

# NARMADA CONTROL AUTHORITY

## Environment Sub Group

### Subject Wise Review of Minutes

Compiled and Reviewed by  
Aneeta

2008

## Contents

NCA Environmental Sub-Group.....	6
Terms of reference .....	6
Members (as of 20 <sup>th</sup> June 2008) .....	7
Meetings .....	9
Meeting agenda and minutes annexures .....	10
Glossary/ abbreviations .....	15
Project overview.....	17
Introduction .....	17
The submergence zone of the project.....	17
Environmental Clearance 24.6.87 conditions .....	18
Forest Clearance 8.9.87 conditions .....	19
Details for environmental Action Plans, 1988 .....	21
Investment Clearance 5.10.88 conditions .....	23
Catchment Area Treatment .....	24
Chronology.....	24
Total area/overall CAT issues.....	24
Progressive filling of reservoir.....	24
CAT plans – GOG.....	27
CAT plans – GOMP.....	28
CAT plans – GOM.....	28
CAT duration .....	29
CAT progress (overall) .....	29
CAT progress – Phase I – GOMP.....	30
CAT progress – Phase II – GOMP.....	34
CAT progress – Phase I – GOM.....	35
CAT progress – Phase II – GOM.....	37
CAT progress – GOG .....	38
Silt monitoring (general) .....	40
Silt monitoring (reservoir sedimentation) – GOG .....	41
Silt monitoring (reservoir sedimentation) – GOMP.....	42
Silt monitoring (reservoir sedimentation) – GOM.....	43
Cost estimates – GOM and Phase II costs for all states .....	44
Field trip observations and recommendations – extracts: .....	44
Soil conservation measures .....	44
Command Area Development/ Downstream issues.....	45
General .....	45
HR Wallingford reports.....	46
Interdepartmental Committee – env effects .....	46
Integrated CAD plan - Gujarat.....	46
CAD plan – Rajasthan.....	55
CAD programme/progress .....	58
Phase I.....	65
Phase II.....	66
Rajasthan works .....	66
Agro-chemicals (Run off affecting surface/ground waters).....	69

Drinking water/Other .....	69
Waterlogging/ drainage .....	70
Canal realignment .....	74
Irrigated agro-forestry in Phase 1 .....	74
Environmental effects / downstream effects/ status of environmental safeguard measures (ESMs) .....	75
Enclosure: 27/06/07 letter to Chief Engineer and Member Sec, Sardar Sarovar Regulation Cmte, NCA, Indore from VK Parikh, Member (Engineering) NVDA, Bhopal. Comments on minutes of 7 <sup>th</sup> SSRRC meeting of 10 <sup>th</sup> March 2007: .....	84
Environmental studies - Rajasthan .....	86
Control and monitoring .....	88
Automated canal regulation, management .....	89
Bhal and Bara tracts .....	90
Canal breaches .....	90
Use of power water for irrigation .....	90
Navigation .....	90
Enclosure: 27/06/07 letter to Chief Engineer and Member Sec, Sardar Sarovar Regulation Cmte, NCA, Indore from VK Parikh, Member (Engineering) NVDA, Bhopal. Comments on minutes of 7 <sup>th</sup> SSRRC meeting of 10 <sup>th</sup> March 2007: .....	90
[HR Wallingford]. Annex 1. Summary of recommended actions .....	92
Environmental changes downstream of Sardar Sarovar Dam .....	92
Report EX 2750: March 1993 .....	92
Key features brought out in HR Wallingford Report [EM 2006 p26] .....	94
Proposed measures to prevent environmental degradation [EM 2006 p28] .....	94
Shekhar Singh letter on CAD Phase I report to Shri Misra, 15 <sup>th</sup> July 2003 .....	95
Findings of TATA-IWMI Research Project .....	105
42A Annex 4. Status of environmental safeguard measures planned by the GOG for implementation pari-passu with the commencement of irrigation, in the areas of Sardar Sarovar Project Command .....	107
A. Irrigation efficiency, water use, prevention of salinity and alkalinity, water logging etc .....	107
B. Targets and the progress on implementation of environmental safeguard measures for the Phase I of the command. Incremental activities (Physical & Financial) necessitated on account of Sardar Sarovar Project are to be reported. ....	108
Archaeological and anthropological survey .....	111
General .....	111
GOMP .....	111
GOG .....	113
GOM .....	113
Anthropology, R&R benefits, GOG .....	113
Current status of protection/ relocation works .....	114
Lots of annexes on archaeology in agendas/minutes/status reports etc listing excavations. Difficult to follow this thread ... ..	114
Flora, fauna and carrying capacity studies (FFAC) .....	115
General .....	115
Survey of flora, fauna & carrying capacity (FFACC) studies – GOMP .....	115
Survey of flora, fauna & carrying capacity (FFACC) studies – GOG .....	120
Survey of flora, fauna & carrying capacity (FFACC) studies – GOM .....	124

Status of implementation wrt dam height [ <i>items are summarised</i> ]: .....	125
GOM sanctuary/ social forestry etc.....	128
Clear felling – overview.....	128
GOMP clear felling.....	129
GOG clear felling.....	130
GOM clear felling .....	131
FFAC: Clear Felling Progress.....	134
GOM .....	134
GOMP .....	134
Fisheries Development, and Aquatic Fauna (part of FFAC) .....	135
General .....	135
Organic loading of reservoir/ studies .....	135
Draft guidelines.....	135
Severity of downstream impacts .....	136
Inter State Fisheries Development Board .....	137
Reservoir stocking during initial impoundment.....	137
GOMP: .....	137
GOG: .....	138
GOM: .....	139
Aquatic fauna. ....	139
A39 status of aquatic fauna fisheries .....	140
Health aspects.....	141
General .....	141
Recommendations/ tasks overview .....	142
Table of status re cmte recommendations following AUG 2001 visit.....	143
GOG .....	144
Inclusion of districts – GOMP .....	146
GOMP .....	147
GOM .....	148
GMC, Bhopal report on ISP and SSP .....	150
Health Aspects – Status.....	152
Seismicity and rim stability.....	155
General .....	155
Analysis of data.....	156
General items .....	158
Pari passu compliance .....	158
Progressive filling of reservoir.....	158
Submergence.....	158
Compensatory afforestation .....	159
Published documents.....	161
Environmental management plan.....	161
Problems in Maharashtra on implementation .....	161
Request of GOG for permission to raise dam height to 110m.....	163
Annex: on humps do not cause extra submergence .....	164
Request of GOG for permission to raise dam height to 121m.....	165
Table of status re 121 m (See later table on dam height raising).....	166
Request of GOG for permission to raise dam height to 121m – NBA letter .....	168

Formation of multi-disciplinary cmte by MOEF .....	169
- for appraisal of survey and study reports on various environmental aspects of sardar sarovar project / monitoring .....	169
Review of status of envl safeguard measures – visits and verification .....	171
Gujarat .....	171
Madhya Pradesh .....	172
Reconciliation of status of compliance between party States and NCA Secretariat .....	173
Request of GOG for permission to raise dam height to full reservoir level .....	174
Dam Height Raising, 100m .....	178
Dam Height Raising, 121.92m .....	179
Dam height raising 121m, Annex 3, 41M .....	184
Dam Height Raising, full reservoir level: current status of ESM implementation .....	185
Shekhar Singh's letters to Sub-Group .....	188
Shekhar Singh letter of 2001 on pari passu (also letter of 1998 on same) .....	188
Shekhar Singh letter of 8 <sup>th</sup> February 2002 .....	190
Shekhar Singh note of dissent on raising dam height to 100m (first 4 points not shown) .....	191
Dams, Conditional Environmental Clearances and the pari-passu clause: note from Shekhar Singh .....	193
Pari-passu timetable attached to note from Shekhar Singh .....	195
References .....	197
From www.narmada.org: .....	197
References – CAT .....	199
References – Compensatory Afforestation .....	200
References – Terrestrial and aquatic flora and fauna .....	201
Aquatic environment – upstream effects .....	201
Fauna: Estuary and marine environment .....	201

## NCA Environmental Sub-Group

### *Terms of reference*

The terms of reference for the tasks of the Environmental Sub-Group (ESG) are as follows [Environment Management overview document, NCA, Oct. 2000]:

- 1) To work out the environmental safeguard measures to be planned and implemented for the entire Narmada Basin so that environmental safeguard measures are executed and remain fully in consonance with the clearance accorded to the Narmada Sagar and Sardar Sarovar Projects.
- 2) To determine the terms of reference of required surveys and studies necessary for implementation of environmental safeguard measures inclusive of database required, the methods by which the data base is to be prepared and also to identify the institutions/ individuals to undertake the preparation of such documents.
- 3) To get prepared for clearance by the Ministries and NCA, the Action Plans with regard to all environmental safeguard measures and the assessment criteria thereof.
- 4) To devise a suitable monitoring and evaluation mechanism so that the action plans are effectively implemented in consonance with stipulations at the time of the projects.
- 5) To assess the necessary organisation with management capability being set up for adequate implementation of environmental safeguard measures.
- 6) To undertake all measures necessary to assist Narmada Control Authority in the planning and implementation of environmental safeguard measures.

On 18<sup>th</sup> October 2000, directions were issued by the Supreme Court of India which further defined the role of the Environmental Sub-Group. The relevant portions from the directions are given below:

- While issuing directions and disposing of this case, two conditions have to be kept in mind, (i) the completion of project at the earliest and (ii) ensuring compliance with conditions on which clearance of the project was given including completion of relief and rehabilitation work and taking of ameliorative and compensatory measures for environmental protection in compliance with the scheme framed by the Government thereby protecting the rights under Article 21 of the Constitution. Keeping these principles, in view, we issue the following directions.
- 3) The Environment Sub-group under the Secretary, Ministry of Environment and Forests, Government of India will consider and give, at each stage of the construction of the dam, environment clearance before further construction beyond 90 meters can be undertaken
- 4) The permission to raise the dam height beyond 90 meters will be given by the Narmada Control Authority, from time to time, after it obtains the above-mentioned clearances from the Relief and Rehabilitation Sub-group and Environment Sub-group.

The Environmental Sub Group meetings are generally held in New Delhi. The main attendees include government officials, company officials, specialists and a number of invitees.

**MEMBERS OF THE NCA****ENVIRONMENT SUB-GROUP**

1.	Secretary to the Govt. of India, Ministry of Environment & Forests	Chairman	i)	To work out the environmental safeguard measures to be planned and implemented for the entire Narmada Basin so that environmental safeguard measures are executed and remain fully in consonance with the clearance accorded to the Narmada Sagar and Sardar Sarovar Projects.
2.	Executive Member, NCA	Member		
3.	Vice-Chairman, NVDA GOMP	Member		
4.	Secretary (Env.), GOM	Member		
5.	Secretary (R&R), Narmada Development Depts. GOG	Member	ii)	To determine the terms of reference of required surveys and studies necessary for implementation of environmental safeguard measures inclusive of data base required, the methods by which the data base is to be prepared and also to identify the institutions/ individuals to undertake the preparation of such documents
6.	Secretary, Env. Deptt. GOR	Member		
7.	Commissioner (PP), MOWR	Member		
8.	Dy. Director General, ICAR	Member		
9.	Dy. Inspector General, MOE&F	Member	iii)	To get prepared for clearance by the Ministries and NCA, the Action Plans with regard to all environmental safeguard measures and the assessment criteria thereof.
10.	Director, Wildlife Institute, Dehradun	Member		
11.	Dr. S. Ramaseshan, Professor, Indian Institute of Technology, Kanpur	Member		
12.	Director General, Anthropological Survey of India	Member		
13.	Dr. Shekhar Singh, Faculty Member, IIPA, New Delhi	Member	iv)	To devise a suitable monitoring and evaluation mechanism so that the action plans are effectively implemented in consonance with stipulations at the time of clearance of the projects.
14.	Dr. R.K. Katti, Professor (Retd.), Indian Institute of Technology, Mumbai	Member		
15.	Director General, Archaeological Survey of India	Member		
16.	Director General, ICMR	Member		
17.	Expert of Flora	Member	v)	To assess the necessary organisation with management capability being set up for adequate implementation of environmental safeguard measures.
18.	Member (E&R), NCA	Member Secretary		
			vi)	To undertake all measures necessary to assist Narmada Control Authority in the planning and implementation of environmental safeguard measures.

An agenda is sent out in advance of each ESG meeting and typically contains reports and other enclosures (as Annexures) that will be discussed at the meeting, in addition to requests for information to be submitted at the meeting. The agenda and minutes follow the same order of points:

- ❑ Confirmation of previous meeting minutes
- ❑ Review of action taken on the decisions of the previous meetings
- ❑ Present status of studies, surveys and environmental action plans
- ❑ Any other items
- ❑ Annexures

The 44<sup>th</sup> Agenda also includes:

- ❑ Review of implementation of the environment safeguard measures of SSP: commensurate with progressive filling of the reservoir
- ❑ Legal issues arising out of an application filed by SNEH before the committee of Supreme Court
- ❑ Sharing the cost of the treatment of freely draining critically eroded catchment area

A list of meeting dates is tabulated in this document, along with a list of annexures for all meeting agendas and minutes since the 33<sup>rd</sup> meeting (28.09.99).



**Meetings**

<b>Year (financial)</b>	<b>No.</b>	<b>Meeting</b>	<b>Date</b>	<b>Venue</b>	<b>Chairman</b>
1987-88	2	I	27.11.87	Paryavaran Bhavan, New Delhi	Shri TN Seshan
		II	05.01.88	Paryavaran Bhavan, New Delhi	Shri TN Seshan
1988-89	3	III	19.07.88	Paryavaran Bhavan, New Delhi	Shri KP Geetakrishnan
		IV	18.11.88	Paryavaran Bhavan, New Delhi	Shri KP Geetakrishnan
		V	07.03.89	Paryavaran Bhavan, New Delhi	Shri KP Geetakrishnan
1989-90	2	VI	07.08.89	Paryavaran Bhavan, New Delhi	Shri Mahesh Prasad
		VII	19.12.89	Paryavaran Bhavan, New Delhi	Shri Mahesh Prasad
1990-91	3	VIII	14.05.90	Paryavaran Bhavan, New Delhi	Shri Mahesh Prasad
		IX	07.09.90	Paryavaran Bhavan, New Delhi	Shri Mahesh Prasad
		X	31.01.91	Paryavaran Bhavan, New Delhi	Shri R Rajamani
1991-92	4	XI	01.05.91	Paryavaran Bhavan, New Delhi	Shri R Rajamani
		XII	10.09.91	Paryavaran Bhavan, New Delhi	Shri R Rajamani
		XIII	29.11.91	Kevadia Colony, Gujarat	Shri R Rajamani
		XIV	25.02.92	Paryavaran Bhavan, New Delhi	Shri R Rajamani
1992-93	3	XV	19.08.92	Paryavaran Bhavan, New Delhi	Shri R Rajamani
		XVI	09.11.92	Paryavaran Bhavan, New Delhi	Shri R Rajamani
		XVII	16.03.93	Paryavaran Bhavan, New Delhi	Shri R Rajamani
1993-94	4	XVIII	28.05.93	Paryavaran Bhavan, New Delhi	Shri R Rajamani
		XIX	28.07.93	Paryavaran Bhavan, New Delhi	Shri R Rajamani
		XX	03.11.93	Hotel Taj Malwa, NCA, Indore	Shri R Rajamani
		XXI	07.12.93	Paryavaran Bhavan, New Delhi	Shri R Rajamani
1994-95	3	XXII	03.05.94	Paryavaran Bhavan, New Delhi	Shri R Rajamani
		XXIII	29.11.94	Paryavaran Bhavan, New Delhi	Shri NR Krishnan
		XXIV	10.03.95	Paryavaran Bhavan, New Delhi	Shri NR Krishnan
1995-96	3	XXV	11.07.95	Paryavaran Bhavan, New Delhi	Shri NR Krishnan
		XXVI	12.10.95	Paryavaran Bhavan, New Delhi	Shri NR Krishnan
		XXVII	18.12.95	Paryavaran Bhavan, New Delhi	Shri NR Krishnan
1996-97	3	XXVIII	14.05.96	Paryavaran Bhavan, New Delhi	Shri NR Krishnan
		XXIX	15.11.96	Paryavaran Bhavan, New Delhi	Shri TKA Nair
		XXX	28.01.97	Paryavaran Bhavan, New Delhi	Shri TKA Nair
1997-98	1	XXXI	31.01.98	Paryavaran Bhavan, New Delhi	Shri Vishwanath Anand
1998-99	1	XXXII	14.10.98	Paryavaran Bhavan, New Delhi	Shri Vishwanath Anand
1999-00	1	XXXIII	28.9.99	Paryavaran Bhavan, New Delhi	Shri K Roy Paul
2000-01	2	34	14.11.00	Paryavaran Bhavan, New Delhi	Shri PV Jayakrishnan
		35	19.01.01	Kevadia Colony, Dist. Narmada, Gujarat	Shri PV Jayakrishnan
2001-02	2	36	02.05.01	Paryavaran Bhavan, New Delhi	Shri PV Jayakrishnan
		37	08.02.02	Paryavaran Bhavan, New Delhi	Shri PV Jayakrishnan
2002-03	1	38	10.03.03	Paryavaran Bhavan, New Delhi	Shri KC Misra
2003-04	1	39	26.12.03	Paryavaran Bhavan, New Delhi	Dr Prodipto Ghosh
2004-05	2	40	07.06.04	Paryavaran Bhavan, New Delhi	Dr Prodipto Ghosh
		41	06.01.05	Paryavaran Bhavan, New Delhi	Dr Prodipto Ghosh
2005-06	1	42	07.04.05	Paryavaran Bhavan, New Delhi	Dr Prodipto Ghosh
2006-07	1	43	27.11.06	Paryavaran Bhavan, New Delhi	Dr Prodipto Ghosh
2007-08	1	44	16.07.07	Paryavaran Bhavan, New Delhi	Mrs Meena Gupta
2008-09	2 to date	45	24.04.08	Paryavaran Bhavan, New Delhi	Mrs Meena Gupta
		46	20.06.08	Paryavaran Bhavan, New Delhi	Mrs Meena Gupta

**Meeting agenda and minutes annexures**

Mtg	Annex	Item
33A	1	Composition and TOR of committee given in notice NCA office letter No Env-3(33)/99/475 dated 16.3.99
	2	Observation and recommendations of R&R issues related to joint inspection 22-23/12/98 to ISP areas
	3	Status report for activities of environmental safeguard measures for Sardar Sarovar Project & NSP, ending 31/03/99.
	4	Letter from MOEF to VC NVDA declaration of prime areas of ISP as national parks/ sanctuaries
	5	GOMP: exec sum of revised action plan to protect 10 monuments besides evacuation of 5 mounds and collection sculptures
	6	Salient features of estimates for safeguarding the monument, by ASI
	7	Letter from Member E&R, NCA to Dr Romila Thapar for reviewing status of archaeological investigations
	8*	Minutes of fifth meeting of high level expert group on fisheries development and conservation in SS Reservoir held on 5 <sup>th</sup> January 1999 at Krishi Bhawan, ND
33M	1	List of participants
	2	Observations and recommendations made during field visit (June 1999)
	3	Letter No. PAMR/99/311/Status/1080 10.06.99 of GOMP regarding replies to points raised in joint inspection note.
	4	Letter from MOEF regarding ISP CAF areas acceptance
	5	Sardar Sarovar Project: Cost estimates
	6	IS Pariyojana Evam Paryavaran Sanrakshan – a popular publication by GOMP
	7	Progress of Phase I CAT works in Maharashtra
	8	Sardar Sarovar Project Canal Works: physical and financial progress
	9	Sardar Sarovar Project: Shoolpaneshwar Sanctuary, progress of development works
	10	Summary record of discussion with Dr Romila Thapar y NCA officials
	11	Final report of epidemiological studies by GMC, Bhopal, an abstract
34A	1	A report of the second field visit of the committee of the environment sub-group undertaken during July 2000
	2	Status report on environmental management of the Sardar Sarovar Project & ISP – March 2000
	3	Minutes of the review meeting on flora, fauna & carrying capacity aspects held on 23.6.2000
	4	A note by SSNNL on the progress of works on Shoolpaneshwar Sanctuary in Gujarat
	5	Minutes of meeting of archaeological aspects held on 23.6.1999
	6	A copy of the letter received from ASI regarding Joga Fort dated
	7	A note on recommendations of the review meeting on health aspects held on 28.8.1999
	8	Minutes of the meeting on fisheries held on 04.11.99
34M	1	List of participants
	2	Observations of Dr S Ramaseshan on the draft report of second field visit, July 2000
	3	Statement on progress of works: Govt of Maharashtra & Madhya Pradesh
	4	Updated cost estimate: Govt of Gujarat & Govt of Madhya Pradesh
	5	Progress on flora & fauna: Govt of Gujarat
	6	Summary of programme: Health Dept Govt of Maharashtra
	7	Statement showing malarial situation in Gujarat
	8	Direction given by Hon'ble Supreme Court in the matter of writ petition (Civil) 319 of 1994: Responsibilities of environment subgroup of NCA
	9	Letter No. MD/Env/2000/635 dated 6 <sup>th</sup> Nov 2000: A request from NCA to accord environmental clearance up to 110 meters height of dam.
35A	1	A note on "Pari-Passu": regulatory regime
	2	GIS generated map of the reservoir at RL 100m
	3	Status report – environmental management Sardar Sarovar Project & ISP, September 2000
	4	CAT: Map showing sub-watershed in the vicinity of the reservoir corresponding to RL 100m
	5	CAF: Map showing location where plantations have been raised

	6	Flora & fauna & carrying capacity aspects – showing conservation measures along the periphery of the reservoir
	7	Flora & fauna & carrying capacity aspects – Madhya Pradesh cost estimates of social forestry components
	8	Map showing location of the cultural heritage along the periphery of the reservoir
	9	Map showing location of seismic monitoring stations
	10	Sardar Sarovar Project: health map – showing existing & proposed facilities
	11	ISP: Health – summary of VIth report of Gandhi Medical College, Bhopal
	12	Cost estimates & expenditure on SSP
35M	1	List of participants
	2	Letter from NVDA seeking corrections in the minutes
	3	Letter dated 24.11.2000 from Prof RK Katti, Expert Member
	4	Note on details of area transferred for CAF in Gujarat and their legal status
	5	Note on targets and achievements related to development works in Shoolpaneshwar Sanctuary in Gujarat
	6	Statement of works on archaeological aspects by NVDA for the areas in Madhya Pradesh
	7	Summary of final report on study of health aspects by Dept of PSM, Gandhi Medical College, Bhopal
	8	Extract of studies on runoff of agrochemicals from the agricultural fields submitted by NVDA
36A	1	A diagrammatic view of the proposed dam at RL 100 m to be achieved by June 2002
	2	A copy of the status report on environmental management of Sardar Sarovar Project for the quarter ending December 2000
	3	Thematic map of the areas under treatment as Phase 1 programme of CAT works
	4	A tabular statement showing the target and achievement on the work of the Shoolpaneshwar Sanctuary received from GOG
	5	A tabular statement on the recommendations of the study group of Pune University covering flora, fauna and carrying capacity aspects
	6	A plan for felling of trees from submergence areas in Maharashtra and its presentation on GIS generated map
	7	Summary of the plan on flora and fauna received from NVDA
	8	Summary of the plan for felling of trees received from the NVDA and its presentation on GIS generated map
	9	A copy of the minutes of the 3 <sup>rd</sup> meeting on archaeology & anthropology taken by the Member (E&R), NCA on 8 <sup>th</sup> March 2001
	10	A GIS generated map showing locations of protection/ relocation/ excavation works under progress
	11	A tabular statement containing details of the health facilities created in the State of Gujarat, Maharashtra and Madhya Pradesh.
	12	A GIS generated map showing location of health facilities in the three states
	13	A copy of the action plan on health aspects received from the Government of Gujarat
	14	A copy of the status report on environment management of ISP for the quarter ending December 2000
	15	A copy of the letter addressed to the secretary, Department of Culture, GOI with regard to the protection works on Joga Fort
	16	A copy of the letter addressed to the secretary, Department of Agriculture, GOI with regard to catchment area treatment under RVP scheme
	17	Draft statement of cost estimates and expenditure related to survey, studies and implementation of the environmental work plan for updating
36M	1	List of participants
	2	The operative part of the judgement
	3	A copy of the letter addressed by Dr Shekhar Singh, IIPA, dated 1.5.2001
	4	A plan for treating the balance area during the next two years submitted by the Govt of Madhya Pradesh
	5	Progress Report on creation of various health facilities submitted by Govt of Madhya Pradesh
	6	Information on progress of Phase II CAT works submitted by the Govt of Madhya Pradesh

	7	A copy of the letter addressed by the Secretary, MOA, GOI to the Chief Secretary, GOMP to provide funds for Narmada Project
	8	A copy of the statement on environmental cost of the Sardar Sarovar Project
	9	A copy of the letter addressed by Commissioner (PP) to the Secretary, MOEF & the Chairman of the Env Sub-group during the meeting
37A	1	CAT: details for completion of works received from Madhya Pradesh
	2	Tabular information on recommendations, action plans and present status of various studies and surveys carried out for Shoolpaneshwar Sanctuary, submitted by SSNNL
	3	Write up on recommendations, action plans and present status of various studies and surveys relating to flora and fauna affected due to impoundment. Proposal for felling of trees in the submergence zone prior to impoundment of the reservoir
	4	Phased felling plan for forests coming under submergence at EL 100m
	5	Information on recommendations of the study group on flora and fauna and the proposed action plan for their dispersal/migration.
	6	Command Area Development details, particularly with reference to the proposed monitoring and controlled release of water for avoiding water logging, salinity, etc
	7	Final health plan incorporating the preventative and curative measures proposed for malaria control and other diseases
	8	Report on health aspects and the additional districts required to be covered by NICD
	9	An updated health Action Plan
	10	Minutes of the 3 <sup>rd</sup> meeting to review the progress on archaeological & anthropological aspects in relation to Sardar Sarovar Project & ISP held on 27.7.2001 at Bhopal
	11	A copy of the map showing the reservoir and the river stretch
	12	A copy of the status report on environmental management – Sardar Sarovar Project & ISP, for quarter ending September 2001
	13	A map of the areas treated/ under treatment of the sub watershed
	14	A map delineating the submergence, catchment, areas under tree cover, areas of sanctuaries
	15	The progress of the fisheries development programme received from Govt of Gujarat
	16	A copy of the map indicating location of the monument vis a vis impoundment
	17	The report on rim stability received from Govt of Gujarat
	18	Recommendations of the report of the Experts on Health for the areas in Madhya Pradesh, Maharashtra and Gujarat
	19	The status of works in relation to impoundment at RL 100m is brought out in the map
	20	The current status of works on development of Narmada Main Canal and distributaries
	21	The key expected impacts on downstream environment are outlined in the note
	22	A copy of the thematic maps delineating improvement of the vegetal cover due to CAT works
	23	Copy of the letters received from ISRO Office Ahmedabad
	24	A copy of the letter received from the Ministry of Agriculture
	25	Compilation of the estimates and expenditure incurred on survey, studies and implementation of the suggested safeguard measures for the Sardar Sarovar Project
	26	Copies of the letters addressed to the Govt of Maharashtra for eliciting needed response
37M	1	List of participants
	2	Progress report of directly draining sub-watersheds in MP
	3	Status of archaeological monuments/ mounds in MP
	4	Status of compliance submitted by GOMP
	5	Status of construction works on canal in Rajasthan
	6	Copy of letter submitted by WAPCOS
	7	Report on monitoring the impact of CAT using remote sensing & GIS in parts of Narmada Catchment area
38A	1a	Comments received from GOMP
	1b	Comments received from Prof Ramaseshan
	2	Profile of the dam
	3	Area capacity curve for ISP
	4	Backwater curve corresponding to 1/100 year flood
	5	The committee constituted by the ESG: ISP areas: main body of the report

	6	Status report for the quarter ending Sept 2002
	7	Final report of diseases surveillance studies from GMC, Bhopal/NVDA: key recommendations
	8	Progress of CAT works
	9	Progress of felling Maharashtra
	10	Progress of felling in MP
	11	Copy of the map showing the reservoir and the river stretch
	12	Map of the areas treated/ under treatment of the sub-watershed
	13	Map delineating the submergence, catchment, areas under tree cover, areas of sanctuaries
	14	Progress of the fisheries development programme received from the GOG
	15	Copy of the map indicating location of the monument vis-à-vis impoundment
	16	Proposed health facilities in relation to impoundments in MP and Maharashtra
	17	Current status of works on development of Narmada Main Canal and distributaries
	18	Suggested safeguards to be adopted while raising dam height to 100m and beyond
	19	Sardar Sarovar Project: Environment Action Plans: Estimates and Expenditure
	20	Monitoring of ISP: Copy of the letter from NCA addressed to GOMP
	21	Relevant extracts from Narmada Water Scheme exhibiting the duties entrusted to NCA on monitoring of environment aspects of ISP
38M	1	List of participants
39A	1	Letter from NHDC for correction in the minutes of 38 <sup>th</sup> ESG meeting
	2	Letter from SSNNL for correction in the minutes of 38 <sup>th</sup> ESG meeting
	3	Letter GOMP for correction in the minutes of 38 <sup>th</sup> ESG meeting
	4	Comments of Dr Shekhar Singh on CAD plan for Phase I of Command of SSP
	5	Response of Sardar Sarovar Project on comments of Dr Shekhar Singh
	6	Comments of Secretary, SSCAC on CAD Plan for Phase I of Command of Sardar Sarovar Project
	7	Forest cover status of Gujarat areas
39M	1	List of participants
40A	1	Observations of SSNNL on minutes of 39 <sup>th</sup> meeting of ESG
	2	Comments of the Secretary, SSCAC on EIA report of Command Area in Rajasthan
	3	Downstream management plan submitted by SSNNL
40M	1	List of participants
	2	Copy of the letter No. 64/1/92-2004/ECD-II from Indian Council of Medical Research, New Delhi dated 28 <sup>th</sup> June 2004 regarding action plan on health submitted by GOMP and GOM.
	3	Letter No. NVDD/E&F/2004/1123 from NVDD, GOMP regarding inclusion of 2 additional agenda items on permission for fishing in ISP and constitution of wildlife sanctuaries under Sardar Sarovar Project.
41A	1	A copy of the communication, on confirmation of minutes of 40 <sup>th</sup> meeting of ESG received from Prof Ramaseshan
	2	A copy of the proposal on formation of sanctuaries for Sardar Sarovar Project, received from GOMP vide dated 7 <sup>th</sup> July 2004 and request for inclusion of agenda items for discussion by ESG on ISP and Sardar Sarovar Project
	3	A copy of the letter dated 8 <sup>th</sup> July 1992 conveying decision of GOI regarding extent of area to be treated at the cost of the project
41M	1	List of participants
	2	Letter No. CAD-TECH/ESG/8/04/18 dated 23 <sup>rd</sup> September 2004 from Managing Director SSNNL for corrections in minutes under item No. XL-2(185)(B)(C) on page 8.
	3	Abstract of the ATR received from the States of Gujarat, Maharashtra and MP after circulation of the agenda papers of the 41 <sup>st</sup> meeting of ESG.
	4	Status of readiness on implementation of environmental safeguard measures commensurate with raise in the height of the dam to EL 121.92m as presented to the ESG during its 41 <sup>st</sup> meeting held on 6 <sup>th</sup> January 2005.
42A	1	Letter received from MD SSNNL vide his letter No. CAD/TECH/ESG/8/P.II/2005/106 dated 7 <sup>th</sup> March 2005
	2	Progress achieved by each state on qualitative parameters of compensatory afforestation
	3	Stipulations contained in the order of clearance to Sardar Sarovar Project issued by the MOEF related to CAD plan

	4	Status of environmental safeguard measures planned by GOG for implementation pari-passu with the commencement of irrigation, in the areas of Sardar Sarovar Project command.
	5	Letter No. SE/NCPC/T-23/2004-05/38 dated 3 <sup>rd</sup> January, 2005 of SE, Narmada Canal Project Circle – Samchore, Govt of Rajasthan enclosing intention plan for implementation of environmental safeguard measures in the areas of the Sardar Sarovar Project command in Rajasthan.
	6	Summary of the status on implementation of environmental safeguard measures for flora, fauna and carrying capacity of the Sardar Sarovar Project areas.
	7	Summary of status on implementation of key components of the action plan suggested by CICFRI to safeguard the aquatic environment
	8	Status of felling of forest trees from the submergence area of the Sardar Sarovar Project for the areas in MP and Maharashtra
42M	1	List of participants
	2	Rainfall, runoff and sediment yield measurement in the catchment area of Sardar Sarovar Project lying within Gujarat: Interim report – 2004-05 prepared by CSWCR&TI, received from Govt. of Gujarat
	3	Observations on creation of sanctuaries/national parks for ISP, received from Director, Wildlife Institute of India, Dehradun.
43A	1	Observations of expert members on conditions of implementation for the Command Area in Gujarat.
	2	Key stipulations contained in the environment / forest / investment clearance to the SSP by the departments / agencies of the Govt. of India.
	3	Tabular statement on planned works in command area in Gujarat. Progress to be provided by the SSNNL
	4	Observations of experts on CAD plan received from Rajasthan.
	5	Action plan during pre & post impoundment period of SSP as prepared by CICFRI.
43M	1	List of participants
44A	1	Key stipulations contained in the environment/ forest/ investment clearance to the SSP by the departments/ agencies of the Govt. Of India
	2	Tabular statement on planned works in command area in Gujarat. Progress to be provided by the SSNNL.
	3	GIS map of the proposed National Parks/ Sanctuaries/ Conservation areas for the Indira Sagar/ Omkareshwar project in MP
44M	1	List of participants
45A	1	Copy of the letter received from NVDA dated 6 <sup>th</sup> Oct. 2007.
	2	Copy of the letter received from NVDA dated 30 <sup>th</sup> Oct. 2007 & 7 <sup>th</sup> Nov. 2007.
	3	Copy of the letter received from SSNNL dated 22 <sup>nd</sup> Oct. 2007.
	4	Extracts of recommendations from the field reports of GoMP, GoG & GoM.
	5	Key requirements stipulated in clearance orders regarding Command Area.
45M	1	List of participants
	2	Letter from Dr. Shekhar Singh dated 24th April 2008.
	3	NVDA letter dated 9th April 2008.
	4	NVDA letter dated 17th April 2008.
46A	-	
46M	1	List of participants
	2	Narmada Valley Development Authority, letter No. NVDA/E&F/Tec/2008/903 dated 17.06.08

\* not referred to in contents but within documentation

***Glossary/ abbreviations***

A	Agenda
AIUSLUS	All India Soil and Land Use Survey organisation
ASI	Archaeological Survey of India
BC	Branch Canal
BSI	Botanical Survey India
CAD	Command area development
CAF	Compensatory afforestation
CAT	Catchment area treatment
CAZRI	Central Arid Zone Research Institute
CCF	Chief Conservator Forests
CICFRI	Central Inland Capture Fisheries Research Institute
CIFA	Central Institute of Freshwater Aquaculture
CSWCR&TI	Central Soil & Water Conservation Research & Training Institute
Cumecs	Cubic metre per second (m <sup>3</sup> /s), 1 = 35.3 cubic feet per second
Cusecs	Cubic foot per second (ft <sup>3</sup> /s), 1 = 1.983 acre foot/day; 1 = 2446.6 m <sup>3</sup> /day
DFA	Degraded forest area
DPR	Detailed Project Report
EIA	Environmental impact assessment
EM	Environmental management (SSP annual status report)
ESG	Environmental Sub-Group
ESM	Environmental safeguard measures
FA	Forest area
FC	Field channel (command area)
FCA	Forest Conservation Act
FFACC	Flora, Fauna & Carrying Capacity
FRL	Full Reservoir Level
FSI	Forest Survey India
FSL	Full Supply Level
GCA	Gross Command Area
GERI	Gujarat Engineering Research Institute
GIS	Geographic Information System, 3D, co-ordinate based data display software
GMC	Gandhi Medical College, Bhopal
GoG	Government of Gujarat
GOI	Government of India
GoM	Government of Maharashtra
GoMP	Government of Madhya Pradesh
GoR	Government of Rajasthan
GRA	Greivance Redressal Authority
GW	Ground water
ha	Hectare, = 10,000 square metres
HRW	HR Wallingford, water engineering consultancy
ICAR	Indian Council of Agricultural Research
ICCB	
ICED	Indian Council of Enteric Diseases
ICMR	Indian Council for Medical Research
IDSP	Integrated Disease Surveillance Program
IIM	
IIPA	Indian Institute of Public Administration
ISP	Indira (Narmada) Sagar Project
ISRO	Indian Space Research Organisation
IWAI	Inland Waterways Authority of India
M	Meeting
MAF	Million-acre feet; 1 hectare metre = 10,000 m <sup>3</sup> ; 1 acre-foot = 1233.4 m <sup>3</sup>
MC	Main Canal
MCE	Maximum credible earthquake
MoEF	Ministry of Environment & Forests
MoWR	Ministry of Water Resources
NCA	Narmada Control Authority

NDSP	National disease surveillance programme
NFA	Non forest area
NHDC	Narmada Hydroelectric Development Corporation
NHP	National Health Policy
NHRM	National Rural Health Mission
NICD	National Institute of Communicable Diseases
NMC	Narmada Main Canal
NMEP	National Malaria Eradication Programme
NVCRI	National Vector Control Research Institute
NVDA	Narmada Valley Development Authority
NVDD	
NWDTA	Narmada Water Disputes Tribunal Award, 1979
OFD	On farm/field development (works)
OM	Office Memorandum
PAF	Project Affected Person
PHC	Public/primary health centre
PHU	Primary health unit
Project works	Main dam construction works
Pvt	private
R&R	Relief and rehabilitation; resettlement & rehabilitation
RCCF	
RIS	Reservoir induced seismicity
RVP	River Valley Project
SBC	Saurashtra Branch Canal
SC	Supreme Court of India
SSCAC	Sardar Sarovar construction Advisory Committee
SSNNL	Sardar Sarovar Narmada Nigam Ltd
SSP	Sardar Sarovar Project
SSRRC	Sardar Sarovar Reservoir Regulation Committee
SW	Surface water
ToR	Terms of Reference
VC	Vice Chairman
VSA	Village service area
WAPCOS	Water and Power Consultancy Services
WCD	World Commission on Dams
WII	Wildlife Institute India
WUA/WUS	Water user association (in command area)



## Project overview

### Introduction

Narmada is the fifth largest river in India and is the largest and least polluted of the west flowing rivers. Its length from Amarkantak to the Arabian Sea is 1,312 km. The mean annual rainfall in the river basin is 1,180 mm (46.45 inches) and the average annual rainfall is 41,000 M.Cu.m (33.21 MAF, million acre feet) [NCA, EM 2000]. Its catchment area is approximately 98,000 sq.km, covering the states of Madhya Pradesh, Maharashtra and Gujarat [NCA, EM 2000].

Estimates of the Government of Madhya Pradesh anticipate that over the next half century there will be 29 major, 135 medium and approximately 3000 minor dam projects in the Narmada River valley [NCA, EM 2000]. The Sardar Sarovar dam, one of the first to be built on the main river, is the terminal project on the river system and its effects are linked to development of the upstream Narmada Sagar (Indira Sagar) dam. The impoundment of the Narmada by the Sardar Sarovar Project (SSP) will convert a stretch of river between the dam site and upper limits of the reservoirs, from a comparatively shallow, free-flowing river into a narrow lake about 2km wide and about 210 km long with depth of about 120 m at the dam site. The submergence zone of the project is set out below, from NCA, EM 2000.

### The submergence zone of the project

State	Culturable land (ha)	Forestland (ha)	Land under other uses (ha)	Total land (ha)	Number of affected villages	Number of PAFs
Madhya Pradesh	7,883	2,731	10,208	20,822	193	33,014
Maharashtra	1,519	6,489	1,592	9,599	33	3,213
Gujarat	1,877	4,166	1,069	7,112	19	4,600
<b>Total</b>	<b>11,279</b>	<b>13,386</b>	<b>12,869</b>	<b>37,533</b>	<b>245</b>	<b>40,827</b>

At 121.92m, impoundment will submerge about 16,800 ha of the 37,533ha total.

A Government committee was appointed in 1965 to develop a master plan for the Narmada river basin, in relation to dam building. The affected States did not accept the committee's recommendations and the Government constituted the Narmada Water Disputes Tribunal in 1969. Following ten years of deliberation, the Tribunal notified its order in December 1979. In its final award the Tribunal set out decisions on the dam location, regulation of flows, reservoir levels and other fundamental aspects of the Narmada developments. The Tribunal award decisions that relate to the environmental aspects of the Sardar Sarovar Project are summarised below:

- The utilizable quantum of Narmada waters at the Sardar Sarovar dam site is specified at 28 million-acre feet (MAF) at 75 per cent dependability;
- Apportionment of water shall be 18.25 MAF to Madhya Pradesh, 9.00 MAF to Gujarat, 0.50 MAF to Rajasthan and 0.25 MAF to Maharashtra. The apportionment/sharing of water are subject to review after 45 years;
- The Full Supply Level (FSL) of the main canal and Full Reservoir Level (FRL) of Sardar Sarovar dam are fixed at 91.44 m and 138.68 m respectively. The FRL of Indira Sagar dam is 262.13 m;

- Madhya Pradesh is to provide regulated releases of water from the Narmada Sagar Projects to the Sardar Sarovar Project. Terms of the award are subject to change if there is agreement between all the States concerned.

Project authorities submitted a Detailed Project Report (DPR) and information on environmental issues during February to October 1980. In April 1983, the 12th meeting of Environmental Appraisal Committee of Ministry of Environment and Forests (MOEF, Department of Environment of GOI) approved the project in principle.

In 1985, MOEF issued guidelines for environmental impact assessment and environmental management of river valley projects. The three State Governments submitted further information and data on environmental impact and management. On 24 June 1987, the Ministry of Environment and Forests (MOEF) granted the environmental clearance to the Sardar Sarovar and Indira Sagar Project, with attached conditions [Environmental Clearance 24.6.87, GOI, MOEF, New Delhi, Office Memorandum No. 3-87/80-IA]. Details were sought from the project authorities on the following:

- Rehabilitation master plan
- Phased catchment area treatment scheme
- Compensatory afforestation plan
- Command area development
- Survey of flora and fauna
- Carrying capacity of surrounding area
- Seismicity
- Health aspects

The Narmada Control Authority (NCA) was given the responsibility of ensuring that the environmental safeguard measures would be planned and implemented, at a rate that would be *pari-passu* with the project works. The clearance order set four conditions, basically for completing surveys, studies and preparation of Action Plans for mitigative measures for the identified parameters, as below.

#### ***Environmental Clearance 24.6.87 conditions***

- Environmental Clearance 24.6.87, GOI, MOEF, New Delhi, Office Memorandum No. 3-87/80-IA

i	The Narmada Control Authority (NCA) will ensure that environmental safeguard measures are planned and implemented <i>pari-passu</i> with progress of work on projects;
ii	The detailed surveys/studies assured will be carried out as per the schedule proposed and details made available to the Department for assessment;
iii	The Catchment Area Treatment programme and the Rehabilitation plans be so drawn as to be completed ahead of reservoir filling;
iv	The Department of Environment should be kept informed of progress on various works periodically.

The Environmental Clearance memorandum item 3 stated that “*field surveys are yet to be completed. The first set of Information has been made available and complete details have been **assured** to be furnished by 1989*”.

The Environmental Clearance memorandum item 6 stated that approval under Forest (Conservation) Act 1980 for diversion of forestland would be obtained separately and that no work should be initiated on forest area prior to this approval. Also approval from environmental and forestry angles for any other irrigation, power or development projects in the Narmada Basin should be obtained separately.

On 8<sup>th</sup> September 1987, the Ministry of Environment and Forests (MOEF) granted the forest clearance to the Sardar Sarovar Project, with attached conditions, approving the diversion of 13,385.45 hectares of forest land for SSP [Forest Clearance 8.9.87, GOI, MOEF, New Delhi, Office Memorandum No. 3-87/80-IA]. This comprised:

- 4,165.91ha Gujarat
- 2,731.00ha Madhya Pradesh
- 6,488.54ha Maharashtra

This forest clearance was strictly subject to 11 conditions in all three states, as below.

***Forest Clearance 8.9.87 conditions***

- Forest Clearance 8.9.87, GOI, MOEF, New Delhi, Office Memorandum No. 3-87/80-IA

i	Legal status of the land will remain unchanged;
ii	The full details of the non-forest lands for retaining compensatory afforestation with complete details viz Khasara No, village, etc will be reported by the State Government before 30.9.87;
iii	The non-forest areas available for rehabilitation of all the oustees will be reported by the State Governments or a proposal to the satisfaction of Govt. of India in this regard will be furnished by the State Governments before 30.11.87;
iv	No work on the project in forest area will be commenced until and unless condition under (II) and (III) above are fulfilled;
v	Since the project involves violation and also most of the non-forest areas for compensatory afforestation are away from the project area, the State Governments will raise compensatory afforestation in double the degraded forest lands also in the project impact areas in addition to the afforestation on equivalent non-forest land. A scheme for this will be submitted by 30.11.87;
vi	The State Governments will prepare by 30.11.87 a plan for the treatment of catchment areas failing which the Central Government will appoint a team for this purpose at the cost of the project for this purpose;
vii	No forest land will be utilised for the rehabilitation of the oustees;
viii	Tree felling will be permitted in submergence area only up to 4 m below FRL;
ix	Tree planting will be done on either side of the canals, roads, forest area of the reservoir and in the wasteland/ vacant land under the control of the Irrigation Department;
x	Water will be supplied free of cost to the Forest Department for raising nursery and for irrigating forestry plantations in the command area;
xi	In order that the construction labour and staff while working on the project in the forest area may not allow destruction to the forest area for meeting their fuel wood needed, the user agency will establish fuels depots and will provide suitable alternative domestic fuel such as fuel wood, kerosene oil etc to them free of cost or at cost deducted from their salary or wages.

In a letter of clearance dated 20<sup>th</sup> July, 1990 [No. 8-29/89-F C], from the Asstt. Inspector General of Forests, a parcel of 2,700 ha of forest land was approved for rehabilitation of SSP affected persons in Dhule District, subject to the condition that compensatory afforestation be done by the Government of Maharashtra. The Government of Maharashtra is requested to identify the land for raising compensatory afforestation and send a detailed report along with a scheme for raising compensatory afforestation before 30.9.1990. The original proposal of the State Govt. [letter No.1688/CR 329/F-10 dated 28.12.88 from Secretary (Forests), Govt. of Maharashtra] was for diversion of 2,583.42ha of forest land, whereas 2,700ha of forest land are being diverted by this order. The State Govt. is requested to send the details of survey number etc. along with map showing the additional area being diverted by this order. This issues in relaxation of condition No.(iii) \* (vii) of this Ministry's letter No.8-372/83-FC.

In a letter of clearance dated 21<sup>st</sup> February, 1994 [No. 225/92-FC], from the Asstt. Inspector General of Forests, a parcel of 1,500 ha of forest land was approved for rehabilitation of SSP affected persons in Dhule District, after examination by the Advisory Committee constituted by Central Govt. [re letter No.FLD-1692/CR-239/F-10 dated 11<sup>th</sup> February 1994 from Secretary, Forest Department, Govt. of Maharashtra], subject to the following conditions:

- The felling of trees on the proposed forest land shall be done in phases as per requirement of land for rehabilitation.
- The amount realised by the felling of trees in 1,500ha of forest land shall be transferred in favour of Forest Department in the special fund created for compensatory afforestation as an additionality for afforestation and allied activities.
- Compensatory afforestation to be raised over equivalent non-forest land which will be notified as protected forest under Indian Forest Act.

The Ministry of Environment and Forests issued a direction on 4<sup>th</sup> February 1988 on the contents of the environmental Action Plans.

*D.O. letter No. 3/87/80/HCT/Env.5/IA dated February 4, 1988 from Shri TN Seshan, Secretary to the Government of India, Ministry of Environment and Forests, Paryavaran Bhawan, Lodi Road, New Delhi addressed to Shri Naresh Chandra, Secretary to the Government of India, Ministry of Water Resources, New Delhi – Direction from Secretary, MOE&F, 04.02.88 [NCA, 2000] ... “You may kindly recall that in the last meeting of the NCA, it was considered desirable that to facilitate basic environmental data collection and preparation of needed Action Plans a framework may be worked out to be followed uniformly by all the four States. Accordingly, on each of the major environmental aspects for which necessary action plans have to be prepared, details worked out are enclosed. You may like to convey these details to the concerned Chief Secretaries for necessary follow-up action.”*

**Details for environmental Action Plans, 1988**

<b>1. Catchment Area Treatment</b>	<p>Catchment Area Treatment should cover both submergence area as well as free draining catchment. The important parameters under both these heads are given below:</p> <ul style="list-style-type: none"> <li>• <b>Submergence area</b></li> </ul> <p>Extent, land use, population affected, socio-economic profile of affected population, inter-linkages with outer population, special characteristics, flora and fauna – endangered, habitat sufficiency, seismic status, geological features, groundwater status, geomorphological aspects.</p> <ul style="list-style-type: none"> <li>• <b>Free draining catchment</b></li> </ul> <p>Land use, extent of degradation, erodability, precipitation pattern, cloudbursts, landslides, biotic pressures, siltation load, other existing and proposed activities</p> <ul style="list-style-type: none"> <li>• <b>Catchment Area Treatment Plan</b></li> </ul> <ol style="list-style-type: none"> <li>1) Criteria adopted for identifying degraded and vulnerable areas;</li> <li>2) Map showing critically degraded area requiring engineering and biological treatment on the basis of a recent field survey;</li> <li>3) Details of the engineering and biological measures proposed to be carried out as a time bound programme;</li> <li>4) Arrangements made to mobilise:             <ol style="list-style-type: none"> <li>i. Technical manpower to carry out the soil conservation and rehabilitation schemes;</li> <li>ii. Planning material either through creation of special nursery or through purchases from Forest Department etc</li> </ol> </li> <li>5) Geomorphological studies of the reservoir periphery.</li> </ol>
<b>2. Compensatory afforestation</b>	<ol style="list-style-type: none"> <li>1) Map of the areas identified for afforestation;</li> <li>2) Land capability survey of the identified areas;</li> <li>3) Availability of surface and ground waters;</li> <li>4) Spaces identified and the nursery creation programmes;</li> <li>5) Phased Action Plan for compensatory afforestation;</li> <li>6) Public participation details;</li> <li>7) Details of after-care and monitoring.</li> </ol>
<b>3. Rehabilitation and masterplan</b>	<ol style="list-style-type: none"> <li>1) Enumeration of affected population including those whose land is submerged but houses are not as well as the landless workers;</li> <li>2) Socio-economic studies and profile of the affected population;</li> <li>3) Details of the rehabilitation sites along with the land capability surveys and availability of water at the selected sites;</li> <li>4) Map of rehabilitation colonies and type, designs of the houses proposed;</li> <li>5) Details of the occupational training programme proposed for the oustees;</li> <li>6) Measures needed to make the identified land fit for agriculture and rehabilitation along with a phased Action Plan.</li> </ol>
<b>4. Command area development</b>	<p>Command area involves both the management of plant as well as human aspects. The details have to be collected on the following:</p> <ul style="list-style-type: none"> <li>• <b>Land management</b></li> </ul> <p>Existing land use, irrigation status, cropping pattern, water availability – surface and ground; natural drainage pattern, induced drainage, yield, permeability, precipitation, precipitation distribution, salinity and alkalinity problems, soil profile, land capability.</p>

	<ul style="list-style-type: none"> <li>• <b>Human management</b></li> </ul> <p>Cropping pattern, rationale and controlled water use; training for skills upgradation; package of irrigation water, seeds, fertilisers, insecticides, pesticides with controls; surface and subsurface drainage.</p> <ul style="list-style-type: none"> <li>• <b>Command Area Development plan</b></li> </ul> <ol style="list-style-type: none"> <li>1) Land capability survey of the areas which are proposed to be brought under irrigation along with soil profiles;</li> <li>2) Identification of the areas prone for water logging and salinity;</li> <li>3) Details of the drainage works proposed in the command and the norms based on which these details have been planned;</li> <li>4) On-farm development works proposed and the assistance proposed to be given to the farmers to ensure conjunctive use of water;</li> <li>5) Details of the present and proposed cropping pattern;</li> <li>6) Steps proposed to prevent contamination of ground and surface water due to fertilisers, pesticides, run-off.</li> </ol>
<b>5. Flora and fauna</b>	<p><b>Flora</b></p> <p>Rare and endangered species, gene-pool reserve.</p> <p><b>Fauna</b></p> <p>Rare and endangered species, migratory species, migration route, breeding habitat, sanctuary, national park.</p> <p>Accordingly, the rehabilitation of Flora and Fauna Action Plans would cover the following:</p> <ol style="list-style-type: none"> <li>1) Survey of flora and fauna in the region going to be affected;</li> <li>2) Gene-pool if any likely to be affected;</li> <li>3) Details of wildlife habitats in the region;</li> <li>4) Measures proposed to rehabilitate endangered species of flora and fauna if any;</li> <li>5) Assessment of the carrying capacity of the neighbouring areas wherein the wildlife would disperse if the scheme is implemented;</li> <li>6) Plan for rehabilitation of endangered Flora and Fauna.</li> </ol>
<b>6. Health aspects</b>	<ol style="list-style-type: none"> <li>1) Present status of the waterborne diseases in the areas;</li> <li>2) Present status of the health delivery system;</li> <li>3) Screening arrangements proposed for the work force;</li> <li>4) Preventative measures proposed to control the incidence of waterborne diseases;</li> <li>5) Reinforcement proposed to the existing health delivery system.</li> </ol>
<b>7. Monument and cultural aspects</b>	<ol style="list-style-type: none"> <li>1) Cataloguing of monuments and sites considered important from religious, historical and cultural angles;</li> <li>2) Plan for rehabilitation of monuments wherever necessary</li> </ol>

**Investment Clearance 5.10.88 conditions**

- Investment Clearance 5.10.88, GOI, Planning Commission, New Delhi, Office Memorandum No. 2 (194)/88-I&CAD

i	The State shall comply with the conditions as laid down in the OM No. 3-87/80-IA dated 24.6.1987 and 8-372/83-FC dated 8.9.1987 issued by the Ministry of Environment and Forests while according the environmental clearance and the approval for diversion of forest lands for this project respectively.
ii	Looking to the size and importance of this project, the State Government will give sufficient priority to this project in the Eighth Plan by ensuring <b>adequate funding</b> to match with the construction schedule as indicated in the concurrence of State Planning and Finance Department vide Government of Gujarat in Narmada Development Department's letter No. NPP/1084/GOI-4/Pat.V/J dated 3.10.1988. The State will also complete other ongoing projects at advance stage in time to ensure that there is no difficulty in funding the peak requirements of Sardar Sarovar Project.
iii	A programme of <b>drainage and ground water balance studies</b> has been completed for the areas beyond the Mahi. The Bhal, Saurashtra, Kutch, Sami-Harij and other areas require this as a pre-condition. The State should submit to Planning Commission a detailed programme of studies, with milestones of achievements, duly vetted through Central Water Commission for monitoring the same by Planning Commission.
iv	The State should take suitable advance measures, as may be necessary, to ensure that annual revenue to be accrued from this project covers at least <b>annual operation and maintenance charges</b> including depreciation charges by setting the water rates suitably.
v	The State should set up a special group of experts <b>to study the siltation aspect in the main canals under all operating conditions</b> since such siltation if occurs is likely to pose a serious problem during the actual operation of this project and may require a huge expenditure for desilting as well as result in serious operational difficulties.
vi	The State should draw up a detailed time schedule for completion <b>within five years</b> the investigation, <b>detailed survey, planning and working out the detailed cost estimates for micro level network system for the balance area</b> of the total command of this project.
vii	Past experience of irrigation projects has revealed that main and branch canals are completed up to the end but, in absence of micro level networks to take irrigation water up to outlet, corresponding irrigation benefits do not start accruing in spite of huge financial investment made. To avoid this, the State should draw up <b>an implementation schedule, segmentwise, for completion of canal network</b> , in such a way that a segment of the canal network, taken up from head reaches, is completed in all respects so as to make the irrigation waters available, for the designed potential of that segment, up to the outlet in that particular segment.

