



May 23, 2014

ISIS Analysis of IAEA Iran Safeguards Report

by David Albright, Paulina Izewicz, Andrea Stricker, and Serena Kelleher-Vergantini

The International Atomic Energy Agency (IAEA) released on May 23, 2014 its [report](#) on the implementation of NPT safeguards in Iran and the status of Iran's compliance with Security Council resolutions.

Key Findings:

1. Iran has taken measures agreed upon in the Joint Plan of Action, including ceasing enrichment to 19.75 percent, finishing down blending about 100 kilograms (kg) of near 20 percent low enriched uranium (LEU) hexafluoride, and converting most of the rest of its stockpile of 19.75 percent hexafluoride;
2. Iran has not installed any new centrifuges of any type at Natanz or Fordow fuel enrichment plants;
3. Iran continues R&D work at the Natanz Pilot Fuel Enrichment Plant;
4. Iran's stock of near 20 percent LEU hexafluoride is approaching zero. However, the LEU is not disappearing. Iran retains a large total stock of near 20 percent LEU, about 230 kg of near 20 percent LEU (uranium mass) in various chemical forms, mostly oxide. If this stock of near 20 percent LEU were all reconverted into hexafluoride form, it would total about 340 kg of near 20 percent LEU hexafluoride, more than enough to produce sufficient weapon-grade uranium for a nuclear weapon;
5. Iran has agreed to an additional five practical measures under the IAEA/Iran Framework for Cooperation, but the IAEA needs to do a better job of explaining how it judges Iran's implementation of all of these measures, in particular the measure involving Exploding Bridge Wire detonators.
6. IAEA will conduct a "system assessment" of outstanding possible military dimension (PMD) issues with Iran, possibly indicating Iran's lack of cooperation on resolving these issues. It is unclear how the IAEA's apparently long timeline with regard to resolving these outstanding issues will be congruous with the looming July 20th deadline for Iran to conclude a long term agreement with the P5+1; and

7. **The IAEA (and ISIS) have observed ongoing activity at Parchin, calling into question the IAEA's ability to verify alleged nuclear weapons related activities at the site. Iran's efforts to modify the site, despite international criticism of its actions, raise questions about whether Iran intends to address the IAEA's concerns about its past and possibly continued nuclear weapons activities.**

LEU production and centrifuge levels at Natanz Fuel Enrichment Plant (FEP)

Iran's total 3.5 percent low enriched uranium (LEU) production at the FEP through May 13, 2014 is reported to be 11,767 kilograms (kg), including 676 kg estimated to have been produced since February 9, 2014. The FEP is Iran's primary enrichment facility, where the majority of its IR-1 centrifuges are installed. Activity at the Pilot Fuel Enrichment Plant (PFEP), where Iran has enriched uranium up to the 20 percent level until January 20, 2014, is discussed below.

The average production of 3.5 percent LEU at the FEP decreased slightly from the past reporting period to approximately 218 kg per month from approximately 235 kg per month of LEU hexafluoride. This rate is lower than Iran's production through 2013 and most of 2012.

Since November 10, 2013, Iran has had 90 IR-1 centrifuge cascades fully installed for a total of 15,420 IR-1 centrifuges, the same as the previous reporting periods. The number of cascades enriching, 54, remains constant since the previous reporting period; these cascades contain approximately 9,166 centrifuges enriching. Iran fed 7,024 kg of natural uranium hexafluoride into the cascades at the FEP, which is lower than Iran's feed rate throughout 2013 and much of 2012. Iran's centrifuge performance at the FEP can also be evaluated in terms of separative work units (swu). ISIS derives this value from information about LEU production. In the most recent reporting period, the LEU is taken as on average as being 3.5 percent enriched, and the waste is assumed to have on average a tails assay of 0.4 percent. The IAEA did not provide updated concentrations in this report, but these older numbers are used, based on interviews with knowledgeable senior officials close to the IAEA. Using standard idealized enrichment calculations, 676 kg of LEU translates to 1,662 kg of swu, or 17.87 kg swu/day. On an annualized basis, this is about 6523 kg swu per year (see Figure 6). These numbers are slightly lower than the FEP's operation throughout 2013.

The average swu/centrifuge-year for this period was slightly lower than the performance at the FEP throughout 2013 at 0.71 swu/centrifuge-year. However, for most of 2010, this value was about 0.9 kg U swu per year per centrifuge (see Table 1, which lists these values on a quarterly basis since the FEP started operation, and Figure 6, which displays this data graphically). This consistently lower enrichment output likely indicates that Iran is continuing to have trouble with the IR-1 centrifuges installed at the FEP. Although, reports state that fewer IR-1 centrifuges are breaking at the FEP.

Installation of Advanced Centrifuges at Natanz Fuel Enrichment Plant

In a letter dated January 23, 2013, Iran informed the IAEA that its advanced, carbon fiber-based centrifuge, designated the IR-2m, "will be used" in one of the modules of Production Hall A. This statement is being widely interpreted as Iran announcing that it intended to install about 3,000 IR-2m centrifuges, which is the normal deployment in a module.

Under the Joint Plan of Action, Iran agreed to halt installation of any additional centrifuges and to not begin enriching in any new machines. In the unit containing IR-2m centrifuges, as of 14 May 2014, the situation remained unchanged from the IAEA's previous report: six cascades had been fully installed with IR-2m centrifuges; none of these cascades had been fed with natural uranium hexafluoride; and preparatory installation work had been completed for the other 12 IR-2m cascades in the unit.

Iran had not begun enriching in any of these cascades. Figure 7 tracks the IR-2m installation at the FEP.

Advanced Centrifuges at Natanz Pilot Fuel Enrichment Plant (PFEP): New "IR-8" Centrifuge Casing Installed; Iran Downblending 20 Percent LEU

Iran is not precluded from continuing its centrifuge R&D activities under the Joint Plan of Action, although it cannot feed uranium hexafluoride into any centrifuges that had not been fed with UF₆ as of November 2013. Four out of six cascades at the pilot plant are dedicated to this on-going research and development (R&D).

They are cascades 2, 3, 4 and 5. As of May 11, 2014, there were:

In Cascade 2: 13 IR-4 centrifuges (up from 11 IR-4 centrifuges on February 15, 2014, down from 14 on November 3, 2013, 17 on August 12, 2013, 19 on May 14, 2013, and 29 on February 19, 2013); 9 IR-6 centrifuges (up from 7 IR-6 centrifuges on February 15, 2014, down from 13 on November 3, 2013, which was up from 12 on August 12, 2013, down from 14 on May 14 2013, and up from six on February 19, 2013); 0 IR-6s (down from 1 IR-6s centrifuge on February 15, 2014, same as November 3, 2013, down from 8 on August 12, 2013, 3 on May 14, 2013 and two on February 19, 2013); one IR-5 centrifuge (same as previous report); and one IR-1 centrifuge (up from zero in previous report);

In Cascade 3: 14 IR-1 (same as in previous report); and 10 IR-2m centrifuges (up from zero on February 15, 2014, and down from 2 IR-2m centrifuges removed after November 2013 report);

In Cascade 4: 164 IR-4 centrifuges, same as in the past year;

In Cascade 5: 162 IR-2m centrifuges, same as in the past year.

