

ENGINEERING ETHICS

Gilbane Gold: A Video Case Study

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Gilbane Gold

Introduction to the Case

This case was originally prepared by the National Institute for Engineering Ethics of the National Society of Professional Engineers. It is a fictional but highly plausible case, suggested by actual situations. Students will find it easy to identify with the junior environmental engineer, David Jackson, who is caught between his desire to be a good employee and his sense of obligation as an engineer to protect the health, safety, and welfare of the public.

Although the primary ethical issue raised in the case is whistle blowing, secondary ethical issues include the obligations of engineers with respect to environmental issues, management problems having to do with honesty and trust between business and its host community, the issue of the fairness of a community towards local manufacturing plants, the problems raised for individuals and groups by the necessity for action in the face of inconclusive scientific evidence, and the relationship of law and morality.

The case takes place in the imaginary town of Gilbane. The sludge from the Gilbane sewage plant has been used for many years as a fertilizer and is sold under the name "Gilbane Gold." The revenue from the sale of Gilbane Gold enables the city to supplement its tax revenues, saving a family of four approximately \$300/year in taxes. In order to protect this source of income, the town placed severe restrictions on the discharge of heavy metals into the sewage, so the sewage would be safe for use by farmers as fertilizer. The restrictions are ten times more stringent than federal regulations.

Before implementing these regulations, Gilbane had aggressively marketed itself as a city with a good business climate, offering tax abatements to industries that chose to move there. After several high-tech firms moved to the area, the more stringent regulations were enacted. Z CORP was one of the companies that moved to Gilbane. Its Gilbane plant manufactures computer components, but the plant's manufacturing process creates substantial quantities of toxic materials, primarily heavy metals. Z CORP monitors its waste discharge monthly.

Two facts about the regulations affect the resolution of the case. First, plants in Gilbane are responsible for supplying test data to the city. The data must be signed by an engineer, who attests to its accuracy. The law governing effluents is flawed, however, for it only regulates effluent discharge in terms of the amount of toxic

material for a given volume of discharge, not in terms of the total quantity of contaminant. So a plant can always operate within Gilbane standards by simply increasing the volume of discharge.

Second, a newer and more sensitive (but also more expensive) test for heavy metals has been developed since the city enacted its standards. The newer test is not required by the city, and the city of Gilbane does not use it. Z CORP employees have access to the test, and it shows that the plant has apparently been slightly exceeding the allowable emissions on a number of occasions. This produces a problem for Z CORP. If it discloses the results of the new test, the city might take legal action against it. If it does not disclose the results, some of its own employees may believe it is exhibiting bad faith with the city.

The plant's junior environmental engineer, David Jackson, is a new employee. He has replaced a consultant who believes he was released because of his warnings about the discharge of toxic materials. David is concerned about Z Corp.'s heavy metals discharge, and his concern is further intensified when he learns that Z CORP has signed a contract that will result in a five-fold increase in the discharge of heavy metals. David finally decides to blow the whistle on the plant's discharge levels by talking to the local TV newscaster.

The Standpoints of the Judge and the Agent

In preparation for leading a class discussion, you will want to view the tape at least once, and preferably twice. Announce to the class that present-time scenes are in color and flashbacks are in black and white. Because this case is based on the video, there is no critical need for overheads or bibliographies, although having one overhead with the names and roles of the chief characters and another summarizing the key ethical issues in the case has been found helpful. These overheads are provided.

It is important to ask what one expects the student to learn from viewing and discussing Gilbane Gold. We believe the best answer to this question is that the student should develop some skills which would be useful in her own professional career. The primary skills we have in mind here are the abilities to (1) analyze moral issues and to (2) resolve them in creative and professionally responsible ways. In order to do this, the student should attempt to put herself in the position of David Jackson and to decide how she would handle the issues that David faces. That is, the student should take the standpoint of the principal agent in the case, not the position of a judge. This means the student should place herself in the situation and approach it from the standpoint of one who must make a decision, not take the standpoint of one who evaluates David's actions from the standpoint of a spectator. Taking an "internal" and present-tense standpoint, in other words, is more instructive than taking an "external" and "after-the-fact" perspective. While it may require more effort to analyze the issue and construct one's own solution than to simply evaluate David's actions, the former exercise is ultimately more challenging and more valuable for a young engineer's professional development.

The recommendation, then, is to focus on David Jackson, to encourage the student to put herself in David's place and decide what she would do if she were facing his situation. Of course the comparison of how one would handle the situation with the way David actually dealt with it may lead to an implicit judgment of David's action, but the principal aim of the discussion should be to prompt the student to come up with the plan of action that she herself would take.

