A trial court also has the discretion to admit relevant, necessary and trustworthy evidence.[71]

B. EVIDENCE MAINTAINED BY A PARTY OPPONENT

Different problems of admissibility arise when a party seeks to introduce computer data generated by an opponent. Hearsay, best evidence, authentication and other foundational objections are likely to be seen as frivolous if made by the party seeking to keep its own data out of evidence. Instead, the principal battles are likely to be waged over questions of privilege and prejudicial effect.

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66. *Id.* at 294-95 n.13, 136 Cal. Rptr. at 612-13 n.13.

67. *Id.*

68. Section 352 provides that "[t]he court in its discretion may exclude evidence if its probative value is substantially outweighed by the probability that its admission will (a) necessitate undue consumption of time or (b) create substantial danger of undue prejudice, of confusing the issues, or of misleading the jury." CAL. EVID. CODE § 352 (West.)

69. 67 Cal. App. 3d at 295-96, 136 Cal. Rptr. at 613.

70. *Id.* at 302, 136 Cal. Rptr. at 617. *See also* FED. R. EVID. 403.

71. *See* Dallas County v. Commercial Union Assurance Co., 286 F.2d 388 (5th Cir. 1961); Massachusetts Bonding & Ins. Co. v. Norwich Pharmacal Co., 18 F.2d 934, 937-38 (2d Cir. 1927).

1. Objection: Privileged

The opponent may object to admission on the ground that the document is privileged. A privileged document may be wholly or partially shielded from disclosure. Typically, state laws accord privileged status to trade secrets, professional-client communications, and attorney work-product.[72] Banking and health records may also be privileged from disclosure under various "privacy" laws.[73] Privilege or privacy objections may arise at either pre-trial discovery, trial, or both. Often the objections will be resolved prior to trial; many times they will not.

a. Trade Secret

The opponent may claim trade secret status for the underlying data, the unique organization of the data, or the computer programs that manipulate and retrieve the data. This claim may be grounded in common law[74] or in statute.[75]

The objector has the burden of proving the applicability of the privilege.[76] Though the requisite elements for a trade secret vary from state to state, many jurisdictions have adopted the definition contained in the Restatement of Torts.[77] Typically, the holder of a purported trade secret must prove that the information was (a) developed at substantial cost; (b) carefully protected from public dis-

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72. *See, e.g.,* CAL. EVID. CODE §§ 950-62 (attorney-client), 990-1007 (physician-patient), 1010-26 (psychotherapist-patient), 1030-34 (clergyman-penitent) & 1060 (trade secrets) (West); CAL. CIV. PROC. CODE § 2016 (b) & (g) (attorney work-product) (West). Federal Rules of Evidence, Rule 501 indicates that claims of privilege in civil actions are to be determined by state law.

73. *See* notes 97-98 *infra.*

74. *See generally* 1 R. MILGRIM, TRADE SECRETS §§ 4.01-4.03 (1978) [hereinafter cited as MILGRIM].

75. *See e.g.,* CAL. EVID. CODE § 1060 (West). *See also* 2 MILGRIM, *supra* note 74, app. B, and statutes cited therein.

76. *See generally* 4 MOORE'S FEDERAL PRACTICE ¶ 26.60[4], at 26-242 to 26-249. The following factors are to be considered:

> (1) the extent to which the information is known outside of [the claimant's] business; (2) the extent to which it is known by employees and others involved in his business; (3) the extent of measures taken by him to guard the secrecy of the information; (4) the value of the information to him and to his competitors; (5) the amount of effort or money expended by him in developing the information; (6) the ease or difficulty with which the information could be properly acquired or duplicated by others.

MILGRIM, *supra* note 74, § 2.01, at 2-8.