Since the previous report, Iran has intermittently fed natural UF₆ into IR-6s centrifuges as single machines and into IR-1, IR-2m, IR-4 and IR-6 centrifuges, sometimes into single machines and sometimes into cascades of various sizes. It has not yet fed the single installed IR-5 centrifuge with UF₆, and under the interim arrangement, cannot do so through July 20, 2014. On December 4, 2013, Iran provided the IAEA with an updated Design Inventory Questionnaire (DIQ) which informed it of its intention to install a single "new centrifuge" called the IR-8. Since then, Iran has installed a new casing which is still without connections. Iran has committed not to feed this centrifuge with uranium hexafluoride.

Between February 10, October 26, 2013 and February 9, 2014, Iran had fed a total of 430.1 kg of natural UF₆ into the centrifuges in the R&D area, but recombined the enriched product and depleted tails. Between February 10, 2014 and May 6, 2014, a total of approximately 389.1 kg of natural UF₆

was fed into centrifuges in the R&D area, but no LEU was withdrawn as the product and the tails were recombined at the end of the process. So, in total for these two periods, Iran fed a total of 819.2 kg of natural UF₆. There is no specific information about the performance of these advanced centrifuges.

19.75 percent LEU production at the Natanz pilot plant: Halted on January 20

From February 2010 to January 2014, Iran designated two, tandem cascades at the smaller, above-ground Pilot Fuel Enrichment Plant for the production of LEU enriched to nearly 20 percent uranium-235, ostensibly for the Tehran Research Reactor. One of these cascades enriched from 3.5 percent LEU to almost 20 percent LEU, while the second one received the tails from the first and outputted roughly 10 percent LEU and a tails of natural uranium. The ten percent material was fed into the first cascade in addition to 3.5 percent LEU. This process allowed Iran to more efficiently use its 3.5 percent LEU stock. **Per its agreement with the P5+1, Iran ceased production of 19.75 percent enriched uranium in these cascades and began producing 3.5 percent enriched uranium as of January 20, 2014.**

Between October 26, 2013 and January 20, 2014, 90 kg of 3.5 percent low enriched uranium in the form of uranium hexafluoride was introduced into the two, interconnected cascades. Iran withdrew from the tandem cascades a total of 13 kg of nearly 20 percent LEU hexafluoride during this reporting period. This rate, approximately 4.6 kg per month, represents a slight decrease of 0.35 kg per month from previous reporting periods. **In total, Iran has fed 1,631 kg of 3.5% LEU to produce 202 kg of 19.75% uranium since the beginning of operations in February 2010.**

As of January 21, 2014, the IAEA reported that Iran began enriching to 3.5 percent in the cascades previously designated for 19.75 percent enrichment. Between January 20, 2014 and May 6, 2014, Iran had fed 265.3 kg to produce 26.1 kg of LEU enriched up to 5 percent of U-235.

On January 20, 2013, in line with its commitment under the JPA, Iran began downblending some of its inventory of UF₆ enriched to 20 percent U-235 to no more than five percent LEU hexafluoride. As of mid-April 2013, Iran had downblended 104.56 kg of this material, fulfilling its commitment to downblend half of the 209.1 kg of the nuclear material that had been in the form of UF₆ enriched up to 20% U-235 on 20 January 2014.

Fordow Fuel Enrichment Plant (FFEP)

The Fordow site has two enrichment halls, Units 1 and 2, which are currently each designed to hold 8 cascades of 174 IR-1 centrifuges. Iran was operating the four cascades of 174 IR-1 centrifuges each in two, tandem sets to produce 19.75 percent LEU in a total of 696 enriching centrifuges, the same number of centrifuges enriching as was reported in the August, May, and February 2013 reports as well as the November, August, and May 2012 safeguards reports. In compliance with the Joint Plan of Action, Iran stopped enriching to 19.75 percent in these cascades and began enriching to no greater than 5 percent LEU hexafluoride.

The Fordow facility remains nearly fully outfitted with centrifuges, though Iran has not increased the number of centrifuges enriching in five reporting periods. Figure 11 displays the number of centrifuges enriching and installed at the FFEP graphically.

As of January 21, 2014, the IAEA reported that Iran began enriching to 3.5 percent in the cascades previously designated for 19.75 percent enrichment. Between January 20 and May 13, 2014, Iran had fed 739.3 kg of natural uranium hexafluoride to produce a total of 76.5 kg of LEU enriched up to 5 percent U-235. On February 8, as previously reported by the IAEA, Iran updated the facility's Design Information Questionnaire as it "had taken measures due to change in level of enrichment and that the measures are temporarily taken during the first step implementation of the JPA."

Production of Near 20 Percent Uranium Oxide

Iran reported in the August 2012 report that it began feeding its 19.75 percent uranium hexafluoride into the Fuel Plate Fabrication Plant at Esfahan. As of the end of this reporting period, Iran had fed a total of 303.2 kg of 19.75 percent enriched uranium hexafluoride into the process at Esfahan to produce U_3O_8 containing about 142.5 kg of enriched uranium oxide (uranium mass). The 303.2 kg of near 20 percent LEU hexafluoride contains about 205 kg of enriched uranium (uranium mass). The IAEA verified 40.4 kilograms of uranium in liquid or solid scrap form. Thus, approximately 22.1 kg of enriched uranium remain held up in the process or in waste.

The IAEA also reports that as of May 11, 2014, Iran had produced 28 Tehran Research Reactor (TRR)-type fuel assemblies and one test fuel assembly. Twenty of these assemblies, including the test assembly, had been transferred to the TRR. The IAEA has continued its publication of additional data in annexes to its report. From this data, the TRR fuel and assemblies and plates contain 33.8 kilograms of near 20 percent LEU (U-mass). Of the total amount of 205 kg of near 20 percent LEU (uranium mass) sent for conversion, about 17 percent has been made into fuel assemblies for the TRR.

Taking Stock

Iran has produced a total of 11,977 kilograms of 3.5 percent LEU hexafluoride, which constitutes an increase of 866 kilograms since the previous report. About 3,437 kilograms have been used to make the 19.75 percent LEU hexafluoride. Across its three centrifuge facilities, it has installed 18,458 IR-1 centrifuges and 1,008 IR-2m centrifuges. Figure 7 shows IR-2m trends in Iran, and Figure 8 shows historical cumulative IR-1 centrifuge trends in Iran.

Combined, the PFEP at Natanz and the FFEP have produced 448 kg of 19.75 percent uranium, though Iran ceased production of this material on January 20, 2014. Figure 9 represents the cumulative production of 19.75 percent enriched uranium in Iran.

Of the 448 kg of near 20 percent LEU, according to the IAEA's May 2012 report, Iran had down blended 1.6 kilograms of 19.75 percent LEU hexafluoride into LEU enriched to less than five percent. Between December 17, 2011 and February 16, 2014 the IAEA reported that Iran fed into the process line at the Fuel Plate Fabrication Plant at Esfahan 303.2 kilograms of uranium hexafluoride enriched up to 20 percent uranium-235, or 205 kilograms of enriched uranium, and it produced 142.5 kilograms of near 20 percent enriched uranium in the form of U_3O_8 powder (U-mass). In total, Iran had a stock of 38.4 of near 20 percent LEU hexafluoride, down significantly from the last IAEA report. **Table 2 summarizes these findings. It should be noted that Iran retains a large total stock of near 20 percent LEU.**

Iran has a total stock of about 230 kg of near 20 percent LEU (uranium mass) in various chemical forms, mostly oxide. If this stock of near 20 percent LEU were all reconverted into hexafluoride form, it would total about 340 kg of near 20 percent LEU hexafluoride, more than enough to produce sufficient weapon-grade uranium for a nuclear weapon.