We shall approach this case somewhat differently from the others, in that we shall make a more concerted effort to employ the concepts and modes of ethical analysis developed in the essays entitled "Moral Concepts and Theories" and "Basic Concepts and Methods in Ethics" which appear at the end of the cases in this report. While the analysis may be somewhat more formal and structured than the analysis that will emerge in the classroom

discussion, it should assist you in leading the discussion. We shall begin with a discussion of some of the important factual issues in the case and then proceed to a discussion of the relevant conceptual and moral issues.

The Factual Issues

The factual issues that are relevant to a case are always of crucial importance. Often, however, the place of a factual issue in a moral problem is not clear. Three theses regarding the place of factual issues in a moral problem can illustrate this claim.

First, many times disagreements that appear to be over moral issues turn out to be disagreements over the relevant facts. Suppose two engineers disagree over whether the government should enforce affirmative action policies in the workplace. They may think their disagreement is over the moral issue of the permissibility of affirmative action policies. Further discussion may reveal, however, that their real difference is over the factual question of how discrimination can be eliminated. On the one hand, Tom may think that, apart from affirmative action policies, women and minorities will continue to experience gross discrimination in the workplace. Jim, on the other hand, may believe that fair treatment in the workplace can be achieved without governmental intervention. Furthermore, Jim may admit that if governmental intervention is the only way to eliminate injustice in the hiring system, he would be in favor of it too. Thus the real difference between Tom and Jim is not over any moral beliefs, but over a factual belief about what it takes to eliminate unjust hiring practices. If they could agree on the factual question as to how injustice to women and minorities could be eliminated, they could agree on their moral evaluation of the permissibility of governmental intervention.

A second thesis about factual issues is that often disagreement over the facts is every bit as difficult to resolve as disagreement over moral principles. Let us continue the example of the argument between Jim and Tom over affirmative action policies. Whether or not governmental intervention in hiring policies is the only way to eliminate injustice toward women and minorities is an issue over which people can and do argue interminably. Tom may cite cases in which discriminatory hiring practices continued for many years and were only eliminated when affirmative action policies were enforced. Jim may argue that now things are different, that younger people would be much more inclined than their elders to hire on the basis of merit. Tom may reply that Jim's assumption about the future is as yet unproved, and the argument may continue without resolution. Sometimes factual disputes cannot be resolved.

A third thesis about factual issues is that, once the factual issues are clearly isolated, moral disagreement may re-emerge on another (and more clearly defined) level. Suppose Tom and Jim finally agree that their dispute over whether affirmative action policies are necessary to eliminate injustice in hiring policies cannot be resolved. They may then agree that the issue between them must be reformulated in the following way:

Given that the question whether affirmative action policies are necessary to eliminate injustice in hiring practices cannot be resolved, which policy should we adopt? Should we agree that affirmative action policies are right, because they make it less likely that women and minorities will suffer discrimination? Or should we conclude that affirmative action policies are wrong, because, in the face of uncertainty, greater weight should be given to the freedom of employers to hire whom they will?

Jim and Tom may still disagree, but the nature of their disagreement will be much clearer. Now it is clear that the real issue is what should be done in the face of factual uncertainty. The possibility of their coming to agreement is also much greater.

It is particularly important for engineering students to appreciate the central place of facts in moral controversies and the necessity of isolating the precise nature of disagreements over the facts. Sometimes engineering students leave a classroom discussion of a moral issue with an attitude that might be stated like this:

Well, here was another dispute about ethics in which nobody could agree. I am glad that I am in engineering, where everything depends on the facts that everybody can agree on.

Ethics is just too subjective.

As the example given above illustrates, such beliefs are often based on profound confusions about what was really going on in an ethical debate. Many times it is impossible to know what the facts are, especially when they have to do with future consequences and degrees of risk and safety. Many times so-called ethical disagreements are disagreements about the facts. When the differing factual assumptions are isolated and resolved, people can often agree. And when the factual disagreements are clearly isolated, sometimes the moral issues can be more clearly formulated, and even resolved.

Part of David Jackson's dilemma may be attributable to his problems in resolving some of the factual issues in the case. Let us consider some areas in which David may encounter such problems.

First, there seems to be some doubt as to whether and to what extent Z CORP has violated city regulations. On the one hand, Tom Richards, the environmental engineering consultant fired by Z CORP, believes that Z CORP has violated the regulations repeatedly. Professor Massin, on the other hand, believes that the case against Z CORP is not conclusive. Part of the problem is that two different tests are involved: an older and less sensitive test and a newer and more sensitive one. The newer test seems to show that Z CORP is violating the regulations—though only slightly. There is a question as to how long the violations have been going on, because the new tests have been used for only a short time.

Second, there is a question about the legal status of the new tests. Would courts use the old tests or the new tests in determining whether Z CORP has violated the law? The law specifies the old tests as the measure, but there might be reason to wonder what the courts would do if it were known that Z CORP was aware that it was violating the standards by the more sensitive tests.