77. "A trade secret may consist of any formula, pattern, device or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it." RESTATEMENT OF TORTS § 757, comment b (1939).

closure; (c) sufficiently novel[78]; and (d) such that it gives the holder a competitive advantage, which would be lost if the information was made public.[79]

The proponent may attempt to side-step the trade secret objection by requesting that the court fashion an appropriate protective order that will admit, but maintain the confidentiality of, the trade secret evidence. For example, the court may enjoin all parties and witnesses other than the holder of the trade secret from using or disclosing the secret information outside the trial. Alternatively, the court may order an *in camera* proceeding in which the public and all non-party witnesses are excluded from the courtroom during the presentation of the trade secret evidence. The court may also appoint its own expert witness to review the secret information and present conclusions based upon that review.[80]

The proponent may also seek to overcome the trade secret objection by a factual showing that one or more of the essential elements of a trade secret is missing. On the other hand, the objection may be overcome by a showing that failure to disclose the information will work an injustice on the proponent.[81]

A complication may arise where some or all of the information requested is proprietary, not to the user, but to a third party such as a software developer. The developer in such a situation may have included language in the software licensing contract that penalizes the licensee for any disclosure of the trade secret or other confidential information.[82] There also may be non-contractual duties arising from a confidential relationship between the user and a third party.[83] A party seeking admission in such circumstances may be required to make a particularly strong show of need. Upon such a

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78. This is a term of art in trade secret law. *See* MILGRIM, *supra* note 74, § 2.01, at 2-9.

79. *See, e.g.*, Telex Corp. v. IBM Corp., 510 F.2d 894, 928-30 (10th Cir. 1975); Digital Dev. Corp. v. International Memory Sys., 185 U.S.P.Q. 136, 141 (S.D. Cal. 1973); MILGRIM, *supra* note 74, § 4.01, at 4-1 to 4-2 & § 7.07[1] at 7-96 to 7-103.

80. *See generally* Annot., *In Camera Trial or Hearing and Other Procedures to Safeguard Trade Secrets*, 62 A.L.R.2d 510, 516 *et seq.* (1958); 2 MILGRIM, *supra* note 74, § 7.06.

81. *See, e.g.*, CAL. EVID. CODE § 1060 (West). *See generally* Annot., *supra* note 80, at 511 n.2.

82. If the contract is not carefully drafted, it may not give the licensee the right to assert the developer's trade secret privilege against disclosure requests by third parties. *See generally* R. BERNACCHI & G. LARSEN, DATA PROCESSING CONTRACTS AND THE LAW 368-97 (1974).

83. MILGRIM, *supra* note 74, § 4.03. States often authorize a court to exclude privileged information on its own motion, if there is no party to the proceeding who is able to claim the privilege. *See, e.g.*, CAL. EVID. CODE § 916(a)(2) (West).

showing and under an appropriate protective order, however, the proponent may argue that there is the possibility of liability, or the possibility that the licensor could attempt to terminate the contract for a technical violation of the nondisclosure provision.[84]

It is at least arguable that the Copyright Act of 1976[85] precludes an objection based on trade secret status, as no trade secret protection is available if the evidence is copyrightable, but has not been copyrighted. Dicta and predictions based upon attitudes or policies reflected in older cases have suggested that computer-based information, including both data and software, cannot be protected by state trade secret law, since federal copyright, patent and antitrust laws have preempted the field.[86] In *Kewanee Oil Co. v. Bicron Corp.*,[87] however, the United States Supreme Court held that Ohio's trade secret law was not void under the supremacy clause because of a conflict with the federal patent laws. The *Kewanee* rule has since been specifically applied to computer-based information.[88]

Section 301 of the Copyright Act of 1976 provides, however, that beginning on January 1, 1978, all legal or equitable rights equivalent to any of the exclusive rights within the general scope of the Act, are to be governed exclusively by the Act.[89] "Thereafter, no person is entitled to any such right of equivalent right in any such work under the common law or statutes of any State."[90] It is not clear that trade secret rights are "equivalent rights." Whether this language preempts common law trade secrecy status for copyrightable

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84. Such disclosure could also possibly constitute abandonment. *See* Annot., *Disclosure of Trade Secret in Court Proceedings as Abandonment of Secrecy*, 58 A.L.R.3d 1318 (1974).

85. 17 U.S.C. §§ 1 *et seq.* (1976 & Supp. I).

86. *See, e.g.*, Sears, Roebuck & Co. v. Stiffel Co., 376 U.S. 225 (1964); Compco Corp. v. Day-Brite Lighting, Inc., 376 U.S. 234 (1964); Lear, Inc. v. Adkins, 395 U.S. 653, 2 CLSR 235 (1969).

87. 416 U.S. 470, 4 CLSR 1203 (1974).

