

**NOTE BY THE DIRECTOR-GENERAL****REPORT ON THE PERFORMANCE OF THE REVISED METHODOLOGY
FOR THE SELECTION OF OTHER CHEMICAL PRODUCTION FACILITIES
FOR INSPECTION****BACKGROUND**

1. In 2011, the Director-General introduced—as an interim measure and on the basis of consultations within the Industry Cluster—a revised methodology to select other chemical production facilities (OCPFs) for inspection (S/962/2011, dated 8 September 2011).
2. In line with the recommendation of the co-facilitators for the consultation on the site selection methodology for OCPFs, contained in their report to the Executive Council (hereinafter “the Council”) at its Sixty-Fifth Session (EC-65/WP.1, dated 10 June 2011) and with the reaffirmation by the Council in its report of that same session (paragraph 6.32 of EC-65/4, dated 15 July 2011), the Technical Secretariat (hereinafter “the Secretariat”) reports annually to States Parties on the performance of the interim OCPF site selection methodology.
3. The previous reports on this topic are contained in Notes by the Secretariat S/1070/2013, dated 14 February 2013; S/1157/2014, dated 10 February 2014; S/1240/2015, dated 6 February 2015; S/1348/2016, dated 4 February 2016; S/1461/2017, dated 6 February 2017; S/1582/2018, dated 12 February 2018; S/1715/2019, dated 6 February 2019; and S/1850/2020, dated 24 February 2020.
4. This Note provides an overview of the performance of the methodology in its ninth year of implementation (for inspections planned in 2020), as specified in S/962 and the policy guidelines approved by the Council in its decision EC-66/DEC.10 (dated 7 October 2011). For the purpose of making an assessment, the results achieved in 2020 have been compared to those of 2019 and 2018 and, in specific cases, as far back as 2013.

FINDINGS

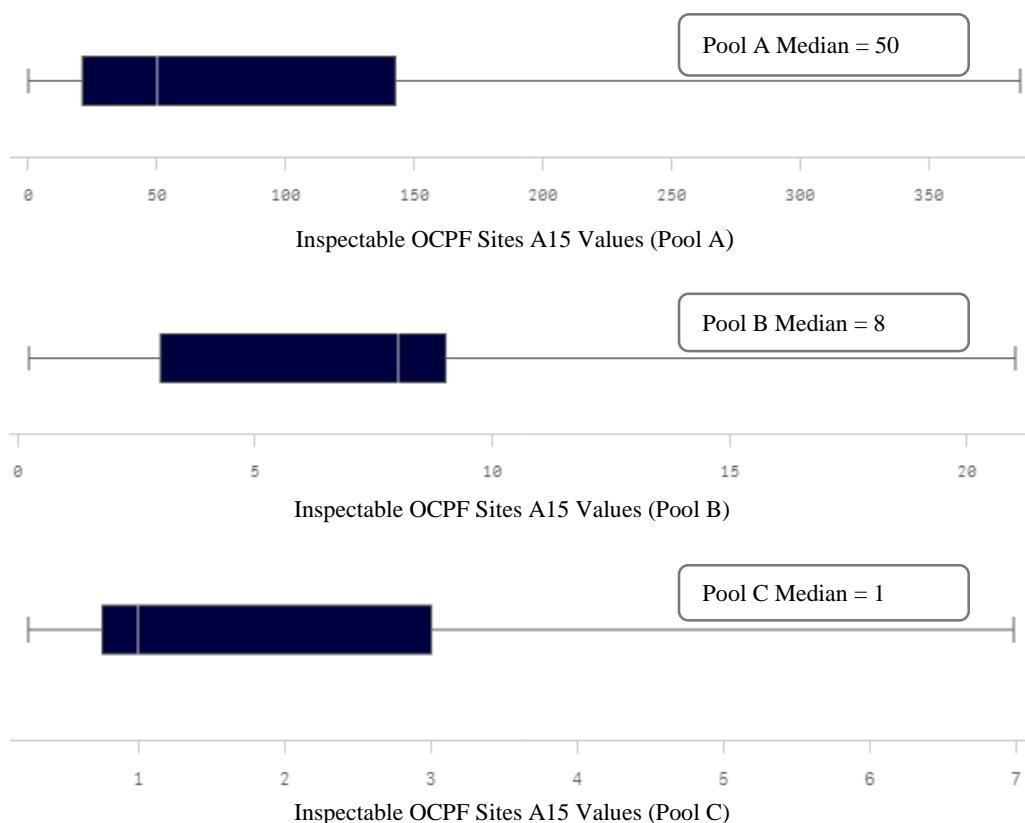
5. Using the plant site selection (PSS) process based on the S/962 methodology, the Secretariat selected 169 OCPF plant sites which were budgeted for inspection in 2020. Due to the outbreak of the coronavirus disease (COVID-19) pandemic and its impact on OPCW activities, the actual number of OCPF inspections conducted in 2020 was 55 (33% of the budgeted number). The purpose of this document is to report on the performance of the site selection methodology. Because of the unusual circumstances of 2020, reporting based on the actual inspections conducted would not



accurately reflect the performance of the methodology. Thus, this report bases its findings on the complete inspection plan of 2020 (169 inspections) and not the actual number of inspections conducted (55 inspections).

6. In general, in 2020 the S/962 methodology achieved the objectives of the EC-66/DEC.10 guideline regarding balanced geographical distribution of inspections. There were 46 States Parties that were selected to receive at least one OCPF inspection, and an additional three States Parties that were planned to receive only Schedule 1, Schedule 2, or Schedule 3 inspections. Furthermore, there were 80 States Parties with at least one inspectable Article VI facility. Thus, this total of 49 States Parties represents 61% (49/80) of States Parties with inspectable facilities declared under Article VI, which is more than the preferred goal of 60% in the aforementioned guideline.
7. The goal to select the most relevant plant sites for inspection (as reflected in the A15¹ value) continues to be achieved. Figure 1 below depicts the A15 data distribution for inspectable plant sites in pools A, B, and C. For OCPF plant sites not yet inspected in a given State Party, the one-third most relevant are allocated to Pool A, the next one-third are allocated to Pool B, and the one-third least relevant are allocated to Pool C. For purposes of clarity, outliers are not displayed.

