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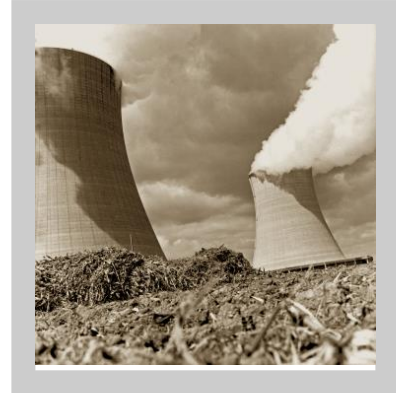
Meltdown

On January 3, 1961, nine days after Christmas, Richard Legg, John Byrnes, and Richard McKinley were killed in a remote desert in eastern Idaho. Their deaths occurred when a nuclear reactor exploded at a top-secret base in the National Reactor Testing Station (NRTS). Official reports state that the explosion and subsequent reactor meltdown resulted from the improper retraction of the control rod.

When questioned about the events that occurred there, officials were reticent. The whole affair, in fact, was not discussed much, and seemed to disappear with time.

In order to grasp the mysterious nature of the NRTS catastrophe, it helps to know a bit about how nuclear reactors work. After all, the generation of nuclear energy may strike many as an esoteric process. However, given its relative simplicity, the way in which the NRTS reactor functions is widely comprehensible. In this particular kind of reactor, a cluster of nine-ton uranium fuel rods are positioned lengthwise around a central control rod. The reaction begins with the slow removal of the control rod, which starts a controlled nuclear reaction and begins to heat the water in the reactor. This heat generates steam, which builds pressure inside the tank.

As pressure builds, the steam looks for a place to escape. The only place this steam is able to escape is through the turbine. As it passes through the turbine on its way out of the tank, it turns the giant fan blades and produces energy.



On the morning of January 3, after the machine had been shut down for the holidays, the three men arrived at the station to restart the reactor. The control rod needed to be pulled out only four inches to be reconnected to the automated driver. However, records indicate that Byrnes yanked it out 23 inches, over five times the distance necessary. In milliseconds the reactor exploded. Legg was impaled on the ceiling; he would be discovered last. It took one week and a lead-shielded crane to remove his body. Even in full protective gear, workers were only able to work a minute at a time. The three men are buried in lead-lined coffins under concrete in New York, Michigan, and Arlington Cemetery, Virginia.

The investigation took nearly two years to complete. Did Byrnes have a dark motive? Or was it simply an accident? Did he know how precarious the procedure was? Other operators were questioned as to whether they knew the consequences of pulling the control rod out so far. They responded, "Of course! We often talked about what we would do if we were at a radar station and the Russians came. We'd yank it out."

Official reports are oddly ambiguous, but what they do not explain, gossip does. Rumors had it that there was tension between the men because Byrnes suspected the other two of being involved with his young wife. There is little doubt that he, like the other operators, knew exactly what would happen when he yanked the control rod.

- 1) As used in paragraph 1, which is the best antonym for **reticent**?
- A. nosy
 - B. talkativereserved
 - C. concerned
- 2) As used in paragraph 2, which is the best definition for **esoteric**?
- A. risky or dangerous
 - B. highly scientific
 - C. kept secret
 - D. understood by few
- 3) Based on information in paragraph 2, it can be understood that which of the following is directly responsible for energy production in a nuclear reactor?
- A. the turning of the turbine blades
 - B. the escape of pressurized steam
 - C. the removal of the control rod
 - D. the positioning of the uranium fuel rods
- 4) Which of the following literary devices does the author use in the passage?
- I. *Hyperbole*, characterized by the use of specific words and phrases that exaggerate and overemphasize the core of the statement in order to produce a grander, more noticeable effect. This usually works to convey an action or sentiment that is generally not realistically possible or plausible but helps to emphasize an emotion.
 - II. *Foreshadowing*, characterized by the use of words or phrases that hint at something—typically something bad—that is going to happen later in the story. This is done without revealing the story or spoiling the suspense.
 - III. *Flashback*, characterized by a depiction of specific events which have taken place before the present time in the narration. Flashback devices that are commonly used are past narratives by characters, depictions and references of dreams, and memories. Flashback is used to provide background information to the present situation, place or person.
- A. I only
 - B. I and II only
 - C. II and III only
 - D. I, II, and III