88. *See, e.g.*, Analogic Corp. v. Data Translation, Inc., 358 N.E.2d 804, 6 CLSR 345 (Mass. 1976); Data Gen. Corp. v. Digital Computer Controls, Inc., 357 A.2d 105, 111-12, 5 CLSR 1073, 1085 (1975); People v. Serrata, 62 Cal. App. 3d 9, 133 Cal. Rptr. 144 (1976).

89. Section 301 provides:

(a) On and after January 1, 1978, all legal or equitable rights that are equivalent to any of the exclusive rights within the general scope of copyright as specified by section 106 in works of authorship that are fixed in a tangible medium of expression and come within the subject matter of copyright as specified by sections 102 and 103, whether created before or after that date and whether published or unpublished, are governed exclusively by this title. Thereafter, no person is entitled to any such right or equivalent right in any such work under the common law or statutes of any State.

17 U.S.C. § 301 (1976 & Supp. I).

90. *Id.*

computer data is, at the moment, an open question.[91]

The National Commission on New Technological Uses of Copyrighted Works (CONTU), created by Congress to make recommendations on further revisions of the Copyright Act, submitted its Final Report on July 31, 1978.[92] Though CONTU's Software Subcommittee appeared mildly to favor construing the Copyright Act to preempt trade secrecy laws,[93] CONTU's Final Report states:

> The availability of copyright for computer programs does not, of course, affect the availability of trade secrecy protection. Under the Act of 1976 only those state rights that are equivalent to the exclusive rights granted therein (generally, common law copyright) are preempted. Any decline in use of trade secrecy might be based not upon preemption but on the rapid increase in the number of widely distributed programs in which trade secret protection could not be successfully asserted.[94]

The reaction of Congress and the courts remains to be seen.

b. Work Product

The opponent may object to the introduction of evidence if it was prepared by the opponent in anticipation of the litigation. Though the problem is more likely to arise in pre-trial discovery, a proponent may wish to introduce such material at trial if, for example, it is the only convenient summary of a large volume of data.

The Federal Rules of Civil Procedure permits discovery, and by implication admissibility, of materials prepared in anticipation of litigation upon a showing by the party seeking admission that he has "substantial need" of the materials and cannot otherwise obtain the substantial equivalent without "undue hardship."[95] Rule 26(b)(3), however, further provides that, in ordering discovery of such materials when the required showing has been made, the court shall protect against disclosure of the "mental impressions, conclusions, opinions, or legal theories of an attorney or other representative of a party concerning litigation."[96]

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91. *See* Diamond, *Preemption of State Law*, in MILGRIM, *supra* note 74, app. B-1; Fetter, *Copyright Revision and the Preemption of State "Misappropriation" Law*, 25 BULL. COPYRIGHT SOC'Y 367 (1978).

92. NATIONAL COMM'N ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT (1978).

93. *See* 2 MILGRIM, *supra* note 74, app. B-3, at B3-17.

94. FINAL REPORT, *supra* note 92, at 44 (footnote omitted).

95. FED. R. CIV. P. 26(b)(3).

96. *Id.* In *In re* IBM Peripheral EDP Devices, 5 CLSR 878 (N.D. Cal. 1975), the court refused to order the defendant to use its computerized document retrieval system to answer interrogatories, since it held that such a procedure would enable the plaintiffs to learn defendants' "key words." *Id.* at 880. *Cf.* Montrose Chem. Corp. v.

After making an initial showing of need for the work product materials, the proponent may be able to circumvent the "mental impressions" problem by requesting an appropriate protective order. For example, a court-appointed expert may be able to review the evidence and prepare an abstract that does not disclose the opponent's mental impressions, but conveys the information needed by the proponent.

c. Privacy

Computer-based information which contains financial or other data pertaining to identifiable individuals may be protected from immediate disclosure in civil litigation by the operation of state or federal privacy acts.[97] These privacy statutes almost uniformly provide mechanisms for the release of information pursuant to civil subpeona. Thus, the key to admissibility of such data may be simply a matter of careful trial preparation.[98]

d. Confidential Relationship

The opponent may object to evidence as reflecting privileged communications between, *e.g.*, attorney-client or physician-patient. These privileges are not waived simply because third parties have encoded the communications in a data processing system.[99] The privileges, however, are rarely absolute, and the proponent should carefully examine the relevant statutes to see if grounds for admissibility exist.[100]

2. Objection: Prejudicial Effect

Federal Rules of Evidence, Rule 403 provides that evidence may

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Train, 491 F.2d 63 (D.C. Cir. 1974) (court refused to order disclosure of summaries prepared for trial where the organization of the summaries was part of the deliberative process and revealed the mental processes of the drafters).