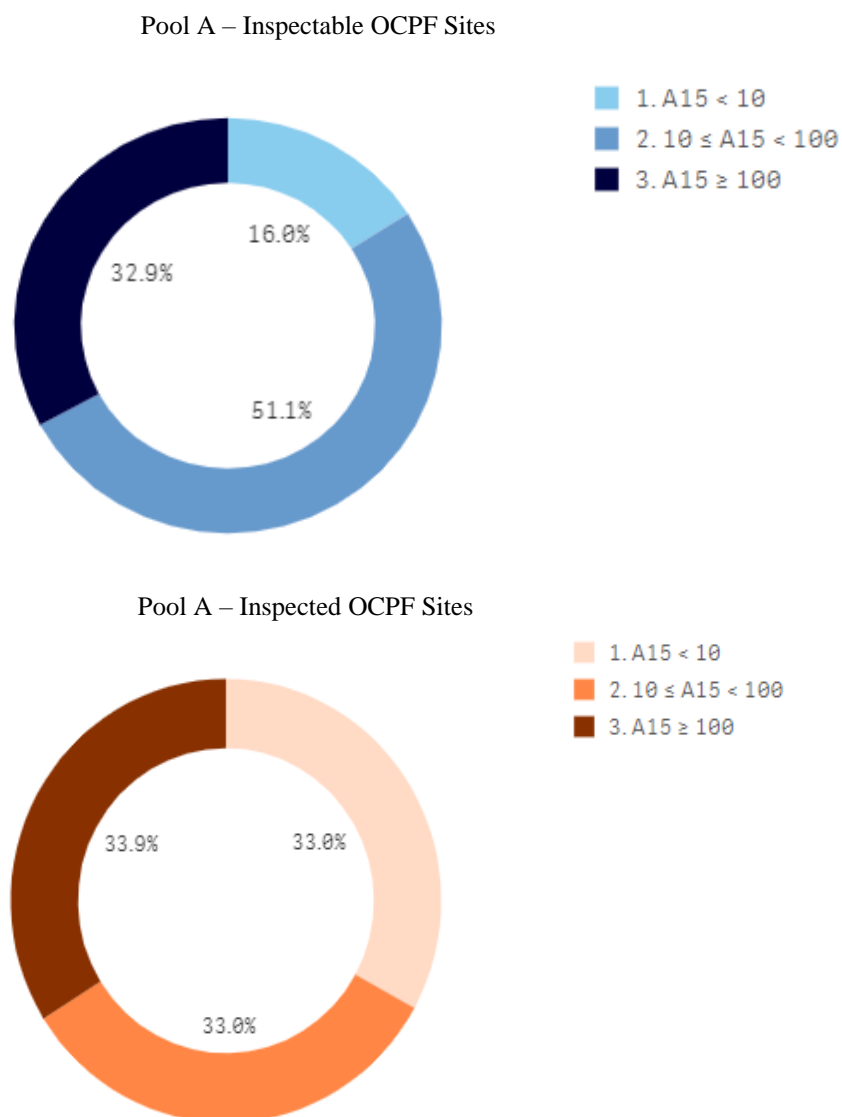
FIGURE 1: DISTRIBUTION OF A15 SCORES IN POOLS A, B, AND C FOR INSPECTABLE OCPF PLANT SITES (2020)



¹ A15 (formerly A14) is an algorithm that determines the relevance of an OCPF site for inspection, as defined in the current S/962 selection methodology.

8. However, within each relevance pool, the A15 value has a limited impact on the selection of sites with higher A15 values. Furthermore, the A15 calculation and the subsequent selection probability calculations within each pool are not significantly affected by relevance weighting factors. The probability calculation should be optimised to better target most relevant plant sites within each pool. In order to illustrate this point, Figure 2 below depicts the A15 data distribution from Pool A (from which roughly 70% of all inspections are carried out) for inspectable and inspected plant sites. The data demonstrates that the relevance factor A15 does not have any significant impact on the selection of plant sites for inspection within a pool.

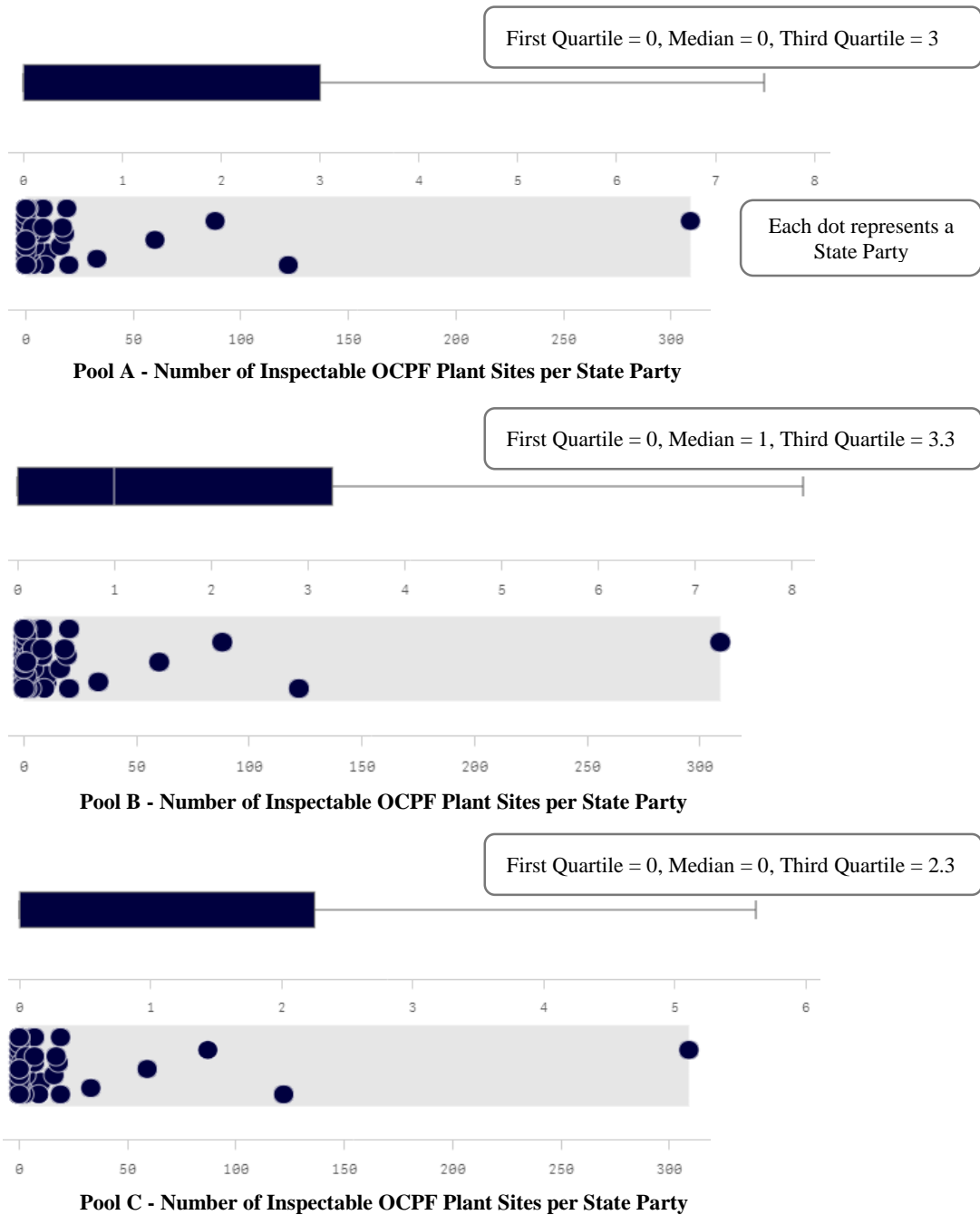
FIGURE 2: DISTRIBUTION OF A15 SCORES IN POOL A FOR INSPECTABLE AND INSPECTED OCPF PLANT SITES (2020)



