

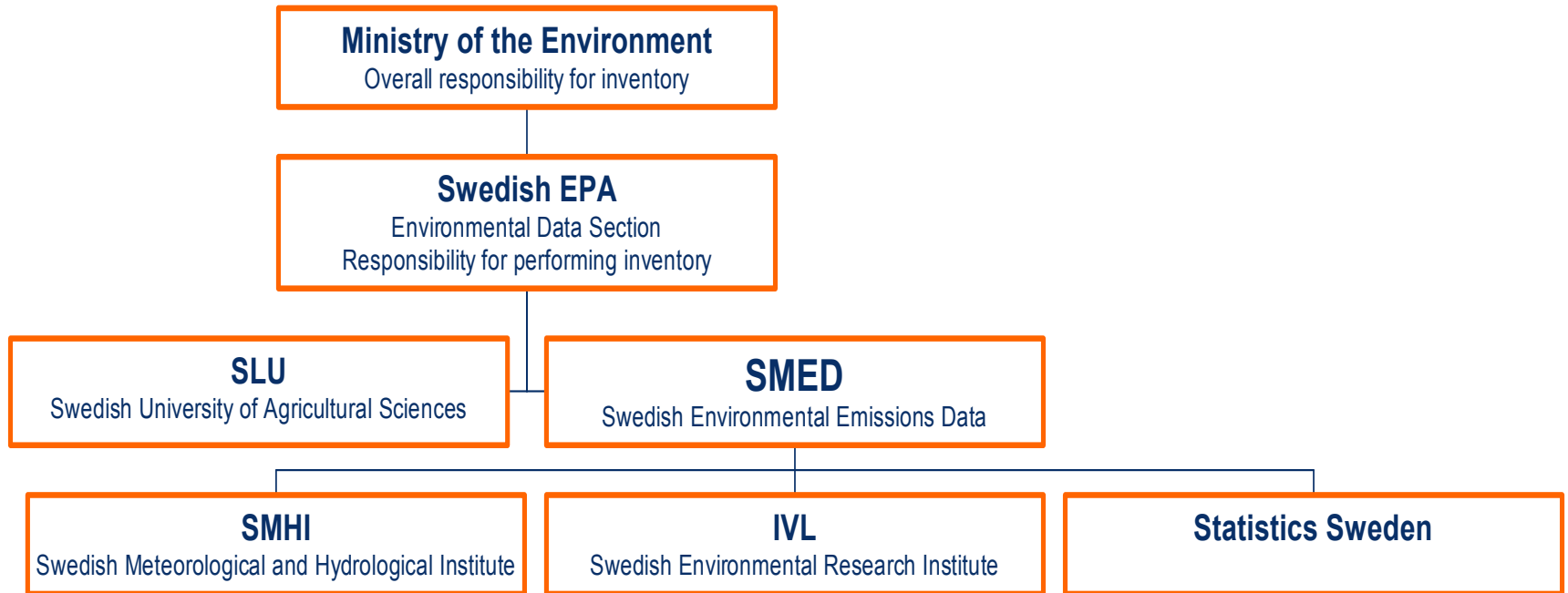
Development of QA/QC-procedures in Sweden

**QA/QC in Emission Inventories - Training Workshop
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Current National Inventory System



SMED organisation:

Steering group

Co-ordinator

Inventory project, led by a project leading team

SMED

IVL

Procedure, time and resources 1

The development of a QA/QC system is financed by and reported to Swedish EPA, who are formally responsible for the inventories.

One system covers all QA/QC and procedures to be performed “internally” in SMED, both relating to greenhouse gases and air pollutants.

The development of the system has been run as defined projects, led by a project leading team. Inventory staff is actively involved by reacting to and giving feedback on proposed procedures/documents. Inventory staff experts contribute by writing code specific material.

Swedish EPA is responsible for the development of the National System, in which the SMED system is a part.