97. *See generally* 3 R. BIGELOW, COMPUTER L. SERV., apps. 5-2a through 5-4.1b; 4 *id.*, apps. 8-2a through 8-6b. *See also* Valley Bank v. Superior Court, 15 Cal. 3d 652, 656-58, 542 P.2d 977, 979-80, 125 Cal. Rptr. 553, 555-56 (1975) (information disclosed to a bank in confidence by a customer is protected in part by the customer's state constitutional right of privacy; the bank must take reasonable steps to inform the customer of the discovery proceedings pending and provide him a reasonable opportunity to interpose objections and seek appropriate protective orders). *But see* United States v. Miller, 425 U.S. 435 (1976) (no similar federal constitutional right.)

98. *But cf.* Stiles v. Atlantic Gas Light Co., 453 F. Supp. 798, 800 (N.D. Ga. 1978) (construing provision of federal privacy statutes, 5 U.S.C. § 552a(11) (1976)).

99. *See* Blue Cross v. Superior Court, 61 Cal. App. 3d 798, 132 Cal. Rptr. 635 (1976) (medical histories in the files of a computerized billing service remain privileged).

100. *See, e.g.*, CAL. EVID. CODE § 996 (West) (physician-patient communications are not privileged where the condition of the patient is an issue in the litigation).

be excluded "if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence."[101] An opponent may assert that the computer-based evidence is prejudicial or may mis-lead the trier of fact. In *Huber, Hunt & Nichols, Inc. v. Moore*,[102] the court held that an opponent's computer printout was properly excluded because of its potentially prejudicial effect.[103] The document's complexity made it unintelligible to a lay jury in the absence of oral evidence explaining how it related to the issues in the case.[104]

Similarly, confusion may be created by interjecting into the trial conflicting and complex testimony regarding the meaning and reliability of computer-based evidence.[105] A proponent in such circumstances should be prepared to offer testimony that will fully explain the evidence. In addition, the proponent may argue that the possible prejudice that might result will not "substantially" outweigh the probative value.[106]

The opponent may assert that the scope of the requested information is too broad. While this objection is more usual in pretrial discovery,[107] such an objection may be particularly well-taken at trial if the proponent seeks to introduce the original records that support an opponent's computer printouts.

In an appropriate case, the opponent may also assert that the production in court of a large number of computer files will disrupt its business. In *United States v. Greenlee*,[108] the defendant in a criminal tax evasion case moved to be given access, for a period of time "not to exceed three weeks," to an Internal Revenue Service computing center in order to evaluate the accuracy of its computers, programs, and data files. The court held that the request was "patently unreasonable," since it would result in serious disruptions of the computer operations of the Internal Revenue Service.[109]

The decisions are in conflict on which party must pay for the du-

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101. FED R. EVID. 403.

102. 67 Cal. App. 3d 278, 136 Cal. Rptr. 603 (1977).

103. *See* notes 65-70 *supra* and accompanying text.

104. 67 Cal. App. 3d at 294, 136 Cal. Rptr. at 612.

105. *See* notes 30-47 *supra* and accompanying text.

106. *See generally* 10 MOORE'S FEDERAL PRACTICE §§ 403.02[3]-403.10[1], at IV-69 to IV-77.

107. *Cf.* FTC v Exxon, D. 8934, in which the FTC issued, but subsequently withdrew, a document subpoena that ran to approximately 1,800 pages.

108. 380 F.Supp. 652 (E.D. Pa. 1974).