- 5) As used in paragraph 4, which is the best synonym for **precarious**?
- A. slow
 - B. difficult
 - C. risky
 - D. involved
- 6) The author's tone can best be described as
- A. neutral
 - B. dejected
 - C. sarcastic
 - D. haunting
- 7) As used in the final paragraph, which is the best synonym for **ambiguous**?
- A. vague
 - B. disturbing
 - C. detailed
 - D. strange
- 8) Using the information in the final paragraph as a guide, which of the following statements would the author most likely agree with?
- A. Official reports about the disaster were detailed and conclusive.
 - B. Legg, Byrnes, and McKinley were best friends.
 - C. Byrnes deliberately yanked the control rod.
 - D. Rumors about the disaster are dubious and uninteresting.
- 9) In your opinion, what is the most plausible reason behind the NRTS disaster? Explain.

Answers and Explanations

1) B

Core Standard: **Craft and Structure**

reticent (*adjective*): disposed to be silent or not to speak freely; reserved.

To understand the meaning of words, it is often helpful to look at them in context. In this case, we need to look to the following sentence for clarification. In paragraph 1, the author states, "When questioned about the events that occurred there, officials were very reticent. The whole affair, in fact, was not discussed much, and seemed to disappear with time." From this information we can understand that the officials were *reticent* because they did not discuss the affair very much. This means that reticent means silent or reserved, so a good antonym is *talkative*. Therefore **(B)** is correct.

Nosy means snooping into or investigating others' affairs. Though the officials may have been investigating the incident thoroughly, they were not talking about it. Since the passage does not contain information about how thoroughly the officials investigated the incident, or how curious they were about it, **(A)** is incorrect.

Reserved is a synonym for reticent, not an antonym, so **(C)** is incorrect.

We do not know the level of the officials' concern about the incident based on the information in the passage; what we do know is that they were not discussing it. This means **(D)** is incorrect.

2) D

Core Standard: **Craft and Structure**

esoteric (*adjective*): understood by or meant for only the select few who have special knowledge of interest.

To understand the meaning of words, it is often helpful to look at them in context. In this case, we need to look to the following sentence for clarification. In paragraph 2, the author states, "After all, the generation of nuclear energy may strike many as an esoteric process. However, given its relative simplicity, the way in which the NRTS reactor functions is widely comprehensible." First, the author tells us that the process is esoteric. Then, the author contrasts this idea by telling us that the way in which this particular reactor functions is widely comprehensible. Given that something esoteric is contrasted with something widely comprehensible, we can infer that a good definition for esoteric is understood by few. This means **(D)** is correct.

Although the generation of nuclear energy is may seem risky or highly scientific based on information in the passage, context does not support this definition. Therefore, **(A)** and **(B)** are incorrect.

The passage does not provide information to support the idea that esoteric means kept secret. Therefore **(C)** is incorrect.

3) A

Core Standard: **Key Ideas and Details**

In paragraph 2, the author describes the process under which nuclear energy is created. At the end of this paragraph, the author outlines the role of steam in the turning of the turbine. The author concludes this explanation with the final cause that is directly responsible for energy production: "As it passes through the turbine on its way out of the tank, it turns the giant fan blades and produces energy." This lets us know that it is the turning of the turbine blades which is directly responsible for energy production. Therefore **(A)** is correct.

Although the escape of pressurized steam, removal of the control rod, and the positioning of the uranium fuel rods are all involved in the process of creating energy, none of them is directly responsible for turning the turbine. They are all indirectly responsible. This means **(B)**, **(C)** and **(D)** are incorrect.

4) C

Core Standard: **Key Ideas and Details**

There is no example of exaggeration for effect in this passage. Even extreme statements, such as "in milliseconds the reactor exploded" or "Legg was impaled on the ceiling," are reported as facts, not as exaggerations. This eliminates **option (I)**.

Several times the author hints at the mystery of the disaster and the rumored motive of Byrnes before it is revealed in the final paragraph. In paragraph 1, the author states that "the whole affair...was not discussed much" by the officials, implying that something might have been covered up. In paragraph 4, the author asks, "Did Byrnes have a dark motive?" Both of these quotes foreshadow the suspected motive which the author reveals in paragraph 5. This supports **option (II)**.

