Professional Competence – Design of Professional Facility Plumbing System

Case No. 09-8

Facts:

Engineer A, a professional mechanical engineer with expertise in plumbing design, is hired to design the plumbing system for a small food processing facility. While generally knowledgeable and experienced in plumbing design, Engineer A has never before provided plumbing system design services for this type of processing facility.

In preparation for the development of design documents, Engineer A reviews some technical marketing literature from Manufacturer Z. Manufacturer Z makes and sells a variety of products that are components to support the plumbing system Engineer A is planning to design for the building. The technical marketing literature explains that the manufacturer can provide technical drawing support relating to Engineer A's plumbing design, including pipe dimensions, proposed measurements between component fittings, drawing calculations that will show pipe length, diameter, flow rate, friction loss, pressure loss, and static pressure for each component in the drawing. The manufacturer then states it will provide the drawings and calculations to Engineer A for approval, since Manufacturer Z does not employ any professional engineers in-house. Engineer A accepts the manufacturer's offer, specifies the manufacturer's components and, following a general review of the documents without a detailed verification of the manufacturer's calculations, he signs and seals the drawings and calculations, which are subsequently submitted to the local building department for approval.

Questions:

1. Was it ethical for Engineer A to accept the manufacturer's services?

2. Was it ethical for Engineer A to have signed and sealed the drawings under the circumstances?

References:

Section I.1	-	*NSPE Code of Ethics:*	*Engineers, in the fulfillment of their professional duties, shall hold paramount the safety, health, and welfare of the public.*
Section II.2.	-	*NSPE Code of Ethics:*	*Engineers shall perform services only in the areas of their competence.*
Section II.2.a.	-	*NSPE Code of Ethics:*	*Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved.*
Section II.2.b.	-	*NSPE Code of Ethics:*	*Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control.*

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Section II.2.c.	-	*NSPE Code of Ethics:*	*Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment.*
Section II.4.	-	*NSPE Code of Ethics:*	*Engineers shall act for each employer or client as faithful agents or trustees.*
Section III.5.a.	-	*NSPE Code of Ethics:*	*Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product.*
Section III.5.b.	-	*NSPE Code of Ethics:*	*Engineers shall not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with clients or employers of the engineer in connection with work for which the engineer is responsible.*

Discussion:

As many NSPE Board of Ethics panels have noted, conflicts of interest are among the most fundamental ethical situations faced by engineers in the course of their professional practice. Each conflict of interest situation encountered must be evaluated based upon the individual and specific facts in the case as there is no one-size-fits-all rule that can be applied to these situations. Some situations involve obvious answers while others are more complicated and require careful analysis and examination. Sometimes issues of conflict of interest intersect with other fundamental ethical issues such as confidentiality, protection of the public health and safety, or competence to practice engineering.

Equally so, engineers also face situations where they are in the role of lead professional in the design of a facility, system, building, or structure containing highly specialized systems or equipment for which they do not possess the requisite design knowledge or experience to ensure a competent and safe design. In these situations, the engineer must work with others who possess the necessary expertise to complete the overall design of a project. The precise manner in which the engineer integrates the work of outside experts into his overall design has significant ethical implications, which the engineer must be aware in order to safeguard his own professional integrity as well as that of the engineering profession as a whole.

The NSPE Board of Ethical Review has had many occasions to examine the issue of conflicts of interest in the past. For example, in BER Case 60-9, the Board examined a situation involving certain engineering employees of an industrial firm who were in a position to recommend for or against the purchase of products used by the company. Product sales people regularly gave the employees cash gifts ranging from $25 to $100. In ruling that accepting those gifts was not ethical, the Board noted that an occasional free luncheon or dinner and a holiday or birthday present when there is a personal relationship are acceptable practices. However, cash payments to those positioned to

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influence decisions over the giver are not in good taste and immediately raise the suspicion of an ulterior motive.

In Case No. 81-4, the Board deliberated about three engineers who were principals or employees of a consulting engineering firm that did an extensive amount of design work for private developers. The engineers were involved in recommending to the developers a list of contractors and suppliers to be considered for a bidding list for construction of some projects. Usually, the contractors and suppliers that the engineers recommended obtained most of the contracts from the developers.

Over a period of years, the officers of the contractors or suppliers developed a close business and personal relationship with the engineers. From time to time, at holidays or on the engineers' birthdays, the contractors and suppliers would give them personal gifts of substantial value, such as house furnishings, recreational equipment, or gardening equipment. In finding that it was unethical for the engineers to accept those gifts, the Board stated that engineers should "lean over backwards" to avoid acceptance of gifts from those whom they, or their firm, do business. At that time, the Board again noted that there may be circumstances when a gift is permissible, as stated in BER Case 60-9, and does not compromise the engineer's independent professional judgment.

In BER Case 87-5, the ABC Pipe Company, in an effort to become known within the engineering community and, in particular, to those engineers involved in the specification of pipe in construction, sought to educate engineers about the various products available in the marketplace—the advantages and disadvantages of using one type of pipe over another. ABC Pipe Company sent an invitation to Lead Engineer A, as well as other engineers in a particular geographic area, announcing a one-day complimentary educational seminar to educate engineers on current technological advances in the selection and use of pipe in construction. ABC Pipe Company agreed to host all refreshments, buffet luncheon during the seminar, and a cocktail reception immediately following. Lead Engineer A agreed to attend.