Number of OCPF inspections per State Party

9. The distribution of the number of inspectable OCPF plant sites per State Party (for each of the 80 States Parties with inspectable sites) for each of the pools (A, B, and C) is depicted in Figure 3 below, with Table 1 below outlining observations from the three charts in Figure 3.

FIGURE 3: DISTRIBUTION OF INSPECTABLE OCPF PLANT SITES PER STATE PARTY IN 2020 WITH AND WITHOUT OUTLIERS DISPLAYED (POOLS A, B, AND C)²



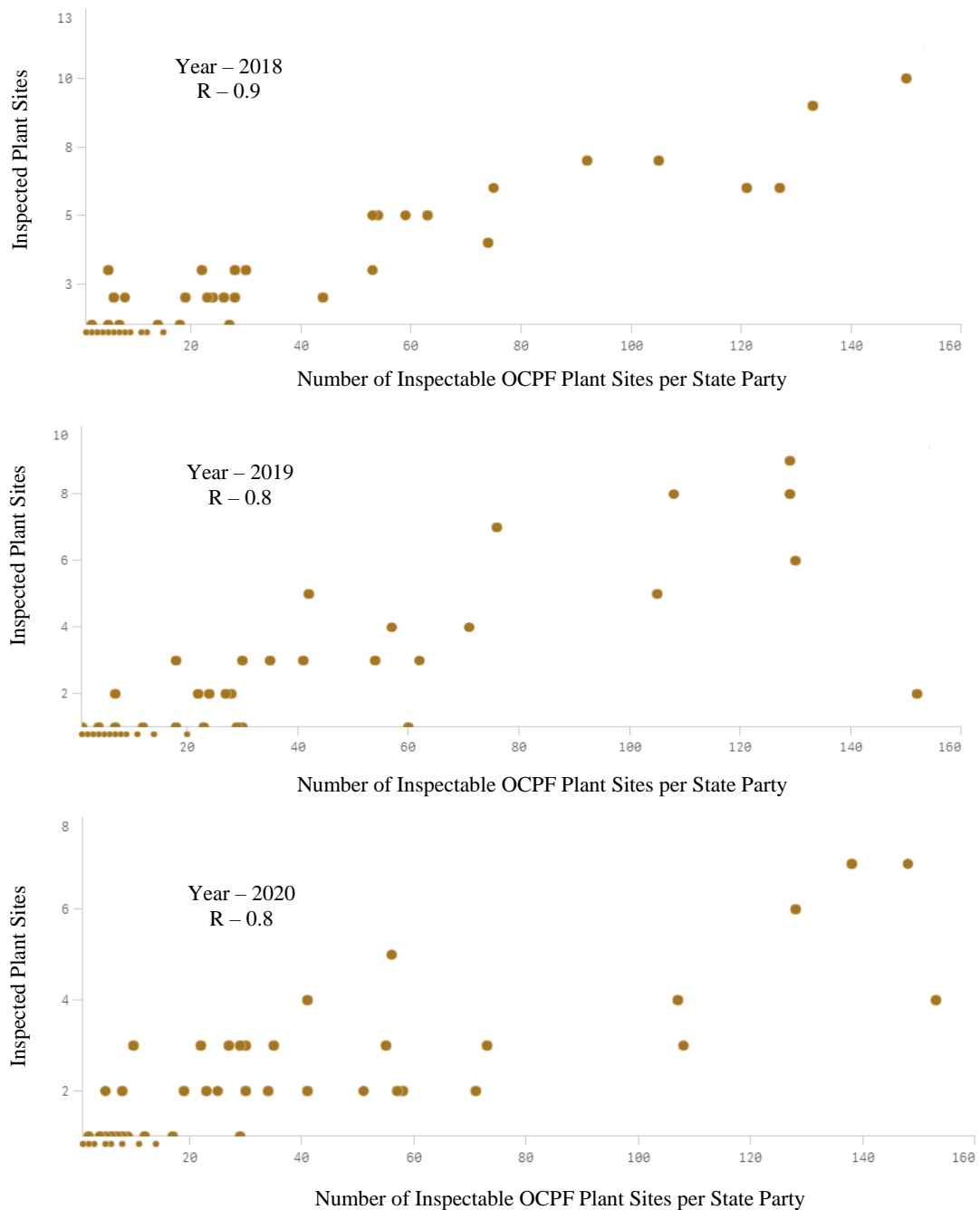
² Figure 3 to be read in conjunction with Table 1.