Third, there is a question about the exact nature of the reports on discharge purity that David sends to the city each month. Does the report merely give the amount of heavy metals discharged for a given unit of effluent, or does it explicitly state that the discharge of heavy metals is of a certain amount as measured by the old test? The answer to this question is important in considering the first question whether David is deceiving the city, although it is not sufficient to answer that question.

Fourth, David might have reason to wonder whether the consultant, Tom Richards, has ulterior motives which bias his position with respect to Z CORP. His consulting firm lost a valuable client in Z CORP, and he was insulted by being summarily dismissed by Z CORP. Is he pressing David to blow the whistle on Z CORP in order to punish the company for their treatment of him and vindicate his warnings about the toxic discharges?

Fifth, there are questions about the long-term health effects of introducing various amounts of heavy metals into Gilbane Gold. In his interview with the reporter, Professor Massin said that if Z CORP substantially increased its production, "then, we may have a problem." How substantial would this problem be? At what levels will there be a problem? Professor Massin may not be sure, although he seems to believe that the problem would be

significant. Other experts may be equally unsure.

Sixth, what would happen if Z CORP officials were to take David's suggestion and present their problem to the city? Would city officials recognize Z Corp.'s financial problems and attempt to work out some sort of equitable agreement with Z CORP? If Z CORP officials knew the city would make this response--perhaps by giving Z CORP further tax relief--they would probably not hesitate to follow David's suggestion. No one knows how the city of Gilbane would respond to an overture of this nature, but assumptions (and these are factual assumptions) as to how the city would react can have a powerful influence on one's judgment as to what should be done.

You can probably think of other factual issues which are important in the case. The exercise of isolating these issues and deciding how they influence one's thinking is an important part of the analysis of Gilbane Gold.

Conceptual Issues

A conceptual issue is a matter of definition, of what we mean by a term. Getting clear about the meanings of crucial terms is an important part of responsible ethical thinking. There are several conceptual issues in the case that call for clarification.

First, in commenting on the flaw in the law that allows Z CORP to legally discharge more toxic materials by increasing the volume of the discharge, Lloyd Bremen, former state commissioner of environmental protection, says that this loophole allows Z CORP to legally "poison" the sludge. He might just as easily have used other terms that would have conveyed a similar meaning. For example, he might have said that Z CORP is "endangering" the public by its actions. To say that Z CORP is "poisoning" or "endangering" the public would ordinarily be the same as saying that Z CORP is doing something wrong, for we do not ordinarily think that "poisoning" or "endangering" people is a good thing. Words, such as this, however, will repay closer examination.

Many terms used in ethical discussion have both a factual and a value component. The best way to see the double aspect of such words is to continue with the process of definition. Suppose we define "poisoning" or "endangering" as "imposing an unacceptable risk." Now the factual and value components are clear, for the term "unacceptable" implies a value dimension.

It is true that in determining what constitutes an unacceptable level of risk with regard to heavy metals in the sludge, we must determine the effects on human health of various levels of the contaminants. This is a factual issue. There is another dimension, however, which involves value judgments. In order to determine what constitutes "poisoning" the sludge, or "endangering" the public, we must determine the acceptable level of risk. What is the highest level of heavy metals that should be tolerated? At what level do the concentrations of heavy metals become unacceptable? We may decide that any measurable increase in heavy metals in the bodies of those who consume the vegetables fertilized by Gilbane Gold is unacceptable. Or we may decide that any level which produces any noticeable effects is unacceptable or we may decide that any level which produces a given effect in a given percentage of the population is unacceptable. Or one may use some other criterion.

In any case, a value judgment must be made in determining the levels at which the discharge is "poisoning" or "endangering" the public. Dr. Massin seems to believe that present levels of heavy metal discharge by Z CORP are acceptable, but that substantial increases may be unacceptable. David must decide whether to accept Dr. Massin's definitions.

A second conceptual issue has to do with the question whether David is engaging in "deception" when he signs

the monthly reports to the city without disclosing that newer and more sensitive tests show that Z CORP is violating city standards. To say that someone is engaged in "deception" is ordinarily to say that he is doing something wrong, although there may be justifiable instances of deception. If David is deceiving the city, this means he is doing something wrong, unless this is a justifiable instance of deception. Therefore it is important for David to know what he means by "deception."

It is not easy to come up with a satisfactory definition of deception. Most people would probably agree that actively denying something a person knows to be true or affirming something a person knows to be false are examples of deception. If David is called to testify before city officials and denies that the newer test shows Z CORP to be violating the standards, he would be engaged in deception. But this is not David's most immediate concern. Deliberately attempting to conceal information would probably also be considered a type of deception by most people, but David does not appear to be engaged in such a cover-up. The best description of David's action is probably that he has failed to come forward with information that is relevant, but which has not as of yet been required by the city. Is this deception?

