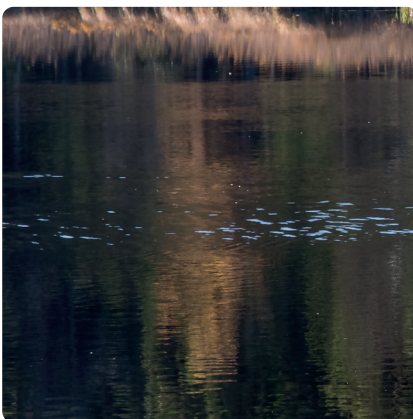


Swedish National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

Update 2020 to include substances listed 2017 and 2019

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Swedish National Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

Update 2020 to include substances listed 2017 and 2019

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Summary

The Stockholm Convention was adopted in 2001 with the objective to protect human health and the environment from persistent organic pollutants. According to the Stockholm Convention on Persistent Organic Pollutants, each Party to the Convention is to develop and endeavour to implement a plan for the implementation of its obligations under the Convention.

The Swedish national implementation plan aims at describing what Sweden has done and intends to do to fulfil the obligations of the Stockholm Convention. The plan describes the situation in Sweden and presents actions and strategies for future work. This plan is the fifth in the scheme and contains updates in accordance with the decisions taken at the Conferences of the Parties in 2017 and 2019. The substances covered are short-chain chlorinated paraffins (SCCP), decabromodiphenyl ether (decaBDE), hexachlorobutadiene (HCBd) and perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds and dicofol. For all other substances we refer to the Swedish national implementation plan from 2017, Swedish EPA Report 6794.

Sweden will continue to work actively to minimise the environmental and health impacts of POPs in national, regional and international fora. As Party to the Stockholm Convention, Sweden is required to ban, and/or take the necessary legal and administrative steps to ban the production, use, import and export of SCCP, decaBDE, PFOA, its salts and PFOA-related compounds and dicofol and to take measures to reduce the unintentional production of HCBd. Sweden supported the inclusion of these substances in the Convention. According to the Products Register there was in 2018 no production or import of any of the substances as chemical products with a concentration above the limit values for registration. For PFOA-related compounds there is limited information from the Products Register.

Sweden implements the requirements of the Stockholm Convention mainly through existing legislation, strategies and programmes. Significant progress has been achieved since production and use of all POP substances is prohibited with some minor exemptions. The main remaining challenges identified in previous implementation plans are linked to dioxins, PCBs and PFASs including PFOA and PFOS, which is elaborated in the Swedish Implementation Plan from 2017. This new plan focuses on the newly added substances to the Convention where the main challenges are related to SCCPs, PFOA and decaBDE in articles in use and in the waste stream, and to develop efficient environmental monitoring of these substances.

Sammanfattning

Naturvårdsverket har fått regeringens uppdrag att, i samråd med Kemikalieinspektionen och Havs- och Vattenmyndigheten, uppdatera den svenska genomförandeplanen för Stockholmskonventionen om långlivade organiska föroreningar. Texter har även inhämtats från Livsmedelsverket. Planen ska användas för rapportering till Stockholmskonventionen, och samtidigt utformas så att den blir användbar för de aktörer som berörs nationellt. Texten nedan på svenska är utformad för svenska aktörer.

Mål och syfte med Stockholmskonventionen

Målet med Stockholmskonventionen är att skydda människors hälsa och miljön mot långlivade organiska föroreningar. Alla parter i konventionen ska utveckla och sträva efter att genomföra en plan för sina åtaganden enligt konventionen. Den svenska genomförandeplanen syftar till att beskriva vad Sverige har gjort och har för avsikt att göra för att uppfylla åtagandena i Stockholmskonventionen.

Planen beskriver läget i Sverige för tillkomna långlivade organiska föroreningar i Stockholmskonventionen sedan 2017 och 2019 samt presenterar åtgärder och strategier för kommande arbete. Planen innehåller uppdateringar i enlighet med de beslut som fattades på partsmöten år 2017 och 2019 avseende tillägg till Stockholmskonventionen av fyra ämnen i Annex A för utfasning: Dessa ämnen är:

- kortkedjiga klorparaffiner,
- dekabromdifenyleter,
- perfluoroktansyra (PFOA), och PFOA-relaterade ämnen och
- dikofol.

Partsmötet 2017 beslutade även att lista hexaklorbutadien i Annex C om oavsiktligt bildade POPs-ämnen.

För övriga ämnen i Stockholmskonventionen och andra avsnitt i en genomförandeplan hänvisar vi till Sveriges genomförandeplan från november 2017, rapport 6794.

Bakgrund

Långlivade organiska föroreningar (Persistent Organic Pollutants, POPs) är kemiska ämnen som är långlivade i miljön. De bioackumuleras och utgör en risk för negativa effekter på människors hälsa eller miljön. Föroreningarna transporteras långt från sina källor, över internationella gränser och även till regioner där de aldrig har använts eller tillverkats.

Eftersom föroreningarna transporteras långt via vatten och luft och även via handeln med varor kan inget land ensamt agera för att skydda sina medborgare och miljön från POPs. För att reducera och eliminera produktion, användning och

utsläpp av dessa ämnen krävs internationella åtgärder. Inom ramen för FN:s miljöprogram (UNEP) antogs därför Stockholmskonventionen om POPs, med målet att skydda människors hälsa och miljön från POPs. Formellt antogs konventionen i maj 2001 i Stockholm.

De ämnen som ingår i Stockholmskonventionen finns listade i bilaga A, B och C. Produktion och användning av de avsiktligt producerade POPs som anges i bilagorna A och B ska fasas ut eller begränsas kraftigt. När de undantag som gäller för vissa ämnen har upphört är import och export endast tillåten för miljömässigt säker avfallshantering under kontrollerade förhållanden. Utsläpp av oavsiktligt bildade ämnen, som anges i bilaga C, ska kontinuerligt minskas och målsättningen är att utsläppen slutligen ska elimineras där så är möjligt.

Stockholmskonventionen omfattar även identifiering och säker hantering av lager som innehåller eller består av POPs. Avfall som innehåller, består av eller har förorenats med POPs ska hanteras på sådant sätt att POPs-innehållet förstörs eller irreversibelt omvandlas så att det inte längre har några POPs-egenskaper. I fall där destruktion eller omvandling inte utgör det alternativ som är att föredra med hänsyn till miljön, eller då POPs-innehållet är lågt, ska avfallet hanteras på ett för miljön säkert sätt.

Avfallshantering som kan leda till återvinning eller återanvändning av POPs är förbjuden enligt artikel 6 i konventionen. När det gäller transport av avfall ska relevanta internationella regler, standarder och riktlinjer beaktas, såsom 1989 års Baselkonvention om kontroll av gränsöverskridande transporter och slutligt omhändertagande av farligt avfall.

Regler om POPs

Åtgärderna inom Sveriges miljö kvalitetsmål om en Giftfri miljö bidrar till att uppnå målet med Stockholmskonventionen. Dessa åtgärder inkluderar att öka kunskapen och informationen om kemiska ämnen, att användningen av särskilt farliga ämnen såsom POPs, så långt som möjligt upphör, och att minska de risker som användning av andra kemikalier medför.

Som part i Stockholmskonventionen har Sverige åtagit sig att vidta nödvändiga juridiska eller administrativa åtgärder för att eliminera produktion, användning, import och export av listade POPs. Sverige ska också minimera utsläpp av POPs till miljön och säkerställa en säker hantering av lager som innehåller eller består av POPs. Avfall som innehåller, består av eller är förorenat med POPs måste bortskaffas på ett sådant sätt att POPs förstörs eller omvandlas irreversibelt så att det inte längre uppvisar POPs-egenskaper.

Sverige är även part i UNECEs konvention om långväga gränsöverskridande luftföroreningar (CLRTAP). Under konventionen finns åtta protokoll som specificerar mål och åtgärder för att minska utsläppen av olika typer av luftföroreningar. Ett av

protokollen handlar om utsläppen av POPs. Konventionen och dess protokoll reglerar begränsning, minskning och förebyggande av luftföroreningar, inklusive långväga gränsöverskridande luftföroreningar. Syftet med konventionens POPs-protokoll är att eliminera utsläpp av POPs.

Europaparlamentets och rådets förordning (EU) 2019/1021 av den 20 juni 2019 om långlivade organiska föroreningar (POPs-förordningen) genomför bestämmelserna inom EU. Eftersom det är en EU-förordning gäller den direkt i Sverige. Tillsyn av POPs-förordningen regleras i Miljöbalken. Miljöbalkens kapitel 5 och tillhörande förordningar och föreskrifter implementerar Europaparlamentets och rådets direktiv 2000/60/EG av den 23 oktober 2000 om upprättande av en ram för gemenskapens åtgärder på vattenpolitikens område (vattendirektivet) och dess dotterdirektiv om prioriterade ämnen (2008/105/EG). Vattendirektivet och dotterdirektivet har reviderats genom 2013/39/EU då ytterligare prioriterade ämnen lades till. Enligt artikel 4 i vattendirektivet ska medlemsstaterna genomföra de åtgärder som är nödvändiga med målsättningen att gradvis minska förorening från prioriterade ämnen och utfasning av utsläpp och annan tillförsel av farliga prioriterade ämnen.

Nya POPs i Stockholmskonventionen

Nedan ges en mer utförlig beskrivning av de ämnen som tillkommit i Stockholmskonventionen sedan förra genomförandeplanen. För varje ämne har en bedömning tagits fram. Bedömningarna baseras på ämnenas produktion, användning, upplagrade mängder, avfall och förorenade områden, samt förekomst i miljön för respektive ämne. Bedömningarna sammanfattar situationen i Sverige och därefter redogörs för behovet av åtgärder och strategier.

Kortkedjiga klorparaffiner

Produktion och användning

Framställning av klorparaffiner (CP:s) har pågått sedan 1930-talet. CP:s delas in i kort-(SCCP:s), mellan-(MCCP:s) respektive långkedjiga klorparaffiner (LCCP:s). Sedan 2017 omfattas SCCP av Stockholmskonventionen. Sedan 2010 regleras SCCPs i EU:s POPs-förordning och det är sedan 2019 inte tillåtet att producera eller släppa ut några produkter som innehåller SCCP på marknaden. Undantag gäller för blandningar som innehåller upp till 1 % SCCP och i varor upp till 0,15 % av ämnet.

Klorparaffiner (CP:s) har på grund av sina tekniska egenskaper, däribland termisk och kemisk stabilitet, haft flera användningsområden inom tillverkningsindustrin. Sverige har inte haft någon egen produktion av CP:s, men ämnet har importerats för industriell användning exempelvis i metallindustrin, som mjukgörare i plast och färg, för användning i fogmaterial och som flamskyddsmedel i textilier, gummi och i plast. Enligt Kemikalieinspektionens produktregister förekommer i dagsläget ingen import av SCCP för yrkesmässig användning till Sverige. Det saknas

information om i vilken utsträckning och omfattning import av produkter som innehåller kortkedjiga klorparaffiner (SCCP) förekommer.