Iran has achieved varying rates of separative work in the IR-1 centrifuge at its enrichment plants. Although Iran continues to install and enrich in additional centrifuges at the FEP, the enrichment output measured in swu/centrifuge-year at this plant has varied and declined overall. During this reporting period, the FFEP achieved 0.87 swu/centrifuge-year, a decrease from the previous reporting period's 1.2 swu/centrifuge-year, and the PFEP cascades achieved 0.67 swu/centrifuge-year, an increase from 0.56 in the previous reporting period. Table 3 compares the enrichment output at the FEP, PFEP, and FFEP.

Arak IR-40 Reactor and Heavy Water Production Plant

According to a May 11, 2014 DIV at the IR-40 Reactor, Iran has not installed any major components at the IR-40 Reactor since the previous report, in line with its obligations under the interim deal, the Joint Plan of Action. Moreover, Iran continues to not produce nuclear fuel assemblies for the IR-40 Reactor.

Iran and the IAEA agreed on safeguard measures for the IR-40 Reactor, and, as part of the next five practical measures, Iran has pledged to conclude with the IAEA the safeguards approach for this reactor by August 25, 2014.

The IAEA gained managed access to the Arak Heavy Water Production Plant in December 2013 and gained relevant information. In a positive sign, the IAEA gained access to the heavy water storage location at the Uranium Conversion Facility (UCF) at Esfahan and was able to characterize the heavy water, a task it had sought for several years. The report did not state the results of this characterization.

New Research Reactor Planned

As noted in previous IAEA quarterly safeguards reports, Iran has declared one additional facility, the Fars Research Reactor (FRR). This reactor, according to Iran, will be a 10 megawatt-thermal light water reactor that will be fueled by low enriched uranium. The level of enrichment is not specified in the IAEA report. The reactor's planned location is in the vicinity of Shiraz. A construction schedule was not published.

Iran agrees to implement five additional measures under IAEA/Iran Framework for Cooperation; IAEA's reporting on "implementation" unsatisfactory

The IAEA reports that Iran has implemented the seven practical measures agreed in February 2014 under the IAEA/Iran Framework for Cooperation and it is "analysing the information provided by Iran." On May 20, the IAEA reports, Iran agreed to implement an additional five measures by August 25, 2014. These measures include:

- *Exchanging information with the Agency with respect to the allegations related to the initiation of high explosives, including the conduct of large scale high explosives experimentation in Iran.*
- *Providing mutually agreed relevant information and explanations related to studies made and/or papers published in Iran in relation to neutron transport and associated modelling and calculations and their alleged application to compressed materials.*
- *Providing mutually agreed information and arranging a technical visit to a centrifuge research and development centre.*
- *Providing mutually agreed information and managed access to centrifuge assembly workshops, centrifuge rotor production workshops and storage facilities.*
- *Concluding the safeguards approach for the IR-40 reactor.*

The IAEA has not included any information or a judgment about the adequacy of Iran’s implementation of the initial seven practical measures, in particular the most important one involving exploding bridge wire detonators. **Although it states that it continues to analyze information provided by Iran, the IAEA should clearly state that a measure is not resolved if it cannot yet draw conclusions from the information it has obtained.** It should provide more detail and avoid vague language in order for the international community to be able to reasonably assess progress and the status of Iran’s implementation of its Framework for Cooperation commitments. If the IAEA will delay any assessment on the possible military dimensions (PMD) of Iran’s nuclear program until it has evaluated the entirety of the information provided by Iran on outstanding issues as part of a larger, systemic assessment (as suggested below), it should more clearly state this.

With regard to the five additional measures, Iran’s pledge to allow access to centrifuge assembly workshops, rotor production workshops, and storage facilities, as well as provide associated mutually agreed information, appears to be a redundant commitment that Iran has already made under the parallel [P5+1 Joint Plan of Action](#). The Joint Plan of Action (JPA) states that Iran will allow “IAEA inspector managed access to: centrifuge assembly workshops; centrifuge rotor production workshops and storage facilities; and, uranium mines and mills.” This raises the question of whether Iran’s commitment to carry out these steps under the JPA has not been adequately met. The IAEA should explain the reason for this redundant commitment or explain how it differs.

The IAEA did report on one aspect of this cooperation. The report states that Iran has provided the IAEA with “an inventory of centrifuge rotor assemblies that will be used to replace those centrifuges that fail. The IAEA has analyzed the information provided by Iran and, upon request, has received additional clarifications.” It continues, “Based on analysis of all the information provided by Iran, as well as the managed access and other verification activities carried out by the IAEA, the IAEA can confirm that centrifuge rotor manufacturing and assembly are consistent with Iran’s replacement programme for damaged centrifuges.”

Iran’s Cooperation on Possible Military Dimensions Unclear; IAEA Seeks Systemic Assessment Implying a Lack of Cooperation

Iran agreed as one of the initial seven practical measures under the Framework for Cooperation to “Provide information and explanations for the Agency to assess Iran’s stated need or application for the development of Exploding Bridge Wire detonators (EBW).” The IAEA reports that on May 20 during a technical meeting between Iran and the IAEA, Iran “provided additional information and

explanations, including showing documents, to substantiate its stated need and application of EBW. Iran showed information to the Agency that simultaneous firing of EBW was tested for a civilian application.” The IAEA notes that its assessment of this information is ongoing and it may ask for additional information on this issue. Overall, the EBW issue appears unresolved.

It is worth noting that Fars New Agency, the semi-official Iranian news organization, may be conducting a disinformation campaign regarding Iran’s development of EBW. [In a story dated May 21](#), Fars discusses the agreement to five additional measures under the Framework for Cooperation, and lists the initial seven measures. However, it changes “Exploding Bridge Wire detonators (EBW)” to “Electron Bernstein waves (EBW) (new generation of safe fuses).” This change was also present in a February story. While this could be a mistake, it is unclear how it could have been possible, and as a practical matter, it is unclear how electron Bernstein waves could be associated with a new generation of safe fuses as this article asserts.