Let us consider an example from medicine. Suppose a physician discovers that her patient has cancer and fails to reveal this information to him, even though she does not lie or actively conceal it. Most people would probably say she is deceiving her patient, even if they think the deception is justified. This is because (a) the information that a physician fails to reveal is important for the patient, and (b) patients ordinarily expect their physicians to tell them about their illness, given their relationship to the physician.

Both of these considerations seem important in the concept of deception. Failing to reveal information that is irrelevant to a situation would not ordinarily be considered deception. If a physician is making inquiries about my health and I fail to mention that I have an interest in antique cars, this would not usually be considered deception. My interest in old cars is just not relevant to the state of my health. If I fail to mention that I am a heavy smoker, this would be deception.

Likewise, what one would ordinarily expect a person to reveal is also relevant to the issue of deception. A person whom I have just met does not expect me to reveal the details of my sexual history or the traumas of my early childhood. Failing to reveal this information is not deception. Similarly, I am not expected to reveal the proprietary secrets of my company, and the fact that I do not is not a case of deception. Everyone knows that I am not going to do this, even though it involves a failure to divulge information that might be relevant in a certain context.

Perhaps we can use these insights to construct a more formal definition of deception:

X deceives Y if X denies what is the case or asserts what is not the case or conceals information from Y or even fails to reveal information to Y (a) which is important for Y or (b) which Y would customarily expect X to reveal to Y, given X's relationship to Y.

This definition still leaves two questions unanswered. (1) David must decide whether his relationship to the city is one in which the city would customarily expect David to be forthcoming with information about the new test. (2) Even if David decides that his failure to come forward with the information is deception, he must decide whether it is a justifiable case of deception.

A third conceptual issue has to do with the definition of "fairness," a concept which is relevant to at least two issue in the Gilbane Gold case. There is a question whether the city of Gilbane is unfair in requiring Z CORP and

other businesses to bear the full financial burden of complying with the stringent standards imposed on industrial discharges into the sewer system. There is also a question whether Z CORP is fair to David in forcing him to take the possible legal liability associated with failing to disclose the results of the new tests to the city.

The concept of fairness is enormously complex and probably not subject to any simple definition. Perhaps it will be enough to say that fairness involves at least two elements. First, it requires free and informed consent. In order to be treated fairly, a person must be given the opportunity to make decisions in a non-coercive atmosphere and on the basis of as much information as possible. In particular, information relevant to his decision should not be deliberately concealed from him. Second, fairness requires that harm and benefit be shared in a roughly equal manner, unless there are other relevant circumstances. For example, it is not fair for one group to enjoy all of the benefits of a social policy and another group to bear all of its negative features.

In the next section we shall see how David might use these concepts in attempting to think clearly and responsibly about the moral and professional dilemma in which he finds himself. You may be able to think of other concepts which must be clearly defined before moral reasoning can proceed, but these are three of the most important. Now we shall consider the use of these concepts in making moral judgments.

Moral Issues: Relevance Problems

There are several moral issues in the case. Using terminology developed in the essay "Basic Concepts and Methods in Ethics," (appended to this report at the end of the cases) we can point out three relevance problems and one conflict problem that David must resolve. Recall that a relevance problem is one in which there is a difficulty in determining whether a concept applies in a given situation. A conflict problem is one in which two or more moral principles seem to be relevant to a given situation, and they seem to point to different judgments as to what should be done.

First, David must decide whether Z CORP is "poisoning" the sludge or "endangering" the health of those who consume the vegetables fertilized by Gilbane Gold. The facts are not completely clear, but it appears that Z CORP is violating the strict city regulations by the standards of the newer and more expensive test. The violations must be very small, however, for otherwise they would be detected by the older test. Since the strict regulations are intended to keep plants from poisoning the sludge and since the violations are minimal, it is difficult to argue that Z CORP is "poisoning" the sludge at the present time. If Z CORP increases its production 500%, then, as Professor Massin said, "we may have a problem." At the time of the story, however, it seems implausible to say that Z CORP is poisoning the sludge.

Second, David must decide whether he is engaged in deception in refusing to reveal the results of the new test to the city. We have given a definition of the concept of "deception" in the previous section. Now David must decide whether he is in compliance with this definition. Let us look at the definition again:

X deceives Y if X denies what is the case or asserts what is not the case or conceals information from Y or even fails to reveal information to Y (a) which is important for Y or (b) which Y would customarily expect X to reveal to Y, given X's relationship to Y.

It is certainly true that David is failing to reveal information to city officials which is important to them; the only question is whether the city would "customarily expect" David to reveal the information. One might argue that the relation of David to city officials is not at all like the relationship of a physician to her patient. David is an employee of Z CORP, and so one might argue that his relationship with the city is adversarial. Perhaps city

officials expect that he will reveal as little information as possible to them.

