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Central Valley Regional Water Quality Control Board

14 June 2013

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SUBJECT: REVIEW OF 2012 ANNUAL MONITORING REPORT – CALIFORNIA RICE COMMISSION

Thank you for submitting the California Rice Commission (CRC) Annual Monitoring Report (AMR) on 31 December 2012. This report was submitted to meet the conditions of Monitoring and Reporting Program (MRP) Order R5-2010-0805 and the associated Conditional Waiver of Waste Discharge Requirements for discharges from Irrigated Lands adopted by the Central Valley Water Board on 1 July 2006 (Resolution R5-2006-0053). On 19 December 2012, the CRC received an extension of the MRP Order and will conduct core monitoring at its primary sites for the 2013 season.

The Central Valley Water Board staff review of the AMR is in the attached memo. The staff review indicates there were three exceedances of a field parameter (dissolved oxygen) for which exceedance reports were not submitted. To comply with the MRP Order, the CRC must submit exceedance reports within the time frame specified (see Part IV.B).

The staff review also indicates information related to quality control is required to ensure laboratory methods meet the MRP Order conditions. This information includes 1) missing QC lab reports for hardness and total dissolved solids, and 2) additional data to validate the analytical methods for clomazone and triclopyr.

By 1 July, the CRC must submit a report with the corrective actions to be taken to ensure that in future monitoring events all required QC analyses are performed for all constituents and the process to ensure exceedance reports are submitted in the time frame required. The missing QC lab data and the remaining information to validate the analytical procedures should be submitted with the report.

If you have any questions or comments regarding the review, please contact Susan Fregien at 916-464-4813, or Margaret Wong at 916-464-4857.

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Enclosure

Central Valley Regional Water Quality Control Board

TO: Susan Fregien
Sr. Environmental Scientist

FROM: Margaret Wong
Water Resources Control Engineer
SACRAMENTO OFFICE

DATE: 12 June 2013

SUBJECT: REVIEW OF 2012 ANNUAL MONITORING REPORT -- CALIFORNIA RICE COMMISSION

On 31 December 2012, the California Rice Commission (CRC) submitted its 2012 Annual Monitoring Report as required by the CRC Monitoring and Reporting Program (MRP) Order R5-2010-0805 for the Irrigated Lands Regulatory Program (ILRP).

Under the MRP Order, the CRC was to perform assessment monitoring from May to September at the four primary sites: CBD5, BS1, CBD1, and SSB. The sampling schedule and constituents monitored for the 2012 season are shown in Table 1.

Table 1. 2012 Monitoring Schedule

Month	Sample date	Field	TDS & TOC	Dissolved Copper & Hardness	Aquatic Toxicity	Pesticides	Nutrients	Sediment Toxicity & TOC
May	5/8/12	√	√	√	√	√	NR	NR
June	6/12/12	√	√	√	√	√	NR	NR
July	7/17/12	√	√	NR	√	√	√	NR
August	8/21/12	√	√	NR	√	√	√	NR
September	9/18/12	√	NR	NR	NR	NR	NR	√

NR = not required

Monthly sampling occurred at the four primary core sites (CBD5, BS1, CBD1 and SSB) from May through September. The sites were monitored for field parameters (flow, pH, electrical conductivity [EC], dissolved oxygen [DO], temperature, and turbidity) during each sampling event. Other general physical/chemical parameters monitored from May through August included total dissolved solids (TDS); total organic carbon (TOC); aquatic toxicity (three species); and pesticides (clomazone and triclopyr). During July and August; nutrients (ammonia, un-ionized and ionized, as nitrogen [N]; nitrate/nitrite as N; total phosphorus [P], orthophosphate as phosphate [PO₄], dissolved; and total Kjeldahl nitrogen [TKN]) were monitored. During the May and June events, dissolved copper and hardness were analyzed. During the pre-harvest drainage in September, sediment toxicity and sediment TOC were analyzed in sediment samples. No special project monitoring was required in 2012.

REVIEW OF THE ILRP AMR REPORT

The CRC AMR was submitted in electronic format and evaluated by staff for the presence and completeness of the components described in the 2010 MRP Order. Most of the required components of the AMR were completely addressed by the CRC..