Procedure, time and resources 2

Work started in 2003 by a pre-study

- 1) to establish the current status of the Swedish Air Emission Inventories in relation to Good Practice.
- 2) to assess uncertainty for all substances and sources (more or less rough) and contributions to national total (Key source)
- 3) to suggest a priority of improvement needs based on 1 and 2.
- 4) to make a first draft of a QC procedures document (QC-plan)
- 5) to make a plan for the development of QA/QC-procedures

Procedure, time and resources 3

Based on the pre-study the next steps were:

- Development of general QC procedures
- Development of Tier 2 QC where appropriate/required
- Define roles and responsibilities within SMED
- Define boundaries to Swedish EPA responsibilities/the National System
- Establish a first version of a long term plan for improvements (in co-operation with the Swedish EPA)
- Refine uncertainty estimates (primarily GHGs)
- Further develop the QC procedures document

Procedure, time and resources 4

In 2004 we have:

- Further developed the QC procedures document
- Defined QC procedures for all reporting codes in checklists
- Written “manuals” for all reporting codes
- Worked according to the procedures described in the documents and used the checklists.

In late 2004 we will evaluate the proposed procedures and probably make some changes and/or additions.

Procedure, time and resources 5

Time:

It took two years to develop and test the documents and procedures

Resources:

Approximately 18-20 man-months

The System as it looks today

A document describing the QA/QC system and activities, which includes a scheduled time frame that follows inventory preparation.

Available for external review

Appendices:

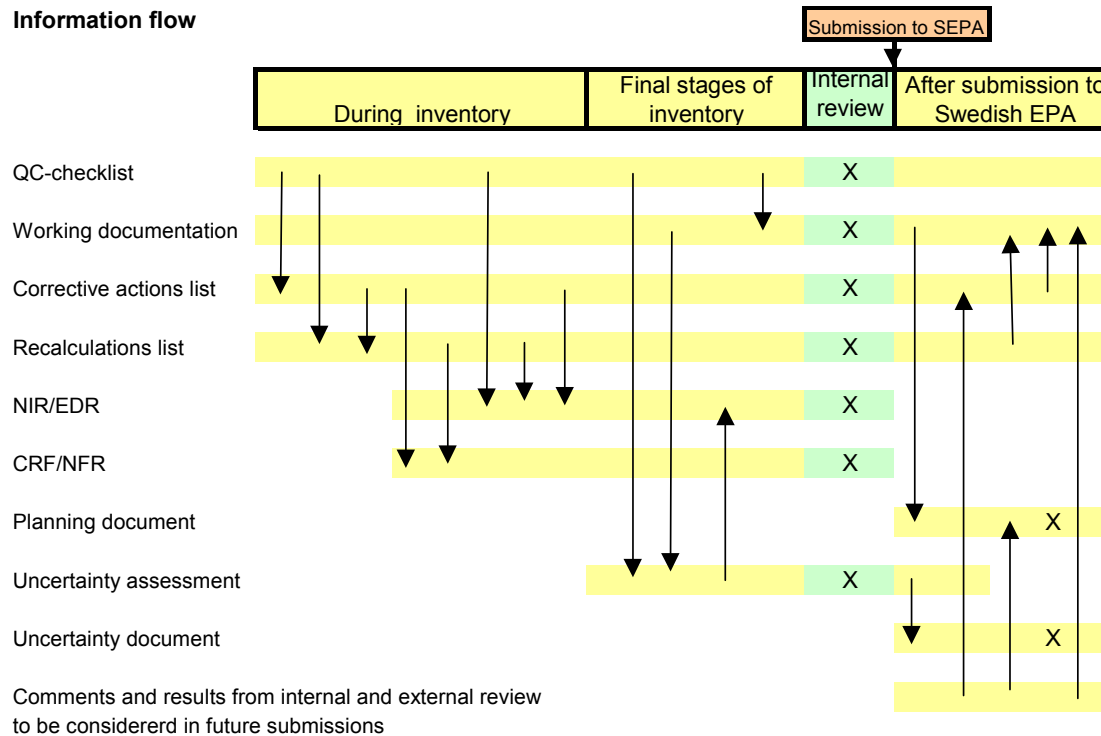
- Roles and responsibilities
- Work manuals for all codes (or groups of codes)
- QC-checklists (Tier 1 and where appropriate Tier 2) for each code
- Uncertainty document, describing procedures for uncertainty assessment
- Procedures for non-conformity reporting (not finalised)
- Procedures for handling and responding to external reviews
- Documentation of databases and models
- Procedures for Key Source analysis