While it may be true that whether or not David is engaged in deception depends in part on the expectations that others have of him in his role as the environmental representative to the city for Z CORP, it is also true that David is a professional engineer. There are certain expectations that come with this role as well. As an engineer, David is expected to adhere to standards of honesty and integrity. According to professional engineering codes, he is also expected to be concerned with the health, safety, and welfare of the public. It is difficult to believe that city officials would not consider David's concealing the information from the new tests to be a breach of faith and perhaps even a violation of the law. The letter from the city to David is an indication that city officials expect David to be forthright with them. So it seems reasonable to conclude that if David fails to reveal the information about the new tests, he is engaged in deception.

In the deliberation that he is engaged in, David might attempt to persuade himself that, while failure to disclose the results of the new tests to the city is a type of deception, it is justifiable deception. He might point out that Z CORP is not required to use the new tests, and therefore that Z CORP is not required by law to reveal the results of these tests to the city. He might also recall that Z Corp.'s plant is only marginally profitable and that the plant's closing would represent a substantial loss to the city. Finally, David could argue that the new test was performed at Z Corp.'s own expense, and he might even claim that the information about the tests should be considered "proprietary."

While not without a point, these arguments are ultimately unconvincing. The fact that something is not required by law does not mean it is not morally obligatory, so the fact that reporting the results of the new test is not a legal requirement does not mean it is not a moral requirement. The fact that the plant is only marginally profitable does not mean that its economic viability should be preserved by deceptive practices. There may be other ways (which will be discussed later) to preserve the plant. Finally, even though Z CORP may have paid for the tests, their results are not proprietary information, and their results may be relevant to the health of the public.

There are other reasons for believing that deception is not justified in this situation. David has a legitimate concern for his own legal liability, professional reputation, and the possible loss of his license. Considerations of self-interest are legitimate, within certain limits, and this is one situation in which these concerns seem legitimate. Deception is also not justifiable when the health and safety of the public are at risk.

Probably David's most pressing concern is the prospect of a five-fold increase in Z Corp.'s production, and what this will mean for the health of those who consume vegetables fertilized by Gilbane Gold. He probably believes that a dialogue should be started with the city as soon as possible, and that this dialogue cannot be conducted effectively if Z CORP has already shown bad faith with the city. Concealing information will only exacerbate the problem, and the information probably cannot be concealed for very long in any case. Here, as in most cases, honesty is the best policy.

David faces a third relevance problem in deciding whether principles of fairness have been violated. One of the issues involving fairness is whether the city of Gilbane has itself acted unfairly toward Z CORP. There are good arguments that Z CORP has been treated unfairly in terms of both of the elements of fairness discussed earlier.

Fair treatment involves free and informed consent. David could argue that Z CORP was treated unfairly because the company was enticed with tax abatements to build a plant in Gilbane, and then the city imposed unusually stringent regulations on the discharge of heavy metals. Even if it is true that (1) the standards have been impartially imposed on all firms, that (2) the standards may be necessary to make Gilbane Gold safe, and that (3)

the city of Gilbane may not have been fully aware of the dangers posed by the increased discharge of the heavy metals until after the new plants were built, it is also true that firms such as Z CORP were not able to make a free and informed decision about building the Gilbane plant.

A second aspect of fairness is that harms and benefits should be roughly equally distributed. Yet the city of Gilbane appears to be forcing the business sector to bear the full economic burden of protecting Gilbane Gold from contamination, while keeping all of the profits from the sale of Gilbane Gold for itself. City officials would no doubt argue that the plants that cause the pollution should have to clean it up, but Z CORP officials might argue that fairness requires only that Z CORP clean up its discharge to the level stipulated by national standards. Gilbane's regulations, by contrast, are ten times more stringent than those imposed by the United States government. Furthermore, the unusual restrictions are needed only because the city uses the sludge to make Gilbane Gold. Perhaps fairness requires the city to bear that part of the cost of pollution control that is created by the city's stricter standards. It could do this by a tax rebate to the plants or by a direct payment to them.

In the light of these considerations, David might well conclude that there is an issue of fairness between Z CORP and the city of Gilbane. This implies that if Z CORP officials inform the city of the results of the new test, they would have a good moral case for asking the city to agree to some type of accommodation. Whether the city would do this is, of course, another matter.

There is another issue of fairness in the case. In forcing David to sign the documents affirming Z Corp.'s compliance with city discharge standards when he knows that by the more sensitive tests Z CORP is violating those standards, Z CORP is being unfair to David. It is forcing him to make decisions that are neither free nor informed. When David took employment with Z CORP, he probably did not agree to engage in such questionable activities. Furthermore, David is being forced to place his professional career in jeopardy. If he signs the documents he knows to be misleading, he may be in danger of losing his license and facing prosecution. If he refuses to sign the documents or blows the whistle, he may be dismissed and blackballed by other employers.