Upplagrade mängder, avfall och förorenade områden

Kortkedjiga klorparaffiner (SCCP) återfinns i flera produkter som har en lång livslängd och som tidigare haft en omfattande användning. SCCP kan frigöras från använda eller deponerade produkter som innehåller ämnet. SCCP förekommer i byggnader och medvetenheten om SCCP i bygg- och rivningsbranschen är relativt hög. Lagkrav finns om att inventera samt identifiera farligt avfall innan renovering och rivning.

Avfall som innehåller mer än 0,25% SCCP klassificeras som farligt avfall. Vid 1% gäller dessutom att avfallet ska destrueras eller omvandlas irreversibelt. Material med avsiktlig användning av SCCP innehåller vanligen mer än 1 % SCCP. Inom ramen för tillsynsarbetet har konsumentprodukter såsom plastleksaker, påsar, mobilskal, hemelektronik, köksredskap och sportartiklar konstaterats innehålla SCCP över gränsvärdena för utsläppande på marknaden (KemI, 2020).

SCCP finns inte registrerade i databasen över förorenade områden. Användningen av SCCP är kopplad till flertalet industrier med känd användning av SCCP men det saknas specifika data.

Förekomst i miljön

SCCP övervakas i luft och deposition samt slam från avloppsreningsverk i Sverige. Övervakningen visar inte någon signifikant trend över tid. I en screeningundersökning från 2018 undersöktes CP i terrestra fåglar och däggdjur. Högst halter återfanns i muskel från älg. Rovfåglar hade också relativt höga halter jämfört med andra fåglar och djur längre ned i födokedjan. Det finns endast begränsat med information om halter och trender i andra matriser.

SCCP är en prioriterad substans inom vattendirektivet. Påverkansanalysen från den tredje förvaltningscykeln (2017-2021) visar att det potentiellt finns en belastning av SCCP på 121 vattenförekomster som skulle kunna resultera i att miljö kvalitetsnormen inte kan följas. I de vattenförekomster där SCCP har övervakats har den kemiska statusen generellt klassats till god med avseende på SCCP men tillförlitligheten är låg på grund av begränsad övervakningsdata (databasen Vatteninformationssystem Sverige (VISS), april 2020).

Bedömning

SCCP finns fortfarande kvar i varor under användning som sedan blir avfall. Halterna i miljön minskar ännu inte i tillräcklig omfattning och ämnet kräver fortsatt hög uppmärksamhet i Sverige. Genom åren har åtgärder vidtagits för att förebygga spridning av SCCP och fortsatta åtgärder för att minska halterna i miljön är nödvändiga.

Åtgärder och strategier

- Tillsyn av kemiska produkter och importerade varor som kan innehålla SCCP kommer fortsatt att genomföras.
- Fortsatt och utökad övervakning både av människa och miljö kommer att ske, med syfte att bättre identifiera relevanta källor.
- Fortsatt och intensifierad identifiering och vägledning kommer att genomföras med syfte att uppnå korrekt hantering av SCCP i avfall.

Dekabromdifenyleter

Produktion och användning

Dekabromdifenyleter (dekaBDE) ingår i samlingsgruppen polybromerade difenyletrar (PBDE). Den globala tillverkningen av dekaBDE var som störst i inledningen av 2000-talet. Ämnet har inte framställts i industriell skala i Sverige och industriell användning upphörde innan år 2003.

Ämnet har använts som flamskyddsmedel i ett flertal produkttyper, till exempel plast-, polymer- och kompositmaterial, textil och klädsel i fordon, fogmassor, ytbeläggningar och tryckfärger. Plast som behandlats med dekaBDE har tidigare förekommit i stor utsträckning i elektronik, men ämnet är sedan 2006 förbjudet i ny elektronik i hela EU genom Europaparlamentets och rådets direktiv 2011/65/EG av den 8 juni 2011 om begränsning av användning av vissa farliga ämnen i elektrisk och elektronisk utrustning (RoHS-direktivet). DekabDE förekommer även i byggmaterial till exempel plaströr och golvmattor.

DekabDE listades i Stockholmskonventionen år 2017 med vissa tidsbegränsade undantag. Restriktioner för produktion, användning och utsättande av produkter på marknaden har funnits genom REACH men dessa har sedan 2019 överförts till POPs-förordningen. Genom bestämmelser om undantag i POPs-förordningen är det för vissa specifika områden tillåtet att använda dekaBDE inom fordons- och flygplansindustrin.

Upplagrade mängder, avfall och förorenade områden

DekabDE återfinns fortfarande som flamskyddsmedel i en del äldre varor som används, även om nyförsäljningen är förbjuden. Det medför att ämnet är relevant för avfallshanteringen. Det utökade producentansvaret för elektronik och elektriska produkter (WEEE) ska säkerställa att sådana uttjänta produkter samlas in för särskild behandling. Vid förbehandling av WEEE gäller nationella bestämmelser som anger att plast som innehåller bromerade flamskyddsmedel måste separeras innan materialåtervinning.

DekabDE kan fortfarande återfinnas i importerade produkter och finns därmed i avfallsströmmar med elektroniska och elektrisk utrustning, bygg och rivningsavfall och fragmenterat avfall. Det finns ingen särskild information om dekaBDE i databasen över misstänkt förorenade områden. Då dekaBDE har olika användningsområden kan ämnet troligtvis återfinnas på platser där produkter som

innehåller dekaBDE hanteras, till exempel vid avfallsanläggningar med hantering av elektroniskt avfall, bilar och textilier.

Förekomst i miljön

Förekomst av dekaBDE, eller mer specifikt BDE 209, övervakas i luft och deposition men den detekteras endast sporadiskt och ingen signifikant trend över tid har observerats. En signifikant ökning kan ses i slam från avloppsreningsverk mellan 2004 och 2010, men efter 2010 ses ingen tydlig trend. BDE 209 övervakas inte regelbundet i akvatisk biota. I modersmjölk går det inte att se någon signifikant trend över tid men en eventuellt ökande tendens kan ses mellan 2009 och 2016. I mätningar från barn genomförda mellan 2016 och 2017 låg alla provsvar under kvantifieringsgränsen.

Bedömning

Fortfarande finns dekaBDE kvar i varor under användning som sedan blir avfall och halterna i miljön minskar ännu inte i tillräcklig omfattning. Flera åtgärder har genom åren vidtagits för att minska spridningen av dekaBDE. Åtgärderna behöver fortsätta och ämnet kräver fortsatt hög uppmärksamhet i Sverige.

Åtgärder och strategier

- Tillsyn av importerade varor är fortsatt nödvändigt eftersom dekaBDE fortfarande används globalt som additiv i plastråvara och kan förekomma i återvunnet plastmaterial.
- Plast från uttjänta elektronikprodukter (WEEE) som innehåller dekaBDE kommer fortsatt att sorteras ut för särskild destruktion.
- Fortsatt övervakning både av människa och miljön, inklusive den akvatiska miljön, kommer att ske.

Hexaklorbutadien

Produktion och användning

Hexaklorbutadien (HCBd) ingår sedan tidigare i bilaga A och är sedan år 2017 även listat under oavsiktligt bildade POPs-ämnen i bilaga C till Stockholmskonventionen. Den avsiktliga produktionen och användningen har sedan länge upphört i Europa. Oavsiktligt bildad HCBd uppkommer som en biprodukt i industriprocesser, bland annat vid framställning av klorerade lösningsmedel, men kunskapsläget är ofullständigt.

Förekomst i miljön

HCBd övervakas inte regelbundet i Sverige. Ämnet har detekterats i luft och deposition men inte i ytvatten eller biota.

Bedömning

HCBD är en prioriterad substans inom vattendirektivet. HCBD har dock inte påträffats i Sverige vid upprepade provtagningar av fisk, ytvatten eller sediment. Naturvårdsverket har därför beslutat att inte regelbundet övervaka HCBD.

Åtgärder och strategier

Utifrån ovanstående bedömning anses att inga ytterligare åtgärder behövs.

Perfluoroktansyra (PFOA) och PFOA-relaterade ämnen

Produktion och användning

Vid Stockholmskonventionens partsmöte år 2019 beslutades att lista Perfluoroktansyra (PFOA) i bilaga A till Stockholmskonventionen. Beslutet omfattar även PFOA-relaterade ämnen vilka kan omvandlas till PFOA. Sammantaget berörs därmed uppemot 800 ämnen av beslutet. Beslutet innehåller ett antal tidsbegränsade undantag för produktion och användning. Genom bestämmelser om undantag i POPs-förordningen är det för vissa specifika områden tillåtet att använda PFOA, till exempel i brandskyddsinstallationer (EU 2020/784).

PFOA har framställts och använts sedan 1950-talet. Under 1960- och 70-talet upptäcktes nya användningsområden, särskilt i samband med flourtelomerteknologins utveckling. PFOA samt PFOA-relaterade ämnen har till följd av sina fukt- och smutsavvisande egenskaper samt filmbildande förmåga använts för konsumentprodukter såsom köksutrustning, som ytbehandlings- och impregneringsmedel för textilier, papper, pappersförpackningar, färger och filmbildande brandsläckningsskum.

I Sverige förekommer en känd begränsad användning av ett PFOA-relaterat ämne i läkemedelsindustrin. Den huvudsakliga källan för PFOA/PFOA-relaterade ämnen i Sverige är import av kemiska produkter och varor med innehåll av ämnena.

Upplagrade mängder, avfall och förorenade områden

Branschorganisationen Avfall Sverige har utfört en studie (Avfall Sverige 2018) för att öka medvetenheten av förekomster av PFAS vid större avfallsanläggningar, som också utgör en källa till en diffus spridning av PFOA till miljön. Studien visar att PFOA finns i lakvatten, processvatten, och dagvatten från avfallsanläggningars område. PFOA finns inte registrerat i databasen över förorenade områden men är kopplad till produkter med ökad risk för PFOA-spridning, bland annat användning vid ytbehandlingsanläggningar och brandsläckningsskum som använts vid militära- och civila flygplatser.

Förekomst i miljön

PFOA övervakas löpande i luft och deposition sedan 2009. Ingen tydlig trend över tid har observerats i dessa matriser. PFOA mäts också regelbundet i slam och utgående vatten från avloppsreningsverk. Inte heller i denna övervakning är det

möjligt att se någon tydlig trend. Minskande halter kan dock ses i den löpande övervakningen i biota, till exempel i strömming och sillgrissleägg från Östersjön. Halterna av PFOA i lever från abborre, provtagna 2015-2017 från sex svenska sjöar, låg samtliga under detektionsgränsen. I modersmjölk provtagen mellan åren 1972 och 2014 går det att se en ökande trend fram till år 2000, därefter går halterna ned.