TABLE 1: OBSERVATIONS ON THE DISTRIBUTION OF INSPECTABLE OCPF PLANT SITES PER STATE PARTY (POOLS A, B, AND C)

Pool	Observations
A	The first chart in Figure 3 indicates that more than 50% of the 80 States Parties (with inspectable sites) had zero inspectable plant sites in Pool A. Furthermore, 75% of the States Parties had three or fewer inspectable plant sites in Pool A. In addition, 15 States Parties had between four and 33 inspectable plant sites, and four States Parties had between 60 and 309 inspectable plant sites in Pool A.
B	The second chart in Figure 3 indicates that more than 50% of the 80 States Parties (with inspectable sites) had one or fewer inspectable plant sites in Pool B. Furthermore, 75% of the States Parties had three or fewer inspectable plant sites in Pool B. In addition, 16 States Parties had between four and 33 inspectable plant sites, and four States Parties had between 60 and 309 inspectable plant sites in Pool B.
C	The third chart in Figure 3 indicates that more than 50% of the 80 States Parties (with inspectable sites) had zero inspectable plant sites in Pool C. Furthermore, 75% of the States Parties had two or fewer inspectable plant sites in Pool C. In addition 16 States Parties had between three and 33 inspectable plant sites, and four States Parties had between 59 and 309 inspectable plant sites in Pool C.

10. Based on the above observations, three-quarters of States Parties have zero or close to zero uninspected plant sites left, and another 15 States Parties will have zero or very few uninspected plant sites left in the coming few years. Four to five States Parties will probably have a large number of inspectable plant sites left at that point.
11. There are few States Parties with a high number of inspectable plant sites (outliers). This data is also displayed for each of the three pools. It is to be noted that the display of outliers skews the data distribution.
12. The distribution of plant site inspections conducted in each State Party against the number of inspectable OCPF plant sites in that State Party is plotted in Figure 4 for the period from 2018 to 2020, across all pools. In order to prevent a skewed display as mentioned above, statistical outliers (inspectable plant sites) have not been considered in the data set below. The data on the number of OCPF plant sites in each State Party is based on the information declared by States Parties. In 2019, as in 2018, the Secretariat conducted 169 OCPF inspections.

FIGURE 4: NUMBER OF OCPF INSPECTIONS PER STATE PARTY AGAINST THE TOTAL NUMBER OF INSPECTABLE OCPF PLANT SITES (2018 – 2020)



13. In order to provide more clarity with respect to the methodology currently used, only the analysis for the last three years is included in Figure 4 above. The number of inspectable OCPF plant sites is presented on a linear scale. The correlation coefficient (R), which measures the strength of the relationship between the two variables, is also displayed for each year.

14. From this analysis, several facts can be observed, which are common to all three years:
- (a) The number of inspections conducted in each State Party is positively correlated with the number of inspectable OCPF plant sites in that State Party. The R values indicate a strong positive correlation, which means that high inspection values concur with high inspectable sites values (and vice versa).
 - (b) In accordance with the provisions of paragraph 13 of Part IX of the Verification Annex to the Chemical Weapons Convention (hereinafter “the Verification Annex”), within a State Party there is an upper limit to the combined number of inspections per year received under both Parts VIII (Schedule 3) and IX (OCPF) of the Verification Annex. While the selection of plant sites under both Parts of the Verification Annex is determined by a weighted random selection process, in some States Parties the total number of inspections reached the limit, causing the reallocation of inspections to other States Parties and subsequently distorting the positive correlation. This is seen by comparing the chart in Figure 5 below with the 2020 chart in Figure 4 above. There is a stronger positive correlation (higher R value) in Figure 5 (selected plant sites) than in Figure 4 (inspected plant sites).
 - (c) The weighted random selection process makes use of a probabilistic methodology that takes into account both the characteristics of the plant sites and the activities carried out there. Therefore, States Parties with a similar number of inspectable plant sites received a comparable number of inspections, but varying within a limited range. For instance, States Parties declaring between 100 and 160 plant sites were scheduled to receive between three and seven inspections in 2020. This fact is represented in Figure 6 below.

FIGURE 5: NUMBER OF SELECTED OCPF PLANT SITES PER STATE PARTY AGAINST THE TOTAL NUMBER OF INSPECTABLE OCPF PLANT SITES (2020)