109. *Id.* at 658.

plication of data files. In *Lodge 743, IAM v. United Aircraft Corp.*,[110] the defendant produced approximately 120,000 photocopies of computer-generated records. The court ordered it to analyze the records at its own expense in order to make them intelligible to the plaintiff.[111]

3. Objection: Hearsay

The opponent may assert that the evidence is hearsay if the underlying information has been provided by third parties and has merely been collected and stored by the opponent. A similar objection may be raised where the opponent's data has been processed by an outside service bureau. In the usual case, the proponent can assert that the third parties, including any outside service bureau, are the opponent's agents, or that the opponent has adopted the third party's statements and the evidence therefore constitutes an admission.[112] In *Texas Warehouse Co. v. Spring Mills, Inc.*,[113] plaintiff prepared computerized bills of lading against which the defendant issued warehouse receipts. The defendant objected to admission of the receipts as hearsay. The court held that the records were admissible as admissions, business records, and declarations against interest, on the grounds that the defendant never questioned the accuracy of the receipts prior to trial.[114]

A proponent may also seek to introduce the results of a program of his own design that has processed the opponent's data. If the program incorporates assumptions which add to or otherwise alter the data, the opponent may object to admissibility on the ground of hearsay. If the program merely performs routine mathematical operations upon the data, however, the proponent should be able to overcome objections to admissibility by showing the accuracy and reliability of the program and processing.

4. Other Objections

An opponent may object to the admission of its own records on

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110. 220 F. Supp. 1, 1 CLSR 242 (D. Conn. 1963), *cert. denied*, 380 U.S. 908 (1964).

111. *Id.* at 21, 1 CLSR at 244. *See also* Greyhound Computer Corp. v. IBM Corp., 3 CLSR 138, 139 (D. Minn. 1971) (defendant required to provide "someone familiar with material to guide, aid and assist plaintiff's counsel or representative in ascertaining the answers it deserves and furnish print outs of of any taped information which will aid in securing the answers"). *But see* United States v. United States Alkali Export Ass'n, 7 F.R.D. 256, 259 (S.D.N.Y. 1946); Monarch Ins. Co. v. Spach, 281 F.2d 401, 413 n. 30 (5th Cir. 1960).

112. *See* FED. R. EVID. 801(d)(2).

113. 511 S.W.2d 735, 6 CLSR 1055 (Tex. Ct. App. 1974).

114. *Id.* at 740-42, 6 CLSR at 1061-63.

the ground of lack of authenticity. A proponent must be prepared to prove that the opponent's records are genuine, either through the use of subscribing witnesses or by circumstantial proof.[115] Absent extraordinary circumstances, however, an opponent's authenticity objection is likely to be seen as frivolous.

Novel objections are best overcome by an appeal to the court's common sense. In *Garrett v. Coast Federal Savings & Loan Association*,[116] plaintiffs, dissatisfied with the financial information that the defendant produced, asked at trial for an accounting. The court ordered the defendant to produce the accounting from a run of its computer data, reasoning that since the defendant had chosen to computerize its records and was unable to produce a hard copy, the burden was on it to do the work which otherwise would have fallen to plaintiffs. Plaintiffs then sought to introduce the accounting into evidence, while at the same time attacking its correctness on the ground that the program was not adequate to accomplish the purpose of the accounting. The defendant objected to the admission of the accounting printout, claiming that plaintiffs could not offer it into evidence and at the same time attack the underlying programming. The court overruled the objection and held that the accounting was admissible as an admission.

II. COMPUTER SIMULATIONS

A computer simulation is a mathematical model of an event that combines data and opinions in order to present a conclusion. It will rarely, if ever, be based on the personal knowledge or the direct perceptions of a witness. More often, it will attempt to describe events that have not been and cannot be directly perceived. Both the admissibility and probative value of a computer simulation, therefore, depend on whether its conclusions qualify as proper "expert" rather than "lay" opinion.

A. Objection: Opinion

A lay witness may testify only as to matters of which he has personal knowledge.[117] "[H]is testimony in the form of opinions or inferences is limited to those opinions or inferences which are (a) rationally based on the perception of the witness and (b) helpful to a clear understanding of his testimony or the determination of a fact in issue."[118]

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115. *See* text accompanying notes 1-6 *supra*.

116. L.A.S.C. Civ. No. C 995634.

117. FED. R. EVID. 602.

118. *Id*. Rule 701.

> Expert testimony is not limited in the same way:
> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of opinion or otherwise.[119]

Nevertheless, expert testimony must be based upon "established facts," and not "guess, speculation or conjecture."[120]

Computer simulations differ from other expert testimony by adding the element of processing to the other elements which form the basis for the opinion. Each element offers a potential ground for objection.