Bedömning

PFOA behöver fortsatt hög uppmärksamhet i Sverige. De förekommer fortfarande i produkter och i avfall, samtidigt som trenden och halterna i miljön som övervakas minskar generellt sett. Kunskapen om förekomst, användning och halter i miljön av PFOA och PFOA-relaterade ämnen är otillräcklig. Det är en utmaning att med tillräcklig precision bedöma aktuell situation och behov av ytterligare åtgärder enligt Stockholmskonventionen, för en så stor grupp av ämnen.

Åtgärder och strategier

- Fortsätta att arbeta för en sammanhängande och koordinerad EU strategi för hantering av PFAS (inklusive PFOA) genom regulatoriska och icke-regulatoriska åtgärder.
- Tillsyn av kemiska produkter och varor som kan innehålla PFOA och/eller PFOA-relaterade ämnen är planerade att initieras.
- Övervakningen av PFOA i människa och miljö ska fortsätta på nationell och regional nivå. Arbete med att öka kunskapen om både källor, halter och trender samt exponering för PFOA-relaterade ämnen är nödvändigt.
- Varor och avfall som innehåller PFOA och/eller PFOA-relaterade ämnen behöver definieras på ett korrekt sätt och möjligen i vissa fall separeras från annat avfall för en korrekt avfallshantering enligt Baselkonventionens:s vägledning för avfall som innehåller POPs.
- Ytterligare forskning behöver initieras för att öka kunskapen om förekomsten av PFOA och/eller PFOA-relaterade ämnen i förorenade områden samt från andra identifierade källor.

Ett svenskt nationellt åtgärdsprogram med syfte att öka kunskapen om och minska användningen av PFAS-ämnen¹, inklusive PFOA och PFOA-relaterade ämnen, genomförs med deltagande från flera myndigheter. En avsiktsdeklaration har signerats av 37 myndigheter och forskningsinstitutioner för att öka samarbetet, sprida mer kunskap och kunna minska användningen av PFAS.

Det pågår ett flertal nationella åtgärder för att minska humanexponeringen, minska användningen och spridningen till miljön och för att öka kunskapen om PFAS-ämnen inklusive PFOA.

¹ <http://www.kemi.se/pfasguide>

PFOA ingår i gruppen PFAS-ämnen. PFAS-ämnen som använts i brandskum på brandövningsplatser har visat sig förorena sjöar och grundvatten vilket inkluderar dricksvattentäkter. Problematiken började gradvis upptäckas via en screening 2005 och studier från 2009 och framåt har visat omfattningen av dessa föroreningar. Förhöjda halter i dricksvatten upptäcktes för första gången i Botkyrka kommun år 2011. Liknande föroreningsnivåer har därefter påträffats på många platser beroende på användning av PFAS-innehållande brandsläckningsskum (AFFF), som främst använts av det svenska försvaret och av Swedavia. Fortsatt analys och ytterligare data behövs för att till fullo kunna överblicka situationen och överväga ytterligare åtgärder.

För dricksvatten har Livsmedelsverket sedan flera år tagit fram en haltgräns på 90 ng/L för summan av 11 olika PFAS-ämnen (inklusive PFOA), över vilken åtgärder till skydd för hälsan behöver vidtas bland vattenproducenter och myndigheter. Inom vattenförvaltningen så är PFAS11, sedan 2018, identifierat som särskilda förorenande ämnen nationellt. Bedömningsgrunden (90 ng/L för PFAS11) baseras på livsmedelsverkets värde och gäller vid en punkt som är representativ för råvattenintaget i dricksvattenförekomster (HVMSF 2019:25).

Inom EU har Sverige tillsammans med ett antal andra länder i december 2019 föreslagit till EU-kommissionen att PFAS ämnen ska åtgärdas gemensamt och som en grupp av ämnen.² Förslaget innebär bland annat att PFAS-ämnen behöver fasas ut, gränsvärden behöver tas fram och införas i olika lagstiftningar, liksom förstärkt miljöövervakning, allmän kunskaphöjning, ökad forskning kring alternativ, säker avfallshantering och effektiv efterbehandling av PFAS-förorenade områden.

Dikofol

Produktion och användning

Dikofol är ett bekämpningsmedel som använts för att motverka angrepp av kvalster vid odling av grödor såsom frukt, grönsaker, prydnadsväxter, bomull och te. Dikofol produceras och används inte längre av något EU-land och tillverkning av dikofol har aldrig förekommit i Sverige. Dikofol godkändes i Sverige 1964 som bekämpningsmedel mot kvalster. Det sista godkännandet löpte ut vid utgången av år 1990 och användningen har varit förbjuden sedan 1993. I juni 2020 infördes förbud för dikofol utan undantag i POPs-förordningen.

Upplagrade mängder, avfall och förorenade områden

Dikofol är ett av flera bekämpningsmedel som är kopplade till branschen handelsträdgårdar men ämnet registreras inte specifikt i databasen över förorenade

² "Elements for an EU-strategy for PFASs" a plan
<https://www.regjeringen.no/contentassets/1439a5cc9e82467385ea9f090f3c7bd7/fluor---eu-strategy-for-pfass---december-19.pdf> (hämtad augusti 2020)

områden. I en studie genomförd av länsstyrelserna återfanns dikofol i jorden i ett mindre antal undersökta handelsträdgårdar i Mälardalen. Det finns knappt 750 objekt med en hög eller mycket hög risk för hantering av bekämpningsmedel.

Förekomst i miljön

Dikofol övervakas inte regelbundet i den svenska miljön. I en sammanställning över förekomst i ytvatten mellan 1983 och 2014 hade inte dikofol detekterats i något av de 256 analyserade proven. Dikofol detekteras dessutom väldigt sällan i den övervakning av produkter av vegetabiliskt ursprung som genomförts mellan 2010 och 2020.

Bedömning

Halterna av dikofol i livsmedel, grundvatten, avfall och miljö är låga i Sverige. De nationella åtgärder som hittills vidtagits avseende dikofol bedöms som tillräckliga.

Åtgärder och strategier

Ytterligare åtgärder är inte planerade.

Introduction

The general objective of the Stockholm Convention is to protect human health and the environment against persistent organic pollutants (POPs). The Convention requires the currently 184 Parties to take measures to ban and/or take the necessary legal and administrative steps to eliminate the production, use, import and export of the listed POPs, eliminate or reduce releases of POPs into the environment, and ensure safe management of stockpiles containing or consisting of POPs. Waste containing, consisting of, or contaminated with POPs, must also be disposed of in such a way that the POPs content is destroyed, or irreversibly transformed so that it does not exhibit POPs characteristics.

The Convention initially included 12 substances or groups of substances and has subsequently been amended. Currently 30 POPs are covered by the Stockholm Convention, see Annex II for an overview.

At the 8th meeting of the Conference of the Parties (COP) to the Stockholm Convention held in May 2017 it was agreed to include short-chain chlorinated paraffins (SCCPs) on the list of persistent organic pollutants to be eliminated. SCCPs were introduced in Annex A (Elimination) with various specific time-limited exemptions regarding its production and use. It was also decided to list decabromodiphenyl ether (decaBDE) in Annex A with various specific time limited exemptions. In addition to these two substances the Parties also decided to include hexachlorobutadiene (HCBD) in Annex C to address the unintentional production.

The amendments to include SCCPs and decaBDE with specific exemptions (decisions SC-8/11, SC-8/10) in Annex A together with HCBD in Annex C (decision SC-8/12) entered into force on 18 December 2018.

In May 2019, at the 9th meeting of the Conference of the Parties to the Stockholm Convention, it was agreed to include perfluorooctanoic acid (PFOA) its salts and PFOA-related compounds in Annex A with some specific time limited exemptions regarding its production and use. It was also decided to include dicofol in Annex A without any exemptions.

The amendments to include PFOA, its salt and PFOA-related compounds (Decision-9/12) and Dicofol (Decision-9/11) in Annex A enter into force 3 December 2020.

The Convention allows Parties to register for specific exemptions that are available with respect to the relevant POP for a specific period of time. Sweden does not register for specific exemptions separately, this is done by the European Commission on behalf of the European member states.

According to the Convention, all Parties are required to update the National Implementation Plan (NIP) within two years from the date the amendments enter into force. This update of the Swedish NIP is the fifth in the scheme and has been prepared by the Swedish Environmental Protection Agency in cooperation with the Swedish Chemicals Agency and the Swedish Agency for Marine and Water Management and is describing the regulatory framework and measures taken to phase-out the above-mentioned substances. In preparing the update, consultations were made with the National Food Agency. For all other substances in the Stockholm Convention and other sections in a NIP, we refer to the Swedish NIP from November 2017, Swedish EPA Report 6794.

Table 1. Added substances in Annex A up to 2019, Cas No and main use.

Annex A Elimination	Cas No	Main use
Short chain chlorinated paraffins (SCCPs)	85535-84-8 and others	Metal working fluids, lubricants, waterproofing, flame retardants in paint and plasticizers
Decabromodiphenyl ether (decaBDE)	1163-19-5	Flame retardant
Perfluorooctanoic acid (PFOA) its salts and PFOA related compounds ³	335-67-1 and others	Impregnation, fire fighting foam
Dicofol	115-32-2 10606-46-9	Pesticide

Table 2. Added substance in Annex C in 2017 and Cas No.

Annex C Unintentionally produced	Cas No	
Hexachlorobutadiene (HCBD)	87-68-3	

³ UNEP/POPS/POPRC.13/INF/6/Add.1

Country baseline

This section provides a description of the additional POPs that were included in the Stockholm Convention following the eighth and ninth Conference of the Parties (COP) meeting in 2017 and 2019, respectively.

Regulation of POPs

The obligations of the Stockholm Convention are implemented in Sweden mainly via the Regulation (EU) 2019/1021 of the European parliament and of the council of 20 June 2019 on persistent organic pollutants (the POPs Regulation). The Regulation does not provide for any country-specific exemptions.

The placing on the market and use of most of the POPs listed in the Convention have been banned or restricted in the EU by previous provisions in other EU regulations (Regulation (EC) no 1907/2006 of the European parliament and of the council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), Regulation (EC) no 1107/2009 of the European parliament and of the council of 21 October 2009 concerning the placing of plant protection products on the market and Regulation (EU) no 328/2012 of the European parliament and of the council of 22 May 2012 concerning the making available on the market and use of biocidal products). When substances are listed in the Stockholm Convention those restrictions are moved or amended as required, and also its production is banned or strictly regulated by adding it to the appropriate Annex of the POPs Regulation.

Import is regarded as placing on the market in the EU and thus import of all Annex A and Annex B chemicals is prohibited or restricted to registered exemptions for uses allowed under the convention. There are general exemptions for laboratory-scale research or as a reference standard and as unintentional trace contaminant in substances, preparations or articles.

The export of all POPs, including the additional POPs considered in this NIP, is regulated under Regulation (EU) No 649/2012 of the European parliament and of the council of 4 July 2012 concerning the export and import of hazardous chemicals.