The meltdown is described in paragraphs 1 as an event in the past. Then, in paragraph 3, the author goes back in time to recreate the scene "on the morning of January 3," when the explosion happens. Because this scene flashes back to exactly what happened during the meltdown, it is considered a flashback. This supports **option (III)**.

Therefore **(C)** is correct.

5) C

Core Standard: **Craft and Structure**

precarious (*adjective*): doubtful; perilous; risky.

In paragraph 4, the author asks, "Did [Byrnes] know how precarious the procedure was?" Earlier, in paragraph 2, the author states that the procedure begins with "the slow removal of the control rod." In paragraph 3, the author describes the procedure even more specifically, writing that "the control rod needed to be pulled out only four inches to be reconnected to the automated driver." From this information, we can understand that in the procedure, the rod had to be pulled out slowly and only four inches. When Byrnes "yanked it out 23 inches," the reactor exploded. This means that pulling out the rod too far and too quickly caused the explosion. From this information we can understand that the procedure was *precarious* because it was dangerous, so in this context *risky* is a good synonym. Therefore **(C)** is correct.

Although the author does tell us that the removal of the control rod had to be *slow*, it was also crucial that the rod was not pulled out too far. Since the procedure was precarious for these two reasons, slow is not a good synonym for precarious. This means **(A)** is incorrect.

Removal of the control rod by four inches had to be done slowly and with care, but it was a procedure that was not particularly *difficult*, only dangerous. This makes **(B)** incorrect.

Again, because the removal of the rod only required pulling it out four inches slowly, it was not an *involved* procedure, but relatively simple. This means **(D)** is incorrect.

6) D

Core Standard: **Integration of Knowledge**

To identify the tone of the author, it is helpful to examine both the content and the author's language. The subject of the passage, which is the mysterious deaths of three young men due to a nuclear explosion, is serious and even upsetting. The fact that the "accident" could have been caused intentionally is even more unsettling. The author also uses words such as "oddly," "rumors," "gossip," and "dark." Because of the unsettling subject and the words which hint at a mystery, we can describe the tone as haunting. Therefore **(D)** is correct.

The tone would be neutral if the author's language were different. However, the words such as "oddly," "rumors," "gossip," and "dark" lend a mysterious feeling to the piece that is not neutral. This means **(A)** is incorrect.

Although the sad subject matter could be viewed as depressing, the author does not express personal sadness or dejection about the incident. The author's concern is primarily with the mystery of it. This makes **(B)** incorrect.

While the author does hint at a dark motive behind the explosion, there is no place where the author is sarcastic, or bitterly ironic, about the incident. This means **(C)** is incorrect.

7) A

Core Standard: **Craft and Structure**

ambiguous (*adjective*): allowing the possibility of several different meanings; unclear; inexact.

In the final paragraph, the author states, "Official reports are oddly ambiguous, but what they do not explain, gossip does." From this information we can understand that the reports were *ambiguous* because there was information that the official reports did not explain: gossip explained what the reports left out. Since the reports did not contain enough information to give a clear picture of what happened, it can be inferred that the reports were *vague*, which is a good synonym for ambiguous. Therefore **(A)** is correct.

Although the passage suggests that the incident was *disturbing* and *strange*, there is no information in the passage to suggest that the reports were disturbing or strange. Therefore **(B)** and **(D)** are incorrect.

A *detailed* report would explain the incident in great detail, but the passage tells us that there are things the reports "do not explain." This means **(C)** is incorrect.

8) C

Core Standard: **Integration of Knowledge**

In the final paragraph, the author writes, "There is little doubt that [Byrnes], like the other operators, knew exactly what would happen when he yanked the control rod." Since Byrnes knew exactly what would happen if he yanked the control rod, we can infer that the author would likely agree with the idea that he did so deliberately. Therefore, **(C)** is correct.

In the final paragraph, the author writes, "Official reports are oddly ambiguous, but what they do not explain, gossip does." This lets us know that the author thinks the disaster reports are not detailed and conclusive. This rules out choice **(A)**.

The author also writes, "Rumors had it that there was tension between the men because Byrnes suspected the other two of being involved with his young wife." This lets us know that the author thinks the men were not on good terms, and therefore were certainly not best friends. This means **(B)** is incorrect.

The author also writes, "Official reports are oddly ambiguous, but what they do not explain, gossip does. Rumors had it that..." This lets us know that the author subscribes to rumors about the disaster and finds them trustworthy and interesting. This makes **(D)** incorrect.