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Overview of QA/QC-activities and schedule

Information flow



Procedures	Responsible	Comments
During inventory work		
Distributing tasks among inventory staff	Project leading team	
Documenting in QC-checklist	Inventory staff	as defined by the project leading team
Updating working document	Inventory staff	as defined by the project leading team
Updating list of corrective actions	Inventory staff	as defined by the project leading team
At the end of inventory work		
QC-checklist, all "action needed" signed as attended to	Checklist team	Checking that all relevant entries are made in the QC-checklist, not verifying all actions.
Corrective actions list, all entries attended to and signed	Checklist team	Checking that all relevant entries are made in the Corrective actions list, not verifying all actions.
Recalculations list, all entries signed as attended to	Checklist team	Checking that all relevant entries are made in the recalculationslist, not verifying all actions.
New uncertainty information from QC-checklist	Checklist team	Identify all changes and pass on to resp. for uncertainties
Uncertainty assessment	One person responsible for uncertainties	Work performed by several persons
Internal review of inventory		
Inventory estimates	Co-ordinator	first inventory staff, then co-ordinator who is formally
NIR/EDR	Co-ordinator	
Working documents updated	Working document team	overhaul, checking that there are comments for current year
Table formats	Project leading team	
Delivery to Swedish EPA	Steering group and project leader	Steering group formal responsibility, project leader actual delivery
Reporting of nonconformity (avvikelserapportering)	One person	One person will be appointed and task will be specified in 2004
Review of working documents on a rolling		
Periodic review of working documents	One person responsible for periodic review	One person will be appointed during 2005 for planning and administration of this review
Annual documentation after inventory		
Documenting in uncertainty document	One person responsible for uncertainties	
Review of uncertainty document	Co-ordinator?	
New information to planning document	One person responsible for Planning document	One person within SMED. Overhaul of quality chapter in working documents, gathering new relevant information on
Follow-up of internal and external review	One person responsible for Planning document	One person within SMED collecting and documenting comments from reviews that are to be attended to (corrective
Archiving	Project leader	
External QA/QC		
Administration of external QA/QC	Swedish EPA	
Response to external QA/QC	Project leader	and resubmission of corrected documents to the Swedish EPA.

The QC checklists

Are based on the IPCC Good Practice Guidance general Tier 1 QC procedures

- Assumptions and criteria for selection of activity data and EF documented
- Transcription errors
- Calculations
- Units, conversion factors
- Integrity of database files
- Consistency between source categories
- Correct movement of inventory data between processing steps
- Uncertainties estimated
- Uncertainty estimates calculated correctly
- Review of internal documentation
- Recalculations
- Completeness check
- Compare estimates to previous estimates