Moral Issues: Conflict Problems

David's situation confronts him with a number of conflicting moral demands. He must evaluate these demands and try to find a way to reconcile as many of them as possible. It will be helpful to enumerate these demands and evaluate their strengths.

The results of the previous analysis strongly suggest that David cannot continue to sign reports asserting that Z CORP is in compliance with city regulations on the discharge of heavy metals. In the light of David's knowledge of the results of the new test, he would be guilty of deception with regard to the city. It is also unfair to him for Z CORP to ask him to jeopardize his license and perhaps even his professional career by forcing him to sign documents that he knows to be misleading.

David may well believe not only that continuing to sign the documents would violate the ethical prohibitions against deception and fairness, but also that it would violate his positive obligation as an engineer to protect the health and safety of the public. While present discharge levels (even if slightly above regulations by the new test) may not constitute any severe health risk, the time will soon come when Z CORP will be discharging heavy metals in quantities that will be a threat to public health. Z CORP should begin negotiating with the city as soon as possible, and this negotiation must take place in an atmosphere of trust. This will be much more difficult if Z CORP is known to have engaged in deceptive reporting to the city.

David also has an obligation to Z CORP. He is an employee and therefore has an obligation to defend the company insofar as ethical considerations will allow. His obligation is not only to defend the integrity of the company, but also to do what he can to insure that a marginally profitable plant survives economically. Furthermore, the city may well have been unfair to Z CORP in imposing the strict discharge standards after Z CORP had moved to Gilbane and without giving financial assistance to the company in meeting the standards.

David has an obligation to the people of Gilbane as well. In addition to the obligation to protect their health and safety, he also has an obligation to do what he can to save a marginally profitable plant that employs thousands of local residents. Z CORP may not be the only plant that is in financial trouble. If the new test is required by city regulations and if the law is rewritten to prevent plants from being able to comply with the law merely by increasing their volume of discharge, other plants may face closure. David must try to meet the need of Gilbane citizens for jobs as well as their need for good health.

Resolving the Conflict Problem: What Should David Do?

David must find some way to honor these conflicting moral demands in an ethically and professionally responsible manner. It is important for students to understand that the preceding ethical analysis does not provide a ready-made guideline as to how he should do this. The preceding analysis establishes ethical constraints, but it does not tell David precisely how he should solve the problem within the context of these constraints. As with a problem in engineering design, it is one thing to supply the constraints in terms of which the problem must be solved and another thing entirely to provide a solution to the problem.

Let us briefly review the ethical constraints in terms of which any solution should be found. We have concluded that David should not continue to sign the documents reporting the discharges into the sewer line. We shall also assume that, as an employee of Z CORP, David should represent his company in a responsible way to the public (including the city) and that he should do what he can to promote the plant's economic viability. We have not argued for this claim, except to point out that there is an element of unfairness in the city's imposition of the unusually strict discharge requirements. It goes without saying that an employee owes his employer responsible service, insofar as this is compatible with ethical considerations. We shall also assume that David should attempt to protect his own professional reputation and his career. This is merely legitimate self-interest, and it is especially important in the light of the fact that Z CORP seems to be imposing an unfair burden on David in requiring him to sign the discharge reports under questionable circumstances.

Now the question is: How should David act so as to honor these constraints in the way that provides the optimal solution? There are many possible solutions, just as there are many possible solutions to a problem in engineering design. Some solutions are good, and others are bad, and there may be no single correct solution. David must engage in some brainstorming in order to act in the most creative and ethically responsible way.

David's inadequacies were probably most evident in his resolution of the conflict problem. He seems to be aware of most of the important ethical constraints, but his solution of the problem may not have been a very good one. It was made very quickly in the conversation with Prof. Massin and Tom Richards. Let us attempt to take David's standpoint (the standpoint of the agent) and determine whether any more thoughtful resolutions of his problem are possible.

(1) Probably the most appealing option for David is to attempt an inexpensive technical solution to the problem. If the discharge of heavy metals can be reduced to acceptable amounts, even as measured by the new test, Z Corp.'s problems would be eliminated. If the amounts of heavy metals discharged with increased production can

be reduced to a total amount no greater than present allowable discharges, even Z Corp.'s long-term problem will be resolved. It is David's responsibility as an employee and a professional engineer, as well as his responsibility to himself and his own career, to explore this avenue as thoroughly as possible.

There are two broadly different ways in which the discharge of heavy metals could be reduced. One way is to reduce the amounts of heavy metal wastes from the production process itself. The other is to prevent the heavy metals from being discharged into the sewer. If neither of these procedures can be accomplished in an economically feasible way, David should document this and bring it to the attention of management.