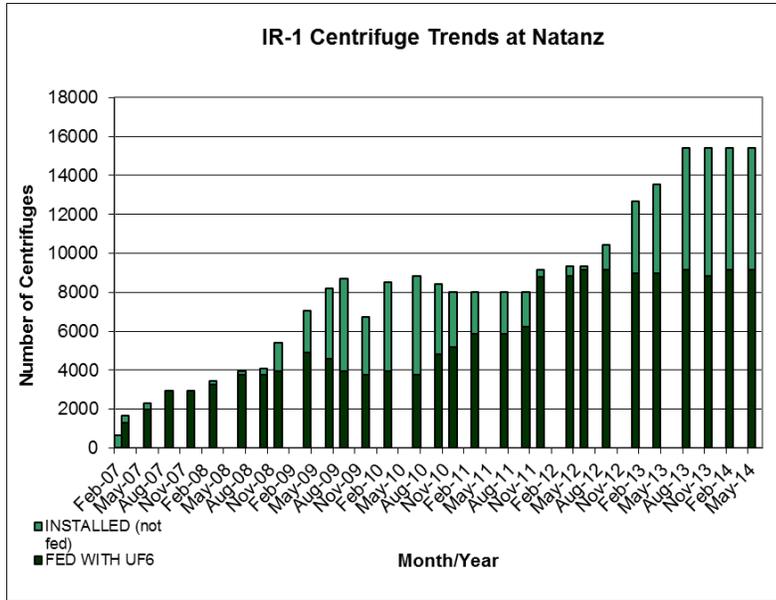
The IAEA informed Iran at a meeting on April 26 and in a letter dated May 12 that it “needs to be able to conduct a system assessment of the outstanding issues contained in the Annex to the Director General’s November 2011 report (GOV/2011/65). This will involve considering and acquiring an understanding of each issue in turn (of which EBW is one), and then integrating all of the issues into a “system” and assessing that system as a whole.” This approach likely reflects Iran’s lack of adequate cooperation on PMD issues. **Moreover, finishing this system assessment will likely take time and is unlikely to be finished before the interim July 20, 2014 deadline for the negotiation of a comprehensive solution by the P5+1 and Iran.**

Continued Activity Observed at Parchin

Although Iran has pledged to cooperate further on addressing the past and present issues over its alleged military nuclear programs, the latest report notes that the IAEA continues to seek access to a particular location at the Parchin military site and answers concerning the foreign expert alleged to have assisted Iran on high explosives related to the development of nuclear weapons. Previous ISIS reports have identified the foreign expert as a former Soviet nuclear weapons expert, who could have assisted Iran in research toward developing nuclear weapons.

The IAEA reports that Iran continues to take steps to modify the Parchin site, observed in IAEA satellite imagery and in [ISIS satellite imagery reports](#), which “seriously undermine[s]” the IAEA’s ability to verify activities at the site.” **The IAEA has observed new movement at the site. Since the previous report, satellite imagery shows “building materials, debris and earth deposits, as well as ongoing construction activities that appear to show the removal/replacement or refurbishment of the external wall structures of the site’s two main buildings.”** One building is alleged to contain a high explosive chamber; the alleged contents of the other building (located on the north end of the site) are not specified. Several of these new activities are highlighted in the latest [Parchin ISIS Imagery Brief](#).

Figure 1: IR-1 Centrifuge Trends at Natanz**



** The dark green bar represents the number of IR-1 centrifuges enriching, while the light green represents the number of IR-1 centrifuges installed but not enriching. The sum of the two represent the total number of IR-1 centrifuges installed at the FEP.