## Catchment Area Treatment

Mtg.	Doc.	Item	Chronology	CAT follow-up
33	A	Ann 3	<b>Chronology</b> Status report: Sardar Sarovar Project Env Aspect, March 1999: To aid CAT management plan, studies: <ul style="list-style-type: none"> <li>Report of Inter-Departmental Committee on Soil Conservation and Afforestation (the Dewan Committee Report), 1985.</li> <li>Report on Prioritisation of Sub-watersheds in Sub-catchments of Narmada Catchment, 1991 by AISLUS, New Delhi</li> </ul> Total catchment area of Sardar Sarovar Project below NS Dam is 2442,440 ha. Of this 682,769 ha area spread to 500 sub-watersheds having silt yield index 1,200 and above was identified as critically degraded.	<b>Note:</b> GOI directive (letter) of July 1992 only refers to costs to project of 'phases' of CAT, rather than their implementation timeframe, in terms of directly draining area and Phase I. Appears to be confusion with funding for CAT and timeframe for CAT. No scientific basis for neglecting Phase II until post impoundment: issues of excessive cost then incurred, health impacts, water quality and sedimentation.
42	A	B p4	Out of total catchment of 24,45,163 ha, 28.4% (27.96% in EM2006) was found critically degraded – Dewan Cmtee (1985) estimated 33%. 6.66% of the total catchment was treated under Phase I and balance area is proposed for treatment under Phase II.	<b>Note:</b> changed total catchment area and EM status document Nov 2004/Feb 2005 p12 discusses only 27% identified for treatment.
34	A	Ann	<b>Total area/overall CAT issues</b> As per AISLUS data, area of 176,517 ha to be treated in Phase I, prepared plans include an additional area of 2663 ha, total is 179,180 ha (7.34% of area, EM2006) to be treated at cost of project and pari-passu with project works. Plans for completing in about 10 years.	Phase 1: 10 years (Nov 2000 meeting). Note figure changes to 179,180 ha
35	A	I p3	134,832 ha of 179,180 ha Phase I so far complete, i.e. 75.25%	
35	M	P3	503,589ha (20.62%, total 27.96%) Phase II.	
2006	EM	P12	Phase I + II = 682,769ha <b>Progressive filling of reservoir</b> Shekhar Singh letter. Prof RK Katti letter to Chairman (Annex 3). No need to reopen pari-passu. Prof Ramaseshan reiterated Prof Khatti view and also referred to earlier sub-group discussions whereby Phase II areas should be treated in rational time frame.	Phase II: in rational time frame/ <i>pari passu</i> No change in progress.
35	M	B1 p4	134,832 ha of 179,180 ha Phase I so far complete, i.e. 75.25%. Total area of sub-watersheds in vicinity of proposed impoundment is 92,529 ha of which 82,279 ha has been treated (88.4%).	
35	M	Ann 3	Letter/note by DR RK Katti (ESG Member and employed by Universal Earth Engineering Consultancy Services Pvt Ltd) on siltation of reservoir catchment area and pari-passu.	<b>Review:</b> by expert of very basic (unreferenced) note by Dr Katti on siltation of reservoir catchment area, Annx 3 of 35M (Jan 2001)
36	A	I p4	135,222 ha of 179,180 ha Phase I target so far complete, i.e. 75.46%.	
37	A	P3	133,251 ha of 179,180 ha Phase I target so far complete, i.e. 80%.	
37	M	B p5	146,852 ha of 179,180 ha Phase I target so far complete, i.e. 82.42%.	
37	M	B p8	States should <b>monitor and maintain works</b> undertaken for various activities such as CAT, CAF etc.	<b>Note:</b> requirement to monitor and maintain works (Feb 2002)



38	A	A1 p16	<p>Studies:</p> <ul style="list-style-type: none"><li>GOG: satellite imagery studies carried out by Space application research centre, Ahmedabad show considerable improvement in conditions of catchment over period 1985-6/ 1994. <b>Suggested to update these studies – progress request.</b></li><li>GOMP: suggested that studies through satellite imagery as in Gujarat be carried out by Space application research centre, Ahmedabad – <b>progress requested.</b></li><li>GOM: satellite imagery studies carried out by Forest Survey of India, Nagpur show considerable improvement in conditions of catchment over period 1991/95/98. <b>Suggested to update these studies – progress requested.</b> [Ref to details in Annex 6 p 56 incorrect.]</li></ul> <p>For Phase II, <i>availability of funds, manpower and annual plan of treatment</i> to be presented [for Mah and MP].</p>	<p><b>Require:</b> expert statement of accuracy of satellite review (% accuracy) &amp; list of complicating factors e.g. season, rainfall. Plus quantification of term “considerable improvement”</p> <p><b>Require:</b> quantification of term “considerable improvement”</p>																				
39	A	B p3	<p>Targets/achievements</p> <table><tr><td></td><td>Subw</td><td>target area</td><td>achievement area</td></tr><tr><td>GOG</td><td>15</td><td>29,157 ha</td><td>29,157 ha</td></tr><tr><td>Mah</td><td>17</td><td>24,298 ha</td><td>23,295 ha</td></tr><tr><td>MP 110.64</td><td>35</td><td>91,668 ha</td><td>90,864 ha</td></tr><tr><td>MP FRL</td><td>42</td><td>125,725 ha</td><td>109,345 ha</td></tr></table> <p>Assessment through remote sensing: GOG: complied GOM: complied GOMP: <b>not initiated</b></p> <p>Silt monitoring stations: GOG: <b>final report awaited</b> GOM: <b>Not initiated</b> GOMP: <b>Agency yet to be finalised.</b></p>		Subw	target area	achievement area	GOG	15	29,157 ha	29,157 ha	Mah	17	24,298 ha	23,295 ha	MP 110.64	35	91,668 ha	90,864 ha	MP FRL	42	125,725 ha	109,345 ha	<p>In March 2003, States requested to present funding, manpower and annual treatment plan issues.</p> <p>In 33A Ann 3 (March 2003 status report) critically degraded Phase I area was described as <b>28,226 ha</b> 95.9% 99.1% 87.0%</p> <p><b>Note:</b> See above, 38A, where GOM and GOG requested to update studies</p>
	Subw	target area	achievement area																					
GOG	15	29,157 ha	29,157 ha																					
Mah	17	24,298 ha	23,295 ha																					
MP 110.64	35	91,668 ha	90,864 ha																					
MP FRL	42	125,725 ha	109,345 ha																					
41	A	P17	<p>Status of compliance re 121m: <i>CAT</i> - qualitative (assessment of adequacy): <b>awaited</b> from all 3 states</p>																					
41	M	A p3	<p>Prof Ramaseshan: areas of sub-watersheds where the CAT works could not be taken up i.e. areas not available for treatment as mentioned in the agenda should be <b>shown distinctly along with reasons</b>, for information of members. NVDA VC pointed out that the detailed information on such areas was already submitted to ESG earlier and could be referred to.</p> <p>MOEF Director: though progress of physical works completed in the field was satisfactory, the assessment on efficacy of the treatment works is required to be made so as to initiate further requisite measures if required.</p>	<p><b>Require:</b> more detailed, GIS based info with clear digital maps (with latitude/longitudes and labelling of unworkable sites and their reasons for being unworkable) of areas that are not available to allow for inspection. These areas are described as unworkable due to being rocky, waterlogged, under development or under litigation, etc. A few photos and low resolution remote sensing data is insufficient proof and requires follow up.</p>																				

41	M	A p4	Chairman: compliance on qualitative assessment in all states needed to be expedited with help of satellite imageries and report on assessment for both FA and NFA should be placed before ESG.	What other CAT qualitative assessment methods are there available?
-	EM	04/05	EM status report Nov 04/ Feb 05, p14: Works completed in treatable area. Against planned target of 179180 ha, 161212 ha completed up to Dec 04. Reported by GOMP and GOM that balance areas <b>were not available</b> on account of being rocky/ unproductive/ under development/ litigation and thus <b>targets of CAT works chargeable to SSP were revised to 162,212 ha.</b>	<b>GOM/GOMP:</b> 16,968 ha not treated as part of Phase I, described as not available
42	M	B p3	NCA Dir Env: the physical works of CAT as reported by the State Govts were nearly completed. The assessment of the efficacy/ qualitative assessment of the treatment works in Maharashtra and Gujarat was <b>in progress</b> while GOMP <b>did not take up this work</b> on the plea that since these works related to Sardar Sarovar and Indira Sagar projects are already being carried out by Central Water Commission and Forests Survey of India, no useful purpose will be served by taking up this exercise.	<b>Request:</b> GOMP progress assessment of efficacy
42	M	B p4	Chairman: definitely a need for assessment of efficacy of CAT works. Data generally available with FSI may be quite old and whatever has been done during the last five years shall not be reflected in the imageries. Regular assessment of the areas treated is required and suitable agencies have to be engaged for this work. Qualitative assessment of CAT works and that of forest cover of areas treated has to be analysed. Reliance however could be placed on aerial photographs if available for recent period otherwise no way out but to identify the agencies and get the same.	No assessment of CAT Phase I efficacy in GoMP
			Chairman also suggested need for field visits to the areas for sample verification of the quality and quantity of the forest cover by associating CCF of MOEF could be organised by NCA within two or three months time and suitable recommendations for engaging agencies towards procurement and analysis of the aerial photographs should be brought out.	Are aerial photos adequate?
2006	EM	P13	Area under treatment 163,449ha, balance unavailable. Completed 2003-4.	<b>Note:</b> field visits be made [with inclusion of independent experts]
45	M	P9 pdf	The Vice Chairman, NVDA referred to the decision of Committee of Secretaries dated 08.07.1992 which suggested that major irrigation projects are not to be loaded with CAT expenditure on freely draining areas. Additional Director, MoEF pointed out that in the same order, it was also mentioned that <b>Ministry of Environment &amp; Forests would decide as to how much of the Phase-II area will have to be treated pari-passu.</b>	15,731 ha unavailable
45	M	P26 pdf	Annx 3 letter from Member (E&F), NVDA to Member Secretary, ESG, NCA re cost sharing: <ul style="list-style-type: none"> <li>"Representative of GoMP stated that the clearance issued from environmental angle in 1987 identified the Phased Catchment Area Treatment, as one of the environmental safeguard measures required to be planned and implemented pari passu with the progress of work on the project and imposed a condition that the catchment area treatment (CAT)</li> </ul>	Phase II pari passu decision only refers to costing. Confusion of implementation timeframe and cost phasing.

46	A	P6 pdf	<p>programme and the rehabilitation plans be so drawn as to be completed ahead of reservoir filling. <b>While according approval to the diversion of forest land for Sardar Sarovar Project, Gol, MoEF under section 2 of the forest (Conservation) Act, 1980 had stipulated that a plan for the treatment of catchment area will be prepared by 31.3.1989 and implemented at the cost of the project.</b> D.O. letter of MoEF dated 4.2.1988 laid down the details to be covered in the CAT plan including treatment of degraded and vulnerable area. All India Soil &amp; Land Use Survey under 001, MoA&amp;C had prioritized the sub-watersheds of Narmada catchment into 5 categories out of which sub-watersheds deserving very high and high priority were critically degraded. However, in July 1992 the Committee of Secretaries directed to treat only directly draining critically degraded subwatersheds at the cost of the project. Gol, MoE&amp;F, have not yet amended the conditions of clearance. It is necessary that the conditionality of carrying out the entire CAT work (directly draining as well as freely draining) at the cost of the project, is modified otherwise the project authorities would be required to treat the critically degraded sub-watersheds within the entire catchment at the cost of the project, which will in turn overburden the project.</p> <ul style="list-style-type: none"> <li>• He also drew the attention of the Members that given the resources at their command <b>Govt. of Madhya Pradesh would not be able to treat the areas pari-passu with engineering works on the project or ahead of impoundment</b> and therefore the time frame for treating the Phase-II areas may also be resolved."</li> </ul> <p>Maintenance of treatment works: Party States have reported that the maintenance of catchment area treatment works in forest areas are being taken care of by respective Forest Departments and in non-forest areas, it is being done through private land owners or panchayats under different watershed programmes / rural development schemes.</p>	<p>Phase II pari passu decision with MOEF only refers to costing. Confusion of implementation timeframe and cost phasing.</p> <p><b>Note:</b>potential infringement of compliance</p>
33	A	A3 p3	<p><b>CAT plans – GOG</b></p> <p>Submission of CAT plans for freely draining critically degraded sub watersheds required as by GOI decision June 1992.</p> <p><b>GOG:</b> almost completed</p>	<p>While according approval to the diversion of forest land for Sardar Sarovar Project, Gol, MoEF under section 2 of the forest (Conservation) Act, 1980 had stipulated that a plan for the treatment of catchment area will be prepared by 31.3.1989 and implemented at the cost of the project.</p> <p>GoMP + GOM submitted microwatershed CAT plans for all Phase II critically degraded subwatersheds.</p> <p><b>Note:</b>There is no relevant GOI decision, this is re costs.</p>
	A	A3 p3		

33	A	A3 p3	<b>CAT plans – GOMP</b> <b>GOMP:</b> plan for balance by 2011 prepared and promised yearly micro-watershed plans. 30,881 ha of catchment to RVP submitted so far. 23,210.78 ha to be treated in current year (99), cost Rs 1062.67L. By end March 99, 9152 ha treated. 32 schemes submitted over area of 60,000ha. Of this 22 schemes over 36,373 ha on Sardar Sarovar Project. GOMP required to submit schemes for treatment of NFA/FA sub-watersheds spread to 475,617 ha (Phase I & II total). Plans prepared for treating <b>349,842 ha</b> of catchment in 139 sub watersheds of Phase II areas <b>by end 2011</b> . Micro-watershed plans promised yearly, so far 22 Sardar Sarovar Project schemes submitted. 30 schemes relating to Sardar Sarovar Project approved. 21,036 ha from these schemes treated by end March 2000. <b>Problem with sanction part of schemes, either because of delay in approval from concerned agency or in release of funds.</b> Ann Min(3). Regarding works on implementation of Phase II plan, no change on status. However some structural changes in pattern of funding by GOI to State of MP. Total area freely draining critically degraded sub-watershed Is 546,702 ha Catchment below NSP 352,089 ha Net treatable area 318,118 ha <b>changed from 349,842 ha</b> In EM October 2000 p 17: Catchment area below NSP 544,505 ha Less other projects 475,617 ha gross area critically degraded sub-wtd Phase I 125, 725 ha Phase II 349,892 ha Project authorities have prepared schedule for treating the 349,892 ha of catchment spread over 139 sub-watersheds by end of year 2011 ... indicating that GOMP would treat about 20,000-25,000 ha area per year. However annual micro-watershed plans are prepared by state govt and got approved by MOA under its RVP schemes according to budget availability.	Post-impoundment compliance statement.
33	M	M p4		
34	A	3 p3		
34	M	3 p5		GOMP compliance problem: Phase II CAT
35	M	p17		
36	A	Ann p21		
EM	2000	P17		<b>Note:</b> reduction in net treatable area: by 31,724 ha
EM	2000	P18		Budget availability
33	A	A3 p3	<b>CAT plans – GOM</b> <b>GOM:</b> Of 80,881 ha to be treated, micro-watershed plans in 1994 submitted for 77,568 ha net area (freely draining) inc 40,619 FA and 36,949 ha NFA. But for funding, as per Env't SG discussions, GOM revised plans as per NAEB/RVP guidelines. <b>13/35 schemes prepared got approval, = 22,706 ha FA +NFA.</b> By March 99, 3646/7050 ha FA treated + 7854/15656 NFA. <b>Of 22 remaining schemes submitted to GOI, 19 still awaiting approval and only 3 have been so far sanctioned.</b> GOM requested revision of cost norms to take up CAT works properly. Paucity of fund for Phase II works and may not be able to treat even by 2011. <i>Issue to be taken up with MoA and Rural Development.</i> 7050 ha of 13 approved schemes treated. Delays in receiving funds from central	
33	M	M p4		<b>Fund issue on Phase II CAT,</b> may not be able to treat even by 2011. <b>Note:</b> potential infringement of compliance
34	M	3 p6		

35	M	P18	funding agencies which delays works progress. Chairman stated that state funds can also be utilised to avoid such delays – Joint Secretary/ Commissioner dealing with sanction of scheme in MOA to regularly be invited to ESG meetings to facilitate review of bottlenecks.	
EM	2000	P18	For ninth five-year plan period, cost norms have been revised to RS 10,000 requiring revision of balance schemes. Micro-watershed plans for forestland in all 35 watersheds have been submitted, which covers 42,867 ha area. <b>[This contrasts with 40,619 ha for forest land in A33 above]</b>	
33	A	A4 p4	<b>CAT duration</b> As per last meeting: increasing CAT duration from present 3 to 5 years, NCA & NVDA approached MOA for consideration & joint commissioner MOA requested meeting convened on issue. (MOEF to pursue MOA & Cooperation)	<b>GOMP</b> had massive delays in progressing CAT phase I despite assurances
33	A	Ann 4	Letter to NVDA from MoEF saying was assured CAT works would be completed in 2 years in Sardar Sarovar Project. <b>For monitoring and ensuring pari-passu compliance request revised time schedule.</b>	GOMP state as of mid1999 that CAT works would be complete in 2 years, i.e. by 2001 <b>Note:</b> A1 p7 POINT BELOW
33	M	M1 p3	GOMP CAT Dir explained reason for some slippage and “ <b>assured</b> that works would be accelerated to complete them in four years time. He submitted a revised schedule for treatment of the balance works”. MOEF suggested while assessing CAT works targets, quality also be considered. Chairman suggested different items also be looked into during future visits.	GOMP state in Sept 1999 that Phase I would be complete in 4 years, i.e., by 2003.
33	A	A1 p7	<b>CAT progress (overall)</b> Dr Ramaseshan’s view endorsed by subgroup “that for directly draining areas to impounded reservoir the work of CAT should be completed in its vicinity before storage was completed”	[as per clearance. but EM Plan 2000 says only 7% of 27% is critically degraded, directly draining, to be done pari-passu].
43	M	P8	After some discussions, the Chairman reiterated that the compliance on qualitative assessment in all the States needed to be expedited as already discussed and suggested during the last meeting. He directed that updated report for forest as well as non-forest areas <b>should be submitted before 31 st March, 2007</b> & verification of the same through field visits should be continued.	
45	A	P16 PDF	Phase II: The balance sub-watersheds were to be treated under programme for implementation in a time frame to be determined separately by the project authorities in consultation with the Ministry of Environment & Forests. It was ruled by the Chairperson, Environment Sub-group of NCA & Secretary, MoEF that these areas <b>should be treated within 5 to 6 years time.</b>	<b>Note:</b> this is a violation of clearance which refers to pari-passu and pre-impoundment
46	M	Ann	Letter from NVDA to ESG, NCA: <ul style="list-style-type: none"> <li>In first Para it has been stated that "Remaining area of Phase-II in Maharashtra and Madhya Pradesh should be completed during next 5/6 years' time". It is requested that the issue of sharing of cost on CAT should be decided before setting up any time limit for CAT in Phase II area. It is, therefore, essential that phrase "Remaining area of Phase-II in</li> </ul>	<b>Phase II:</b> 5 to 6 years time from April 08 (so 2013-14)

			<p>Maharashtra and Madhya Pradesh should be completed during next 5/6 years' time" shall be deleted from this Para and it should read as follows:</p> <ul style="list-style-type: none"> <li>The Sub-Group reviewed the status as presented in the Agenda Notes. CAT works in Phase I area has almost been completed. Phase II area has been treated fully in Gujarat. The treatment of Ph II area in MP and Maharashtra is in progress.</li> <li>In first Para on page 7 it has been mentioned, "Additional Director. MoEF pointed out that in the same order, it was also mentioned that MOEF would decide as to how much of the phase II area will have to be treated pari passu." It is to be pointed out that in decision of Committee of Secretaries dated 08.07.1992, treatment of Phase II area pari-passu had not been mentioned and as such these lines should be deleted from the minutes. Accordingly first para on page 7 should read as follows</li> <li>"The Vice Chairman, NVDA referred to the decision of Committee of Secretaries dated 08.07.1992 which suggested that major irrigation projects are not to be loaded with CAT expenditure on freely draining areas."</li> </ul>	<p>NVDA/GOMP against 5 to 6 yr timeframe</p> <p><b>Note:</b> NVDA request removal of pari passu and Phase II reference.</p> <p>This refers to cost not timeframe.</p>
33	A	A1 p7	<p><b>CAT progress – Phase I – GOMP</b></p> <p><b>GOMP:</b> NVDA past performance suggests difficult to treat 15,000 ha/yr. NVDA VC <b>assured</b> subgroup that though available funds a constraint yet NVDA would make all efforts for adhering to the given targets for CAT and that CAT works would be completed <b>within 2 years in Sardar Sarovar Project</b> areas. By end August 99, 72504ha/ 125,725 ha completed.</p>	<p>Funding issue but GOMP assured completion by 2001 (2 years from 1999, meeting Sep 1999) in SSP areas.</p>
33	M	P4	<p>"Director (CAT) NVDA pointed out to the limited release of funds for the schemes under RVP. He desired that considering the increase in the wage rate, the unit cost of treatment is getting higher and higher with each passing day. He therefore requested the subgroup to emphasise the upward revision of the cost."</p>	
33	M	P8	<p>CAT Dir GOMP informed remaining CAT works have been rephrased and expected to be <b>complete within 4 years:</b></p> <p>99/00: 13,0000 00/01: 14,000 01/02: 14,000 02/03: balance</p>	
34	A	1 p6	<p>By end July 2000, 76,044 ha treated of 125,725 Phase I target.</p>	<p>[est. to be 8785 Phase I, from 49,785 balance at 99]</p>
34	M	1 p8	<p>As of September 2000, 82,380 ha treated of 125,725 ha target. Member (E&amp;F) NVDA <b>assured that the remaining areas will be treated in next two years.</b></p>	<p>Nov 2000, GOMP assure completion in next two years, i.e. 2002 (June 2002 according to 35A)</p>
35	A	I p4	<p><b>Tippexing over of statement of slow progress on areas (due to agitation of NBA) and replaced with reference to previous meeting of assurance to complete all the works in 2 years time i.e. by June 2002.</b></p>	
35	M	P4	<p>Prof Ramaseshan said need for MP to accelerate works, especially in areas of vicinity sub-watersheds. Director (IA) MOEF suggested all works in identified sub-watersheds of Phase I should be completed by March 2002. <b>Representative</b></p>	<p>GOMP complete CAT by June 2002 (should it be specific number of months <u>prior</u> to submergence?) No efficacy assessment scheduled.</p>

36	A	I p5	<b>of GOMP assured that all balance works for CAT would be completed by June 2002.</b>	
36	M	A p6	By end <u>March 2001</u> , <b>82,770 ha</b> treated of 125,725 ha target. <i>Action plan for completion required.</i>	
36	M	Table p10	NVDA Vice Chairman informed: By end <u>March 2001</u> , area of <b>90,565</b> ha against final target of 125,725 ha was treated up and that the entire area commensurate with EL 100m impoundment has been treated up. Proposed to treat 17,580 ha during 2001-2 and 2002-3 respectively for completion of CAT works. Plan at Annex 4 p7.	
37	A	P4	72% complete. <b>Remaining work to be complete by March 2003.</b>	Assurance to complete by March 2003
37	A	P12	As of November 2001, 90,799 ha treated of 125,725 ha target.	
37	A	Ann p93	<b>Correction:</b> during last meeting informed that 90,565 ha treated of 125,725 ha target, should be <b>87,213</b> ha (letter 06.06.01).	<i>Need for reconciliation of extent treated up for Sardar Sarovar Project as well as ISP.</i>
37	M	B p4	In <b>Sept 2001 EM status report, GOMP CAT figures completely changed from EM 2000 and NFA and FA breakdowns given, but totals not much changed:</b>	Ignore, as no meaningful differences. Main issue is to ensure that these works have proceeded on the ground rather than just on paper.
37	M	Bp5	<ul style="list-style-type: none"> <li>Up to 2000/01: 87, 213 ha of 125,725 ha target, 69.37%</li> <li>Up to 2001/02: 90,368 ha of 125,725 ha target, 71.88% [this is only part of the financial year]</li> </ul>	
37	M	B p8	Dam height raising, Shekhar Singh comments: status of incomplete works in sub-watersheds <i>requested</i> .	
38	A	P8	CAT Director NVDA: 94,400 ha treated of 125,725 ha target (about 75% of final). Progress Chart Annex 2, p13. <b>Works under progress but due to difficulty in taking up private agricultural areas for treatment, some areas in these watersheds could not be treated.</b> Also actual treatable area would be less and would be possible for NVDA to treat entire area in time.	Actual treatable area lower , and to “difficulty in taking up private agricultural areas for treatment”
38	A	1 p10	<b>Should complete treatment of remaining degraded watershed Phase I of CAT by 2003 and also undertake treatment of areas in reservoir vicinity on priority.</b>	
38	A	Ann p78	Planned to complete entire Phase I by June 2003.	
39	A	B p3	By end Nov 2002: 100,818 ha of 125,725 ha target, 80.19%	
39	A	C p9	By end Sep 2002: 100,268 ha of 125,725 ha target	
39	M	B p3	(End Dec 2003 minutes). Phase I, 35 watersheds at 110.64 m, target 91,668 ha, achievement 90,864 ha. Almost complied. At FRL, 42 watersheds, target 125,725 ha, achievement 109,345 ha. Assessment through remote sensing: <b>not initiated.</b>	<b>Target</b> quoted as 91,668 ha cf 125,725 ha (72.9%)
39	M	B p3	By end Sep 2003: 100,268 ha of 125,725 ha target, 64,745 ha NFA and 44,600 ha FA. Total 109,345.	GOMP has still not initiated remote sensing verification for FA. Note: since remote sensing is a relatively crude, low resolution method, need to check data comparing like by like season + other confounding factors
39	M	B p3	GOMP: entire catchment area commensurate with dam height of 110.64m RL was	

39	M	B p3	already treated and that the remaining area was not treated on account of being rocky, water logged, etc. Chairman: <i>reasons for areas considered unsuitable should be explained and sample photographs of such areas should also be presented at next ESG meeting. Willing members could be invited by NVDA for visiting such areas.</i>	<b>Require:</b> detailed information on locations of these unsuitable sites (coordinates), reasons, detailed photos to allow for visits to check such sites
40	A	Bp2	NVDA VC: Forest Survey of India [satellite imagery] data indicated increased green cover for MP. <i>Chairman requested report be presented before next meeting.</i>	
40	A	B p3	In table: achievement of 110,712 ha of 125,725 ha target. Status of compliance: 88.05%, complied. From 39M, balance areas requiring treatment are in fact not treatable on account of being rocky or non-availability of areas due to various reasons. Photos to be presented showing non-treatable areas.	
40	A	P17	[GOM & MP progress in TABLE MAY BE WRONG WAY ROUND]: Assessment through remote sensing: <b>not initiated</b>	[TABLE MAY BE WRONG WAY ROUND]:
40	M	P4	Decision of 39M: entire Phase 1 to be completed by <b>end Dec 2004</b> . Status: 110,712 ha of 125,725 ha target. 88% completed.	Entire Phase I CAT promised by June 2003 yet now Dec 2004
40	M	P5	Following 39M discussions Action Taken Report ATR submitted. Status: 110,997 ha of 125,725 ha target (44,600 ha of 51,930 ha FA and 66,397 ha of 73,795 ha NFA). <b>Commensurate with FRL. Remaining area was not treatable on account of being rocky, waterlogged etc</b> and photos were made available.	<b>Check:</b> that <b>15,000 ha is not treatable</b> due to being rocky, waterlogged etc. Why not mentioned before 39M (Dec 2003, after assured completion)? 15,013 ha cf 110,712 ha
41	A	A p2	NVDA Vice Chairman: considering that CAT works have been completed and data on district wise increase in forest cover is available from FSI, detailed assessment on efficacy of CAT works in priority sub-watersheds <b>might not be necessary</b> .	<b>FSI</b> data reported as outdated in 42M
41	A	A p3	Status: 110,712 ha of 125,725 ha target	
41	A	P32	Assessment through remote sensing: <b>not initiated</b>	
41	M	A p4	GOMP taking steps for [phase I efficacy silt monitoring] entrusting studies to CSR&TI [CSWCR&TI]. <b>Progress</b> to be reported.	
41	M	Ann 3	NVDA VC: FSI already carrying out periodic assessment of forest cover for entire country including that of MO. Similarly Central Water Commission [CSWCR&TI] also monitoring silt load in river and this should suffice. Prof Ramaseshan: areas treated required dedicated focused monitoring as per decisions of ESG 40 <sup>th</sup> M. Data received from CWC needs to be analysed with respect to CAT locations. The Chairman summing up the discussions stated that compliance on qualitative assessment in all the States needed to be expedited and directed that, the assessment of the forest cover for the areas treated should be analysed with the help of satellite imageries and the report on assessment for both forest and non forest areas should be placed before the Sub-Group by the party States.	
41	M	Ann 3	ATR information table: ref 4/12/04. CAT quality: (remark: subject to verification) • FA: not justified	<b>Obtain:</b> ATR reports



-	EM	04/05	<ul style="list-style-type: none"> <li>NFA: negotiations with Central Soil Water Conservation and Research and Training Centre, Datia [CSWCR&amp;TI] <b>making progress</b></li> </ul> <p>EM Status report Nov 04/Feb 05 – Targets: FA 51930, NFA 73795, total 125725 Totals so far: FA 40208 + xx NFA. 3352 FA + 889 NFA (4241 ha) by other agency etc. Total overall 109760 ha.</p>	
42	A	p18 B p5	<p>Assessment in FA through remote sensing <b>not initiated</b> (p18). To assess the success or failure of the CAT measures implemented at the cost of huge investments and for ensuring that structures were maintained and remained functional, monitoring through establishment of silt studies stations/remote sensing was directed by the Sub-group earlier. In MP:</p> <ul style="list-style-type: none"> <li>FA: no work proposed</li> <li>NFA: progress awaited</li> </ul>	
42	M	B p3	<p>The assessment of the efficacy/ qualitative assessment of the treatment works in Maharashtra and Gujarat was <b>in progress</b> while GOMP <b>did not take up this work</b> on the plea that since these works related to Sardar Sarovar and Indira Sagar projects are already being carried out by Central Water Commission and Forests Survey of India, no useful purpose will be served by taking up this exercise.</p>	
42	M	B p4	<p>Chairman: definitely a need for assessment of efficacy of CAT works. Data generally available with FSI may be quite old and whatever has been done during the last five years shall not be reflected in the imageries. Regular assessment of the areas treated is required and suitable agencies have to be engaged for this work. Qualitative assessment of CAT works and that of forest cover of areas treated has to be analysed. Reliance however could be placed on aerial photographs if available for recent period otherwise no way out but to identify the agencies and get the same.</p>	
-	Letter to NCA/SS	GOMP 4/1/5	<p>Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and GOG. GOMP letter dated 04/01/05.</p> <ul style="list-style-type: none"> <li>Details of CAT works in forest areas of Sardar Sarovar Project, giving forest compartment/ village level details and survival percentage of plants (as per monitoring reports) enclosed as Annexure 4.</li> <li>List of villages in sub watersheds of Sardar Sarovar Project enclosed as Annexure 5. Physical verification of CAT works in NFA of Sardar Sarovar Project has been carried out and its <b>reports are available in headquarter/ division level offices</b></li> </ul>	<p>Not adequate for FA, ignores ESG requests for update of remote sensing</p> <p><b>Obtain:</b> reports of physical verification of CAT works in NFA areas that are described in GOMP letter of 4/1/5 as being in headquarter/ division level offices.</p>
-	Letter to NCA/SS	From SSNNL dated 27/12/4	<p>Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and SSNNL. SSNNL letter dated 27/12/04.</p> <ul style="list-style-type: none"> <li>From enclosure: target 125,725; work done 87,213 (36986 FA and 50227 NFA); balance 38,512 (14944 FA and 23568 NFA) [seems to be status as</li> </ul>	

43	A	P13	of 2002] Use of aerial photography / remote sensing for assessment of the success rate of CAT works in forest areas: Forest cover assessment <b>awaited</b> .	Still no progress on forest cover efficacy assessment. Therefore incomplete and not fully complied.
43	M	P8	Member (E&F), NVDA stated that NVDA is taking steps for the purpose and progress shall be reported soon.	
44	M	P14 PDF	CAT (physical) – subject to availability of resources, to revisit the areas for maintenance & casualty management – plan for maintenance of works to be carried out on Govt land <b>awaited</b> .	
46	A	P5 pdf	Quoted Ph I, 100% complete: 110,997 ha.	
46	M	P6 P7	Forest cover assessment: Conservator of Forests to revisit the areas. The NVDA have entrusted studies on assessment of efficacy of the Catchment Area Treatment to Forest Survey of India, Dehradun. Studies are <b>likely to commence soon</b> .	
34	A	3 p3	<b>CAT progress – Phase II – GOMP</b> <b>GOMP:</b> GOMP required to submit schemes for treatment of NFA/FA sub-watersheds spread to 475,617 ha (Phase I & II total) = 349,892ha Phase II By end March 1999, of 22 schemes approved (over 36,373 ha), about 9,973 ha treated.	2.9% progress of total
34	M	3 p5	NCA pointed out schedule of Phase II treatment suggested about <b>95,750 ha land to be treated up by 2000 whereas progress only 9,973 ha</b> . NVDA stated 50 schemes covering 91,518 ha submitted of which 43 schemes covering 87,884 ha approved, 30/43 of which relate to Sardar Sarovar Project. 21,036 ha from these schemes treated by end March 2000. <b>Problem with sanction part of schemes, either because of delay in approval from concerned agency or in release of funds. Ann Min (3).</b>	10.4% progress of suggested target for year 2000  Slow Phase II progress
37	A	Ann p38	Of 349,892 ha target of Phase II by 2011, 30 Sardar Sarovar Project schemes approved, covering area of 59,566 ha of which 21,036 ha has been treated.	6.0% progress of total
37	M	Ann p28	Present rate of funding is insufficient to treat area in time frame envisaged i.e. by 2011. Direct funding of RVP seems only solution. <b>ESG is requested to take up this issue at their level.</b>	<b>Phase II:</b> by 20011 not possible states GOMP
37	M	B p4	Dam height raising, Shekhar Singh comments: revised Phase II schedule in MP <i>sought</i> .	
40	A	P30	Of 319,118 ha area for Phase II plan, achievement is 35,312 ha.	10.1% progress against original target, 11.1% new
-	EM	04/05	EM Status report Nov 04/Feb 05, p19: of the 35,312 ha, FA progress is 7,473 ha and NFA is 27,839 ha.	Where is other 31,774ha? <b>Target changed</b> , referred to as net treatable area in 38A Annex EM status report.
		p20	Progress is dependent on availability of manpower and resources available at disposal of state govt concern. The time schedule for <b>completion of work is therefore uncertain</b> .	GOMP unable to progress Phase II CAT. <b>Require:</b> detailed justification for 31,774ha being untreatable.
42	A	B p5	The gross area for which plans are required to be submitted for Phase II programme is 318,118 ha. However GOMP has <b>expressed inability</b> in treating these areas commensurate with progressive filling of the reservoir due to lack of resources, the progress reported was 35,312 ha.	<b>Note:</b> potential infringement of clearance condition since non-completion pre-impoundment

2006 43 43	EM A M	P17 P13 P22	<p><b>Plans prepared for treating 349,892 ha Phase II area by end 2011.</b></p> <p>As 42A <b>Inability to treat.</b></p> <p>Director (Env), NCA stated that this issue was discussed by the Sub Group in earlier meetings, wherein it was directed that State Govt would complete the treatment works at the earliest and the resources for the same would be obtained from River Valley Projects scheme, National Afforestation &amp; Eco Development Board/Jawahar Rozgar Yojana or similar schemes of Central or State Government. Progress in this regard and the efforts made in this direction are awaited from Govt of M.P and Maharashtra.</p> <p>... Member (E&amp;F), NVDA informed that progress on treatment of Phase II area was very slow mainly because of lack of resources and sought the help of Sub Group in this regard. [SEE PREVIOUS PARA]</p> <p>Unlikely to be completed due to lack of funds and manpower.</p> <p>50,306ha (15.8%) completed.</p>	
45 46	A A	P16 P5 pdf		This refers to 319,118ha target and not original 349,892 ha target of Phase II (14.4% of original). Poss dicussed between 37M and 40M.
33 33 34 34 35 35 36 37 37	A M A M A A A A M	A1 p7 Ann 7 1 p6 1 p8 I p 4 P102 Ann p19 Ann p205 P7	<p><b>CAT progress – Phase I – GOM</b></p> <p><b>GOM:</b> 23,295 ha/ 24,298 ha treated and according to micro-watershed plan, 1003 ha remains. <i>Current status of works and maintenance progress requested, for agricultural (as well as forest) areas.</i></p> <p>Phase 1 work. All work completed, divisions created wound up, maintenance work entrusted to regular CAT divisions in Mah.</p> <p>23,295 ha/ 24,298 ha treated</p> <p>All works completed in Mah and divisions created have been wound up. Further maintenance works entrusted to regular CAT divisions. Prof S Ramaseshan stated that a <b>permanent record of works completed</b> under various Sardar Sarovar Project programmes must be kept and should be retrievable on request.</p> <p>Actual area available for treatment was 23,295 ha treated against planned target of 24,298 ha. Therefore treatment work may be considered completed.</p> <p>Re impoundment to 100m (110m?), 23,294 ha area affected and same as amount done by 2000</p> <p>Now 1003 ha area asterisked and described as area not available for treatment</p> <p>Letter to GOM Secretary Env from Dr Pawan Kumar Specialist Env: report on phase 1 completed required, sub-watershed-wise on map. <b>Scheme for Phase II non-forestland not been provided.</b> Sub watershed wise details not supplied after May 1999, required on map.</p> <p>Report on <i>Monitoring the Impacts of Catchment Area Treatment using Remote Sensing &amp; GIS in Parts of Narmada Catchment Area</i> in Maharashtra prepared by officials of Forest Survey of India, Nagpur, RRSSC, Nagpur. Annex 7. Showed dense forest increase:</p> <ul style="list-style-type: none"> <li>574 ha 1991</li> </ul>	<p><b>Require:</b> record of works</p> <p>[Impoundment <b>diagram difficult to interpret</b>]. What about backwater levels?</p> <p>NFA Phase II received?</p> <p><b>Check:</b> time of year that such measurements made, to ensure similar seasons compared.</p> <p><b>Note:</b> this report requires independent review since it is irrelevant methodology description heavy and very light on sampling methodology, detailed results, and</p>

			<ul style="list-style-type: none"> <li>• 1,079 ha 1995</li> <li>• 2,044 ha 1998</li> </ul> <p>Forest blanks decreased:</p> <ul style="list-style-type: none"> <li>• 6,713 ha 1991</li> <li>• 5,099 ha 1995</li> <li>• 4,354 ha 1998</li> </ul>	critique of methodology. This report cannot be considered reliable until underlying data, maps and photos are reviewed.
38	M	P13	Re question on status of felling on submergence area commensurate with 100 m RL, Addl Chief Engineer, irrigation dept, informed that funds were received from the GOM but the <b>work was yet to commence</b> .	
39	A	B p3	Phase I, 17 watersheds. Complied. Assessment through remote sensing: <b>complied</b>	<b>Note:</b> this is in constrast to remote sensing studies being requested in the next meetings.
39	M	B p4	ESG could not review progress in Mah due to the absence of representatives from Mah. After some discussions, it was agreed that the Chairman would appraise the Chief Secretary GOM on the deficiencies in the compliances and lack of participation of the GOM officials during the meeting.	
40	A	B p2	In Table: achieved 23,295 ha of target 24,298 ha. Status of compliance: 95.87%, complied. From 39M, balance areas requiring treatment are in fact not treatable on account of being rocky or non-availability of areas due to various reasons. <b>Photos to be presented showing non-treatable areas.</b>	<b>Require:</b> need evidence of areas described as not treatable, along with coordinat, etc to verify the statement.
40	A	B p3	Assessment through remote sensing: FSI being requested.	
40	M	P5	Project specific sub-watershed wise assessment of plantation works was carried out by Nagpur branch of FSI and results presented to ESG <b>earlier</b> [37M]. <b>Periodic assessment was being</b> carried out.	
41	A	A p3	<i>Assessment through remote sensing:</i> Forest areas: FSI Nagpur was carrying out the works	[GOM & MP progress in TABLE MAY BE WRONG WAY ROUND]:
41	A	P32	Report <b>awaited</b> on periodical updating of focussed studies carried out for sub-watersheds already treated, through FSI.	
41	M	A p4	FSI Nagpur assessing CAT efficacy in forest areas. For agricultural areas, Central Soil Research & Training Institute has been asked to conduct such studies.	
41	M	Ann 3	ATR information table, ref dated 22/11/04: FA – quality report within 4 to 5 months (remark: subject to verification) NFA – quality assessment by Water Conservation Research and Training Institute CSWCR&TI, Vasad cost Rs. 1.5 lakhs study to commence by monsoon 2005 (remark: subject to verification).	<b>Obtain:</b> reports of GOM assessment of FA and NFA CAT works efficacy, latest updated reports required
-	EM	04/05	EM Status report Nov 04/Feb 05 – summary of forest density increase findings over period 1993 to 1998. <b>Updating</b> in progress.	
42	A	B p5	To assess the success or failure of the CAT measures implemented at the cost of huge investments and for ensuring that structures were maintained and remained functional, monitoring through establishment of silt studies stations/remote	

42	M	B p4	<p>sensing was directed by the Sub-group earlier. In Maharashtra:</p> <ul style="list-style-type: none"> <li>FA: progress awaited</li> <li>NFA: progress awaited</li> </ul> <p>FSI Nagpur carrying out sub-watershed wise assessment of efficacy of CAT in FA. For agricultural areas, CSWCR&amp;TI asked to carry out studies. <b>Initial estimate of Rs 3 lakhs revised to Rs 16 lakhs.</b> Prof Ramaseshan: areas where CAT works could not be taken up due to litigation possibly should be explored for treating these areas if become available in near future.</p>	<p>NFA was Rs 1.5 lakhs, then 3 lakhs then 16 lakhs. <b>Ask for:</b> justification for increase in costs over course of 1 meeting (41+42) GOM: FA not updated, NFA not assessed (cost?)</p> <p><b>In 41M quoted as 1.5 lakh cost – needs checking</b></p>
-	Letter to NCA/SSA	From SSNNL dated 27/12/4 P13	<p>Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and SSNNL. SSNNL letter dated 27/12/04.</p> <ul style="list-style-type: none"> <li>Enclosure on CAT status. 1003 balance broken down into 839 FA and 164 NFA</li> </ul> <p>Use of aerial photography / remote sensing for assessment of the success rate of CAT works in forest areas: Forest cover assessment – updating under progress.</p>	
43	M	P7	<p>Representative of the GOM informed that Forest Survey of India, Nagpur Centre was carrying out sub watershed wise assessment of efficacy of the catchment treatment works in the forest areas. He assured to expedite updating of the report at the earliest.</p>	
45	A	P16 of PDF	<p>Report received <b>revealed decrease in forest cover.</b></p>	<p><b>Mah forest cover decreased.</b></p>
46	A	P5 pdf	<p>Quoting Phase I 100% complete at 22,395 ha</p>	<p><b>Conflict with</b> achieved 23,295 ha of target 24,298 ha. Status of compliance: 95.87% (40A)</p>
46	A	P6	<p>Forest cover assessment is being updated by FSI, Nagpur</p>	<p>Incomplete.</p>
33	A	A3 p3	<p><b>CAT progress – Phase II – GOM</b> <b>GOM:</b> Of 80,881 ha to be treated, micro-watershed plans in 1994 submitted for 77,568 ha net area (freely draining) inc 40,619 FA and 36,949 ha NFA. But for funding, as per Env't SG discussions, GOM revised plans as per NAEB/RVP guidelines. <b>13/35 schemes prepared got approval, = 22,706 ha FA +NFA.</b> By March 99, 3646/7050 ha FA treated + 7854/15656 NFA.</p>	<p>No progress after 1999? Until A40, when another 5,000ha treated</p>
35	M	P17	<p><b>GOM:</b> 80,881 total area of watersheds [3313 ha unworkable area leaves 77,568], 40,619 FA and 36,949 agricultural. Schemes for 13 sub-watersheds approved, of 31,219 ha available, about 22,706 ha available for treatment of which 13,843 ha treated by end December 2000.</p>	<p>FA 7,050/40,619ha = 17.4%; NFA 15,656/36,949ha = 42.4%</p>
36	A	Ann p22	<p>Of 42,867 ha area forestland [perhaps should be 40,619], 7050 ha progress. For non-forestland, schemes not available with NCA but progress is 7854 ha reported on 13 micro-watershed schemes covering area of 15,656 ha.</p>	
37	A	Ann p205	<p>Letter to GOM Secretary Env from Dr Pawan Kumar Specialist Env: report on phase 1 completed required, sub-watershed-wise on map. Scheme for Phase II non-forestland not been provided. Sub watershed wise details not supplied after</p>	

38	A	Ann p80	May 1999, required on map. Of 42,867 ha area forestland, 7,050 ha progress. Of NFA, schemes not available with NCA but progress is 7854 ha reported on 13 micro-watershed schemes covering area of 15,656 ha.	<p><b>Request:</b> current status of CAT works and funding availability for such works, in terms of FA/NFA. 26.9% progress against planned amount of 77,568 ha, note 80,881 ha to be treated, according to 33A.</p>
40	A	P30	Of 77,568 ha area for Phase II plan, achievement is 20,861 ha.	
43	A	B p5	GOM reported progress in 20,861 ha against a target of 77,568 ha.	
	M	P22	Director (Env), NCA stated that this issue was discussed by the Sub Group in earlier meetings, wherein it was directed that State Govt would complete the treatment works at the earliest and the resources for the same would be obtained from River Valley Projects scheme, National Afforestation & Eco Development Board/Jawahar Rozgar Yojana or similar schemes of Central or State Government. Progress in this regard and the efforts made in this direction are awaited from Govt of M.P and Maharashtra. Representative of Govt of Maharashtra informed that there are 66 sub water sheds in Phase II of which work has been completed in 18 watersheds and another 8 sub watersheds the work was under progress. It is proposed to take up works in 9 sub watersheds next year at an estimated cost of Rs. 5.5 crores. However, release of funds for completion of work in 8 sub water sheds is awaited. Further progress would be reported in due course.	
44	A	P9	The gross area for which plans are required to be submitted for Phase-II programme is 77,568 ha, the progress reported was <b>14,904 ha</b> . Forest Area: An area of 7,218.96 ha of forest area was treated during the last 10 years. Non Forest Area: Agricultural areas in 5 sub-watersheds were treated at an estimated cost of Rs.9.86 crores and for treating the balance area RS.5.02 crores are required for the agricultural department of which RS.3.26 crores during 2005-06 and Rs.1.76 crores during 2006-07.	<p><b>Note:</b> seems to be less than the progress of 15,656 ha and 20,861 ha reported in 38A and 40A.</p>
45	A	P16 pdf	Target (treatable areas): <b>54,707 ha</b> , achievement: 29,403 ha. <b>Possibly can be completed in 5-6 years time.</b>	<p><b>Note: target changed.</b> Where does this target of 54,707ha come from? But this is actually 37% of the 77,568 ha amount <b>Note:</b> incomplete, no compliance pre-impoundment</p>
46	A	P5 pdf	Quoted as 53% compliance at 29,043 ha	
33	A	A1 p7	<b>CAT progress – GOG</b> <b>GOG:</b> End Sep 94 completed plantation in entire planned area of 13,950 ha inc NFA and DFA.	<p><b>Obtain:</b> high resolution, digital maps of submergence areas Diagram difficult to interpret.</p> <p><b>Obtain:</b> Space Research Centre, Ahmedabad data analysed for 2002 on efficacy of CAT works in Gujarat</p>
35	A	P102	Re impoundment to 100m (110m?), 28,995 ha area affected and same as amount done by 2000	
39	A	B p3	Phase I, 15 watersheds. Complied. Assessment through remote sensing: <b>final report awaited.</b>	
40	A	A p30	[GOG]:In terms of Phase I silt monitoring station establishment for Phase CAT efficacy assessment, studies carried out by Space Research Centre, Ahmedabad through satellite imagery for period 1985-6/1994 showed considerable improvements in conditions of catchment. Data for 2002 was analysed and made	

40	A	P30	available by SSNNL.	
40	M	P4	Of 657 ha area for Phase II plan, achievement: completed. Project specific assessment of plantation raised under CAT extending over 27,000 ha area, through satellite imageries was carried out earlier and is also being <b>re-assessed periodically</b> . Results were encouraging.	
41	A	A p3	<i>Assessment through remote sensing</i> : complied.	
41	M	A p3	SSNNL MD: GOG had already submitted detailed reports on progress of qualitative assessment of physical works for forest areas during 1998 and thereafter during 2001. For the non-forest areas, work as per suggestion of ESG entrusted to Valsad centre of Central Soil Research and Training Institute, Dehradun. One interim report submitted.	
41	M	Ann 3	ATR information table: Reports on progress of qualitative assessment of completed CAT works. SSNNL/Env/ESG-41/888-89 dated 9 November 2004.	
42	A	B p5	To assess the success or failure of the CAT measures implemented at the cost of huge investments and for ensuring that structures were maintained and remained functional, monitoring through establishment of silt studies stations/remote sensing was directed by the Sub-group earlier. In Gujarat:	
42	M	B p3	<ul style="list-style-type: none"> <li>FA: progress awaited</li> <li>NFA: progress awaited</li> </ul> GOG: have already submitted report on qualitative assessment of physical works for forest area during 1998 and thereafter during 2001. Further updating was in progress. For the non-forest areas, work as per suggestion of ESG entrusted to Valsad centre of Central Soil Research and Training Institute, Dehradun who submitted an interim report in 2004-5. Copy of report submitted during meeting in <b>Annex 2</b> . Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and SSNNL. SSNNL letter dated 27/12/04. <ul style="list-style-type: none"> <li>Details of CAF and CAT done in the three States, giving village level details and monitoring reports where available – Details of progress and monitoring of CAF and CAT are being provided from time to time since inception of ESG and subsequent meetings taken place so far. Copy of detailed progress and monitoring report on CAF and CAT which had already been submitted to NCA earlier enclosed within.</li> </ul>	<b>Obtain:</b> latest FA and NFA CAT works efficacy (remote sensing) reports and ATRs. For NFA only interim report provided. For FA, need 2002 and beyond reports.
-	Letter to NCA/SS	SSNNL letter 27/12/4		
43	A	Survey	Visits were undertaken to the areas in Gujarat during <b>June and November, 2005</b> . Copies of the reports along with recommendations were circulated to the members & invitees separately vide letter no Env4 (43)/2450-2485 dated 15/09/06 Key recommendations [summarised] below <ul style="list-style-type: none"> <li>Efficacy of CAT works – Study to continue at least for a three years period</li> </ul>	
43	A	Ann 3	Prof Ramaseshan comments on draft report of site visit: "..... <b>the committee further strongly recommended that additional check dams/ nulla bunds</b>	<b>Note:</b> heavy erosion reported, cause to be identified before solutions proposed.

			<p><b>should be taken up in such sub-watersheds on a priority."</b> The cause of heavy erosion has to be identified before solutions are suggested. Hence no such action is desirable as it will adversely affect the consistency of data collected in the sub watershed. This line be deleted.</p> <p>Prof Katti comments inc:</p> <ul style="list-style-type: none"> <li>Assessment of efficacy of CAT by well programmed field experiments, lab experiments, and in depth analysis to predict the erosion of various geomorphic features and forecast cover, nature of siltation and the corresponding period</li> <li>Assessment of efficacy of CAT: Unless the experiments are designed taking into consideration all parameters affecting the erosion and siltation the exercise may lead to erroneous conclusions. To assess correctly the time needed for different degree of siltation of the reservoir there is need to conduct in depth analysis taking in to account various variables. It is advisable to provide adequate funds to obtain authentic prediction.</li> </ul> <p><b>Proper stations need to be established to conduct such studies.</b></p>	
43	A	P13	Use of aerial photography / remote sensing for assessment of the success rate of CAT works in forest areas: Forest cover assessment – updating under progress.	
43	M	P7	M.D. SSNNL informed that the updating of assessment work on Non-forest areas was under progress through field stations established by the Central Soil Research & Training Institute, Dehradun, specially for the purpose. Interim report, received recently, shall be sent to the Narmada Control Authority for circulation to the members. Regarding forest areas, he assured that the work on updating and reassessment shall be entrusted to the identified institute (GEER Foundation) for carrying out periodic assessment on a regular basis & the <b>progress shall be reported soon.</b>	<b>Note:</b> silt monitoring stations not established. How reliable is remote sensing in this regard, need independent expert review.
44	M	P5	As regards efficacy of NFA CAT works, CMD, SSNNL stated that CSWCR & TI has been carrying out the studies. The report of 2006 is awaited from the Institute. He further informed that work on assessment of Catchment Area Treatment Works has been entrusted to GEER Foundation. However, the report was awaited.	
46	A	P5 pdf P6 pdf	Quoted Ph I as 29,157 ha (100% completed) and Ph II as 500ha (100% complete). Forest cover assessment is being done through GEER Foundation.	
39	M	B p4	<b>Silt monitoring (general)</b> Dr Shekhar Singh: the ESG was not having any access to the official reports on silt monitoring exercise in either of the States of Gujarat, Mah or MP and that silt monitoring stations of CWC might not be in the areas treated by the project authorities and therefore might not serve any useful purpose. Chairman: CWC could be relied upon on analysis of silt load in river system <b>however point raised will be examined after receipt of the report.</b>	<b>Request:</b> maps of CAT/silt works and silt monitoring station locations, digitally, high resolution to check. Or just latitudes and longitudes of stations. To check in CAT works/ project affected areas.
43	A	Ann 3	Site visit draft report comments by Ramaseshan: Results .... trend. <b>Not true.</b> Preliminary results for 2004, say for Kokam I & Kokam II watersheds (Tables 8&9) indicates a highly variable nature of data	Was report received?  <b>Require:</b> eventwise analysis report



			collected and need for lot more of careful observations. Event wise analysis rather than daily analysis, dependence on antecedent conditions and sediment routing models may lead to a better understanding of the process.	
33	A	A5 p4	<b>Silt monitoring (reservoir sedimentation) – GOG</b> <b>GOG: CCF, SSPA in consultation with Dir GERI preparing plan for evaluation and monitoring of sedimentation in reservoir. Progress requested.</b>	<b>Note:</b> inability to evaluate and monitor reservoir sedimentation in whole area by either CSWCR&TI or GERI.
33	M	P5	“The CCF, SSPA informed that Central Soil & Water Research Station (CSWCR&TI ) have expressed the inability to take up their entire area. Gujarat Engineering Research Institute (GERI) was also approached. GERI have also expressed their inability to take up the study. Therefore the work was proposed to be taken up with the help of Chief Engineer (Design) and forest field staff.”	
34	M	4 p6	SSNNL has entrusted work to Central Soil & Water Conservation Research and Training Institute, Vasad & the Chief Engineer (Design) will co-ordinate the work. A37: status request. A38: status request. <b>Final report awaited.</b>	
39 40	A M	B p3 P5	GOG had entrusted work to Central Soil Research and Training Institute (CSWCR&TI), Silaqui, Dehradun who have presented <b>interim report. Final report is still awaited.</b>	
40	M	P5	GOG: 6 silt-monitoring stations have been installed and their observations are recorded regularly. Observers have been trained at CSWCR&TI for this purpose. Prof BG Verghese: if general trends on silt reduction available for Narmada river as a whole, <b>sub-watershed wise assessment of the works might not be needed.</b> Prof Ramaseshan: mechanism of monitoring essentially required to assess success or failure of CAT measures at cost of huge investments. Monitoring mechanism should be put in place to ensure structures are maintained and remain functional. Should be continuous process. Chairman: dedicated focussed monitoring of CAT works is continuous process and arrangements should be continued.	
41	M	A p4	4 silt-monitoring stations have been established and data collection has already been started and an interim report has been submitted by the agency. <b>Assured</b> by GOG that a <b>comprehensive report</b> would be submitted by <b>end January 2005.</b>	
42 42	A M	A p28 Annex 2	Report on silt monitoring works by CSR&TI <b>awaited.</b> Rainfall, run off and sediment yield measurement in the catchment area of Sardar Sarovar Project lying within Gujarat. Interim Report. 2004-05. Sponsored by SSNNL, Gandhinagar. Central Soil & Water Conservation Research and Training Institute, Vasad. MOU signed September 2002. Study initiated rainy season 2004 after construction of weirs, observer’s room/ shelter and posting of observers at six gauging sites by the forest department SSNNL authorities. 6 representative micro-watersheds on both riverbanks abs over three forest divisions identified for sample studies.	
43	A	P13	Establishment of silt monitoring for assessment of the success rate of CAT works	

43	M	P7	in non forest areas – <b>further report awaited.</b> M.D. SSNNL informed that the updating of assessment work on Non-forest areas was under progress through field stations established by the Central Soil Research & Training Institute, Dehradun, specially for the purpose. <b>Interim report</b> , received recently, shall be sent to the Narmada Control Authority for circulation to the members.	<b>Note:</b> updating of instruments and revisits required
43	M	P21	MD, SSNNL informed that committee of the Environment Sub Group which visited the Silt Monitoring stations in Gujarat made two types of recommendations related to firstly, with the updating of instruments and technique adopted by the institute in taking measurements, and secondly, with observations related to measures to be undertaken for revisiting the areas for treatment. He stated that recommendations related to first issue has been sent to their headquarter and steps are being taken to implement other recommendations also. He, further, stated that report for the second year has been sent to the Narmada Control Authority recently and report for the year 06-07 shall be sent after its receipt. Regarding assessment of Canopy cover in the catchment, he assured the Sub Group that regular arrangements would be made for submission of timely report and the results of the recent updating would also be sent to the Narmada Control Authority soon.	
45	A	P16 pdf	<b>Report awaited.</b>	
33	A	A5 p4	<b>Silt monitoring (reservoir sedimentation) – GOMP</b> <b>GOMP:</b> 1 silt monitoring station sanctioned but import equipment not available. NVDA were liaising with manufacturers. <i>Progress requested.</i>	<b>Request:</b> locations of silt monitoring stations (latitudes and longitudes) <b>Check:</b> if in CAT works/ project affected areas  Expect at least 10 stations in SSP project affected areas
33	M	P5	Equipment not yet procured, import instruments not available. Suggested Indian supplier might be sought.	
35	M	P17	Bhopal office of CWC approached and their response was <i>awaited</i> . <i>A37: status request.</i>	
37	M	Ann p27	Water and Land Management Institute (WALMI), Bhopal agreed to take up task. Proposal being drawn up and expected shortly.	
39	A	B p3	<b>Agency yet to be finalised.</b>	
39	M	B p3	NVDA VC: silt load data of 14 gauging stations already with CWC who have been asked to analyse the data. <i>Present analysis results at next meeting.</i>	
40	M	P5	GOMP was also requested by ESG to establish sample stations with help of Central Soil & Water Conservation Research and Training Institute (CSWCR&TI) and GOMP <b>was taking action accordingly.</b>	
40	M	P5	Silt load of 14 gauging stations along Narmada River already available with CWC who have been requested to analyse. Copy of <b>bar chart</b> showing declining trend in silt outflows was presented. Informed that silt load data collected and analysed by CWC was only <b>indicative of general trend of soil erosion and was not specific to the project.</b>	
41	M	A p4	NVDA VC: FSI already carrying out periodic assessment of forest cover for entire country including that of MP. Similarly Central Water Commission also	

42	A	A p28	monitoring silt load in river and this should suffice.	<p><b>Obtain:</b> silt monitoring works report for GOMP areas undertaken by CSWCR&amp;TI. Need to cover FA and NFA.</p> <p>Finally after assurance in Sep 99, one silt monitoring station has been set up (and reported in June 08) but this is not sufficient in number and no analysis has been done to date. Therefore incomplete status.</p>
43	A	P7	Prof Ramaseshan: areas treated required dedicated focus monitoring as per decisions of ESG 40 <sup>th</sup> M. Data received from CWC needs to be analysed with respect to CAT locations.	
43	A	P13	GOMP taking steps for entrusting studies to CSWCR&TI. Progress requested. March 2006 field visit, key recommendations from 15th Sep 2006 report: Quality of CAT works – <b>not yet started</b> - Silt monitoring is to be started as early as possible.	
44	M	P5	Establishment of silt monitoring for assessment of the success rate of CAT works in non forest areas – <b>awaited</b> .	
44	M	P14 pdf	Member (Environment & Forest), NVDA stated that <b>considering that the silt monitoring data for pre-treatment phase was not available, such assessment was not required. He further stated that data from CWC and Forest Survey of India could be utilized if so required.</b> He informed that establishment of silt monitoring stations for Phase-II is being undertaken by the Govt of Madhya Pradesh... Sub Group had directed , dedicated focused monitoring for assessment of the efficacy of the Catchment Area Treatment works. It should be possible for Madhya Pradesh also to undertake such studies with the help of identified Institutions. suggested that Govt of Madhya Pradesh should explore the possibility for undertaking assessment either through Satellite imageries or through aerial photography or a combination of both as already suggested by the sub group earlier. It was suggested by the Chairperson that dedicated focus monitoring as already decided upon by the Sub Group earlier should be undertaken without further delay.	
46	A	P6 pdf	Silt monitoring not yet started. One silt monitoring station has been set up. Another one is being set up.	<p><b>Request:</b> silt monitoring works reports for GOM areas for both FA and NFA+ location of stations. 2 monitoring stations sufficient?</p> <p>NFA: two stations</p> <p>NFA: three stations</p>
39	A	B p3	<b>Silt monitoring (reservoir sedimentation) – GOM</b>	
40	A	B p3	<b>GOM: Not initiated.</b>	
40	M	...	Forest areas: <b>not initiated</b> .	
42	A	A p28	Non-forest areas: 2 stations established, Reports <b>not available</b> . No steps were taken so far by GOM.	
43	A	P13	Report on periodic updating of the focussed studies carried out for the sub-watersheds already treated, through FSI <b>awaited</b> .	
43	M	P7	Establishment of silt monitoring for assessment of the success rate of CAT works in non forest areas – two stations established, <b>report awaited</b> .	
43	M	P21	Representative of the GOM further informed that for the agricultural areas, Central Soil & Water Conservation Research & Training Institute has established two research stations and <b>interim report is expected soon</b> . Representative of Govt of Maharashtra informed that three stations have started functioning in non forest areas at Bijaripati, Dabin and Radhi Kalam. <b>Preliminary report from the first two stations is expected by Feb 07</b> , whereas <b>report from the third station will be submitted only after June, 2007</b> . The work on	

45	A	P16pdf Ann	establishing silt monitoring station in forest area is under progress under the guidance of WCR and TI Washed – Dist Kaira of Gujarat. <b>Two stations established. Interim report received.</b>	FA: two stations. <b>Confirm:</b> these are not the same as the NFA stations.
45	A	p45 pdf	Forest area: forest cover - 2 stations established, silt monitoring station – 1 station established	<b>Require:</b> report for all silt monitoring, along with station locations and analysis of data collected evenet-wise and daily analysis
46	A	P6 pdf	Silt monitoring is being done through CSWCR&TI.	
33	M	P5	<b>Cost estimates – GOM and Phase II costs for all states</b> GOM: Deputy Secretary informed that the funds for CAF and CAT are being received from project but other safeguard measure (health plans, fisheries development plans, flora, fauna plans etc) funds not forthcoming and have already spent Rs. 55 Lakh on studies of flora and fauna alone.	Are CAT funds being received? If no Phase II progress, where is this money going?
-	-	-	June 1992 GOI Directive – for SSP, project would bear costs of treatment of all critically degraded sub-watersheds draining directly into the reservoir and areas directly damaged by project activities. Critically degraded watersheds are those defined by All India Soil and Land Use Survey Organisation (AISLUSO) as “very high” or “high priority” subwatersheds in SSP catchments. Cost of balance of critically degraded watersheds to be met by States. CAT – MOA for agricultural lands, MOEF forest lands.	
45	M	P16	After detailed deliberation, it has been decided in the said meeting that cost of treating critically degraded sub-watersheds in the free draining catchments, including both Phase -I (directly draining) and Phase - II (other than directly draining) shall be treated at the project cost and provided for under UnitI (dam and appurtenant works) and shared in the ratio of the costs charged to Unit-I amongst the party States (Gujarat = 51%, Madhya Pradesh = 32%, Maharashtra =15% and Rajasthan =2%)	
33	M	Ann 2	<b>Field trip observations and recommendations – extracts:</b> In some areas silt was deposited up to the brim of the bunds. Vegetative barriers were very rare - due to high biotic pressure, extremely harsh condition, engineering measures easier to maintain. Need for upkeep of GOM and GOG phase 1 works. In Phase II, need for reconciliation of area treated under forest and non-forest heads [sic].	Need maintenance – have these areas been revisited?
35/6	M/A	II p15	<b>Soil conservation measures</b> Steps to be taken for continued support soil moisture conservation works as envisaged due to decentralization of finding components of watershed management schemes. Additional Commissioner, Soil Conservation and Joint Secretary/ Commissioner of MOA invited to future meetings. [previous mentions re CAT and soil conservation]	
38	A	P12	Map [Annex 13] shows that submergence area is part of large and contiguous tracks of forest land on either bank and that most of this has been treated with Soil Moisture Conservation (SMC) works. Map also shows protected area in vicinity of dam.	