(2) Let us suppose that David finds that there is no inexpensive technical solution to the problem. One option open to him is to explain to his superiors why he believes that Z CORP should attempt to work out some accommodation with the city. He should come up with a specific recommendation for solving Z Corp.'s problem. While emphasizing that he does not want to usurp her management role, he might suggest to Diane that she could provide city officials with documentation that would verify her claims that Z CORP operates on a narrow profit margin and that there is no inexpensive solution to the problem of the discharge of heavy metals. He might also suggest that Diane talk to managers of other industries in the area. If they are experiencing similar problems, perhaps the managers could meet as a group with city officials and ask for additional tax relief.

Diane claims that corporate headquarters is not interested in the plant's problems, but she may not have made a serious effort to convince them of the seriousness of the problem. David could try to persuade Diane that it is part of her responsibility to make a more forceful case with corporate management. She could point out that, with increased production, the problem is only going to get worse and that the city is finally going to learn about the problem. At that time, the atmosphere between Z CORP and the city will be much less conducive to profitable negotiations, because the relationship of trust will have been broken. Now is the time to approach the city with concrete proposals for a solution.

(3) Another option is for David to talk to officials of his professional society. This course of action was mentioned in the tape, but it was not pursued. It is not clear whether professional societies would be helpful: their record of supporting ethical professionals is not encouraging. At the very least, professional society officers might be able to offer a young engineer some helpful advice.

(4) Another option for David is to make clear to Phil and Diane that he believes his professional integrity is on the line in this issue. He could say that, if he continues to sign the discharge reports, he is going to have to make it clear to city officials that Z CORP is conforming to city regulations only by the old standards (if indeed it is), but not by the new standards. Unlike the other options, this is a type of insubordination, and it might cost him his job, but firing David in the present circumstances might be difficult for Z CORP.

(5) Another possibility is for David to take his case directly to corporate officers outside the Gilbane plant. This is a dangerous tactic in terms of his own career. Since his obligation to his own professional development is a real and completely legitimate one, he should not take this option if at all possible.

(6) A more desirable option is to tell Phil and Diane that he has already been summoned to appear before city officials and that he is going to mention the results of the new tests. He should make it clear to Phil and Diane that his professional integrity and his concern for his own legal liability will not allow him to do anything else. At the same time, he should emphasize that he will try to represent Z CORP in a responsible manner and that he will tell city officials that Z CORP is in a difficult financial situation and that there is no inexpensive technical solution to the problem.

(7) Still another possibility is to tell Phil and Diane that his professional integrity will no longer allow him to sign the discharge reports to the city. He should make such a statement without a self-righteous tone and in as non-confrontational a manner as possible. He should probably make it clear that, at least at the present time, he will not make any attempt to go public and that he will make every effort to continue to be a loyal employee. He should also say that he may not be able to keep the matter within the company, because city officials already want to talk to him. He should also emphasize that the problem is only going to get worse for Z CORP. The new production will only increase the discharge of toxic materials. Even if Z CORP is able to fulfill the technical requirements of the law by increasing the volume of discharge, the public is already aware of the problem, and the law will probably be changed. He should use all of his powers of persuasion to argue that firing him or refusing to face the problem will make matters worse for Z CORP.

(8) The final--and probably most undesirable--option is the one David chose, namely granting an interview to the TV reporter. This option is the least desirable for several reasons. First, it breaks the relationship with Z CORP and severely jeopardizes his own career. Second, it poisons the relationship between Z CORP and the local community. Third, it does not solve any problems. It does not, provide any plan for reducing the toxic discharges or for solving Z Corp.'s economic problem. All of these problems must be worked out later--and in a much more adversarial atmosphere. This option should be used only as a last resort.

Additional Notes

Essay #7, "Engineering and the Environment" appended to the end of the cases listed in this report will be particularly relevant to the instructor preparing to lead discussion on "Gilbane Gold." Similarly, Essay #6 "Loyalty and Professional Rights" will also be pertinent. Also, Essays #1 through #4 will have relevant background information for the instructor preparing to lead classroom discussions. Their titles are, respectively: "Ethics and Professionalism in Engineering: Why the Interest in Engineering Ethics?;" "Basic Concepts and Methods in Ethics;" "Basic Concepts and Methods in Ethics;" and "Engineering Design: Literature on Social Responsibility Versus Legal Liability."

The video-tape "Gilbane Gold" is available through the National Society of Professional Engineers, 1420 King Street, Alexandria, VA 22314.

Gilbane Gold Overheads

1. Cast of Characters
2. Ethical Issues Of The Case

GILBANE GOLD

Cast Of Characters

Z CORP

Diane Collins: Z CORP vice president in charge of the Gilbane plant. She reports to corporate headquarters, and is the sole representative of the plant who does so. She is reported to by,

Frank Seeders: In charge of the plant operations, an engineer.