Monitoring results

Field parameters: Dissolved oxygen (DO) exceedances, defined as less than 5 mg/L (warm water quality objective), were found at BS1 (9/18, DO = 3.16 mg/L), CBD1 (7/17, DO = 3.86 mg/L), and SSB (7/17, DO = 4.99 mg/L). Exceedance reports were not received for these events. Staff also noted that exceedances of field parameters were not reported in the 2011 AMR review.

Maximum flow velocity at CBD1 for the July event was measured at 0.6 ft/sec with water temperature at 77°F. The field team observed no flow at SSB for the July event. Maximum flow velocity at BS1 for the September event was 0.2 ft/sec with water temperature at 72°F. The low flow velocities and warm temperatures may contribute to the low DO for the three exceedances.

Total dissolved solids and total organic carbon: The highest TDS value was 420 mg/L observed at the June event at CDB1. The highest TOC concentrations (11 mg/L) were found during the June event at CBD5 and CBD1, and at BS1 in September.

Copper and hardness: Samples were collected for dissolved copper and hardness (required to determine toxicity potential) at the primary sites for the May and June events. This period is when copper sulfate is applied, if needed. All dissolved copper sample results were below the 1-hour and 4-hour California Toxics Rule hardness-adjusted copper criterion for the measured hardness at the sample location.

Nutrient monitoring: Nutrients were monitored during the July and August sampling events when nutrients may be added due to crop requirements. Ammonia as N (un-ionized) showed no detections (reporting level [RL] of 0.10 mg/L). Ammonia as N was less than 0.4 mg/L (RL of 0.10 mg/L) for the two events. Nitrate/nitrite as N was below the RL (400 µg/L) for the two sampling events. TKN (RL = 0.20 mg/L) was less than 1 mg/L for all samples. Total P results were less than 0.3 mg/L (RL = 0.050 mg/L); dissolved orthophosphate as PO₄ was generally not detected (RL=0.15 mg/L) with two detections at CBD1 and SSB showing <0.3 mg/L (July event)

Pesticide monitoring: Two pesticides were chosen for monitoring at the beginning of the 2012 season: clomazone and triclopyr. Both compounds are herbicides that showed an increase in use for rice operations. Clomazone is a rice-only pesticide, while triclopyr is used by other crops. Monitoring for each herbicide occurred during the months of May thru August.

The highest clomazone concentration was 12 µg/L (RL = 0.2 µg/L) found in June at CBD1. This clomazone concentration is an order of magnitude below known aquatic toxicity values.¹ The highest detected triclopyr was 6.4 µg/L found at the July event at SSB. During the July event, triclopyr was detected at concentrations ranging from 2.9 µg/L to 6.4 µg/L. That concentration range is at least an order of magnitude below known aquatic toxicity values for triclopyr.² During the May, June and August events, triclopyr was not detected above the RL (2.0 µg/L).

Aquatic toxicity: Aquatic toxicity tests with three species were performed for all sampling events

¹ ECOTOX reports a EC50 for *Pseudokirchneriella subcapitata* (green algae) of 3500 µg/L for a 89.9% formulation of clomazone, based on a 5 day static test of population/abundance as the endpoint.

² ECOTOX reports a EC50 for *Pseudokirchneriella subcapitata* (green algae) of 32500 µg/L for a 98.9% formulation of triclopyr, based on a 5 day static test of population/abundance as the endpoint.

from May through August. Acute toxicity tests using *Pimephales promelas* and *Ceriodaphnia dubia* found no exceedances when percent survival was compared to the controls. For the short-term chronic *Selenastrum capricornutum* tests, no exceedances based on percent growth compared to the controls were found for the four events.

Sediment toxicity. Sediment toxicity tests with *Hyalella azteca* were performed in September to capture the pre-harvest drainage. Total organic carbon (TOC) of the sediment was tested at the same time. No sediment toxicity based on percent survival of the samples compared to the control was found. Sediment TOC ranged from 5900 to 7600 mg/kg.

QA/QC REQUIREMENTS

The primary laboratory analyzing the physical/chemical parameters was California Laboratory Services (CLS). McCampbell Analytical, Inc. (MAI) performed the sediment TOC analyses. Aquatic toxicity testing for the three species was performed by AQUA-Science who subcontracted the sediment toxicity testing to Nautilus Environmental.