## Command Area Development/ Downstream issues

Mtg.	Doc.	Item	Chronology	CAD follow-up
34	M	3 p9	<b>General</b> SSNNL VC said main environmental concern for CA is <b>water logging apart from aspects relating to flora and fauna and problems of agricultural pollutants</b> etc.	<b>Key issues:</b> waterlogging, flora & fauna, agricultural pollution, etc
36	A	8 p10	The Sardar Sarovar Project irrigation water would start flowing in the canal once the dam height was raised to 110 m. Water will be provided for irrigation command area of 18 lakhs hectares in Gujarat and 75,000 hectares in Rajasthan.	Water flows in canal at 110m dam height, therefore compliance at this height is key.
36	A	Ann p28	GCA is 3.43 million hectares of which culturable CA is est. to be 2.12 million hectares [1.869mha in EM 2006 p23 or 1.84mha on same page]. Thus CA covers very large area of Gujarat and about 75,000 ha area in Rajasthan.	<b>Note:</b> variability in command area extent.
2006	EM	P23	Proposed to irrigate annually 1.792Mha in Gujarat, with 9 MAF surface water	
36	A	Ann p44	Rajasthan: GCA is 142,020 ha of which 135,476 is culturable CA.	
2006	EM	P23	Rajasthan: GCA revised to 2.46mha	
37	M	Ann p37	Rajasthan: 9 major distributaries with total length 282.3 km. Total length minors is 485 km and sub-minors is 636 km.	
38	A	P15	Rajasthan: canal system will cover GCA of 3.00 lakh ha of which 2.51 lakh ha is CCA.	<b>Note:</b> numbers <b>increase</b> for command area
38	A	Ann p86	... Thus command encompasses a very large area of Gujarat and about <b>75,000 ha Raj. now revised to 0.30 million ha of GCA (CCA = 0.251 million ha, revised to 0.246 mha in EM2006 p43)</b> area in Rajasthan and is characterised by wide diversity in agro-climatic and socio-economic conditions.	<b>Note:</b> Rajasthan CA increased in size.
42	A	Ann 3	Stipulations contained in the order of clearance to the SSP issued by the MOEF related to the CAD plan... 5 covenants [ <i>summarised</i> ]: <ul style="list-style-type: none"> <li>• tree planting,</li> <li>• drainage and water-balance studies,</li> <li>• siltation study by group of experts</li> <li>• State should draw up a detailed time schedule for completion <b>within five years</b> the investigation, detailed survey, planning and working out the detailed cost estimates for micro-level network system for the balance area of the total command of this project.</li> <li>• Implementation schedule, segment-wise, for completion of canal network</li> </ul>	Investment Clearance Oct 88.  Micro-level plan not completed in 5 years but for Phase I has been sent in January 2006 to ESG (13 years later). <b>Check:</b> detailed cost estimates available for micro-level network system for total command <b>Check:</b> siltation study done <b>Check:</b> who should pay for field drains/ channels – should farmers pay?
-	Letter to NCA/ SS	SSNNL letter dated 27/12/4	Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and SSNNL. SSNNL letter dated 27/12/04. <ul style="list-style-type: none"> <li>○ Impacts of reported canal breaches: due to unprecedented heavy rainfall in catchment area of Heran river, Bhorda Kotar and other local Kotar on upstream side on 2/8/4 and 3??/8/4, there was heavy flood in</li> </ul>	<b>Review:</b> via expert, whether canal breaches were due to Sardar Sarovar Project and whether situation likely to get worse. Was rainfall during this period 'unprecedented' in Heran River etc?

			<p>Heran river, Bhorda Kotar and local Kotar. The flood of Heran river was so intense that the water flow was diverted in the Bhorda Kotar and Rajwasna Canal. Thus there was heavy rush of flood water in Heran river, Bhorda and Rajwasna Canal (which was converted as a drain) leading to the right bank of Narmada Main canal which is mostly in this region. Sudden rise in water level in Heran river and Bhorda Kotar due to <b>inflow of large quantity of flood water in a short period of time caused over topping of the canal bank causing breaches in NMC between reach 30km and 3.15km</b>. It is to be mentioned here that occurrence of breaches was found to be beneficial as the canal drained off all flood water and saved from any adverse impact on command area. Further owing to rains there was no irrigation going on and hence no adverse impact on command area.</p>	<p><b>Require:</b> damage report to local farms, houses and cost of repair to canal from this and other breaches</p>
-	HRW Command Area EIA	App A1	<p><b>HR Wallingford reports</b>  <i>Registered office: Howbery Park, Wallingford, OX10 8BA, UK</i></p> <ul style="list-style-type: none"> <li>Sardar Sarovar Projects. Command Area EIA. Progress Report. Report EX 2766 Vol 2. March 1993. <b>Appendix A1 is TOR for preparation of detailed</b> integrated CAD plan for Sardar Sarovar Project of Gujarat: The command area plan document after appropriate studies should be completed in a period of <b>one year</b> from date of assignment. 2 interim reports are expected. Framework of study ...</li> </ul>	<p>Need expert review and updating of HRW report as basis for command area impacts. The command area plan document after appropriate studies should be completed in a period of <b>one year</b> from date of assignment. 2 interim reports are expected.</p>
34	A	3 p7	<p><b>Interdepartmental Committee – env effects</b>  During last meeting NVDA assured ESG regarding formation of an inter-departmental committee to look into the issues of environmental impacts within Sardar Sarovar Project command. <i>Progress?</i></p>	<p><b>Obtain:</b> information on agenda and minutes of meetings</p>
33	A	A3 p8	<p><b>Integrated CAD plan - Gujarat</b>  GOMP to review TOR. <i>Finalised TOR for CAD plan integrated development requested.</i></p>	<p><b>Require:</b> TOR</p>
33	A	P9	<p><b>GOG:</b> at last meeting informed that phase 1 of CAD linked with raising of dam height up to 110m and completion of main canal/ branch canal/distributaries in that reach. <b>Unless these two components completed then irrigation cannot start in the command.</b> <i>Progress on integrated CAD plan requested.</i></p>	<p><b>Check:</b> were all Phase I branch canals/ distributaries completed before 110m height raise?</p>
33	M	P10	<p>CAD strategy includes:</p> <ol style="list-style-type: none"> <li>main canal branch and distributaries</li> <li>field channels, drainage etc</li> <li>cropping pattern</li> <li>devt of infrastructure inc agro-based industries, supply of seeds etc</li> <li>quality of water</li> </ol> <p>Based on WAMANA Consultants recommendations, policies framed for participatory irrigation management for on farm development activities. Integrated CAD plan under formulation.</p>	<p><b>Require:</b> review by Wamana, Hyderabad of current status of CA irrigation.</p>
36	A	9 p11	<p>GOG: A write-up circulated during meeting of CAD. “There is time on hand.</p>	<p><b>Note:</b> pressure to raise dam height irrespective</p>

36	A	9 p12	No impact till dam is raised to an EL of 110 m.”	of environmental status.
36	A	Ann p40	GOR: “There is time on hand. No impact till dam is raised to full height.” Main canals and branches will be concrete lined with mechanical pavers [ <i>what is seepage rate and % vs. unlined?</i> ]. Distribution system will be brick lined with sandwiched rich mortar layer [ <i>what is seepage rate and % vs. unlined?</i> ]. Use of polyethylene membranes is also being contemplated.	<b>Request:</b> canal seepage rate and % for lined and unlined canals. Give breakdown for main canal, branch canals etc. Where are polyethylene membranes used?
37	M	B p8	CAD plan for Phase I should be <i>prepared on priority and submitted for review in due course</i> .	
38	A	P9	Draft plan discussed and reviewed on 4 <sup>th</sup> December 2002 by GOG with experts. As per suggestion received, plan was under finalisation.	Draft CAD plan Gujarat Dec 2002
38	M	P12	GOG: submitted copy of CAD plan to MOEF & NCA. Also to go to members for comments.	Has CAD plan been reviewed internally and externally (by independents)?
39	A	C p5	CAD plan is required to be prepared and <b>implemented commensurate with development of irrigation in CA</b> . Stipulations in clearances required that..	<b>See:</b> progress row
39	A	C p6	<i>CAD plan:</i> – Phase I Gujarat submitted. Phase II A and IIB in Gujarat and for Rajasthan <b><u>awaited</u></b> .	Where is CAD plan for Phase IIA, B, C? What CAD guidelines are there to check these docs against
39	A	Annex P51 on	CAD plan Phase I provided. Comments by Shekhar Singh and response from authorities.	<b>See:</b> Table of comments & GOG response
39	A	Annex P67	Letter 1 <sup>st</sup> Oct 2003 detailing comments of SSCAC: General: [brief summary and lists objectives of plan] <ul style="list-style-type: none"> <li>• preparing plan of actions based on studies carried out and considering existing schemes/ programmes</li> <li>• prioritising the mitigating adverse impact</li> <li>• preparing the total financial outlay</li> <li>• planning conjunctive use, forestry and measures for anti water logging/ soil degradation / water contamination</li> <li>• framework of socio-economic upgradation</li> </ul> General comments <ol style="list-style-type: none"> <li>1. action plan sketchy, only gives outline strategy of CAD works. Describes criteria and strategy of works but does not give any concrete action plan of various works to be carried out</li> <li>2. plan does indicate any cost estimate for various works except public health, fishing dev plan, and flora and fauna</li> <li>3. various plates (diagrams) mentioned as enclosed but not seen in report</li> <li>4. need full form of abbreviations in report</li> <li>5. institutional framework and infrastructure for various works not indicated in detail</li> <li>6. booklet containing briefs of various studies carried out/ under progress should be published separately</li> </ol>	<b>Check:</b> status of addressing these comments, <b>Check:</b> against January 2006 micro-level plan  <b>Require:</b> list of target dates for each objective in plan + action plan for works, as per SSCAC comments Require: detailed cost estimate  <b>Require:</b> diagrams  <b>Require:</b> booklet summarising CAD studies, as per SSCAC request



		<p>Chapter 2: Agriculture sector</p> <ol style="list-style-type: none"> <li>1. Plate 1 not enclosed. What meant by region/ category/ zone not fully explained</li> <li>2. any proposal for future planning etc not described</li> <li>3. calculations of value of proposed crop not shown</li> </ol> <p>Chapter 3: CAD plan</p> <ol style="list-style-type: none"> <li>1. Strategy outlined as per national water policy, planning concepts good</li> <li>2. control volume concept and downstream free draining delivery network should be explained with help of diagrams to make it comprehensive</li> <li>3. system response in emergency conditions should be explained with help of diagrams</li> <li>4. detailed action plan and costing of different components required to be given. Cost of operations, drainage facility, WUAs, infrastructure cost should be given</li> <li>5. strategies for online farm mgt not outlined. drip and sprinkler irrigation should have been thought of in big way considering terrain and climatic condition and water scarcity. Village ponds have to be integrated with distribution system. In some areas, field ponds can also be created as has been planned in Indira Gandhi command.</li> <li>6. groundwater monitoring system working in existing SSP command. Changes noted in quality and water levels may be <b>indicated</b>.</li> <li>7. agriculture extension services in commands need to be further expanded under CAD. Detailed planning to be worked out and outlined in report.</li> <li>8. CAD plan may also get vetted by CAD wing of MOWR, GOI.</li> </ol> <p>Chapter 4: CAD</p> <ol style="list-style-type: none"> <li>1. Operation plan for water releases from dam during early stages stated to be given but <b>not available</b>.</li> <li>2. Various CA studies available with planners. Would be proper to prepare one/two page briefs/ recommendations of each such study. Should be made available to appreciate work done so far and how it has been integrated in present report.</li> </ol> <p>Chapter 7: Development plan: soil salinity and water logging</p> <ol style="list-style-type: none"> <li>1. Chapter described groundwater systems, drainage studies, groundwater</li> </ol>	<p>With timescales + infrastructure for achievement</p> <p><b>Require:</b> plan for drip + sprinkler irrigation</p> <p><b>Require:</b> detailed info on changes in water levels and quality in command, as per SSCAC comments.</p> <p><b>Require:</b> operation plan for water releases from dam during early stages and review of such operation by independent experts</p>
--	--	--	--



39	M	C p6	<p>modelling and groundwater monitoring system</p> <ol style="list-style-type: none"> <li>2. Action plan for construction of various drains, land levelling and channels remodelling should be worked out with cost takes and institutional details</li> <li>3. groundwater system monitoring work is carried out by ground water department of State. How this is to be integrated with CAD and what is cost sharing arrangement may be indicated.</li> <li>4. Maps/ plates as stated in chapter not enclosed</li> </ol> <p>Chapter 8: development plan agriculture</p> <ol style="list-style-type: none"> <li>1. Action plan and cost estimates should be worked out</li> <li>2. institutional set up should be indicated</li> </ol> <p>Shekhar Singh: detailed CAD plan should be available before issue of clearance of ESG for raising dam height was discussed further. Planning Commission had very clearly specified that submission of CAD plan formed part of project component and should have been available before commencement of irrigation. Observations of SSCAC indicated that despite so many years plan was not yet available. SSNNL Director: <b>most</b> points pertained to Phase II of CA and that proposal to raise dam height to 110.64 m RL would confine waters to Phase I area only.</p> <p>Water drawn at this stage would be mainly for drought relief works and that only a small percentage of area was irrigated last year ...</p> <p><b>Submission of plan of such a long period might not be adhered to at this stage.</b> Submission of plan was actually delayed due to uncertainty, which prevailed during 1994-2000 due to litigation pending in SC.</p> <p>NVDA VC: requested the Chairman that delay in submission of CAD plan should not be a guiding factor as dam was the property of all the States and generation of electricity was of prime importance for MP and Mah and therefore permission to raise the <b>dam height to 110.64m RL should <u>not</u> be linked with the submission of CAD plan.</b></p> <p>Chairman: required huge resource and manpower for publication of <b>micro level</b> CAD plan and might not be possible to prepare in a short time and this might be one of the reasons for delay in submission of the plan and desired that detailed plan <b>for the entire command area</b> should be submitted <b>within the next 3 months time</b> Could be available as CD-rom. Report would be accompanied</p>	<p><b>Require:</b> action plan for construction of drains, land levelling and channel remodelling</p> <p><b>See:</b> also S Singh comment &amp; SSNNL response</p> <p>Micro-level plan arrived January 2006 yet dam height raised to 110m 2 years earlier</p> <p><b>Check:</b> did 110m dam height confine water to Phase I area only?</p> <p><b>Require:</b> areas where drought relief works done and end use/volume of water from Narmada in 2002 and onwards.</p> <p><b>Note:</b> mistaken view as to what plan is for. Conflicts with HRW findings: HRW states that 1 year after studies, last study on CAD due in ...</p> <p>End Dec 03mtg</p>
----	---	------	--	--

40	A	P18	only by unrestricted maps on appropriate scale. CAD plan awaited for Phase IIA and IIB in Gujarat.	
40	M	P2	GOG to submit plan for entire command within next 3 months. Detailed plan to be prepared. SSNNL Managing Director: entire command area very large and discussion during meeting referred to only Phase I areas and therefore stressed for corrections in minutes. Also assured submission of CAD plan for Phase II areas <b>in November 2004</b> . After discussion, request accepted. Changed to: ... Phase I command area should be submitted within the next three months time.	<b>Note:</b> pressure to ignore CAD plan issue when granting clearance
40	M	C p7	<b>Electronic copies</b> of Phase I CAD plan for an area of 4.5 lacs ha available in CDROM. SSNNL Managing Director: <b>Phase II areas plan would be submitted by November 2004</b> . Prof RK Katti suggested dam construction is linked to impacts upstream and that construction of dam <b>might not be tagged with CAD plans</b> . NCA Env Dir: stipulations in clearances require CAD works progress commensurate with progress of works on water delivery and conveyance system. This system is <b>ready to receive water for irrigation</b> purposes. Dam has nearly attained 110.64m RL and along with IBPT (irrigation by pass tunnel) was in position to provide irrigation water. Negative impacts on health, water logging, salinity etc would manifest no sooner water was made available for irrigation. <b>In 39M reported that some areas of Phase I command were irrigated last year. ESG earlier decided that CA planning would be assessed regarding pari-passu compliance with development of canal system in command.</b>	<b>Check:</b> where is Phase II plan  Managing Director, SSNNL explained .. that the water drawn at this stage would be mainly for drought relief works and that only a very small percentage of area was irrigated last year. [2003?]
40	M	C p8	Prof Ramaseshan: <b>studies on downstream requirements have been missing from CA plan and were required to be conducted and translated into plan for implementation in time.</b> NVDA VC: MP has major stakes in generation of power which is feasible only when dam attained a height of RL 110.64m. Therefore suggested that plan for development of CA might not be linked with filling up of dam and generation of power, as <b>otherwise it would be detrimental to the interest of GOMP</b> . Non-availability CAD plan vs. readiness of project to supply irrigation water, SSNNL MD: earlier water drawn through irrigation by-pass tunnel IBPT was <b>mainly</b> for supply of drinking water. However this was <b>also poured into other river systems like Mahi</b> . As these river systems have a well-developed area of command, <b>negative manifestation were unlikely</b> . Chairman: water might be drawn from Sardar Sarovar Project for generation of power if so envisaged <b>but after generation of power should not be utilised for irrigation of Sardar Sarovar Project command until approved plan to</b>	<b>Check:</b> detailed actions for downstream requirements being implemented  Pressure to delink ESM implementation + compliance by GOMP  <b>Require:</b> year by year breakdown of end uses of water – how much poured into Mahi? <b>Check:</b> have any negative impacts occurred?  See corrections/changes to this later which allows irrigation use of power water

			mitigate negative impacts was implemented and till then this water must be released into the Narmada river system.	
41	A	P17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m – submission of plan and its implementation: submission of plan awaited</i>	
41	M	P2	SSNNL MD: Minutes corrections: not technically possible to let down the water back into the river after generation of power, as the maximum discharge capacity of the Godbole gates was limited to about 700 cusecs only whereas the discharge from the CHPH (all the five units) after generation of power was of the order of 25,000 cusecs ... text changed to “The Chairman summed up the discussions by saying that water might be drawn from the Sardar Sarovar Project for generation of power if so envisaged but after generation of power it should not be utilised for irrigation in the Sardar Sarovar Project command until approved plan to mitigate negative impact was implemented.” [See other correction. [Possible typo in 42A whereby 700 cusecs becomes 7000]	Can gate design be changed? Are all 5 units really going to be fully in operation at this dam height? Will 700 cusecs of water be released at all into river?  <b>Check:</b> can gate capacity be increased? How much water is being released downstream? <b>Check:</b> is it not technically possible to let power water back to river?
41	M	C p5	NCA Dir ENV: ESG decision and conditions contained in order of clearance required pari-passu completion of plans and their implementation commensurate with progressive irrigation. As informed earlier about <b>39,000 ha</b> area was irrigated last year and there is definite demand for irrigation on Phase I command. To ensure ill effects of irrigation do not cause environmental degradation, measures recommended by EIA studies for safeguarding environment are to be implemented by GOG along with development of irrigation in a progressive manner. If farms are allowed to draw water as per their requirement without making use of groundwater though planned, 9 MAF water allocated to Gujarat will be insufficient to irrigate 3.4 million ha of gross command.	ESG decision and conditions contained in order of clearance required pari-passu completion of plans and their implementation commensurate with progressive irrigation.  Cf 4.5 lakhs area = 8.7%
41	M	C p7	SSNNL MD: detailed plan for Phase I (44,000ha) as well as Phase II was already made available to NCA both in physical as well as electronic form which has also been circulated amongst members. <b>Comments received for Phase I plan have also been attended to and comments on Phase II plan are yet awaited.</b>	Request: electronic version of CAD plan <b>Require:</b> demonstration that Phase I plan has been implemented
41	M	Ann 3	ATR information table: SSNNL/Env/ESG-41/1057 dated January 1 2005. Supplementary ATR on CAD. (remark: subject to verification of implementation of planned measures commensurate with progressive irrigation): <ul style="list-style-type: none"> <li>programmes for providing incentives to farmers willing to adopt measures recommended in the reports such as educational &amp; training, incentives.</li> <li>Short note on existing facilities for agricultural extension in CA with emphasis on education. Awareness programmes for limiting pesticides</li> </ul>	Obtain ATRs

42	A	P1	<p>and weedicides.</p> <p>Text in 40 M and modified in 41 M further changed on request of Chairman SSNNL in his letter dated 07/03/05 (Annex 1) to: “The Chairman summed up the discussion by saying that water might be drawn from the Sardar Sarovar Project <b>both for power and irrigation</b> but the implementing state must ensure that all measures as envisaged in the CAD plan are properly implemented so that there is no negative impact of such irrigation.” [bold and underline as per minutes.]</p>	<p><b>Note:</b> change in allowance for water to be used both for power <b>and</b> irrigation</p>
42	M	C p5	<p>NCA Dir Env: <b>the micro plan for CAD Phase 1 has not been made available by GOG.</b> Measures planned for safeguarding the environment were not in place and the works related to the provisions of botanical gardens, health facilities, on farm and off farm developmental works have to be taken up and completed early. CAD estimates to be revised considering the additionalities that emerged from the completed studies – these <b>were awaited</b> from the GOG.</p> <p>SSNNL CMD: CA in Gujarat very large and measures for each area will be specific due to variations in geology, morphology, sociology and other factors. Therefore <b>not possible to develop the entire area before commencing the irrigation.</b> In most areas of Gujarat, water table was at much lower level and it could take several years from now <b>before any drainage measures would be needed.</b> He elaborated different measures such as lining of the canal, lower delta, volumetric supply of water as key features planned by GOG for first time in India to tackle the problems of water logging, salinity etc. <b>Assured Sub-group of the commitment of GOG for implementation of all the needed environment safeguard measures as suggested by the Sub-group from time to time before irrigation.</b></p> <p>Prof Ramaseshan: reiterated point raised during earlier meetings. Stressed that GOG was required to provide financial and institutional support through well defined policy for ensuring consumptive use and also to assist farmers to construct field drains along with the minors and sub-minors.</p> <p>Chairman: ... All the environmental aspects have to be covered and needed safeguards implemented in identified areas. The state govts have to prepare micro level action plans for the purpose. GOG however mentioned that they were identifying a segment of about <b>44,000 ha</b> where they plan to <b>commence irrigation</b> in the initial stages. They shall be submitting the <b>micro plans</b> for the measures needed to be provided in identified segments to NCA secretariat.</p>	<p>Phase I microplan <b>awaited</b> from GOG</p> <p>Lack of CAD progress</p> <p>Measures planned for safeguarding the environment were not in place and the works related to the provisions of botanical gardens, health facilities, on farm and off farm developmental works have to be taken up and completed early. <b>Potential infringement of clearance.</b></p> <p><b>Need:</b> expert review of this statement (drainage) + <b>potential infringement of clearance</b></p> <p><b>Require:</b> detailed digital map of groundwater levels + modelling findings</p> <p><b>Require:</b> action plan for implementation</p> <p><b>Check:</b> financial and institutional support in place for ensuring conjunctive use and to ensure field drains, minors and sub-minors constructed.</p> <p><b>Request:</b> has irrigation begun? Did it begin before micro-level plan reviewed/ implemented?</p> <p><b>Note:</b> 39,000 ha irrigated last year as stated in 41Mp5 – where was this? <b>Potential infringement of clearance</b></p> <p>This date is probably 2005 not 2004</p>
-	Letter to NCA/ SS	Dated 27/12/4 from SSNNL	<p>Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and SSNNL. SSNNL letter dated 27/12/04.</p> <ul style="list-style-type: none"> <li>Current status of CAD plan, copies of any revisions and/or additions since last version circulated to ESG members and details on any implementation on the ground – CAD plan for Phase I and II has been <b>completed</b> and sent to NCA via letter SSNNL/Env/ESG-40/437 dated</li> </ul>	

43	A	P15	<p>23.6.04 and ??/NPG/MEG/252/51 <b>dated 29.11.04</b> respectively. Latest status on implementation of CAD plan is annexed as Annexure 1.</p> <p>During 41st meeting of the Environment Sub-group it was assured by the Govt. Of Gujarat that Micro-plan for about 44,000 ha area proposed to be irrigated during Phase-I shall be submitted soon and that <b>all required environmental safeguard would be implemented before commencement of the irrigation.</b></p> <p>Compliance on the observations of the committee who visited the command area in Gujarat as already discussed above, is awaited.</p> <ul style="list-style-type: none"> <li>• A copy of the micro-plan for development for CCA of 41,305 ha under Phase-I of the command was received during last week of December 2005. Copies of this plan in electronic format have been circulated to the concerned members and is under scrutiny of the Members.</li> <li>• In Gujarat the GCA of the project is 3.43 million hectares of which Cultivable command is estimated to be 2.12 million hectares and annual irrigation is proposed in an area of 1.792 million ha. In order to achieve increase in efficiency of irrigation with the limited quantity of water without impacting the environment adversely, the Govt of Gujarat planned to introduce several measures. <b>However stipulated action as per the CAD plan on formation of the farmers' co-operatives, volumetric water release to them, rotational water distribution, canal automation, conjunctive use etc are yet to be made operational.</b> Monitoring proforma developed on the advice of the MoEF is placed at Annex-XLIII-(3). SSNNL is requested to fill up the progress achieved in the gaps under each category separately.</li> <li>• In addition Gujarat also planned to provide drinking water to Saurashtra and Kachchh regions through a separate drinking water project. Detailed project report and mitigatory measures planned on this project during the normal year and drought year are <b>awaited.</b></li> <li>• Progress on scheduling, budget towards implementation of the Safeguard measures to contain identified negative consequences of the irrigation commensurate with proposed / practised irrigation, even in the Phase-I areas is <b>awaited.</b> The measures proposed in the CAD plan as outlined in the Annex – XLIII (3) have <b>not yet been fully implemented.</b></li> </ul> <p>In view of the above, plan needs revision for incorporating environment safeguard measures commensurate with progressive irrigation in adequate manner.</p>	<p>Micro-plan received Dec 2005 for Phase I irrigation. When did irrigation specifically begin – the meeting discussions are inconsistent on this.</p> <p>No progress on formation of the farmers' co-operatives, volumetric water release to them, rotational water distribution, canal automation, conjunctive use etc.</p> <p><b>Awaiting</b> detailed project report and mitigatory measures planned on separate drinking water project for Saurashtra and Kachchh regions during the normal year and drought year</p> <p>Progress on scheduling, budget towards implementation of the Safeguard measures to contain identified negative consequences of the irrigation commensurate with proposed / practised irrigation, <b>even in the Phase-I areas is awaited. Potential infringement of clearance</b></p>
44	M	P7 pdf	<p>The CMD, SSNNL highlighted key features of the command area in Gujarat. He stated that revised Macro plan for the development of the Phase-I Command Area had recently been sent to Narmada Control Authority office at Indore. This plan incorporated proforma on identified mechanism of monitoring. He informed that about 4 lac ha area would be taken up for irrigation in Gujarat</p>	<p>Phase I macro plan</p>

		<p>from ensuing season.</p> <p>Director (Environment) NCA acknowledged the receipt of the said Plan on 10th July, 2007 and stated that <b>preliminary scrutiny of the plan revealed substantial changes in the original planning especially with regard to irrigation and the source of impacts</b>. He pointed out that while earlier plan envisaged a duty of 53 cm on regulators at minors' outlet, the present plan provided 55 cm of water at Main Canal Head Regulator without consideration of any application losses. This implied that the actual water reaching the field, with a consideration of losses of 60% under very conservative estimates, is likely to be of the order of depth of water of 20 to 25 cm. <b>This required a detailed study of the plan to appreciate the rationale of the Govt of Gujarat. He pointed out that changes in the irrigation planning shall also bring corresponding changes in its impact on environment.</b> He, therefore, expressed the view that, to assess the plan and strategy of the State Government vis a vis impact on environment, consideration of the whole issue through a Committee of Experts, was necessary before approval of the plan by the Sub Group.</p> <p>Shri B.G.Vergheese referring to the progress on development works in Command Area presented in the Agenda Notes stated that there was a need to study the plan as the <b>measures originally planned for mitigating adverse consequences by development of the Command Area not fully implemented</b>. He requested more time for studying the plan for considered comments. Prof. RK. Katti suggested that studies related to synchronized operation of the Dam, storm water drainage vis-a-vis water logging in the command were also required while planning irrigation in the area Dr Shekhar Singh pointed out that change in the irrigation planning has to be looked into from the angle of the conditions of clearances given by the MoEF and the Planning Commission. He further stated that <b>implementation of the mitigation measures planned for the areas already irrigated was missing</b> and suggested a detailed review of the plan.</p> <p>After some discussions, <b>it was decided to form a Committee of Experts to review the plans for development of the Command Area</b>. It was agreed that committee would review the plan presented by the State Govt of Gujarat in view of the various conditions of clearances given by the MoEF and the Planning Commission and adequacy of the irrigation planning and mitigation measures for safeguarding the environment. The Committee would submit its report within a period of three months, well before the next meeting of the Environment Sub Group. Govt of Gujarat suggested to include irrigation experts also in the Committee of Experts, which was agreed to.</p>	<p>4 lac ha area to be irrigated in Gujarat from ensuing season.</p> <p>Plan received 10<sup>th</sup> July 2007</p> <p><b>Note:</b> substantial changes in irrigation planning and sources of impacts!!</p> <p>measures originally planned for mitigating adverse consequences by development of the Command Area not fully implemented</p> <p>studies related to synchronized operation of the Dam, storm water drainage vis-a-vis water logging in the command required</p> <p><b>implementation of the mitigation measures planned for the areas already irrigated was missing</b></p> <p>committee will review the plan against various conditions of clearances given by the MoEF and the Planning Commission and adequacy of the irrigation planning and mitigation measures for safeguarding the environment</p>
--	--	---	---

44	M	P12 pdf	<b>Irrigation commenced in Phase I area.</b> GOG submitted a copy of the revised Action plan June 2007. Preliminary scrutiny of the plan revealed wide gaps therefore decided to constitute an expert group to examine adequacy of planned measures.	Not commenced year before 39 meeting? 39M: Managing Director, SSNNL “explained ... that the water drawn at this stage would be mainly for drought relief works and that only a very small percentage of area was irrigated last year.”
46	M	P7	The plan for Command Area was submitted earlier. However, in pursuance to the discussions of the last meeting of ESG, a team of SSNNL officers visited the NCA office recently for ascertaining gaps in the plan submitted during 2007. <b>The plan except for issues related to drainage, is nearly complete and shall be submitted soon.</b>	Still gaps in plan though irrigation has started. <b>Potential infringement of clearance condition</b>
36 39	A M	9 p12 C p6	<b>CAD plan – Rajasthan</b> GOR: “There is time on hand. No impact till dam is raised to full height.” <i>Rajasthan. Initial plan submitted during 1990: Sub-group directed for revision &amp; EIA studies.</i> <i>EIA studies:</i> Completed by WAPCOS. Area to be irrigated was increased. <i>Preparation of Plan through ICCB: progressing.</i> GOR: draft CAD copies will be provided for circulation for discussions during next meeting.	Check: Rajasthan comments complied with  EIA and revised plan  NCA clarified that replies received from GOR were inadequate  <b>Obtain:</b> ATRs  GoR actions all marked <b>inadequate and not</b>
40	A	C p6	CAD plan: awaited for area in Rajasthan <i>Preparation of Plan through ICCB:</i> Plan submitted by GOR and circulated to Members for review. CAD plan for areas in Rajasthan received and circulated. Comments received from Secretary SSCAC at <b>Annex XL (2)</b> .	
41	M	C p7	Non availability of information regarding CAD plans for areas in Rajasthan. Rajasthan representative: areas to be brought under command of Narmada waters in Rajasthan has increased from 75,000 ha to about 2.5 million ha using modern techniques [2.5 handwritten over 2.3]. NCA: EIA studies for increased command areas were conducted by WAPCOS on the TOR approved by the ESG. Report suggested alternatives through modified technologies to irrigate 2.3 million ( <b>lakh?</b> ) ha and <b>revised plan</b> was circulated to members and their comments received in NCA secretariat have been forwarded to GOR. Prof Ramaseshan requested that points raised by him should also be attended to. NCA clarified that replies received from GOR were inadequate and therefore GOR have been requested to <b>submit detailed plans</b> on the lines as submitted by Gujarat which is <b>awaited</b> . Chairman directed that GOR should examine the technological options and should choose appropriate approved technology for mitigating the negative impacts on the environment and report back during next ESG meeting.	
41	M	Ann 3	ATR information table: <ul style="list-style-type: none"> <li>Ref: dated 13/12/04. Progress on environmental management plan (remark: <b>inadequate and not satisfactory</b>)</li> </ul>	

42	A	C p6	<ul style="list-style-type: none"> <li>Ref dated 03.01.05 fax message. 2 pages from plan submitted as plan for management of environmental impacts (remark: <b>inadequate and not satisfactory</b>)</li> <li>Ref dated 28.10.04. CAD. Table showing proposed cost of plantations along with canal bank (remark: <b>inadequate and not satisfactory</b>)</li> <li>Ref dated 16.11.2004. CAD. Replies to observations of Dr S Ramaseshan (remark: sent to Dr S Ramaseshan)</li> </ul> <p>CAD plan is required to be prepared and implemented commensurate with the development of irrigation in the command area.</p> <p>Command Area macro plan was received. This plan included a reconnaissance report on general flora and fauna in the command. Placed at Annex 5. This <b>report lacked necessary details</b>. ESG have directed GOR to carry out the study and preparation of the plan on the lines carried out by GOG. Accordingly a detailed phased plan with budget and monitoring for implementation of ESMS (environmental safeguard measures) as brought out by the EIA study reports commensurate with progressive development of the Command Area is <b>awaited</b>. NCA Dir Env: <b>action plan for implementation of environment safeguard measures (ESMs) received was not in accordance with directions given by sub-group and required revision</b>.</p> <p>GOR, Sec Env: Rajasthan had adopted appropriate and approved technology for mitigating the negative impacts on environment which included measures like sprinkler irrigation and low delta much lower than that of GOG and scheme of plantations on canal banks.</p> <p>Prof Ramaseshan: <b>plan prepared by GOR if implemented as it is, would lead to large scale water logging and salinity in almost the entire command area</b>. Suggested a <b>detailed review of GOR CAD plan</b> needs to be made by sub-group.</p> <p>Chairman: GOR should resolve issues through discussions/consultations and arrange a presentation in the issued resolved/ revised plan to sub-group in its next meeting.</p>	<p><b>satisfactory</b></p> <p><b>Request:</b> micro-level CAD plan/ revised plan incorporating comments, progress on environmental management plan, flora and fauna – received. This <b>report lacked necessary details</b></p>
42	M	C p7	<p>GOR, Sec Env: Rajasthan had adopted appropriate and approved technology for mitigating the negative impacts on environment which included measures like sprinkler irrigation and low delta much lower than that of GOG and scheme of plantations on canal banks.</p> <p>Prof Ramaseshan: <b>plan prepared by GOR if implemented as it is, would lead to large scale water logging and salinity in almost the entire command area</b>. Suggested a <b>detailed review of GOR CAD plan</b> needs to be made by sub-group.</p> <p>Chairman: GOR should resolve issues through discussions/consultations and arrange a presentation in the issued resolved/ revised plan to sub-group in its next meeting.</p>	<p>Request: where is sprinkler irrigation to be employed: exact locations + amounts of water</p> <p><b>Review by expert:</b> potential for waterlogging and salinity caused by measures in latest GOR plan</p>
43	A	P15	<p>Revisions to plan: discussions were arranged (17 Aug 05) in which Director (Env.), NCA, Prof. Ramaseshan, Expert on Hydrology participated on behalf of the Environment Subgroup, whereas officials of the Govt. of Rajasthan, consultants engaged by Govt. Of Rajasthan participated on behalf of Govt. of Rajasthan. Discussions <b>remained inconclusive for the want of required data and copy of the detailed project report</b> from Govt. of Rajasthan. It emerged from the discussions that the plans submitted by the Govt. of Rajasthan are required to be recast otherwise <b>if implemented without extensive revision it would convert the command area in Rajasthan to a saline desert besides impacting environment adversely</b>. Observations of Prof R and NCA in Annex.</p>	<p><b>Request:</b> information from discussions had by Prof Ramaseshan</p>
45	A	P18 pdf	<p>A meeting to discuss Management Plan for Command Area Development</p>	



45	M	P10 pdf	<p>Works of Narmada Canal Areas in Rajasthan, was held at 11.00 A.M. on 16th March, 2007 amongst the officials / experts of Central and State government from Narmada Control Authority, State Govt of Rajasthan and Central Arid Zone Research Institute and it was agreed as under:</p> <ul style="list-style-type: none"> <li>Govt. of Rajasthan to prepare &amp; present a micro-plan for the areas proposed to be brought under irrigation, utilizing the expertise within CAZRI, considering the status of construction of the canal network. This plan shall be put up for consideration of the Sub-Group in advance of commencing irrigation in the area. Further discussions were held with officials of the Govt. of Gujarat, MoEF, WII &amp; NCA and EIA studies were called for. Subsequently through series of discussions, ToR drafted by the NCA were made available to the Govt. of Rajasthan. It was reported that Govt. of Rajasthan has approved ToR for EIA studies on Biological resources of the Command through Wildlife Institute of India &amp; EIA on other issues is under approval. It was also agreed that a <b>field visit shall be arranged during March 2008 to the areas in Rajasthan, where irrigation is likely to commence soon.</b></li> </ul> <p>Member (E&amp;R), NCA informed that notional supply of water to Govt. of Rajasthan had commenced with <b>initial discharge of about 50 cusecs</b> during 3<sup>rd</sup> week of March, 2008. Since Narmada water to Rajasthan has started flowing, there was an urgent need for preparation of Command Area Development Plan towards mitigation of identified environmental impacts.</p> <p>Director (Env), NCA brought out that in pursuance to the discussions of the Environment Sub-Group, series of discussions were held and Terms of References (ToR) for EIA studies on Biological resources, health impacts, soil, pollutants, etc., were framed and agreed to for addressing identified environmental concerns. <b>A field visit to the Command Area in Rajasthan was also undertaken recently on 8th to 10th April, 2008.</b></p> <p>Chief Engineer, NCP, Rajasthan stated that as per agreed ToR, studies have been given to Wildlife Institute of India and the <b>work order is under issue</b>. For the health impacts, ICMR has agreed for carrying out studies as being done by them for Narmada Projects in Madhya Pradesh. On the issue of ground water for use for irrigation purposes, State Ground Water Board <b>is being involved for the needed studies</b>. Water &amp; Power Consultancy Organisation of the Ministry of Water Resources, Central Arid Zone Research Institute of ICAR <b>are also being involved in</b> preparing Command Area Development Plan.</p> <p>The Chairperson suggested expeditious completion of the works in hand for</p>	<p>Govt. of Rajasthan to prepare &amp; present a micro-plan for the areas proposed to be brought under irrigation, utilizing the expertise within CAZRI</p> <p>Note: stated that irrigation likely to commence soon</p> <p><b>Note:</b> water supply w/o CAD plan preparation let alone implementation. <b>Potential infringement of clearance condition.</b></p> <p><b>Note:</b> all studies are in formulation/assignment stage, none are completed let alone reviewed and their recommendations implemented.</p>
----	---	---------	--	---

46	A	P7	putting a meaningful plan in place, as required.	Request report on aspects of plan that Indian Council for Medical Research are involved in?
46	M	P7	During the 45th Meeting of the Sub-Group, the representative of Government of Rajasthan (GoR) had informed that Wildlife Institute of India, ICMR, State Ground Water Board, WAPCOS, CAZRI, etc. are being involved in preparing the CAD Plan. The Chief Engineer, Narmada Canal Project: informed that <b>water was released to Rajasthan on 20th March, 2008</b> , Modifications of the Command Area Development Plan as per suggestions of the Environment Sub-group of NCA is being carried out with the help of Wildlife Institute of India, Indian Council of Medical Research & WAPCOS. He stated, that <b>final plan would be prepared within a year</b> .	
33	A	A3 p8	<b>CAD programme/progress</b> Programme/ works progress on canal networks construction (Annex to 32 <sup>nd</sup> meeting Agenda) and NVDA was examining. <i>Progress to be reviewed by members.</i>	Plan within a year - not even implementation. <b>Potential infringement of clearance condition</b>
33	M	P10	Physical & financial position submitted (Annex 8). Planned to complete canal system first, with matching OFD works. <b>Construction of field channels (FC) and OFD structures to be entrusted to registered WUA with guidance given by SSNNL.</b> Sardar Sarovar Project authority had formulated construction procedure and management policies for distribution network. Construction of internal roads for transport of farm products also included under OFD works of integrated development of CA.	
34	A	P19	<b>July 2000 field visit.</b> Main canal for construction has been divided into four sections as per major off-take branch canals: Phase I – Ch. 0.0 km to 144.5 km (Mahi Crossing) Phase II (A) – Ch. 144.5 km to 263.165 km (off take to Saurashtra branch) Phase II (B) – Ch. 263.165 km to 338.164 km [357.196 EM 2006 p35] (near off take of Kachhh br. canal) Phase II (C) – Ch. 338.164 km to 458.412 km (up to Gujarat-Rajasthan border)	
34	M	Ann	SC: The current stage was clearly beneficial. The three stages could be identified as follows. Stage: 1. covers the period roughly from the completion of SS Dam to the year 2015. Events occurring during this stage include # a. Sardar Sarovar Project Canal Command will have reached full development and requires diversion of some water b. The upstream demand will reach about 8 MAF and c. The NS Dam will have been built and placed in operation 2. covers the period from 2015 and 2030 during which the demands upstream of Sardar Sarovar Project will continue to grow and reach about 12 MAF still below the volume of 18 MAF that Madhya Pradesh can take in a 75% year	

What are negative effects at this stage (i.e. after 30 years)? What measures are in place to mitigate?