The underlying theory: Is it correct? While this is likely to be a question of fact going to the probative value of the simulation rather than its admissibility, the opponent may make, and the proponent should be prepared to meet, objections based upon relevance, lack of foundation, and opinion.[121]

The underlying facts: Are they correct? Are they inadmissible hearsay? Is the sample skewed? In *N.L.R.B. v. Bogart Sportswear Manufacturing Co.*,[122] a computer study of worker productivity was found mechanically valid, but "loaded" against union adherents, who were assigned less productive work during the test period, and was therefore rejected.[123] A proponent also should be prepared to lay a proper foundation as to any hearsay and argue that any questions of accuracy of the sample should go to its probative value, not to its admissibility.[124]

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119. *Id.* Rule 702.

120. Craig v. Champlin Petroleum Co., 435 F.2d 933, 937 (10th Cir. 1971). *See* Perma Research & Dev. v. Singer Co., 542 F.2d 111, 6 CLSR 98 (2d Cir.), *cert. denied*, 429 U.S. 987 (1976):

> As courts are drawn willy-nilly into the magic world of computerization, it is of utmost importance that appropriate standards be set for the introduction of computerized evidence. Statements like those of the District Judge that a computer is "but calculaters [sic] with a giant 'memory' and the simulations the computer produces are but the solutions to mathematical equations in a 'logical' order" represent an overly-simplified approach to the problem of computerized proof which should not receive this Court's approval.

Id. at 124, 6 CLSR at 105 (Van Graafeiland, J., dissenting).

121. *See In re* American Tel. & Tel. Co. [Hi-Lo Tariff], 55 F.C.C.2d 224, 237-38 (1975) (simulation had inadequate foundation and used improper market analysis).

122. 485 F.2d 1203 (5th Cir. 1973).

123. *Id.* at 1210.

124. *See* Union Elec. Co. v. Mansion House Center N. Redev. Co., 494 S.W.2d 309, 313, 5 CLSR 929, 932 (Mo. 1973); MANUAL FOR COMPLEX LITIGATION § 2.712, at 72 (1977), *reprinted infra* in this issue.

The data base: Have the underlying facts been accurately reflected in the data files? A proponent may encounter objections based upon relevance or prejudicial effect if salient features of the underlying facts are omitted from the model. Such objections may be met by having the propounding expert describe the general validity of the method used.[125]

The program: Does it properly reflect the underlying theory? Accuracy and hearsay objections against admissibility may be raised if the propounding expert is not familiar with the program, or if the programmers are not available for examination.

The processing: The proponent should be prepared to introduce witnesses who can testify to the accuracy of the inputting of the data, the mechanical reliability of the computer, and the skill of the operator.[126]

The proponent's ultimate authority for overcoming objections to the introduction of a simulation is Federal Rules of Evidence, Rule 703, which, under proper circumstances, allows an expert witness to testify in reliance on data that is in itself inadmissible:

> The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to him at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.[127]

The admissibility of computer simulation is generally favored by the *Manual for Complex Litigation*:

> Summaries and analyses of masses of data made by a computer should be admitted on the same basis as other summaries or analyses . . . . Computers perform a useful and often necessary function in summarizing and analyzing great masses of data. Many complex analyses formerly made from visually discernible data by statisticians can now be made more efficiently and with greater sophistication by a properly programmed computer. The admissibility of a statistician's analysis is based on the reliability of the supporting data and the analytical process utilized. Use of a computer to facilitate preparation of the study should not detract from its admissibility. If anything, the computer's superior ability to handle large quantities of data and do mathematical computations will enhance the probative value of the evidence in many contexts.[128]

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125. *See generally id.*

126. *See* text accompanying notes 16-25 *supra*.

