

ALBRIGHT ATTEMPTS TO DEFLECT NEUTRON ACTIVATION ISSUE AT PARCHIN

On May 15, I pointed out that the claims associated with the cartoon published by George Jahn of AP purporting to depict a high explosives chamber used by Iran at Parchin (this is a new link for the cartoon, the AP link in the May 15 post no longer works for me) and in a report by David Albright claiming that Iran has taken actions aimed at cleansing the Parchin site were rendered baseless by the likelihood that if the accused work on a neutron initiator for a nuclear weapon had indeed been carried out at Parchin, then the chamber would be rendered radioactive throughout the thickness of its steel by the process of neutron activation. Yesterday, Albright published even more photos of the Parchin site that he claims document further cleansing activity and in the discussion section of his report he finally addressed the issue of neutron activation. In order to make the issue of neutron activation go away, Albright is now proposing that the uranium deuteride presumed to be present in the explosion would produce too low a flux of neutrons to produce appreciable neutron activation of the chamber's steel, even though Jahn is claiming that the Iranians placed a neutron detector outside the chamber, presumably to measure the neutron flux that passed through its steel walls.

Here is the relevant portion of a 2009 report by Albright describing the neutron initiator:

If the data in this document are correct and the descriptions of the work are accurate, then this report appears to be describing a plan to further develop and test a critical component of a nuclear weapon, specifically a neutron initiator

made out of uranium deuteride (UD₃), which when finished (and subsequently manufactured) would most likely be placed at the center of a fission bomb made from weapon-grade uranium. This type of initiator works by the high explosives compressing the nuclear core and the initiator, producing a spurt of neutrons as a result of fusion in D-D reactions. The neutrons flood the core of weapon-grade uranium and initiate the chain reaction.

Albright goes on to describe the issue of producing neutrons and measuring their production:

The measurement of the neutrons emitted by this UD₃ source would be the hardest measurement Iran would need to make in developing a nuclear weapon. This assumes that Iran believes it cannot do a full-scale nuclear test, although it would be expected to do a "cold test" of the full device as a way to gain confidence the nuclear weapon would perform as expected. . . . The timing of the explosion and resulting shock waves would need to be perfect in order to get enough fusion to create a spurt of neutrons in a reliable manner at exactly the right instant. The experiment itself is very difficult to do. There are relatively few neutrons emitted in a brief period of time and there is a lot of noise from the electronics that interferes with the neutron measurements.

It should be noted here that although Albright is discussing a "cold test", that means the test is carried out without the weapons grade uranium which the initiator sets off in the nuclear explosion. The uranium deuteride is still present as the primary part of the initiator and is producing the neutrons which are to be

measured. Although Albright does claim that few neutrons are produced in the explosion in the latter part of the description, he refers to a “spurt” of neutrons that “flood” the weapons grade uranium in the earlier portion. The fact remains that in such an experiment, significant quantities of uranium are present and there would be neutrons released into the steel of the chamber the entire time the uranium is present, not just during the brief explosion.

As further support for the uranium deuteride initiator being the primary focus of the narrative promoted by Albright and Jahn, it should be kept in mind that Jahn mentions that the chamber is “equipped with” “a neutron detection system outside the explosion chamber to measure neutron emissions”. Jahn goes on to quote another expert who posits the use of uranium in the experiments with explosives:

Diplomats subsequently told the AP that the experiments also appear to have involved a small prototype neutron device used to spark a nuclear explosion – equipment that would be tested only if a country was trying to develop atomic weapons.

/snip/

“What one does inside such a chamber is conduct high explosives testing,” said Mark Fitzpatrick, director of the Non-Proliferation and Disarmament Program of the International Institute for Strategic Studies. “You are going to make something go boom with maybe 70 kilograms (more than 150 pounds) of high explosives, you need to contain the explosion.

“And particularly if you are using uranium, which is reportedly the case, you want to contain all the uranium dust so there’s not any tell-tale, observable signals of that experimentation.”

In his report yesterday, Albright suddenly came up with a German publication which he cites as evidence that the neutron flux from the explosives experiments would be too low to produce significant neutron activation. Don't be distracted by the presence of tungsten being used as a surrogate material. It is not a surrogate for the uranium deuteride initiator, it is a surrogate for the weapons grade uranium that would be present in a bomb. That means this is the "cold test" described in Albright's earlier work:

Some have raised the possibility that, if the explosive chamber had been used to test a neutron initiator, this type of test would leave behind a radioactive signature in the steel. According to *Süddeutsche Zeitung* (article in German language), the chamber could have been used to test a uranium deuteride initiator at the center of a sphere of tungsten used as a surrogate material, all of which would have been compressed by high explosives. If successful, the resulting fusion of deuterium would have produced a small spurt of neutrons. In this case, a tiny fraction of these neutrons would have activated elements in the steel chamber. This has led to the question whether the induced radiation could now be detected by the IAEA. However, in such a neutron initiator test, the number of neutrons is very small and many of the activated materials would have had relatively short half-lives.

Albright's argument that "many" of the nuclides produced by neutron activation are short-lived is meaningless here, as I have pointed out that the primary evidence that IAEA could find if such experiments were indeed carried out would be Cobalt 60, which has a half-life of over five years.

However, even Albright does not seem entirely

convinced by his own argument here, as he immediately moves on to how Iran could otherwise deal with neutron activation in the chamber due to the Cobalt 60 present:

Although long lived radionuclides should have been produced in such a test, they would exist in very small quantities. Claims that such radioactive materials would be easily detectable today appear doubtful. Moreover, the detection of minute amounts of long-lived radionuclides in the steel chamber may not provide definitive proof of an initiator test. Iran could claim that the steel was already contaminated when it purchased it. In addition, Iran could have removed the chamber altogether, preventing any risk of such detection, even if it were possible to accomplish.

The issue of "contaminated" steel presumably could be addressed by sampling other steel items manufactured by the company that is said to have produced the chamber, since Jahn provides the name of the company said to have made the chamber. In fact, Jahn even provides an approximate production date, so other steel produced by this company around the same time could be sought out for testing.

Finally, however, Albright gets to the conclusion I have been stating all along. If Iran really did carry out uranium deuteride initiator work in the chamber, their best bet for hiding the neutron activation evidence would be to remove the chamber in its entirety.

In a very interesting development somewhat tied to the concept of "removing" the chamber in which the accused work may have been carried out, Gareth Porter published a report yesterday in which he calls into question the very existence of a chamber.