The POPs Regulation also implement the POPs-protocol as one of eight protocols to the 1979 UNECE Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants, (LRTAP, POPs-protocol) to which Sweden is also party. The objective is to eliminate any discharges, emissions and losses of certain POPs substances.

In order to eliminate POP substances, efforts and measures need to cover all parts in the life cycle of POP substances. The EU POPs regulation has been developed in

order to approach all parts of the substances life cycle and sets the requirements for waste management. Waste consisting of, containing or contaminated with a POP substance listed in Annex IV of the POPs regulation must be disposed of in a way that the POP content is destroyed or irreversible transformed in order to remove the POP properties.

The Swedish Environmental Code, which was established in 1999, regulates the responsibilities concerning contaminated land. Contaminated sites usually originate from earlier industrial and mining activities or from closed landfills containing hazardous waste. The Swedish Environmental Code provides for the enforcement of the POPs Regulation as well as the Regulations (EU) no 1107/2009 and No 528/2012 concerning the placing of plant protection products and biocidal products on the market. Consumer products containing regulated POPs, above the allowed concentration limits placed on the EU market, that are identified in enforcement are notified to the European Commission Rapid Alert System for dangerous non-food products (RAPEX).

Many of the POPs are regulated by the Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (WFD) and Directive 2008/105/EC of the European parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy (the priority substance directive) as they have been deemed to present a significant risk to or via surface waters (river, lake, transitional and coastal) at EU-level. Environmental quality standards are specified in the priority substance directive and the pollutants are classified as either priority or priority hazardous substances. Dicofol, SCCP and HCBd are classified as priority hazardous substances. Member states shall implement necessary measures to progressively reduce pollution from priority substances and to cease or phase out emissions, discharges and losses of priority hazardous substances. National environmental quality standards can also be set for river basin specific pollutants. PFAS11 (including PFOA) were included in Sweden as national river basin specific pollutants in 2018 (HVMFS 2019:25). The status of European water bodies should be assessed every sixth year and a national preliminary chemical status classification from the third management cycle (2017-2021) is currently available.

As many POPs were used as pesticides the Regulation (EC) No 396/2005 of the European parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origins, is of relevance for the implementation of the requirements of the Stockholm Convention.

For further details on the regulatory framework related to POPs, see Annex II in the Swedish NIP from November 2017 (Swedish EPA, 2017).

Short-chain chlorinated paraffins

The Conference of the Parties of the Stockholm Convention decided in 2017 to list short-chain chlorinated paraffins (SCCPs) in Annex A (elimination) with various specific exemptions (time limited) regarding its use (Decision SC-8/11). A review of the need of the exemptions is for consideration at the next COP (Decision SC-8/14). Parties may notify the Secretariat of the production/or use of SCCPs for the specific exemptions. In September 2020 no Party for whom the amendment is in effect has registered for any of the specific exemptions according to the webpage of the Convention. SCCPs was nominated as a POP by the European Union (EU) and its member states in 2006.

SCCPs are complex mixtures of organic compounds containing polychlorinated n-alkanes. The carbon chain length of commercial SCCPs are usually between 10 and 13 carbon atoms (C10-13). Two other groups of chlorinated paraffins with longer chain lengths, the medium-chain paraffins (C14-17) and the long-chain paraffins (C18 and more), are currently not included under the Stockholm Convention.

Production and use

Chlorinated paraffins (CPs) were introduced in the 1930s and are industrial chemicals with high thermal and chemical stability and relatively inexpensive production. CPs are produced by the unspecific chlorination of n-alkanes derived from petroleum byproducts. Production is often related to several chlorinated paraffin products that do not distinguish SCCPs from other CPs. Historically, SCCPs have been the most widely produced CPs. With the regulation of SCCPs, production and usage of CPs has shifted to medium-chain chlorinated paraffins (MCCPs) and long-chain chlorinated paraffins (LCCPs).

The European production of SCCPs stopped in 2001. There has been no manufacture of SCCPs in Sweden. SCCPs have been used as softeners in plastics, paints, coatings and sealants, as flame retardants in rubber, plastics and textiles as well as an extreme pressure lubricant in metal working fluids.

According to data from the Swedish Product Register no import of SCCPs was registered in 2018. SCCP may be present as impurity of imported mixtures with MCCP.

There are no surveys of the current applications in Sweden or the total consumption of SCCPs with mixtures where the substances may be present in concentrations of up to 1%.

No data are available on the possible import of articles with SCCPs. Regarding SCCPs in articles, those with a content of SCCPs below 0.15% by weight are exempted from the restriction in the POP Regulation.

The estimated consumption of SCCPs in the EU in 2009 was about 530 tonnes, of which 45% was used in sealants and adhesives. Until 2000, the main use of SCCPs was in metal working fluids. Historical, significant uses of SCCPs are:

- Sealants and adhesives: Main use in sealants rather than adhesives, primarily for filling of expansion and movement joints in building and general engineering, joints for protection from spillages and where resistance to water and chemicals etc. is required and waterproofing of roofs.
- Paints: Chloro-rubber and acrylic protective as well as intumescent paints, with road marking paints being a key application, but also e.g. anticorrosive coatings and swimming pool coatings.
- Rubber: Conveyor belts for underground mining and to a minor extent other rubber products.
- Textiles: Furniture upholstery, seating upholstery in transport applications, interior textiles such as blinds and curtains, and tents and protective clothing (UNEP, 2016a).

The European Chemical Agency (ECHA) has received notifications for SCCPs in many types of articles (ECHA, 2015).

Legislation related to SCCPs

Short chain chlorinated paraffins (SCCPs) have been regulated in the EU since 2002 by a restriction of the use of SCCPs for metal working fluids and fat liquoring as substances or as constituents of other substances or preparations in concentrations higher than 1% (Council Directive 76/769/EEC).

In 2018 SCCPs were included under the Regulation (No) 1272/2008 of the European parliament and of the Council of 16 December 2008 on Classification, Labelling and Packaging of substances and mixtures (CLP).

Following the inclusion of SCCPs in the POPs Protocol under the LRTAP Convention in 2009, its production, placing on the market and use was restricted in the POP Regulation (Commission Regulation (EC) No 519/2012). The two exempted uses were (a) fire retardants in rubber used in conveyor belts in the mining industry; (b) fire retardants in dam sealants.

After listing SCCPs in the Stockholm Convention in 2017, its production, placing on the market and all uses has been banned by adding it to Annex I of the POP Regulation in June 2019. There is an exemption for mixtures with concentrations up to 1% and for articles with concentrations up to 0.15%, meaning that, for example, mixtures of medium-chain chlorinated paraffins (MCCPs) can be up to 1% SCCP as a result of contamination.

Stockpiles, waste and contaminated sites

SCCPs may be released from products and articles during their use as well as after their disposal. Stocks of SCCPs may occur in the form of accumulated substances in articles still in use and waste in older completed landfills. Many applications of SCCPs have long service lives. Due to previous extensive use in the building sector, construction and demolition waste (C&D waste) is a highly relevant waste stream.

The main articles with contents of SCCPs accumulated and present in society are sealants and adhesives, rubber, paints and textiles. SCCPs may primarily occur in waste streams in the form of paint and sealants used in buildings and in rubber used in vehicles. The awareness of SCCPs in C&D waste is relatively high. In Sweden there is a legal requirement⁴ to conduct an inventory to identify hazardous waste prior to demolition or renovation activities.

Materials in which SCCPs have been used intentionally typically contain more than 1% of SCCPs and are therefore classified as hazardous waste due to the harmonised classification as carcinogenic (Carc. 2) and ecotoxic (aquatic chronic 1). The lower concentration limit used for determining when a waste consisting or containing SCCPs should be disposed of as hazardous waste is 0,25 %.

SCCPs may still be found in imported articles above the limit value. In market surveillance performed by Swedish Chemicals Agency since 2008 it has been found in a wide range of articles including plastic toys, bags, mobile cases, home electronics, kitchen ware and sport articles (KemI, 2020). Analyses of Christmas lights and other electric Christmas decorations conducted in 2018 by Swedish Chemicals Agency detected SCCPs at levels above regulatory limits in 10 of 120 products investigated (KemI, 2018).

SCCPs has been used in a variety of products and is not specifically registered in the database for contaminated sites. Due to its broad spectra of previous use SCCPs is associated with several former industries which have a known use of SCCP but there is no specific data regarding SCCP.

Occurrence in the environment

SCCPs have been monitored regularly in air and atmospheric deposition since 2009. No significant time trends can be seen but a possible slight decrease in air is seen for the last couple of years, but the variations between sampling occasions are quite large. CPs are also monitored annually (since 2004) in sludge from wastewater treatment plants. The levels in sludge indicates the exposure and use in urban environments. No significant time trends can be seen for SCCPs in sludge which could be an indication of a continuous use of articles containing SCCPs.

⁴ SFS (2010:900) planning and building act

In a screening study commissioned by the Swedish EPA performed in Swedish terrestrial birds and mammals, the highest concentration was observed in muscle tissue from moose (Yuan 2018). Birds of prey showed higher concentrations of SCCPs than found in other birds, indicating bioaccumulation in the food chain. Detection of SCCP, in all analysed species, indicates that SCCP are widely present in the Swedish terrestrial environment. Substantial levels of medium and long chained paraffines was also identified.

There are limited data on human exposure to CPs, but the Swedish EPA has initiated a new project in 2020 focusing on women's and children's exposure. Measurements in Swedish, Norwegian and Chinese mother's milk shows that the levels of CPs are roughly comparable or slightly lower than reported concentrations of PCBs (Zhou 2020).

In the Swedish market basket survey, SCCP were found in fish and fruits. MCCPs were detected in fats and oils as well as sugar, sweets and pastries.

Within the Water Framework Directive, SCCP was one of the original 33 priority substances included in the directive on priority substances (2008/105/EC). The pressure and impact analysis from the third management cycle (2017-2021) indicate that potential emissions of SCCP may affect the chemical status in 121 waterbodies (the database for Water Information System Sweden (WISS)⁵, accessed April 2020). The chemical status has generally been classified as good for SCCP in the waterbodies with monitoring data. However the classifications have low reliability due to limited monitoring data.

Assessment

SCCP needs continued and high attention in Sweden. It is still present in articles in use and in waste, and the trends and occurrence in the environment including in terrestrial mammals are not yet sufficiently known.

⁵ <https://viss.lansstyrelsen.se/>

Decabromodiphenyl ether

The COP decided in 2017 to list decabromodiphenyl ether (decaBDE) in Annex A (elimination) with various specific exemptions (Decision SC-8/10). A review of the need of the exemptions is for consideration at the next COP (Decision SC-8/13). DecaBDE was nominated as a POP by Norway. DecaBDE is the fifth of the polybrominated diphenyl ethers (PBDEs) to be covered by the Convention. The commercial mixture c-decaBDE consists of approximately 99% decaBDE with trace levels of other PBDEs.