Field QA/QC results (field blanks and field duplicates) were acceptable for precision and accuracy. For the May event, inadequate sample volume was received at the lab to perform the triclopyr analysis and required laboratory QA/QC. The sampling team was notified to send the hold sample volume held in cold storage. The extraction for triclopyr was performed 30 hours after the USEPA hold time expired. The miscommunication between CLS and the sampling crew was resolved by clarifying the volume and bottles required for the analyses.

Method blank samples were below the method reporting limit (MRL) for all analytes.

Matrix spike/matrix spike duplicate (MS/MSD) samples that did not meet the relative percent difference (RPD) accepted by the laboratory method included hardness from the May and June events, clomazone for the June event, nitrate/nitrite as N for July and August events, and total phosphorus as P for the August event. However, the lab control spike/lab control spike duplicate (LCS/LCSD) recoveries were acceptable for the clomazone, nitrate/nitrite as N, and total phosphorus as P, indicating matrix effects in the samples.

Matrix spike (MS) recoveries for hardness in May and June were below the acceptable recovery limits. The matrix spike duplicate (MSD) was not performed. CLS stated in its report for those months that the QA/QC was acceptable since LCS/LCSD recoveries were acceptable for hardness. The laboratory reports for May and June did not show those LCSD results. Staff requested that the CRC contact the lab for the missing data, or confirm that QC data (LCSD) was not collected for hardness..³ This item is unresolved.

Lab control spike results for total dissolved solids (TDS) were missing for all events and should be requested from the lab.

The May event LCS recovery result for TOC was low (77% recovery with acceptable recovery limits of 80-120%), but the LCS/LCSD RPD was acceptable. The data was correctly flagged.

Surrogate standard samples were prepared for every pesticide batch as a means of determining lab QA/QC. In August, the surrogate recoveries results for EPA Method 8151A (triclopyr analyses) were outside of the acceptable QAPP ranges. The CLS lab report noted an incorrect surrogate solution was used for the August analyses and an internal corrective action was implemented.

³ Email sent 17 January 2013 on CLS lab reports for May and June.

Survival for controls in the aquatic and sediment toxicity tests were acceptable.

CLS analyzed clomazone and triclopyr using EPA Methods 8141A and 8151A, respectively. Since these methods are not recognized as EPA-approved for those pesticides, staff requested the performance-based method validation package for the alternative methods as specified by EPA.⁴ On 25 January, the CRC submitted by email a QA/QC package for triclopyr and clomazone. Review by staff (sent by email on 29 January) commented on inconsistencies in the calibration data, the reporting level (RL), and minimum detection level (MDL). Additional information is needed before staff review of the validation package can be completed.

REVIEW OF SUBMITTED ELECTRONIC DATA

The CRC transmitted an electronic copy of the 2012 monitoring data in an Excel worksheet format that included sample results and laboratory and field QA/QC. Central Valley Water Board staff review and comments were noted on checklists and sent to the CRC by email on 6 February. Several of the items noted last year were corrected. Overall, staff found that the submittal was accurate and required only minor corrections. These can be addressed in the 2013 data submittal.

SUMMARY

The 2012 AMR contained the necessary components and supporting documentation required to determine completeness. The electronic data submittal was complete in the format required by the MRP, and minor changes were noted in the checklist for correction. Staff emailed its review of the electronic data submittal to CRC noting very few areas where requirements were not met.

No exceedances of water quality objectives were found other than DO which may be related to water temperature and low flow velocity of the waterbody. Exceedance reports for field parameters must be reported to the Regional Board when results are received.

A checklist of the CRC AMR review is attached. Missing information that needs to be submitted and/or clarified:

- Staff communicated with the CRC regarding some errors in tables and missing lab reports. The lab reports for May and June with LCS/LCSD data for hardness are missing. Unless the QC data are supplied, the hardness data for those months will be flagged.
- QC data for LCS/LCSD for total dissolved solids (TDS) are missing for all events. Unless this data is submitted, TDS data will be flagged.
- The method validation packages for the analytical methods used to determine clomazone and triclopyr were not complete. Additional information must be supplied to validate the reported RL, MDL and calibration range as acceptable.

Attachment 1. Checklist for CRC AMR 2012 review

⁴ USEPA, "Protocol for EPA Approval of Alternate Test Procedures for Organic and Inorganic Analytes in Wastewater and Drinking Water," March 1999. EPA 821-B-98-002. This package should, at a minimum, include the method detection level (MDL) studies, initial precision and recovery, and linear calibration ranges. Information on surrogate recovery results should be included as well.