39	A	C p5	<p>3. covers the period up to and beyond full basic development CAD plan is required to be prepared and <b>implemented commensurate with development of irrigation in CA</b>. Stipulations in clearances required that:</p> <ul style="list-style-type: none"> <li>• ...</li> <li>• Past experience of irrigation projects have revealed that main and branch canals are completed up to the end <b>but in the absence of micro-level networks</b> to take irrigation water up to the outlet, corresponding irrigation benefits do not start accruing in spite of huge financial investments made. To avoid this <b>the State should draw up an implementation schedule, segment wise, for completion of canal network, in such a way that a segment of the canal network, taken up from head reaches is completed in all respects so as to make the irrigation waters available</b> for the designed potential of that segment, up to the outlet in that particular segment</li> </ul>	<p><b>Check:</b> when will micro-level networks be constructed – after irrigation commences? <b>Potential violation/ infringement of clearance?</b></p>
39	A	C p6	<p>With attainment of 110.64 m RL, irrigation would be available for Phase I of CA of Gujarat:</p> <ul style="list-style-type: none"> <li>• CAD plan for Phase I would be <b>required</b></li> <li>• Implementation of water delivery and drainage system along with implementation of measures proposed in plan for safeguarding the environment would be <b>required</b></li> <li>• Downstream environment for drinking, health, flora and fauna, salinity ingress, breeding of fishes, water quality etc are <b>required to be addressed</b>.</li> </ul> <p>Status: <i>CAD plan</i>: – Phase I Gujarat submitted. Phase II A and IIB in Gujarat and for Rajasthan <b>awaited</b>.</p> <p><i>Implementation of water delivery and drainage system</i>: – construction Canal Phase I and IIA completed in all respects. IIB in advance stage of completion. Surface drainage is being provided <b>up to 40 ha chaks</b> concurrently with construction of canals. Work of survey investigation, planning, designing and estimating up to 40 ha (macro planning) for 52 blocks (excluding the 4 blocks falling under Bara Tract) has been completed [in Phase I (40A)]. Total 204 distributaries having length of 1166 km and 1635 sub-minors having length of 4766 km have been planned under the area of 52 blocks. Out of these, total 819 km length of distributaries and 1419 km length of minors completed up to June 2003.</p> <p><i>Implementation of environmental safeguard measures</i>: <b>awaited</b>.</p> <p><i>Plantations</i>: plantations on 2,900 ha have already been established.</p> <p><i>Downstream</i>: <b>awaited</b>.</p>	<p>Has finance been given for micro-level networks?</p> <p>Request status on downstream</p>

39	M	C p6	<p><i>Rajasthan. Initial plan submitted during 1990: Sub-group <b>directed for revision &amp; EIA studies.</b></i></p> <p><i>EIA studies:</i> Completed by WAPCOS. Area to be irrigated was increased.</p> <p><i>Preparation of Plan through ICCB: <b>progressing.</b></i></p> <p>GOR: draft CAD copies will be provided for circulation for discussions during next meeting.</p>	
40	A	C p6	<p><i>Development of water delivery and drainage system:</i> The work of survey, investigation, planning, designing and estimating below 40 ha (micro planning) for 52 blocks (excluding 4 blocks falling under Bara Tract) has been completed.</p>	[rest is same as 39A]
41	A	C p6	<p><i>Development of water delivery and drainage system:</i> [Distributaries and sub-minors] Out of these total 835 km/1166km length of distributaries and 2210 km length of minors completed up to June 2004. ??/ 4766 subminors</p> <p><i>Canal side plantations:</i> plantations raised on 3510 ha.</p>	
42	M	C p6	<p>Botanical Survey of India, Joint Dir: to reduce stress on natural vegetation, <b>CAD was expected to include schemes for plantation not only on canal banks but also on all available vacant land besides agro forestry and establishment of botanical gardens for conservation of flora of the region in accordance with the recommendations.</b></p> <p>Wildlife Institute India rep: several other major issues such as movement of wild ass across Rann of Kutch which are required to be addressed professionally.</p> <p>Chairman: ex-situ measures not always desirable and therefore alternative methods of protection/ conservation are required to be considered. Issue raised by WII and BSI required to be resolved through consultations/ discussion before implementation. All the environmental aspects have to be covered and needed safeguards implemented in identified areas. The state govts have to prepare micro level action plans for the purpose. GOG however mentioned that they were identifying a segment of about 44,000 ha where they plan to <b>commence irrigation</b> in the initial stages. They shall be submitting the <b>micro plans</b> for the measures needed to be provided in identified segments to NCA secretariat.</p>	<p>CAD expected to include plantations at locations additional to canal banks</p> <p><b>Request:</b> report on wild ass movements to identify if migration pathways restricted</p> <p><b>Request:</b> status of compliance with issues raised by Wildlife Institute India and Botanical Survey of India</p>
43	A	visit	<p>Visits were undertaken to the areas in Gujarat during June and November, 2005. Copies of the reports along with recommendations were circulated to the members &amp; invitees separately vide letter no Env4 (43)/2450-2485 dated 15/09/06 Key recommendations [summarised] below</p> <ul style="list-style-type: none"> <li>• CAD works (protective and restorative) – <b>Implementation of all identified Environment Safeguard measures is required pari-passu with the development of command area for which Government has to take immediate actions.</b></li> </ul>	<p><b>Immediate</b> action required.</p>

		Annex	<p>Observations of independent expert Prof. Ramaseshan and Prof R.K.Katti on the conditions of implementation of command area works are collectively placed at Annex XL-III (1).</p> <p>“I received the Draft Report of the Fourth Field Visit of the Committee, ESG, NCA and noted the contents. I regret to note that <b>the Report is silent or clearly wrong on many matters of concern including micro canals, micro drainage, groundwater, conjunctive use etc.</b> The Report to be submitted to the Subgroup as per its direction, should be clear with reference to observations at site and <b>should not white wash the obvious failings.</b> I regret to strongly disagree with the draft. In case it is to be submitted to the ESG without major modifications, this <b>note of dissent</b> with enclosures along with the Report may be submitted to the Subgroup as well as the Chairman, ESG for their consideration.</p> <p>Comments Site Visit to Command Area on 13/06/05</p> <ul style="list-style-type: none"> <li>• Minor, Sub minors, field channels and controls are essential for proper distribution of irrigation water to the fields. It was understood that they were ready only for two sites proposed for visit. During the field visit (reported as Demonstration, but in reality a visit to actual sites since otherwise the visit is meaningless at this juncture) <b>the embankment of the canals have not been compacted, the field channels had been crudely scraped and not dug and there were no controls at all, and so the micro channel system for delivery of water to the fields is not functional.</b> In the Meeting on 15<sup>th</sup>, Chairman and MD, SSNNL informed the Committee that the plans for .micro channel system will be ready in 3 months time. The implementation of any such plan is a prerequisite for proper irrigation and environmental control.</li> <li>• <b>No details of field drainage systems seem to exist. Only old drainage channels were seen in the fields and there seems to be no record of the micro drainage system, verification and validation of their capacity, outfall and adequacy or design for integration of these with the surface water drainage system</b> reported to be developed under the SS Project ESG has been repeatedly informed that action is in progress in this regard. It is too late now to claim that they are unnecessary or that WUS will take care of them at their whim and pleasure.</li> <li>• It is reported that WUS/field agencies will take care of ground water development and conjunctive use. Obviously SSNNL seems to operate as a surface water agency and there is no coordination at all with respect to groundwater development. <b>There is no detailed plan for development of groundwater at the village or command area/WUS</b></li> </ul>	<p><b>Note:</b> comments on <b>lack of compliance on CAD works</b> and <b>whitewashing</b> of field visit report</p> <p><b>Problems with minors, sub-minors and field channels</b>  “During the field visit ... the embankment of the canals have not been compacted, the field channels had been crudely scraped and not dug and there were no controls at all, and so the micro channel system for delivery of water to the fields is not functional</p> <p><b>Non-compliance with clearance condition (potential infringement)</b>  <b>Lack of field drainage/ micro-drainage system</b></p> <p><b>Note:</b> tactic of reporting measure as in progress and then at late stage stating it is not required.</p> <p><b>No conjunctive use planning</b></p> <p><b>There is no detailed plan for development of groundwater at the village or command</b></p>
--	--	-------	--	--

43	M	P6	<p><b>level and in the absence of even a joint use plan at WUS or slightly higher level, conjunctive use planning does not arise at all.</b> There seems to be only a lip service to the concept of conjunctive use of surface and groundwater. Integrated coordinated development of surface and groundwater is <b>essential</b> for optimal development of the limited water resources of the region. SSNNL and NCA cannot give up their responsibilities in this regard. It is unfortunate that even in areas of poor drainage and saline soils, action plans and designs at field level for coordinated development of surface and groundwater along with the relevant micro drainage systems do not seem to exist even though they are essential for optimal development and control of environmental impacts of irrigation.</p> <ul style="list-style-type: none"> <li>• Etc (see clear felling, drinking water)</li> </ul> <p>These lacunae are <b>serious and are considered to be the result of not realising the necessity to implement the last km of the surface water distribution system, the first km of the field drainage system and the groundwater system and D/S control which are essential for proper irrigation, drainage and environmental control.</b> If the field organisations are serious, there is no reason why they cannot be successfully tackled in a few years time. Kindly send the copies of detailed Water Delivery and Drainage Plans with necessary topographic details at micro-level at least for some of the areas as well as other documents promised as and when they are received. My specific observations are given in the enclosure, [inc]:</p> <ul style="list-style-type: none"> <li>• Replace “There is a need for conjunctive use” by “It is necessary to implement a well developed groundwater/conjunctive use plan, monitor the groundwater depth and quality and if necessary modify the development and use of water over time.</li> <li>• Add “Development of groundwater and its coordinated (conjunctive) use with surface water affects the optimal utilisation of the limited water resources of the region and also the environment significantly and so cannot be left to WUS. The management of the systems should be under the direct control of a field organisation even though the day to day operation of the systems is with WUS. It is hence necessary to develop action plans for coordinated development of groundwater and conjunctive use and develop the same under a field organisation so that socioeconomic and environmental disasters can be averted.</li> </ul> <p>The CMD, SSNNL pointing out that visit of the committee was undertaken last year and since several new developments have taken place thereafter ... He <b>assured</b> the Sub-Group that implementation works were making progress in the command area and downstream flows as promised to the Sub-Group were also</p>	<p><b>area/WUS level and in the absence of even a joint use plan at WUS or slightly higher level, conjunctive use planning does not arise at all</b> (no conjunctive use planning)</p> <p>even in areas of poor drainage and saline soils, action plans and designs at field level for coordinated development of surface and groundwater along with the relevant micro drainage systems do not seem to exist even though they are essential for optimal development and control of environmental impacts of irrigation.</p> <p><b>Failures serious and are considered to be the result of not realising the necessity to implement the last km of the surface water distribution system, the first km of the field drainage system and the groundwater system and D/S control which are essential for proper irrigation, drainage and environmental control.</b></p> <p>Development of groundwater and its coordinated (conjunctive) use with surface water cannot be left to WUS</p> <p>It is hence necessary to develop action plans for coordinated development of groundwater and conjunctive use and develop the same under a field organisation so that socioeconomic and environmental disasters can be averted.</p> <p>The CMD, SSNNL ... <b>assured</b> the Sub-Group that implementation works were making progress in the command area and downstream flows as promised to the Sub-Group were also</p>
----	---	----	---	--

43	M	P9	<p>being maintained.</p> <p>The Director (Environment), NCA referred to the discussions of the last meeting and drew the attention of the Sub-Group that measures planned for safeguarding the environment were not in place, micro network of distributaries was not ready and that annual targets related to provision of botanical gardens, health facilities on farm and off farm developmental works were small compared to the overall targets. He further pointed out that the activities necessitated on account of bringing irrigation in the areas, where it was not known previously, should have been incremental over and above the normal State plan. He also referred to the recommendations of the committee of the Subgroup in this regard &amp; drew attention of the members to the tabular statement annexed with the agenda papers which showed that <b>information on the most of the parameters was awaited</b>. Prof. R. K. Katti pointed out that designing &amp; implementing the drainage measures was sine-qua-non for development of irrigation and was inescapable specially in the conditions prevailing in Gujarat &amp; Rajasthan, where sub soil water is mostly saline. He enumerated the nature of soil deposits in Rajasthan and Gujarat to emphasize the need for proper planning and implementation of the safeguards in time.</p> <p>The CMD, SSNNL stated that the plan prepared included provisions for drainage &amp; water-logging in addition to various other safeguards but farmers, who are owners of the field, at this juncture do not intend to provide drainage lest they loosen the moisture content present in the soil. He referred to the visit of the committee and stated that <b>committee visited the areas where there was good rainfall yet no water-logging was observed by the committee</b>. He further informed that Gujarat was a major exporter of good quality cotton which is sensitive to water logging and no ill effects have been reported yet. He also referred to the monitoring proforma annexed with the agenda papers and stated that this proforma <b>needed modification to exclude certain issues</b> such as monitoring of the development of the fisheries in the command, which might be outside the purview of the Environment Sub-Group.</p> <p>In response to a question from the Chairman, it was informed that submission of CAD plan to form a part of environmental assessment was directed by the Planning Commission. However, for the SSP and ISP, as these plans were not in place at the time of clearance, the responsibility of overseeing &amp; implementing the plan was entrusted to the Narmada Control Authority. This was also a part of the order of the clearance issued by the Ministry of Environment &amp; Forests, accordingly, <b>it is imperative for the Sub-group to monitor implementation of the command area development plan</b>. Several studies were directed by the Sub-Group including development of fisheries in the command and the States were asked to update their plans to include recommendations of these studies.</p>	<p>being maintained.<b>Require:</b> flow data.</p> <p>measures planned for safeguarding the environment were not in place, micro network of distributaries was not ready and that annual targets related to provision of botanical gardens, health facilities on farm and off farm developmental works were small compared to the overall targets – <b>potential infringement of clearance condition</b></p> <p>The tabular statement ... showed that information on the most of the parameters was awaited.</p> <p><b>Note:</b> statement on no waterlogging of specific areas. <b>Check:</b> to see if these areas have been waterlogged at other times, any occurrence of waterlogging elsewhere, need independent assessment</p> <p><b>Note:</b> attempt to limit monitoring</p>
----	---	----	--	--

			<p>The updated plan received from the Gujarat State was circulated to the members for their observations and approval. To monitor the implementation, in accordance with the advice of the MoEF, a proforma which included targets contained in the plan was developed and circulated. Govt of Gujarat was requested to provide updates on the status of implementation of the planned safeguards. It was pointed out that <b>incase Govt of Gujarat proposes a change in the planning itself or there was deviation in the plan submitted, a revised plan is requested.</b> Prof Katti stated that <b>proper mechanism is to be generated / developed for addressing the drainage problem and it cannot be neglected only on the basis of what farmers could see at this point of time.</b></p> <p>After some discussions on the subject, the Chairman suggested that it would be desirable to monitor &amp; work for betterment of the command area and opinion of the experts is considered at every stage of development, specially when the area under consideration is large. He, however, suggested that the proforma designed &amp; developed may be modified to include or exclude the concerns through mutual discussions amongst officers of the MoEF, NCA and SSNNL. He further stated that this should be expedited at the earliest preferably by the end of January 2007 and reported to the subgroup.</p>	<p>Incase Govt of Gujarat proposes a change in the planning itself or there was deviation in the plan submitted, a revised plan is requested. Prof Katti stated that proper mechanism is to be generated / developed for addressing the drainage problem and it cannot be neglected only on the basis of what farmers could see at this point of time <b>Note:</b> requirement for revised plan if deviation from submitted plan.</p>
44	A	P5	<p>Micro plan received for 41,305 ha area. Irrigation already commenced over 2.5lac ha area, for which even plan awaited. <b>Infringement of Clearance Order.</b></p>	<p>Irrigation over 2.5lac ha area yet macro plan for 41,305 ha area. ESG itself states this is <b>infringement of clearance order.</b></p>
44	A	P11	<p>A copy of the micro-plan for development for CCA of 41,305 ha under Phase-I of the command was received during last week of <b>December 2005</b>. It was reported by the Govt. of Gujarat that an area of <b>2.5 lacs ha was already brought under irrigation.</b> The Environmental Management Plan for 2.5 lacs ha area brought under irrigation is yet <b>awaited</b>. During the last meeting, Govt of Gujarat desired change in the proforma designed for monitoring. In pursuance discussions were held and it emerged that change in the proforma could be considered after submission of the plan. GoG promised to submit the plan by the end of March 2007. <b>This is yet awaited.</b> <b>In Gujarat, stipulated action as per the CAD plan on formation of the farmers' co-operatives, volumetric water release to them, rotational water distribution, canal automation, conjunctive use etc are not yet operational as brought out in the table placed at Annex-XLIV-(3).</b></p> <p>Progress on scheduling, budget towards implementation of the Safeguard measures to contain identified negative consequences of the irrigation commensurate with proposed / practised irrigation, <b>even in the Phase-I areas is awaited.</b> The measures proposed in the CAD plan as outlined in the Annex – LXIII (3) have not yet been fully implemented.</p>	<p>The Environmental Management Plan for 2.5 lacs ha area brought under irrigation is yet <b>awaited</b> despite that “GoG promised to submit the plan by the end of March 2007.” Agenda dated July 2007.</p> <p><b>Note:</b> Gujarat CAD plan actions not yet operational</p> <p>Progress on scheduling, budget towards implementation of the Safeguard measures commensurate with proposed / practised irrigation, <b>even in the Phase-I areas is awaited.</b></p>



44	M	P12	Irrigation commenced in Phase I area. GOG submitted a copy of the revised Action plan June/July 2007. Preliminary scrutiny of the plan revealed wide gaps therefore decided to constitute an expert group (committee) to examine adequacy of planned measures.	Wide gaps in revised action plan submitted by GOG
45	A	P18 pdf	The committee of experts reviewed the Command Area planning & implementation and held discussions with the concerned officers of the State of Gujarat and suggested means for moving forward. Report of the Committee is circulated to all members for their observations. <b>Govt. of Gujarat assured submission of revised plan by the end of January, 2008.</b> The committee reviewed the progress on preparation of plan & diagnostic analysis studies being undertaken by Govt. of Gujarat during field visit undertaken from 12th to 13th Feb 2008. It was observed that diagnostic analyses are initialized and <b>preparation of plan is being firmed up.</b> Further progress shall be presented by the Govt. of Gujarat during the meeting.	Revised plan <b>assured</b> to be submitted by end Jan 2008
45	M	P10	Director (Env.), NCA apprised the Sub-Group about a special meeting of GoG, MoWR, MoEF and NCA Officers regarding preparation of revised Command Area Development Plan by Govt. of Gujarat, held on 23.4.2008 under the Chairmanship of Chairperson, ESG & Secretary, MoEF. It has been decided that GoG Officers would discuss the matter with NCA Officers and expedite submission of revised CAD Plan.	<b>preparation of plan is being firmed up</b>
46	A	P7 pdf	During the last meeting, it was decided that Government of Gujarat (GOG) officers would discuss the matter with NCA officers and expedite submission of revised CAD Plan. Accordingly, a team of GOG officers held discussion with NCA officers at Indore on 5-6 May, 2008.	<b>Note:</b> Suitable Phase I action plan not yet submitted, nor implemented, therefore <b>potential infringement of compliance condition</b>
34	A	P19	<b>Phase I</b> Was earlier programmed to be completed by June 1995, irrigation to start with dam construction up to RL 110 m by end July/August 1995. <b>The GOG have proposed to complete the works of the main canal in Phase I in all respects soon.</b> Total 23 branch canals (656 km length) in Phase I, 13 of which off take directly from NMC, remaining from branch canals. Civil works of 21 canals almost completed. Jambuasar and Kundhela Branch Canals off-taking from Vadodara Branch canal likely to be completed soon.	At 34M, in 1999/2000, GOG proposed to complete Phase I <b>in all respects</b> soon – this should have included micro-level drainage networks
36	A	Ann p43	Construction of Phase I along with distributaries almost complete. Surface drainage being provided up to 40 chaks concurrently with construction of canals. ... <b>The command area development activities and environmental safeguard measures will be taken when water starts flowing in the canals.</b>	<b>Request:</b> when did water start flow in any part of canals? Isn't this <b>infringement</b> ?
37	A	Ann p187	NMC Phase 1 works completed in all respects.	
44	A	P11	Work of branch canals in Phase I completed in all respect. A copy of the micro-plan for development for CCA of 41,305 ha under Phase-I of the command was received during last week of December 2005. It was reported by the Govt. of Gujarat that an area of <b>2.5 lacs ha. was already brought under irrigation.</b> The Environmental Management Plan for 2.5 lacs	

			ha. area brought under irrigation is yet awaited. During the last meeting, Govt of Gujarat desired change in the proforma designed for monitoring. In pursuance discussions were held and it emerged that change in the proforma could be considered after submission of the plan. GoG promised to submit the plan by the end of March 2007. <b>This is yet awaited.</b>	<b>See</b> above row, suitable revised action plan still awaited.
34	A	P19	<b>Phase II</b> For Phase II up to Gujarat-Rajasthan border, works in initial reaches started. Detailed construction programme for balance reach under finalisation. 27 branch canals, including 2 major branch canals, off-taking at 263 km (Saurashtra Branch Canal, 104 km long, water fall of 53.22 m for <b>32.73 km</b> (or up to <b>Ch. 59.49 km?</b> ) and needs water lift of 66.43 m for <b>71.23 km</b> (or <b>59.49 km to 104.46 km?</b> )) and 386 km. At 3 canal fall sites hydropower will be generated (45 MW) and will be utilised to lift water at 5 pumping stations in same branch. 117 MW required to lift water. The Works of SBC up to 88 km. Maliya Branch Canal and Vallabhipur BC have been taken up. By June 2000, about 90% earth works, 88% structure concrete works were completed. Further works of Saurashtra BC beyond 88 to 104 km and remaining works of 4 other sub branch canals, Dhrangadhra, Morbi, Limbdi, Botad BC to be taken up during 2000 and 2001. <b>Works are expected to be completed during 2005.</b>	What is source of remaining 72MW? Diesel generator?
37	Ann	P187	IIA works in ten packages for canal earthwork and 7 packages for major structures. Works in all 10 packages complete. All 7 major structures complete except Mohar Canal Syphon due by December 2002. Phase IIB works in advance stage of completion. Works in Phase IIC to be taken up in December 2001, land acquisition in progress.	Request: are Phase IIA, B and C canal works now complete? When will micro-level works be complete? Is all land acquired?
-	Letter to NCA/ SS	From SSNNL dated 27/12/4	Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and SSNNL. SSNNL letter dated 27/12/04. <ul style="list-style-type: none"> <li>Current status of CAD plan, copies of any revisions and/or additions since last version circulated to ESG members and details on any implementation on the ground – CAD plan for Phase I and II has been <b>completed</b> and sent to NCA via letter SSNNL/Env/ESG-40/437 dated 23.6.04 and ??/NPG/MEG/252/51 dated <b>29.11.04</b> respectively. Latest status on implementation of CAD plan is annexed as Annexure 1.</li> <li><b>Annexure 1: ... at present planned to complete CAD works in Phase I of Sardar Sarovar Project by 2006-7 and in Phase II by 2007-8. Plan to complete CA work may be reviewed after considering the progress to be achieved during 2004-5.</b></li> </ul>	This suggests that <b>irrigation</b> may have begun before <b>Phase I</b> completion. <b>Request:</b> completion dates for all phases, including micro-level drainage network.
36	A	Ann p44	<b>Rajasthan works</b> Main canal runs for 74 km. Irrigation to 89 villages, drinking water to population of about 3.0 lakhs living around irrigation canal. Trapezoid canal in section, lined by cement concrete. Max capacity at canal head 74.58 cumec, discharge requirement is 69.43 cumec. 9 distributaries of total length 282.30	

37	A	Ann p187	<p>km. Total length of minors and sub-minors is 485.0 and 636.0 km respectively. Also construction of head regulators, bridges, cross drainage works, escapes, etc.</p> <p>Construction of Main Canal in first 42.0 km reach has been taken up and earthwork <b>under progress</b>. <b>Entire NMC works in Rajasthan is scheduled for completion by 2005-6.</b></p> <p>Works 0 km to 48 km in progress. Earthwork and masonry structures from 0 to 30 km complete but for few patches where land acquisition problems encountered. Concrete lining in initial reach from 0 to 7.88 km completed. Tenders for earthworks, structures and concrete lining for MC from 7.88 km to 51.50 km invited, works likely to start soon.</p>	<p><b>Request:</b> completion date for all CAD works by GOR including micro-level drainage network.</p>
38	A	P15	<p><b>Entire canal works in Rajasthan scheduled for completion by 2009-10.</b></p>	<p><b>Request:.</b> Why being built without finalised detailed Project Report??</p>
38	A	P15	<p>Detailed Project report based on detailed EIA report of WAPCOS is being revised. GOR had earlier informed that the Agency was short listed for the work of framing Detailed Project Report. <i>Further progress awaited.</i></p>	
39	A	C p6	<p><i>Rajasthan. Initial plan submitted during 1990:</i> Sub-group <b>directed for revision &amp; EIA studies.</b></p> <p><i>EIA studies:</i> Completed by WAPCOS. Area to be irrigated was increased.</p>	<p>Request: reason for delay in finalisation</p>
41	A	C p6	<p><i>Preparation of plan through ICCB:</i> progressing</p> <p><i>Preparation of the plan through ICCB:</i> Plan submitted by GOR and circulated to Members for a review. A <b>phased programme with budget and monitoring awaited.</b></p>	<p><b>Request:</b> phased programme with budget and monitoring.</p>
42	M	C p7	<p>NCA Dir Env: action plan for implementation of environment safeguard measures (ESMs) received was not in accordance with directions given by sub-group and required revision.</p> <p>GOR, Sec Env: Rajasthan had adopted appropriate and approved technology for mitigating the negative impacts on environment which included measures like sprinkler irrigation and low delta much lower than that of GOG and scheme of plantations on canal banks.</p> <p>Prof Ramaseshan: <b>plan prepared by GOR if implemented as it is, would lead to large scale water logging and salinity in almost the entire command area.</b></p> <p>Suggested a <b>detailed review of GOR CAD plan</b> needs to be made by sub-group.</p>	<p><b>Request:</b> EIA studies of CAD plan</p>
43	M	P11	<p>Chairman: GOR should resolve issues through discussions/consultations and arrange a presentation in the issued resolved/ revised plan to sub-group in its next meeting.</p> <p>Representative of the Govt of Rajasthan stated that in pursuance of the last meeting of the subgroup discussions were held with expert members and concerned official of the Narmada Control Authority and response of the Rajasthan on the observation received were forwarded to the Narmada Control Authority, and that Rajasthan was awaiting approval of its plan by the Sub Group. The Director (Environment), NCA drew the attention of the Sub-Group</p>	<p>plan prepared by GOR if implemented as it is, would lead to <b>large scale water logging and salinity in almost the entire command area</b></p>

44	A	P12	<p>that the <b>planning and implementation of the environment safeguard measures were not properly included in the plan received</b> from Govt. of Rajasthan though directed by the SubGroup. The plan submitted by Rajasthan <b>included only recommendations on drainage and conjunctive use aspects</b> made by WAPCOS. There was <b>no EIA report</b> on biological components of the command area. Only a 10 page report containing general features was projected as EIA report. Besides the Environmental Management plan received from Rajasthan was not self contained, referring to the main project report at various places. As copies of the main project report were not available, the management plan could also not be scrutinized by the members. The preliminary observations of the expert members <b>raises apprehensions that the plan received from Rajasthan, if implemented, would convert the command area in the Rajasthan to a saline desert, as area under irrigation was increased through use of saline groundwater which in-fact should be unfit for irrigation without provision for leaching. It was proposed to send this report to Soil Salinity Research Institute, Kamal &amp; Central Ground Water Board for their opinion.</b> Govt. of Rajasthan was requested to send 5 additional copies of the DPR at the earliest.</p> <p>The CMD, SSNNL stated that he is organizing a meeting to discuss the issues related with problematic areas with the experts and officials of the Govt. of Rajasthan <b>during 1st Week of December, 2006</b> as the problems of salinity is common for Phase-II areas in Gujarat with that of Rajasthan.</p> <p>In Rajasthan for 2.3 million ha of GCA, Command Area Development Plan was required to be prepared and implemented commensurate with the development of irrigation in the command area. ... In pursuance a meeting to discuss Management Plan for Command Area Development Works of Narmada Canal Areas in Rajasthan, was held at 11.00 A.M. on 16th March, 2007 amongst the officials experts of Central and State government from Narmada Control Authority, State Govt of Rajasthan and Central Arid Zone Research Institute and it was agreed as under:</p> <ul style="list-style-type: none"> <li>Govt. of Rajasthan to prepare &amp; present a micro-plan for the areas proposed to be brought under irrigation, utilizing the expertise with CAZRI, considering the status of construction of the canal network. This plan shall be put up for consideration of the Sub-Group in advance of commencing irrigation in the area.</li> <li>A suitable agency preferably Wildlife Life Institute of India would be engaged for preparing an EIA report on Biological resources of the Command Area. Recommendations would be incorporated in the Environmental Management Plan. A meeting has been arranged to finalized TOR for the work to be assigned to WLI, Dehradun</li> </ul>	<p>No EIA report on biological components of the command area</p> <p>micro-plan for the areas proposed to be brought under irrigation ... shall be put up for consideration of the Sub-Group in advance of commencing irrigation in the area</p>
----	---	-----	---	--

			<ul style="list-style-type: none"> <li>A field visit shall be arranged during August, 2007 to the areas in Rajasthan, where irrigation is likely to commence soon.</li> </ul>	See CAD plan Rajasthan row for further progress
33	A	A3 p8	<p><b>Agro-chemicals (Run off affecting surface/ground waters)</b> Findings of JN College &amp; RD University study on “impact of agro-chemicals on water quality” presented at last meeting and model of preventative measures <b>assured</b> – progress to be presented by NVDA</p> <p><b>GOMP:</b> study assigned to JN Krishi Vishwa Vidyalaya, Japalpur</p> <p><b>P12:</b> Progress report received by GOMP, under scrutiny at NVDA level.</p>	<b>Obtain:</b> latest report: JN College & RD University study on “impact of agro-chemicals on water quality”
33	A	A3 p8		
34	M	Ann 3		
34	A	P22	<p><b>Drinking water/Other</b> Gujarat Water Supply and Sewerage Board will make arrangements to supply the water from the Narmada Canal System.</p> <p><b>Amount of water supplied per unit area in Sardar Sarovar Project command will be amongst the lowest in the country.</b> Average depth of surface water supplies for entire year measured at main canal head will be only about 53 cm over CA vs. 75-100 cm per crop season on most projects in the country. <b>Need very judicious and economical use of water. If farmers want water intensive crops, they will have to supplement canal water with well waters or reduce area of crops under irrigation.</b> Project authorities have contemplated conjunctive use of surface and ground waters. Water logging problem reduced where well irrigation is concurrently practiced.</p> <p>Site visit: Water available for Gujarat as per Narmada Tribunal Decision is significantly smaller than required by Gujarat plan for water resources development in Gujarat in Narmada Basin. Clarification to remove inconsistencies is needed to ensure the development is realistic and as per decision of the tribunal.</p> <p>Prof Katti comment from site visit:</p> <ul style="list-style-type: none"> <li>The concept used is networking village ponds, irrigation channels, bore well points to draw underground water in the entire state and produce a water grid approach to provide for drinking water, irrigation, industry and for other purposes in an integrated way. Conduct scientific analysis for optimum allocation of water and utilisation with maximum economic and welfare benefit to the state.</li> <li>Sources for storage of water and distribution: Village ponds are/will be suitably designed to store water and distribute it. Sources for storing water are: <ul style="list-style-type: none"> <li>Rain water</li> <li>Excess water from irrigation channels,</li> <li>Direct water from reservoirs through canal systems,</li> <li>Underground water drawn by bore wells and joined to canal water based on the principals of conjunctive use or directly delivered to village pond or to drinking water delivery system</li> </ul> </li> </ul>	Water-intensive crops not being discouraged
36	A	Ann p40		
43	A	Ann 3		

44	A	P11	<p>etc.</p> <ul style="list-style-type: none"> <li>During floods direct water from the rivers through appropriate available delivery systems.</li> </ul> <p>In addition Gujarat also planned to provide drinking water to Saurashtra and Kachchh regions through a separate drinking water project. Detailed project report and mitigatory measures planned on this project during the normal year and drought year are awaited.</p>	
33	M	P10	<p><b>Waterlogging/ drainage</b></p> <p>Drainage planned as part of OFD works to avoid water logging, soil salinity and inundation of command.</p> <p>Group of farmers to be supplied water on volumetric basis for conjunctive use, to avoid water logging. SSNNL VC, in response to question on water logging and drainage network, <b>“was of the view that the problem of drainage might arise 10-15 years later. However members of the sub-group were of the opinion that drainage aspect should not be neglected and should be implemented side by side.</b></p>	Request: rationale for this statement. When exactly may problem arise?
33	M	P14	<p>NCA executive member emphasized the need for adoption of conjunctive use and the drainage aspect. He <b>suggested that the drainage channels are to be provided parallel to the irrigation channel in time.</b> He further stated that the <b>canal automation was a novel idea however its performance under the given condition was not known.</b> Dr Katti suggested that the drainage channels were to be provided simultaneous to the irrigation channels and emphasized the need for laying down specifications for vertical as well as surface drains.</p>	<b>Review:</b> canal automation viability
34	A	P27	<p>Discussions and recommendations ... (7) <b>The construction of the drainage network will be completed simultaneously with the construction of major distribution network and completed on block to block basis so that it is ready for use by the farmers by which time the surface water becomes available for irrigation.</b></p> <p>SSNNL VC informed that considering the water scarcity in the command and uncertainty on commencement of irrigation, people would not like to drain out whatever little rain fall they are getting through installation of drainage network and land themselves in problems. <b>Therefore Govt plan to install drainage network after commencement of the irrigation.</b> Considering low water tables and that irrigation to delta of only 53 cm or less as against 75 cm in existing projects is proposed to be provided, volumetric and rotation water supply by warabandhi and other measures in place, it is expected that problem of water logging would not present a problem during initial irrigation.</p> <p><b>However detailed plans for drainage are included in CAD plan</b> under preparation. Special measures to contain water logging planned for Bara and Bhal tract. Prof. Ramaseshan suggested that some of areas where studies pointed out water table at about 5 m depth / basalt with overlying clay, advance action on drainage would be required. Further suggested water quality at outlet</p>	<p>Drainage network/ major distribution network completed concurrently</p> <p>NB: Govt plan to install drainage network after commencement of the irrigation.</p> <p>Are detailed drainage plans included?</p> <p><b>Request:</b> has advance action of water logging/ drainage been carried out in these high water table/basalt-clay areas?</p>

34	M	3 p9	of drainage may have to be assessed for ascertaining its impacts on users on fringe of CA. VC SSNNL: To take care of water logging sufficient planning is in place like the delta for command adopted as 53 cm which is sufficiently low, the farmers would be supplied water on volumetric basis for conjunctive use and computerised water distribution system will ensure strict control on water distribution.	<b>Request:</b> water quality monitoring at drainage outlets at CA fringes
35	M	8 p12	ESG Chairman stressed need for controlled use of surface and ground water and continuous monitoring in areas of drainage, water logging & soil salinity, water quality, impact on flora and fauna, effects on public health, socio-economic impacts etc. <i>requested details from GOG.</i> Prof Ramaseshan: <b>adequate measures should be undertaken to ensure conjunctive use of water. Suggested establishment of institutions for monitoring problematic areas and permit system for proper development of ground water. Ground water development should not be left to private parties. Suggested mathematical modelling for monitoring water table.</b> SSNNL Managing Director: special measures planned for problematic areas of Bhal and Bara tracts. Proposed canal lining would reduce seepage loss to about 10% of unlined canals.	Continuous monitoring of environmental impacts required  <b>Request:</b> establishment of institutions for monitoring problematic areas and permit system for proper development of ground water (ground water development should not be left to private parties). Modelling + sensors?
36	A	Ann p40	Drainage of excess rainfall, storm water from agricultural land for better crop productivity has been proposed at farm levels as well as at regional level. Command divided into 2 regions to prepare operational design and layout of surface drainage network commencing from 40 ha chak. The construction of the drainage system shall go on concurrently with the canals.	
37	A	Ann 6 p42	2 studies on <b>surface drainage</b> completed covering whole CA: <ul style="list-style-type: none"> <li>• Narmada-Mahi Doab covering Regions 1 to 4 through Core Consultants</li> <li>• Sardar Sarovar Project Command beyond Mahi covering Regions 5 to 13 through CES, New Delhi</li> </ul> <p>These 2 studies provide dependable base for planning agricultural drainage. In Phase I (Region 1 to 4) area, ground [water] levels are well below 5 m from the surface. In Region 4 (i.e. Bara Tract Area), special strategy is planned for irrigation. In other parts of CA (i.e. Regions 5 to 13), some pockets where ground water tables are at or above 5m from surface have been identified and planning for drainage is being done. For Region 7 (i.e. for Bhal area), expert group for planning for irrigation has been constituted.</p> <p>Re problems of water logging and salinity, Narmada Planning Group has taken advance actions:</p> <ul style="list-style-type: none"> <li>• Studies on survey and investigation of ground water resources</li> </ul> <p>Following infrastructure has been established in alluvial plain of command to get regular data on water levels, water quality and other hydro-meteorological</p>	<b>Obtain:</b> reports for these surface drainage studies <ul style="list-style-type: none"> <li>• Narmada-Mahi Doab covering Regions 1 to 4 through Core Consultants</li> <li>• Sardar Sarovar Project Command beyond Mahi covering Regions 5 to 13 through CES, New Delhi</li> </ul> <b>Obtain:</b> reports of studies by Narmada Planning Group on ground water resources.

39	A	C p5	<p>data:</p> <ul style="list-style-type: none"> <li>• Piezometers installation</li> <li>• Automatic water level recorders installation</li> <li>• Observation wells drilling</li> <li>• Long duration pumping tests conducting</li> <li>• Hydro-meteorological stations installation</li> <li>• Piezometer-net establishment</li> </ul> <p><b>Models have been developed using services of Indian consulting firms to predict change in ground level and quality applying various sets of assumptions:</b></p> <ul style="list-style-type: none"> <li>• Narmada-Mahi Doab - ORG, Vadodara</li> <li>• Shedhi-Sabarmati Area - CES New Delhi</li> <li>• Sabarmati-Banas Area – ORG, Vadodara</li> <li>• Beyond Banas to Rajasthan Border – Dalal Consultant, Ahmedabad</li> </ul> <p>CAD plan is required to be prepared and implemented commensurate with development of irrigation in CA. Stipulations in clearances required that:</p> <ul style="list-style-type: none"> <li>• Tree planting</li> <li>• A programme of drainage and ground water balance studies has been completed for Mahi Narmada-Doab. Such a programme must be completed for the areas beyond the Mahi. The Bhal, Saurashtra, Kutch, Sami-Harij and other areas require this a <b>pre-condition</b>.</li> <li>• State should set up a <b>special group of experts to study the siltation aspect in the main canals</b> under all operating conditions since such siltation of occurs is likely to pose a serious problem during the actual operation of the project and may require a huge expenditure for desilting as well as result into serious operational difficulties.</li> <li>• Past experience of irrigation projects have revealed that main and branch canals are completed up to the end but in the absence of micro-level networks to take irrigation water up to the outlet, corresponding irrigation benefits do not start accruing in spite of huge financial investments made. To avoid this <b>the State should draw up an implementation schedule, segment wise, for completion of canal network, in such a way that a segment of the canal network, taken up from head reaches is completed in all respects so as to make the irrigation waters available</b> for the designed potential of that segment, up to the outlet in that particular segment.</li> </ul>	<p><b>Request:</b> details of mathematical modelling for monitoring water table level and quality</p> <p><b>Request:</b> findings of group of experts looking at siltation aspects</p>
39	A	C p6	<p>CAD plan is required to be prepared and <b>implemented commensurate with development of irrigation in CA</b>. Stipulations in clearances required that: ... With attainment of 110.64 m RL, irrigation would be available for Phase I of CA of Gujarat</p>	
41	M	C p5	<p>NCA Dir ENV: <b>ESG decision and conditions contained in order of clearance required pari-passu completion of plans and their</b></p>	



41	M	C p6	<p><b>implementation commensurate with progressive irrigation.</b>  <u>As informed earlier about 39,000 ha area was irrigated last year and there is definite demand for irrigation on Phase I command.</u> To ensure ill effects of irrigation do not cause environmental degradation, measures recommended by EIA studies for safeguarding environment are to be implemented by GOG along with development of irrigation in a progressive manner. If farms are allowed to draw water as per their requirement without making use of groundwater though planned, 9 MAF water allocated to Gujarat will be insufficient to irrigate 3.4 million ha of gross command.</p> <p><b>Prof Ramaseshan:</b> laying out drains simultaneous to construction of canal is <b>essential</b> and one should not wait until water logging raises its head. There is a need to <b>monitor the water quality of the surface/ ground water, rise/ decline in the water table</b> specially in view of the salinity and the prevailing climatic conditions. This <b>problem may be more serious on certain tracts which are not favourable for irrigation and coastal areas.</b> He suggested that farmers themselves are unlikely to pump out the water specially when good quality Narmada water was available and <b>resources for sinking tube wells are scarce and uncertain.</b> Was commitment of the GOG that water would be supplied with low delta and on volumetric basis to <b>prevent negative impacts of irrigation. GOG therefore is required to provide financial and institutional support through well defined policy for ensuring consumptive use and also to assist the farmers to construct field drains</b> which may ultimately be emptying into drains along with the minors and sub minors.</p> <p><b>Prof. RK Katti</b> emphasised need for monitoring water quality both for surface as well as ground water and ensuring of conjunctive use. He stated that the land was in equilibrium for a long time and irrigation would shift this equilibrium. There was therefore a need for close monitoring of the above activities.</p> <p><b>Indian Council of Agricultural Research, Director General:</b> despite certain measures taken up in developing Indira Gandhi canal, serious problems of water logging were observed. He suggested identified areas could be tackled by mixing gypsum to reduce salinity.</p> <p><b>SSNNL MD:</b> there was no organised irrigation by GOG in any areas of Phase I or II as yet however <b>some limited irrigation</b> was being resorted to by farmers through pumping from the canal. As water table much below, problems of water logging not expected in near future. Drainage channels are being constructed simultaneous to construction of canal and GOG could <b>only educate farmers</b> on benefits of consumptive use but cannot compel them.</p> <p>Chairman: essential to develop the area before commencement of irrigation to prevent environmental degradation. In addition to the above there was a need for fixing tariff for irrigation, appraisal planning, avoiding risk of water logging, environmental considerations related to flora and fauna. If more water than what could be absorbed is allowed to be drawn it will have serious implications and</p>	<p>Where are tube wells being sunk? Exact location? How are they being financed?</p> <p>need for monitoring water quality both for surface as well as ground water and ensuring of conjunctive use</p> <p>Note: <b>problems of water logging in Indira Gandhi canal – could compare the two plans</b></p> <p>GOG could only educate farmers on benefits of consumptive use but cannot compel them. No commitment to ensuring conjunctive use.</p> <p>What is irrigation tariff?</p>
----	---	------	--	---

42	M	C p6	<p>therefore is required to be managed and monitored on a regular basis. Suggested that this could be supplemented by properly educating the farmers through educational programmes by the party States.</p> <p>SSNNL CMD: CA in Gujarat very large and measures for each area will be specific due to variations in geology, morphology, sociology and other factors. Therefore <b>not possible to develop the entire area before commencing the irrigation</b>. In most areas of Gujarat, water table was at much lower level and it could take several years from now <b>before any drainage measures would be needed</b>. He elaborated different measures such as lining of the canal, lower delta, volumetric supply of water as key features planned by GOG for first time in India to tackle the problems of water logging, salinity etc. Assured Sub-group of the commitment of GOG for implementation of all the needed environment safeguard measures as suggested by the Sub-group from time to time before irrigation.</p> <p>Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and SSNNL. SSNNL letter dated 27/12/04.</p> <ul style="list-style-type: none"> <li>○ Reports of any water logging in Sardar Sarovar Project command with details thereof – no case of water logging has been reported in Sardar Sarovar Project command due to application of irrigation water, so far</li> <li>○ Annexure 1: ... As per present policy of SSP, SSNNL will construct sub-minor with 100% lining and link drains, whereas field channels and field drain will be constructed by farmers through respective WUAs at their own cost.</li> </ul>	<p>Lack of commitment to drainage</p> <p><b>Review:</b> <u>by experts, if any water logging has occurred in the command area.</u></p>
43	A	Ann 3	<p>"There is no plan for surface drainage even in clayey, low water table and other problem areas. Existing micro drains do not seem to have been mapped or their capacity and outfall technically evaluated. It is necessary to have a proper micro drainage system draining into the surface drainage system of CAD. This implies that existing micro drainage systems are to be mapped; their capacity and outfall evaluated for technical adequacy; or else their capacity is to be increased or new drains designed and constructed so that a fully functional surface- water micro drainage system exists;</p>	<p><b>Note:</b> no surface drainage plan, even in problems areas, no mapping of existing micro drains and their capacity or functioning ... need to ensure a fully functional surface- water micro drainage system exists</p>
33	M	P10	<p><b>Canal realignment</b></p> <p>SSNNL VC, re realignment of canal in sanctuary reach where it bisects run-off Kutch, the greater with the smaller one, steps for providing safe passage through corridor is <b>under consideration</b>.</p>	
33	A	P9	<p><b>Irrigated agro-forestry in Phase 1</b></p> <p>– scientists of Guj Agric Uni &amp; Horti &amp; Forest College, Navsari to give recommendations, then draft plan to be prepared consulting with ICAR, New Delhi – <i>progress to be presented by GOG</i>.</p>	
33	M	P10	<p>Discussions undertaken with university and college and details collected. Phase 1 agro-forestry plan to be formulated after discussion with ICAR officers.</p>	<p><b>Review:</b> is agro-forestry plan part of CAD plan? <b>Request:</b> plan</p>

34	M	Ann	<p><b>Environmental effects / downstream effects/ status of environmental safeguard measures (ESMs)</b></p> <p>SC: HRW March 1993: <b>the overall conclusion of the team undertaking the assessment described in this report is that there are no downstream impacts whose magnitude and effect are such as to cause doubts to be cast over the wisdom of proceeding with the Sardar Sarovar Projects provided that <u>appropriate monitoring and mitigation measures</u> are applied.</b> Much of this work is already under progress ... The recommendations in this report are intended to provide a synthesis of their work and suggestions as to whether it might be modified to enhance its usefulness.</p> <p>HRW 1995: It is thought unlikely that any significant environmental effects will occur over the next 30 years as a result of the project. Some possible adverse effects have been identified, the main one being the affect of flood attenuation on Hilsa migration. This needs to be monitored and more studies undertaken to better understand the conditions which trigger spawning. Beneficial impacts in this period include reduced flooding and more reliable dry season flows as well as an overall improvement of the health and well being of the people to the reliable domestic water supply, improved nutrition and enhanced economic activity.</p> <p>The above report clearly demonstrates that the construction of the dam would result into more regulated and perennial flow into the river with an overall beneficial impact. It is also evident that until all the dams are constructed upstream and the entire flow of the river is harnessed, which is not likely to be in the foreseeable future, there is no question of adverse impact including the fishing activity and the petitioner's assertions in this regard are ill-conceived.</p>	<p><b>Check:</b> what are the appropriate monitoring + mitigation measures? Since much information will be outdated, should HRW do a reappraisal?</p> <p><b>Review:</b> limitations of this statement of no significant effects over next 30 years. What happens after 30 years – is long-term strategy in place?</p> <p>Check: what impacts already occurred. Direct field monitoring required.</p> <p>Check accuracy of statement “until all the dams are constructed upstream and the entire flow of the river is harnessed, which is not likely to be in the foreseeable future, there is no question of adverse impact including the fishing activity”</p>
35	M	9 p13	NCA Member (E&R): unlikely that significant negative environmental impacts will occur over next 30 years as result of Project. Some possible adverse effects have been identified, main one being effect of flood attenuation on Hilsa migration. These were being monitored.	
36	A	Ann p42	Flora and fauna: the negative impacts likely to occur due to the network revolves mainly around four aspects:	
37	A	P9	<ol style="list-style-type: none"> <li>1. water logging</li> <li>2. change in land use pattern and cropping pattern</li> <li>3. wildlife-human conflict in ecological zone</li> <li>4. canal structure as obstacle to movement of wildlife</li> </ol> <p><b>Some possible adverse effects might manifest during raising the dam height further to 100m. The expected key impacts are outlined in the note Annex 21 p193.</b></p>	

			<ul style="list-style-type: none"> <li>• Period of progressive filling to be kept to minimum for which releases from upstream reservoir to be ensured at appropriate time</li> <li>• Time lag 10 to 15 days (while raising blocks/refilling) depending upon hydrology and flow timing. Need to arrange for adequate supplies of water for downstream users and to contain salinity ingress up to observed limits</li> <li>• Pressure on downstream areas due to draw down and sudden upsurge after gap of 10 to 15 days – need to warn people down stream to avoid them being washed down and have signboards</li> <li>• Protect fishing in deep pools downstream of reservoir during these 10 to 15 days to protect aquatic organisms taking shelter there</li> <li>• Control measures to contain mosquito breeding in small ditches that would be formed downstream of reservoir during period of filling</li> <li>• [monitoring of?] changes in water quality downstream of reservoir during and after filling would be desirable and needed mitigating measures would be required.</li> </ul>	<p>Check: any people harmed due to upsurges? Any warnings taken place?</p> <p>Survey: downstream impacts inc. water quality changes pre/post impoundment</p>
38	A	Annex	Annex 18: downstream effects at 110. Some <b>possible adverse effects might manifest during raising the dam height further to 110m.</b>	
39	A	C p6	CAD plan is required to be prepared and <b>implemented commensurate with development of irrigation in CA.</b> Stipulations in clearances required that: ... With attainment of 110.64 m RL, irrigation would be available for Phase I of CA of Gujarat: Downstream environment for drinking, health, flora and fauna, salinity ingress, breeding of fishes, water quality etc are required to be addressed. <i>Implementation of environmental safeguard measures: awaited.</i> <i>Downstream: awaited.</i>	
39	M	H p9	Shekhar Singh: agenda papers not fairly detailed. Detailed plan for maintaining flows in downstream needed for perusal of ESG before any decision on this aspect could be taken. SSNNL MD: <b>reports on downstream environment were available</b> and suggestions made therein were being followed. He assured that SSNNL would be taking all needed measures presented on the agenda papers in time. NCA Director Env: as per award, GOG was required to assess the requirement of the downstream users and to release needed quantum of water for such users out of its own share.	<p>Detailed plan for maintaining flows in downstream needed for perusal of ESG before any decision on this aspect could be taken. SSNNL MD: <b>assured</b> that SSNNL would be taking all needed measures presented on the agenda papers in time.</p>
39	M	P10	The Chairman directed that there should be a formal plan for maintaining downstream flows. This plan should include detailed analysis of the requirement of the down stream users and monitoring of down stream release should be ensured.	<b>Require:</b> data on downstream releases, on daily basis

40	A	C p6	<p>Implementation of environmental safeguard measures: PROGRESS AWAITED:</p> <ul style="list-style-type: none"> <li>• conservation of bio-diversity. Establishment of botanical garden</li> <li>• development of aquaculture</li> <li>• health plan</li> <li>• water quality monitoring</li> <li>• limiting uses of pesticides/ weedicides</li> <li>• measures to contain water logging/ salinity / alkalinity</li> <li>• conjunctive use of water</li> <li>• engineering measures (vertical and horizontal drainage works)</li> <li>• installation of piezometers</li> <li>• agriculture development works (on farm/ off farm)</li> <li>• infrastructure/ industrial development</li> <li>• special provisions for Bhal and Bara tracts</li> </ul> <p>PLANTATIONS RAISED ON 2,900 ha:</p> <ul style="list-style-type: none"> <li>• canal side plantations (15,000 ha)</li> </ul>	<p>Limiting use of these chemicals how?</p> <p>Request: map of piezometer locations and lat/longitudes</p>
40	A	P17/8	During 39M chairman directed submission of formal plan for maintaining downstream flows and should contain detailed analysis of requirement of downstream users and monitoring of downstream should also be ensured. Copy placed at <b>Annex 3</b> .	Very basic plan
40	M	P15	Plan received is annexed for <b>review for adequacy</b> . Last meeting: there should be a formal plan for maintaining downstream flows etc. Formal plan received from SSNNL. Prof Ramaseshan requested copy.	<b>Review:</b> of plan by expert, for adequacy
41	A	P16	During 39M requested plan and timely implementation of needed safeguard during raising dam height to EL 110.64m. Plan was received and circulated in 40A, more time was needed to review. Dam height has been raised to EL 110.64m by end June 2004. Compliance report on environmental safeguard measures suggested by ESG during 40M <b>requested</b> .	Dam height raised before downstream plan reviewed + complete report requested – <b>potential infringement of pari-passu implementation of safeguards</b>
41	A	P17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - Downstream environment</i> – detailed plan to be submitted: <b>awaited</b>	
41	M	C p5	Botanical Survey India, Joint Director: to reduce stress on natural vegetation, CAD expected to include schemes for plantations not only on canal banks but also on all available vacant land besides agro forestry and establishment of botanical gardens for conservation of flora of region.	<b>Request:</b> statement from BSI on effects of not having plantations except on canal banks
41	M	C p6	SSNNL MD: plantations on canal bank have been taken up and there has been substantial progress.	

41	M	H p10	<p>SSNNL MD: reports submitted by HR Wallingford have been accepted by GOG for management of downstream areas and recommendation made therein <b>shall be followed for implementation.</b></p> <p>Prof Ramaseshan: comprehensive plan for management of downstream environment not yet available. Study report of HR Wallingford states that downstream management would depend upon a number of studies which were under progress at the time the report was submitted. A draft plan which was circulated and on which observations were made by him is not yet finalised. HR Wallingford in their studies of 1995 have brought out a series of actions required to be taken during pre and post impoundment phases of Sardar Sarovar Project. These measures included:</p> <ul style="list-style-type: none"> <li>• provisions for complementary flows for mitigating pollution in the downstream, restoration and sustainable development of mangrove and forest vegetation on Aliabet and Tawara Islands, addressing of the Socio-economics of the fisheries development downstream zone,</li> <li>• operational procedures for dam to facilitate survival of downstream biota, adequate monitoring of water quality including physical, chemical and biological parameters</li> <li>• developing of mathematical modelling for prediction of different operational scenarios for mitigation, studies on ecology and resources for downstream environment, narrowing of river channel</li> <li>• legal agreement between party states for regulated releases to ensure project works as planned</li> </ul> <p><u>Assumptions that water received in downstream through regenerated flows coupled with discharges from industries located downstream shall take care of needs is <b>erroneous</b> considering that such flows would be loaded with pollutants like pesticides, insecticides, municipal and industrial sewage.</u> Such releases downstream may also have to be diluted for keeping the surface as well as groundwater in good condition. <b>Reports on implementation of these measures was awaited.</b></p> <p>NCA representative: NWDT Award 1979 has not quantified any water for requirement of environmental control downstream. ESG has however directed minimum quantity of water required from environmental consideration must be released downstream of Sardar Sarovar Project. As per recommendation of MSU, Vadodara <b>45 cumecs of water flow restricted salinity ingress to 3 ppm at about 72 km from mouth of estuary.</b> CWPRS observed that <b>30 cumecs of water can keep this salinity ingress to about 75 km.</b> Besides salinity, issues related with health hazards, fisheries, conservation, river morphology, sedimentation, water table, pollution etc have to be addressed.</p> <p><u>ESG has directed for maintaining minimum flows downstream and accordingly even during closure of construction sluices, GOG maintained minimum flows</u></p>	<p>Compliance with HRW report recommendations for management of downstream areas. Note: downstream recommendations not yet implemented</p> <p><b>Request:</b> Plan for complementary flows</p> <p><b>Request:</b> dam operating procedures to prevent downstream effects</p> <p><b>Request:</b> mathematical modelling for prediction of different operational scenarios for mitigation, studies on ecology and resources for downstream environment, narrowing of river channel</p> <p><b>Request:</b> legal agreement</p> <p><b>Obtain:</b> water quality monitoring data</p> <p><b>Check:</b> water quality monitoring for pre and post impoundment periods</p> <p><b>Obtain:</b> MSU Vadodara study report on downstream minimum water quantity recommendations, and get <b>expert review</b></p> <p>45 cumecs = 1589 cusecs</p> <p>Reliability of figures? Request: salinity ingress monitoring – how far upstream of mouth is dam</p> <p><b>Request:</b> downstream water level data. How</p>
----	---	-------	---	---

			<p>by pumping through electric motors. <b><u>A breach in this condition was reported recently when flows downstream were stopped during repair of stilling basin of the Godbole gates.</u></b></p> <p>Chairman: necessary to maintain downstream flows ... without fail. Desired NCA <b>to monitor and evolve a mechanism</b> to ensure water never flows below the minimum specified. If feasible <b>should be monitored hourly.</b></p> <p>NCA Member E&amp;R: suggested could be ensured through Sardar Sarovar Reservoir Regulation Cmte constituted for reservoir operations and could be included in TOR of Cmte. Possibilities of installation of sensor etc to collect this information <b>through a real time acquisition system could be explored later on.</b> [GOG may inform the status of status of compliance during non monsoon critical months.]</p> <p>SSNNL MD: study report indicated that 600 cusecs of flow would be adequate for maintaining environmental downstream, and he assured that GOG shall be maintaining such flows as would be necessary for meeting the additional downstream requirements for safeguarding the environment</p>	<p>often have minimum flows been breached? [What are the specified minimum flows (30 cumeecs?), cf HR Wallingford values, 700 cusecs = 19.8 cumeecs (30 cumeecs = 1059 cusecs), still less than 1500 cusecs in HRW]</p> <p><b>Request:</b> status of implementation of real-time hourly monitoring of downstream flows instrumentation. Need equipment at more than one location downstream, to account for losses due to abstraction.</p> <p><b>Check:</b> study report limitations on 600 cusecs and request exact calculation of downstream requirements and compare with monitoring</p>
41	M	Ann 3	<p>ATR information table: SSNNL/Env/ESG-41/982 dated 10/13 December 2004. CAD &amp; downstream. Provides short notes <u>on the siltation aspects in the main canal &amp; soil salinity in the downstream areas in Bharuch &amp; Vadodara District.</u></p>	<p><b>Obtain:</b> ATRs [siltation, salinity]</p>
42	A	H p13	<p>Considering that adverse effects manifest during raising the dam, Sub-group, during M39 requested a plan and timely implementation of the needed safeguards during raising dam height to 110.64m. <u>In compliance a copy of the plan was received and circulated to members with 40A papers. Members desired time to study the plan. Dam height however was raised to the recommended height by end June 2004. A report on the ESMs towards compliance of the conditions/ stipulations/ directions/ recommendations of the Sub-group is awaited.</u></p>	<p><u>NB dam raised despite no review of plan nor assurance of timely implementation of its measures.</u></p>
42	A	Annex 4	<p>Status of environmental safeguard measures planned by GOG for implementation pari-passu with the commencement of irrigation, in the areas of Sardar Sarovar Project Command. SEE page 107</p>	
42	M	C p10	<p>NCA Dir Env: Last meeting ESG directed for maintaining minimum flows downstream towards requirements of environmental control and for evolving a mechanism to ensure that the water downstream should never fall below the minimum specified and could be monitored hourly. <b>Awaited.</b> Compliance report on HR Wallingford recommendations also <b>awaited.</b></p> <p>Chairman: requirement laid down for safeguarding identified environmental concerns shall also be ensured by GOG.</p> <p>Member Civil l/c E&amp;R: average of daily downstream releases as recorded by GOG are <b>being obtained</b> by NCA Baroda office. Recently on noticing that the spill over the dam got reduced on the last day of March 2005 due to decreased</p>	<p><b>Request:</b> maintaining minimum flows downstream towards requirements of environmental control and for evolving a mechanism to ensure that the water downstream should never fall below the minimum specified and could be monitored hourly.</p> <p><b>Request:</b> Compliance report on HR Wallingford recommendations</p> <p>NB daily downstream values not very</p>

43	A	Visit	<p>inflows and shutdown of RBPH, GOG was requested to operate the river sluices to let enough water downstream as per requirement which was promptly attended to by GOG. However requested GOG to delegate authority for regulation of reservoir and operation of river sluices to local Chief Engineer at Kevadia who should take necessary action immediately under such circumstances to avoid any delayed responses.</p> <p>SSNNL: Amplifying terms of reference of Sardar Sarovar Reservoir Regulation Committee to include monitoring of downstream releases is acceptable <b>however possibility of installation of sensors etc to collect this information through a real-time data acquisition system</b> also needs to be explored by NCA.</p> <p>Visits were undertaken to the areas in Gujarat during June and November, 2005. Copies of the reports along with recommendations were circulated to the members &amp; invitees separately vide letter no Env4 (43)/2450-2485 dated 15/09/06 Key recommendations [summarised] ... Observations of independent expert Prof. Ramaseshan and Prof R.K.Katti on the conditions of implementation of command area works are collectively placed at Annex XL-III (1):</p> <p>I received the Draft Report of the Fourth Field Visit of the Committee, ESG, NCA and noted the contents. I regret to note that the Report is silent or clearly wrong on many matters of concern including micro canals, micro drainage, groundwater, conjunctive use etc. The Report to be submitted to the Subgroup as per its direction, should be clear with reference to observations at site and should not white wash the obvious failings. I regret to strongly disagree with the draft. In case it is to be submitted to the ESG without major modifications, this <b>note of dissent</b> with enclosures along with the Report may be submitted to the Subgroup as well as the Chairman, ESG for their consideration.</p> <p>Comments Site Visit to Command Area on 13/06/05:</p> <ul style="list-style-type: none"> <li>It is learnt during the field visit that <b>there were a number of occasions with no downstream release at all which is a breach of the ESG direction and SSNNL undertaking that a continuous minimal release of 600 cusecs is to be maintained for the present</b> pending further studies as per the recommendations of IH, Wallingford. The <b>Chairman and MD, SSNNL was kind enough to assure the Committee that the minimal flow will be ensured.</b> Studies and action plans suggested by IH Wallingford need to be completed expeditiously to identify, evaluate and implement adequate measures for downstream environmental control.</li> </ul>	<p>informative. Need hourly data.</p> <p><b>Request:</b> early warning system if minimum downstream flows not met</p> <p><b>Request:</b> update from NCA on use of real-time sensors for water level monitoring</p> <p>NB <b>breach</b> of ESG direction and SSNNL undertaking</p> <p>Assurance that minimum downstream flow will be ensured (600 cusecs, 17.0 cumecs).</p>
----	---	-------	---	---



43	A	P5	Field visit June 05, summary of recommendations, prioritised actions: Ex-situ & in-situ biodiversity conservation in command: to be taken up before commencement of irrigation.	Ex-situ & in-situ biodiversity conservation in command: to be taken up before commencement of irrigation
43	M	P6	The CMD, SSNNL pointing out that visit of the committee was undertaken last year and since several new developments have taken place thereafter ... He assured the Sub-Group that implementation works were making progress in the command area and downstream flows as promised to the Sub-Group were also being maintained.	
43	M	P14	<p>The Director (Environment), NCA referring to the discussions of the last meeting pointed out that the Govt. of Gujarat have promised for maintaining minimum flows of 600 cusecs towards downstream requirement. Based on the analysis of the data received, <b>it has been observed that the flow has not been maintained continuously</b>. Further it was agreed to evolve a mechanism to <b>ensure that the water downstream should never fall below the minimum specified</b> and that it was required to be <b>monitored hourly</b>. <b>Compliance report on the recommendations of the H.R. Wallingford regarding management of downstream areas was also awaited</b>.</p> <p>The Chief Engineer, (Dam Design), SSNNL stated that the situation has improved, after the dam was raised beyond EL 110.62m. Govt. of Gujarat was making efforts for ensuring the assured releases of the water in the downstream. A copy of the letter containing data on downstream flow was presented during the meeting, in support. Regarding management plan for the downstream areas, he stated that several studies have been entrusted to the identified agencies in accordance with the recommendations H.R. Wallingford. Studies related to reservoir regulation were making progress and outcome shall be reported to the Subgroup on availability of the reports. The representative of the SSNNL stated that it was agreed that the terms of references of the Sardar Sarovar Reservoir Regulation Committee would be amplified to include monitoring of downstream releases and that the <b>possibility of installation of sensors</b> etc would be explored later on and as such this has to be ensured by the NCA. It was informed by Conservator of Forest, SSNNL that mangrove plantations were already completed and a report on the same shall be submitted to the Sub-Group. Regarding issues related with ecological studies of Aliabet and Tawara Island, <b>a detailed report</b> was promised.</p> <p>The Chairman desired that report submitted by the Govt. of Gujarat may be <b>examined and presented during the next meeting</b> of the ESG. He requested Govt. of Gujarat to expedite implementation of the downstream management plan in time.</p>	<p><b>Note:</b> downstream flow not being maintained continuously</p> <p>Only possibility of installation of sensors will be explored later on. How reliable is current monitoring methodology therefore?</p>
44	A	P5	<p>Downstream management plan (urgent) – to be prepared at the earliest without further delay – <b>not yet ready</b>.</p> <p>Downstream flows (immediate) – minimum quantity of water required for</p>	