Production and use

DecaBDE has been used as an additive flame retardant in a variety of applications including in plastics/polymers/composites, textiles mainly used in vehicles and public buildings, adhesives, sealants, coatings and inks. DecaBDE-containing plastics were used in computers and TVs, wires and cables, pipes and carpets. (UNEP, 2015a). For defining critical spare parts mainly in the automotive and aerospace industries an assessment was made (UNEP, 2016b).

DecaBDE consumption peaked in the early 2000's, but decaBDE is still used worldwide. According to an EU risk assessment (EU Commission, 2004), world production of decaBDE was 56 100 tonnes in 2001. The amount of decaBDE in products imported into EU was estimated to be about 1 300 tonnes a year.

Historically, at a global scale, decaBDE was the most important substance within the group of brominated diphenyl ethers. In Western Europe, the consumption of PBDEs was high until the mid- or late 1990s. It is likely that some of the decaBDE imported in products into the EU or from other EU countries also reaches Sweden. There is, however, no data to quantify the extent to which decaBDE enters Sweden in imported articles.

DecaBDE has never been produced in Sweden and its industrial use ended before 2003 (KemI, 2003). All decaBDE used in Sweden came from import of the substance, either as a chemical or in plastic raw materials/semi-manufactures, or with manufactured goods.

A national ban on decaBDE was discussed in 2004 and the industry within the plastics and textile sectors on a voluntary basis undertook to reduce releases of decaBDE to near zero (KemI, 2004). Since 2004 there has been no import of decaBDE as a chemical product. Releases of decaBDE can occur throughout its lifecycle. This can take place on a local scale during manufacture, handling and addition to plastics and during the treatment of textiles. Releases can also occur through leakage from products of which decaBDE is a constituent and in waste treatment, which could give rise to increased environmental concentrations over time.

Legislation related to decaBDE

Polybrominated diphenylethers (PBDEs) including decaBDE were in July 2006 regulated in the Directive 2002/95/EC on the restrictions of the use of certain hazardous substances in electrical and electronic equipment (RoHs) and not allowed for use in electrical and electronic equipment placed on the European market.

In December 2012 decaBDE was included in the Candidate List of Substances of Very High Concern ('SVHC') under the REACH-regulation for possible authorisation of its use. Inclusion upon this list means the substances can be subject to further review and ultimately phased out under the Authorization process. Moreover, industry is obliged to inform professional user and consumers upon request on the occurrence of the listed substances in articles. Considering the nomination of decaBDE to the Stockholm Convention the EU in February 2017 restricted the placing on the market and use in the EU REACH-regulation ((EU) 2017/227).

Because of listing decaBDE in the Stockholm Convention in 2017, the ban on its production, placing on the market and restriction on use has been amended and moved from the REACH regulation to the Annex I of the POP Regulation.

The European Union has for its Member states registered for the following specific exemptions for production and use of decaBDE:

- Parts for use in vehicles as specified in the Convention (see paragraph 2 of Part IX of Annex A).
- Aircraft for which type approval has been applied for before December 2018, and has been received before December 2022 and spare parts of those aircraft.
- Additives in plastic housings and parts used for heating home appliances, irons, fans immersion heaters that contain or are in direct contact with electrical parts or are required to comply with fire retardancy standards, at concentrations lower than 10 % by weight of the part.

For Sweden the need of exemptions is limited. The concentration limit for the sum of polybrominated diphenyl ethers (PBDEs), including decaBDE in waste is set at 1 000 mg/kg. According to the regulation, the Commission should review the concentration limit not later than 16 July 2021 and, where appropriate, adopt a legislative proposal to lower that value to 500 mg/kg.

Stockpiles, waste and contaminated sites

The main stockpiles with contents of decaBDE accumulated and present in society are in flame retardant plastics and textiles used in vehicles (ELV), computers and TVs, electric wires and cables (all in all called WEEE), pipes and carpets. Even though the use of decaBDE was banned within the EU in 2008 there still may be

articles containing decaBDE in use and hence decaBDE is highly relevant in terms of waste management.

As regards WEEE there is an extended producer responsibility to collect and recycle e-waste. On national basis this is organized by El-Kretsen who have contracted a few waste operators to conduct the collection and treatment. National regulations⁶ stipulates that all brominated substances in plastics must be separated prior to any material recycling operation. Separated fractions containing brominated substances from plastics in WEEE are disposed of mainly in cement kilns and in waste incinerations plants. In the year 2017 24 400 tonnes (SMED 2019) of plastics from WEEE was collected of which about half the amount was sent for destruction due to content of brominated and other unwanted problematic substances.

DecaBDE may still be found in imported articles and be present in the waste stream for electrical and electronic equipment, waste building materials, and shredder waste. In market surveillance made by the Swedish Chemicals Agency since 2010 decaBDE was found in 22 electrical and electronic products (Informant, 2020).

ELV is also a subject to a producer's responsibility. ELV-waste containing residual plastics, fabric and rubber parts are separated from metal parts in the shredding process into shredder light fraction (SLF). The SLF is disposed of in cement kilns and waste incineration plants. A minor part of ELV plastics are reused in the form of replacement parts for service and automobile repairs.

There are no data to verify use of decaBDE in Sweden and decaBDE is not a substance that is registered in the database of potentially contaminated sites. Since it has been used as additive flame retardant in electronics, textiles, sealants coatings cables and various other products there is a risk that it could be found in several locations such as treatment facilities for electronic waste and textiles. There is no information of individual contaminated sites where decaBDE is located.

Occurrence in the environment

Monitoring of decaBDE in air and atmospheric deposition started in 2009. However, decaBDE is only occasionally detected and no time trend can be seen. A significant increasing time trend was seen in the annual monitoring of sludge from nine wastewater treatment plants between 2004-2010. After 2010 there is no clear trend.

DecaBDEe is not monitored regularly in biota and the aquatic environment. However, a few screening studies has been performed in e.g. moose, lynx, eagle owls, herring and guillemot eggs.

⁶ NFS 2005:10

So far, no significant trend has been observed for BDE-209 in human milk from first time mothers in Uppsala. But a non-significant increase with 4.8% per year was observed between 2009-2016. Measurements in serum from children, aged 11-12, 14-15, and 17-18 years in 2016-2017, showed that the concentration was under the quantification limit (LOQ 16-21ng/kg) in all three age groups.

Assessment

DecaBDE needs continued and high attention in Sweden. It is still present in articles in use and in waste, and the trends in the environment are not yet decreasing significantly.

Hexachlorobutadiene

The Conference of the Parties of the Stockholm Convention decided in 2017 to list hexachlorobutadiene (HCBD) in Annex C covering unintentional production (Decision SC-8/12).

The inclusion of HCBD in Annex A covering production or use without specific exemptions was decided by the Parties in 2015 (Decision SC-7/12). The intentional use and production of HCBD has not occurred in Europe for many years. For more information on production or use please see the previous Swedish National Implementation Plan from 2017, report nr 6794.

Unintentional production

HCBD is unintentionally formed and released from industrial processes. Relevant sources are the production of certain chlorinated hydrocarbons, production of magnesium, and incineration processes. HCBD occurs as a by-product during the production of both carbon tetrachloride and tetrachloroethene. Releases can be minimized by alternative production processes, improved process control, emission control measures, or by substitution of the relevant chlorinated chemicals. Cost efficient best available techniques (BAT) and best environmental practices (BEP) to reduce releases of unintentionally produced HCBD are available. Control measures for other unintentionally produced POPs are similar to those for HCBD. Emission data can be found at the Swedish Pollutant Release and Transfer Register (PRTR)⁷.

Legislation related to unintentionally formed HCBD

Regarding POPs formed unintentionally, EU legislation as well as Swedish environmental protection legislation apply a number of instruments which aim to reduce release of these substances. The most important release reduction measures are laid down in the Directive 2010/75/EU of the European parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control (the IE Directive). The IE Directive entered into force on 6 January 2011. The IE Directive and especially the requirements relating to BAT (Best Available Techniques) are set out in national laws and ordinances, including the Ordinance on Industrial Emissions Ordinance (2013:250), the Ordinance on Operators' Own Control (1998:901) and the Environmental Code (1998:808). These legal provisions, and others, specify expectations relating to the fulfilment of BAT conclusions. The Ordinance on Industrial Emissions Ordinance sets the provisions on precautionary measures for industrial emissions activities and the requirement on using BAT. These BAT conclusions are part of the BAT reference documents (BREF) describing the techniques considered as BAT. The BAT conclusions are considered as a reference for setting conditions in the permit. In Sweden, the BAT conclusions are implemented as general binding rules and they

⁷ Swedish PRTR "Utsläpp i siffror" <http://utslappisiffror.naturvardsverket.se/>

apply four years from published in the European Union Journal and are one part of the foundation for approval and supervisory authorities' administration of regulation.

Stockpiles, waste and contaminated sites

There is no information of HCBD regarding contaminated sites in Sweden.

Occurrence in the environment

In a screening study performed in 2003, HCBD was found in all air samples with the same concentrations in background areas as at point sources, i. e. approximately 0.16 ng/m³ (Kaj and Palm 2004). It was also detected in deposition (0.028 and 0.042 ng/m²/day). HCBD has not been detected in surface water for the years 2002-2014 with concentrations above 0.1 ug/L and it has not been found in any biotic matrices (Danielsson et al 2014). It was concluded by the Swedish EPA in 2005 that HCBD is not an environmental problem in Sweden (Swedish EPA, 2005).

Within the Water Framework Directive, HCBD should be assessed within chemical status classification. The preliminary status classification of the third management cycle (2017-2021) show that chemical status is good (the database for Water Information System Sweden (WISS)⁸, accessed April 2020). Since HCBD cannot be found in biota from repeated sampling occasions in fish, nor surface water and sediment, the Swedish EPA has concluded not to continue to regularly monitor HCBD (Swedish EPA 2014).

Assessment

Taking into account the above, further actions are not considered needed.

⁸ <https://viss.lansstyrelsen.se/>

Perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds

The Conference of the Parties of the Stockholm Convention decided in 2019 to list perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds in Annex A with a number of specific exemptions (time limited) regarding its production and use. The decision also specifies requirements when Parties register for the specific exemption for use in firefighting foams, (Decision SC-9/12). Over 800 substances are included. Information regarding the identification of substances covered by the listing is available in Document UNEP/POPS/POPRC.13/INF/6/Add.1 for the Parties to make use of. It is an indicative list and to provide further information was invited. A decision on actions related to PFOA also encourages Parties to consider that fluorine-based fire-fighting foams could have negative environmental, human health and socioeconomic impacts due to their persistency and mobility (Decision SC-9/13).

PFOA and the PFOA-related substances belong to the class of poly- and perfluorinated alkyl substances (PFASs) and has a similar structure as PFOS, but without the sulphur atom.