Figure 2: Uranium Hexafluoride Feed at the Natanz FEP

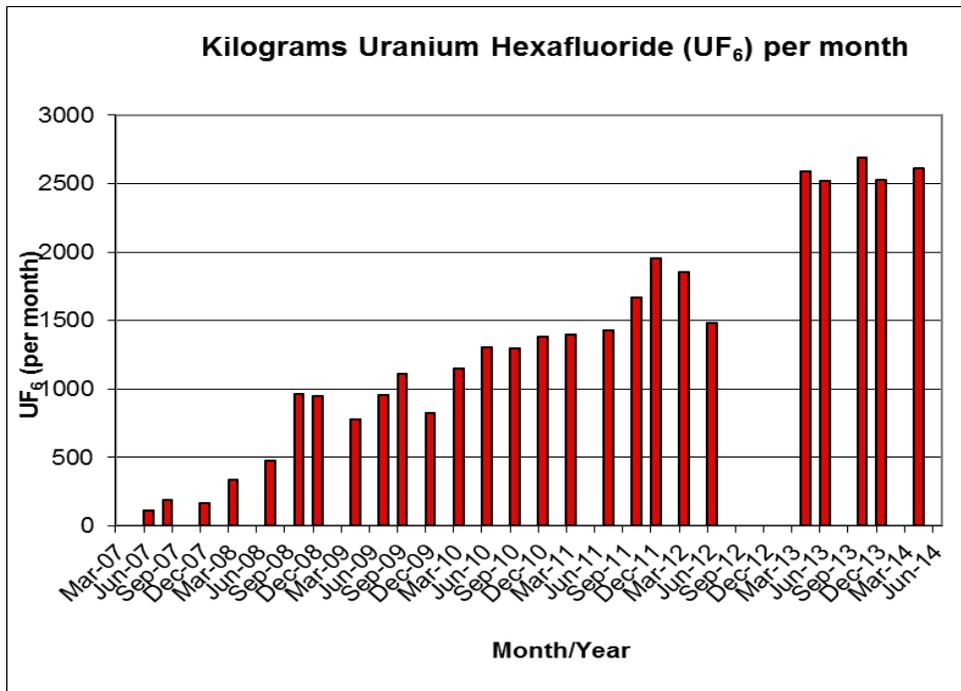


Figure 3: LEU Production (kilograms uranium hexafluoride per month) at Natanz

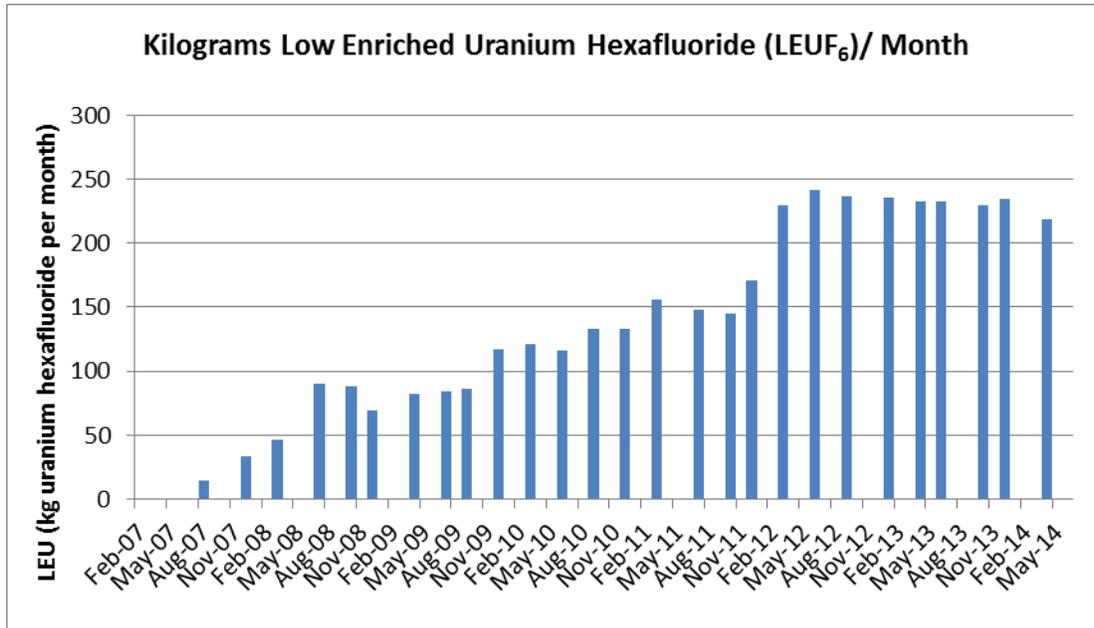


Figure 4: Overall Trends at Natanz

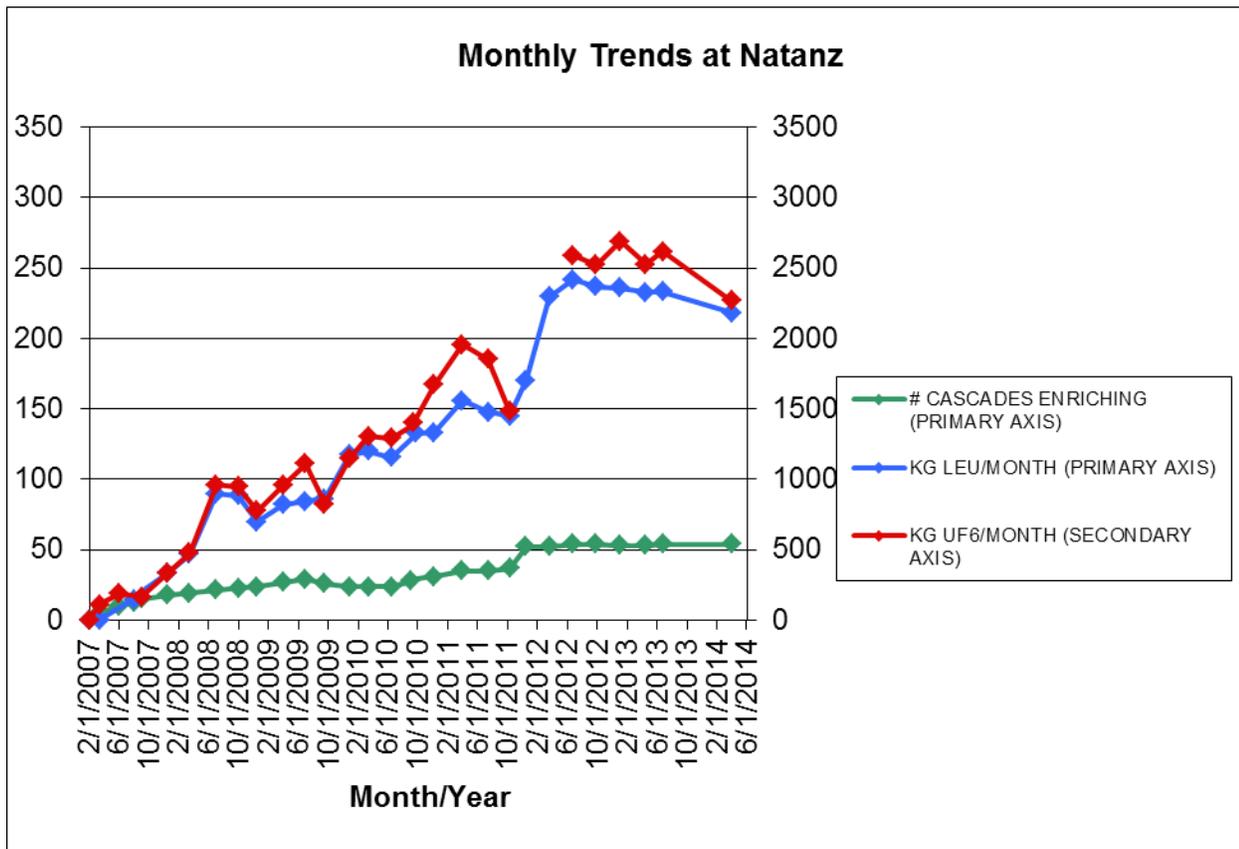