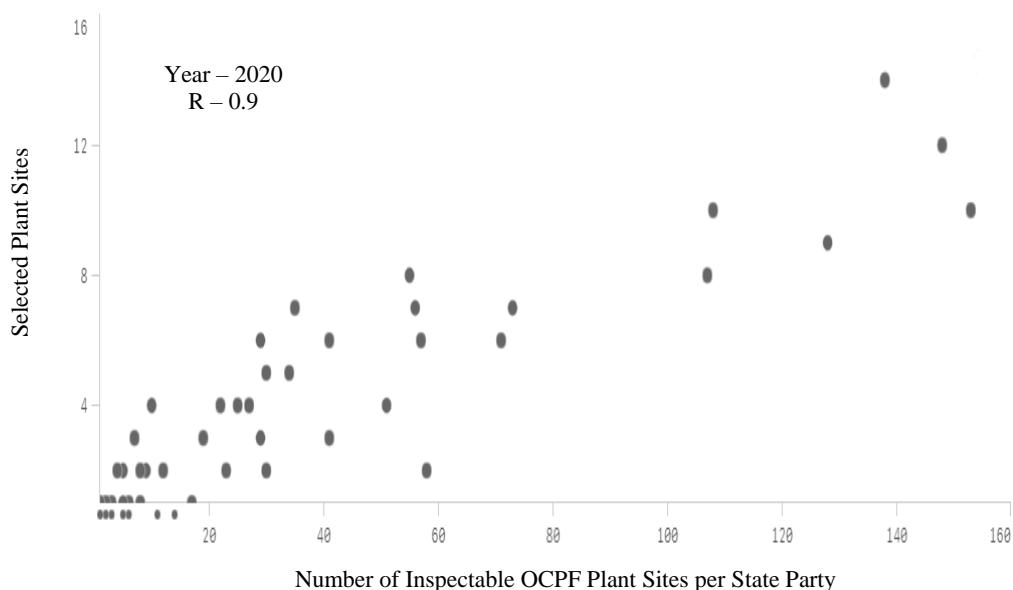
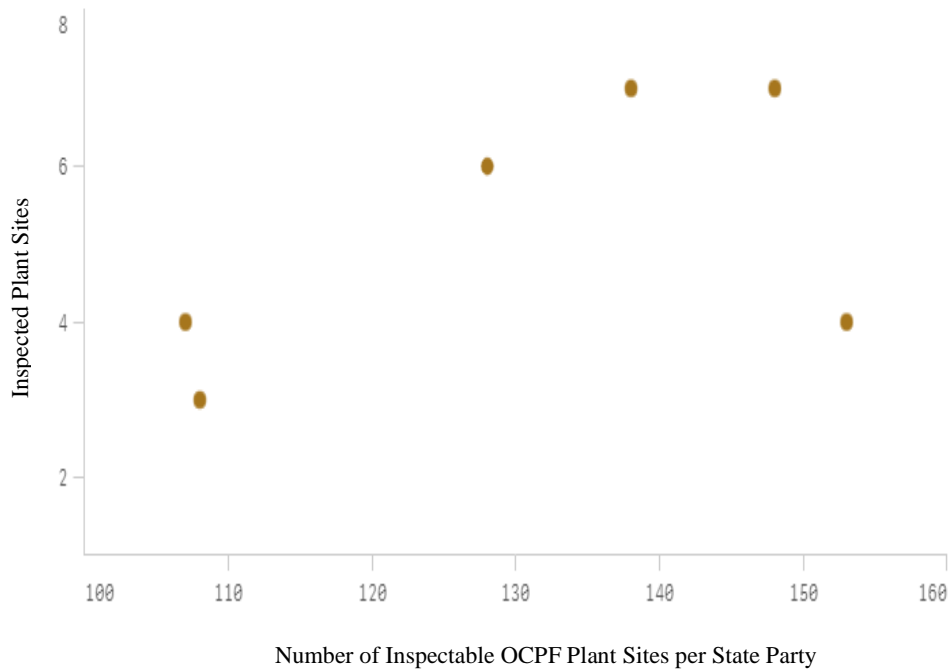


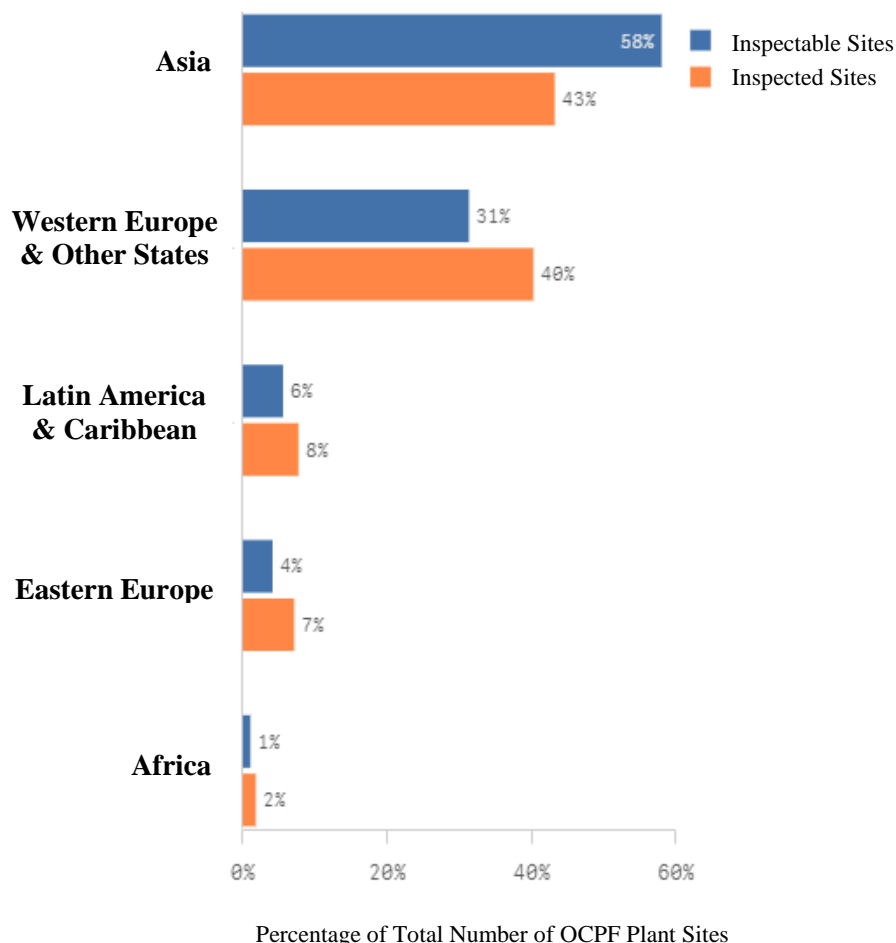
FIGURE 6: NUMBER OF OCPF INSPECTIONS PER STATE PARTY AGAINST THE NUMBER OF INSPECTABLE OCPF PLANT SITES (2020 – EXPANDED VIEW)



Geographical distribution of OCPF plant sites and inspections in 2020

15. The geographical distribution of plant sites and inspections among regional groups is shown in Figure 7 below. The chart shows the share of inspectable plant sites in each regional group in 2019, based on the information declared by States Parties as at 29 October 2019, when the plant site selection was performed. The same chart also shows the share of inspections in 2020 in each regional group, out of a total of 169 inspections in the complete inspection plan of 2020.