PFOA-related compounds are any substances (including salts and polymers) that degrade to PFOA. The nomination to list PFOA, its salts and PFOA-related compounds was made by the EU and its member states in June 2015. The nomination highlighted concerns that the presence of PFOA in the environment is also influenced by the degradation of PFOA-related compounds, including side-chain fluorinated polymers. Hence the addition of PFOA alone would not be sufficient to protect human health and the environment (UNEP, 2015b).

Production and use

PFOA has been manufactured since 1947 (ACS, 2015). PFOA-related compounds such as fluorotelomer alcohols have also been in production and use, notably with the development of fluorotelomer technologies in the 1960s and their subsequent commercialization in the 1970s and thereafter. Commercial products often consist of a mixture of varying chain lengths, and PFOA may be present at low levels in mixtures primarily consisting of homologues with shorter chain lengths.

PFOA has never been produced in Sweden and there is according to the Swedish Products Register no import as chemical.

PFOA, its salts and PFOA-related compounds has been used widely in the production of fluoroelastomers and fluoropolymers, the production of non-stick kitchen ware, food processing equipment (e.g. the brand name Teflon®). PFOA-related compounds, including side-chain fluorinated polymers, are used as surfactants and surface treatment agents in textiles, paper and paints, firefighting

foams. PFOA has been detected in stain resistant carpets, carpet cleaning liquids, microwave popcorn bags, and non-stick kitchen ware.

The Risk management evaluation for PFOA and its addendum (UNEP, 2017a and 2018) highlighted concerns around the use of PFOA within certain types of fire-fighting foam given that the application of fire-fighting foam is widespread and dispersive with high potential for loss to environment.

One use in Sweden of a PFOA-related compound concerns perfluorooctyl iodide (PFOI) when producing pharmaceutical products. The release of PFOI being a contamination of perfluorooctyl bromide (PFOB) is estimated to be 4 gram per year. The by far biggest total amounts in Sweden occur because of the presence in imported articles.

Legislation related to PFOA, its salts and PFOA-related compounds

PFOA was in June 2013 included in the REACH-Candidate List of Substances of Very High Concern ('SVHC') based on being toxic to reproduction and PBT (ED/68/2013). In October 2013 an harmonised classification of PFOA was included in the CLP regulation, by the Commission Regulation ((EU) No 944/2013).

Based on a proposal by Norway and Germany in 2014, a restriction on the production and placing on the market of PFOA, its salts and PFOA-related compounds was included in the REACH regulation, with an entry into force 4 July 2020 and subject to certain derogations (Commission Regulation No 2017/1000).

As a consequence of the listing PFOA, its salts and PFOA-related compounds in 2019, the POPs regulation is amended and apply from 4 July 2020 (Commission regulation (EU) 2020/784). The restrictions on PFOA in REACH are then deleted. The restrictions and requirements specified for the exemptions on use under the Stockholm Convention as now included in the POPs-regulation, are stricter than those adopted within the EU in under REACH, for example related to the use of PFOA-containing firefighting foams.

The POPs-regulation include a number of time limited exemptions and articles already in use before 4 July 2020 are allowed. A transitional period for derogations previously granted in the REACH restriction apply until 3 December 2020 for certain medical devices other than implantable ones, latex printing inks and for plasma nano-coatings.

From 1 January 2023, uses of fire-fighting foam that contains or may contain PFOA, its salts and/or PFOA-related compounds is only allowed in sites where all releases can be contained. For fire-fighting foam for liquid fuel vapour suppression and liquid fuel fire (Class B fires) already installed in systems, including both mobile and fixed systems a derogation apply until July 2025, subject to conditions.

The foam shall not be used for training and not for testing unless all emissions are minimised, effluents collected and safely disposed of. Stockpiles of PFOA-containing firefighting foams are to be notified and managed safely and as waste if no use is permitted.

For photolithography or etch processes in semiconductor manufacturing, photographic coatings applied to films and invasive and implantable medical devices, the derogation apply until July 2025.

For textiles for oil- and water-repellency for the protection of workers, and manufacture of polytetrafluoroethylene (PTFE) and polyvinylidene fluoride (PVDF) for production of high-performance, corrosion-resistant gas filter membranes, water filter membranes and membranes for medical textiles, industrial waste heat exchanger equipment or industrial sealants capable of preventing leakage of volatile organic compounds and PM_{2.5} particulates, the derogation apply until July 2023.

The Parties to the Stockholm Convention also decided on a specific exemption that was not included in the REACH regulation of PFOA. It concerns the use of PFOB containing PFOI, for the purpose of producing pharmaceutical products. The current date of expire of this exemption in the POPs-regulation is December 2036.

The limit value for PFOA, its salts and PFOA-related compounds occurring as an unintentional trace contaminant in substances, mixtures and articles is, subject to a review within 2 years, set at 0.025 mg/kg for PFOA including its salts, and at 1 mg/kg for the individual PFOA-related compounds or a combination of those compounds. For PFOA-related compounds present in a substance to be used as a transported isolated intermediate for the production of fluorochemicals with a carbon chain equal to or shorter than 6 atoms the limit value is 20 mg/kg to be reviewed no later than July 2022. For polytetrafluoroethylene (PTFE) micropowders concentrations the limit is 1 mg/kg (0.0001 % by weight) subject to review and all emissions shall be avoided.

The EU is on behalf of the Member States to register to the Convention Secretariat for specific exemptions for production and use of PFOA, its salts and PFOA-related compounds including for the use as fire-fighting foam in installed installations and the purpose of producing pharmaceutical products. Export or import except for the purpose of environmentally sound disposal are to be ensured by Parties as well as environmentally sound management of fire-fighting foam stockpiles and wastes that contain or may contain PFOA.

According to a national regulation (KIFS 2017:7, 3 chap. 14 § 12) PFASs including PFOA, which have been deliberately added to chemical products, must from February 2020 be reported to the Swedish products register⁹.

In September 2020, the tolerable weekly intake for PFAS was set to 4,4 nanograms per kilogram of body weight per week for PFOS, PFOA, PFNA and PFHxS together by the European Food Safety Authority panel on contamination of food (EFSA, 2020).

Stockpiles, waste and contaminated sites

Waste management facilities in general may be a source for diffuse spreading of PFOA to the environment.

The Swedish Waste Management Association (Avfall Sverige) has conducted a study (Avfall Sverige, 2018) in order to raise awareness on PFAS occurrence at larger national waste management facilities. Results show that PFOA was found in wastewaters (leachates, process water and run off water from treatment areas) in all the investigated sites.

PFOA is not registered in the database of potentially contaminated sites but is however associated with products and industries where there is increased risk for PFOA contamination. Firefighting training grounds as well as military and civilian airports are known spots for usage of firefighting foams. Due to PFOAs usage as a surfactant and surface treatment agent the substance could possibly be found in other locations as well. Further research needs to be conducted to increase knowledge of PFOA and its occurrence.

Occurrence in the environment

PFOA has been measured annually in air and deposition since 2009 and there is no obvious trend in concentrations during those years. PFOA is also detected in sludge and effluent waters from all nine wastewater treatment plants included in the national monitoring program. No significant trend over time can be seen. Noteworthy is that studies have shown the amount of unknown or unidentified PFASs is around 90-95% in Swedish sludge including e.g. possible PFOA related compounds and precursors.

Enhanced levels of PFAS have been discovered in Swedish surface water, ground water, drinking water and fish in the vicinity of firefighting practice areas (Filipovic, 2015). PFASs (including PFOA) are measured regularly in biota in the national monitoring program. In a summary of the monitoring activities within the program for contaminants in marine biota, the concentration of PFOA has

⁹ For more details about this regulation see <https://www.kemi.se/en/products-register/products-obliged-to-be-reported/registration-duty-for-highly-fluorinated-substances-pfas-in-chemical-products> (accessed August 2020).

decreased during the last ten years (2009-2018) in herring in the Bothnian Sea and the Baltic Proper. A decreasing trend was seen at the other sampling areas. In seal liver, the concentration of PFOA increased between 1974-2015 with a significant rate of 5,5% annually. However, if only looking at the last 15 years the concentrations appear stable. In guillemot eggs from Stora Karlsö in the Baltic Sea, a decreasing trend of PFOA has been observed throughout the whole examined time period, 1973-2018 (2.41% per year), with a steep annual decrease of 15% the last ten years. Similar trends were seen in Eurasian Oystercatcher and Common tern eggs from Tjärnö at the Swedish west coast (8% and 16%). The concentrations of PFOA, in perch liver from six lakes within the Swedish National Monitoring Program, were all under the limit of quantification (LOQ) during the period 2015–2017.

In humans, PFASs are monitored in mother's milk and serum and in children and adolescents as a part of the national monitoring. Mother's milk from first time mothers in Stockholm, sampled between 1972 and 2014 show an increasing trend of PFOA until the year 2000 where a significant upward-downward Change-Point trend was detected, and the trend starts to decrease. In serum, temporal trends of pooled and in individual samples from first time mothers from Uppsala 1997-2016 show a yearly decrease of 3-4%. Further, temporal trends in serum from children in Uppsala at 4, 8, and 12 years of age, time period 2008-2019, show a decrease of 6% per year for all groups. The amount of unknown or unidentified PFASs (potentially including PFOA related compounds and precursors) in Swedish serum varied between 25-89% in a study including samples from 1996-2017 and the unknown fraction increased over time.

Intake calculations show that the main sources to dietary PFAS exposure are contaminated drinking water, fish, meat and eggs. The National Food Agency (NFA) has recommendations on risk management measures for drinking water contaminated with PFASs. The recommendations are addressed to drinking water producers, to local authorities, and to consumers that have private wells. There are also recommendations for consumers of locally caught fish.

According to Section 7 of the Drinking Water Ordinance (Livsmedelsverkets föreskrifter (2001:30) om dricksvatten), drinking water shall not contain substances in such concentrations that they might pose a risk to human health. The Swedish Food Agency has therefore established an action level of 90 ng/L for the sum of 11 different PFAS (including PFOA).

The action level is intended for drinking water producers, health authorities and owners of private wells as a guide when determining whether PFAS concentrations in drinking water are so high that they might pose a health risk and therefore should be reduced or that consumers must be advised not to consume the water until such concentrations are reduced. The Swedish Food Agency established the action level in 2014. The same year, a survey was sent to all Swedish

municipalities in order to investigate the knowledge about contamination of Swedish drinking water.

Within the WFD, the national environmental quality standard for PFAS11 (HVMFS 2019:25) is based on the action level established by the Swedish food agency. The environmental quality standard is set at the point of raw water intake in water bodies that are used as drinking water resources. PFAS11 were included as national river basin specific pollutants in 2018 and a pressure and impact analysis has therefore not been done for the third water management cycle (2017-20221). Monitoring data is however available for a few water bodies indicating that that status for PFAS11 is good in the limited number of water bodies that currently have an assessment (the database for Water Information System Sweden (WISS)¹⁰, accessed April 2020).