Citing NSPE Code of Ethics Section III.5.a, the Board noted that the NSPE Code unequivocally states that engineers must not accept gifts or other valuable considerations from a supplier in exchange for specifying its products. However, the Board noted that in this case, it dealt with a material supplier who was introducing information about pipe products to engineers in the community and had chosen the form of an educational seminar as its vehicle. While ABC Pipe Company might seek to present its particular products in a favorable light and point out their many advantages over others, the Board determined that a complimentary invitation to such a seminar would not reach the level that would raise an ethical concern. The Board noted that earlier BER decisions and the pertinent provisions of the NSPE Code relate more to the circumstances in which valuable gifts are received and at least create the appearance

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of a *quid pro quo,* or an exchange of valuable consideration for specifying the equipment.

Under the facts of BER Case 87-5, the Board determined that Lead Engineer A was accepting an opportunity to become educated on a particular topic consistent with current NSPE Code Section III.9.e. The Board indicated that Lead Engineer A would be attending the seminar with many of his colleagues, and there was no suggestion in the facts that anyone at ABC Pipe Company would personally seek to persuade Lead Engineer A to specify its products. The Board further indicated that the buffet luncheon and cocktail reception immediately following the seminar as falling within the *de minimis* provisions noted earlier in BER Case Nos. 60-9 and 81-4, and thus it would not be improper for Lead Engineer A to participate in those activities. However, the Board noted that had Lead Engineer A agreed to accept items of substantial value (e.g., travel expenses, multiday program, resort location) its conclusion would have been quite different.

In BER Case No. 89-3, Design Engineer A is a principal in a large engineering firm that designs plants for industrial clients. In designing a portion of a specialized industrial facility, the engineer finds he does not possess adequate expertise to design several pieces of equipment required for the facility. He therefore requests and pays a manufacturer of the equipment components to prepare contract design drawings for the particular pieces of equipment to be included as part of his contract document bidding package. Design Engineer A reviews the contract drawings, and signs and seals those drawings as part of the overall design drawings.

In discussing this case, the Board noted that Design Engineer A received nothing in exchange from the equipment component manufacturer (unlike the engineers mentioned in cases nos. 60-9, 81-4, and 97-5); in fact, he had paid said manufacturer for the preparation of the design drawings. It also noted that there was no evidence that the manufacturer's equipment components were specified in the bidding package. Rather, it seemed that the manufacturer merely prepared a generic design for certain equipment and that any vendor of equipment components could also bid on the work. In reaching this conclusion, the Board presumed that the manufacturer had competent professional engineers on its staff who are expert and knowledgeable concerning the industrial equipment in question.

On the other hand, the Board found that it was inappropriate for Design Engineer A to sign and seal the contract drawings prepared by the manufacturer. The engineer, by his own admission, did not possess the competence to either review or sign and seal those drawings. Citing NSPE Code of Ethics Section II.2.a and II.2.b, the Board noted that the NSPE Code clearly makes it unethical for engineers to affix their signatures to any plan or document prepared outside their direction and control or that deals with subject matter in which they lack competence. At the same time, the Board, citing NSPE Code

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of Ethics Section III.9, "engineers shall accept responsibility for their professional activities…", did not wish to suggest that a professional engineer who is called upon to serve in the role of lead professional in the design of a facility, system, building, or structure containing highly specialized systems or equipment should be permitted to avoid responsibility for the overall design of the project.

Turning to the facts in the present case, the Board recognizes that it is not uncommon today for an engineer to obtain piping layout details or calculations from contractors or manufacturers in support of the engineering services provided by the engineer to the client. It is neither the purpose nor the intent of this Board to suggest a limitation on the practice among professional engineering firms and contractors, material men, suppliers, venders, fabricators, and others to coordinate and communicate detailed product, work, or other information to the engineer for the benefit of the client and consistent with the public health and safety.

However, it is the Board's view that this type of support should occur following the engineer's development of an independent engineering design. In this connection, while the Board does not see any blatant "*quid pro quo*" as was evident in BER Case 06-1, the Board is deeply troubled by the fact that Engineer A appears to be unduly relying upon the services being offered by Manufacturer Z in support of Engineer A's client. This may be partly because Engineer A is not sufficiently experienced in the design of a processing facility of the type sought by Engineer A's client. Moreover, Engineer A's specification of Manufacturer Z's products raises suspicions about the impartiality of Engineer A's business relationship with Manufacturer Z.

Aside from the conflict of interest issue discussed above, the Board is also greatly concerned by Engineer A's decision to sign and seal the work. It is clear from the facts of the case that the design engineering work performed by Manufacturer Z was not performed under the direction and control of Engineer A or by a licensed professional engineer. An additional Board concern under the facts relates to Engineer A's apparent lack of sufficient competency to perform the required plumbing engineering design services and his apparent overreliance upon Manufacturer Z's offer to provide technical documents to Engineer A in order to fulfill Engineer A's engineering obligations to Engineer A's client.

Engineer A's lack of experience specific to food processing plumbing systems, the fact that Manufacturer Z lacks in-house professional engineering capacity, Engineer A's decision to perform only general engineering review over the work, and Engineer A's apparent failure or inability to perform responsible charge over the engineering design leads the Board to the conclusion that Engineer A should not have signed and sealed the plumbing engineering design drawings prepared in-house by Manufacturer Z.

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Conclusions:

1. Engineer A was not in responsible charge of the detailed engineering work, therefore, it was unethical for Engineer A to accept the manufacturer's services.

2. Engineer A was not in responsible charge of the detailed engineering work, therefore, it was unethical for Engineer A to have signed and sealed the drawings under the circumstances.

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