

NUCLEAR INSECURITY

News and world report/US

- I) Today, we'll come back to the subject of security in a nuclear power station, not only under the scientific lightning but rather under the political one. I suggest we study an American article, extracted from *News and world report*.**
- II) In pairs, answer the following questions:**
- What is the main advantage of using nuclear energy?
 - What is the main drawback?
 - What is the principal worry about the security of a nuclear reactor?
 - Do dangers always come from inside the power station?
- III) You have 10 min to read the text and match each paragraph with the following:**
1. The incredible power of fission
 2. How can risk come from outside?
 3. Measures of protection
 4. The dangers of radiation
- IV) Thanks to the text, answer the questions of exercise II) again (quote sentences out of the text):**
- It generates massive amounts of energy from scant amounts of fuel (1.41).
 - A nuclear reaction releases radiation, potentially life harming high-energy rays (1. 85).
 - Nuclear reactions generate so much heat that power plants demand giant cooling systems to prevent the uranium containers from overheating or melting down (1. 74).
 - Risk can come from terrorist attacks (1.37)
- V) Read the text again and find the equivalents of these words or expressions:**
- A.**
- To go across discreetly = to sneak past
 - To trigger = to unleash
 - The fusion of the nuclear reactor = meltdown
 - Attempt of entering = mock drill
 - To make stronger = to beef up
- B.**
- Tiny = scant
 - For equal masses = pound for pound
 - To release = to churn out
 - A small ball = a pellet
 - To start = to kick in
 - A response = a backup
- C.**
- Mortal = lethal
 - To disturb = to disrupt
 - To give back, to spread = to spew
 - To persist = to linger
 - To give funds for = to earmark
 - Easy to find = over-the-counter

D.

- To reveal = to disclose
- Properly = adequately

VI) What do these figures correspond to ?

- **52** : 52 MWh : energy provided by one pound of nuclear fuel.
- **150,000** : the amount of radiation in Curies released by the explosion of Chernobyl.
- **200,000** : the number of inhabitants which have been displaced for ever.
- **300** : 300 years : the time that radiation will remain in air, soil and water in Chernobyl.
- **1,800** : the number of children who have contracted cancer of thyroid after the accident

VII) Now, let's focus on each paragraph:

A.

- What are your feelings after reading the beginning of this paragraph (1.1 to 11)?
 - We are scared because at first, we believe it's true.
- Is that true?
 - No, it isn't, it's a simulation.
- What were the results of this simulation?
 - Bad results because more than 37 out of 67 have failed that test.
- What can reassure people now?
 - NRC & FBI work together to improve the security against terrorism.
- What do think about fig 1.?
 - The photograph is designed to reassure the reader about security.
- What is your opinion concerning this paragraph?
 - The journalist seems to think that the main insecurity consists of a terrorist attack, he never mentions a possible dysfunction of the power plant nor the dangers of the radioactive waste!

B.

- What percentage of electric power does nuclear energy represent? In the US? In France?
 - Nuclear energy represents 20% of electric power in the US and 75% in France.
- Is nuclear energy more or less efficient than fossil fuels like coal?
 - It's much more efficient.
- Which isotope of Uranium do we use for fission?
 - Uranium 235.
- Can natural ore be used directly?
 - No, it must be enriched (from 0.7 to 3%)
- As a pound is equivalent to roughly a half kilogram, check the statement : " it would take six tons of coal to generate the same amount of power " (1.53) Is there a mistake in the calculation? Is there a mistake in the words?
 - There is a mistake in the calculation: 6 tons make 6000 kg, so the amount of energy is multiplied by 12,000. And there is a mistake in the words : we must use energy instead of power.
- Find an other mistake line 65: the collision...
 - The ejected nuclei aren't uranium nuclei, but other ones because they have not the same number of protons.
- Is this mistake present in the fig 2? Why?
 - There is no mistake in fig 2 because the nuclei that collide with neutrons are larger than the ones that are ejected.
- What are the principal ideas the journalist wants to communicate in this paragraph?
 - Nuclear fission is great because it releases lots of energy with very few fuels and it is very secure !

C.

- What are the main dangers of nuclear power?
 - Radiation and radioactivity.
- Is Chernobyl the only accident which has occurred in nuclear industry?
 - Not at all, a lot took place in the US. The journalist doesn't mention them of course! But the worst occurred in Chernobyl.
- What measures do the US take to protect the population from induced cancer of thyroid in case of accident?
 - Authorities hand out tablets of potassium iodide and they provide evacuation plans for residents.

D.

- What other protections are buildings supplied with?
 - Concrete casing and confinement shells to prevent radiation leakage from escaping and to support explosion as well as earthquakes, hurricanes and plane collision.
- What is the tone of the last paragraph compared with the first one?
 - It is reassuring, comforting.

Fig.3.

- Which element of fig3 contributes to that comforting feeling? What does the nuclear power plant resemble?
 - It resembles a fortified castle, a citadel...
- What are the main buildings you recognize among those you have studied?
 - The reactor, the cooling tower, the turbine generator, the pumps.

Do you think, the article is very objective?

What is the most important cause of danger that isn't mentioned in the article?

To which extent does the article reveal the American culture?

(Security by weapons and no matter about environment...)