Within the EU, work is currently ongoing to establish maximum limits for PFASs in the Drinking Water Directive (DWD) Council Directive 98/83/EC. Once these limit values have been determined, they will be legally binding for all EU Member States.

The directive is a so-called minimum directive, which means that Member States can choose to introduce stricter legislation in their regulations if there are grounds to do so. Sweden has had action limits for PFAS in drinking water since 2014.

Assessment

PFOA needs continued and high attention in Sweden. It is still present in articles in use and in waste, but the trends in the environment are generally decreasing.

PFOA-related compounds are neither sufficiently known as to their use, presence in the environment nor their trends. It is challenging to assess the exact situation and need for action according to the Convention for all PFOA-related compounds, being a large group of substances.

¹⁰ <https://viss.lansstyrelsen.se/>

Dicofol

The Conference of the Parties of the Stockholm Convention decided in 2019 to include dicofol in Annex A (elimination) with no exemptions (Decision SC-9/11). Dicofol was nominated as a POP by the EU. Dicofol consists of two isomers (p,p'-dicofol and o,p'-dicofol). Technical dicofol is composed of 80-85% p,p'-dicofol and 15-20% o,p'-dicofol with some impurities including DDT.

Production and use

Dicofol is an organochlorine miticidal pesticide/acaricide that was introduced commercially in 1955 (WHO 1996). Dicofol has been used in agriculture to control mites on a variety of field crops e.g. fruits, vegetables, ornamentals, cotton and tea (UNEP, 2017b).

Dicofol is no longer produced or used in EU Member States. Dicofol has never been produced in Sweden. It was approved as a pesticide in 1964 and was used to control mites. From January 1988 an impurity with DDT above 0.1% was not allowed. The last approvals of products containing dicofol in Sweden expired 31 December 1990, and no use has been allowed after 31 December 1992.

Legislation related to dicofol

As a consequence of listing dicofol in the Stockholm Convention in 2019, it was in June 2020 added to the Annex I to the POPs Regulation with a ban without exemptions (Commission Regulation (EU) 2020/1204).

The legal basis for not approving dicofol as a pesticide in Sweden already in 1990 was the Act on Chemicals Products from 1985. The Act was in 1998 incorporated in the environmental code (SFS 1998:808).

Within the EU authorisations for plant protection products containing dicofol was withdrawn in March 2009 and no authorisations were granted or renewed from September 2008. (Commission Decision 2008/764/EC). The EU Commission then took a decision not to include dicofol in Annex I to Council Directive 91/414/EEC which lead to the withdrawal from the market of plant protection products containing dicofol. In addition, all non-agricultural uses i.e. as a biocide, are prohibited since 2006 according to the Directive 98/8 EC.

Dicofol is also classified as a priority hazardous substance under the Water Framework Directive (WFD). Dicofol was added to the directive on priority substances in 2013 and should therefore be assessed within the WFD. The preliminary status classification of the third management cycle (2017-2021) indicate that chemical status for dicofol in Sweden is good.

Maximum levels for dicofol (residue definition; sum of p, p' and o, p' isomers) are stipulated in Annexes II and IIIB to the Regulation (EC) No 396/2005 on

maximum residue levels of pesticides in or on food and feed of plant and animal origins.

Stockpiles, waste and contaminated sites

With regard to obsolete pesticides it is estimated that there are no stocks containing dicofol.

Dicofol is one of several pesticides associated with former market gardens or greenhouses and is not specifically registered in the database of potentially contaminated sites. In a study by the Swedish county administrative board dicofol was found in a few studied market gardens in the region of Mälardalen (Länstyrelserna 2017).” The national inventory of potentially contaminated sites has identified the majority of the former Swedish market gardens. These have also been prioritized and categorized owing to the use of pesticides. There are about 743 sites with high or very high risk of use of pesticides according to the national risk classification system (EBH-info 2020). Dicofol as well as other pesticides in market gardens is most likely already localized and prioritized by this national system and will be handled according to it.

Occurrence in the environment

Dicofol is not monitored regularly in the Swedish environment. However, a compilation of the occurrence of pesticides in surface waters 1983-2014 was performed in 2015 in which dicofol were included (Boström, 2015). Dicofol was not detected in any of the 256 analyzed surface water samples. Dicofol was also measured in rainwater samples between 2003-2005 but was not detected (LOD 0.0006 ug/L).

According to the EU regulation (EG) 396/2005, dicofol shall be measured in products of plant origin. Between the years 2010-2020, 17 690 samples of plant origin were analysed. In those samples the concentrations of dicofol were above the quantification limit in 12 samples and exceeded the maximum residue levels in 5 samples.

Assessment

The presence of dicofol in food, groundwater, waste and the environment are low in Sweden. The national actions taken regarding dicofol are considered sufficient.

Strategies and action plans

Efforts to combat harmful chemicals have had high priority in Sweden for many years. The pursuit of the convention is similar to that of Sweden's environmental quality objective "A Non-Toxic Environment". This includes enhancing knowledge and information about chemical substances, decrease the use of substances of particular concern such as POPs as much as possible, and reducing the risks posed by the use of other chemicals¹¹.

Sweden will continue to work actively to minimise the environmental and health impacts of POPs in national, regional and international fora. As Party to the Stockholm Convention, Sweden is required to ban, and/or take the necessary legal and administrative steps to ban the production, use, import and export of SCCPs, decaBDE, Dicofol and PFOA and to take measures to reduce the unintentional production of HCBD. Sweden supported the inclusion of these substances in the Convention. According to the Products Register there was in 2018 no production or import of any of the substances as chemical products with a concentration above the limit values for registration. For PFOA-related there is limited information from the Products Register.

Sweden implements the requirements of the Stockholm Convention mainly through existing legislation, strategies and programmes. Significant progress has been achieved since production and use of all POP substances is prohibited with some minor exemptions. The main remaining challenges identified in previous implementation plans are linked to dioxins, PCBs and PFASs including PFOS, which is elaborated in the Swedish Implementation Plan from 2017. This new plan focuses however on the newly added substances to the Convention where the main challenges are related to SCCPs, PFOA and decaBDE in articles in use and in the waste stream, and to develop efficient environmental monitoring of these substance.

To enable improved prevention of the use of brominated flame retardants, SCCPs and PFOA-related compounds in new articles and entering the recycling and waste stream, information on chemicals in articles in the supply chain including to the recyclers is of importance. Within the Strategic Approach to International Chemicals Management (SAICM) this has been promoted by Sweden and more information can be found at the SAICM webpage¹². In the ongoing work to develop a new global agenda for chemicals and waste beyond 2020, Sweden continues to promote that enhanced information sharing about chemicals in products is of importance in a circular economy.

¹¹ Read more about Sweden's environmental objectives at:
<http://www.swedishepa.se/Environmentalobjectives-and-cooperation/Swedens-environmental-objectives/Environmental-objectives---a-film/>

¹² <http://www.saicm.org/EmergingPolicyIssues/Chemicalsinnbsp;Products/tabid/5473/language/en-US/Default.aspx>

Through the Toxicological Council together with a coordination group for new and emerging chemical threats called SamTox, a network for effective cooperation between responsible authorities in the event of a chemical threat is established in Sweden. The Toxicological Council is an expert organisation that identifies and evaluates signals of chemical substances that can be harmful to human health or the environment. The Council includes known but insufficiently managed chemical risks in its evaluations and reports its findings to the SamTox.

The Swedish Environmental Protection Agency has been working with the remediation of contaminated sites for several decades together with County Administrative Boards and local municipalities. In order to identify contaminated areas, County Administrative Boards in Sweden have carried out an inventory of sites which previously had or currently have operations that may cause contamination of soil, sediment or groundwater. The result of this inventory is stored in a national database regarding potentially contaminated sites. The primary purpose of the database is to keep track of identified or potentially contaminated sites and store information regarding their position and status.

Measures to reduce or eliminate releases of SCCP

- *Market surveillance of chemical products and articles containing SCCPs will continue to be executed.*
- *Continued and extended monitoring and screening activities in the environment will be executed, aiming at identifying relevant sources.*
- *Continued and intensified identification and guidance in order to achieve correct management of SCCP in waste will be executed.*

The legal measures within the EU described above are sufficiently comprehensive to fulfil the requirements of the Convention.

It is necessary to continue market surveillance of chemical products and articles containing SCCPs.

SCCPs are not intentionally placed on the market in Sweden in concentrations above the limit value of 1%. The remaining concerns are SCCPs in imported articles, and in building materials becoming waste.

Materials containing SCCPs in concentrations above 0.25 % are classified as hazardous waste when they are disposed of due to their classification as chronic aquatic long-term effects. Consequently, in order to identify materials with SCCPs, screening for SCCPs should be carried out as part of renovation and demolition activities. It is common to include SCCPs when building materials are screened for

PCB, but the period where SCCPs were used exceeds the PCB period and SCCPs were to some extent used as substitutes for PCB.

Medium chain chlorinated paraffins (MCCPs) should be avoided as alternative to SCCPs as they are in the EU classified as reprotoxic: "May cause harm to breast-fed children", and are persistent in the environment (Glüge et al. 2018). Sweden has in 2019 taken actions related to a future inclusion of MCCPs in the EU RoHS Annex II list of restricted substances.

The Swedish EPA will evaluate the need for further information regarding the identification and management of SCCP waste for contractors, property owners, municipalities and other stakeholders involved in renovation and demolition activities. If the evaluation shows that additional information is required, the EPA will prepare guidance.

Measures to reduce or eliminate releases of decaBDE

- *Market surveillance of imported products or articles remains necessary as decaBDE is still used globally both as additive in virgin material and in recycled plastic material.*
- *Continued monitoring both in the environment including the aquatic environment, and in humans is needed.*
- *WEEE-articles containing decaBDE will continuously be separated from the main waste stream for waste destruction.*

The legal measures within the EU described above are sufficiently comprehensive to fulfil the requirements of the Convention.

In a desktop study on destruction of persistent organic compounds in combustion systems carried out by Umeå University for the Swedish Environmental Protection Agency, Lundin and Jansson (2017) concluded that PBDE is destroyed in MSW incinerators operated at temperatures of $\geq 850^{\circ}\text{C}$ but noted that the confidence level is low because of the limited number of studies available. These results, however, are considered to be sufficiently comprehensive to fulfil the requirements regarding destruction of POPs-waste in the Convention.

Plastics from waste electrical and electronic equipment containing brominated flame retardants is selectively collected and delivered to enterprises approved to manage waste containing bromine. This method of waste management will continue to be executed.

Measures to reduce or eliminate releases of HCBD

No further actions are planned.