Example of QC-checklist

Kod/koder CRF/NFR:	2F, 2C3(PFC),2C4		ja					
Delad kod IVL/SCB?	Nej		Grämmarkerade alla rader som ej är applicerbara (NA) för denna kod.					
Submission	2005							
Generella QC rutiner, Tier 1	Kontroll av	Genomfört (sign, datum)	Kommentar	Krävs åtgärd? (Ja/Nej)	Åtgärd	Åtgärd genomförd (X)	Ska dokumenteras i?	Alla åtgärder genomförda (X, el. skriv vilka)
Indata, aktivitetsdata, produktion av aluminium	MR, Kubal	KK, juni 2004	erhölls via PFC dokumentation från Kubal	nej				
Indata, aktivitetsdata, SF ₆ till magnesiumgjutier	Produktregistret, företaget							
Indata, aktivitetsdata, ackumulerat i electric equipment	Uppg från Svensk Energi							
Indata, aktivitetsdata, Köldmedia till stora stationära	Data från NV	KK 2004-08-06	Fick 2002	ja	uppdatera 2002	x	recalc	x
Indata, aktivitetsdata, Produktregistret	Rimlighetsbedömning, fördelning på aktiviteter							
Indata, aktivitetsdata, XPS, använd mängd, exporterad andel	Nordic foam							
Indata, aktivitetsdata, medical dose inhalers	Tillverkare, Läkemedelsverket							
Indata, aktivitetsdata, aerosoler	Oxydex, Aerosolföreningen	KK juni 2004		nej				
Indata, aktivitetsdata, fönster	Tillverkare							
Indata, aktivitetsdata, trafikregistret/Bilsveden	Antal nyregistrerade fordon av olika slag	KK mars 2004	erhölls till scenarioprojektet	nej				
Indata, destruktion	ABB, Sakab							
Indata, emissioner, aluminiumtillverkning	MR, Kubal	KK, juni 2004	erhölls via PFC dokumentation från Kubal	nej				
Indata, emissioner, elektronikindustri	MR, företaget							
Indata, emissionsfaktorer/omräkningsfaktorer	Ev kontrollera med kylbranschen m fl							
Enheter och omräkningsfaktorer,	Modellen							
Consistency i data som används i olika beräkningar	Produktion av aluminium							
Kontrollberäkningar av erhållna data, Produktregistret	Beräkning av potentiella, rimlighetsbedömning, anpassning							
Jämförelse av resultat med tidigare år, rimlighetsbedömning	Samtliga källor							
Tidsserier konsistent beräkna	Modellen							
Summeringar av underlagsdata till koden	Görs i modellen							
Korrekta förflyttningar av data mellan hanteringssteg, grunddata till beräkningsfil	Indata till modellen							
Korrekta förflyttningar av data mellan hanteringssteg, grunddata till beräkningsfil	Indata till beräkning av potentiella							
Korrekta förflyttningar av data mellan hanteringssteg, grunddata till beräkningsfil	Indata till beräkning av bakgrundsdata till Table 2(II)F							
Korrekta förflyttningar av data mellan hanteringssteg	Beräkningsfil till CRF, actual emissions							
Korrekta förflyttningar av data mellan hanteringssteg	Beräkningsfil till CRF, potential emissions							
Korrekta förflyttningar av data mellan hanteringssteg	Beräkningsfil till CRF, till Table 2(II)F							
Korrekta förflyttningar av data mellan hanteringssteg	Beräkningsfil till CRF, till Table10s4, trend							
Korrekta förflyttningar av data mellan hanteringssteg	Beräkningsfil till NFR							
Tidsserier via webbgranskning	UNFCCC							
Tidsserier via webbgranskning	Takdirektivet							
Tidsserier via webbgranskning	CLRTAP							
Konsistens i Not. Keys, webbgranskning	UNFCCC							
Konsistens i Not. Keys, webbgranskning	Takdirektivet							
Konsistens i Not. Keys, webbgranskning	CLRTAP							
Kontroll av databasdata ??								
Förändring som kan påverka osäkerhetsskattning	EF, akt.data, metod, etc.							
Specifika QC-rutiner, Tier 2	Kontroll av	Genomfört (sign, datum)	Kommentar	Krävs åtgärd? (Ja/Nej)	Åtgärd	Åtgärd genomförd (X)	Ska dokumenteras i?	Alla åtgärder genomförda (X, el. skriv vilka)
Dokumentation avseende om beräkningsmetoder överensstämmer med GPG	Uppdaterat?	KK juni 2004	Första gången	nej				
Dokumentation från Kubal avseende processdata	Uppdaterat?	KK juni 2004	Första gången	nej				

Work manuals 1

In Swedish. Written both for national QA by third party reviewers and as a manual and documentation for inventory work. Managed by inventory staff. Will be periodically reviewed.

1. General description of code

- Reference to Guidelines/Guidebook etc

- Overview of reporting

- Code specific national circumstances

- Description of method, emission factors and activity data

- Completeness and consistency

- Uncertainty

- QA/QC

Work manuals 2

2. Manual for inventory work and reporting
 - Responsibility for code (institute)
 - Background data (brief description and reference to file)
 - Collection and handling of input data
 - Calculations
 - Internal QC and reporting
3. Recalculations and other changes (annually updated)
4. Suggested improvements (entered by date)
5. Other comments (entered by date)
6. References to documentation and links

Additionally

A technical support system is under development, which will be the master database. It will also allow for automated or semi-automated QC, as well as archiving and version control.

At present we use www.projectplace.com as common work space and for archiving.

An temporary database and a web application for QC is used as an interim solution to simplify the work with quality control of data as compiled in the reporting tables

- time series*

- relative changes in reported data compared to the last submission*