44	M	P8	<p>protection of d/s environment is mandatory and has to be ensured – steps are being taken to streamline measures for monitoring.</p> <p>Director (Environment) NCA stated that a plan for management of the downstream areas below the SSP Dam upto the gulf of Cambay was required by the Sub Group in accordance with the conditions of environmental clearance. The Environmental Resource Management of United Kingdom - the Agency engaged for preparation of an EIA report for management for the downstream areas by Government of Gujarat had also made certain recommendation in 1994-95. The Govt of Gujarat assured the Sub Group for timely implementation of the recommendations. A plan for implementation of mitigative measures in the downstream reach of Sardar Sarovar Project as promised by Govt of Gujarat is still awaited.</p> <p>C.M.D., SSNNL stated that interim plan for downstream management was already in place. However the finalization of the plan is pending for want of completion of some of the studies, which are still under progress. After some discussions on the issue, Chairperson directed submission of the Downstream Management Plan before the next meeting of the Sub Group.</p> <p>DOWNSTREAM FLOWS: Director (Env.), NCA stated that in pursuance to the recommendations of the EIA studies, Government of Gujarat promised to ensure release of 600 cusec of water to fulfill the requirements of downstream areas to be monitored on hourly basis by the NCA. Though initially there were slippages but of late necessary arrangements have been made for monitoring by Sardar Sarovar Reservoir/Regulation Committee of NCA for the release of promised quantity of water as directed by the Sub Group. Managing Director, SSNNL stated that minimum required flow of 600 cusecs is being maintained on hourly basis. Shri B.G. Verghese pointed out that there has been considerable variation in the hydrological pattern, as presently north east is facing drought whereas there were floods in the desert areas of Gujarat &amp; Rajasthan. In view of this there was a need for study of impact of Climate change also. Dr. Shekhar Singh suggested that there was a need for setting up infrastructure for monitoring of downstream water management on a long term basis.</p>	<p><b>interim plan</b> for downstream management was already in place. However the finalization of the plan is pending for want of completion of some of the studies, which are still <b>under progress</b></p>
44	M	P12 PDF	Downstream mgt plan (urgent) – <b>action plan not yet finalised</b> by GOG	
45	A	P28 pdf	Downstream flows (immediate) – steps have been taken to streamline measures for monitoring by Sardar Sarovar Reservoir Regulation Committee of NCA. Progress on preparation of the Environmental Management Plan for Management of Downstream areas, in accordance with recommendation with time frame budget and implementation schedule is awaited.	Progress on preparation of the Environmental Management Plan for Management of Downstream areas, in accordance with

45	A	Ann2b	<p>On the recommendation of Environment Sub Group Gujarat entrusted ecological studies for the D/S areas, the report of this study is awaited. M/s H.R. Wallingford appointed by GOG for EIAIEMP of DIS areas of SSP in their report recommended release of 1500 Cusec towards environmental requirement. However, on the submission of Government of Gujarat, a release of 600 cusec of water towards compensatory flow was agreed by the Sub Group, which is being ensured by Sardar Sarovar Reservoir Regulation Committee. <b>Report on modified ecological regime in downstream area may be presented by Gujarat.</b></p> <p>The minimum flow to be let down or made available below SSP is yet to be determined by the ESG or the NCA. In the Agenda note for the 43rd meeting of ESG held on 27.11.2006 (Page 19) it was mentioned as under:-</p> <ul style="list-style-type: none"> <li>• "SSNNL/GOG assured that 600 cusecs of flow which is considered adequate by them for maintaining environment conditions in the down stream shall be maintained".</li> </ul> <p>Thus the minimum flow of 600 cusecs is the assessment of GOG on the basis of Wallingford report and <b>not the quantum approved by ESG or NCA</b>. But in the agenda of 7th meeting of the Sardar Sarovar Reservoir Regulation Committee (SSRRC) held on 10.3.2007 it was stated that minimum flow to be let down below SSP of 600 cusecs has been agreed to by the party States. It was also stated in the said Agenda of the 7th SSRRC that "the committee may deliberate and decide as to whether the quantum of water released down stream of SSP by GOG from environmental considerations either through river sluice or Godbole gate is to be accounted towards the share of GOG or not". The SSRRC appears to be proceeding further on the basis that down stream flow of 600 cusecs is approved by ESG. This can be inferred from Annexure III to the minutes of the said 7th meeting of SSRRC held on 10.3.2007, in which viewpoint of GOG on the requirement of water use down stream of SSP was given. Relevant extract from the said view point of GOG (in Annexure III) is reproduced below for ready reference:-</p> <ul style="list-style-type: none"> <li>• "Agenda item No. SSRRCNII-7/07. Requirement of water use downstream of SSP. The agenda item is required to be withdrawn on following grounds:- The Environment sub-group in its 41st meeting, held on 6.1.2005, while discussing item on "Review of the status of Environment Safeguard measures" while discussing the point (h) Down Stream Environment, has taken certain decisions with consent of all party States. The relevant portion of the minutes of the said meeting is enclosed as per Annexure-I. (Annexure 1 was not reproduced in the minutes of 7th SSRRC). Thus it is the decision of the environment sub-group which has been endorsed by the NCA . No party State has suggested any change in the recorded minutes of the said meeting and</li> </ul>	<p>recommendation with time frame budget and implementation schedule is <b>awaited</b>.</p> <p>The minimum flow to be let down or made available below SSP is yet to be determined by the ESG or the NCA.</p> <p>the minimum flow of 600 cusecs is the assessment of GOG on the basis of Wallingford report and <b>not the quantum approved by ESG or NCA</b></p>
----	---	-------	--	---

45	A	Ann	<p>accordingly, the said part of the minutes of the meeting was confirmed in the 42st meeting of the said Sub-group".</p> <ul style="list-style-type: none"> <li>• Thus GOG has stated that the down stream requirement of 600 cusecs has been endorsed by NCA. On behalf of GOMP the NCA is requested to make available a copy of the Wallingford report on the basis of which the minimum flow of 600 cusecs is arrived at, for examination. A copy of the letter dated 27.6.2007 sent to NCA is enclosed (Enclosure-I) for information of ESG.</li> <li>• In the agenda note for the 44th meeting of the ESG held on 16.7.2007, on page 18, the recommendations in the Wallingford Report are mentioned pertaining to provisions for (1) complementary flows for mitigating pollutions (2) operational procedures for dam to facilitate survival of down stream biota (3) developing of mathematical modeling and (4) dilution of releases for keeping the surface as well as ground water in good condition. These recommendations may increase the minimum flow to be let down below SSP. The requirements for navigation are also to be taken into account. The ESG may, therefore, clarify that the minimum flow of 600 cusecs is proposed by GOG and is yet to be approved by ESG or NCA.</li> <li>• One of the recommendations in the Wallingford report, mentioned in the Agenda for this item (44th meeting held on 16.7.2007, page 18) is regarding legal agreements between the party States for regulated releases to ensure that project works as planned. In this connection it is submitted that the Sardar Sarovar Project is being implemented under the provisions of the NWDT Award which are final and binding on the party States. No state can change unilaterally any of the provisions in the NWDT Award. Even the Court is prohibited from interfering with the provisions in the NWDT Award. NCA is set up to see that the project is implemented as per directions in the NWDT Award. Detailed directions are given in the NWDT Award regarding regulated release to be made available from upstream to SSP. Hence there is no necessity of entering into agreement between party States for letting down regulated releases to ensure that SSP works as planned. This is already being ensured by NCA through the SSRRC</li> </ul> <p>In enclosed letter ...</p> <ul style="list-style-type: none"> <li>• "The Managing Director, SSNNL pointed out that the study Report have indicated that 600 cusecs of flow would be adequate for maintaining environment down stream....."</li> <li>• In this matter, please make available study report mentioned in the said minutes for reference in this office.</li> </ul> <p>Enclosure: 27/06/07 letter to Chief Engineer and Member Sec, Sardar Sarovar Regulation Cmte, NCA, Indore from VK Parikh, Member (Engineering)</p>	<p>the NCA is requested to make available a copy of the Wallingford report on the basis of which the minimum flow of 600 cusecs is arrived at, for examination. A copy of the letter dated 27.6.2007 sent to NCA is enclosed (Enclosure-I) for information of ESG.</p>
----	---	-----	--	--

45	M	P14	<p>NVDA, Bhopal. Comments on minutes of 7<sup>th</sup> SSRRC meeting of 10<sup>th</sup> March 2007:</p> <ul style="list-style-type: none"> <li>• The Sub-clause No.III of clause .No.IX (of .NWDT award) regulated releases to be made by Madhya Pradesh for requirement of Sardar Sarovar Project inter alia States as below: “Gujarat may let down water from Sardar Sarovar for its downstream use by making specific indent for it and such releases shall reckon against its share.” According to the above provision, the quantum of water released down stream of SSP at the specific indent by GoG from environmental or other consideration should be counted towards share of GoG.</li> <li>• Also <b>note on water accounting</b>: calculating utilizable flow.</li> </ul> <p>Member (E&amp;R), NCA drew the attention of the Members to the comments of Govt. of Madhya Pradesh vide their letter NO.2206 dated 7.11.2007 (page 34-37 of the Agenda) asking for clarification regarding approval of Environment SubGroup or Narmada Control Authority with regard to minimum flow of 600 cusecs for maintaining Environmental conditions in the downstream areas.</p> <p><b>Govt. of Gujarat representatives informed that downstream requirement of 600 cusecs for Environmental purposes has already been endorsed by the Environment SubGroup and should not be reopened.</b> GoMP representatives asked for the copies of HR Wallingford report or any other report on the basis of which the minimum flow of 600 cusecs has been arrived at. After some discussions, it was clarified that minimum flow of 600 cusecs towards Environmental requirement for downstream areas has the endorsement of Environment Sub-Group and since this quantum of water could not be used by Gujarat and has to let down into the sea, it would not be accounted towards the utilizable flow of Narmada river or reckoned against the use by Govt. of Gujarat.</p>	<p>GoMP representatives asked for the copies of HR Wallingford report or any other report on the basis of which the minimum flow of 600 cusecs has been arrived at.</p>
46	M	P7	<p>Downstream management plan could be prepared after completion of the following studies <b>initiated recently</b>:</p> <ul style="list-style-type: none"> <li>• Morphological studies for River Narmada from Sardar Sarovar Dam to Bharuch.</li> <li>• Mathematical Model studies for routing of flows in River Narmada.</li> <li>• Mathematical Model studies for Assessment of water quality of Sardar Sarovar Reservoir.</li> <li>• Impact on ecology and fisheries in the downstream of Sardar Sarovar Reservoir.</li> </ul> <p>These studies are likely to be completed <b>within six to twelve months</b>. Thereafter, downstream management plan would be prepared.</p>	<p>Downstream management still not prepared, despite interim report being referred to earlier (in 44M)</p> <p>Yet interim plan was referred to in 44M with no mention of additional studies being required <b>NB</b> six to 12 months <b>before</b> downstream mgt plan preparation could even be initiated!</p>

33	A	P9	<b>Environmental studies - Rajasthan</b> <b>GOR:</b> Last meeting informed that Narmada Canal EIA completed and expected to be approved by October 1998, <i>progress to be reviewed by members and by GOR.</i>	GOR Narmada Canal I EIA completed and expected to be approved by October 1998
33	M	P11	GOR Principal Sec Env't: environmental studies completed by WAPCOS, report accepted by GOR. GOR had floated the international competitive biddings for consultancy to decide the further course of action. He agreed to provide more information soon.	
36	A	Ann p43	Submitted report on Environmental and Ecological aspects and remedial measures for Narmada Canal Project to MOEF. Studies on EIA of CA in Rajasthan assigned to WAPCOS. Revised draft final report available, in process of approval by state govt.	Command area EIA separate from canal EIA?
36	M	P13	<i>To review implementation of ESM, updated progress requested.</i>	
37	M	B p6	WAPCOS: executive summary of report provided (report submitted in 1998), <i>with view of seeking approval of ESG. Report to be circulated to members.</i>	<b>Obtain:</b> full WAPCOS EIA report
38	A	P15	Detailed Project report based on detailed EIA report of WAPCOS is being revised. GOR had earlier informed that the Agency was short listed for the work of framing Detailed Project Report. <i>Further progress awaited.</i>	
39	A	C p6	<i>Rajasthan. Initial plan submitted during 1990:</i> Sub-group <b>directed for revision &amp; EIA studies.</b>	
			<i>EIA studies:</i> Completed by WAPCOS. Area to be irrigated was increased.	
			<i>Preparation of plan through ICCB:</i> progressing.	
41	M	C p7	NCA: EIA studies for increased command areas were conducted by WAPCOS on the TOR approved by the ESG. Report suggested alternatives through modified technologies to irrigate 2.3 million ha and <b>revised plan</b> was circulated to members and their comments received in NCA secretariat have been forwarded to GOR.	
			Prof Ramaseshan requested that points raised by him should also be attended to. NCA clarified that replies received from GOR were inadequate and therefore GOR have been requested to <b>submit detailed plans</b> on the lines as submitted by Gujarat which is <b>awaited.</b>	
			<u>Chairman directed that GOR should examine the technological options and should choose appropriate approved technology for mitigating the negative impacts on the environment and report back during next ESG meeting.</u>	<b>Request:</b> request results of examination of technological options/ approved technologies for mitigating the negative impacts on the environment.
41	M	Ann 3	ATR information table: <ul style="list-style-type: none"> <li>• Ref: dated 13/12/04. <u>Progress on environmental management plan</u> (remark: <b>inadequate and not satisfactory</b>)</li> <li>• Ref dated 03.01.05 fax message. 2 pages from plan submitted as plan for management of environmental impacts (remark: <b>inadequate and not satisfactory</b>)</li> <li>• Ref dated 28.10.04. CAD. Table showing proposed cost of plantations along canal bank (remark: <b>inadequate and not satisfactory</b>)</li> </ul>	<b>Obtain:</b> ATRs <b>Note:</b> all progress on safeguards described as <b>inadequate and not satisfactory</b>  Request info on cost of plantations

42	A	Ann 5	<ul style="list-style-type: none"> <li>Ref dated 16.11.2004. CAD. Replies to observations of Dr S Ramaseshan (remark: sent to Dr S Ramaseshan)</li> </ul> <p>Letter from Superintending Engineer, Narmada Canal Project Circle, Sanchoe to Dr Pavan Kumar, Director Environment, dated 03/01/05. Discusses environment and ecology budget provisions for Rajasthan portion of canal, canal side plantations and states that <b>no separate lands for plantation shall be acquired</b>. At Annexure 5-1-3 of environmental action, tree species, suggestion made that a forestation area be planted with local species. The adverse impacts of the canal are referenced. No plantation will be required for any bio-drainage method. An extract of Detailed Project Report Chapter 7 is attached and this refers to alternative to canal side plantations of strip plantations would be costly.</p>	NB lower cost plantation chosen.
43	A	Ann	<p>Review of Report (EIA &amp; Management) on devt of Command Area of SSP in Rajasthan (by Dr Ramaseshan):</p> <ul style="list-style-type: none"> <li>The Executive Summary and Report on "Preparation of Detailed Project Report for Revised Plan of Utilisation of Narmada Water Allocated to Rajasthan" were reviewed. The Review Report follows:</li> <li>The Report reviewed is only a preliminary proposal for preparation of the Detailed Report and not the Detailed Report. It has a number of ideas that may and probably will not work. No detailed analysis, design, testing or simulation has been done to validate several important components of the proposal. In the absence of the above any of the suggestions for detailed design cannot be adopted without further detailed investigation vis a vis other feasible alternatives.</li> <li>In particular, before the irrigation of problem soils is considered it is <b>necessary to work out the following to avoid future catastrophe</b>. <ul style="list-style-type: none"> <li>The details of application of irrigation supplies to the field (perhaps from the diggies) for different crop sequences and soils in terms of frequency, depth of application and GW or SW;</li> <li>Operation of the canal / GW system, if necessary to fill the diggies.</li> <li>Simulation of canal and SW irrigation system;</li> <li>Simulation of Groundwater aquifer in terms of quality and quantity;</li> <li>Salinity control in terms of field testing and some soil/water quality simulation; it is seen that no flushing dose or drainage is provided implying no removal of salts;</li> <li><b>Justification is needed for irrigation with poor quality groundwater without dilution.</b> Loose spreading of Gypsum without proper control is not a technical solution for salinity control. In the absence of flushing and surface-drainage how</li> </ul> </li> </ul>	<p>Justification is needed for irrigation with poor quality groundwater without dilution. Loose spreading of Gypsum without proper control is not a technical solution for salinity control</p>

44	M	P9	<p>is the salinity controlled?</p> <ul style="list-style-type: none"> <li>Any proposal for irrigation of problem soils needs specific details on <ul style="list-style-type: none"> <li>Field testing of proposed irrigation schedules on different problem soils.</li> <li>Field irrigation schedules;</li> <li>GW pumping schedules;</li> <li>Canal wise design crop pattern, sequences, irrigated areas and irrigation plans;</li> <li>Surface water, groundwater and drainage simulations including quality;</li> <li>Planned salinity control;</li> <li>Economics of proposed irrigation system taking into account the capital and running costs for sprinkler, pumps, power supply, labour, maintenance etc. In addition to the canal system; and</li> <li>Details of monitoring and control systems to ensure that uncontrolled irrigation of problem soils with questionable irrigation practices do not lead to the destruction of the existing low level of productivity, and irreversible ecological and environmental damage. A loose WUA as it generally exists is not at all solution.</li> </ul> </li> </ul> <p>It emerged from the discussions that there was a need to carry out EIA of Biological Resources in the Command and a review of the irrigation plan was necessary, with the help of Central Arid Zone Research Institute, Jodhpur. Govt. Of Rajasthan has agreed on the suggestions for setting up a Multidisciplinary Expert group on the lines, these are set up by Govt. of Gujarat &amp; Govt. of Madhya Pradesh. Representative of the Govt. of Rajasthan state that Wildlife Institute of India also agreed to take up EIA studies, the terms of references of which are under finalisation.</p>	<p>Details of monitoring and control systems to ensure that uncontrolled irrigation of problem soils with questionable irrigation practices do not lead to the destruction of the existing low level of productivity, and irreversible ecological and environmental damage</p> <p>need to carry out EIA of Biological Resources in the Command and a review of the irrigation plan was necessary</p>
36	A	8 p10	<p><b>Control and monitoring</b></p> <p>In order to safeguard these benefits [fresh water to farming communities], control and monitoring was suggested by MOEF Secretary and ESG Chairman in the following areas from time to time:</p> <ul style="list-style-type: none"> <li>drainage, water logging and salinity</li> <li>water quality</li> <li>forest loss</li> <li>potential impact on flora and fauna</li> <li>effects on public health</li> <li>socio-economic impacts</li> </ul>	
36	A	Ann p41	Carrying out water balance studies and salt balance studies and the necessary	<b>Request:</b> locations of and data for continuous



36	M	Ap5	<p>monitoring: <b>during monsoon, when surplus waters likely in canal such waters will be used for flooding and leaching the saline soils. Continuous monitoring of salt and water balance has also been planned for such marginal soils.</b></p> <p>Director MOEF requested details on proposed monitoring and controlled release of water for avoiding water logging, salinity etc in CAD. SSNNL Mg Director informed <u>water logging expected only in 3 of 13 agro climatic zones of CA</u> and Expert group appointed decided that drains to be provided would be based on gravity flow besides envisaging conjunctive use. Agreed SSNNL provide a time schedule for implementation of safeguards commensurate with provision of water in canal system.</p>	<p>monitoring of salt and water balance particularly in marginal soils. Need daily average (and hourly statistics) data for number of years. Provide details of monitoring equipment.</p> <p>Request justification for this statement on limitations of waterlogging geographical extent</p> <p>Time schedule for implementation requested 36M</p>
36 39	M A	P13 C p5	<p><i>Requested reports on drainage, water logging and soil salinity.</i></p> <p>Stipulations in clearances required that:</p> <ul style="list-style-type: none"> <li>• ...</li> <li>• A programme of drainage and ground water balance studies has been completed for Mahi Narmada-Doab. Such a programme must be completed for the areas beyond the Mahi. <u>The Bhal, Saurashtra, Kutch, Sami-Harij and other areas require this a pre-condition.</u></li> <li>• State should set up a <b>special group of experts to study the siltation aspect in the main canals</b> under all operating conditions since such siltation of occurs is likely to pose a serious problem during the actual operation of the project and may require a huge expenditure for desilting as well as result into serious operational difficulties.</li> </ul>	<p>A programme of drainage and ground water balance studies is required to be completed in The Bhal, Saurashtra, Kutch, Sami-Harij and other areas as a pre-condition</p>
41	M	H p12	<p>Chairman: necessary to maintain downstream flows ... without fail. Desired <b>NCA to monitor and evolve a mechanism</b> to ensure water never flows below the minimum specified. If feasible <b>should be monitored hourly.</b></p>	
36	A	Ann p41	<p><b>Automated canal regulation, management</b></p> <p>Draft legislation prepared to regulate distribution and use of canal and ground water in state. On Sardar Sarovar Project there will be volumetric supply of water through computerised semi-automated operation system. Discharge from canals down to <b>8.5 cumecs (300 cusecs)</b> capacity will be regulated through automatic computer control. Quantity based tariff encourages economical use. Better water management further ensured through farmers associations and rotational water supply. Irrigation water depths actually required will be worked out through system of soil moisture sensors and observations of hydro meteorological and climatological parameters as related to crop growth stages and sprinkler methods of water application will also be encouraged.</p>	<p><b>Obtain:</b> legislation</p> <p>When will these be in place: tariffs, farmers association and rotation water supply, soil moisture sensors and observations of hydro meteorological and climatological parameters as related to crop growth stages and sprinkler methods</p>

36	A	Ann p41	<p><b>Bhal and Bara tracts</b></p> <p>Difficult for irrigation in view of high water table and salinity. Suitable forest development programme may be possible way of developing this area. Salt loving plants, having a high evapo-transpiration rate preferred and can help in controlling water table. <b>In the initial stage of development of irrigation in the command there will be excess water available.</b> This can be used over this area for initial leaching by way of surface diffusion. This can promote initial growth, plants will develop some resistance. Species like <i>Prosopis juliflora</i>, <i>Eucalyptus Artiplex</i> and other suitable plants can be tried. <b>No irrigation system can be thought of for this area.</b></p>	<p><b>Request:</b> water level and quality monitoring data for Bhal and Bara tracts.</p>
37	A	Ann 6 p42	<p>In Phase I (Region 1 to 4) area, ground [water] levels are well below 5 m from the surface. In Region 4 (i.e. Bara Tract Area), special strategy is planned for irrigation. In other parts of CA (i.e. Regions 5 to 13), some pockets where ground water tables are at or above 5m from surface have been identified and planning for drainage is being done. For region 7 (i.e. for Bhal area) expert group for planning for irrigation has been constituted.</p>	<p>What is planning for drainage in the pockets with groundwater table at or above 5m?</p> <p>What are expert group's findings for this area?</p>
-	NBA Letter	June 2005	<p><b>Canal breaches</b></p> <p><u>The breach of the main canal of SSP in August 2004 resulted in <b>submergence of 700 houses and 5000 hectares of land</b> with standing crops, while the breaches in the minor canals are creating serious problems for agricultural lands in Gujarat.</u> The beneficiaries are turning into the affected; the benefits zone is turning into the submergence zone.</p>	<p><b>Require:</b> press clippings on breaches</p> <p><b>Require:</b> independent review of canal breaches and their causes</p>
-	NBA Letter to Mr. Pradipto Ghosh Chairman, ESG	June 2005	<p><b>Use of power water for irrigation</b></p> <p>In addition, in the 40th meeting of ESG, it was stated that "<b>water might be drawn from the SSP for generation of power if envisaged but after generation of power it should not be utilised for irrigation in SSP command, until approved plan to mitigate negative impacts was implemented till then this water must be released into the Narmada river system</b>". However, in reality SSP water has been used for irrigation for over two years now, as we have seen as Gujarat Govt itself has been claiming through various means.</p>	<p><b>Require:</b> press clippings on irrigation</p> <p><b>Require:</b> plan to mitigate negative impacts of irrigation</p>
45	A	Ann (p42 pdf)	<p><b>Navigation</b></p> <p>Enclosure: 27/06/07 letter to Chief Engineer and Member Sec, Sardar Sarovar Regulation Cmte, NCA, Indore from VK Parikh, Member (Engineering) NVDA, Bhopal. Comments on minutes of 7<sup>th</sup> SSRRC meeting of 10<sup>th</sup> March 2007:</p> <ul style="list-style-type: none"> <li>As you know there is a proposal of providing navigation facilities on the Narmada from Hoshangabad to the Sea (637 km). The feasibility study is being carried out by WAPCOS and is in the final stage of its completion. The meetings convened by IWAI in this regard attended by Secretary, NCA. It may be stated the irrigation Ministers</li> </ul>	

			<p>of Madhya Pradesh and Gujarat had agreed in a meeting in Madhya Pradesh Bhawan, New Delhi on 23.02.1992 that "0.7 MAF water below SSP will be made available for navigation by both the States jointly and the position would be conveyed to the Central Government". IWAI had forwarded to NVDA the report of WAPCOS TEF study for development of navigation on the Narmada vide letter No.IWAI/Hy/1 (7)/2002 dated 20th July 2006 and' comments were sent to IWAI vide letter No.2327/II/9/12/Pt.IV/NVDA/E/W-2/05 Bhopal dated 12.09.2006 including the comments on requirement of navigation below SSP. Copy of the said comments is enclosed for reference. This aspect of requirement of navigation below SSP will have to be kept in view under "downstream requirement".</p>	<p>0.7MAF = 863,380,000m<sup>3</sup></p>
--	--	--	--	--

**[HR Wallingford]. Annex 1. Summary of recommended actions**  
**Environmental changes downstream of Sardar Sarovar Dam.**  
**Report EX 2750: March 1993**

Action		Timescale	Priority	Staff time (months)	Approximate costs	Comments	Downstream follow-up
<b>Immediate</b>							
1	Prepare plan to mitigate effects of initial dam closure*	Minimal	High	Minimal	Minimal	Subject to availability of OWRRS results*	<b>Request:</b> plan and monitoring of effects of initial dam closure
2	Prepare plan to mitigate effects of surges from turbines	1 month	High	Local 1m	Rs 12,500 *		<b>Request:</b> plan and impact analysis
<b>Short-term</b>							
3	Prepare and implement policy of monitoring and mitigating effects on fishermen	Ongoing	High	Local 3 m per year	Rs 37,500 per year plus direct costs	Direct costs include all costs of rehabilitation	<b>Request:</b> policy and implementation report
4	Data collection and workshop on fish ecology	2 years	High	Local 12 m	Rs 150,000	Possibly met by redefining CICFRI's tasks	
5	Salinity monitoring at freshwater intakes	Ongoing	High	Minimal	Minimal		<b>Request:</b> data
6	Study of flood risk to determine if flood zoning needed	6-9 months*	Lower	Local 12 m	Rs 150,000		<b>Request:</b> flood risk study reports and any proposed remedial measures. Need map of flood zones.
7	Monitor reservoir limnology to warn of poor quality releases	Ongoing	Lower	Local 1 m per year	(Rs 12,500 per year)	No additional cost if part of wider limnological monitoring	<b>Request:</b> monitoring strategy and action plan/ warning system
8	Coordinated monitoring of water quality in river and estuary	Ongoing	High	Local 6 m per year, intl 1/2 m	Rs 75,000 per year US\$ 9,000	Cost might be reduced by rationalising existing monitoring and using water quality probes	

Action		Timescale	Priority	Staff time (months)	Approximate costs	Comments	Downstream follow-up
<b>Medium-term</b>							
9	Study of low-flow hydrology and integration of items 12 to 15 below	3 months*	High	Local 4 m, intl 1 m	Rs 60,000* US\$ 15,000	To be undertaken once Stage 2 operating policy for SSP established	Has Stage 2 operating policy for SSP been established?
10	Reconnaissance study of domestic water supplies close to river	2 months	Lower	Local 3 m	Rs 37,500	Study required once releases from SSP are cut for several weeks	<b>Request:</b> report of study findings, for reconnaissance study of domestic water supplies close to river
11	Reconnaissance study of mosquito breeding in river channel	2 months	Lower	Local 3 m	Rs 37,500	As for 10	<b>Request:</b> report of study findings
12	Water quality and salinity model of river and estuary and study of effluent disposal options	12 months	High	Local 12 m, intl 2 m	Rs 150,000 US\$ 32,000 plus software costs	May include further modelling of estuary morphology, depends on 8	<b>Request:</b> model findings
13	Assessment of costs and benefits of providing compensatory flows	2 months	High	Local 2 m	Rs 25,000	Depends on results of 9, 12 and 14	Are compensatory flows required?
14	Policy options to safeguard freshwater intakes	2 months	High	Local 2 m	Rs 25,000	Depends on results of 9 and 12	<b>Request:</b> policy
15	Prediction of ecological changes particularly to fisheries	2 months	Lower	Local 3 m, intl 1 m	Rs 37,500 US\$ 18,000	Depends on results of 4, 9 and 12	<b>Request:</b> reports

Assuming Rs 12500 per month local and US\$ 18000 per month international

\* difficult to read text intl – cannot read clearly, assuming it means initial

***Key features brought out in HR Wallingford Report [EM 2006 p26]***

- Socio economic factors
- On farm/ off farm development works
- Municipal and industrial supply
- Public health
- Water quality
- Chemical used in agriculture
- Drainage, waterlogging and salinity
- Natural fisheries and aquaculture
- Forest loss and afforestation
- Flora and fauna
- Archaeology

***Proposed measures to prevent environmental degradation [EM 2006 p28]***

- Mechanised, well-controlled canal lining
- Provision of surface drains
- Conjunctive utilisation of surface and groundwater, limited water delta
- Better water management, automated canal regulation, rotation water supply on volumetric basis, and active participation of farmers
- Carrying out water balance and salt balance studies and the necessary monitoring
- Bhal and Bara Tract
- Biological resources and issues in the command
- Sanctuaries in the command
- Public health

***Shekhar Singh letter on CAD Phase I report to Shri Misra, 15<sup>th</sup> July 2003***

	Shekhar Singh Comments	GOG response [39] letter dated 29/08/03 from O Ravi SSNNL	Summary SS Comments	
G1	This plan should have been made years ago. The plan is being made in April 2003 when the irrigation is said to have commenced last year (2002) in an areas of about 100,000 ha. It would be important to study what the impact of the delay would be.	<u>Irrigation in a true and regular sense has not yet started as Project yet to be fully commissioned.</u> Even Phase I is distribution network comprising field channels & field drains yet to be constructed. <u>IBPT constructed in advance mainly to meet drought situation. Some irrigation has taken place in an ad hoc manner on a very limited scale which <b>has not been</b> taken into account in this integrated CAD plan.</u> The plan will come into operation after completion of canal system along with distribution system. Hence it is not too late to plan the CAD.	Plan Very Delayed. Study Impact Of Delay.  GOG response goes against clearance.	In what sense has irrigation started?  Location and amount of irrigation that has already taken place  Should construction be taking place before plan finalised?
G2	While a large number of studies have been carried out (from time to time, spread over many years and not at the planning stage), some of the major recommendations of these studies are overlooked. (For example, that irrigation should be avoided in the so called "supercritical area of the command" – in Zone 7. See <i>Critical Zones in Narmada Command Report for Zone 7 Extended Bhal Region</i> ) <sup>1</sup> . It would, therefore, be useful to get a comprehensive statement of the major recommendations of the earlier studies and their current status. Specifically, it is also not clear whether the recommendations made in the Wallingford Report (summary at annex 1) were actually acted upon. The SSNNL should give a detailed statement of the status of each recommendation.	Numerous studies referred to have indeed provided the requisite resource base for this plan. The important recommendations/ suggestions have not been ignored as alleged. However they do not pertain to Phase I such as: 1. recommendations regarding critical zone Bhal region. This region doesn't fall into Phase I of CA and will be covered in plan for Phase II. 2. <b>recommendations of HRW report Annexure 1 pertains to downstream environment of Sardar Sarovar dam and not to CAD therefore not relevant to this report. However recommendation regarding minimum flow in lower Narmada has already been implemented.</b>	Large Number Of Studies. Need List Of Study Recommendations	Phase II – has Malinga Canal branch been removed?
G3	Several of the recommendations of the study that call for review of the project design have been ignored and only mitigative measures are being	3. recommendation regarding wild ass: this again does not come within this Phase. Shall be taken care of in Phase	Impacts On Wild Ass – Maliya Branch Of Canal Required To Be Removed.	

<sup>1</sup> I do not recollect the exact title, but it is something like this.

	talked about. (For e.g. The WRI study on the <i>Impact of SSP Canal on Wild Ass</i> calls for cutting out one section of the canal totally – I think it is the Maliya Branch).	II.	No Feedback Of Studies Into Fundamental Approach	
G4	Chapter 7, relating to soil salinity and water logging, appears only to deal with the four regions of the command area between the Narmada River and the Mahi Doab. The larger remaining part of the command area, with nine regions (5 to 13), was studied by the CES Water Resources Development and Management Consultancy Private Limited, for the SSNNL. Their report, dated December 1992, states that a large proportion of the area under these nine regions would have TDS of over 3000 ppm and would, therefore, need special handling (p9.3-9.4). This CAD plan does not seem to have covered this large area and, as such is incomplete.	<p>4. CES study of 9 regions 5 to 13 regarding salinity and water logging: these areas are outside Phase I hence not covered.</p> <p>5. this is a plan for integrated CAD of Phase I comprising districts Vadodara, Panchmahals, Narmada and Bharuch only.</p>	Phase 2 Plan Required – Integrated Plan Over Entire Area	Phase II plan?
SS1	On page 2/3 (bottom of 2 and top of three), it is said that this will be " <i>the first project in India to plan simultaneous implementation of surface waters delivery and rain water disposal system.</i> " Yet, every year from 1995 onwards, it has been reported that in the initial part of the command where the canal network is most advanced, in the monsoons there are large areas that suffer from water logging as the canals have cut off the drainage. This has resulted in large crop losses in these areas. This is a clear indication that the drainage network is <i>not</i> being built simultaneously. The actual status should be reported.	Pre-feasibility level drainage study for Phase I completed in 1983. Out of 4 Phase I zones, zone 1 has high ground slope sufficient to ensure adequate sub-surface drainage. Similarly 46% area in zone 2 and 63% area in zone 3 does not require sub-surface drainage. Zone 4 Bara Track, the existing drain density of 0.5 km/ sq.km shall be enhanced to 1-1.5 km/ sq.km and for small, medium and large drains a drain coefficient of 4.50, 5.75 and 6.75 lps/ha has been adopted. <u>As the water table in Bara track is well below 5m, sub-surface drainage is not required.</u> For surface drainage extension of minor drains and remodelling of existing channels is required. This work is being carried out simultaneously with the construction of canal network comprising main canal, branch canals, distributaries, minor canals, sub-minors and field channels. Work related to construction of main canal and branch canals completed in Phase I and rest of work in progress.	Lack Of Timely Drainage Provision	<p>Drainage required in: 54% zone 2 37% zone 3 ... zone 4 Bara - enhanced existing drain efficiency</p> <p>Clippings on water logging in Phase I</p>



		Canal system provides for adequate cross drainage in form of siphons and bridges to maintain the natural drainage. <u>Reports of inundation are mostly from such areas where such inundations occurred even before the canal system.</u>		Confirm inundation locations and previous impacts through press clippings
SS2	On the top of page four it says, "It is evident that very few projects in developing countries have so much data gathered on such a wide variety of subjects. The immediate task is to analyse and synthesise the results of the studies, identify mitigatory measures where necessary and plan monitoring activities for inclusion in action plan, is a challenge." The analysing and synthesizing of results of the studies should have been done long ago and not at this late stage. As already mentioned, the impact of this delay ought to be determined.	Integrated CAD plan is product of detailed planning based on results of studies and recommendations/ suggestions of expert groups set up for the purpose. <b>Regular irrigation is yet to start, therefore not late.</b>	Lack Of Timely Analysing/ Synthesisising Of Study Results, Identifying Mitigatory Measures, Planning Monitoring – Determine Impact Of Delay	Expert group meetings
SS3	Page 16 talks about change in the cropping pattern. Its assumptions seem to be quite at variance with the ground reality. One of the important likely developments is that large number of farmers will go for sugarcane. This is evident from large number of sugar factories that have come up or are planned in the area that is the first phase of command. These factories have come up all waiting for the SSP waters. Also, in the first phase, excess water is likely to be available. Despite this, sugar cane has not been mentioned on page 16. This needs to be explained.	Total command of project worked out with allocation of 21 inches/ ha (53 cm) of water supplied annually for irrigation purpose. No irrigation project in country planned with such low water intensity. <u>Concept of protective and extensive irrigation through participatory irrigation management has been adopted for CAD. Beneficiary farmers will be discouraged to cultivate high water intensive crops such as sugar cane and banana.</u> Research centres have been set up to conduct studies for identify most suitable cropping pattern in CA. SSNNL has set up spearhead groups to disseminate information and create awareness amongst farmers for adopting best agronomical practices. <u>As per extant Government policy, no sugar factories will be set up in CA and due to availability of very limited water.</u>	Sugar Cane To Be Included In CAD Plan	<b>Check:</b> are any sugar cane factories set up in command area – what is extant government policy? <b>Request:</b> measures to ensure water-intensive crops are not grown <b>Request:</b> findings of research centre studies on most suitable cropping pattern for command  Check: none already existing in command?

SS4	Also, though tobacco is listed as a major crop in the command area, in <i>Sardar Sarovar: Environmental Management</i> , (October 2000, NCA, page 95), it is not even mentioned in the CAD. This needs to be explained.	Tobacco is traditionally cultivated in zone 1, 2 and 5. Since it is not a water intensive crop and WUAs are free to decide type of crop to be grown in VSA keeping in view availability of very limited quantity of water, this was not specifically mentioned in CAD plan. However cultivation of tobacco duly incorporated in detailed study on cropping pattern for CA.	Tobacco To Be Included In CAD Plan	<b>Check:</b> is tobacco in latest CAD plan?
SS5	Similarly, there is no mention of tree crops and dry area crops in the CAD. These need also to be focussed on.	SSNNL will focus on cultivation of value added crops such as tree crops, dry area crops, horticultural crops, vegetables and spices by creating awareness through spearhead groups set up for the purpose which has representatives from state agricultural dept, horticultural dept, agriculture university, engineering staff of SSNNL, NGOs and Gujarat State Fertiliser Company/ Gujarat Narmada Fertiliser Company.	Trees And Dry Area Crops To Be Included In CAD Plan	<b>Check:</b> are tree/dry/horticultural crops, vegetables and spices in latest CAD plan?
SS6	On page 20, the three classes of waters are set out. Class "C" – which is the excess water during the project build up is likely to cause serious problems by completely upsetting the very finely tuned, meticulously detailed, controlled water delivery that the project deems necessary to control the water logging and salinity problems, (See Water logging and Salinity section of the report.). Another problem will be that the use of these waters may be deemed by people to have created rights to this water for them. A more detailed and realistic plan is needed to meet with such eventualities.	<b>Class C water will not be allocated from the Sardar Sarovar reservoir for the purpose of irrigation in SSP CA.</b> Would be utilised to fill up village tanks in CA. Would also be released in en route rivers to enliven them. As in plan, water for irrigation in command would be released in predetermined measured quantity and would be given to WUAs only. They are required to distribute this water to beneficiaries on rotational basis as per delivery schedule decided by WUAs in consultation with project authorities well in advance. Water delivery via structures in fixed quantities and regulation of flow of water will be decided by canal automation system. <b>Therefore question of supplying water in excess leading to problems</b>	Impact Of Excess Water Before Project Completed, Issue Of Water Rights – More Detailed Plan Needed - Specific Targets	

		<b>of water logging and salinity would not arise.</b> Besides, creation of rights for use of surplus water will not be an issue.		
SS7	Page 21 talks about services to be provided for removing surplus waters harmful to crops. This essentially is the provision of drainage. Bullet point "C" says that water pumped to control groundwater that is suitable quality and water recovered from surface drains would be utilised for irrigation. But what about water that is <i>not</i> of suitable quality? What about the highly saline waters? Elsewhere in the report (Page 22), there is mention of "disposal areas" but there is only a mention – no details are given. It should be pointed out that the problem of disposal of saline waters is one of the most vexed problems and even in irrigation systems that are a hundred years old (like Punjab) this is still a major issue. It is critical to get a detailed plan of how this water is going to be disposed of and assess it for its environmental and social impacts.	<b>Chemical quantity of Phase I CA groundwater generally fair.</b> In most of Phase I area surface water and groundwater will be used for irrigation directly or with canal water. As per recommendations on studies of conjunctive use of groundwater by MacDonald & Partners UK in association with an Indian consulting firm, proposed to use buried concrete pipelines for conveying tube well water. Details of conclusions/ recommendations of this study have been taken into consideration while planning CAD plan as per page 55-56 of CAD plan. Under para 7.5 "Conjunctive use of water" at page 61-62, estimates for region-wise groundwater to be used conjunctively and that to be disposed of are worked out. Gross est. for CA 3351 M m3 (2.71 MAF) of usable groundwater and 8.16 M m3 (0.66 MAF) unusable to be disposed of as per study recommendations.	Disposal Of Groundwater Removed & Water Recovered From Drains That Is Not Suitable For Irrigation/ Of High Salinity. Where Are Disposal Areas? Eia Of Disposal.	<b>Request:</b> water quality data for Phase I command area, from multiple locations and over number of years. <b>Request:</b> status of construction of buried concrete pipelines for tube well water conveyance. <b>Obtain:</b> report by MacDonald and Indian firm
SS8	Page 23 mentions an overall irrigation efficiency of 65%, which is unrealistically high. Has this been achieved in other similar projects. Details need to be provided, along with justifications.	Overall efficiency in other Gujarat irrigation projects is 55%. Sardar Sarovar Project is planned and designed with proven technologies and new concepts therefore anticipated overall irrigation efficiency should increase and pegged at 65% due to: 1. adoption of rotational water distribution system with volumetric supply of water at fixed point 2. no irrigation water supply to any individual but bulk supply in measured quantity to WUAs only	Has 65% Overall Irrigation Efficiency Been Achieved In Similar Projects. Details And Justification Of How This Will Be Achieved.	<b>Review:</b> by expert

		<p>3. automatic remote controlled operation of canal system up to 300 cusecs capacity and manual/ semi-automatic control below 300 cusecs network</p> <p>4. restricted allocation of delta</p> <p>5. lining of entire canal network</p> <p>6. CAD activities</p> <p>Losses of water in canal systems carefully estimated. Canal losses can be broadly grouped as:</p> <ul style="list-style-type: none"> <li>• seepage and evaporation losses in main canal, branches and distributaries</li> <li>• seepage and evaporation losses in minors, sub-minors and field channels</li> <li>• field application losses</li> <li>• operational losses in entire conveyance and delivery system</li> </ul> <p>The losses have been based on following assumptions:</p> <ul style="list-style-type: none"> <li>• losses in lined system at 2 cfs/msft</li> <li>• losses in unlined system 5 cfs/msft</li> <li>• field application loss will be 20% of net irrigation requirement</li> <li>• distributaries, minors, sub-minors, whenever so run, will always run full</li> <li>• branches and main canal will run 290 days in a year</li> <li>• operational losses will be about 10 % of main canal releases</li> </ul>		
		Main project thrust is empowerment of beneficiary farmers in sustainable water resources management through		

		participatory irrigation management which should ensure actions towards institutional reform as well as improved governance, accountability, transparency and community participation. All these cumulative factors would certainly add to irrigation efficiency and therefore in our view achieving 65% efficiency is quite realistic.		
SS9	Page 29, last but one para, says that the implementation of the action plan will go on <i>pari-passu</i> with the phase one irrigation area. Two issues – one raised in third point of Overall comments – what about certain aspects that require design changes and hence need to be implemented before the project commences. Second issue is whether on ground the work is going on <i>pari-passu</i> or not – this needs to be checked as there is doubt about this – see point 1 above.	Recommendations/ suggestions of various studies for CA are given due weightage while planning and designing the canal network and taking up construction work in a phased manner.	CA Action Plan Measures – How Will Measures Requiring Design Changes Be Addressed? To Check If Work On Ground Is Going On <i>Pari-Passu</i> .	
SS10	Page 31 has the conclusion (Sec. 5.1 first line) – that "according to Studies conducted there will be no impacts on major fauna." This appears to be incorrect. For example, there is likely to be a huge impact on the wild ass, an endangered species. The various studies done on this aspect need to be summarised and their findings presented in support of this point.	There will be no adverse impact on major fauna and flora on account of Sardar Sarovar Project as inferred by various studies and surveys. It may be further noted that the endangered species of Phase I of CA...	Fauna Impacts – Need Summary Of Studies And Findings To Ensure No Impacts On Major Fauna As Claimed	
SS11	Page 32 talks about livestock. One major possibility is that livestock would suffer, as grazing land is likely to be lost over the years due to conversion to cultivation. Has this been assessed and planned for?	Possibility of suffering of livestock is remote and not based on facts. As per extant policy of Govt, grazing land of a village panchayat cannot be diverted for any other use without approval of Govt. On the other hand higher and better quality grass will be made available in Phase II of CA under Integrated Grassland Development Scheme. Further, large number of farmers will be cultivating <i>rabi jowar</i> in command which can be utilised as fodder by cattle.	Has Impact Of Loss Of Grazing Land On Livestock Been Assessed And Mitigated?	<b>Check:</b> has any grazing land been diverted for agricultural use in command area

SS12	<p>Page 48 talks about some of the areas that are at high risk of water logging and salinisation. In this page, as elsewhere in the report, the measures outlined to prevent these are very fine-tuned, elaborate, meticulous and needing huge coordination between large number of agencies. Page 48 says, "A very limited irrigation water allowance would be permitted. Groundwater extraction, and part mixing of saline water, improved water management and agricultural practices, leaching of surface salts by flooding the surplus spill waters of Narmada, salinity resistant agriculture and continuous careful monitoring of the groundwater table and salinity status through observation wells piezometers etc. will constitute the multi-pronged strategy for tackling the problem areas." For one, it is unrealistic to expect such a strategy to work. One very crucial thing in making the strategy work is the full participation of the people and taking them into confidence, especially about the fact that their lands are at severe risk and that they will be given only very limited water supplies. <i>Has this has been done and have the people been taken into confidence?</i></p>	<p>Phase I area if command is having good drainage efficiency and quality of ground water is also quite fair. Hence problem of salinity and water logging not likely to arise. But during irrigation to control ground water table and minimise problem of water logging, a very limited irrigation water allowance would be permitted. Continuous monitoring of ground water table and its quality will be carried out; use of groundwater either directly or with conjunctive use will be practiced. Necessary awareness will be created for adopting land and water management techniques for optimising land and water use efficiency through Participatory Irrigation . Experience shows that wherever farmers have been actively engaged, overall management of irrigation systems and water use efficiency has significantly improved. After examining pros and cons of Participatory Irrigation Management concept has been decided to secure active participation of beneficiary farmers in CAD with an ultimate objective of achieving long-term balanced and environment friendly growth.</p>	<p>Have People Been Informed That Lands At Severe Water Logging And Salinisation Risk And That They Will Receive Only Very Limited Water Supplies?</p>	<p><b>Request:</b> water level and quality monitoring data</p> <p><b>Request:</b> detailed plan for implementing Participatory Irrigation Management</p>
SS13	<p>Another important pointer of the workability of these measures is given in the report itself. On page 102, it says, "The phase I area will have plentiful amounts of water available during the first stage of project development, such that there will be little or no incentive for development of conjunctive use by individual farmers and "worst-case" conditions for water logging might prevail."</p>	<p>Suitably addressed in item 6.</p>	<p>Incentive For Development Of Conjunctive Use By Individual Farmers To Avoid Worst Case Conditions For Water Logging</p>	
SS14	<p>Page 49 once again asserts that the construction of drainage system is going on concurrently with canals. This assertion has already been questioned above. It needs an explanation.</p>	<p>The construction of drainage system is going on concurrently with canal network.</p>	<p>Need To Confirm Drainage System Construction Is Concurrent With Canals</p>	

SS15	Pages 55-60 describe the large number of detailed measure that will be required to prevent water logging and salinisation. The workability of these measures has already been questioned above. Another issue that comes up through these pages is that it is expected by the SSP that in the regions 1-4 (first phase of command), medium rivers like Dhadhar and other streams will form the main drains. Now, it is acknowledged that these are today only seasonal rivers. What will happen when these dry rivers / streams carry the load of saline drainage waters in the non-monsoon months? This will have serious impacts on the areas through which they pass. Has this been studied and assessed? If so, the findings need to be disseminated.	Rivers like Dhandhar, Vishwamitri, Rangai, Orsasng, Heran, Dev, Jambuva and Meni fall under zones 2 and 3 which are having good ground water. Hence problem of salinity will not be there.	Use Of Seasonal Rivers As Drains For Saline Water. What Are Impacts During Non-Monsoon Months Of Their Carried Load – Has This Been Studied And Assessed, Need Report On Findings.	<b>Request:</b> current/historic water quality monitoring data for these rivers, pre/during/post monsoon
SS16	The issue of water quality in the command (page 102-) is dealt with most cursorily. It appears from this that there is no plan to deal with this issue adequately. A far more professional plan needs to be developed.	Suitable mechanism already in place which involves monitoring of ground water quality four times a year during January, May, August and October. Further areas having saline ground water and depth of 0 to 5 m are identified to take care of drainage. Therefore problems relating to water quality in command not anticipated in Phase I project.	Need Adequate, Detailed Plan On Addressing Water Quality Issues On CA.	<b>Request:</b> monitoring data
SS17	An important aspect in water quality is that contamination of the waters is expected in the command area due to fertiliser and pesticide residues, salinity, irrigation return flows, industrial discharge etc. This is outlined on Page 102 in "Issues". Then, at the bottom of the page, it is stated "Projected demand is based on prevailing population estimated and accepted per capita requirements after subtracting all assured supply alternatives". What this means is that the SSP will assume that the village will use all the water resources available to it for drinking and domestic and cattle water needs, and SSP will supply only additional water. But these very water resources of the village are likely to be degraded due to contamination resulting directly or indirectly from the project. Yet, there is no cognisance of this	Drinking water to villages having saline ground water and water with high fluoride content will be supplied by Narmada water. Besides due care shall be taken to see that residual drainage water does not contaminate existing assured supplies of water. Therefore observation that water resources of villages are likely to be degraded due to contamination resulting from project is not correct.	Contamination Directly / Indirectly Occurring Due To Project Will Degrade Basic Water Resources Of Villages – Need To Study And Mitigate Effects On Village Water Quality.	<b>Request:</b> how will drinking water be supplied to villages. Provide details of equipment and labour costs and implementation schedule.

	problem. This needs to be studied and added.			
SS18	Under "Mitigation" (Page 103), it is stated that "The mitigation plan would include guaranteeing minimum flow in rivers...". While this is a welcome recognition, it should be pointed out there is not a single river or dam project in Gujarat where this principle has been accepted. (Including in SSP). Now to ensure minimum flows in rivers would mean re-designing the operation if not the structures of virtually every river project in the state. How is this to be done? For example, the Action Plan expects that one of the medium rivers – Dhadhar – will play the most important role in drainage. One of the tributaries of Dhadhar is the Vishwamitri. On this river, near Baroda is a dam and reservoir – the Ajwa - which supplies water to the city. Due to this dam, the river is virtually dry below (including where it passes through the Baroda city). To now make sure that Vishwamitri will always have a minimum flow is a welcome step – but will mean re-writing the operating rules of the Ajwa reservoir and importantly, releasing water from it into the river in all the non-monsoon months. Will the Baroda Corporation, which is already crying that they are water deficient, allow this? This section needs to be re-examined and made realistic.	Narmada Main Canal along with its conveyance system crosses number of rivers. Hence with respect to availability of surplus water after considering the requirement of the CA and domestic, municipal and industrial use, a minimum flow in rivers will be maintained in downstream of the escapes provided on the canals. Also, a minimum flow on downstream of Sardar Sarovar dam as recommended by HRW report is also being maintained.	Mitigation: How Will Minimum River Flow Be Ensured? To Ensure Minimum Flow In Drainage River Dhadher. Ajwa Dam Will Need To Release Water To Dhadher Tributary (River Vishamitri) In All Non-Monsoon Months And Thereby Divert It From Baroda City Users – Will City Users Allow This? Needs To Be Re-Examined And Made More Realistic.	<b>Request:</b> details of minimum flow amounts required in NMC and in rivers the NMC crosses.
SS19	In the section on Planning (Page 103), the Action Plan proposes that there will be "restricted use of water until proper provisions have been made for transport, treatment and disposal of downstream discharges". Some of these measures are listed. It is totally unrealistic to expect that it will be possible to impose such a restriction. Perhaps the SSNL can give more details on how it proposes to achieve the stated objectives.	SSNNL has planned measures listed on p103 under section Planning for M&I water supply. M&I water is being provided by project and its treatment and distribution will be handled by Gujarat Water Supply and Sewerage Board and other authorities. They will consider these measures during preparation of management plan.	How Will Water Use Be Restricted (Until Transport, Treatment And Disposal Of Downstream Charges Provided For)?	
SS20	The section on groundwater contamination, under "Mitigation", (Page 105) states: "Mitigation of groundwater pollution necessarily involves corrective measures in regions of critical concern, in the form of fertiliser and chemical use plans. The project authorities would provide research for, and inputs into, the plans". First of all, it will be	4 agricultural research centres established in Phase I of command to conduct research and suggest guidelines on cropping pattern, proper use of fertilisers and chemicals, land and water management techniques and best agricultural practices. Therefore	How will fertiliser and pesticide use plans be imposed on such a scale	<b>Request:</b> detailed guidelines on proper use of fertiliser and chemicals, and land and water management techniques and best agricultural practices. How is this information being



	virtually impossible to impose / implement a fertiliser and pesticide use plan in such a large area. Secondly, it is clear from the wordings that such a plan does not exist and will be made in the future – whereas the irrigation has already started. This needs detailed explanation.	necessary steps have been initiated to mitigate effects of groundwater pollution.		disseminated?
SS21	In the section on Agricultural Chemical Use (Page 106), there is a statement (last line) "Multiple cropping is not likely so that pest problem will be reduced". But in the irrigation plans there is repeated talk about how the cropping will change from a single crop to multiple cropping. This contradiction needs to be resolved and a coherent plan needs to be made.	Term 'multiple cropping' used in this context means to grow more than 1 crop in a year and not repeating the same crop in a year. By this method pest problem will be reduced.	Plan for cropping, is it multiple or not, how will pests be affected	
	<p><b>Findings of TATA-IWMI Research Project</b></p> <p>The Tata-IWMI research team based at Anand, Gujarat has published results of a detailed survey of the first part of the SSP command area.<sup>2</sup>. Their findings and conclusions:</p> <ul style="list-style-type: none"> <li>A. While Water Users Associations (WUAs) have been registered, few are actually functional and not many are prepared to collect water fees on behalf of SSP. None of the villages has built a distribution system; instead, thousands of diesel pumps are likely to get pressed into service to convey water through rubber pipes.</li> <li>B. One idea that is deeply ingrained in the minds of farmers is that SSP's need to supply water to them is greater and stronger than farmers' need to use the water.</li> <li>C. Farmers and management committee members [of the WUA] we met assigned no seriousness or urgency to SSP's</li> </ul>	Noted up to this juncture that, out of total 1197 cooperative societies to be constituted for Phase I, 1015 such WUAs have already been constituted and registered. Indicates the enthusiasm and overwhelming response of beneficiary farmers to adopt concept of Participatory Irrigation Management. All WUAs are functional and willing to shoulder responsibility pertaining to Participatory Irrigation Management. SSNNL had posed project Phase I for financial assistance under centrally sponsored CAD programme to MOWR, GOI and this project has already been approved for inclusion by InterMinisterial Sanctioning Cmte at est. cost of Rs. 955.64 crore. Formal sanction awaited from GOI and SSNNL has already worked out detailed strategy to construct distribution system which includes construction of sub-minors, field	<p>Very few functional Water User Associations (WUAs). No villages have built distribution systems.</p> <p>How will SSP's policies be ensured to be implemented</p>	<b>Undertake:</b> questionnaire/ study visit to large sample of WUAs to identify how they intend to function and what problems they envisage

<sup>2</sup> Shah Tushaar 2002; *Framing the Rules of the Game: Preparing for the first Irrigation season in the Sardar Sarovar Project*; IWMI-Tata, Anand. Available at [www.iwmi.org/iwmi-tata](http://www.iwmi.org/iwmi-tata)

	<p>insistence on the operating practises it intends to pursue....All in all, farmers and local notables take SSP and the government so lightly that they are totally nonchalant about SSP's new water policy...</p> <p>D. The most difficult challenge in establishing SSP's rules of the game is in ensuring that its writ runs in the command area.</p> <p>These findings point out to the great difficulties in implementing the detailed mitigatory plans prepared by the SSP which require lot of control on the water supply and other farmer practises.</p>	<p>channels, field drains/ link drains with farmers participation till such time a separate Authority is constituted for the purpose. In this backdrop it is too premature to draw any negative inference.</p>		
--	--	--	--	--

G general

SS Shekhar Singh specific comments

AA specific comments

**42A Annex 4. Status of environmental safeguard measures planned by the GOG for implementation pari-passu with the commencement of irrigation, in the areas of Sardar Sarovar Project Command**

**A. Irrigation efficiency, water use, prevention of salinity and alkalinity, water logging etc**

	Planned measures	Progress		Follow up
		Physical	Financial	
A	Volumetric supply (crop and field demand based water releases) of Narmada water instead as per crop requirement: introduction of automation to assist in water release decision making to ensure that the available water in the reservoir is not unnecessarily diverted and cause degradation of the environment	Not yet in place		<b>Request:</b> when automation of water supply to be in place
B	To prevent irrigation-induced land and water degradation and reducing the chances of its misuse and to prevent the gap between the irrigation potential created and the potential utilised, tail enders' problems, water logging and salinity: <ol style="list-style-type: none"> <li>1. maintenance of low delta</li> <li>2. low water allowance (550 mm/ha)</li> <li>3. regulation of cropping pattern: changes between the planned and actual cropping pattern</li> </ol>	No progress reported		<b>Request:</b> progress report
C	Conjunctive use of ground (saline) and surface water in appropriate ratio	Progress nil		
D	Pre-monsoon and post-monsoon water table scenario:	No progress reported		<b>Request:</b> progress report
E	Important soil chemical parameters in the crop root zone and of the groundwater	No progress reported		<b>Request:</b> progress report
F	Vertical and horizontal drainage: <ol style="list-style-type: none"> <li>1. increasing drainage density and drainage coefficient for surface drainage</li> <li>2. introduction of short duration, low water requiring and salt resistant crops</li> </ol>	No progress reported		<b>Request:</b> progress report
G	Land consolidation, land levelling and in the construction of the low level irrigation and drainage network	Progress is nil		<b>Request:</b> progress
H	Limited use of pesticides/ insecticides etc	Progress is nil		<b>Request:</b> progress
I	Functioning of the village service area (VSA) to ensure a greater participation of the beneficiaries in maintaining the low level irrigation and drainage related infrastructure <ol style="list-style-type: none"> <li>1. a close liaison between the VSAs and the CAD authority</li> <li>2. the rights and responsibilities of the two are to be clearly defined</li> <li>3. a mechanism should exist to ensure that these are honoured</li> </ol>	No progress reported		<b>Request:</b> progress
J	Irrigation related on-farm developmental activities: <ol style="list-style-type: none"> <li>1. training the cultivators on all aspects of on-farm water management</li> <li>2. establishment of well managed demonstration farms to motivate them to initiate appropriate action</li> </ol>			
K	The measures of continuing nature such as setting up of research centre and farmers' training centre, regular monitoring of water table and soil salinity, monitoring of the impact of introducing irrigation.			