Measures to reduce or eliminate releases of PFOA, its salts and PFOA-related compounds

- *Continue to work for a coherent and coordinated EU strategy to address PFASs (including PFOA) through regulatory and non-regulatory actions.*
- *Market surveillance of chemical products and articles containing PFOA and/or PFOA-related compounds is necessary to be initiated.*
- *Monitoring of PFOA in the environment and in humans will continue at national and regional level. Work to increase the knowledge on both sources, levels and trends, and exposure to PFOA related compounds is needed.*
- *Articles and waste containing PFOA and/or PFOA-related compounds needs to be more accurately defined and possibly in some cases to be separated from other waste for environmentally sound waste management according to BASEL Guidelines for POPs waste.*
- *Further research needs to be implemented to increase knowledge of PFOA and/or PFOA-related compounds and its occurrence in contaminated sites and other identified sources.*

The legal measures within the EU described above are considered to be sufficiently comprehensive to fulfil the requirements of the Convention.

PFOA is part of the group PFASs, a large group of thousands of man-made chemicals that are widely used throughout society. They have been observed to contaminate water and soil in most EU countries and are extremely costly to clean up, if even possible with today's methods.

As indicated in the Swedish national implementation plan from 2017 the elevated levels of PFASs in drinking water, in surface water and in fish, represent an area where further actions are considered needed to reduce the amount of these substances in Sweden. The usage of PFAS-containing Aqueous Foam Forming Films (AFFF) during fire extinguishing was shown to be the main source. A transition from PFOA to the use of any short-chain PFASs for dispersive applications such as fire-fighting foams is not a suitable option from an environmental and human health point of view.

The use of PFOA across a range of different applications has been widespread also in Sweden, with challenges for waste management. The limited data on stockpiles

of mixtures and articles containing PFOS and PFOA and PFOA-related compounds, particularly items like fire-fighting foams and treated textiles, poses challenges for management of stockpiles and wastes.

Waste management facilities in general may be a source for diffuse spreading of PFOA to the environment. Requirements to investigate the presence of PFOA and other PFASs at waste management facilities are increasing as are requirements for monitoring.

The section 3.1.2 in the Swedish National Implementation Plan from 2017 describes a range of measures to reduce risks to human health and the environment and to increase knowledge of PFOS and PFASs as a group that continue to be relevant also for PFOA.

Sweden will continue to work actively in national, regional and international fora for the development of methodologies and strategies for monitoring of PFOA-related compounds and to develop approaches to quantify remaining stockpiles of fire-fighting foams that contain PFASs (including PFOS and PFOA).

The purpose of the Swedish Chemicals Agency's reporting requirements on PFAS to the Products Register from 2019 is to increase the knowledge about how PFAS including PFOA are used. This will give an opportunity to inform companies that have submitted registrations about the regulation on PFOA. In April 2020, 59 companies had registered 237 products containing PFAS, out of which 73 are available to consumers. The main functions of these products are paints, lubricants and impregnation. Also, products for firefighting are recorded.

As the EU regulation on PFOA now has entered into force, surveillance activities are planned by the Swedish Chemicals Agency.

During 2014, a survey was sent to all Swedish municipalities in order to investigate the knowledge about contamination of Swedish drinking water. The survey is in 2020 followed up by a more detailed investigation, to find out more about actual contamination levels and possible management measures taken to decrease contamination.

Within the EU, work is currently ongoing to establish maximum limits for PFAS in the Drinking Water Directive. Once these limit values have been determined, they will be legally binding for all EU Member States. Following the final decision, Member States will have two years to implement the national drinking water directive in their national legislation.

The EU Drinking Water Directive is a so-called minimum directive, which means that Member States can choose to introduce stricter legislation in their regulations if there are grounds to do so. Sweden has had action limits for PFAS in drinking

water since 2014. Some of the PFAS covered by PFAS11 are not included in the EU proposal for maximum limits. These are PFAS substances that have been found in drinking water in Sweden and there may be grounds for adding these substances to the Swedish regulations. The PFAS not included in the EU proposal are PFPeA and 6: 2 FTS. The EU proposal on maximum limits is 100 ng/L for PFAS 20, and/or 500 ng/L for PFAS total.

Within the Swedish national PFAS action program, a guide¹³ to inform about PFASs has been developed by the nine governmental authorities in the authority PFAS network. The guide works as an umbrella directing stakeholders at different levels to the more specific guidelines that have been developed (see NIP 2017) and is continually updated with new information.

In the work to meet environmental quality standards and other assessment criteria, the organizing and availability of data regarding identified and potential PFAS-sources will be improved. Furthermore, guidance to regional and local enforcement agencies will be developed at a pace relating to the development of new techniques and research findings within the PFAS field.

In addition, Sweden runs projects within the HELCOM Baltic Sea Action Plan (BSAP) framework to develop monitoring guidance to increase the knowledge about PFAS in the Baltic sea region. The two different PFAS networks, also initiated under the PFAS action program, will continue to be a communication platform of work progress, enforcement needs, strategies and research between governmental agencies and other key community stakeholders in Sweden.

Monitoring and risk assessment of locations where firefighting foam have been used will be finalized in late 2020. This will bring crucial information to the continued remedial work at these sites.

The Swedish Armed Forces have in 2020 received a government assignment to develop an action plan for remediation from PFASs and to report action taken as well as further plans for action.

The Swedish Chemicals Agency has in 2016 proposed to regulate PFASs within the EU (Kemi, 2016). Sweden continues to work actively for a coherent and coordinated EU strategy to address all PFASs (including PFOA) through regulatory and non-regulatory actions. In December 2019 Sweden together with a number of other countries submitted a proposal for a coherent and coordinated EU strategy to address PFASs through regulatory and non-regulatory actions to the EU Commission¹⁴ The purpose of the proposal is to prohibit any use that is not

¹³ <http://www.kemi.se/pfasguide>

¹⁴ <https://www.documentcloud.org/documents/6586418-EU-Strategy-for-PFASs-FINAL-VERSION-December-19.html>

necessary for society. The goal is to minimize environmental and human exposure to PFASs, at all stages of their life cycle. To achieve this:

- PFASs need to be managed as a group.
- PFASs need to be phased out and only essential uses allowed until alternatives are available.
- Limit values need to be set in different pieces of legislation.
- Steps to ensure effective enforcement are needed.
- Environmental monitoring, awareness raising, research on alternatives, remediation and environmentally sound management of waste are also needed.

Legal measures under EU legislation as well as actions on a global level will substantially contribute to the goal of the PFASs strategy. While PFOS and PFOA have been listed under the Stockholm Convention and are included in the POPs Regulation, further work on other PFASs is ongoing at international level, including perfluorohexanesulfonic acid (PFHxS) that is to be considered at the next meeting of the Parties in 2021.

Measures to reduce or eliminate releases of dicofol

As stated in the previous chapter, measures to eliminate the use of dicofol as a pesticide were taken on a national basis already in 1990. The legal measures nationally and within the EU are sufficiently comprehensive.

Annex I Abbreviations

Abbreviations	Explanations
BSAP	Baltic Sea Action Plan
COP	Conference of the Parties
C & D Waste	Construction and Demolition Waste
DecaBDE	Decabromodiphenyl ether
ELV	End of Life Vehicle
HCBD	Hexachlorobutadiene
HELCOM	Baltic Marine Environment Protection Commission/ Helsinki Commission
Kemi	Swedish Chemicals Agency
NFA	National Food Agency
NIP	National Implementation Plan
PBDEs	polybrominated diphenyl ethers
PFAS	poly- and perfluorinated alkyl substances or used for highly fluorinated substances
PFOA	Perfluorooctanoic acid
POPRC	Persistent Organic Pollutants Review Committee
RAPEX	European Commission Rapid Alert System for dangerous non-food products
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (Regulation (EC) No 1907/2006)
RoHS	Restriction of the use of certain Hazardous Substances in electrical and electronic equipment
SAICM	Strategic Approach to International Chemicals Management
SC	Stockholm Convention
SCCPs	Short-chain chlorinated paraffins
SLF	Shredder Light Fraction
SwAM	Swedish Agency for Marine and Water Management
Swedish EPA	Swedish Environmental Protection Agency
UNEP	United Nations Environment Programme
WEEE	Waste Electrical and Electronic Equipment
WFD	Water Framework Directive

Annex II Overview of POPs in the Stockholm Convention

Substance	CAS	Listed in Stockholm Convention
Aldrin	309-00-2	Annex A
Chlordane	57-74-9	Annex A
Chlordecone	143-50-0	Annex A
Dieldrin	60-57-1	Annex A
Decabromodiphenyl ether (c-decaBDE)	1163-19-5	Annex A
Dicofol	115-32-2	Annex A
Endosulfan	959-98-8 33213-65-9 115-29-7 1031-07-8	Annex A
Endrin	72-20-8	Annex A
Heptachlor	76-44-8	Annex A
Hexabromobiphenyl (HBB)	36355-01-8	Annex A
Hexabromocyclododecane (HBCDD)	25637-99-4 3194-55-6	Annex A
Hexabromodiphenyl ether and heptabromodiphenyl ether	68631-49-2 207122-15-4 446255-22-7 207122-16-5 and others	Annex A
Hexachlorobenzene (HCB)	118-74-1	Annex A
Alpha hexachlorocyclohexane*	319-84-6	Annex A
Beta hexachlorocyclohexane	319-85-7	Annex A
Lindane	58-89-9	Annex A
Mirex	2385-85-5	Annex A
Pentachlorobenzene	608-93-5	Annex A and C
Pentachlorophenol (PCP)	87-86-5	Annex A
Polychlorinated biphenyls (PCB)	all PCBs and their mixtures have different CAS numbers	Annex A and C
Tetrabromodiphenyl ether and pentabromodiphenyl ether	5436-43-1 60348-60-9 and others	Annex A
Toxaphene	8001-35-2	Annex A
DDT	50-29-3	Annex B
Perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride (PFOS)	1763-23-1 s, 307-35-7, and others	Annex B
Perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds	335-67-1	Annex A
SCCPs – short chain chlorinated paraffins	85535-84-8; 68920-70-7; 71011-12-6; 85536-22-7; 85681-73-8;	Annex A

Substance	CAS	Listed in Stockholm Convention
	108171-26-2; and others	
HCBD – hexachlorobutadiene	87-68-3	Annex A and C
PCN –polychlorinated naphthalenes	all PCNs & their mixtures have different CAS numbers	Annex A and C
Polychlorinated dibenzo-p-dioxins (PCDD)	1746-01-6	Annex C
Polychlorinated dibenzofurans (PCDF)	1746-01-6	Annex C

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Update 2020 to include substances listed 2017 and 2019

The Stockholm Convention was formally adopted with the objective to protect human health and the environment from persistent organic pollutants. According to the Stockholm Convention on Persistent Organic Pollutants, each Party to the Convention is to develop and endeavour to implement a plan for the implementation of its obligations under the Convention.

The fifth Swedish national implementation plan aims at describing what Sweden has done and intends to do to fulfil the obligations of the Stockholm Convention. The plan describes the situation in Sweden for persistent organic pollutants, identifies ongoing actions and presents strategies for future work. The plan contains updates in accordance with the decisions taken at the Conferences of the Parties in 2017 and 2019 regarding the addition of chemicals to the Convention.