FIGURE 7: COMPARISON OF THE REGIONAL DISTRIBUTION OF OCPF PLANT SITES AND INSPECTIONS (BASED ON THE INFORMATION DECLARED BY STATES PARTIES AS AT 29 OCTOBER 2019)

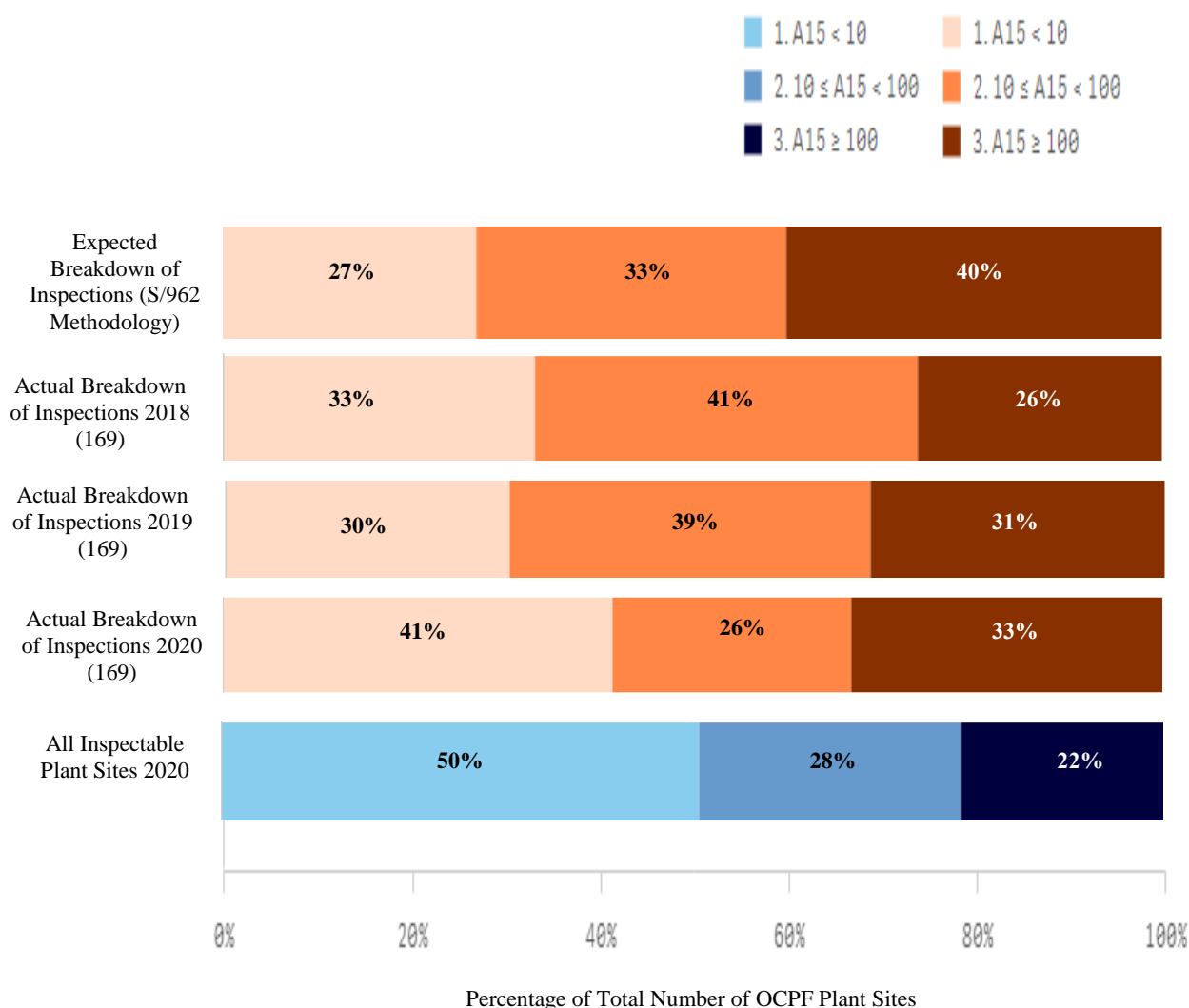


16. By comparing the two distributions, the following conclusions can be drawn:
- (a) Even though the PSS methodology does not include any mechanism for achieving an adequate regional balance, regions declaring a higher number of inspectable OCPF plant sites were scheduled to receive a larger proportion of inspections in 2020.
 - (b) The vast majority of inspectable plant sites (about 89%) were declared by States Parties belonging to the Asian Group and to the Western Europe and Other States Group. Accordingly, States Parties located in these two regional groups received most of the total OCPF inspections planned for 2020 (about 83%).
 - (c) In accordance with the provisions of paragraph 13 of Part IX of the Verification Annex, when in some States Parties the total number of sites selected for inspection in 2020 reached the threshold, inspections were reallocated to other States Parties according to the order of the selection process.

Distribution of OCPF inspections according to the relevance of plant sites

17. The distribution of plant sites according to relevance is compared in Figure 8 below, which describes the share of inspected OCPF plant sites each year from 2018 to 2020 in each of the low- ($A15 < 10$), medium- ($10 \leq A15 < 100$), and high-relevance ($A15 \geq 100$) groups according to the A15 values for those years, as well as the breakdown of all inspectable sites in the pool for 2020 inspections according to the same criteria. The breakdown is shown according to the value of the A15, both in terms of the expected distribution³ according to the respective methodology, and the actual selection of sites for inspection in each period.

FIGURE 8: RELATIVE SHARE OF INSPECTIONS ACCORDING TO THE RELEVANCE OF OCPF PLANT SITES



³ The expected distribution is generated based on the results of the simulation runs of the algorithm using 2017 declaration data.

18. The evolution of the distribution over time and the characteristics of the pool of inspectable sites lead to the following observations:
- (a) The S/962 methodology resulted in the selection of relatively more OCPFs with low A15 values (i.e. lower relevance).
 - (b) The S/962 methodology resulted in the selection of relatively fewer OCPFs with higher A15 values (i.e. higher relevance).
 - (c) Concerning the distribution of all inspectable plant sites for 2020 inspections, the S/962 methodology targets the higher-relevance sites; even though such sites constitute only 22% of all inspectable plant sites, 33% of the inspections were planned at the higher-relevance sites. While Figure 8 depicts the distribution across all OCPF pools, it is worth reiterating that within each relevance pool, the A15 value has generally little to no impact on the selection of sites with higher A15 values. This point is illustrated again in Table 2 below, which shows two A15 data distributions for Pool A (from which roughly 70% of all inspections are carried out).