***B. Targets and the progress on implementation of environmental safeguard measures for the Phase I of the command. Incremental activities (Physical & Financial) necessitated on account of Sardar Sarovar Project are to be reported.***

	Suggested actions	Incremental planning	Annual targets		Achievements	
			Physical	Financial	Physical	Financial
1	<b>Agriculture development:</b> <ul style="list-style-type: none"> <li>Water course and field channel</li> <li>Land levelling and shaping</li> <li>Field drains and chak drains</li> <li>Support and assistance to farms in development of ground water in conjunction with the surface water</li> <li>Network of approach roads and eventually farm roads</li> <li>Marketing and warehousing</li> <li>Establishment of agricultural, research-cum-demonstration farms</li> <li>Co-operatives or farmer-friendly structures for inputs and credit facilities</li> <li>Provision for supply of seeds, fertilisers, pesticides etc</li> <li>Incremental communication facilities</li> <li>Incremental municipal and civil facilities</li> <li>Consolidation of land holdings</li> <li>Agricultural extension activities</li> <li>Problem areas of Bhal and Bara tract</li> </ul>	<ol style="list-style-type: none"> <li>subsidy proposed to water users associations</li> <li>education and training to farmers proposed</li> <li>public sector involvement under consideration</li> <li>five research stations of state agricultural research universities briefed on the need</li> <li>command area requirements included in the syllabus by the universities for extension training</li> <li>left to the farmers, only capsules for training</li> <li>emphasis on creating awareness in farmers on land consolidation</li> <li>trend shows less use of chemicals</li> </ol>				
2	<b>Public health:</b> <ul style="list-style-type: none"> <li>strict control on supply of water (volumetric supply)</li> <li>lining of canals</li> <li>surface drains</li> <li>drainage of borrow areas</li> <li>training at levels</li> <li>presumptive treatment</li> <li>curative treatment</li> <li>- NMCP</li> <li>- strengthening of CHCs</li> <li>- strengthening of PHCs</li> <li>- strengthening of sub centers</li> <li>- strengthening of urban health services</li> </ul>	Before commencement of irrigation				
				20 lacs		
				325 lacs		
				420 lacs		
				4 lacs		
				6 lacs		
3	<b>Water quality:</b> <ul style="list-style-type: none"> <li>water quality monitoring wells</li> <li>institutional arrangement for monitoring of surface water quality</li> <li>ensuring releases of fresh water for diluting the pollutants</li> <li>regulatory control for prevention of downstream environmental by</li> </ul>					

	<ul style="list-style-type: none"> <li>municipal and industrial sewage</li> <li>• surface and sub-surface drainage in region -1 to 4</li> <li>• regulation for pesticides control</li> <li>- research centers for biological control</li> <li>• integrated pest management</li> </ul>					
4	<b>Water logging and salinity</b> <ul style="list-style-type: none"> <li>• improving the quality of the soil maps</li> <li>• volumetric supply of water through computerised system</li> <li>• improving the design of drainage system. Re-use plan.</li> <li>• Ground water modelling with new data</li> <li>• Modelling of regions with rocky strata</li> <li>• Operationalisation of the drainage studies</li> <li>• Special works on coastal zone</li> <li>• Location of piezometers/well</li> <li>• Integration of GWDRC wells in the command</li> <li>• Institutional mechanism for monitoring water table/ quality</li> <li>• Legal/ financial framework for utilisation of ground water by the WUA for conjunctive use (included in the cost estimates of the Sardar Sarovar Project)</li> </ul>					
5	<b>Downstream environment:</b> <ul style="list-style-type: none"> <li>• Provisions for complimentary flows for mitigating pollutions in the downstream</li> <li>• Restoration and sustainable development of mangrove and forest vegetation on Aliabet and Tawara islands, addressing of the socio-economics of the fisheries development downstream zone</li> <li>• Operational procedures for dam to facilitate survival of downstream biota, adequate monitoring of water quality</li> <li>• Developing of mathematical modelling for prediction of likely impacts of different operational scenarios for mitigation</li> <li>• Studies on ecology and resources for the downstream environment, narrowing of river channel</li> <li>• Legal agreement between the party states for regulated releases to ensure that project works as planned</li> </ul>					
6	<b>Fisheries and aqua culture</b> <ul style="list-style-type: none"> <li>• Linking village tanks to distribution system in about 4,000 ha village pond. And other works from the budget of FFDA and loan from the bank</li> <li>• CAD plan on cost of Sardar Sarovar Project:</li> </ul>					
	- status paper			9 lacs		
	- modification in capacity of ponds			9 lacs		
	- major carp hatchery			15 lac		

	- project cells			9 lacs		
	• Control fouling from saline aquifers and agricultural chemicals					
	• Monitoring responsibilities	FFDA				
	• Arrangements for analysis of monitored information	Commission (F) GOG				
7	<b>Plantations in the command: Existing schemes (1980-1992)</b>		ha		ha	
	Departmental work prior to SSP					
	• Strip plantations		10,304			
	• Common lands		12,213			
	• Degraded forests		5,904			
	• Degraded non forest		460			
	• Community forest		29,000			
	Incremental programme (after SSP)					
	• Canal banks		15,000		3,510	
	• Borrow areas		3,000		[2900*]	
	• Community forest		40,000		Nil	
	• Non culturable land		40,000		Nil	
	• Field bunds		100,000		Nil	
	• Farm forestry		100,000		Nil	
8	<b>Flora and Fauna:</b> • Development of botanical garden • Tree preservation programme • Bio-diversity conservation plan: - Environmental stability - coastal zone ecosystem - denuded areas in the command - increase in tree cover by 5% (outside the forest) - measures for meeting MFP requirements - awareness programme for peoples participation • Incremental management of Nal Sardovar environment • Incremental management Valvador environment • Incremental management of wild ass sanctuary environment	Before commencement of irrigation in the command	Nil	Nil	Nil	Nil
9	<b>Monitoring responsibilities in key areas and related training:</b> • Environment such as fisheries, health, ecology, forestry, agriculture, horticulture, veterinary, extension centre, wildlife, bio-technology, soil etc • Engineering such as ground water, pollution, salinity, water management etc					
10	Arrangement for data management (GIS) for managers of the project in future years					

\* instead of 3510 ha, amount is 2900 ha in EM Status report Nov 04/Feb 05, p42

## Archaeological and anthropological survey

Mtg.	Doc.	Item	Chronology	Archaeology follow-up
34	A	5 p9 p139	<p><b>General</b></p> <p>Meeting held on 23.06.99 at Bhopal to review progress. Annex 5. Annex. Re: Dr Romila Thapar's letter. Agreed that only those monuments of national significance and not all sites to be taken up.</p> <p>Re: Joga Fort, MP – <b>visit of Director General ASI to Joga Fort was long awaited.</b> Director (exploration) ASI to appraise DG for a final view on method of protecting the monument. Letter of 21/7/00 from GOI Superintending Archaeologist: DG ASI recommended (ref No. 9-6/93-EE, dtd 02/07/99 that said work [safeguard wall at Joga Fort] should be taken up by NVDA as per ASI requirement in accordance to estimate and design submitted.</p>	<p><b>Review:</b> by experts, to study villages yet to be submerged to identify if significant archaeological/ anthropological material needs protection</p> <p>NB Joga Fort possibly in ISP area not SSP.</p>
34	M	Ann 3	P12: Fort is centrally protected national monument. Only ASI can carry out safeguarding and protection works. Also NVDA does not have required experience. Referred back to ASI.	<p>that there was danger of rich historical legacy being lost and even a small increase in dam height would threaten to submerge many of the sites listed in the report of the ASI</p> <p><b>Obtain:</b> lists of villages already surveyed for archaeological/ anthropological material.</p>
34	M	SC	<p><b>SC:</b> The area of submergence was stated to be rich in archaeological remains but it still remains to be studied. It was contended that there was danger of rich historical legacy being lost and even a small increase in dam height would threaten to submerge many of the sites listed in the report of the ASI....</p> <p>Summary of current situation and progress in State of Gujarat, survey of villages in submergence zone complete for all items in the State, identification of cultural sites complete for all items in the State, collection of data and documentation of sites complete, selection of appropriate sites complete, Action Plan complete. ...</p>	
35	M	IV p7	NCA Specialist Env informed that the three State Govts have completed surveys of cultural and religious sites within submergence zone with view to list all archaeological sites requiring protection / relocation under state list etc. List also includes sites of religious or cultural significance that although not protected under national law are of significance and need to be relocated. ...	
45	M	P14 pdf	The Sub-Group reviewed the status of issues on Archaeology & Anthropology as brought out in the Agenda notes and felt that necessary works have been <b>completed.</b>	
33	A	P11/12	<p><b>GOMP</b></p> <p>1997 Action Plan revised in January 1999 (Exec Summ Annex V). Proposed 10 monuments to be protected besides excavation of 5 mounds and collection of sculptures. NVDA informed that 1993 Plan identified monument protection works being entrusted to Archaeological Survey of India (ASI). In 31<sup>st</sup> meeting compliance status of affected monuments reviewed, thus 7 monuments relocated. Temples located at Semalda and Barda were required to be relocated before dam height could be raised to 110m. NVDA Member E&amp;F informed Barda relocated and Semalda to be worked by ASI. Also, sanction issued for relocation of monuments of Khujawa and rock cut sculptures at Pipladgarhi area. <i>Present status</i></p>	

34	A	P140	<i>in field report circulated.</i> Representative of State Department of Archaeology & Museum MP stated that they are <b>not getting funds in time, those received were meagre and land is not being available for relocation in time.</b>	
35	M	IV p7	NCA Specialist Env't: Work in progress for housing sculptures in museums at Village Kasravad and District HQ at Indore, Dewas and Bhopal collected from in and around river bed. Commissioner Arch, GOMP: temples at village Varda and Pipaldagarhi besides rock-cut sculptures at village Pipaldagarhi already relocated and preparations started for relocation of temple at Nawada Toli in RL 137.765. Progress in Annex 6 p11-12. Prof Ramasesham suggested <b>monuments impacted by back water level of proposed impoundments also need to be identified and protected in time.</b> MOEF Joint Secretary ... though are at higher EL, if villages fully/ partially submerged at EL 100m, may become difficult thereafter to relocate them. Therefore such monuments should also be identified. <b>Backwater contours drawn at various elevations and available with NVDA could be used.</b> <i>Findings of excavation work requested.</i>	Monuments impacted by back water level of proposed impoundments also need to be identified and protected in time.  <b>Request:</b> backwater contour levels – need high resolution maps, digitally as GIS files.
36	A	5 p8	Review meeting held on 08.03.01. Map at Annex 10. Accordingly no monument shall be impacted by the pondage by raising the dam to EL 100m. With regards to backwater there would be no change in status of monuments as compared with dam not in place.	With regards to backwater there would be no change in status of monuments as compared with dam not in place.
36	M	p7	Micro-planning, considering priority of monuments for their relocation in relation to rise in submergence due to raising of dam to various levels/stages was not included in action plan of 1997. <i>Field officers instructed to look into this aspect.</i>	[not copied all Agenda/Minutes info as generally repetitive]
38	M	p15	NVDA VC: works progressing as scheduled except for some monuments which ASI agreed to take up works initially but withdrew subsequently. Chairman suggested these issues could also be discussed in meeting to be convened by MOEF to discuss issues related to Joga Fort concerning ISP.	ASI agreed to take up works initially but withdrew subsequently- <b>need justifications for withdrawal</b>
39	M	G p8	NVDA VC: all works related to relocation of temple at Roligaon already completed and those related to temple at Choti Khasrawad <b>would also be completed by January 2004.</b>	
41	A	P17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - Archaeology – relocation/ protection/ excavation: awaited.</i>	
41	M	G p10	NVDA VC: no monument shall be impacted by raising dam height to EL 121.92m however two Shiva temples at Roligaon and Chhoti Khasrawad shall be impacted by the backwater levels of the Sardar Sarovar Project. Relocation of temple at Roligaon has been completed whereas work related to relocation of other temple is being opposed by local villagers. Issue shall be settled soon. No mound shall be impacted.	no monument shall be impacted by raising dam height to EL 121.92m however two Shiva temples at Roligaon and Chhoti Khasrawad shall be impacted by the backwater levels of the Sardar Sarovar Project
41	M	Ann 3	ATR information table: (remark: subject to verification). Ref 04/12/04	



46	M	P7	Relocation of Shiv temple at Choti Kasrawad affected by backwater levels at 121.92 m RL is <b>held up due to resistance</b> , As per NVDA decision, only one Museum is to be established, which has been completed.	<b>Note:</b> 3 proposed museums scrapped																
33	A	P11/12	<b>GOG</b> Of 2 temples proposed for relocated, Shoolpaneshwar already relocated and Hampsheshwar would be relocated before submergence.	proper documentation of historic sites should be undertaken carefully and sample representative sites may be excavated carefully																
33	M	P12	Dr Romila Thapar of view that proper documentation of historic sites should be undertaken carefully and sample representative sites may be excavated carefully. She sought reports on anthropological and historical findings and that she was satisfied with GOMP plan. Summary of discussion at Annex 10.																	
34	M	5 p10	NCA Member requested GOG to speed up relocation of Hampsheshwar temple whose plinth level is at 105 m. Managing Dir SSNNL informed in addition to completion of all works related to Shoolpaneshwar, about 87% of work of relocation of Hampsheshwar temple completed.																	
41	A	p17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - Archaeology – relocation/ protection/ excavation: completed</i>																	
35	A	P8	<b>GOM</b> there is no identified monument of significance in Maharashtra.																	
41	A	P17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - Archaeology – relocation/ protection/ excavation: NA</i>																	
33		Ann 3, 7 p31 env status March 1999	Cultural heritage: <table><thead><tr><th></th><th>GOG</th><th>GOM</th><th>GOMP</th></tr></thead><tbody><tr><td>Temple relocation</td><td>1/2</td><td>none</td><td>1/13 completed of target</td></tr><tr><td>Excavation</td><td>-</td><td>none</td><td>3/6 progress of target</td></tr><tr><td>Sculptures</td><td>-</td><td>none</td><td>118/186 progress of target</td></tr></tbody></table>		GOG	GOM	GOMP	Temple relocation	1/2	none	1/13 completed of target	Excavation	-	none	3/6 progress of target	Sculptures	-	none	118/186 progress of target	<b>Check:</b> GoMP managed to relocate all 13 temples and all 186 sculptures
	GOG	GOM	GOMP																	
Temple relocation	1/2	none	1/13 completed of target																	
Excavation	-	none	3/6 progress of target																	
Sculptures	-	none	118/186 progress of target																	
33	A	P12	<b>Anthropology, R&amp;R benefits, GOG</b> During the last meeting, to effect the extending of semi-statutory & non-statutory benefits to the PAFs entitled similar facilities in their home state. It was informed that Gujarat has issued a Govt. Resolution vide its letter No. SCW/1091/201/Kit dated 18.7.1991. Govt. of Madhya Pradesh vide its letter No. 7/TW cell/1148 dated 2.8.94 has proposed amendment to Article 341 and 342 of the Constitution of India to the Govt. of India, Ministry of Welfare (Ministry of Social Justice & Empowerment). The Govt. of Gujarat has also consented to the aforesaid amendment. But orders to this effect are still awaited from Govt. of India.	Have these orders been made by GoI?																

***Current status of protection/ relocation works***

From 40A p16 and 42A p13 and 43A p22

		<b>Gujarat</b>	<b>Maharashtra</b>	<b>Madhya Pradesh</b>
<b>Monuments</b>	<b>FRL</b>	2 (2 completed)	Nil	23 (4). Completed (43A)
	<b>Comm w 110.64</b>		Nil	NVDA assured no approach shall be impacted
<b>Mounds</b>	<b>FRL</b>	Nil	Nil	15 (9). Completed (43A)
	<b>Comm w 110.64</b>	Nil	Nil	NVDA assured that not likely to be impacted
<b>Museums/park</b>	<b>FRL</b>	NA		4 (1 completed)
	<b>Comm w 110.64</b>	NA	NANA	Not relevant

Comm w 110.64 is commensurate with 110.64 [m dam height]

***Lots of annexes on archaeology in agendas/minutes/status reports etc listing excavations. Difficult to follow this thread ...***

## Flora, fauna and carrying capacity studies (FFAC)

Mtg.	Doc.	Item	Chronology	FFAC follow-up
34	A	4 p8	<b>General</b> Meeting held on 23/06/00 at NCA Office, New Delhi. Minutes Ann 3.	<b>Survey:</b> impact on wild ass
34	M	SC	<b>SC:</b> In relation to flora and fauna studies it was contended by the petitioners that the studies had finished only recently and the action plans were awaited in many cases. In the meanwhile extensive deforestation of the submergence zone had taken place, as also part of the area had not submerged, even as the studies have been on. It was also contended that the impact on some of these Wild Ass Sanctuary in Kutch would be very severe. The guidelines of MOEF required ... surveys ... so that the status of flora and fauna present could be assessed. ... number of studies was carried out ... submergence area and catchment area on right bank of proposed reservoir exhibited highly degraded ecosystem ... with construction of dam, availability and soil moisture will increase and support varieties of plants and animals.	
36	A	3 p6	Carrying capacity of impact areas studied and ameliorative measures being undertaken in areas neighbouring submergence under schemes of CAT. While <b>6,476</b> ha <ul style="list-style-type: none"> <li>• 4,376 ha Gujarat</li> <li>• 2,300 ha Maharashtra</li> <li>• 1,900 ha MP</li> </ul> Forestland is to be submerged at 100 m, entire works of plantation completed. Status of works at Annex 4, 5 and 6 pages 71-78.	<b>[numbers don't add up, total is 8,576 ha]:</b>
33	A	P10	<b>Survey of flora, fauna &amp; carrying capacity (FFACC) studies – GOMP</b> <b>GOMP:</b> At last meeting, informed that State Forest Dept requested to draw up plan for forest management & social forestry, which is additional to area already covered by CAT. <i>Further progress to be reviewed by members.</i>	no sanctuary development proposed 185 villages falling under impact zone are proposed to be taken up under Social Forestry Plantations
33	M	P11	Action Plan presented to State Wildlife Cmte for approval	
34	M	4 p10	Plan sent to MOEF & NCA letter No. Env/Forests/Tecvh./1896 dated 07/11/00. Plan under <del>implementation</del> sent to GOMP Forest Dept [corrected in M35].	
35	A	III p7	Action plan: CAT under progress, no sanctuary development proposed. For social forestry, 185 villages falling under impact zone are proposed to be taken up under Social Forestry Plantations at est. cost of Rs 58778,200. Funds to be allotted to Forest Dept as per annual demand to NVDA.	
35	M	III p7	Wildlife habitat details surveyed and studied by State Forest Research Institute (SFRI), Jabalpur. Action Plans by NVDA on basis of study recommendations envisaged completion of CAT as a measure to improve carrying capacity of their adjoining ecosystem, and social forestry in impact zone.	
36	A	3 p7	All studies related to flora fauna and carrying capacity aspect have been <b>completed.</b> Action Plan Annex 7 p79-92	

36	M	p7	<p>NVDA Vice Chair informed that survey of FFAC was conducted by SFRI, Japalpur with 3 major recommendations:</p> <ul style="list-style-type: none"> <li>• establishment of sanctuaries at Bokarata and Mathwad</li> <li>• Implementation of soil and water conservation measures in vicinity of reservoir</li> <li>• Carrying out social forestry works in project impact area</li> </ul> <p>Action Plan based on studies was posed to State Wildlife Committee. After due consideration Cmte <b>did not approve creation of sanctuaries</b> as areas were not rich in wildlife. Also considered that soil and water conservation measures being executed under catchment area treatment programme were adequate. MOEF Director <i>requested NVDA provide information in tabular format on recommendations of study group, action proposed and status of implementation.</i></p>	State Wildlife Committee <b>did not approve creation of sanctuaries</b> as areas were not rich in wildlife. Also considered that soil and water conservation measures being executed under catchment area treatment programme were adequate. So <b>two survey recommendations not implemented.</b>
37	M	B p4	Dam height raising, Shekhar Singh comments: arrangements for rehabilitation of wildlife for Sardar Sarovar Project areas in MP, recommendations on FFACC regarding recommendations on creation of Mathwad and Bokarata Sanctuaries.	
37	M	B p5	NVDA Member E&F: study for 2732 ha forest land showed it was highly degraded and supported very little or no noticeable wildlife requiring any special areas. As per clearance order, GOMP constituted wildlife committee and recommendations of study group regarding creation of sanctuaries in Sardar Sarovar Project areas not agreed by committee. Also not considered necessary by NCA Expert Group on Flora and Fauna. However <b>creation of Suryamanya, Omkareshwar Sanctuaries and Narmada National Park for ISP areas expected to take care of wildlife conservation</b> in State.	
39	A	C p9	<p>MP, SFRI, Japalpur recommendations and status [<i>summarised</i>]:</p> <ul style="list-style-type: none"> <li>• <i>Catchment protection work (engineering and biological) and shifted forest management, reestablishment of indigenous forest ecosystem and local diversity</i> – CAT plan over 125,725 ha under implementation. End Sep 03, 109345 complete.</li> <li>• <i>Fodder production through agro-forestry or silvi-pastoral system through management of village wastelands</i> – answer as above</li> <li>• <i>Bamboo production</i> – covered under CAT as well as social forestry programme</li> <li>• <i>Forest management plans, fire protection, grazing control</i> – Working plans on these issues <b>under implementation</b> by State Forest Dept.</li> <li>• <i>Forest-environment awareness, people's participation backed by <u>development legislation</u></i> – Joint Forest Management &amp; Social Forestry Schemes being run by State Forest Dept. They have adequate involvement of local people. People's participation is sought while carrying out CAT works.</li> <li>• <i>Social forestry programme (timber, fuel-wood)</i> – Social Forestry programme is <b>under consideration</b> of State Forest Dept. Social</li> </ul>	<p><b>Obtain:</b> GOMP forest management plans, measures for fire protection and grazing control</p> <p><b>Review:</b> social forestry plan by independent</p>

			<p>Forestry Plan of RS. 5.60 crores have been approved by NVDA on 02/10/03.</p> <ul style="list-style-type: none"> <li>• <i>Quick growing exotics for soil stabilisation and for people</i> – as above.</li> <li>• <i>Two sanctuaries as alternative habitat for wildlife</i> – <b>no action is taken so far.</b></li> <li>• <i>Leave islands in reservoir undisturbed</i> – recommendation <b>would be taken up in time for implementation.</b></li> <li>• <i>Studies of forests with particular reference to topography, physical and chemical properties of the soil and soil moisture regime are necessary-</i> <b>not considered necessary by GOMP.</b></li> </ul>	<p><b>Review:</b> impact of not undertaking this aspect: <i>Studies of forests with particular reference to topography, physical and chemical properties of the soil and soil moisture regime are necessary-</i> <b>not considered necessary by GOMP.</b></p>
40	A	P18	Carrying capacity: <b>not estimated</b> but being ensured through CAT & CAF.	<b>Request:</b> estimates of carrying capacity in MP areas.
40	M	P10	Terrestrial fauna: NCA Dir Env: as per EIA study reports ... execution of felling of trees in forest to avoid possibility of animals being trapped in submergence area were required to be taken up in systematic manner and carrying capacity in vicinity was required to be enhanced for accommodating extra wildlife moving out from submergence area. This included provision for migratory corridors ... there was <b>very little progress</b> in Mah and MP.	<b>Request:</b> maps of migratory corridors for wildlife, need high resolution maps, preferably digital
40	M	P11	Earlier Wildlife Cmte had not agreed to creation of sanctuaries ... GOMP has <b>now</b> submitted a proposal for creation of 2 wildlife sanctuaries, Bokrata and Kathiawad ... estimated cost Rs. 35.73 crores. Requested ESG to discuss issues on merit.	execution of felling of trees in forest required to be taken up in systematic manner and carrying capacity in vicinity required to be enhanced, included provision for migratory corridors ... there was <b>very little progress</b> in Mah and MP.
41	A	P10	<p>NVDA VC: proposal before ESG was for <b>in-principle approval. Issues related to boundaries, social and other aspects shall be taken up later.</b></p> <p>Chairman summed up: would be premature to discuss <b>without a proper EIA report</b> besides more time be given to members to study proposal.</p> <p>Progress update request with recommendations shown at 39A above:</p> <ol style="list-style-type: none"> <li>1. <i>catchment area treatment:</i> <b>report requested</b> on realisation of objectives of recommendations</li> <li>2. <i>social forestry programme (timber, fuel-wood etc)</i> – <b>progress</b> on implementation</li> <li>3. <i>Joint forestry management and social forestry schemes run by State Forest dept inc involvement of local people</i> - <b>report requested</b></li> <li>4. <i>Steps taken for declaring island being formed during filling as wildlife habitat</i> - <b>to be presented</b></li> <li>5. <i>Sanctuaries: instead of Bokrata State Wildlife Cmte recommended Kathiwada</i></li> </ol>	No proper EIA report.
41	A	P17	Status of readiness on implementation commensurate with raise in dam height to EL 121.92m -	
41	M	D p8	<ul style="list-style-type: none"> <li>• <i>Flora, fauna</i> – draft plan is yet to be finalised and implemented</li> <li>• <i>Carrying capacity</i> – not estimated</li> </ul> <p>NCA Dir ENV: conditions/clearance required implementation of plan for</p>	Flora, fauna – draft plan is yet to be finalised and implemented

			<p>protective/ ameliorative/ restorative measures for protection of flora and fauna pari-passu with submergence. <b>Presently though submergence has already commenced measures to protect environment in accordance with the plans received are not yet complete.</b></p> <p>Prof VB Mathur: as per decision of last meeting, a <b>detailed EIA report</b> was required which is not yet available.</p> <p>NVDA VC: proposal for establishment of sanctuaries was placed before ESG last meeting. Members needed more time to study. Details of proposal sent to NCA secretariat vide NVDA's letter dated 1.1.2005. Rs. 3.14 crores have been given to State Forest Dept for implementation of social forestry plan.</p>	<p>though submergence has already commenced measures to protect environment in accordance with the plans received are not yet complete.</p> <p><b>Infringement</b> of clearance condition.</p> <p><b>Request:</b> detailed EIA report on wildlife sanctuary creation</p>
41	M	Ann 3	<p>ATR information table: (remark: subject to verification), ref dated 04/12/04</p> <ul style="list-style-type: none"> <li>• Social forestry programme started at est. cost of Rs. 5.0945 crores by state dept.</li> <li>• Proposal for rehabilitation of wildlife through creation of sanctuaries and other measures is under consideration of ESG</li> </ul>	<p><b>Obtain:</b> ATRs</p>
42	M	D p8	<p>NCA Dir Env: desired plans for declaration of sanctuaries/ national parks/ conservation and development of fisheries, flora and fauna, migratory corridors etc for the wildlife moving out from the submergence area for safeguarding the terrestrial and aquatic ecosystem are awaited in Maharashtra and Madhya Pradesh though the submergence though submergence up to EL 121.92m is expected this year.</p>	<p>desired plans for declaration of sanctuaries/ national parks/ conservation and development of fisheries, flora and fauna, migratory corridors etc for the wildlife moving out from the submergence area for safeguarding the terrestrial and aquatic ecosystem are <b>awaited in Maharashtra and Madhya Pradesh though the submergence though submergence up to EL 121.92m is expected this year.</b></p>
42	M	D p8	<p>NCA Dir: EIA report on proposed creation of sanctuary/ national park directed by sub-group during last meeting awaited from MP.</p>	
-	Letter to ESG/ SS	Dated 4/1/5	<p>Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and GOG. GOMP letter dated 04/01/05.</p> <p>Enclosures include:</p> <ul style="list-style-type: none"> <li>○ Area details and map of proposed Mathwad Wildlife Sanctuary and Katthiwada Wildlife Sanctuary (Annexure 1). These protected areas are proposed for rehabilitation of wildlife impacted by Sardar Sarovar Project</li> <li>○ Area details and map of proposed Mathwad Wildlife Sanctuary enclosed. There is no Pati Wildlife Sanctuary.</li> </ul>	
43	A	P6	<p><b>March 2006 field visit</b>, key recommendations from 15<sup>th</sup> Sep 2006 report: FF&amp;CC (terrestrial ecosystem) – not yet started - EIA studies should be expedited and recommendation implemented before submergence. Impacts have commenced but safeguards measures are not in place.</p>	<p>FF&amp;CC (terrestrial ecosystem) – not yet started - EIA studies should be expedited and recommendation implemented before submergence. Impacts have commenced but safeguards measures are not in place</p>
43	A	P17	<p>State Forest Research Institute, Jabalpur carried out the EIA for the areas in Madhya Pradesh and recommended measures for drawing up of the environmental management plan. State Govt. <b>however proposed restorative and ameliorative safeguard measures</b> as brought out below:</p> <p>1. To cater to increase requirement of timber, fuel-wood etc., social forestry</p>	<p>Note: expert's recommendation of environmental management plan <b>ignored</b></p>

43	M	P12	<p>programme at an estimated cost of RS.5.0945 crores chargeable to SSP (price level of 1999-2000) with escalation of 9% per annum was approved by the State Wildlife Committee.</p> <p>2. 60 islands which will be formed in the reservoir varying in extent from 1 ha to 75 ha should be left undisturbed for study of the process of natural succession and to provide refuge to bird life in the area.</p> <p>3. Studies recommended creation of two wildlife sanctuaries namely Mathwad (34.659 sq. km.) in Jhabua district and Bokrata (35.59 sq. km.) in Khargone district. The State Wildlife Committee had not accepted these recommendations during its earlier meeting (July, 2000). However, during its meeting convened recently in November, 2002 reconsidered the decision and recommended creation of Mathwad sanctuary (at an estimated cost of RS.21.76 crores) as per recommendation of SFRI but instead of Bokrata Sanctuary recommended Kathiwada Sanctuary (at an estimated cost of Rs.13.97 crores) a little away but within the same ecological zone.</p> <p>... During this meeting, after some discussions on the issue, it was observed by the Sub-group that it would be pre-mature to discuss creation of these sanctuaries without an EIA report. As per the information received from the GoMP negotiations for carrying out EIA studies with Wildlife Institute of India, Dehradun are in final stages.</p> <p>Required actions such as creation of Sanctuaries / Closed areas at Mathawad &amp; Bokrata, though planned, have not been implemented, in Madhya Pradesh though. submergence has increased to EL 121.92 m.</p>	<p>State Wildlife Committee reconsidered the decision and recommended creation of Mathwad sanctuary as per recommendation of SFRI but instead of Bokrata Sanctuary recommended Kathiwada Sanctuary little away but within the same ecological zone.</p> <p>observed by the Sub-group that it would be pre-mature to discuss creation of these sanctuaries without an EIA report. negotiations for carrying out EIA studies with Wildlife Institute of India, Dehradun are in final stages</p>
44	A	P13	<p>Detailed EIA report on the proposed creation of the sanctuary/national park directed by the Sub-Group during in its last meeting was <b>awaited</b> from Madhya Pradesh. Member (E&amp;F), NVDA informed that an <b>agreement has been reached and Terms of References (TOR) have been signed</b> with the Wildlife Institute of India for carrying out Environmental Impact Assessment (EIA) at the earliest. In response to a question from the Chairman, Dr. V.B. Mathur, Dean, Faculty Wildlife Institute of India stated that the work would take about three months time after release of required funds and work order. <b>If funds are released by the end of Dec. 06, it would be possible to submit the report after March 2007.</b></p>	<p>work would take about three months time after release of required funds and work order. <b>If funds are released by the end of Dec. 06, it would be possible to submit the report after March 2007.</b></p>
44	M	P14	<p>In pursuance to the directions in the Environment Sub-group GoMP entrusted EIA studies to the Wildlife Life Institute of India. Studies have commenced and report is likely to be available shortly. Issue of cost sharing for the proposed sanctuaries brought up by the Govt. of Madhya Pradesh could be discussed thereafter.</p> <p>... Govt of Madhya Pradesh has taken up steps for the implementation of social forestry plan to increase availability of forest produce and to reduce burden on the existing forest. Dr. Shekhar Singh pointed out that the study itself was under progress and implementation of the resulting recommendation could not be</p>	

45	A	P21 pdf	carried out pari passu as stipulated in the order of clearance. Dr. V.B. Mathur, Dean Faculty of Wildlife Institute of India stated that as per the reports received from study group the fringe areas of the Sardar Sarovar Project can only be considered for extending protection under conservation reserve whereas the other area given for study is near Ratanmahal Sanctuary of the Govt of Gujarat and these areas showed good evidences for consideration of a notification of a National park/sanctuary.	GOMP received report of Wild Life Institute of India, which is under consideration of BVDA/GOMP. Social Forestry Plan has been taken up in a big way, which is likely to be completed very soon
45	A	P49 pdf	In pursuance to the directions in the Environment Sub-group GoMP entrusted EIA studies to the Wildlife Life Institute of India. Studies have commenced and <b>report is likely to be available shortly.</b>	
45	M	P11 pdf	EIA studies should be expedited and recommendation implemented before submergence. Impacts have commenced but safeguards measures are not in place: <b>field studies commenced, report is expected shortly.</b> Govt. of Madhya Pradesh representatives informed that they have received report of Wild Life Institute of India, which is under consideration of Narmada Valley Development Authority / Govt. of Madhya Pradesh. Social Forestry Plan has been taken up in a big way, which is likely to be completed very soon. About 60 Islands formed in the reservoir having area from 1 to 75 ha are being left undisturbed for the study of the process of natural succession and to provide refuge to bird life in the area.	
46	A	P8 pdf	Social forestry plan completed. GoMP <b>may submit compliance report as per EIA recommendations.</b>	
46	M	P6	Regarding creation of two Sanctuaries proposed in the report of State Forest Research Institute, the area of which is already submerged, Vice Chairman, NVDA stated that NVDA will provide financial support, if forest department in future decide to set up a Sanctuary, Shri Shekhar Singh however stated that sanctuary has to be established before commencement of submergence and therefore unless environment safeguard measures are duly complied, permission cannot be considered.	
		P7	The NVDA has decided to set up Kathiwada Sanctuary as recommended by Wildlife Institute of India. It has also agreed to meet expenditure on notification of Wildlife Sanctuary by Forest Department	
33	A	P10	<b>Survey of flora, fauna &amp; carrying capacity (FFACC) studies – GOG</b> <b>GOG:</b> Shoolpaneshwar Sanctuary development action completed and being implemented. <i>Progress to be reviewed.</i>	Shoolpaneshwar Sanctuary development action completed and being implemented
33	M	P11	Shoolpaneshwar Sanctuary development works presented, Annex 9.	
34	A	4 p8	Shoolpaneshwar Sanctuary development works info, Annex 4 Action Plan recommended by MSU, Baroda study group – <i>progress.</i>	
34	A	p16	Field visit committee (July 2000)informed that all studies of FFACC have been completed in Gujarat. Sanctuary action plan drawn up, environmental management plan for sanctuary development.	
35	A	III p5	In Maharashtra and Gujarat forest getting submerged formed only a small part of	



35	M	III p5	the large contiguous tracts of forests, migratory corridors during progressing filling of the reservoir were not considered desirable. Map at Annex 6 p105. SEE MAH COMMENTS FROM NCA ENV.	<b>Request:</b> maps of migratory corridors for wildlife (in Sanctuary areas and outside), need high resolution maps, preferably digital
36	M	P5	Progress on implementation of ameliorative measures in Shoolpaneshwar Sanctuary made available by GOG at Ann 5, p 9-10. Shoolpaneshwar Sanctuary, Item A – Afforestation/ B – Eco development Prgm in table on p71 of Agenda where <b>against recommendation of plantation over 500ha and 250 ha for animal corridor, achievements have been very meagre.</b> <i>More details sought.</i> CCF informed that no endemic endangered species in submergence area etc.	against recommendation of plantation over 500ha and 250 ha for animal corridor, <b>achievements have been very meagre</b>
37	A	Ann 2	17. Letter including aspects of sanctuary work that were omitted at last meeting and updating to 2001. States that “progress in most of the component is more than 100%, while for the remaining the progress far exceeds the % submergence at FRL of the reservoir i.e. 24% ...”.	
37	M	B p4	Dam height raising, Shekhar Singh comments: Of view that planting of fuel wood/ minor forest produce/ timber/ fruit trees in sanctuaries for tribal living within the sanctuary is in violation of wildlife protection act 1972.	
37	M	B p7	<i>Response</i> on periphery. Statements by Principal Chief Conservator of Forests, Gujarat that plantations in periphery of sanctuary and not on violation of the act.	
39	A	Cp8	FFAC requirements: Undertake development programmes in rural areas to <ul style="list-style-type: none"> <li>• improve <b>hydrological regime</b>,</li> <li>• institute <b>rational land use planning</b>,</li> <li>• undertake <b>reseeding programmes</b>,</li> <li>• induce each state unit to solve own problems rather than transfer biotic load</li> <li>• put on strong cash economy</li> <li>• <b>training manpower</b> for necessary industrial skills</li> <li>• establishing interactive relationships between different state units</li> <li>• <b>independent monitoring and evaluating infrastructure</b> absolute necessity for successful execution of these strategies and action plans</li> </ul> [ALL ABOVE POINTS WERE COMBINED INTO ONE ROW AND COMINED RESPONSE GIVEN ON STATUS]: Entire catchment over 30,000 ha was treated up by soil conservation measures, including reforestation over 27,204 ha. Also, Dhumkal sloth bear sanctuary enlarged 4 times, renamed Shoolpaneshwar Sanctuary. Sanctuary development plan drawn up and under implementation.	Sanctuary development plan drawn up and under implementation
40	A	P18	Carrying capacity: estimated for sanctuary being ensured through sanctuary development.	
41	A	P8	MSU, Vadodara conducted EIA and recommended measures for preparation of environmental management plan for upstream environment. Key	<b>Request:</b> Compliance report on MSU Vadodara study recommendations. E.g. details for Gujarat of:

41	A	P9	<p>recommendations focussed <b>amongst others</b> on following issues:</p> <ul style="list-style-type: none"> <li>• rehabilitation plan for the identified animals and plants</li> <li>• an independent monitoring and evaluating infrastructure is an absolute necessity for successful execution of these strategies and action plans</li> <li>• to undertake development programmes in rural areas in natural watershed unit</li> <li>• institute rational land use planning</li> <li>• undertake reseedling programmes</li> <li>• training the manpower for necessary industrial skills and establishing relationships amongst different units of the state</li> </ul> <p>Progress:</p> <ul style="list-style-type: none"> <li>• entire catchment over 30,000 ha in Guj treated by soil moisture conservation measures inc reforestation over 27,204 ha area. <b>Report requested</b> on other recommendations focussing on activities of joint forest management committees and recommendations for protection of <i>butea monosperma</i> (yellow variant) and <i>radrmachera xlyocarpa</i> which were <b>unique</b> and represented important and <b>rare</b> floral element.</li> <li>• <b>Report requested</b> on development works under implementation in sanctuary areas and on migration of wild animals during progressive reservoir filling.</li> </ul>	<ul style="list-style-type: none"> <li>○ hydrological regime improvement</li> <li>○ land use planning rationalisation</li> <li>○ reseedling programmes</li> <li>○ manpower training for industrial skills needed</li> <li>○ independent monitoring and evaluating infrastructure</li> </ul> <p><b>Report requested</b> on other recommendations focussing on activities of joint forest management committees and recommendations for protection of <i>butea monosperma</i> (yellow variant) and <i>radrmachera xlyocarpa</i> which were <b>unique</b> and represented important and <b>rare</b> floral element</p>
41	A	P17	<p><i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m -</i></p> <ul style="list-style-type: none"> <li>• <i>Flora, fauna</i> – progress on development of sanctuary: satisfactory</li> <li>• <i>Carrying capacity</i> – estimated for sanctuary. Being ensured through sanctuary development</li> </ul>	
41	M	Ann 3	ATR information table: Ref: SSNNL/Env/Nal/AP/929 to 37 dated 1 December 2004. Sanctuary development. Encloses action on Nal Sarovar Bird Sanctuary in Gujarat. (Remark: subject to verification).	<b>Obtain:</b> ATRs
42	A	D p8	Progress reported on Shoolpaneshwar Wildlife Sanctuary development. Further progress on other recommendation of EIA study group <b>awaited</b> . Detailed report on development works under implementation in sanctuary areas and on migration of wild animals during progressive filling of reservoir requested to be <b>presented</b> .	<b>Request:</b> Detailed report on migration of wild animals during progressive filling of reservoir.
42	M	D p8	Implementation of management plan for development of Shoolpaneshwar Sanctuary was making progress. Removal of coppice crop was expected to be completed end of April 2005.	Removal of coppice crop was expected to be completed end of April 2005.
-	Letter to SS/ NCA	SSNNL letter 27/12/4	<p>Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and SSNNL. SSNNL letter dated 27/12/04.</p> <ul style="list-style-type: none"> <li>○ Details of wildlife sanctuaries planned in connection with projects being looked at by the NCA sub-group, and details of the related displacement (no. of villages, families etc): NCA ESG review activities mentioned in action plan protected areas viz. Shoolpaneshwar Sanctuary, Velavadar</li> </ul>	

			<p>National Park .... Bird Sanctuary, Wild Ass Sanctuary. The action plan for aforesaid sanctuaries (except wild ass sanctuary) has already been submitted to NCA. There is no displacement of any family involved due to SSP in these protected areas.</p> <ul style="list-style-type: none"> <li>○ Detailed plan for eco-tourism being planned at Kevadia, near Sardar Sarovar Project dam site – as per environmental clearance, NCA is monitoring components mentioned there in the clearance order. Accordingly the subject of eco-tourism does not fall in ambit of Sub-group</li> </ul>	
43	A	P5	Field visit June 05, summary of recommendations, prioritised actions: Part area of sanctuaries should be developed as a garden for multiplication of identified rare species, local areas along the canal to be developed to conserve local herbs, shrubs tree species.	
43	A	P13	Govt. of Gujarat reported progress on development of Shoolpaneshwar Wild life Sanctuary. A detailed report on development works under implementation in the Sanctuary areas and on migration of wild animals during progressive filling of the reservoir is <b>awaited</b> . Further progress on other recommendations of the EIA study group is <b>awaited</b> .	
43	M	P12	In Gujarat recommendations of the M.S. University, Baroda regarding protection of flora & fauna have not been implemented. Implementation of the recommendations of the committee of the Environment Sub-Group was also awaited. The CMD, SSNNL stated that the implementation of the management plan for development of Shoolpaneshwar sanctuary was making progress. He read out from a report from Wildlife Census indicating that the only tiger observed in the past has not been sighted for a very long time. He assured the Sub-Group that the steps would be taken for implementation of the other suggested measures by the end of June, 2007.	recommendations of the M.S. University, Baroda regarding protection of flora & fauna have not been implemented. Implementation of the recommendations of the committee of the Environment Sub-Group was also awaited.
44	M		Director (Env.), NCA pointed out that though some general development works in the sloth bear sanctuary (Shoolpaneshwar Wildlife Sanctuary) by the forest department had been undertaken, but the plan for implementation of the recommendations contained in the EIA studies was yet <b>awaited</b> . C.M.D., SSNNL stated that plan for conservation was under implementation. The Chairperson directed submission of the plan before the next meeting for consideration of the Sub Group.	CMD, SSNNL <b>assured</b> that the steps would be taken for implementation of the other suggested measures by the end of June, 2007
45	A	P18 pdf	Govt. of Gujarat reported progress on development of Shoolpaneshwar Wildlife Sanctuary. A detailed report on development works under implementation in the Sanctuary areas and on migration of wild animals during progressive filling of the reservoir is <b>awaited</b> . Further progress on other recommendations of the EIA study group is <b>awaited</b> . Compliance of the recommendations of the ESG Committee is <b>awaited</b> .	
45	M	P11 pdf	Govt. of Gujarat representative informed that development of Shoolpaneshwar Wild Life Sanctuary and Bio-Diversity Conservation Plan is <b>in progress</b> .	

46	A	P8 pdf	Execution of plan on recommendations of EIA studies, before submergence: Reported to be complied. GoG may submit compliance report as per EIA recommendations.	
33	A	P10	<b>Survey of flora, fauna &amp; carrying capacity (FFACC) studies – GOM</b> GOM: Based on recommendations of the study group for areas in Mah, an Action Plan and its implementation in time was desired by sub-group. <i>Progress to be reviewed by members.</i>	no endangered species in submergence area in Mah
33	M	P11	Main recommendations can be categorised into 6 types, 3 each for forests and agriculture department, and being looked at for plan formulation.	
34	A	4 p8	Action Plan based on recommendations of Pune Uni study group on FFACC aspects – <i>progress.</i> <i>Status of CICFRI studies.</i>	
34	M	4 p10	GOM: no endangered species in submergence area in Mah. <b>Plan under formulation for providing safe corridors for migration of wild animals due to submergence.</b>	
35	A	III p5	<b>In Maharashtra and Gujarat forest getting submerged formed only a small part of the large contiguous tracts of forests, migratory corridors during progressing filling of the reservoir were not considered desirable. Map at Annex 6 p105.</b>	
35	M	III p5	Specialist Env NCA explained in Mah and Gujarat, forest getting submerged formed only small part of the large contiguous tracts of forests and none of identified animal species were either endemic (rare/ endangered/ threatened) or migratory in nature, except local migration for food and shelter. Therefore migratory corridors during progressive filling of reservoir were not considered necessary and there was no threat to Gene Pool. Carrying capacity of adjoining forest ecosystem studied and measures have been devised for improving – plantations under CAT programmes along periphery of proposed impoundment have been undertaken by State Govts, which are expected to be 100% complete before filling of reservoir at 100m RL by June 2002. Status of flora and fauna in and around Sardar Sarovar Project Maharashtra, Uni Pune [only recommendations provided]:	
36	A	Ann 5	To minimise the loss of biomass and life, including wildlife, anticipated due to submergence on account of filling the reservoir, following measures are recommended ..	
36	A	p75	1) management of corridors for shifting of wildlife, several corridors, passing through moderate to good (0>3) vegetation cover are suggested. <i>Tabular statement on Pune study group recommendations covering FFAC aspects along with suggested actions and implementation.</i>	
36	M	P12	Letter to GOM Secretary Env from Dr Pawan Kumar Specialist Env:	
37	A	Ann p205		
39	A	D p7	FFAC status [ <i>have summarised Pune recommendations</i> ]: <ul style="list-style-type: none"> <li>• <i>Management of corridors – due to CAT-related vegetation growth,</i></li> </ul>	

40	A	D p7	<p>special management for corridors not considered essential. Also this is considered under routine management by state forest department</p> <ul style="list-style-type: none"> <li>• <i>Multi-region seed banks for trees species conservation, and <u>planting in isoclimatic regions</u> – buffer zone in 500m around wetland area of reservoir <b>awaits implementation</b>.</i></li> <li>• <i>Surface soils of low-lying areas be used to develop natural vegetation in degraded areas as seed bank status of these soils good – <b>To be established</b> with help of forest protection cmtes working in remote tribal areas of Satpuda ranges, voluntarily without any cost</i></li> </ul> <p>[For all these following, combined response of]: catchment area treatment programme implemented during 1992-8 over forest area of 20,283.48. These man made forests were flourishing successfully.</p> <ul style="list-style-type: none"> <li>• These soils be deposited rather than spread thin at end points of transformation, to facilitate diverse vegetation growth, comparable to natural vegetation</li> <li>• Futile to concentrate on one or other methods for conservation of soil due to various terrains. Go for combination of methods locally feasible. Small storages of run-off water should be aimed at</li> <li>• Abundance of vegetation growth in different terrains along crevices and slopes, use these species with spreading habit for soil conservation and to develop microhabitats on difficult terrain, will form pioneer stages of secondary succession on distributed habitats, help consolidate substratum, pave way for further regeneration on steep slopes and areas with poor soil cover.</li> <li>• Efforts to be made to encourage conservation of soil on slopes and crests, and restore adequate soil cover on undulating grounds, through soil deposition, restoration of degraded lands, formation and retention of plant cover and eventually improvement of water potential. Reciprocally supplementary phenomena of improvement of high diversity vegetation cover and soil potential should be exploited and encouraged through meticulous planning and its execution. For ultimate aim of improvement of carrying capacity of region.</li> </ul> <p><b>Status of implementation wrt dam height [items are summarised]:</b></p> <ol style="list-style-type: none"> <li>1. <i>Management of corridors</i> – as above</li> <li>2. <i>Tree species with high diversity in region should be conserved in form of multi-region seed banks and planting</i> – buffer zone plantation on 500m width around wetland area of reservoir <b>awaits implementation</b></li> <li>3. <i>surface soils from low lying areas be used to develop vegetation in degraded areas</i> – to be established with help of forest protection cmtes voluntarily</li> <li>4. <i>soils should be deposited rather than spread</i> – CAT implemented 1992-</li> </ol>	<p><b>Request:</b> status of tree seed bank/ planting in isoclimatic regions and planting of buffer zone</p> <p><b>Request:</b> status of use of low lying soils to develop natural vegetation in degraded areas</p> <p>Need proof that CAT covers all relevant FFAC areas and that all these aspects have been covered</p>
----	---	------	--	---

40	A	P18	8 over forest area of 20,283.48 ha. flourishing successfully, <b>assured by GOM to follow suggested recommendations during implementation state</b>	
40	M	P10	<ol style="list-style-type: none"> <li>5. <i>use combination of method for soil conservation</i> – as above</li> <li>6. <i>use these species with spreading habit for soil conservation and to develop micro habits in difficult terrain</i> – as above</li> <li>7. <i>encourage conservation of soil on slopes etc</i> – as above</li> </ol> <p>Carrying capacity: <b>not estimated</b> but being ensured through CAT &amp; CAF.</p> <p>Terrestrial fauna: NCA Dir Env: as per EIA study reports ... execution of felling of trees in forest to avoid possibility of animals being trapped in submergence area were required to be taken up in systematic manner and carrying capacity in vicinity was required to be enhanced for accommodating extra wildlife moving out from submergence area. This included provision for migratory corridors ... there was <b>very little progress</b> in Mah and MP.</p>	<p><b>Request:</b> estimates of carrying capacity in Maharashtra areas.</p>
40	M	P10	<p>GOM have prepared plan for buffer zone plantation but <b>funds awaited</b>.</p> <p>NCA Member E&amp;R drew attention of Sub-group to the <b>weak interdepartmental coordination</b> in Mah and ... Secretary CAD, GOM who is allotted funds for different activities has been requested to make provision in the budget for implementation of ESM like health, fisheries, flora and fauna, felling of trees etc but <b>responses have not been adequate</b>. ... <b>ESG strongly recommended</b> creation of an environment cell.</p>	<p>This included provision for migratory corridors ... there was <b>very little progress</b> in Mah and MP. Key issue for Maharashtra is <b>lack of funds</b> for implementing the environmental safeguard measures. Yet despite no/ minimal progress on some issues, clearance still granted on each occasion.</p>
41	A	P8	<p>Regarding University of Pune recommendations</p> <ol style="list-style-type: none"> <li>1. <i>Management of corridors</i> – <b>report</b> on issue during progressive filling of reservoir achieved so far to be presented.</li> <li>2. <i>Tree species with high diversity in region should be conserved in form of multi-region seed banks and planting</i> – buffer zone plantation on 500m width around wetland area of reservoir <b>awaits implementation</b></li> <li>3. <i>Seed bank of surface soils from low lying areas be used to develop vegetation in degraded areas</i> – <b>Progress</b> to be reported</li> <li>4. <i>Conservation of soil on slopes through deposition of soil, restoration of degraded lands, formation and retention of cover etc to be exploited and encouraged</i> – <b>assured</b> for implementation by GOM. <b>Progress</b> to be reported.</li> </ol>	<p><b>Request:</b> report on wildlife migration/m,igratory corridor management during progressive filling of reservoir achieved so far</p>
41	A	P17	<p><i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m -</i></p> <ul style="list-style-type: none"> <li>• <i>Flora, fauna</i> – recommendations of EIA studies not yet implemented</li> <li>• <i>Carrying capacity</i> – not estimated</li> </ul>	<p><b>Request:</b> progress on conservation of soil on slopes through deposition of soil, restoration of degraded lands, formation and retention of cover etc to be exploited and encouraged</p>
41	M	D p8	<p>GOM: Substantial progress on felling of trees but the planned environmental safeguard measures could not be taken up actively mainly due to constraint of funds .... NCA: Non-realisation of [funds] is the main cause of delay in implementation of environmental safeguard measures in Maharashtra.</p>	
41	M	Ann 3	<p>ATR information table: ref dated 22/11/04</p>	

42	A	D p7	<p>No endangered wildlife species (remark: subject to verification)</p> <p>Rehabilitation measures for wildlife moving out from submergence area in form of buffer zone plantation shall be started <b>after receipt of funds</b>. Other activities are also <b>subject to receipt of funds</b>.</p> <p>Rehabilitation of wildlife moving from submergence zone: request for release of funds from Secretary Cam GOM. (remark: bottleneck is allocation of resources).</p> <p>EIA reports indicated presence of rare, endangered and threatened species of wildlife calling special measures for their conservation. State Govt proposed two critical restorative measures: ... buffer zone plantations and management of corridors. These measures were required to be taken before commencement of submergence in terms of the order of clearance and direction of the Sub-group. However GOM due to lack of inter-departmental coordination allotted no resources for implementation of the safeguard measures resulting in difficult situation. Sub-group considered the requests on the assurances of the project authorities for completion of needed safeguard measures in time. No progress is reported yet where as 80% of the submergence is already affected in Mah.</p>	<p>EIA reports <b>indicated presence of rare, endangered and threatened species of wildlife</b> calling special measures for their conservation. State Govt proposed two critical restorative measures: ... buffer zone plantations and management of corridors.</p> <p>But in 34M stated: no endangered species in submergence area in Mah!</p>
42	M	D p8	<p>NCA Dir Env: desired plans for declaration of sanctuaries/ national parks/ conservation and development of fisheries, flora and fauna, migratory corridors etc for the wildlife moving out from the submergence area for safeguarding the terrestrial and aquatic ecosystem are awaited in Maharashtra and Madhya Pradesh though the submergence though submergence up to EL 121.92m is expected this year.</p>	
42	M	D p8	<p>GOM: planned measures for the environmental safeguard like buffer zone plantation could not be taken up actively mainly due to constraint of funds. Funds have been released only during last week of March and therefore it would be <b>possible to start the works only beginning of April 2005</b>.</p>	<p><b>Request:</b> calculation of costs for all outstanding measures. And request current amount of funds allocated.</p>
43	M	P16	<p>State Govts. Proposed amongst others two critical restorative measures as brought out below:</p> <ol style="list-style-type: none"> <li>1. Buffer zone plantations for rehabilitation of wildlife moving out from the submergence area.</li> <li>2. Management of corridors for shifting of wildlife, several corridors, passing through moderate to good (0)3 vegetation cover.</li> <li>3. Studies on development of neo ecosystem</li> </ol> <p>These measures were required to be taken before commencement of submergence in terms of the order of clearance and direction of the Sub-group. SubGroup <b>considered the requests permitting raising of the dam height on the assurances of the project authorities for completion of needed safeguard measures in time</b>. GoM submitted revised estimates of Rs. 7.767 crores (price level of 2004-05 for taking up buffer zone plantations over a period of 3 years. However Govt. of Maharashtra <b>due to lack of inter departmental coordination allotted no resources for implementation of the safeguard measures</b>. Areas in Maharashtra have <b>already experienced negative impacts due to submergence</b></p>	<p><b>Review:</b> how much of Maharashtra areas have been submerged without implementation of environmental safeguard measures.</p> <p>SubGroup <b>considered the requests permitting raising of the dam height on the assurances of the project authorities for completion of needed safeguard measures in time</b>.</p> <p>Govt. of Maharashtra <b>due to lack of inter departmental coordination allotted no resources</b></p>

43	M	P12	<b>during the past years.</b> Recently GOM reported that against a target of 1500 ha an area of 218 ha was planted during 2005 and it is planned to plant 782 ha area during the monsoon of 2006. The representative of GOM informed that shortfalls on buffer zone plantations have been removed and plantations have been raised as targeted. He assured the Sub-group that the other recommended measures would also be attended <b>to on priority within next three months time.</b>	<b>for implementation of the safeguard measures</b>  <b>Note:</b> confusion re 45M progress on buffer zone  Buffer zone plantations received and fully completed in one-third areas
44	A	P13	As reported by Govt. of Maharashtra buffer zone plantations are making satisfactory progress whereas <b>progress on other recommendations of the studies are awaited.</b>	
45	M	P11 pdf	Govt. of Maharashtra representative informed that 90% of the works in Buffer Zone Plantation has been achieved and balance work would be <b>completed soon.</b>	
46	A	P8 pdf	Plan for buffer zone plantations received and fully completed in one-third areas. 90% Preparatory works in balance areas have been completed. The works would be completed in the coming monsoon.	
35	A	III p7	<b>GOM sanctuary/ social forestry etc</b> In last meeting was contemplated that creation of wildlife sanctuary may not be possible in Maharashtra and State Forest Dept has undertaken social forestry components in the areas on a larger scale. <i>Expedite response – in tabular form. GOM should prepare in tabular form findings of study report on flora, fauna, action needed and present status etc.</i>	
35	M	III p7	Letter to GOM Secretary Env from Dr Pawan Kumar Specialist Env: study group recommendation for creation of 500m wide area as buffer zone around wetland of reservoir ... <i>Tabular information request repeated.</i>	
37	A	Ann p205	CAD Secretary GOM: Due to CAT forest cover improved along riverbank. Substantial vegetation growth for shifting of wildlife, hence <b>special management for the corridor</b> was not considered essential. ... <i>Region multi-seed bank will be established</i> with help of forest protection committee. SEE ABOVE ROW ALSO	
37	M	B p6		
35	A	7 p11	<b>Clear felling – overview</b> To avoid possibility of formation of hydro-sulphuric sludge after inundation of forests [affecting rearing ponds etc], all three state govts have prepared work plans for clear-felling of forest areas due to be submerged.	To avoid possibility of formation of hydro-sulphuric sludge after inundation of forests [affecting rearing ponds etc], all three state govts have prepared work plans for clear-felling of forest areas due to be submerged.  <b>Note:</b> GOM not managed to undertake clear felling
37	M	B p8	Clearing of trees in FA getting submerged at RL 100m should be completed at earliest for avoiding eutrophication and degradation of water quality.	
39	A	D p10	Felling plans for forest areas coming under submergence to avoid possibility of animals being trapped in submergence area, prevention of eutrophication, degradation of water quality, proliferation of disease vectors etc required. TABLE OF FELLING STATUS ON p11	
40	A	P17	Table of status. Decision of 39M: Entire tree growth from submergence area should be removed before commencement of impoundment and report should be presented before next ESG meeting.	