Annual Monitoring Report Review Checklist

Report Name: Californi Rice Commission 2012 Annual Monitoring Report				Reviewer Name: Margaret Wong				
Submittal Date: 12/31/12				Review Date: April 2013				
Item No.		AMR Component Name	Acceptable	Unacceptable	Incomplete/Not included	Not Applicable	Page # (Section #)	Comments
1		Signed Transmittal Letter						
	1.1	Penalty of Perjury Statement	X					
	1.2	Signature of Authorized Coalition Representative	X					
	1.3	Dated	X					
	1.4	Discussion of exceedances, and corrective actions taken or planned (or reference to previous correspondence)	X					
	1.5	Submitted on time	X					
2		Title Page						
	2.1	Report title	X					
	2.2	Date of the report	X					
	2.3	Monitoring date range covered by the report	X					
	2.4	Coalition Group name	X					
3		Table of Contents						
	3.1	List of sections/chapters, tables, figures, appendices/attachments with page numbers	X				i-vi	
4		Executive Summary						
	4.1	Summary of key results and activities	X				7-1.	
	4.2	Brief summary of conclusions and recommendations	X				7-2, 7-3	
5		Description of the Coalition Group Geographical Area						
	5.1	General description of relevant geographic features of the Coalition area, such as location and extent of area, major landforms, land uses, vegetation types, crop types, climate patterns, key waterways, and cities	X				1-2, Figure 1-1	
6		Monitoring Objectives and Design						
	6.1	Brief description of monitoring objectives (references to section and page numbers in MRP Plan or QAPP, as appropriate)	X				4-9.	
	6.2	Monitoring design aligns with MRP Plan, any deviations from MRP Plan or QAPP are described (references to section and page number in MRP Plan or QAPP, as appropriate)	X					
	6.2.1	Assessment Monitoring: sites, parameters, schedule	X				Table 4-1 to 4-3	
	6.2.2	Core Monitoring: sites, parameters, schedule	X				Table 4-1 to 4-3	
	6.2.3	Special monitoring (Management Plan, TMDL, source identification): sites, parameters, schedule				X		
7		Sampling Site Descriptions and Rainfall Records for the time period covered under the AMR						
	7.1	Sampling site name and description (e.g. geographic area, watershed, crop type and drainages that the site represents), or unique information about the site or surrounding area	X				4-12 to 4-17	
	7.2	Rainfall records in graphic or narrative form (in inches of precipitation)	X				Figure 2-2	
8		Location Maps(s) of sampling sites, crops, and land uses						
	8.1	Location maps show sampling sites, crops, and land use with informative level of detail	X				Appendix A	