Figure 5: Cumulative LEU Production at the Natanz Fuel Enrichment Plant

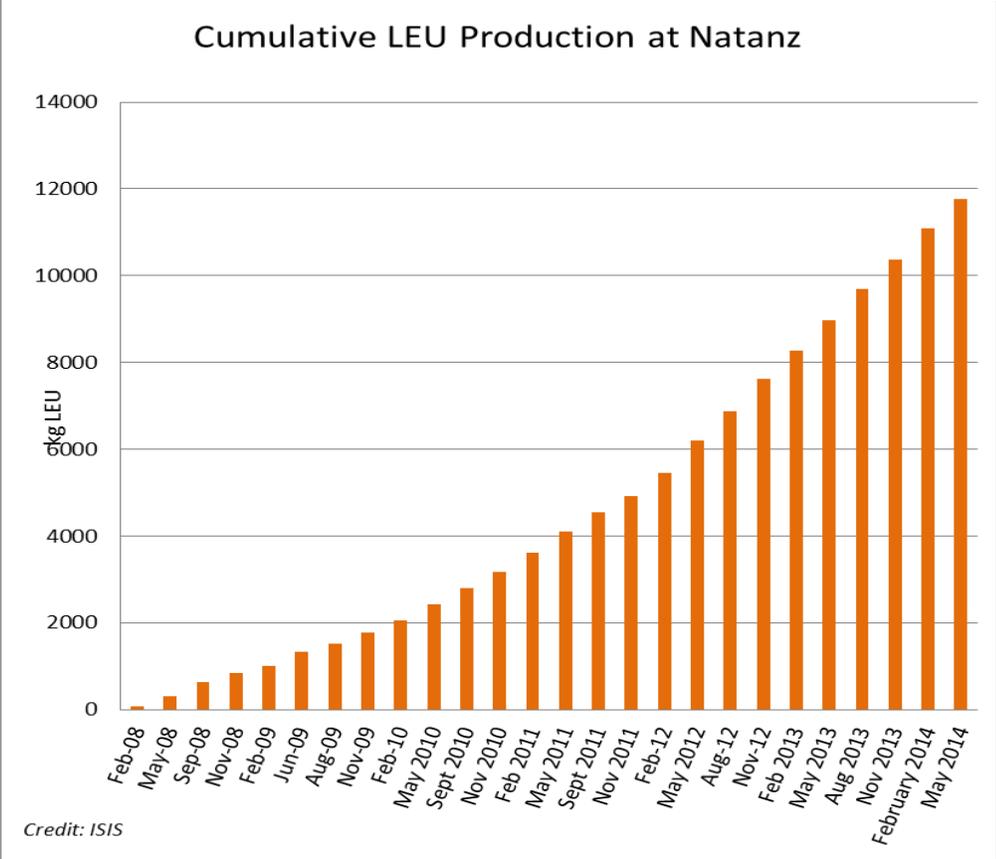


Figure 6: Annualized SWU at Natanz

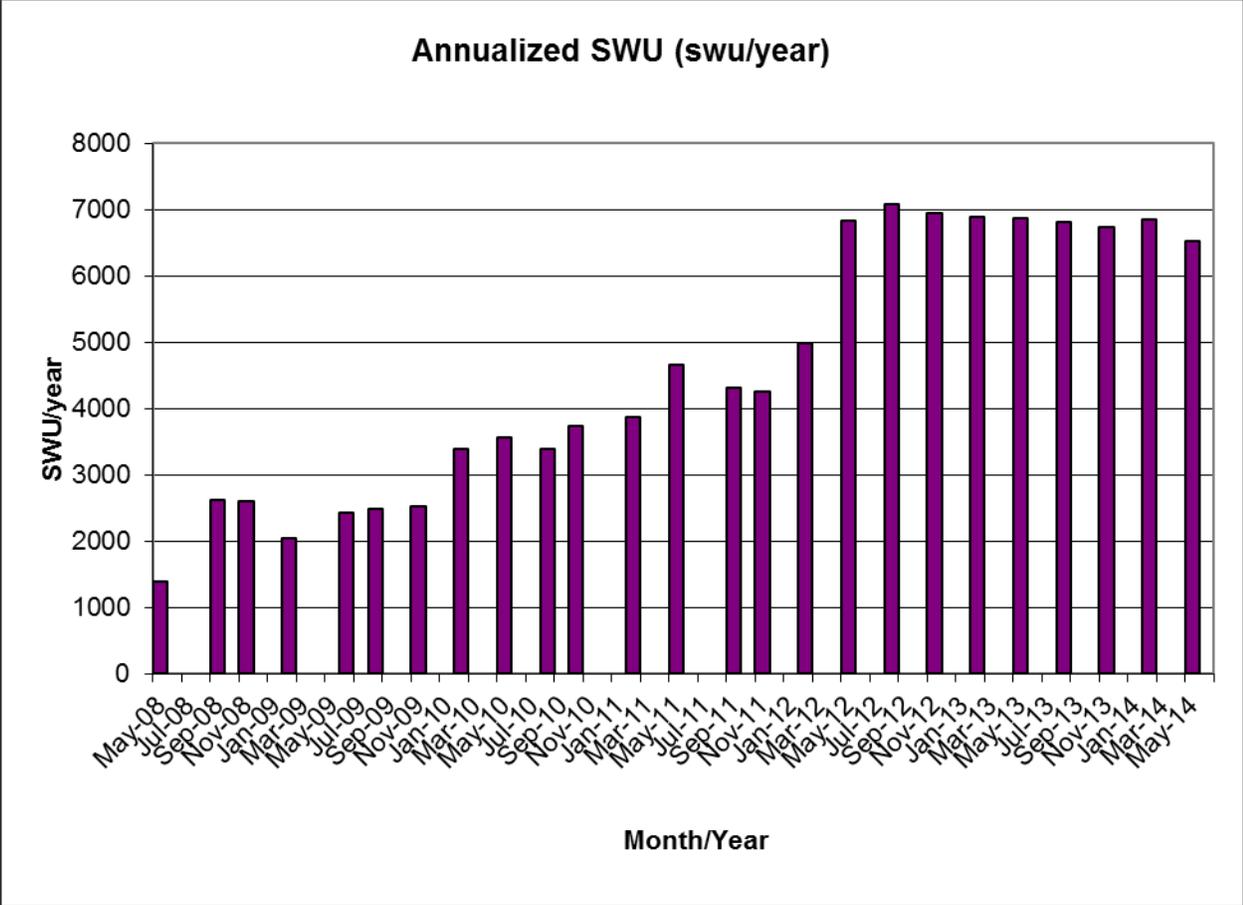


Figure 7: IR-2m Progress at the FEP

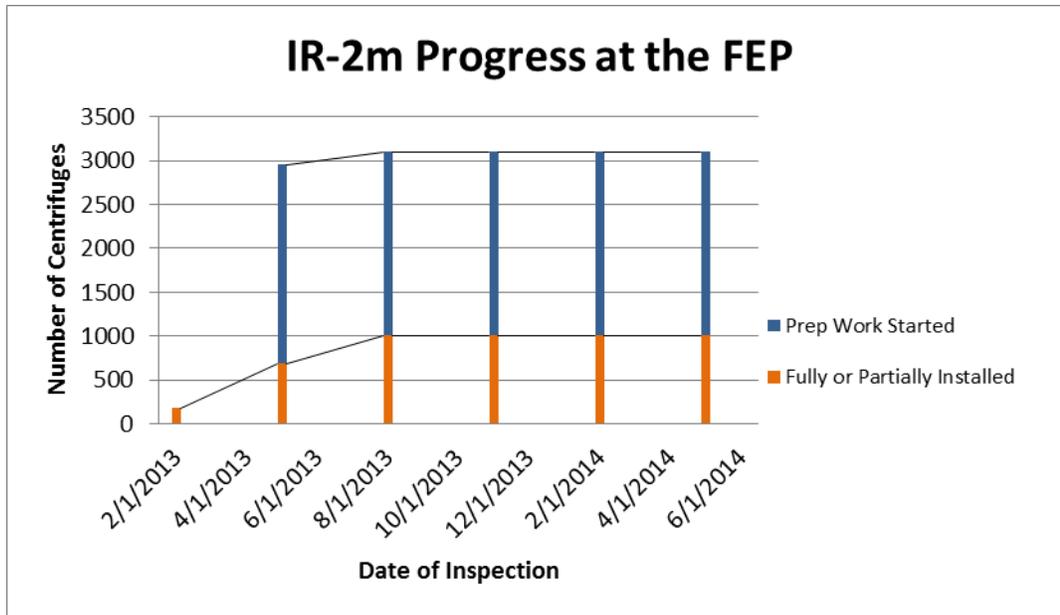