40	M	D p9	NCA Member E&R: Sub-group <b>recommended raising of the dam height subject to several conditions</b> . One of the <b>key conditions</b> was that tree growth from the submergence area would be removed commensurate with progressive filling of the reservoir. Pointed out that compliances reported by GOMP and GOM <b>but GOM lagged behind</b> . NCA Director Env: no progress made by GOM for prevention of eutrophication, degradation of water quality, proliferation of disease vectors etc. This has resulted in a <b>situation whereby large chunk of forest faces certain threat of inundation due to raise in the dam height and consequential rise in water level and its negative impact</b> . It was pointed out that similar situation occurred earlier also whereby dam was raised but tree growth was not removed. SEE GOM BELOW	prior to submergence, yet permission for dam height raising still given.
41	A	P17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m -</i> <ul style="list-style-type: none"> <li>○ Guj: Report on removal of coppice crop <b>awaited</b></li> <li>○ Mah: report awaited</li> <li>○ MP: completed in forest area. Report on removal of coppice crop in NFA awaited</li> </ul>	<b>Note:</b> Repeated negative impact event.  <b>Request:</b> report on Gujarat removal of coppice crop, Maharashtra status of clear felling and MP removal of coppice crop in NFA (non forest areas).
35	A	III p7	<b>GOMP clear felling</b> <i>Status.</i>	Felling plan prepared by SFRI in 1991, revised 1996  Map shows that felling to be completed at FRL is 821 ha (cf 1900 ha land getting submerged at 100 m) – ‘balance area is either blank or cultivated’.
35	M	III p7	MP Project Authorities have prepared plans for felling forests so as to avoid trapping wild animals.	
36	M	3 p7	Felling plan prepared by SFRI in 1991, revised 1996, discussed at 18 <sup>th</sup> ESG meeting. Under implementation. Entire area commensurate with submergence at EL 100 m was felled. Plan summary Annex 8 p93-105. Map shows that felling to be completed at FRL is 821 ha (cf 1900 ha land getting submerged at 100 m) – ‘balance area is either blank or cultivated’.	
36	M	P13	<i>Request status.</i>	
37	M	B p5	NVDA VC: felling operations almost completed. However difficulty in about 200 ha area due to agitation by those opposed to project.	
38	A	P9	While there is compliance in MP, works lagged behind in Mah. Areas to be felled at Annex 9. <i>Progress requested</i> (page 13).	
38	M	P14	Re question on status of felling on submergence area commensurate with 100 m RL, <b>except for some 60 trees</b> all areas have been felled as suggested by ESG.	
40	A	P17	Completed in forest area. Trees in non-forest area are to be felled.	
41	A	P17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m -</i> completed in forest area. Report on removal of coppice crop in NFA awaited	
41	M	Ann 3	ATR information table: ref dated 04/12/04 Felling of trees (remark: subject to verification): completed in FA whereas NFA felling was in progress.	
43	A	P18	Felling in entire forest area coming under submergence is completed. However	Report on removal of coppice crop in NFA awaited  <b>Obtain:</b> ATRs  8,159 trees in non-forest area up to FRL yet to be

44	A	P14	8,159 trees in non-forest area up to FRL were yet to be felled. Felling in entire forest area coming under submergence is reported to have been completed. <b>Detailed report is awaited.</b>	felled
44	M	P10	Member (Environment & Forest), NVDA stated that except for some 3,000 trees, all trees in the submergence zone were felled. It was further informed Member (E&F) , NVDA that , it was <b>not possible to remove coppice crop from the submergence zone due to lack of required road net work.</b> The issue was discussed in details and it was suggested by Director (Env.), NCA that all steps should be taken for removal of coppice crop from the submergence zone as it has serious negative consequences on the overall environment due to eutrophication, proliferation of disease vector, corrosion of turbine-blades, production of methane gas etc. Besides it has serious negative consequences for development of fisheries in the reservoir as it also damages boats and nets besides producing fish kill. He referred to the case of Brokapando Lake where <b>the costs incurred on removing vegetation after submergence was several time more than the total cost of the project</b> itself. Dr. B.G. Verghese suggested that in case it was not possible to remove coppice crop departmentally, it could be done by contract work Dr. Shekhar Singh suggested that removal of coppice crop may not be economically viable for obvious reasons but considering the negative impact that it generates it should be removed on priority Shri Inderraj, Commissioner (PR) stated that considering the enormous costs involved on removing submerged vegetation after completion of the project, it is desirable that such crops should be removed before submergence.	Lack of road network!  all steps should be taken for removal of coppice crop from the submergence zone as it has serious negative consequences on the overall environment due to eutrophication, proliferation of disease vector, corrosion of turbine-blades, production of methane gas etc. Besides it has serious negative consequences for development of fisheries in the reservoir as it also damages boats and nets besides producing fish kill. He referred to the case of Brokapando Lake where <b>the costs incurred on removing vegetation after submergence was several time more than the total cost of the project</b> itself.
45	M	P12	GoMP reported vide letter dated 15.04.08 that about 10% trees are remaining to be felled in non-forest areas.	about 10% trees are remaining to be felled in non-forest areas
46	A	P9 pdf	Of 71,867 nos target, 69,287 nos achievement (96.4%)	Of 71,867 nos target, 69,287 achievement (96.4%)
35	A	III p6	<b>GOG clear felling</b> Entire reservoir bowl in Gujarat was cleared of vegetation growth and even the coppice growth was removed up to 4 m below the FRL	<b>coppice crop in FA felled earlier shall also require felling.</b>  Removal of coppice crop was expected to be completed end of April 2005.
41	A	P12	FA diverted was 4,165.91 ha in addition 356.78 ha was diverted earlier. In all 4,522.69 was utilised for Sardar Sarovar Project. Of this 4,152.68 ha of Dist Vadodara and Bharuch requited felling. Felling reported to be completed <b>however coppice crop in FA felled earlier shall also require felling.</b>	
41	A	P17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - Report on removal of coppice crop awaited.</i>	
42	M	D p8	Implementation of management plan for development of Shoolpaneshwar Sanctuary was making progress. Removal of coppice crop was expected to be completed end of April 2005.	
43	A	Annex	Visits were undertaken to the areas in Gujarat during June and November, 2005. Copies of the reports along with recommendations were circulated to the members & invitees separately vide letter no Env4 (43)/2450-2485 dated	

43	A	P18	15/09/06 Key recommendations [summarised] ... Observations of independent expert Prof. Ramaseshan and Prof R.K.Katti on the conditions of implementation of command area works are collectively placed at Annex XL-III (1): Comments Site Visit to Command Area on 13/06/05:	10 year or older coppice growth is present in the submergence areas. Only around 30% of felling of this seems to have been completed.
			<ul style="list-style-type: none"> <li>Gujarat had completed tree felling as required and yet because of delays in the project generally beyond its control, 10 year or older coppice growth is present in the submergence areas. Only around 30% of felling of this seems to have been completed.</li> </ul>	
43	M	P6	It was observed by the Committee of the ESG that corresponding to 121.92 E.L. about 30% of the area only could be felled and balance 70% felling is <b>awaited</b> .	
44	A	P15	The CMD, SSNNL pointing out that visit of the committee was undertaken last year and since several new developments have taken place thereafter ... He further stated that felling of coppice growth from the entire area had been completed.	
44	M	P12	Detailed report is <b>awaited</b> .	
45	M	P12	Summary statement submitted during the meeting found <b>inadequate</b> . Detailed report yet <b>awaited</b> .	
46	A	P9 pdf	Govt. of Gujarat representative informed that felling of trees has been completed. The Coppice crops have also been removed as submitted vide letter NO.1480 dated 15.02.08.	<b>Note not FRL</b>
			Achievement: 100% completed. Coppice crops removal completed upto EL. 121.92m.	
33	A	III p7	<b>GOM clear felling</b>	
35	M	III p6	Of 6,488 ha forest land getting submerged, 748 ha clear felled. <i>Progress.</i> Of 6,488 ha forestland getting submerged at FRL about 2,500 ha area required felling. About 750 ha felled and marking for felling has been carried out in balance areas. <i>For ensuring felling of trees up to EL 100m, GOM requested to provide phased action plan.</i>	
36	A	3p7	Of 6,489 ha forest land getting submerged at FRL of 138.68m, clearance required up to 4 m below FRL. Encroachment into forest is nearly 1036.19 ha – most trees have already been felled by encroachers in Akrani Taluka – in this Taluka 2,101.95 ha area is under land in river and nalla portion. Thus for felling only 2,753.93 ha area falls under RL 4m below FRL. About 748.02 ha already felled. <i>GOM requested to complete felling of trees by May/June 2002.</i>	
36	A	P10	About 290 ha required to be felled for which orders likely to be issued by GOM soon.	
36	M	P13	<i>Request status.</i>	<i>GOM requested to complete felling of trees by May/June 2002</i>
37	A	P7	4 m below FRL covers 5,892 ha, of which 1,036.19 ha is encroachment, 2,753.93 ha is forestland and 2,101.95 is riverbed portion. Between 1993-97, 748.02 ha felled. <b>After the year 1997 the work was stopped for want of grants. About 940 ha area was to be felled for consideration of submergence at RL 100m.</b> Letter to GOM Secretary Env from Dr Pawan Kumar Specialist Env: 748 ha	
				Note: After the year 1997 the work was stopped for want of grants. About 940 ha area was to be felled

37	A	Ann p205	done, 138 ha done earlier. For 100 m RL, marking not complete but of villages on periphery about 643 ha already felled and only about 80 ha remained of which 62 ha in Manibeli and out of bounds and so only required in 15 ha in Banni and 2 ha in Jagdhi. <i>Detailed status of felling required.</i>	for consideration of submergence at RL 100m.
37	M	B p4	Dam height raising, Shekhar Singh comments: p 34-35 of agenda mentioned for Mah, sample survey of areas to be felled up to EL 100 m RL carried out but no final survey or counting has been done. SS of view that progressive filling be treated as impoundment at FRL.	
38	A	P9	While there is compliance in MP, works lagged behind in Mah.	
38	M	P13	Progress Annex 9.	
39	A	D p11	Re question on status of felling on submergence area commensurate with 100 m RL, Addl Chief Engineer, irrigation dept, informed that funds were received from the GOM but the <b>work was yet to commence</b> . [DIFFERENT NUMBERS, SEE TABLE PROVIDED ALSO]. Of 6,488 ha FA diverted for submergence, 3,157.03 ha was forest, remainder was under riverbed, nallah etc. Of this, 2288.63 ha lies between 90m and up to 4 m below FRL.	
39	M	D p7	<ul style="list-style-type: none"> <li>In Akkalkua tehsil, 220.14 ha affected at EL 100m but only 79.40 ha required felling. 82.62 ha also required felling between 100m and 110m RL.</li> <li>In Akrani tehsil, 3173 trees of very poor quality required felling from submergence area is 232.53 ha which has been completed. However <b>area of 501.62 ha is to be felled</b> between 100m and 110m RL.</li> </ul> <p>Shekhar Singh: about 600 ha in Mah between 100m and 110m RL yet to be felled. May have serious negative environmental consequences. Member E&amp;R: degradation of water, formation of hydrosulphuric sludge, endangering wildlife. Desirable that trees removed before commencement of further submergence. SSNNL CCF: <b>very small part of total submergence area (about 6%) was not felled and it might be ignored being of less consequences.</b> Chairman: tree growth from submergence area should be removed before commencement of impoundment and report should be presented before next meeting for review. [REPORT]</p>	“very small part of total submergence area (about 6%) was not felled and it might be ignored being of less consequences.” Can we verify how much was actually remaining?
40	A	P17	Felling in 663.64 ha forest area is yet to be taken up.	
40	M	D p9	NCA Member E&R: Sub-group <b>recommended raising of the dam height subject to several conditions</b> . One of the <b>key conditions</b> was that tree growth from the submergence area would be removed commensurate with progressive filling of the reservoir. Pointed out that compliances reported by GOMP and GOM <b>but GOM lagged behind</b> . NCA Director Env: no progress made by GOM for prevention of eutrophication, degradation of water quality, proliferation of disease vectors etc. This has resulted in a <b>situation whereby large chunk of forest faces certain threat of inundation due to raise in the dam height and consequential rise in water level and its negative impact</b> . It was pointed out that similar situation occurred	NB key condition of dam height raising set by sub-group still violated y GOM. infringement

			<p>earlier also whereby dam was raised but tree growth was not removed. GOM: As per orders received vide letter 28.4.2004 from GOM, tenders invited twice on 28.5.2004 and 5.6.2004 but responses from contractors lacking. <b>Now that monsoon has already set in</b>, felling from the Mah side would only be possible after monsoon was over. Therefore <b>requested GOG to lend helping hand by undertaking felling from Gujarat side.</b> GOG officials agreed to explore possibility. Sub-group expressed deep concern and dissatisfaction on failure of GOM to live up to its commitments for carrying out felling from impacted zone within stipulated time. Sub-group considered various options and after exhaustive discussions requested GOG to offer such help to GOM as needed for removal of trees and suggested cost of removing trees must also be recovered from GOM. <i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - report awaited.</i></p>	
41	A	P17		
41	M	D p8	<p>GOM: Substantial progress on felling of trees but the planned environmental safeguard measures could not be taken up actively mainly due to constraint of funds .... NCA: Non-realisation of [funds] is the main cause of delay in implementation of environmental safeguard measures in Maharashtra. ...Felling of trees up to EL 110m was completed except for 27 ha in village Bamni. <b>Assured</b> that the tree felling between 110 to 121.92m RL would be <b>completed by March 2005.</b> ATR information table: ref dated 22/11/04 Up to 110m, completed except for 27 ha (remark: subject to verification) Between 110 and 134.68m, shall be completed before monsoon 2005 <b>subject to receipt of fund.</b></p>	<p>Sub-group expressed deep concern and dissatisfaction on <b>failure of GOM</b> to live up to its commitments for carrying out felling from impacted zone within stipulated time</p>
41	M	Ann 3	<p>The 79.4 ha balance up to 100m has been changed to “-” without any change in progress level. GOM: Substantial progress on felling of trees and would be possible to complete by June 2005.</p>	<p><b>Assured</b> that the tree felling between 110 to 121.92m RL would be <b>completed by March 2005.</b></p>
42	A	Ann 8	<p>In Maharashtra the forest area of 6,488 ha was diverted for submergence out of which 3,157.03 ha was forest. The balance area was under river bed, nallah etc. Of this 2288.63 ha lied between 90 m &amp; up to four meter below the FRL. Felling of Trees, except for 27 is completed up to EL 121.92m. Coppice crop shall require removal prior to submergence.</p>	
42	M	D p8	<p>Site visit: Furthermore <b>tree felling in submergence areas of Maharashtra was seen to be very much incomplete and there seems to be some legal problems with reference to tree felling and coppice growth removal in the expanded Shoolpaneshwar sanctuary.</b> ESG should look in detail into the various aspects of the problem and take definitive decisions. Detailed report <b>awaited.</b> Target: 6488ha, achievement 6461ha (99.6%).</p>	<p><b>Request:</b> status of clear felling and request when 79.4 ha up to 100m balance was felled. possible to complete by June 2005</p>
43	A	P19		
43	A	Ann 3		<p>[appears to <b>contradict site visit, as below, 43A]</b></p>
44	A	P15		<p><b>tree felling in submergence areas of Maharashtra was seen to be very much incomplete</b> and there seems to be some legal problems with reference to tree felling and coppice growth removal in the expanded Shoolpaneshwar sanctuary.</p>
46	A	P9 pdf		<p>Seems to contradict site visit, 43A.</p>

## FFAC: Clear Felling Progress

### GOM

#### A39 P11 Dec 2003 agenda

Between	Akkalkua tehsil		Akrani tehsil		Total		
	Submergence area (ha)	Progress (ha)	Submergence area (ha)	Progress (ha)	Submergence area (ha)	Progress (ha)	Balance (ha)
90-100m	220.14	140.74	232.53	232.53	452.67	373.27	79.4 <b>42A: -</b>
100-110m	239.72	157.10	515.73	14.11	755.45	171.21 <b>42A: 728.45</b>	584.24 <b>42A: 27</b>
110-121m	153.25	NA	460.05	NA	613.30	NA	NA
121-	117.82	NA	349.39	NA	467.21	NA	NA

NA = not available

In A40 p12: NA all changed to **awaited**. In A41 p12: row added for between 110 – 110.64m and comment added as “areas not marked” and under balance as “not available”

To 90-100m balance added: areas could not be felled

To 100-110 m balance added: during 6<sup>th</sup> August Mumbai meeting reported that most of area between 100-110m RL was clear felled except 35 ha in village Bamni which could not be felled due to objections from villagers. Further felling was ruled out as the **backwater level** rose to EL 114m by 6<sup>th</sup> August 2004.

In 42A the 79.4 ha balance up to 100m has been changed to “-“ without any change in progress level. Status table in Annex 8.

### GOMP

#### A39 P11 Dec 2003 agenda

Felling in entire FA coming under submergence is completed except 23,318 trees in NFA up to FRL as shown below.

Districts	Forest Area			Non Forest Area		
	Total trees	Trees felled	Balance	Total trees	Trees felled	Balance
Jhabua	38,234	38,234	Nil	3,112	3,112	Nil
Dhar	Nil	Nil	Nil	11,296	405	10,891
Badwani	14,771	14,771	Nil	16,530	4,103	12,427

#### A41 P12 Oct 2004 agenda

GOMP: Felling in entire FA coming under submergence is completed except 23,318 trees [NOT CORRECT, ONLY 8,159 ACCORDING TO TABLE] in NFA up to FRL as shown below. In addition coppice crop in FA felled earlier shall also require felling.

Districts	Forest Area			Non Forest Area		
	Total trees	Trees felled	Balance	Total trees	Trees felled	Balance
Jhabua	38,234	38,234	Nil	3,112	3,112	Nil
Dhar	Nil	Nil	Nil	11,296	<b>4,380</b>	6,916
Badwani	14,771	14,771	Nil	16,530	<b>15,287</b>	1,243
<b>Total</b>	<b>53,005</b>	<b>53,005</b>	<b>-</b>	<b>30,938</b>	<b>22,779</b>	<b>8,159</b>

42A: status of felling is unchanged from 41A. Status table in Annex 8. EM Status report Nov 04/Feb 05, p56 – as above

## Fisheries Development, and Aquatic Fauna (part of FFAC)

Mtg.	Doc.	Item	Chronology	Fisheries/ aquatic fauna follow-up
33	A	8 p13	<b>General</b> Minutes of 5 <sup>th</sup> meeting of high-level expert group (HLEG) on fisheries development and conservation for SS reservoir – minutes at Annex 8. <b>HLEG working groups have submitted their reports, guidelines being finalised.</b>	HLEG working groups have submitted their reports, guidelines being finalised
34	A	8 p11	Meeting on fisheries aspects held on 04.11.99 at ND, Annex 8. Annex 3 to minutes is Report of the committee on leasing policies of inland fisheries.	
40	M	p12	NCA Director Env: environment being transformed from existing lotic ecosystem to a newer lentic environment of which fish was an important indicator. Several studies conducted and <b>reports available</b> . These studies identified <b>action plan for pre and post impoundment scenarios</b> to be implemented. Later NCA in 52 <sup>nd</sup> meeting formed High Level Expert Group. Fisheries plan and guidelines for conservation of fisheries were under the scrutiny of this group. Draft guidelines available and proposed for discussion at 7 <sup>th</sup> meeting.	studies identified action plan for pre and post impoundment scenarios to be implemented  40M: draft guidelines available and proposed for discussion at 7 <sup>th</sup> meeting
45	M	P12 pdf	Director (Environment), Narmada Control Authority informed that the plan for conservation of Aquatic Environment <b>needs to be updated</b> considering the guidelines circulated by the High Level Expert Group (HLEG) on Fisheries under the Chairmanship of Joint Secretary (Fisheries), Ministry of Agriculture, Govt. of India. Similarly, stocking of the reservoir <b>needs to be taken up immediately</b> . Other Conservation measures as recommended by CICFRI studies <b>also need to be fully implemented</b> .	plan for conservation of Aquatic Environment need to be updated  stocking of the reservoir needs to be taken up immediately. Other Conservation measures as recommended by CICFRI studies also need to be fully implemented
46	A	P9 pdf	Further monitoring of compliance may be monitored by High Level Expert Group on Fisheries Development constituted by NCA in its 52 <sup>nd</sup> meeting.	
33	A	8 p13	<b>Organic loading of reservoir/ studies</b> Reports from CICFRI Baroda <b>awaited</b> . GOM to provide status. Another 8-10 months required as scientists finding difficult terrain. No endemic endangered species in Mah reach.	33A: another 8-10 months required as scientists finding difficult terrain. No endemic endangered species in Mah reach.
33	A	Ann 8, p72	TOR for Mah studies awaited from CICFRI, chairman suggested CICFRI should complete work by June 1999.	<b>Request:</b> report for GOM from CICFRI Vadodara on organic loading / hydro-biological status of reservoir
34	A	8 p11	Hydro-biological studies assigned to Vadodara centre of Central Inland Capture Fisheries Research Institute, Barrackpore.	
34	M	7 p11	CICFRI study was due in 1995 and last extension granted up to October 2000. Help requested from NCA/Subgroup in pushing for its completion.	CICFRI study was due in 1995 and last extension granted up to October 2000. <b>Help requested from NCA/Subgroup in pushing for its completion.</b>
33	A	8 p13	<b>Draft guidelines</b> Re draft guidelines on conservation and development of fisheries, Asst Fisheries Devt Commissioner informed draft guidelines in final stage and to be sent to NCA soon.	
34	A	Ann 8, p186	Requested Dr YS Yadava for an early submission of guidelines. Fisheries Development Commissioner assured submission of draft guidelines by end	<b>Request:</b> guidelines on conservation and development



36	A	Ann p51	November 1999. 5 meetings held, guidelines on the anvil.	of fisheries.
40	M	P12	Draft guidelines available and proposed for discussion at 7 <sup>th</sup> meeting [of HLEG].	Took from 33A announcement that draft guidelines will be sent to NCA soon to statement of availability at 40M to 42A statement that they will be finalised during 8.11.2004 meeting. Have they been finalised?
42	A	Ann 6 p51	Draft guidelines are proposed to be finalised during the meeting scheduled to be convened on 8.11.2004 under chairmanship of Jt. Secretary Fisheries, MOA, GOI	
33	A	Ann 8, p71	<b>Severity of downstream impacts</b> In HLEG minutes, re status paper on studies & action plans: “It was pointed out by GOG that considering the current status of development, the stage where impacts on downstream were expected to be severe was not likely to be reached ... Dr PV Dehadrai suggested that considering the issues related with the germ plasm of available species, it would be desirable to keep a watch on those species whose occurrence is reported even if in low numbers and occurrence of the commercial species only should not be considered as guiding factor”.	
35	A	7 p11	Dam attaining 90m has triggered initial submergence. Reaching 100m, major consequences of impoundment shall manifest as follows: <b>will convert stretch of river between dam site and upper limits of reservoir at 105 km from comparatively shallow, free-flowing river into narrow lake with depth of about 80 m at dam site.</b> [85m depth, A35 p9] None of Narmada aquatic fauna is rare or threatened per IUCN red data list. But CICFRI compiled list of 8 species which is suggested could be ‘vulnerable’ in Narmada Basin though they are present elsewhere in India in abundance: <ul style="list-style-type: none"> <li>• 3 species of Mahaseer <ul style="list-style-type: none"> <li>○ Tor tor,</li> <li>○ Tor putitora,</li> <li>○ T. khudree</li> </ul> </li> <li>• Important food and game fish upstream of the dam site</li> <li>• 1 species each of: <ul style="list-style-type: none"> <li>○ Rita rita,</li> <li>○ Rita pavementata,</li> <li>○ Labeo fimbriatus</li> <li>○ Notopterus chitala</li> </ul> </li> </ul> All these can adapt to impoundment and thrive there. If appropriate management practices are adopted no threat to important fauna.	Dam attaining 90m has triggered initial submergence. Reaching 100m, major consequences of impoundment shall manifest as follows: <b>will convert stretch of river between dam site and upper limits of reservoir at 105 km from comparatively shallow, free-flowing river into narrow lake with depth of about 80 m at dam site.</b> [85m depth, A35 p9]
35	M	7 p11	Protection of valuable fish fauna will to some extent be dependent on maintaining acceptable water quality upstream of dam ... water quality monitoring stations commissioned.	If appropriate management practices are adopted no threat to important fauna. Protection of valuable fish fauna will to some extent be dependent on maintaining acceptable water quality upstream of dam ... water quality monitoring stations commissioned.
37	M	Ann p25	State Fisheries dept requested to furnish details on issue and initiate suitable actions to identify such locations and to suggest suitable measures to protect breeding grounds of Mahaseer or alternative strategy to develop conducive environment in nearby regions in Narmada river and its tributaries.	<b>Request:</b> plan for protecting breeding grounds of Mahaseer/ other measures to ensure its survival.



44	M	P10	Member (Environment & Forest), NVDA stated that the plans for conservation of fisheries would be updated after receipt of the guidelines on the same from NCA. Director (Env.), NCA pointed out that guidelines for conservation and development of fisheries were framed by the Expert Group constituted by the NCA, chaired by Jt. Secretary, Ministry of Agriculture during the Meeting held during 2004. These guidelines were widely circulated to the State Governments towards updation of their plan. This was yet awaited. He further pointed out that there were 8 species of fishes identified by the CICFRI, as vulnerable. These species required protection, for which state governments were required to take identified action. No action seems have been taken in Madhya Pradesh through impoundment commenced during 1994. Opportunity for scientific management of the reservoir already seems to have been missed.	44M: guidelines for conservation and development of fisheries were framed during the mheld during 2004 and were widely circulated to the State Governments towards updation of their plan. This was yet <b>awaited</b> . There were 8 species of fishes identified by the CICFRI as vulnerable. These species required protection, for which state governments were required to take identified action. <b>No action seems have been taken in Madhya Pradesh through impoundment commenced during 1994. Opportunity for scientific management of the reservoir already seems to have been missed.</b>
33	A	Ann 8, p72	<b>Inter State Fisheries Development Board</b> – apex cooperative or formation of joint stock company. Working paper to be framed.	<b>Request:</b> details of inter-state fisheries board, including operating guidelines.
34	A	Ann 8, p184	Meeting 04/11/99 in ND.	
36	A	Ann p52	Board creation agreed to by party States, expected to be set up and fully functional prior to reservoir filling. Will implement guidelines for conservation of fisheries recommended by HLEG.	
33	A	Ann 8, p72	<b>Reservoir stocking during initial impoundment</b> – undertaken by GOG but not yet by GOM and GOMP who are awaiting Expert Group directions.	<b>Request:</b> details of all fishing co-operatives formed and capture fisheries training given (hours of training per person and number of persons trained, including name and village).
35	M	7 p11	CCF, SSNNL: to improve quality of seed to be stocked and to lessen pressure on land deployment, possibility of cage/ pen rearing of fish seed being examined, in consultation with Central Institute of Fisheries Aquaculture, Bangalore who have offered a consultancy package to State Fisheries Dept. SSNNL also appointed Fisheries Consultant to gear up fisheries sector activities under Sardar Sarovar Project.	
37	A	Ann	Guppy/gambusia fish to control mosquitoes Carp stocking, contemplating major carp hatchery at dam site.	
38	A	Ann p120	Sufficient rearing space needed for rearing seed into fingerling. Land not found therefore pen/cage culture being pursued, for use in dykes and/or Sardar Sarovar. A provision to create rearing space for seed rearing in Sardar Sarovar and funds have been provided by Sardar Sarovar Project. Project affected persons on periphery of dykes/reservoir being trained for capture fisheries by SSNNL. A fisheries co-operative was registered at Panchmuli (Nadod Taluka) in 1998 under title Panchmuli Narmada Jalashay Vistar Adivasi Matsyodyog Limited of 102 fishermen with share capital of Rs 17,000.	
38	A	P12	<b>GOMP:</b> Plan for development of fisheries, water quality and limnological aspects was under formulation. <i>Progress to be reported.</i>	

40	A	P18	Centre was established by NVDA at Barwani for R&D works related to development of fisheries in MP. <i>Progress to be reported.</i>	<p>Fisheries conservation: revised plan <b>awaited</b>.</p> <p><b>Obtain:</b> ATRs. <b>Request:</b> GOMP fisheries conservation plan and status of implementation <b>Request:</b> information on fish landing and social economic surveys</p> <p><b>Up-dating of plan and implementation should be high priority. Impacts have commenced but safeguards measures are not in place</b></p> <p>GOM and GOMP informed that stocking of the reservoir will commence soon</p> <p>Action plan in 43A Annex (Action plan during pre &amp; post impoundment period of SSP as prepared by CICFRI.) is a wishlist of pre and post impoundment studies and monitoring required but with no detail, structure, timeframes or follow-up implementation</p>
40	M	P12	Fisheries conservation: revised plan <b>awaited</b> . Of 6 species identified as vulnerable, breeding technology of 4 species already known and for remaining 2, ICAR agreed to take up works on breeding technology. One unit functioning at Badwani District. Long-term hydro-biological monitoring of water quality entrusted to Universities at Jabalpur, Bhopal and Ujjain was making progress.	
41	A	P17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - Fisheries conservation aspects:</i> revised plan awaited.	
41	M	Ann 3	ATR information table: ref dated 4/12/04. (remark: subject to verification): <ul style="list-style-type: none"> <li>Fisheries: Revised plan includes measures for rehabilitation of vulnerable species</li> <li>Asst Director (Fish.) collection of information on fish landing and social economic surveys</li> <li><b>Measures for rehabilitation of endangered species shall be included</b> in the revised plan</li> <li>Studies of limnology making progress</li> </ul>	
43	A	P7	<b>March 2006 field visit</b> , key recommendations from 15th Sep 2006 report: Up-dating of plan and implementation should be high priority. Impacts have commenced but safeguards measures are not in place.	
43	A	P18	State Govt's are requested to present the steps taken to safeguard the aquatic environment. Observations of the State Govts. on the actions suggested by IIM in the report sent to the State Govt. are also <b>awaited</b> .	
45	A	P49 pdf	Up-dating of plan and implementation should be high priority. Impacts have commenced but safeguards measures are not in place: <b>not yet started. Up-dation of plan needed.</b>	
45	M	P12 pdf	Govt. of Maharashtra and Govt. of Madhya Pradesh representatives informed that <b>stocking of the reservoir will commence soon</b> . The Vice Chairman, NVDA stated that Govt. of Madhya Pradesh has its well initiated policy towards the Fisheries Development and decision taken by the HLEG need to be brought up in NCA for discussion and approval from party States.	
46	A	P8	Action Plan suggested by CICFRI (1994) to safeguard the aquatic envt <b>yet to be taken up for updating/implementation. Reservoir stocking started in 2007</b> and would be continued in this monsoon. The site for establishment of a Mahaseer Hatchery is <b>under process</b> . Director CIFA (ICAR) Bhubaneswar is being approached for technique to breed Rita Pavimentata. Agreed for Joint fishing in principle in HLEG. The issue shall be discussed in NCA.	
40	A	P18	<b>GOG:</b> Fisheries conservation: <b>draft</b> plan available. Implementation <b>progressing</b> .	<b>Request:</b> Gujarat fisheries conservation plan and status of implementation
40	M	P12	Reservoir and dykes stocked with 426 lacs fingerlings. Water quality data collected and sent to NCA office vide letter dated 23.6.2004. [REVIEW DATA]	

41	A	P17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - Fisheries conservation aspects:</i> draft plan available, implementation progressing.	further action would be taken according to the recommendations of the studies
43	A	P18	State Govt's are requested to present the steps taken to safeguard the aquatic environment. Observations of the State Govts. on the actions suggested by IIM in the report sent to the State Govt. are also <b>awaited</b> .	
45	M	P12 pdf	Govt. of Gujarat representatives informed that stocking in the Sardar Sarovar reservoir is being continued and MoU has been signed with CICFRI and further action would be taken according to the recommendations of the studies.	
46	A	P9	Re: conservation measures - It was reported in HLEG that tripartite agreement being put in place next year for further actions.	
40	A	P18	<b>GOM:</b> Fisheries conservation: revised plan submitted.	Issue was urgent as people vested with traditional rights and concessions habituated to fishing in the shallow river would find it difficult to fish in the deep reservoir which required different technology: craft, gears and nets  41M: GOM aquatic flora and fauna implementation unlikely due to bottlenecks  <b>Request:</b> Maharashtra fisheries conservation plan and status of implementation  <b>Studies on organic loading received in NCA suggested that trophic burst is prolonging and should be utilised. Stocking to commence soon. Check statement:</b> Near absence of CO <sub>2</sub> thereby methane gets eliminated. <b>Note:</b> lack of compliance
40	M	P13	Study of organic loading results <b>still awaited</b> . Updating of plan <b>was also awaited</b> . Issue was urgent specially in view of the fact that people vested with traditional rights and concessions habituated to fishing in the shallow river would find it difficult to fish in the deep reservoir which required altogether a different technology craft, gears and nets. GOM representative stated that concerned officials from dept of fisheries in Sardar Sarovar Project reservoir could not make it to meeting. ESG could not therefore review progress on development of fisheries in Mah.	
41	A	P17	Chairman: fisheries issue already being discussed by expert group. <i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - Fisheries conservation aspects.</i> revised plan submitted	
41	M	Ann 3	ATR information table: ref dated 04/12/04 Revised action plan for Rs 298.85 lakhs received. (remark: <b>implementation unlikely due to bottlenecks</b> ).	
43	A	P18	State Govt's are requested to present the steps taken to safeguard the aquatic environment. Observations of the State Govts. on the actions suggested by IIM in the report sent to the State Govt. are also <b>awaited</b> .	
45	M	P12	Govt. of Maharashtra and Govt. of Madhya Pradesh representatives informed that <b>stocking of the reservoir will commence soon</b> .	
46	A	P8 pdf	Works <b>commenced</b> on CICFRI plan. <b>Studies on organic loading received in NCA suggested that trophic burst is prolonging and should be utilised</b> . Near absence of CO <sub>2</sub> thereby methane gets eliminated. Plan being updated. <b>Stocking to commence soon</b> . Agreed for tripartite agreement to ensure conservation of aquatic ecosystem, as recommended by HLEG.	
41	A	P11	<b>Aquatic fauna.</b> Most of the suggested actions as presented in the table above [on p11] awaited implementation. This will have <b>serious consequences</b> on the aquatic environment up-stream of the Sardar Sarovar Project. <i>Members may like to discuss and review.</i>	
42	A	D p9	Impoundment has progressed... requiring a number of sequential actions, in	See table below

			accordance with pre and post impoundment action plan suggested by CICFRI to safeguard aquatic environment as brought out in <b>Annex 7</b> . Most of suggested actions <b>still awaited</b> . This will have <b>serious consequences</b> on the aquatic environment up-stream of the Sardar Sarovar Project.	
--	--	--	--	--

### A39 status of aquatic fauna fisheries

Requirement by MOEF/SG	CICFRI recommendation	Gujarat	Mah	MP	Follow-up action
<b>Gene pool affected</b>	8 species considered vulnerable	Plan included measures for vulnerable species like <i>hilsa ilisha</i> , <i>macrobrachium rosenbergii</i> were taken	Revised plan <b>awaited</b> A40: plan to be put up to HLEG <b>for review</b>	Plan <b>to be revised</b> to include measure for vulnerable species like <i>Mahaseer</i> , <i>Rita pavementata</i> etc M40: Of 6 species identified as vulnerable, breeding technology of 4 species already known and for remaining 2, ICAR agreed to take up works on breeding technology.	<b>Request:</b> revised fisheries/ aquatic fauna conservation plans
<b>Details of wildlife habitat in region</b>	Breeding and habitation places identified	Existing plan included this aspect	Existing plan included this aspect A40: as gene pool comment	Office of DD (F) established at Barwani, <b>details of works awaited</b> M40: One unit functioning at Badwani District.	
<b>Measures proposed to rehabilitate endangered species of flora, fauna</b>	Measures for rehabilitation of endangered fauna <b>delineated</b>	Hatcheries established and reservoir was being stocked	Revised plan <b>awaited</b> A40: as gene pool comment	CICFRI <b>was to be requested</b> for inclusion of identified vulnerable species for developing rehabilitation methodology for those species, it is <b>not yet available</b> . Results were to be included in revised plan, it is <b>awaited</b> .	
<b>Assessment of CC of neighbouring areas wherein wildlife would disperse if scheme implemented</b>	<b>Certain studies</b> on water quality, prey-predator relation, carbon: nitrogen ratio etc <b>were suggested</b>	Results of water quality studies upstream, downstream and estuary available with CICFRI and pollution control board [OBTAIN?]	Studies entrusted to CICFRI <b>likely to be completed by Dec 2003</b> A40: date changed to <b>Dec 2004</b> A41: and required to be translated into action plan	Limnological studies were completed. Long-term hydro-biological monitoring was to cover identified parameters for water quality monitoring. This is <b>expected to be covered in the revised action plan</b> . M40: Long-term hydro-biological monitoring of water quality entrusted to Universities at Jabalpur, Bhopal and Ujjain was making progress.	<b>Request:</b> reports on hydro-biological status and water quality studies
<b>Plan for rehabilitation of endangered flora &amp; fauna</b>	Guidelines by HLEG on anvil 42A: *	Existing plan <b>to be revised</b>	Existing plan <b>to be revised</b>	Existing plan <b>to be revised</b>	<b>Request:</b> rehabilitation plan for endangered flora and fauna

A40: all comments as before except where specifically identified as a change. M40: comments taken from text therefore not necessarily directly relating to table items.

\* draft guidelines are proposed to be finalised during the meeting scheduled to be convened on 8.11.2004 under chairmanship of Jt. Secretary Fisheries, MOA, GOI

## Health aspects

Mtg.	Doc.	Item	Chronology	Health follow-up
34	M	SC	<p><b>General</b></p> <p><b>Contended (by petitioners) that whole project will have serious impacts on health, both around submergence area and in command.</b> Preventative aspects had not been given attention. <b>No linkage between studies and work.</b> ... Gujarat large number of studies on health of villagers ... most common diseases malaria, scabies, dysentery and diarrhoea. Only threat of malaria to be of concern. Better water availability reduces incidences of other diseases. Gujarat work plan made provision for monitoring, surveillance and control of malaria. Principle features establishment of hospital at Kevadia, strengthening of lab facility including establishment of mobile unit residual insecticidal spraying operations etc. This showed that area of public health is in no way being neglected.</p>	(from Supreme Court Judgement, 2000)
35	M	VI p9	NCA Specialist Env: Project Authorities expected to prepare plans on public health aspects focusing on prevention and control of malaria besides surveillance of diseases during pre and post impoundment period and routine care taken by concerned Depts of State and Central Govts.	Project Authorities <b>expected to prepare plans on public health aspects focusing on prevention and control of malaria besides surveillance of diseases during pre and post impoundment period and routine care</b> taken by concerned Depts of State and Central Govts.
39	A	F p13	As well as national policy obligations ... a specific requirement in environment clearance was that the plans for the provision of health facilities to workers and residents of the affected areas should be prepared. Each state should take necessary measures to minimise the risk of malaria, filarial, schistomiasis and other diseases associated with water that may result from implementation of the project. Preparation of an action plan for the surveillance and control of malaria was also stipulated.	
42	M	F p9	NCA: incremental facilities over and above normal state budget required to be provided for to take care of people on periphery of proposed reservoir, at project site and at newly created R&R sites.	
45	M	P13	Director (Environment), NCA informed that during the meeting held with certain Project Affected Persons on 26.03.08, the Chairperson has directed that <b>Expert Committee on Health should re-visit the areas and submit its findings.</b> The copies of the representation received from MoE&F would also be forwarded to the concerned State Governments for their comments and further necessary action.	incremental facilities over and above normal state budget required to be provided for to take care of people on periphery of proposed reservoir, at project site and at newly created R&R sites. <b>Note:</b> this para deleted by 46M modifications. <b>Request:</b> revisit of expert.
46	A	P10 pdf	Thereafter, some discussions took place with regard to the format of monitoring of water borne diseases. The Sub-Group felt that this aspect including review of the status of implementation of Health Aspects should be carried out by the Committee of Health Experts. Committee of Health Experts visited Maharashtra areas from 3rd to 5th June 2008. Representatives of the National Vector Control Research Institute of Indian Council of Medical research, National institute of Communicable Diseases, Indian Council of Enteric Diseases, Kolkata & representatives of the	

			RCCF, MoEF, Bhopal besides Officers of NCA and experts of the Govt. of Maharashtra participated.	
33	A	7 p13	3 <sup>rd</sup> meeting proposed of committee of experts on health.	<b>Request:</b> agendas and minutes of all meetings of committees of experts on health.
34	A	7 p10	Meeting held on 28.08.99 at New Delhi, Annex 7.	
33	A	7 p13	<b>Recommendations/ tasks overview</b> NICD representatives suggested surveillance studies be taken in some impacted areas under GOI national disease surveillance programme.	surveillance system for communicable diseases
37	A	Ann 18 p183	Sardar Sarovar Project: health aspects: report of <b>field visit</b> to areas in MP, Mah & Guj state, from 7 <sup>th</sup> to 10 <sup>th</sup> August 2001: In order to ensure health protection in Sardar Sarovar Project area, 2 principal tasks remain: <ul style="list-style-type: none"> <li>Firming up of surveillance system for communicable diseases. Four facets. This surveillance undertaken [at national level and by state and district counterparts] ... be used for reporting. Progress and status of national programmes under implementation should also be reflected in reports brought out by the State.</li> <li>Project authorities to present a comprehensive picture on the general status of the diseases surveillance and health delivery system in project areas. Inputs for control of related disease need to be tied up with concerned programmes of national and state agencies.</li> <li>Control of water related/based/washed diseases on a long-term basis throughout pre and post impoundment periods through qualified paramedical staff specially in Maharashtra and MP needs to be strengthened. There are weaknesses in disease surveillance specially in Maharashtra and MP. In Maharashtra disease surveillance is being handled and diseases diagnosed by ayurvedic doctors. May not fit into allopathically designed surveillance structure. Standard formats could be used. Computers could be used, gathering information for proper surveillance and timely corrective measures.</li> <li>As per reports provided, malaria declining. As high risk, close watch to be kept for preventing re-occurrence. District health officers/ authorities should be identified and enlisted to monitor compliance with guidelines for malaria control and in drinking water supply areas under national directives</li> <li>Limited study showed co-relation between open defecation and positive bacteriological test of drinking water supplies and consequent increased gastroenteric diseases as in Village Mandvi in Mah and pattern in other areas in MP and Mah. Suggested as precaution latrines be established at R&amp;R sites and villagers educated to use them. Campaign for use through information, education programmes in local dialects.</li> <li>Some deficiencies noted in strength of para-medical staff actually deployed vs those outlined in plan. Services of qualified technicians similarly may also be obtained at least during high risk months of July –</li> </ul>	
				general status of the diseases surveillance and health delivery system
				In Maharashtra disease surveillance is being handled and diseases diagnosed by <b>ayurvedic</b> doctors. May not fit into allopathically designed surveillance structure.
				<b>Check:</b> is malaria still in decline?
				As precaution latrines be established at R&R sites and villagers educated to use them. Campaign for use through information, education programmes in local dialects
				Some deficiencies noted in strength of para-medical staff actually deployed vs those outlined in plan

			<p>October. Diseases under control with current staff level but with full development additional strength might be required</p> <ul style="list-style-type: none"> <li>In many places norms prescribed by MOEF for disposal of hospital waste not being adhered to. Suggested to follow prescribed norms.</li> </ul>	
37	M	B p8	Compliance report on recommendations of expert committee on health aspects should be submitted in <i>next meeting of ESG</i> .	
38	A	P9	There was a substantial compliance from GOG. However <i>compliance from GOMP and GOM was awaited</i> .	
38	M	P8	Re concerns expressed by Cmte of Experts which visited the areas, Dr Kawathekad, NVDA consultant stated that the final consolidated report of the Gandhi Medical College was already received and the recommendations were being taken up for implementation. Control of waterborne diseases, surveillance and monitoring of the diseases trend and reinforcement of the existing medical facilities were being taken up in a phased manner. He further informed that water quality assessment by Central Pollution Control Board would be supplemented through collection of data and analysis of samples in field by mobile field stations proposed in plan under implementation. NCA Director Env: <i>Certain gaps in disease surveillance programme found by Cmte. NVDA VC: expert advice if NICD Malaria Research Ctr being solicited.</i> Addl Director NICD: NICD would extend all possible help, disease surveillance would point out any possibility of outbreak of the monitored diseases.	
39	A	P14	<p><b>Table of status re cmte recommendations following AUG 2001 visit</b> includes [SEE TABLE AT END OF HEALTH SECTION]:</p> <ul style="list-style-type: none"> <li>3) Epidemiological surveillance studies: Mah: <b>Phase II study yet to start</b></li> <li>4) Present status health delivery system, preventative measures proposed to control waterborne diseases incidence: Guj: action plan <b>under implementation</b>, Mah: revised action plan <b>awaited</b>, MP: action plan revised Aug 2003</li> <li>5) Reinforcement of existing health delivery system commensurate with 110.64 m RL: Mah and MP both <b>incomplete</b></li> <li>6) surveillance of diseases: Guj <b>progressing</b>, Mah <b>weak</b> – being implemented under MHSDP, use of computer record and compile data at district level, MP <b>weak</b></li> <li>7) standard format for disease surveillance – Guj progressing, Mah format circulated, <b>implementation awaited</b>, MP <b>awaited</b></li> <li>8) District health authorities to be enlisted to monitor compliance with guidelines for malaria control and drinking water supply areas under national directives – Guj <b>progressing</b>, Mah <b>awaited</b> 2 water quality labs working, 4 bring <b>operationalised</b>, Pada workers are appointed to</li> </ul>	



39	M	F p8	<p>perform house to house disinfections with help of Medichlor, MP <b>awaited</b></p> <ul style="list-style-type: none"> <li>• 9) Progress and status of national programmes ... - Guj <b>progressing</b>, Mah <b>awaited</b>, MP <b>awaited</b></li> <li>• 10) Regular entomological monitoring ... - Guj <b>progressing</b>, Mah <b>awaited</b>, preventative measures planned, MP <b>awaited</b></li> <li>• 11) Latrines ... - Guj <b>progressing</b>, Mah <b>awaited</b>, health dept is performing IES activities to educate people, MP <b>awaited</b></li> <li>• 12) Hospital waste disposal norms ... - Guj <b>awaited</b>, Mah <b>awaited</b>, MP <b>awaited</b></li> </ul> <p>Shekhar Singh: on Agenda p14, most items shown as incomplete, awaited or weak for areas in Mah and MP. ESG must get opportunity to review progress before considering request of GOG [to raise height].</p> <p>NVDA VC: NVDA had already engaged ICMR as experts and <b>work has been initiated</b>. Health delivery already in place in areas close to submergence. Beside, 99 R&amp;R sites were equipped with medical facilities as per directions in Award. Additional activities promised were being provided and monitoring mechanism has been evolved by NVDA.</p> <p>Chairman: additional activities must be provided and monitoring reports should also be available before next meeting</p> <p>Suggested that data on the health issue available with party states should be put up on the websites.</p> <p><i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - Health</i> – additional facilities as required must be provided. Monitoring reports should also be available. Data to be put up on website.</p> <ul style="list-style-type: none"> <li>○ Guj: awaited</li> <li>○ Mah: awaited</li> <li>○ MP: awaited</li> </ul>	<p>Many health aspects awaited from Mah and MP and in progress only by GOG.</p> <p><b>Request:</b> status update and request website links of all health information on project and health monitoring reports, as per expert committee recommendations.</p> <p>[Activities, monitoring reports].</p> <p>Major shortcomings in implementation of health safeguards and Bhopal college findings show worsening health situation in MP, yet dam height raising still permitted.</p>
33	M	7 p13	<p><b>GOG</b></p> <p>Subgroup requested information on status of malaria in peripheral Gujarat villages surrounding SS reservoir. GOG agreed.</p>	<p>34A: data from vicinity village in Gujarat <b>promised soon</b>.</p> <p><b>Review:</b> malaria status, expert review.</p>
34	A	Ann 7, p181	<p>State Dept made presentations showing decline of malaria in Sardar Sarovar Project command after 1992. Attributed to better infra-structural set-up by GOG.</p> <p><i>Data from vicinity village in Gujarat promised soon.</i></p>	
34	M	6 p11	<p>Annex 7</p>	
35	A	p10	<p>By end 2000, intensified malaria control programme was underway in several project-impacted villages and construction of 25-bed hospital at Kevadia Colony was complete.</p>	
35	M	6 p9	<p>NCA Specialist Env: during last review of health aspects by Member (E&amp;R) NCA, presented that <b>incidence of malaria had declined in command area and this was attributed to better managerial practices adopted by GOG. However keeping in view droughts during last couple of years, desired to</b></p>	



36	A	6 p8	<b>tread cautiously.</b> Action plan at Annex 13 p122-143	
36	A	Ann p38	Command area: Under Sardar Sarovar Project, the infra-structure itself, at a large cost, takes care of avoiding or minimising seepages and stagnations. Following control strategies expected to address malaria problems on account of Sardar Sarovar Project: <ul style="list-style-type: none"> <li>a) special health units to monitor and treat migrants (workers and resettled people) intensively under malaria control programmes</li> <li>b) effective monitoring and surveillance under the operative malaria control programmes</li> <li>c) emphasis on 'tidy' irrigation and drainage</li> <li>d) creating awareness among Sardar Sarovar Project staff as well as among command population through health education and extension programmes. This also includes preparation of a manual on malaria control</li> <li>e) use of identified carnivorous fish in tanks, ponds etc inside and near command area</li> </ul>	Request: what measures reduce seepage <i>apart from lining</i>
36	M	A p6	Final Health Plan in Agenda. Dy Director, Indian Council Medical Research – cases of Malaria gone down considerably in Gujarat. Similar models needed for Mah and MP. Prof Katti: drought conditions prevailing may cause proliferation of diseases from stagnant water/shallow pools along river course. Re Chairman's query whether consecutive drought in Gujarat is reason for decrease in malaria cases: Joint Director, NICD explained that better medical facilities and preventative measures by health personnel resulted in reduction of malaria cases and drought has no direct bearing on decline of malaria in Gujarat.	Similar health plan models to Gujarat needed for Mah and MP.
36	M	P9	Dy Director, Indian Council Medical presented observations on 6 <sup>th</sup> interim report of GMC Bhopal and suggested a joint action plan for the Sardar Sarovar Project as a whole. Further suggested monitoring very essential for tracking new emerging trends and plan therefore may include following: <ul style="list-style-type: none"> <li>• surveillance should be continuous process</li> <li>• establishment of early warning system</li> <li>• breeding of vectors needs to be controlled</li> <li>• vulnerable areas should be delineated</li> </ul> GOG activities set out. Chairman suggested increasing frequency of deliberations of Group of experts on health and <i>suggested field visits</i> organised for assessment of ground conditions in impact zones.	<b>Review:</b> is consecutive drought in Gujarat reason for decrease in malaria cases
40	A	P18	Re additional facilities etc: monitoring report <b>awaited</b> and progress on placing data on the website <b>awaited</b> .	
41	M	C p6	SSNNL MD: incremental facilities on health aspects would also be put in place in the areas under consideration <b>by March 2005</b> [re: command area].	<b>Request:</b> reports of field visits of group of experts on health.