TABLE 2: A15 DATA DISTRIBUTION FOR POOL A (2020)

Pool	A15 <10	≤10 A15 < 100	A15 ≥ 100
Pool A (Inspectable)	16%	51%	33%
Pool A (Inspected)	33%	33%	34%

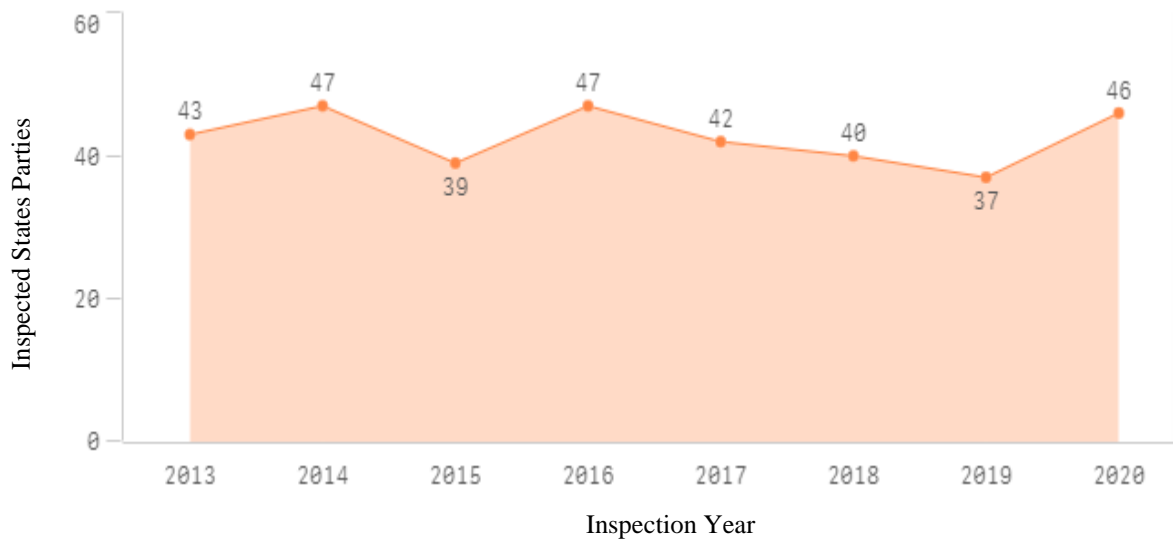
Coverage of States Parties selected to receive inspections

19. The coverage of States Parties selected for OCPF inspection can be compared over time. Figure 9 below shows the total number of States Parties inspected each year from 2013 to 2020. Between 2016 and 2019, the number of States Parties receiving inspections shows a steady decrease. However, the changes applied to the methodology in 2019⁴ have had a positive impact on this number; the number of States Parties with inspections planned in 2020 has increased to 46, resulting in a positive impact on the objective for a balanced geographical distribution of inspections. The Secretariat will continue to monitor against this objective and report on whether this positive trend is maintained.

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<https://c.connectedviews.com/assets/878981bf-42ee-4b61-bf7c-cfc9bb9be901.pdf>.

FIGURE 9: COVERAGE OF STATES PARTIES SELECTED TO RECEIVE OCPF INSPECTIONS



Average number of years since last inspection

20. Concerns by some States Parties have been raised in the Industry Cluster about the frequency of subsequent inspections at a number of declared plant sites. To address this concern, the changes applied to the methodology in 2019 further reduce (but do not completely eliminate) the chances of a recently inspected plant site from being selected again in short succession. Figure 10 below shows the average number of years since the last inspection of all sites receiving subsequent inspections between 2015 and 2020. The average is significantly higher in 2020, after changes were made to the methodology. Along similar lines, Figure 11 below shows the distribution of years since the last inspection for each of the 34 plant sites receiving subsequent inspections between 2018 and 2020.

FIGURE 10: AVERAGE NUMBER OF YEARS BETWEEN SUBSEQUENT INSPECTIONS AT THE SAME OCPF PLANT SITE (2015-2020)