127. FED. R. EVID. 703.

128. MANUAL FOR COMPLEX LITIGATION § 2.717 (citations omitted), *reprinted infra*

The general rule is that the proponent show the "impracticability" of making his proof by conventional methods; it does not require a showing of total inaccessibility to proof of the facts desired to be shown.[129] In *Perma Research & Development v. Singer Co.*,[130] a computer simulation was used to demonstrate that an automotive anti-skid device could be made fail-safe. In his dissenting opinion, Judge Van Graafeiland argued that a test under actual use conditions should have been made, instead of permitting the introduction of a "hypothetical, untested, and unproven simulation."[131]

B. Objection: Privileged

The proponent may seek to introduce a simulation prepared by an adverse party. The adverse party is likely to raise objections based on trade secret or work-product, particularly if the simulation had been prepared specially for the litigation.[132] The modern trend is to permit simulations to be offered into evidence, whether or not the authors intended to introduce them at trial, if they provide any part of the basis of expert testimony:

Federal Rule of Evidence, Rule 705 requires disclosure of the data underlying the expert testimony:

> The expert may testify in terms of opinions or inference and give his reasons therefor without prior disclosure of the underlying facts or data, unless the court requires otherwise. The expert may in any event be required to disclose the underlying facts or data on cross-examination.[133]

However, Federal Rule of Civil Procedure 26(b)(4) states that a party may only discover facts relied upon by experts who are not expected to testify at trial "upon a showing of exceptional circumstances under which it is impracticable for the party seeking discovery to obtain facts or opinions on the same subject by other means."[134]

In *Pearl Brewing Co. v. Joseph Schlitz Brewing Co.*,[135] plaintiff commissioned two computer simulations, one an econometric model

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in this issue. *See, e.g.*, Messex v. Louisiana Dep't of Highways, 302 So.2d 40, 44, 6 CLSR 752, 754 (La. 1974). *See generally* Jenkins, *Computer-Generated Evidence Specially Prepared for Use at Trial*, 52 CHI.-KENT L. REV. 600 (1976), *excerpted in* 3 R. BIGELOW, COMPUTER L. SERV. § 5-4.2, art. 3.

129. MANUAL FOR COMPLEX LITIGATION § 2.712, at 73 n.226 (1977) and cases cited therein, *reprinted infra* in this issue.

130. 542 F.2d 111, 6 CLSR 98 (2d Cir. 1976).

131. *Id.* at 122-23, 6 CLSR at 102.

132. *See* text accompanying notes 74-96 *supra*.

133. FED. R. EVID. 705.

134. FED. R. CIV. P. 26(b)(4).

135. 415 F. Supp. 1122 (S.D. Tex. 1976).

of the "Texas beer market," the other a "damage assessment program." The former simulation produced information which was used by the latter programs to develop computer output to be relied upon by plaintiff's expert at trial. Plaintiff proposed to make the computer output and certain other documentation available to the defendant in advance of the trial, but the defendant argued that such information was inadequate to prepare its own expert to analyze the programs. Though the court held that the "exceptional circumstances" requirement of Rule 26(b)(4) was applicable to the requests for documentation, the court ordered plaintiff to allow defendant, at its own expense, to copy the entire system documentation for the programs and depose the programmers who had implemented the models but were not to be trial witnesses. At the same time, the court rejected defendant's request for the documentation underlying any alternative computer programs rejected for usage in connection with the trial.[136]

On the other hand, in *Perma Research & Development*,[137] plaintiff not only refused to produce its computer simulation, but its expert at trial refused to disclose the manner in which the computer was programmed, on the grounds that this was his "private work-product" and was proprietary information.[138] The Second Circuit Court of Appeals stated that while it would have been the "better practice" for counsel to have arranged to exchange the computer documentation in advance of trial, the trial judge did not abuse his discretion in allowing plaintiff's expert to offer such limited testimony, since defendant did not show that it lacked an adequate basis on which to cross-examine plaintiff's expert.[139]

III. CONCLUSION

This article has examined likely objections to computer-based evidence, and methods of meeting them, in light of the presently developing case law. However, the reported decisions involving such evidence have barely scratched the surface in dealing with the unique problems associated with such evidence. The practitioner should be prepared to make and meet novel objections in each case.

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136. *Id.* at 1139.

137. 542 F.2d 111, 6 CLSR 98 (2d Cir. 1976).

138. *Id.* at 124, 6 CLSR at 105 (Van Graafeiland, J., dissenting).

139. *Id.* at 115, 6 CLSR at 99. For a discussion of other possible trade secret and work-product objections to the admission of a party-opponent's computer simulations, see Fromholz, *Discovery, Evidence, Confidentiality, and Security Problems Associated with the Use of Computer-Based Litigation Support Systems*, 1977 WASH. U.L.Q. 445, 454-59.

Particularly in sophisticated cases, there is likely to be a premium placed on creative and well-prepared advocacy.