Figure 8: Total Number of Deployed IR-1 Centrifuges in Iran

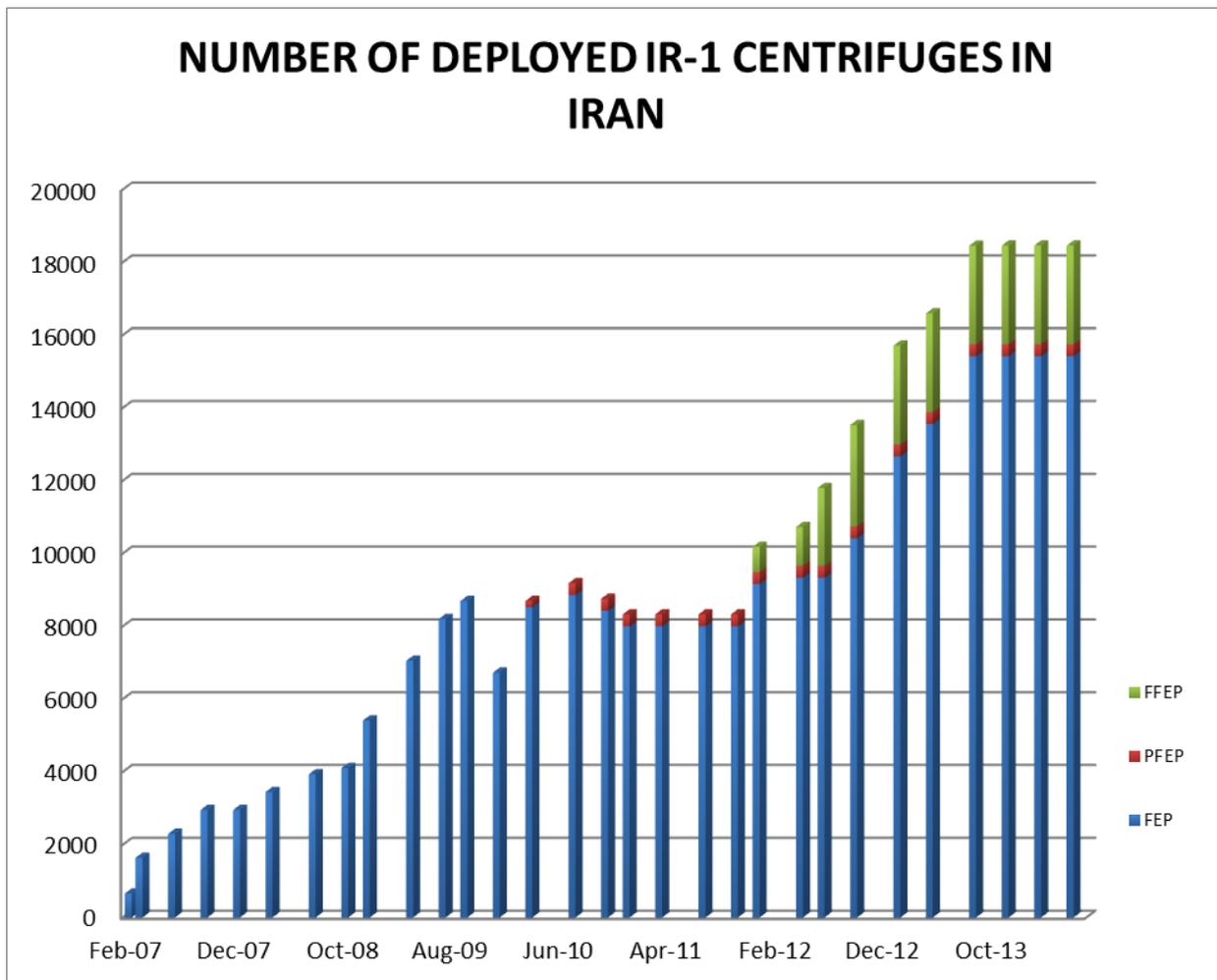


Figure 9: Cumulative 19.75 Percent Uranium Production in the PFEP and FFEP

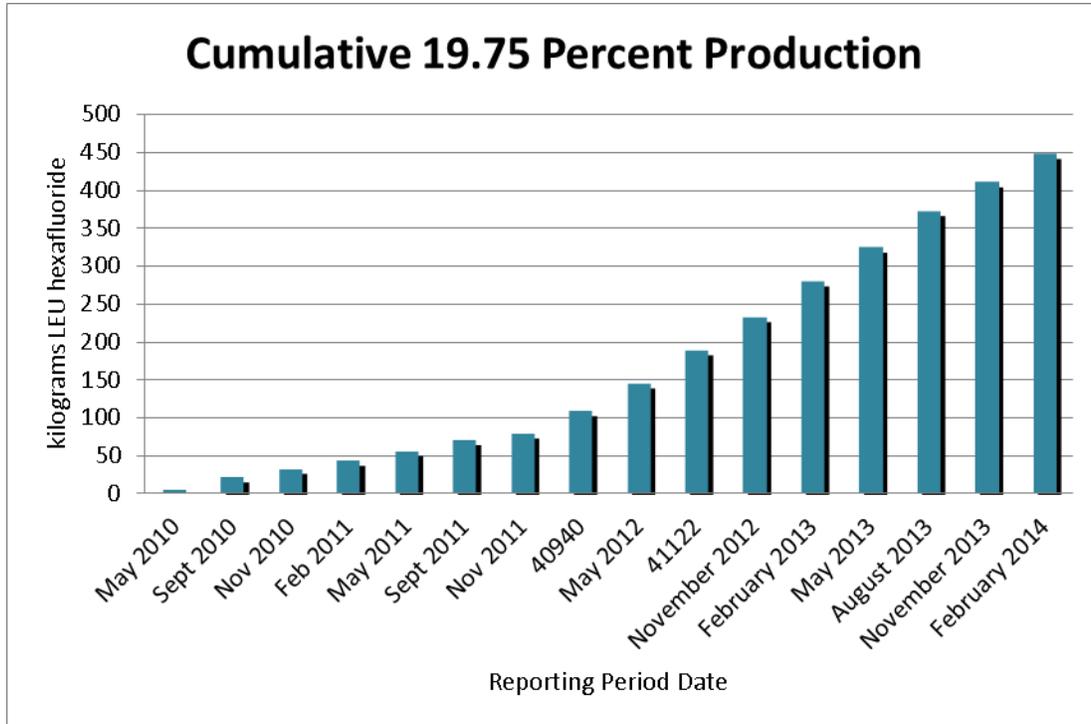


Figure 10: SWU/Centrifuge-year at the Fordow Fuel Enrichment Plant and Pilot Fuel Enrichment Plant