Annual Monitoring Report Review Checklist

Item No.	AMR Component Name	Acceptable	Unacceptable	Incomplete/ Not included	Not Applicable	Page # (Section #)	Comments
8.1.1	Datum identified on map (<u>must be</u> WGS 1984 or NAD 1983)			X			Datum identified in Table 4-2 listing all monitoring sites. Maps are USGS topos. Staff did not note this as a requirement for the AMR in previous reviews.
8.1.2	Source and date of all data layers identified on map	X				various pgs.	All maps include required layer information.
8.2	Accompanying list or table indicates: site name, ID number, ILRP station code number, and GPS coordinates (latitude and longitude in decimal degrees to at least five decimal places)			X		Table 4-2	Longitude to 3 decimals only. CRC has reported the monitoring sites to 5 decimals, but staff did not note this as a requirement for the AMR in previous reviews.
9	Tabulated Results						
9.1	Data are in tabular form, clearly organized and readily discernible	X				Various tables in Section 5	
9.2	Tabulated results agree with the electronically submitted data	X				Various tables in Section 5	Note that Table 5-16 has error for SSB. Correct survival in CD.
9.3	Previously reported exceedances match exceedances identified in the AMR		X				No exceedance reports filed. DO < 5 mg/L noted in AMR. CRC noted that warm water temperatures and low flow at monitoring sites.
9.4	All required constituents for each site have reported results	X				Various table in Section 5	
9.5	All necessary re-sampling completed and results reported				X		
10	Data Discussion to Illustrate Compliance						
10.1	Results discussed in text agree with tabulated data	X				Section 5	Correction needed to Table 5-16 to conform with reported lab result for SSB.
10.2	Discussion illustrates compliance with the Conditional Waiver, or if a required component was not met an explanation of missing data or a reason for non-compliance is included	X				Section 5	
10.3	Results are compared to ILRP requirements, water quality standards and trigger limits; toxicity results, TIE's and possible causes of toxicity are discussed		X			Section 5	Exceedances for DO not reported to staff.
11	Electronic data submitted in a SWAMP comparable format, either Option A or B						
11.1	<u>Option A. Spreadsheet format:</u> Lab data submitted electronically within the SWAMP comparable spreadsheets; Field data submitted electronically, or in paper copy on SWAMP comparable field sheets within AMR	X				Received by email 12/31/12	Database containing lab and field data sent on Excel spreadsheet.
	<u>Option B. SWAMP database format:</u> All field and lab data uploaded into a SWAMP comparable database (following the most current <i>Required Data Submission Format</i> document)				X		
11.2	Sample results and required QC results are included: field blanks, field duplicates, lab blanks, spikes (LCS, MS), duplicates (LCD, MSD, replicates), surrogates (for pesticide analyses)			X		Appendix B-2	Missing lab QC data requested for TDS and hardness. See staff memo.
11.3	Toxicity analyses include: individual sample results, negative control summary results, replicate results, water quality measurements (pH, ammonia, temperature, SC, DO)	X				Appendix B-3	All required results for toxicity analyses were included.
11.4	Data not meeting project QA acceptance guidelines are flagged and include brief notes detailing the problem in the <i>Comments</i> field	X				Section 6 and electronic submittal	
12	Description of sampling and analytical methods used						
12.1	Description of sampling methods used (e.g. type of collection, collection containers, sample preservation, transportation, handling, field measurements), with references to SOP's if appropriate	X				Table 4-3, 4-20 to 4-22	

Annual Monitoring Report Review Checklist

Item No.		AMR Component Name	Acceptable	Unacceptable	Incomplete/ Not included	Not Applicable	Page # (Section #)	Comments
	12.2	Description of analytical methods used (references to SOP's and QAPP as appropriate); any deviations from the QAPP are described and explained			X		Table 4-4, Section 6	Request for method validation packages for clomazone and triclopyr. Incomplete information submitted to validate alternative/new method. See staff memo.
13	Copies of chain-of-custody forms and sample receipt documentation							
	13.1	Copies of all COCs are included, legible and completed accurately; any anomalies are noted/explained	X				Appendix B	Staff reviewed 20% of COCs.
14	Field Data Sheets, Lab Reports, Lab Raw Data							
	14.1	Copies of all field data sheets (attached/provided electronically on CD) are included, legible, contain the required elements in the ILRP template, and are completely filled out	X				Appendix B-1	
	14.2	All analytical reports (attached/provided on CD) are included, complete, and signed by authorized laboratory representative	X				Appendix B	
	14.2.1	Sample results with units, RLs and MDLs	X				Appendix B-2 and electronic submittal	
	14.2.2	Sample preparation, extraction and analysis dates	X				Appendix B-1 and electronic data	
	14.2.3	Results for all QC samples: field and laboratory blanks, lab control spikes, matrix spikes, field and laboratory duplicates, surrogate recoveries			X		Appendix B-2 and electronic submittal	Missing QC data for TDS and hardness. Problems noted with surrogate recovery for triclopyr analyses and inadequate sample volume collection. Corrective actions initiated. See staff memo.
	14.2.4	Chemistry lab narrative describes all QC failures, analytical problems and anomalous occurrences.	X				Appendix B-2 and Section 6	Corrective actions taken for inadequate sample volum collection and unacceptable surrogate recoveries.
	14.3	All toxicity lab reports (attached/provided on CD) are included, complete, and signed by authorized lab representative	X				Appendix B-3	Sediment toxicity lab results and associated QA/QC missing from CD. Missing information sent 1/9/13.
	14.3.1	All toxicity sample results included	X				Appendix B-2; info sent 1/9/13	See note above.
	14.3.2	Results for all QC samples: field duplicate, negative control, narrative summary of reference toxicant results	X				Appendix B-2; info sent 1/9/13	
	14.3.3	All raw data (including failed tests) and original bench sheets showing individual replicates	X				Appendix B-2; info sent 1/9/13	
	14.3.4	Toxicity lab narrative describes all QC failures, analytical problems and anomalous occurrences	X				Appendix B-2 and info sent 1/9/13	
15	Associated laboratory and field quality control samples results							
	15.1	Chemical analyses include: field blank, field duplicate, lab blank, matrix spike and MSD, lab control spike and LCSD			X		Appendix B-2 and electronic submittal	Missing LCS/LCSD for TDS and QC data for hardness.
	15.2	Microbiological analyses include: field blank, field duplicate, negative control, positive control				X		
	15.3	Toxicity tests include: field duplicate, negative control, reference toxicant (narrative OK, raw data not required)	X				Appendix B-2; info sent 1/9/13	
16	Summary of Quality Assurance Evaluation results							
	16.1	Acceptance criteria for all field and laboratory QA/QC measurements identified and in agreement with ILRP requirements; any adjustments to acceptance criteria documented and discussed		X			Section 6	Missing laboratory QC data needs to be submitted. Hold time exceeded for one triclopyr analysis. Corrective action taken by lab and sampling team. See staff memo.