Phil Port: Manager and Head of environmental affairs, not an engineer. He is reported to by,

David Jackson: The young engineer who is the nominal protagonist in the video. He is an engineer and PE responsible for signing plant effluent reports and keeping the plant in compliance with regulations.

Dan Martin: Z CORP. lawyer from the corporate office.

Non-Employees

Tom Richards: Environmental engineering consultant who was fired by Z CORP. He has the new test which shows the company is discharging excessive toxic waste. He also encourages David to blow the whistle on Z CORP.

Lloyd Bremen: Former state commissioner of environmental protection, now retired and a farmer who uses Gilbane Gold on his ranch. Though he oversaw the regulations, he now is critical of the rules regarding the testing of effluent.

Dr. Winslow Massin: Professor emeritus, Hanover University, School of Engineering.

Maria Renato: TV Reporter who does the up-close piece on Z CORP.

GILBANE GOLD

Ethical Issues Of The Case

1. Does the presentation of the case by Maria Renato affect the decision made by David Jackson?
2. In what ways does the fact that David's boss is not an engineer affect David's actions?
3. Does Prof. Massin add any insight into what actions David should perform? That is, would you look to a former professor to help you deal with an ethical issue?
4. If you were David would you look to your professional society for advice on how to handle the situation?
5. The plant manager is presented with conflicting reports from her employees. How could David have presented his concerns more effectively to the plant manager?
6. Do you think Z CORP is "poisoning" the soil at present levels of discharge? What about a 500% increase?
7. Do you think David is deceiving the city if he does not reveal the results of the new test? Regardless of whether he is deceiving the city, is failing to reveal the results of the new test justified?
8. Do you think Diane's actions are unfair to David?

GILBANE GOLD

Ethical Issues Of The Case

(continued)

9. Do you think the city is treating Z CORP unfairly? Should it bear some of the expense of complying with its

strict effluent standards?

10. Do the actions of the ex-consultant Tom Richards seem in any way to have ulterior motives?

11. Does David have any other options that he did not consider?

Gilbane Gold:

A Video Case Study Produced By

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Student Handout

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Additional Case Materials Provided and Prepared in the Departments of Philosophy and Mechanical Engineering

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Introduction

The videotape, "Gilbane Gold," presents a hypothetical case involving a young engineer, David Jackson, who faces a problem posed by discharges from his plant, Z CORP, which is located in the town of Gilbane. You will not experience the challenge posed by the tape if you take the position of an external judge and determine what David "should have done." Instead, try to put yourself in the position of David and ask yourself what you would do in this situation, realizing that your job is probably on the line.

Here is a list of other characters and organizations in the videotape:

Z CORP is a computer components manufacturer which discharges wastewater containing small amounts of lead and arsenic into the city sewer system.

Diane Collins is the Z CORP vice president in charge of the Gilbane plant. She is the only link between the plant and corporate headquarters.

Frank Seeders, an engineer, is in charge of the plant operations.

Phil Port is the chief environmental officer for Z CORP.

David Jackson, as a registered professional engineer, is responsible for signing plant discharge reports and keeping the plant in compliance with regulations.

Dan Martin is a lawyer for Z CORP.

Tom Richards is an environmental engineering consultant who was dismissed by Z CORP for advocating the use of newer and more sensitive tests which show that Z CORP is often not in compliance with the standards for heavy-metals emissions.

Lloyd Bremen, former state commissioner of environmental protection, is a retired farmer who uses Gilbane Gold on his ranch. Though he oversaw the enforcement of the regulations designed to protect Gilbane Gold from contamination, he now believes they may be too weak.

Dr. Winslow Massin is professor emeritus at Hanover University School of Engineering.

Maria Renato is a TV reporter who narrates the coverage of the controversy over Gilbane Gold.

Questions for Discussion

In this case you have been asked to assume the role of David Jackson and ask yourself what you would do in his situation. The following questions are directed to you in your role as David Jackson.

1. Does the presentation of the case by Maria Renato affect the decision made by David Jackson?
2. In what ways does the fact that David's boss is not an engineer affect David's actions?
3. Does Prof. Massin add any insight into what actions David should perform? That is, would you look to a former professor to help you deal with an ethical issue?
4. If you were David would you look to your professional society for advice on how to handle the situation?
5. The plant manager is presented with conflicting reports from her employees. How could David have presented his concerns more effectively to the plant manager?
6. Do you think Z CORP is "poisoning" the soil at present levels of discharge? What about a 500% increase?
7. Do you think David is deceiving the city if he does not reveal the results of the new test? Regardless of whether he is deceiving the city, is failing to reveal the results of the new test justified?
8. Do you think Diane's actions are unfair to David?
9. Do you think the city is treating Z CORP unfairly? Should it bear some of the expense of complying with its strict effluent standards?
10. Do the actions of the ex-consultant Tom Richards seem in any way to have ulterior motives?
11. Does David have any other options that he did not consider?