

## Cutting Through the Fog on 'Possible Military Dimensions' to Iran's Nuclear Programme: Large berm at the end of the building at Parchin

by Robert Kelley

On 14 July 2015, the Joint Comprehensive Plan of Action (JCPOA) was agreed after more than two years of intensive negotiations between France, Germany and the United Kingdom (E3), the European Union (EU), China, Russian federation and the United States of America (+3), E3/EU+3 and Iran, on ensuring the exclusively peaceful nature of Iran's nuclear activities. On the same day, the International Atomic Energy Agency (IAEA) and Iran agreed on a work plan called the Road-map for the Clarification of Past and Present Outstanding Issues regarding Iran's Nuclear Programme. Under the Road Map, the IAEA and Iran also concluded separate arrangements to address the issues of: (1) possible military dimensions to Iran's nuclear programme as set out in the Annex to the November 2011 IAEA report; and (2) of activities at Parchin, a large military-industrial factory in Iran.

Over past years, since November 2011, the issues of PMD and Parchin have been the subject of many analyses in the public domain, some which instead of clarifying the underlying issues have muddied waters. In a series of assessment, Robert Kelley, Associated Senior Research Fellow with the Disarmament, Arms Control and Non-Proliferation Programme at SIPRI, who has experience in nuclear intelligence and remote sensing, respectively at the U.S. Los Alamos National Laboratory and the U.S. Department of Energy, discusses some of the key issues and misperceptions concerning PMD and Parchin. These assessments are designed to acquaint the public with the truth and the application of the scientific method to information analysis in the service of peace and security. While some are trying to make the problem seem difficult, competent and experienced intelligence analysts use many tools to understand information and paint a clear picture. These tools include measurements of objects, categorization of objects, historical imagery over a relevant period of time, and, of course, common sense plus experience. **The third of these assessments looks at allegations regarding a berm at Parchin.**

### Large berm at the end of the building

The IAEA identified the building of interest at Parchin largely due to a shield at the south end of the building. One might think that at first the IAEA identified it because they saw the large cylinder, but if you read their statement carefully, you can see that the shield itself was the key:

*The explosives vessel, or chamber, is said to have been put in place at Parchin in 2000. A building was constructed at that time around a large cylindrical object at a location at the Parchin military complex. A large earth berm was subsequently constructed between the building containing the cylinder and neighboring building, indicating the probable use of high explosives in the chamber. The Agency has obtained commercial satellite images that are consistent with this information.*

Note that the IAEA does not say they have imagery of the cylinder, only that their imagery is consistent with a berm. The “berm” is actually small for the Parchin factory and they have leapt to the conclusion that it is probably for high explosives without exploring its actual characteristics.

29 November 2014



Is the berm at the end of the building consistent with high explosives protection? For starters, the berm is very small compared to other berms at Parchin. And we only have to study the dozens of explosives handling buildings within a few kilometres to see that this one is different.

#### **How are berms designed?**

- Berms normally are an inverted “Vee” shape: an accidental blast does not strike a flat wall but is directed over the top
- Berms are located away from the edge of a building to give the blast wave some room to dissipate
- They normally do not have a concrete facing.
- They protect property and people on all sides where they are at risk.

The Parchin “berm” fails all these tests. It is a big flat concrete shielding wall that forms a driveway at the south end of the building. It only protects one small nearby building but not people on the road running through the site to the north end, and neither its parking lot nor the other end of the building of interest. (The rocky bluff protects the fourth side.) The wall extends out only a few metres from the angle of hazard of postulated explosives.

The alleged chamber must be aligned along the axis of the building for it to fit. This suggests that designers were only betting the south end of a symmetrical cylinder would fail in an accident: if it were an explosion chamber. Most of the other buildings at Parchin protect all the angles of hazard from a design basis accident. But the designers of the alleged chamber at Parchin were concerned about rupture through the cylinder walls so they put a massive concrete collar around the central explosion point to reinforce it. This means the berm should surround the middle of the building as well. And finally, the greatest hazard comes when an alleged explosive experimental package is being moved in the building before it is put in the chamber. There is no physical protection at that point. The IAEA claims the chamber is designed to contain an experiment with 70 kg of high explosive; design practice at all other Parchin buildings would dictate protection on all sides subject to rupture.

There is a much simpler explanation. The concrete wall is clearly for protection against a hazard. It has earth piled behind it. It is on one end of the building because the hazard it is protecting against is only directed to this end. The most logical reason to have a wall with earth behind it in this industrial situation is called a “beam stop” for a powerful industrial x-ray machine or accelerator commonly used for non-destructive testing of welds and internal structure of items being manufactured. It is shielding for x-rays, not explosives. It is located close to the building to stop x-rays that are being scattered by objects and walls.

**Conclusion: The snap judgement in the 2011 IAEA PMD annex is not backed up by the evidence seen in satellite imagery and clearly visible in dozens of other sites around the Parchin plant.**