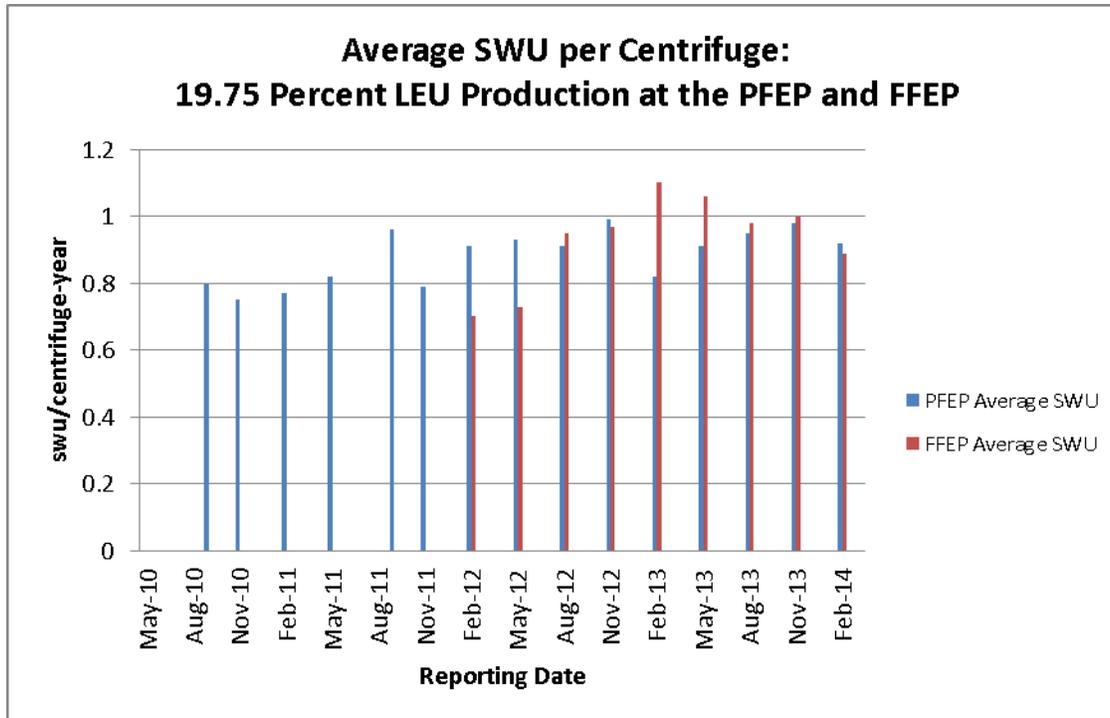
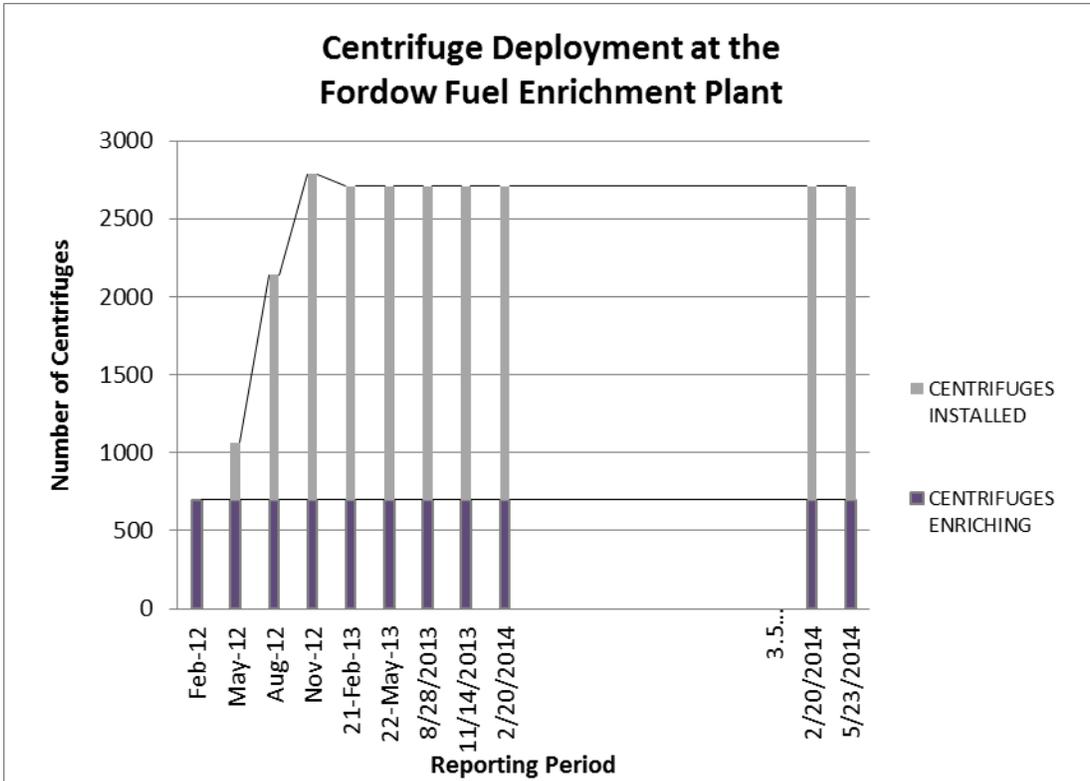


Figure 11: IR-1 Centrifuges Enriching and Installed at the Fordow Fuel Enrichment Plant



Note: All centrifuges are now dedicated to the production of 3.5 percent LEU.

Table 1: Minimal Average Separative Capacity of an IR-1 Centrifuge at the FEP**(kg U swu/year-centrifuge)**

<i>Period</i>	<i>Start of Period</i>	<i>End of Period</i>
12/13/2007 – 05/06/2008	0.47	0.43
05/07/2008 – 08/30/2008	0.80	0.69
08/31/2008 – 11/07/2008	0.69	0.69
11/08/2008 – 11/31/2009	0.55	0.52
02/01/2009 – 05/31/2009	0.62	0.49
06/01/2009 – 07/31/2009	0.51	0.54
08/01/2009 – 10/30/2009	0.55	0.64
11/23/2009 – 01/29/2010	0.88	0.92
01/30/2010 – 05/01/2010	0.92	0.90
05/02/2010 – 08/06/2010	0.90	0.92
08/07/2010 – 10/31/2010	0.99	0.78
10/18/2010 – 02/05/2011	0.75	0.81 (1.0 if 1,000 questionable centrifuges ignored)
02/06/2011 – 05/13/2011	0.90	0.80
05/14/2011 – 08/13/2011	0.74	0.74
08/14/2011 – 11/01/2011	0.73	0.68
11/02/2011 – 02/04/2012	0.76	0.53 (Note: Iran began enriching in approximately 2,600 additional centrifuges during this period. Therefore, these data are likely skewed.)
02/05/2012 – 05/11/2012	0.77	0.77
05/12/2012 – 08/06/2012	0.77	0.77
08/07/2012 – 11/9/2012	0.77	0.76
11/10/2012 – 02/03/2013	0.75	0.76
02/04/2013 – 05/04/2013	0.76	0.76
05/05/2013 – 08/16/2013	0.76	0.74
08/17/2013 – 11/05/2013	0.74	0.76
11/06/2013 – 02/09/2014	0.78	0.75
02/10/2014 – 05/13/2014	0.71	0.71

Table 2: CUMULATIVE TOTALS OF NATURAL AND ENRICHED URANIUM FEED AND 3.5 AND 19.75 PERCENT LEU HEXAFLUORIDE PRODUCT IN IRAN

LOCATION	0.711 percent hex feed	3.5 percent LEU hex product	3.5 percent LEU hex feed	19.75 percent LEU hex product
FEP	133,839 kg	11,767 kg	N/A	N/A
PFEP	26 kg	26 kg	1,631 kg*	202 kg*
FFEP	739 kg	77 kg	1,806 kg*	246 kg*
GROSS TOTAL	134,604	11,870** kg	3,437 kg	448 kg
NET TOTAL	134,604	8,380***	3,437 kg	38 kg****

* Figures as of January 20, 2014, when the production of 20 percent enriched LEU has ceased.

** This total does not include the LEU (<5% uranium 235) resulting from downblending the near 20 percent LEU hexafluoride covered by the Joint Plan of Action.

***Number is less 3.5 percent enriched uranium hexafluoride used as feedstock at the PFEP and FFEP as well as 53 kg 3.5 percent LEU hexafluoride converted to uranium oxide. The total does not include an increase from downblending near 20 percent LEU hexafluoride into less than five percent LEU.

****This is just the amount of near 20 percent LEU hexafluoride. This number is less 303.2 kg of 19.75 percent LEU hexafluoride fed into the process at the Fuel Plate Fabrication Plant near Esfahan and 106.2 kg 19.75 percent LEU hexafluoride down blended in total.

Table 3: COMPARATIVE SWU Rate* IN IR-1 CENTRIFUGES AT

IRAN'S ENRICHMENT FACILITIES

LOCATION	IR-1 centrifuges producing 3.5 percent enriched uranium	IR-1 centrifuges producing 19.75 percent enriched uranium
FEP	0.71 swu/cent-year	N/A
PFEP	0.67 swu/cent-year	N/A
FFEP	0.87 swu/cent-year	N/A

*SWU rate represents an average of the SWU/centrifuge-year calculated using the number of centrifuges at both the beginning and the end of the reporting period.