Annual Monitoring Report Review Checklist

Item No.	AMR Component Name	Acceptable	Unacceptable	Incomplete/ Not included	Not Applicable	Page # (Section #)	Comments
16.2	Summary of accuracy (lab control spike and matrix spike recovery) and precision (RPD for field duplicate, LCS/LCSD and MS/MSD pairs) included for all constituents and tests	X				Section 6	Accuracy and precision results summarized by constituent. Table 6-7 I sting surrogate recovery has some results switched.
16.3	QA/QC results that did not meet acceptance criteria identified in a table or narrative description that is prepared by the Coalition (not laboratories)	X				Section 6	Analysis of precision and accuracy discussed
16.3.1	Discussion of how the failed QA/QC results affect the validity of the reported data	X				Section 6	Report noted QC samples not meeting the acceptance criteria and evaluated how those results affect usability of data. For example, acceptance of data in cases where MS/MSD were outside of acceptance levels, but LCS/LCSD were acceptable, indicating matrix effects.
16.3.2	Corrective actions for QA/QC results that did not meet acceptance criteria are described, laboratory exception reports are included when samples are reanalyzed due to exceedance of the linear range	X				Section 6; Appendix B-2	Laboratory corrective actions noted in lab reports.
16.4	Both field and laboratory completeness are calculated and reported; overall Project completeness is determined		X				Completeness not calculated in AMR. Field completeness >90%. Missing lab QC data required to calculate laboratory completeness.
17	Flow Monitoring Method(s)						
17.1	The method used to obtain flow measurement at each monitoring site during each monitoring event is listed	X				4-28.	
18	Monitoring Site Photos						
18.1	Photos are included for each monitoring site, either electronically or in hard copy	X				4-14 to 4-17	
18.2	Each photo is clearly labeled with site ID and date	X				4-14 to 4-17	
18.3	Photos are descriptive and useful	X				4-14 to 4-17	
19	Summary of Exceedance Reports submitted during the reporting period and related pesticide use information						
19.1	Summary of all Exceedance Reports submitted during the AMR period is included		X				No exceedance reports received during growing season. Item noted in 2011 AMR review.
19.2	Pesticide use data for all pesticide and toxicity exceedances occurring during the AMR time period (unless under a Management Plan): all chemicals applied within the monitoring site subwatershed during the four weeks prior to the measured exceedance	X				Section 2, Tables 2-1 to 2-6	
20	Actions Taken to Address Water Quality Exceedances						
20.1	Discussion of actions taken to address water quality exceedances during the time frame of the AMR is included	X					DO exceedances associated with low flow and high water temperature.
20.2	Updates or additional management practices implemented (Attachment A of the MRP Order, p. 4)				X		
21	Status update on preparation and implementation of all management plans and other special projects						
21.1	Brief update on status of all Management Plans and special projects that are in preparation or being implemented				X		
22	Conclusions and Recommendations						
22.1	Conclusions are supported by the data presented in the AMR	X				Section 7	
22.2	Recommendations are appropriate and adequately detailed	X				Section 7	