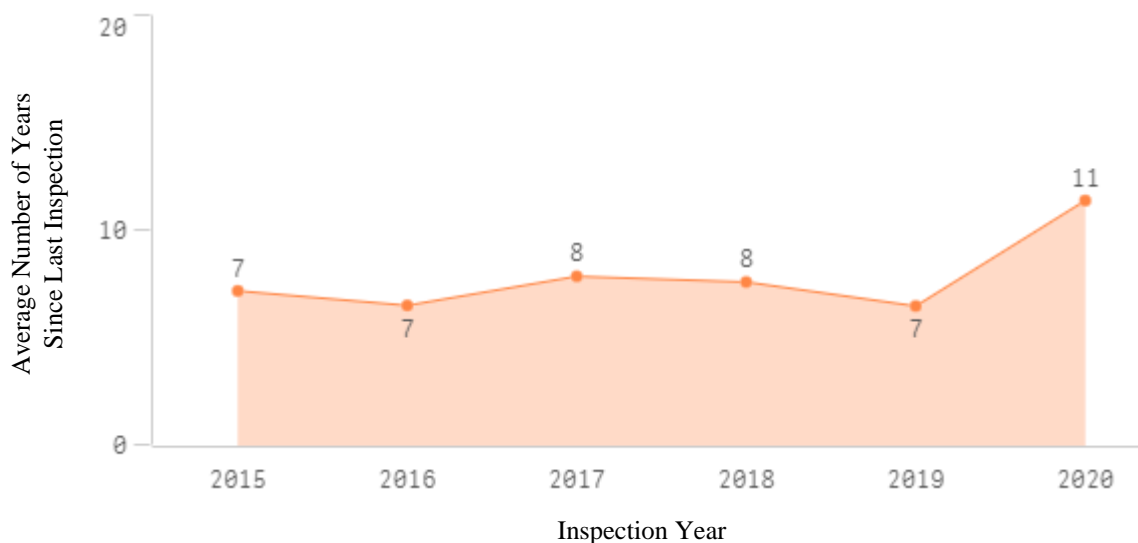
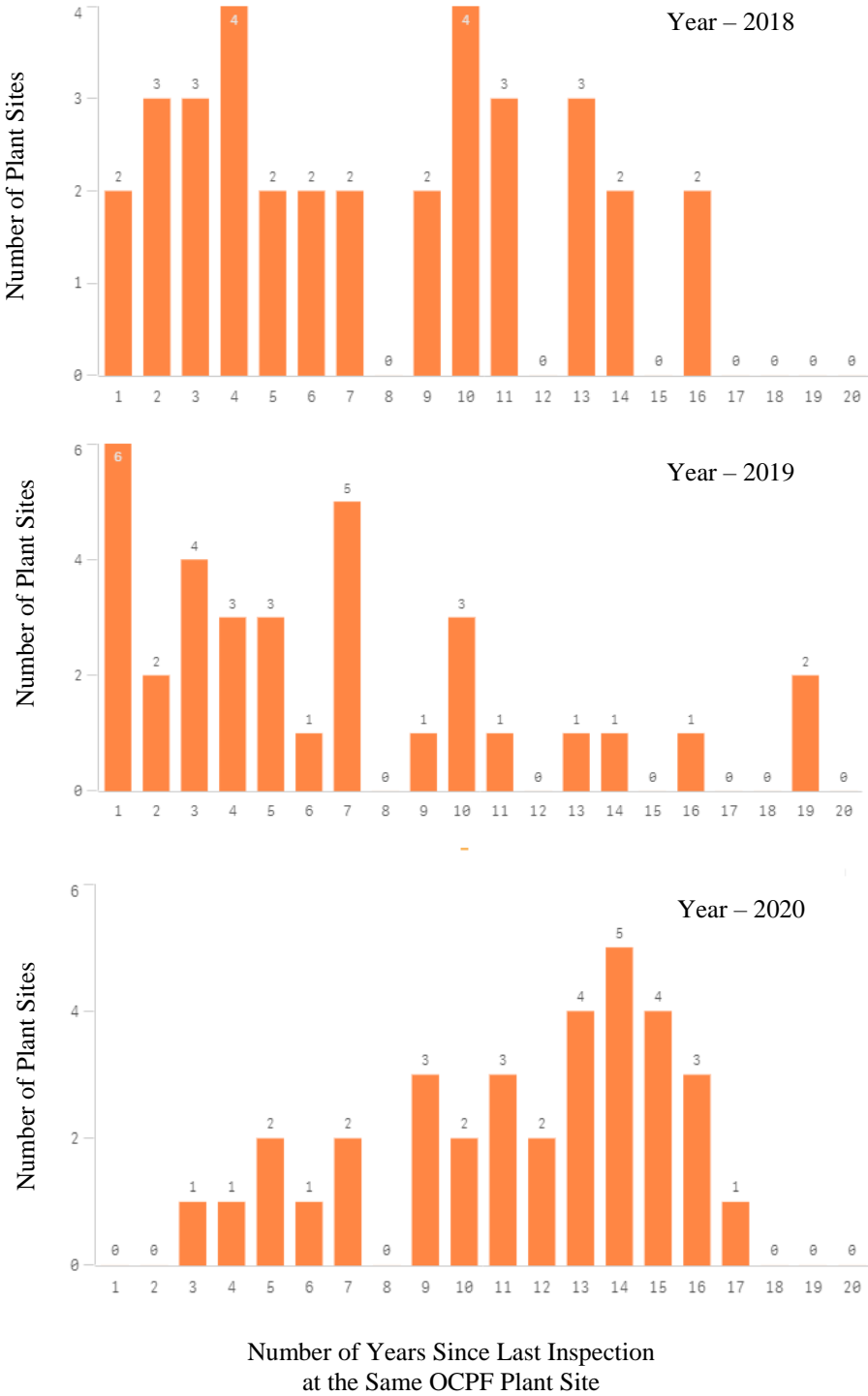


FIGURE 11: NUMBER OF YEARS BETWEEN SUBSEQUENT OCPF INSPECTIONS (2018-2020)



CONCLUSIONS

21. The analysis of the results from the PSS process to select OCPF plant sites for inspection in 2020 confirms that the use of the S/962 methodology takes into account both the number and the relevance of plant sites declared by States Parties. The key aspects of the selection results for 2020 are as follows:
- (a) In general, in 2020 the S/962 methodology achieved the objectives of the EC-66/DEC.10 guideline regarding balanced geographical distribution of inspections. There were 46 States Parties that were selected to receive at least one OCPF inspection, and an additional three States Parties that were planned to receive only Schedule 1, Schedule 2, or Schedule 3 inspections. Furthermore, there were 80 States Parties with at least one inspectable Article VI facility. Thus, this total of 49 States Parties represents 61% (49/80) of States Parties with inspectable facilities declared under Article VI, which is more than the preferred goal of 60% in the aforementioned guideline.
 - (b) In Pools A, B, and C, three-quarters of States Parties (having inspectable plant sites) have zero (or close to zero) uninspected plant sites left, and another 15 States Parties will have no or very few uninspected plant sites left in the coming few years. Four to five States Parties will probably have a large number of inspectable plant sites left at that point.
 - (c) Within each relevance pool, the A15 value has a limited impact on the selection of sites with higher A15 values. Furthermore, the A15 calculation and the subsequent selection probability calculation within each pool are not significantly affected by relevance weighting factors. The probability calculation should be optimised to better target the most relevant plant sites within each pool.
 - (d) The number of inspections conducted in each State Party is positively correlated with the number of declared OCPF plant sites in that State Party. States Parties that declare a higher number of OCPF plant sites can expect more inspections than those that declare fewer, within the limitations set by the Chemical Weapons Convention.
 - (e) The PSS process using the S/962 methodology continues to result in more inspections in medium and highly relevant sites: relatively fewer OCPFs with low A15 values are being selected, and a higher proportion of more relevant plant sites with medium and high A15 values are being selected.
 - (f) In the early implementations of the selection algorithm, a trend towards decreasing number of States Parties receiving inspections was observed. When the S/962 methodology was adopted in order to address this trend, the number of States Parties receiving inspections was expected to be 32. Since its adoption, the number of States Parties receiving inspections remains above the expected number, reflecting the effect of the three-pool approach in the selection methodology, the increase in the rate of subsequent inspections, and the impact of the limitation on the number of inspections in accordance with paragraph 13 of Part IX of the Verification Annex.
22. In conclusion, the S/962 methodology achieves the goals set forth in the report of the co-facilitators (EC-65/WP.1), namely, to better target OCPF inspections without the need for States Parties to provide additional information in declarations. The Secretariat will continue to monitor this performance and recommend any adjustments that might become necessary in the future.