41	M	F p9	Commissioner ( <u>fisheries</u> ) [typing mistake?], GOG: there was <b>substantial progress</b> on health aspects and the <b>recommendations of the expert committee on health have been complied with.</b>	
42	M	Fp9	Some progress is reported for facilities at dam site and R&R sites, progress report on provision of such facilities in command area is <b>awaited.</b>	<b>Request:</b> status of health provision in command area
43	A	P5	Field visit June 05, summary of recommendations, prioritised actions: Considering reported rise in diseases and consequent high risk, qualified experts may be involved in preventing recurrence of various diseases.	43A: Field visit June 05, summary of recommendations, prioritised actions: Considering <b>reported rise in diseases and consequent high risk</b> , qualified experts may be involved in preventing recurrence of various diseases.
43	M	P13	Member (E&F), NVDA presented a report on completion of buildings for the proposed health facilities on the periphery of the reservoir and stated that for Geographic reconnaissance studies, the work was being carried out by the National Anti Malaria Programme (formally Malaria Research Centre) for the ISP areas and their recommendations would be applicable to SSP areas also. The data on epidemiological and water quality aspects was being collected by the Health Cell of the NVDA. It was informed by the Director (Env.) that the data collected was required to be synthesized and submitted to the Narmada Control Authority. The water quality parameters being collected by the Pollution Control Board were also required to be analysed as it would be useful in assessment of required mitigatory measures. This was urgent to prevent any epidemic in the area, specially in view of the fact that dam height has to be raised to 121.92 m. and beyond, soon.	44M: <b>Detailed report Commensurate with Action Plan submitted is yet awaited</b>
44	A	P11	Director (Env.) NCA, stated that while progress reported for the facilities at the dam site and R&R sites were <b>making progress</b> , the progress on provision of such facilities in the command was <b>awaited.</b>	43M: The water quality parameters also required to be analysed in assessment of required mitigatory measures - urgent to prevent any epidemic in the area, specially in view of the fact that dam height <b>has to be raised to</b> 121.92 m. and beyond, soon.
44	M	P13 PDF	C.M.D., SSNNL stated that existing State health services in the Command Area were adequate for any emergency requirement besides services of Malaria Research Centre at district Nadiad were also available. Director (Env.), NCA pointed out that Govt of Gujarat submitted a 17 year health plan for implementation commensurate with progressive development of Command Area. Implementation of the plan submitted to the Sub Group was awaited. The Chairperson desired submission of the report on implementation of the plan.	44A: Govt of Gujarat submitted a 17 year health plan for implementation commensurate with progressive development of Command Area. Chairperson desired submission of the report on <b>implementation</b> of the plan
44	M	P13 PDF	Health (urgent) - Considering reported rise in diseases and consequent high risk qualified experts may be involved in preventing recurrence of various diseases - <b>Detailed report Commensurate with Action Plan submitted is yet awaited</b>	
46	A	P10 pdf	Prep of state action plan – health aspects: Action plan updated for 2000-2001. Health survey – routine surveillance activities are carried out under IDSP or NHRM of Govt of India.	Require: current status, esp. re command area
33	M	7 p12	<b>Inclusion of districts – GOMP</b> Khandwa and Hoshangabad districts identified for inclusion in annual NICD programme. Dr RC Sharma, Dir, NICD, New Delhi informed that he would pursue for their inclusion in a phased manner.	
34	M	6 p11	Dr RC Sharma, Dir, NICD: as per NICD programme, there were 11 districts in	

35	M	6 p11	the 3 states. As NICD monitors for district as whole and MP information is for inclusion of certain villages, a health cell may be created in NVDA for co-ordinating the activities.	
36	M	p8	Principal Director of surveillance studies had approached NICD for inclusion of Districts Khandwa and Khargone [? Not Hoshangabad?] in their programme. Joint Director NICD suggested that surveillance studies on vector borne, water borne, gastro intestinal diseases etc be continued on a long-term basis and biological quality of water should also be monitored.	<b>Request:</b> is biological quality of water being monitored? Are surveillance studies on vector borne, water borne, gastro intestinal diseases etc being continued on a long-term basis?
33	A	7 p13	<b>GOMP</b> Final report of Gandhi Medical College, Bhopal awaited. Agreed that ongoing surveillance studies by the college shall incorporate reference data also.	Agreed that ongoing surveillance studies by the college shall incorporate reference data also.
33	M	7 p12	Final report still awaited but baseline data are in report. Report abstract at Annex 11.	Final report still <b>awaited</b> but baseline data are in report.
34	A	Ann 7, p181	ICMR made recommendations accepted by NVDA and GM College and 6 <sup>th</sup> <b>report redrafted</b> accordingly. Water quality data available with pollution control board and needs to be purchased and analysed.	Water quality data available with pollution control board and needs to be purchased and analysed.
34	M	Ann 3, p13	Director MRC requested to help identify potential breeding areas of mosquito. Disease surveillance programme assigned to GM College, Bhopal. Based on experience, GMC suggested 2 villages be included by NICD in their NDSP in MP. Annex 4: sixth version of six monthly reports. GMC requested to submit compiled and final report extrapolating recommendations to project impact areas.	
35	A	P10	Since 1992 GMC continued surveillance studies, work started on additional facilities for Nisarpur village hospital, Dhar District. Nisarpur hospital extension due for completion by time submergence of areas in MP commences.	
34	M	P11	[Corrected in M35]: GMC Bhopal sixth and final report has been received <del>and is being compiled</del> . <i>However a final report incorporating all findings and recommendations is awaited.</i>	
35	M	6 p10	Dr SC Tiwari, GMC: <b>certain cases of filarial reported from some pockets of impact areas of Maheshwar project upstream of Sardar Sarovar Project. MOEF Joint Secretary suggested effective monitoring to keep disease in check.</b> 6 <sup>th</sup> Report Exec Summary at Annex 7 p23-31. 6 <sup>th</sup> interim report submitted at last meeting. Reports equally applicable to submergence area in MP spread due to Sardar Sarovar Project and includes above aspects. <i>Final report awaited.</i>	<b>Request:</b> what monitoring has been put in place to keep filarial in check?
37	M	B p5	Re expert committee recommendations, NVDA VC: comments being obtained from Director, Health Services and Dept of Preventative & Social Medicines, GMC, Bhopal. DR RC Sharma: <i>better disease surveillance system needed in MP. NVDA VC</i>	

40	A	P18	<i>requested one expert on Indian system of medicine be invited to assess disease surveillance as per Indian systems.</i>	
40	M	P14	Re additional facilities as required etc: progress <b>awaited</b> . Re agenda paper. Out of 57 dispensary buildings completed, 22 have been handed over to departments and would <b>be made functional soon</b> . Assured that there would <b>not be any deficiency in the treatment of the affected population up to a dam height of RL 110.64m</b> .	<b>Request:</b> have all 57 dispensary buildings in MP now been handed over and are they fully functional? Assured that there would <b>not be any deficiency in the treatment of the affected population up to a dam height of RL 110.64m</b> .
40	M	P14	Observations of ICMR on GOMP health plans at <b>Annex 2</b> .	
41	M	F p9	NVDA VC: there was substantial progress after last reporting. Health cell with full computerised system has been established in NVDA for analysing the data and for suggesting remedial measures. Control of malaria being attended to by state department. Malaria Research Centre also carrying out studies with help of regular field visits. State government was taking care of biological waste.	
41	M	Ann 3	ATR information table: ref dated 04/12/04	<b>Obtain:</b> ATRs
41	M	Ann 3	health aspects (remark: subject to verification): reports progress on incremental health facilities.	Request reports
42	M	F p9	Status - Health aspects (remark: subject to verification) - reports on incidence of diseases for Sardar Sarovar Project/ISP and OSP for period 2003-4. Further work was making progress.	
43	A	P7	Report on implementation of provision of incremental facilities towards posting of doctors, purchase of medicines/ equipments, spray of insecticides etc for villages on periphery of reservoir was <b>awaited</b> . March 2006 field visit, key recommendations from 15th Sep 2006 report: Health aspects – in progress - Implementation of the action plan on ground <b>should have been completed</b> and disease monitoring required on long term basis.	<b>Request:</b> Report on implementation of provision of incremental facilities towards posting of doctors, purchase of medicines/ equipments, spray of insecticides etc for villages on periphery of reservoir.
44	A	P11	The Sub Group was informed that reports on disease monitoring were <b>awaited</b> .	reports on disease monitoring <b>awaited</b> .
44	M	P14 pdf	GOMP reported progress on health facilities being created at R&R sites. Report on implementation of plan of peripheral villages submitted is yet <b>awaited</b> .	report on implementation of plan of peripheral villages submitted is yet <b>awaited</b> .
46	A	P10 pdf	Prep of state action plan – health aspects: Action plan was submitted in 1993; a draft health plan 2005-06 was also submitted. Health survey – routine surveillance activities are carried out under IDSP or NHRM of Govt of India.	Action plan was submitted in 1993; a <b>draft health plan 2005-06</b> was also submitted.
33	M	7 p13	<b>GOM</b> Detailed health plan drawn up by Dept. Dir of State Health Services <b>but not yet available</b> . Delay in purchase of launch due to non-commitment of funds – GOM to contact SSNNL VC for provision in Sardar Sarovar Project budget.	<b>Request:</b> detailed health plan <b>Delay in purchase of launch due to non-commitment of funds</b>
34	A	7 p11	A separate cell on health aspects along lines of GOG.	
34	M	6 p11	Annex 6: ...	
35	A	p10	2 cottage hospitals, 8 primary health centres and 55 primary health units have been established in Dhule District. Provision made for 8 additional PHUs, 10	

35	M	6 p11	mobile units and floating dispensary for villages within 10 km of submergence zone, taking into account inaccessibility of some of villages. One hospital at Somawal resettlement village already functional.	Info from GOM on progress of Phase II studies awaited
36	M	p10	<b>Info from GOM on progress of Phase II studies awaited.</b> Phase I surveillance studies completed much earlier and provisions contained in Health Plan submitted by GOM were delineated in Adena Annex 11. <i>Update of activities and review of implementation of health provisions within Sardar Sarovar Project impact zone requested.</i>	
37	A	Ann p206	Letter to GOM Secretary Env from Dr Pawan Kumar Specialist Env: <i>update requested</i> on Health Plan activities inc status of Phase II study for disease monitoring, compliance with committee visit report recommendations [SEE ABOVE, 2001 visit].	<b>Update on</b> compliance with committee visit report recommendations
40	A	P18	Re additional facilities as required etc: progress <b>awaited</b> .	
40	M	?	40M: Director General, Health Svs GOM Dr Salunke: all needed steps would be taken for streamlining implementation of proposed action and for carrying out Phase II studies in time. Earlier surveillance studies proposed to be by Scion Medical College but now Health Dept would undertake for completing expeditiously.	
41	M	F p9	Principal Secretary, Energy & Environment, GOM: epidemiological studies for Phase II areas entrusted to Government Medical College, Dhule and <b>final report expected by March 2005</b> . For incremental health facilities, a revised plan would be completed by <b>March 2005</b> . NCA Director ENV: progress on implementation of the environmental safeguard measures was received only a few days back and is under scrutiny. Preliminary observations however reveal that the progress reports sent is not in response to the action plan submitted instead appears to cover only general activities of the health department.	<b>Request:</b> Phase II studies report. <b>Final report expected by March 2005</b> . For incremental health facilities, a revised plan would be completed by <b>March 2005</b> .
41	M	Ann 3	ATR information table: ref dated 01/01/05 and 17/11/04 Reports on progress on health aspects <ul style="list-style-type: none"> <li>Epidemiological studies commence interim report by March 2005 (remark: subject to verification by experts)</li> <li>Implementation of action plan held up as the <b>cheque issued was dishonoured by bank</b> due to technicalities - (remark: subject to verification by experts)</li> </ul>	41M: progress reports sent is not in response to the action plan submitted instead appears to <b>cover only general activities</b> of the health department.  <b>Obtain:</b> ATRs
42	M	F p9	GOM: Epidemiological surveillance studies making progress and report <b>expected shortly</b> . Facilities in impact areas are being created by the State and are not being charged to the Sardar Sarovar Project. NCA Dir Env: There were discrepancies in the implementation report with that of the plan submitted. The disease surveillance system continued to be <b>weak</b> as only a few diseases were being monitored. <b>Reports received indicated increasing trend in malarial cases.</b> Chairman: formal complete plan giving details of the facilities covered under the	Note funding problem – <b>dishonoured cheque</b> .   NB increased trend in malaria in Maharashtra.

43	M	P14	<p>state plan and incremental facilities necessitated on account of recommendations of EIA study group/ field visits <b>report may be prepared by GOM</b> giving budget provisions. <b>Pari-passu compliance of various activities be submitted in next meeting of Sub-group by all concerned States.</b></p> <p>The representative of Govt. of Maharashtra stated that epidemiological surveillance studies was <b>making progress</b> and report was expected shortly and it would be submitted by the end of January 2007. Director (Env.), Narmada Control Authority referring to the decision of the last meeting stated that there were discrepancies in the implementation report with that of the plan submitted. The disease surveillance system continued to be weak as only a few diseases were being monitored. Representative of the Health Services, Govt. of Maharashtra regretted for the discrepancies in the reports submitted and assured that he would examine the issues personally and resolve to submit the report as per precise requirement of the Environment Sub-Group by the end of January 2007.</p>	<p><b>Request:</b> report plan giving details of the facilities covered under the state plan and incremental facilities necessitated on account of recommendations of EIA study group/ field visits inc budget provisions.</p> <p>epidemiological surveillance studies was <b>making progress</b> and report was expected shortly and it would be submitted by the end of January 2007</p> <p>disease surveillance system continued to be weak as only a few diseases were being monitored</p>
44	M	P11	<p>Director (Env.), NCA stated that last review of the progress of work was undertaken by Principal Secretary (Environment), Govt of Maharashtra, this review was attended by the Director (Env.) and deficiencies in implementation of environment safeguard measures was apprised therein. The field visit to the areas in Maharashtra is planned for the last week of September, 2007 and it is expected that it would be completed before the next meeting of the Sub Group.</p>	
46	A	P10 pdf	<p>Prep of state action plan – health aspects: Action plan was submitted in 1996, the plan is further revised in Aug 2003.</p> <p>Health survey – routine surveillance activities are carried out under IDSP or NHRM of Govt of India.</p>	<p>health aspects: State action plan was submitted in 1996, the plan is further revised in Aug 2003</p>
35	A	P119	<p><b>GMC, Bhopal report on ISP and SSP</b></p> <p>Annex 11 – GMV+C, Bhopal, MP report: <b>ISP</b> health (sixth phase focus on morbidity), summary: post impoundment shows:</p> <ul style="list-style-type: none"> <li>• higher morbidity: post 14.47% vs. pre 11.16%</li> <li>• males higher morbidity post 16.77% than females 11.61%</li> <li>• males higher morbidity pre 13.88% than females 8.09%</li> <li>• vector-borne infections, respiratory, water-borne gastrointestinal infections and skin infections largely responsible for morbidity in community in these areas</li> <li>• prevalence of morbidity: post 9.46% vs. pre 6.48%</li> <li>• prevalence chronic diseases: post 7.15% vs. pre 4.90%</li> <li>• bronchial asthma, pulmonary tuberculosis, cataract blindness and chronic malaria were main chronic diseases</li> <li>• surprisingly higher morbidity rate in well nourished children of post 42.68% vs. pre 27.11</li> <li>• unimmunised children: post 23.34% vs. 26.85%</li> <li>• in both areas pvt medical practitioners main source of treatment for</li> </ul>	<p>Note: findings of report for ISP but made applicable to SSP also. Finds <b>health issues worsening post-impoundment.</b></p> <ul style="list-style-type: none"> <li>• Higher morbidity, particularly male, due to various infections (vector-borne, respiratory, water-borne and skin)</li> <li>• Prevalence of chronic diseases, mainly bronchial asthma, pulmonary tuberculosis, cataract blindness and chronic malaria</li> <li>• Much higher morbidity rate post impoundment amongst well nourished children</li> </ul>

38	M	P8	<p>community and allopathic system more commonly adopted</p> <ul style="list-style-type: none"> <li>• rural population of study therefore majority deliveries are home deliveries in both areas, conducted by trained birth attendant</li> <li>• malaria slide positivity rate always higher post 4.40% vs. 3.04%</li> </ul> <p>Dr Shekhar Singh stated data generated by GMC presented an alarming situation and threat and more stress was required on implementing preventative measures. Dr Kawathekad, NVDA consultant stated GOMP alive to situation. Though waterborne diseases under control, preventative measures were being taken for malaria and filaria together. He further stated that though project areas might have only Annual Parasitic Index API below –2 still these areas would be covered up by insecticide spray as per the plan. He requested Dir, Malaria Research Ctr for <b>suggestions on promoting engineering design parameters for residential complex to prevent proliferation of diseases vector.</b></p>	<p>[haven't followed ISP threads so may have been other discussions]</p> <p><b>38M:</b> Dr Kawathekad, NVDA consultant stated GOMP alive to situation. Though waterborne diseases under control, preventative measures were being taken for malaria and filaria together. .. He requested Dir, Malaria Research Ctr for <b>suggestions on promoting engineering design parameters for residential complex to prevent proliferation of diseases vector.</b></p>
----	---	----	--	--

## Health Aspects – Status

From 39A p14: TABLE OF STATUS RE CMTE RECOMMENDATIONS FOLLOWING AUG 2001 VISIT.

Unchanged in 40A p14. 46A table shows some different actions: establishment of health facilities, vector control, disease monitoring

	Mitigation measures	GUJ	MAH	MP	Follow-up on health status
1	Present status of waterborne disease in the areas	Completed 43A: pre-impoundment data available.	Completed 43A: pre-impoundment data available.	Completed 43A: pre-impoundment data available.	
2	Screening arrangements proposed for the workforce	Completed	Not relevant	Not relevant	
3	Epidemiological surveillance studies	Completed by SCHMS	Phase II study yet to start 40M: Director General, Health Svs GOM Dr Salunke: all needed steps would be taken for streamlining implementation of proposed action and for carrying out Phase II studies in time. Earlier surveillance studies proposed to be by Scion Medical College but now Health Dept would undertake for completing expeditiously. 41M: epidemiological studies for Phase II areas entrusted to Government Medical College, Dhule and <b>final report expected by March 2005</b> . 43A: report on disease pattern of Nandurbar Dist. received but <b>falls much short of the requirement</b> .	Completed by GMC, Bhopal	<b>Request:</b> Phase II study report
4	Present status health delivery system, preventative measures proposed to control waterborne diseases incidence	Action plan under implementation	Revised action plan <b>awaited</b>	Action revised Aug 2003	<b>Request:</b> revised health action plans for each state.
5	Reinforcement proposed to existing health delivery system commensurate with 110.64 m RL in upstream areas and at project site	Completed	<b>Incomplete.</b> 41M: For incremental health facilities, a revised plan would be completed by <b>March 2005</b> .	<b>Incomplete.</b>	<b>Request:</b> status of reinforcement of health delivery system for 110m RL, 121m and FRL, separating each requirement.



	Mitigation measures	GUJ	MAH	MP	Follow-up on health status
6	Surveillance of diseases	Progressing	<b>Weak.</b> Being implemented under MHSDP. Use of computer to record and compile the data at district level 43A: <b>continued to be weak</b>	<b>Weak.</b> 40M: regular training programmes organised for surveillance. 41M: Health cell with full computerised system has been established in NVDA for analysing the data and for suggesting remedial measures. EM04/05: 1 monitoring cell under NVDA with SMS in position is functioning. 43A: <b>surveillance weak.</b> Reports <b>not received.</b>	<b>Request:</b> details of measures to improve disease surveillance for each state.
7	Standard format for disease surveillance	Progressing 45A: <b>awaited.</b>	Format circulated. Implementation <b>awaited.</b>	<b>Awaited.</b> 40M: monthly information on major communicable diseases was being sent to NICD and also processed by health cell of NVDA Bhopal. Data in NICD format was being collected. EM 04/05: compliance reported is under scrutiny 43A: <b>awaited.</b>	
8	District health authorities to be enlisted to monitor compliance with guidelines for malaria control and drinking water supply areas under national directives	Progressing	<b>Awaited</b> 2 water quality labs working, 4 bring <b>operationalised.</b> 77 Pada workers are appointed to perform house to house disinfections with help of Medichlor (chlorination – EM04/05) 45A: progressing	<b>Awaited.</b> 40M: quality of water being monitored. 41M: Control of malaria being attended to by state department. Malaria Research Centre also carrying out studies with help of regular field visits. 43A: <b>awaited.</b>	<b>Request:</b> guidelines for malaria control and drinking water supply areas under national directives, and reports on compliance monitoring
9	Progress and status of national programmes	Progressing	<b>Awaited.</b>	<b>Awaited.</b>	<b>Request:</b> status reports
10	Regular entomological monitoring	Progressing, with help of ICMR	<b>Awaited,</b> preventative measures planned	<b>Awaited.</b> 40M: being taken up with help of Malaria Research Ctr. EM 04/05: reports awaited	<b>Request:</b> compliance reports

	Mitigation measures	GUJ	MAH	MP	Follow-up on health status
11	Latrines	Progressing	<b>Awaited.</b> Health dept is performing IEC activities to educate people	<b>Awaited.</b>	<b>Request:</b> compliance reports, listing locations where latrines have been built and where they are yet to be built.
12	Hospital waste disposal norms	<b>Awaited.</b> 40M: steps have been taken by Gujarat Pollution Control Board for disposal of bio-medical waste in acc with Bio Medical Rules 1998. Govt hospitals have been asked to obtain authorisation and for arranging disposal of their waste.	<b>Awaited.</b>	<b>Awaited.</b> 41M: State government was taking care of biological waste.	<b>Request:</b> compliance reports

## Seismicity and rim stability

Mtg.	Doc.	Item	Chronology	Seismicity/rim stability follow-up
39	A	E p12	<p><b>General</b></p> <p>River Narmada lies in seismo-tectonic provinces of Cambay Basin and Peninsular Shield. Moderate seismic activity has been recorded in the Cambay Basin (up to 5.4 on Richter scale) although majority of events in dam vicinity have been of sub-zero magnitude.</p> <p>GOG appointed Dam Review Panel comprising engineers and geologists to evaluate the report and findings and a <b>revised final report</b> was submitted to project authorities in 1982. Main recommendations:</p> <ul style="list-style-type: none"> <li>Construction of dams and infrastructure (incorporating seismic design coefficients) to <b>withstand the maximum credible earthquake</b> – adoption of horizontal design coefficient of 0.125g, installation of stress monitors in main body of dam, increase of depth of foundation to 18m below lowest riverbed.</li> <li>Establishment of seismic monitoring stations <b>at key locations around reservoir</b></li> </ul> <p>GSI (Nagpur division) rim stability studies – completed</p> <p>Tracer studies by CWPRS – completed</p> <p>Earlier it was considered desirable to <b>upgrade the instruments</b> for which a proposal was being worked out by SSNNL in accordance with IMD suggestion – <i>progress</i>.</p>	<p>Moderate seismic activity has been recorded in the Cambay Basin (up to 5.4 on Richter scale) although majority of events in dam vicinity have been of sub-zero magnitude</p> <p>Seismotectonics: Dam is design to meet MCE of 6.5. Stable Continental Region (SCR) activity has reached 6.4 Latur 30/09/93, Jabalpur 6.0 22/05/97 (see EM 04/05) – respectively Terna and Bargi dams in vicinity of these events did not suffer damage. Bhuj, 400km away, was 6.9, 26/01/01.</p> <p><b>Check:</b> any cracks in dam concrete.</p> <p><b>Check:</b> is a disaster management plan in place with early warning system for all downstream and other affected populations.</p> <p><b>Check:</b> is above 6.5 possible due to reservoir induced seismicity (EM04/05 p61 states it is established that levels of RIS have never exceeded 6.3)</p> <p>“very unlikely” term used without any quantification of uncertainty, meaningless without quantification and statistical basis.</p>
40	M	P13	<p>Dam Safety Review Panel data review after October 2001 – <i>to be informed</i>.</p> <p>SSNNL Director Civil: Dam Safety Review Panel met and reviewed the data up to January 2001 and <b>observed that the dam was safe and no review of the dam design was needed</b></p> <p>Data was again analysed by the Dam Safety Panel during October 2001 when it <b>was noticed that effect of Bhuj Earthquake was totally imperceptible</b>.</p>	<p>Dam Safety Review Panel met and reviewed the data up to January 2001 and <b>observed that the dam was safe and no review of the dam design was needed</b>: very confident statement, this needs an independent review to ensure it is on a sound basis. Would upgraded instrumentation provide better perceptibility of events?</p>
40	M	P14	<p>Re upgradation of network: technical specifications being worked out in consultation with IMD, Likely to cost about Rs 5.50 crores. GOG planned to invite tenders by <b>August 2004. Work was likely to be completed by September 2005</b>.</p> <p>Chairman’s view: studies carried out were for a particular value of the probability.</p>	<p><b>Request:</b> status of upgradation of network and details of all new equipment and monitoring station locations. <b>Work was likely to be completed by September 2005</b>.</p>
40	M	P14	<p>Dam designed to withstand a probable earthquake of a given intensity therefore not be proper to attach absolute values to the statements.</p>	<p>A robust basis for statistical inferences need to be provided, what do the various probability levels relate to?</p>
43	A	P7	<p>March 2006 field visit, key recommendations from 15th Sep 2006 report: seismicity&amp; rim stability – in progress - Recommendations of the dam Safety review panel should be put up to the Sub Group from time to time IMD may be requested to provide V-Set communication facilities for all observatories.</p>	
43	A	P20	<p>Regarding up-gradation of network: Progress from Gujarat is yet <b>awaited..</b></p>	<p>Regarding up-gradation of network: Progress from Gujarat is yet <b>awaited</b>.</p>

33	A	6 p13	<b>Analysis of data</b> <b>GOG:</b> For regular monitoring of seismicity in vicinity of reservoir, total of 9 seismic stations planned and 8 already in place.	
33	M	p12	Instruments installed on 9 <sup>th</sup> observatory, Sagbara, on 23/01/99, functioning from same date. For analysis and application of data suggested SSNNL or NVDA may contact Earthquake Research Institute, Roorkee or Indian Meteorological Department or GSI.	GOG: Instruments installed on 9 <sup>th</sup> observatory, Sagbara, on 23/01/99, functioning from same date
34	M	Ann 3	<b>GOMP:</b> P12. seeking suitable agency for data analysis and application in relation Sardar Sarovar Project. Feed back from field staff awaited.	<b>GOMP:</b> seeking suitable agency for data analysis and application in relation Sardar Sarovar Project. Feed back from field staff awaited.
36	M	P13	<i>Information on analysis by expert institutions.</i>	
37	M	B p8	Data from 9 monitoring stations <b>should be got analysed</b> through concerned recognised institutions and submitted for information of ESG.	
38	A	P9	Computation of parameters of micro earthquake occurring in Narmada Basin is being carried out. Also special reports of major earthquakes occurring in Gujarat, other parts of India like Uttarkashi, Latur, Jalpalpur and other global earthquakes are regularly prepared. The analysis of earthquake data and overall monitoring is being done by office of Chief Engineer (Designs). These reports are periodically monitored by the Dam Safety Review Panel.	
38	A	Ann p122	Results of analysis of data from monitoring stations: received, analysed by the dam safety review panel of Sardar Sarovar Project during October 2001.	
38	M	P12	GOG: Regarding data analysis, <b>shortage of the technically qualified manpower for day-to-day analysis and that help of institutions like</b> IMD and University of Roorkee was being sought [see M33]. These institutions due to staff shortage have also not shown interest in taking up analysis of data. <b>Objective of seismological monitoring was to ascertain reservoir induced seismicity RIC</b> and that data generated was of academic interest for ascertaining seismological activities and can also be used by those who needed this. Data was being collected and presented to dam safety review panel for their consideration and recommendations from time to time.	GOG: Regarding data analysis, <b>shortage of the technically qualified manpower for day-to-day analysis and that help of institutions like</b> IMD and University of Roorkee was being sought. These institutions due to staff shortage have also not shown interest in taking up analysis of data. <b>Note:</b> lack of available resource expertise on analysing reservoir induced seismicity.
40	M	P13	Seismic activity at dam site and around periphery was being studies by team of experts. Data was being analysed and <b>annual seismological bulletins</b> were being published. GOG had requested Director General, Indian Seismological Research Institute ISRI for evaluation of seismic data obtained by SSNNL.	
41	A	P17	<i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m - Seismicity and rim stability</i> – collection and analysis of data should be continuous process: <b>Up to date progress awaited</b>	
42	M	E p8	SSNNL requested to expedite analysis of the data and upgradation of the equipment.	
43	A	P20	Results of analysis of data from monitoring stations – received, analysed by dam safety review panel of SSP during Oct 2001. Updation of data <b>awaited</b> .	
43	M	P13	The CMD, SSNNL stated that next meeting of the Dam Safety Review Panel is likely to be convened shortly and its recommendations shall be put up to the Sub-	<b>Request:</b> detailed reports on data analysis and terms of reference given to organisations undertaking the analysis.

45	M	P13	<p>Group thereafter. He further informed that a completion report on up-dation of the instruments shall be submitted by the end of March 2007.</p> <p>Member (E&amp;R), NCA submitted that necessary actions with regard to Seismicity &amp; Rim Stability has been completed including setting up of institutional mechanism for periodic collection of seismic data and their review by Dam Safety Review Panel. Hence, this aspect may be taken as complied with. The SubGroup agreed.</p>	<p>a completion report on up-dation of the instruments shall be submitted by the end of March 2007.</p> <p><b>Check:</b> where is updated analysis and upgradation information?</p>
----	---	-----	---	---

## General items

Mtg.	Doc.	Item	Chronology	General issues follow-up
33	A	A1 p2	<b>Pari passu compliance</b> - committee for field visits formed as per item 1 and annex 1 (TOR) (as suggested at 32 <sup>nd</sup> meeting). Field visit 1, 6-7/99 in MP and Mah. Report produced (letter no Env 3(33)/99/1594-1608	[SS notes as not received].
33	M	M1 p3	CAF practically over, CAT nearing completion in GOG and GOM. “There is some slippage in MP, however, overall works by and large are on schedule. All other works on health, flora, fauna & carrying capacity, archaeology etc were making satisfactory progress”.	There is some slippage in MP, however, overall works by and large are on schedule
34	A	A1	2 <sup>nd</sup> field visit of committee in 07/00. Report at Annex 34 (1). 26-29 <sup>th</sup> July, 2000	
34	M	1 p3	Shekar Singh expressed opinion that MOEF should clarify the definition of the terms pari-passu used in the clearance order and that the sub group should examine progress in light of this definition before consenting to any further raising of dam. NCA said this was discussed in detailing during hearing in writ petition and MOEF stand was very clear. ESG has also clarified this issue more than once – no need to redefine afresh. BG Varghese and Prof Khatti also desired issue not to be reopened again. Chairman requested NCA to prepare a note on the past discussions.	Shekar Singh expressed opinion that MOEF should clarify the definition of the terms pari-passu used in the clearance order and that the sub group should examine progress in light of this definition before consenting to any further raising of dam.... Chairman requested NCA to prepare a note on the past discussions.
35	A	P3	Dam construction stages set out	
35	A	Annex 1	Pari-passu note. Submergence is indicator of progress of works.	<b>Pari-passu note.</b> Submergence is indicator of progress of works.
35	M	P3	<b>Progressive filling of reservoir</b> Shekhar Singh letter. Prof RK Katti letter to Chairman (Annex 3). No need to reopen pari-passu. Prof Ramaseshan reiterated Prof Khatti view and also referred to earlier sub-group discussions whereby Phase II areas should be treated in rational time frame. Re Shekhar Singh letter about pari-passu implementation of various environmental conditions, Chairman referred to majority judgement and observed matter was discussed and settled particularly under caption CAT. He further stressed that directions given are quite clear and sub-group has to function in accordance with operative part of the judgement.	discussions whereby Phase II areas should be treated in rational time frame
36	M	2 p3	NBA Review Petition – operative part at Annex 2.	
41	A	p10	Impoundment in Sardar Sarovar Project commenced with the closure of construction sluices during Feb 1994.	
35	A	P3	<b>Submergence</b> At 90m xx reach, 7200 ha submergence	Not related to impact but <b>very unscientific</b> basis
38	A	P10	At 100m, 105 km reach, 8900 ha submergence, 24% of FRL	19.2% FRL submergence
39	A	P2	At 110m, 121 km reach, 11,136 ha submergence, about 1/3 of FRL	23.7%
42	A	P2	At 110m, 141 km reach, about 11,500 ha of 37,533 ha total submergence	29.7%
			At 121.92m, 16,814.57 ha of 37,533 ha total submergence, as ascertained from area capacity curve of the Sardar Sarovar Project annexed with the project rpt	30.6%
				44.8%
				<b>What is accuracy of submergence figures?</b>

39	A	Ann 7 p71-2	<b>Compensatory afforestation</b> Bar chart: forest cover status (based on remote sensing data) Pie-charts: status of forests in SSP catchment area (based on remote sensing data)	
41	M	B p5	Chairman directed that the areas where <b>survival rate is poor</b> should be supplemented with casualty replacements and a <b>report on the composition, survival count etc should be presented before ESG along with information on the areas which were already transferred.</b> He suggested that a <b>report on the plantations carried out during 1989-90</b> must have been established by now and should be presented to ESG.	Chairman directed that the areas where <b>survival rate is poor</b> should be supplemented with casualty replacements
41	M	Ann 3	ATR information table: ref dated 04/12/04 GOMP: yardstick for assessment of success for plantations is enclosed [NVDA/E&R/Tech./1925 dated 4.12.2004]	Require: efficacy information - <b>composition of species (monoculture?), the year + season of counting, age of plantations, survival count, crop diameter and crop height</b>
- 42	EM M	04/05 B p5	EM Status report Nov 04/Feb 05 – provides update on CAF status. After some discussions, Chairman directed that the areas where survival rate was poor should be supplemented with casualty replacements, proper maintenance and watch and ward and also adequate provision of funds should be made for the purpose. He further instructed that the committee undertaking field visits should also assess such areas and make suitable recommendations in this regard.	[not given in minutes]
-	Letter to NCA/ SS	GOMP letter 04/01/05	Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and GOG. GOMP letter dated 04/01/05. ○ Details for CAF works of Sardar Sarovar Project, giving forest compartment/ village level details and survival percentage of plants (as per monitoring reports) enclosed as Annexure 3.	Chairman instructed that the committee undertaking field visits should also <b>assess [poor survival rate] areas and make suitable recommendations</b> in this regard
-	Letter to NCA/ SS	SSNNL letter 27/12/4	Letter from Dr Pawan Kumar, NCA, Dir Env enclosing letters from GOMP and SSNNL. SSNNL letter dated 27/12/04. ○ Details of CAF and CAT done in the three States, giving village level details and monitoring reports where available – Details of progress and monitoring of CAF and CAT are being provided from time to time since inception of ESG and subsequent meetings taken place so far. Copy of detailed progress and monitoring report on CAF and CAT which had already been submitted to NCA earlier enclosed within.	<b>GOMP:</b> provided CAF and survival % details
44	A	P10	MP: 80% NF covered under Forest Act (45M: 89%). Assessment of survival % and crop composition awaited. Mah: about 80% NFA covered under Forest Act (93% notified 46A). Assessment of survival % reported to be 48% and crop composition awaited. Guj: 96% NFA covered under Forest Act. Assessment of survival % and crop composition awaited.	11% NFA to be notified. Survival % + composition awaited 7% NFA to be notified. <b>48%</b> survival %.+ composition awaited 4% NFA to be notified. Survival % + composition awaited
44	M	P6	Guj: Conservator of Forest, SSNNL stated that recommendations of the Committee of the Sub Group are being followed and that works on replacement	

44	M	P14 PDF	<p>of casualties and maintenance of the plantations was already undertaken. After some discussions on the issue it was <b>suggested that a plan along with implementation report should be submitted.</b></p> <p>MP: Member (Environment &amp; Forest), NVDA stated that as the areas treated were already handed over to the respective owners therefore, it was not possible to revisit the areas for any maintenance work. Farmers carry out maintenance work on their field at their own. <b>Regarding quality of compensatory plantation work it was informed by him that average survival was 41% but considering that the exercise of assessment would be prohibitively costly and time consuming there was no need for any kind of assessment.</b></p> <p>The progress presented by Govt of Madhya Pradesh was reviewed in detail and it was observed by the Chairperson that on most of the items view point expressed by Govt of Madhya Pradesh was that either these could not be done or not desirable. She stated that <b>this approach is counterproductive</b> and Govt of Madhya Pradesh should take steps for implementation of the directions of Sub Group in time.</p>	<p><b>Mah:</b> 48% survival %</p> <p><b>Note:</b> lack of desire for MP to comply</p> <p><b>MP:</b> 41% survival %</p>
45	A	P45 pdf	<p>To revisit areas for maintenance &amp; casualty replacement – <b>GOMP declined to revisit the areas.</b></p> <p>GOM: assessment (survival %): Survival percentage is low &amp; required further care.</p> <p>Guj:</p> <ul style="list-style-type: none"> <li>• There is a need to prepare a list of successful species and to keep the germplasm ready for plantations to be taken up in future in the same areas: <b>awaited.</b></li> <li>• There is a need to provide for replacement of casualties due to death decay or wilting and to provide support for artificial propagation of the species planted up. If necessary, help from organisation like Arid Zone Research Institute of Central/State Govts. may be obtained: <b>detailed report awaited.</b></li> <li>• There is a need to establish seed orchards /clonal orchards for providing support for the activities suggested in para one: <b>awaited.</b></li> <li>• There is a need to consider culture of Rhizobium for development of root nodules: <b>awaited.</b></li> <li>• There is a need to keep in check infestation of termite through Silvi cultural/chemical control: <b>report awaited.</b></li> <li>• In future sufficient number of fruit and fodder trees may be planted up for supporting wildlife in the area of sanctuary: <b>ongoing process.</b></li> <li>• These areas may also be utilised for raising palatable grasses to be as valuable source for protection of these plantations: <b>report awaited.</b></li> <li>• Financial support for keeping planted area in good condition in terms</li> </ul>	<p><b>Note:</b> MP refusal to revisit plantations.</p>



45	M	P10 pdf	<p>of watch &amp; ward, replacement of casualties and research &amp; development work for promoting natural / artificial regeneration of the identified species: <b>report awaited</b>.</p> <p>MP:</p> <ul style="list-style-type: none"> <li>quality of CAF works: Crop Diameter and Crop height required to be assessed by complete enumeration through identified agencies: <b>not yet started</b>.</li> </ul> <p>Additional Director, MoEF referred to some representations received in MoEF regarding <b>failure of the plantations with abysmally low survival</b> and stated that according to the <b>complaint received one sugar factory had been commissioned on the site shown as SSP plantation site</b>. Chairperson stated that representations received would be forwarded to the concerned State Govts. for their comments and further necessary actions.</p>	<p>MP not started CAF efficacy assessment</p> <p><b>Note:</b> sugar factory commission on site shown as SSP plantation site.</p>
35	M	P18	<p><b>Published documents</b></p> <p>GOG: SSNNL has prepared</p> <ul style="list-style-type: none"> <li>Environmental activities and impacts in the Sardar Sarovar Project, Gujarat</li> <li>Faunal Diversity in the Sardar Sarovar Project catchment area of Gujarat</li> </ul>	Not followed thread
34	A	2 p2	<p><b>Environmental management plan</b></p> <p>MOEF desired NCA to prepare comprehensive document on findings of various studies and management plan drawn for mitigating environmental aspects. State Govts to submit revised Action Plans. Existing plans collated into an integrated <b>Environmental Action Plan 2000</b> by NCA and circulated.</p>	Various updates published
33	A	A6 p4	<p><b>Problems in Maharashtra on implementation</b></p> <p><b>Cost estimate of environmental safeguards</b> (96/97) price level under revision. GOG submitted copy of environmental costs info. Annex. <i>GOMP and GOM requested to provide costs estimates and spend.</i></p>	<p><b>Note: Funding problem in Maharashtra leading to lack of implementation of measures commensurate with dam height raising, yet permission still given.</b></p> <p>difficulty in getting proper, timely GOM response</p> <p><b>GOM representative has expressed difficulties in receiving funds from project authorities for implementation of environmental safeguards like health, fisheries, flora, fauna, etc</b></p>
33	M	P6	<p>Cost data regularly provided by states</p>	
34	M	6 p7	<p><b>Separate authority for co-ordinating environmental works in Maharashtra</b></p> <p>GOM Deputy Secretary suggested that since most CAF and CAT works complete and other environmental plans under way (flora, fauna, carrying capacity, fisheries, health etc), an authority may not be necessary. Subgroup discussed, need was based on difficulty in getting proper, timely GOM response.</p>	
35	A	6 p17	<p>Monitoring works in Maharashtra: <b>GOM representative has expressed difficulties in receiving funds from project authorities for implementation of environmental safeguards like health, fisheries, flora, fauna, etc</b>. Issue was discussed and informed that policy decision needs to taken by appropriate authorities of SSNNL after studying availability of funds and financial</p>	

35	A	6 p17	consequences thereof. <i>Further info awaited from GOM and GOG.</i> Lack of proper inter-departmental coordination in GOM and need for Director (Environmental) for Sardar Sarovar Project with supporting field and office staff.	Environmental cell for strengthening inter-departmental co-ordination has accordingly been formed. Funds have also been released and it would start functioning by 1 <sup>st</sup> April 2005  however, observed that monitoring in Maharashtra continued to be weak  suggested that the implementation of environment safeguard measures was mandatory in terms of the requirement of environmental clearance given by the MoEF to the Project, and therefore, the requirement of funds cannot be a constraint and indent for the same has to be given to the Irrigation Dept. of Govt of Maharashtra in time. 43M: directed that Govt. of Maharashtra should strengthen Environmental Cell created on the directions of the Environment SubGroup for effective monitoring of the implementation of the Environmental Safeguard Measures. <b>It was a mandatory requirement and should be expedited at the earliest.</b>
40	A	p30	GOM representative of view that existing committee for field visit in Maharashtra might suffice and it has been decided that there is no need of a separate cell as such.	
40	M	p10/11	Re officers nominated by GOM onto Field Committee might suffice: no officers from Maharashtra have participated during 2 <sup>nd</sup> field visit in July 2000 therefore <b>progress could not be reviewed</b> by committee for areas in Maharashtra. During recent discussions of NCA officials with GOM Secretary Environment it was agreed by GOM to submit a proposal for establishment of an environmental cell dedicated to environmental monitoring of Sardar Sarovar Project.	
41	M	D p8	GOM have prepared plan for buffer zone plantation but <b>funds awaited</b> . NCA Member E&R drew attention of Sub-group to the <b>weak interdepartmental coordination</b> in Mah and ... Secretary CAD, GOM who is allotted funds for different activities has been requested to make provision in the budget for implementation of ESM like health, fisheries, flora and fauna, felling of trees etc but <b>responses have not been adequate</b> . ... ESG <b>strongly recommended</b> creation of an environment cell.	
42	M	B p18	GOM: Substantial progress on felling of trees but the planned environmental safeguard measures could not be taken up actively mainly due to constraint of funds .... NCA: Non-realisation of [funds] is the main cause of delay in implementation of environmental safeguard measures in Maharashtra.	
43	M	P23	GOM: Environmental cell for strengthening inter-departmental co-ordination has accordingly been formed. Funds have also been released and it would start functioning by 1 <sup>st</sup> April 2005. It was, however, observed that monitoring in Maharashtra continued to be weak. A copy of the notification of the formation of Cell was awaited. A report on the activities of the Cell was also required to be presented to the Sub Group. Representative of Govt of Maharashtra informed that a separate dedicated Environment monitoring cell has been set up to coordinate and monitor the physical progress of environment safeguard measures for Sardar Sarovar Project. It was stated by him that there is a problem related to sanction of funds from the Planning Deptt. The issue was discussed and it was suggested that the implementation of environment safeguard measures was mandatory in terms of the requirement of environmental clearance given by the MoEF to the Project, and therefore, the requirement of funds cannot be a constraint and indent for the same has to be given to the Irrigation Dept. of Govt of Maharashtra in time, as it would be chargeable to the same source from where funds for survey, studies and implementation are being charged. After some discussions, it was directed that Govt. of Maharashtra should	

			strengthen Environmental Cell created on the directions of the Environment SubGroup for effective monitoring of the implementation of the Environmental Safeguard Measures. <b>It was a mandatory requirement and should be expedited at the earliest.</b>	
34	M	P12	<b>Request of GOG for permission to raise dam height to 110m</b> Chairman desired review of progress of works on implementation of safeguard measures before considering request. Annex 9. [Changed to 100m (as per NCA stages) in 35A]	
35	M	P3	Reported that Chairman of Sub-group visited dam site, aqueduct near Bodoli, canal bank plantations along Narmada Canal from CH-45 km to 48 km, Surya rehabilitation site in Samkheda Taluka of District Vadodara and Shoolpaneshwar Sanctuary to get first hand assessment of status of compliance of environmental safeguard measures. Proposed visit by Chairman also on following day 20/01/01 to Kutch area plantation works.	
36	M	2 p3	Letter from S Singh IIPA to ESG Chairman raising concern against raising dam height and monitoring of implementation aspects. Annex 3.	
37	M	B p4	Commissioner PR, MOWR informed that NCA might consider raising dam height to 97 m with additional humps of 3 m height or raising the dam height to 100 m and part humps with end blocks open. Prof Ramaseshan desired copy of Study Report of CWPRS on this issue for his perusal.	<b>Review:</b> by expert, issue of humps and backwater levels. Are additional areas required to be treated for environmental safeguard measures?
37	M	B p8	During raising of dam height and filling of reservoir, care should be undertaken to ensure release of regulated and adequate water in downstream stretch both for drinking water purposes and to maintain aquatic life.	
38	A	P8	... Subsequently NCA considered various clearances and permitted raising of the dam height up to 95 m RL. In pursuance thereof, the Project Authority raised the dam to this height. Raising the dam beyond this height is under consideration of R&RSG and NCA. Request in meanwhile was received from GOG for grant of permission for raising dam height beyond 100 m. A review of current status of works relation to 100m, 110 m RL and beyond for works under progress for areas of Sardar Sarovar Project in State of Gujarat, MP, Mah and Rajasthan is presented below. Environmental status report at Annex 6.	
38	A	Ann 1b p26a	Prof Ramaseshan's letter: <ul style="list-style-type: none"> <li>Extending 105 km and impoundment of 24% area at EL 100 m – is this level pool level? If so what is backwater effect for <b>median</b> monsoon season flow?</li> <li><b>Claim that humps do not increase water level cannot be accepted unless technically proven.</b></li> <li>What is effect of such humps on backwater effect for median monsoon season flow and 100 years flood.</li> <li>At RL 100 m should be modified to at or below levels affected by backwater due to monsoon median flow. This should also be a</li> </ul>	
				<b>Review:</b> by expert, issue of backwater effect for median monsoon level, and other statistical values.  38A Prof ramaseshan: Claim that humps do not increase water level cannot be accepted unless technically proven + What is effect of such humps on backwater effect for median monsoon season flow and 100 years flood.

38	M	P15	<p>condition for clearance. SEE 121 M HEIGHT RAISING 40M FOR CONTINUATION OF THIS STRAND</p> <p>GOG [complied with all aspects re 110 m] and therefore request Chairman to consider request of GOG for allowing to raise dam to 110 m as per schedule approved by NCA.</p> <p>NCA Member E&amp;R: <b>request from GOG towards sharing expenditure and responsibilities related to conservation of lake environment received and being presented for consideration of HLEG on fisheries conservation</b> and development formed by NCA on advice of ESG. HLEG meeting proposed.</p> <p>GOMP: further CAT to be done to 110 m RL. FFAC Action Plan implementation making progress. For 100 m RL, <b>almost all tree felling and monuments relocation completed</b> and MP preparation for considering dam height raising to 110 m request may be considered as adequate.</p> <p>GOM: Absence of officers. Addtl Chief Engineer Irrigation department GOM: <b>felling was yet to be started in 79 ha of forest coming under submergence at 100 m</b>, though all CAT &amp; CAF works complete. Steps being taken for implementation of FFAC plan also.</p> <p>GOR: WAPCOS recommendations on CAD being examined and Action Plan under formulation. However water could reach Rajasthan only after main canal was completed by GOG and dam height was raised to full level.</p> <p>Prof Ramaseshan: <b>issues about humps and submergence.</b></p> <p>SSNNL MD requested Prof R to visit CWPRS for detailed discussions on this aspect.</p> <p>Prof Katti: substantial compliance so GOG should be permitted to raise height. All steps should be taken for analysing data on seismicity especially in view of phenomenon of amplification as was evidenced during Bhuj Earthquake wherein although centre was at Bhuj yet Ahmedabad experienced higher than expected impacted and therefore regular monitoring of seismological activity was necessary.</p> <p>Dr Shekhar Singh: what are outcomes of recommendations of multidisciplinary committee formed by MOEF? Until ESG provided inputs of this Cmte and convinced that all that was required was completed, ESG might not be in position to consider request of GOG. Needs time to review CAD Plan. Tree felling works needs to be expedited especially in Maharashtra. MP CAT and MP and Mah health issues were beset with shortcomings.</p>	
39	A	A p2	<p>SSNNL letter 20<sup>th</sup> October 2003 for grant of permission for raising dam height beyond 100 m RL and up to 110.64 m RL.</p> <p>Proposed to raise to 110.64 m RL by end of June 2004. Resulting impoundment would extend to 141 km from dam site and corresponding submergence will be about 11,500 ha of 37,533 ha total.</p> <p><b>Annex: on humps do not cause extra submergence</b></p>	<p><b>Obtain:</b> under right to information, agendas, minutes etc of this MOEF multidisciplinary committee.</p>

?	?	?	<b>Shekhar Singh:</b> detailed CAD plan should be available before issue of clearance of ESG for raising dam height was discussed further. Planning Commission had very clearly specified that submission of CAD plan formed part of project component and should have been available before commencement of irrigation. Observations of SSCAC indicated that despite so many years plan was not yet available. <b>SSNNL Director:</b> most points pertained to Phase II of CA and that proposal to raise dam height to 110.64 m RL would confined waters to Phase I area only. Water drawn at this stage would be mainly for drought relief works and that only a small percentage of area was irrigated last year [2002]. ... <b>Submission of plan of such a long period might not be adhered to at this stage.</b> Submission of plan was actually delayed due to uncertainty, which prevailed during 1994-2000 due to litigation pending in SC.	detailed CAD plan should be available before issue of clearance
39	M	C p5		<b>Review:</b> humps and submergence note  <b>Check:</b> proposal to raise dam height to 110.64 m RL would confined waters to Phase I area only.  <b>Check:</b> what early use was for, in 2002/03 Mistaken view as to what plan is for – not implementation post operation
40	A	A p2	<b>NVDA VC:</b> requested the Chairman that delay in submission of CAD plan should not be a guiding factor as dam was the property of all the States and generation of electricity was of prime importance for MP and Mah and therefore permission to raise the <b>dam height to 110.64m RL should not be linked with the submission of CAD plan.</b> Chairman: required huge resource and manpower for publication of <b>micro level</b> CAD plan and might not be possible to prepare in a short time and this might be one of the reasons for delay in submission of the plan and desired that detailed plan <b>for the entire command area</b> should be submitted <b>within the next 3 months time</b> [END DEC 03 MTG]. Could be available as CD-rom. Report would be accompanied only by unrestricted maps on appropriate scale. NCA on the basis of the decision taken during the 70 <sup>th</sup> meeting held on 12-13 <sup>th</sup> March 2004 has directed SSNNL/Gujarat on 16.3.2004 to raise the dam to this level [of 110.64m] by June, 2004.	Chairman: required huge resource and manpower for publication of <b>micro level</b> CAD plan and might not be possible to prepare in a short time and this might be one of the reasons for delay in submission of the plan and desired that detailed plan <b>for the entire command area</b> should be submitted <b>within the next 3 months time</b> [END DEC 03 MTG].
40	M	A p3	<b>Request of GOG for permission to raise dam height to 121m</b> Prof Ramaseshan reiterated that <b>medium flow</b> which extended for more than 2 months during monsoon period should be considered for planning and execution of environmental safeguard measures and not <b>just the level pool submergence.</b> SSNNL Managing Director informed that backwater flows were considered for detailed planning of measures like R&R works and details were available with SSNNL. Information presented in Agenda <b>was of only a very general nature</b> and assured that details as requested by Prof Ramaseshan <b>would be made available to him soon.</b> NVDA Vice Chairman stated backwater flows were always considered by GOMP while planning relocation/excavation works of monuments/ mounds and other measures and that all activities were planned considering flow conditions of 1 in 100 year floods. <b>Prof Ramaseshan suggested that as a large number factors depended on submergence to be caused by monsoon floods, it would be appropriate if</b>	medium flow <b>which extended for more than 2 months during monsoon period should be considered for planning and execution of environmental safeguard measures and not just the level pool submergence.</b>  Seek confirmation: <b>that</b> backwater flows were always considered by GOMP while planning relocation/ excavation works of monuments/ mounds and other measures and that all activities were planned considering flow conditions of 1 in 100 year floods.

41	A	P17	<p>backwater curve commensurate with medium monsoon flow was considered while presenting status of compliance <b>for a review by Members of ESG.</b></p> <p><b>Chairman: details as suggested by Prof Ramaseshan should be provided to him by concerned party States.</b></p> <p><b>Table of status re 121 m (See later table on dam height raising)</b></p> <p><i>Status of readiness on implementation commensurate with raise in dam height to EL 121.92m -</i></p> <ul style="list-style-type: none"> <li>• CAT - qualitative (assessment of adequacy): <b>awaited</b> from all 3</li> <li>• <i>Tree felling</i> - <ul style="list-style-type: none"> <li>○ Guj: Report on removal of coppice crop <b>awaited</b></li> <li>○ Mah: report awaited</li> <li>○ MP: completed in forest area. Report on removal of coppice crop in NFA awaited</li> </ul> </li> <li>• <i>Flora, fauna</i> – <ul style="list-style-type: none"> <li>○ Guj: progress on development of sanctuary: satisfactory</li> <li>○ Mah: recommendations of EIA studies not yet implemented</li> <li>○ MP: draft plan is yet to be finalised and implemented</li> </ul> </li> <li>• <i>Carrying capacity</i> – <ul style="list-style-type: none"> <li>○ Guj: estimated for sanctuary. Being ensured through sanctuary development</li> <li>○ Mah: not estimated</li> <li>○ MP: not estimated</li> </ul> </li> <li>• <i>Fisheries conservation aspects</i> <ul style="list-style-type: none"> <li>○ Guj: draft plan available, implementation progressing</li> <li>○ Mah: revised plan submitted</li> <li>○ MP: revised plan awaited</li> </ul> </li> <li>• <i>Downstream environment</i> – detailed plan to be submitted <ul style="list-style-type: none"> <li>○ Guj: awaited</li> </ul> </li> <li>• <i>CAD</i> – submission of plan and its implementation <ul style="list-style-type: none"> <li>○ Guj: submission of plan awaited</li> </ul> </li> <li>• <i>Health</i> – additional facilities as required must be provided. Monitoring reports should also be available. Data to be put up on website <ul style="list-style-type: none"> <li>○ Guj: awaited</li> <li>○ Mah: awaited</li> <li>○ MP: awaited</li> </ul> </li> <li>• <i>Seismicity and rim stability</i> – collection and analysis of data should be continuous process <ul style="list-style-type: none"> <li>○ Up to date progress awaited</li> </ul> </li> <li>• <i>Archaeology</i> – relocation/ protection/ excavation <ul style="list-style-type: none"> <li>○ Guj: completed</li> <li>○ Mah: NA</li> <li>○ MP: awaited</li> </ul> </li> </ul>	<p><b>Review:</b> these need reviewing for next dam height raising.</p>
41	M	P3		

41	M	P12	Prof Ramaseshan stated that as per decisions of ESG, status of compliance on implementation of the environmental safeguard measures is required to be assessed with respect to <b>submergence being caused by the backwater levels and not with respect to the pool level submergence.</b>	ATRs
41	M	P13	NVDA VC informed ESG that status of compliance reported by the States was with respect to backwater profile only and <b>assured</b> that this is being strictly followed for rehabilitation as well as for the environmental safeguard measures. NCA: progress reports beyond what was presented in agenda papers were received from project authorities and is under scrutiny. Abstracts of reports are placed at <b>Annex 3</b> [REQUEST FULL REPORTS?]. BG Varghese: it shall be appropriate to give clearance for raising the height of Sardar Sarovar Dam as the benefits from the project have already started pouring after having invested huge amount of money in it. A decision has to be taken considering scenario with project and without project. NVDA VC: there have been substantial compliances by GOMP and remaining work would also as assured be completed by end March 2005. GOG: SSNNL MD: as per construction schedule dam height to be raised by end June 2005 as per construction schedule and would take 5 months time to complete required construction by that date. Requested ESG to consider request favourable in <b>view of the fact that there was substantial compliance on almost all areas by GOG and areas where there are shortfalls are mostly long term issues. The status of such issues would remain the same even after a year.</b> He conveyed assurance of project authorities for completion of all remaining works by <b>end March 2005.</b> Brief of review of progress based on information submitted during meeting in Table <b>Annex 4.</b> It was observed by ESG that there was substantial compliance on most of the areas but still there are gaps which are required to be filled by concrete actions on the ground by party states and considering that GOG, GOM and GOMP have conveyed their assurance for completion of all the remaining activities by end of March 2005 ESG gave clearance for raising dam from EL 110.64m and up to EL 121.92m and at same time asked party states to implement all environmental safeguard measures as discussed in the letter and spirit. ATR information table: TABLE PRESENTS SUMMARY OF ABSTRACTS RECEIVED AND GIVES LETTER REFERENCE OF DOCUMENTS – NEED TO REQUEST SOME OF THE DOCUMENTS REFERRED TO. GOMP: NVDA/E&F/Tech./18, ESM: information requested by Dr Shekar Singh. ATR information table: GOG:	
41	M	Ann 3	<ul style="list-style-type: none"> <li>SSNNL/Env/ESG-41/1007 dated 27 December 2004. ESM. Information submitted for forwarding to Dr Shekhar Singh.</li> <li>SSNNL/Env/ESG-41/1971 dated 07 December 2004 and</li> </ul>	

41	M	Ann 4	SSNNL/Env/ESG-41/958 dated 07 December 2004. ESM. Reports on progress of survey/ studies/ implementation of ESMs. (remark: subject to verification)	
42	M	A p3	<p>Status of readiness on implementation of ESMs commensurate with raise in height of dam to EL 121.92m as presented to the ESG during its 41<sup>st</sup> meeting held on 6<sup>th</sup> January 2005. TABLE. SEE BELOW.</p> <p>It was pointed out by expert member Dr Shekhar Singh and by Prof S Ramaseshan that the ATR submitted by the states indicated <b>limited compliance</b> on several issues which may have serious implications later on. Director Env, NCA informed that issues related to submergence were required to be addressed before commencement of submergence whereas some other works which were of continuing nature could be allowed to be completed with a different schedule later on. After some discussion the Chairman asked the State Govts to make efforts to complete the remaining works also well in time.</p>	
-	NBA Letter	June 2005	<p><b>Request of GOG for permission to raise dam height to 121m – NBA letter</b></p> <p>In its last meeting held on January 6, 2005, the ESG of the NCA has already "recommended to the NCA to permit raising in the dam height to EL 121.92 m". When the Sub-Group met in January, upon review of the various environmental aspects, the following status was reported:</p> <ol style="list-style-type: none"> <li>1. Catchment Area Treatment: Madhya Pradesh and Maharashtra: Report on quality of work in non-forest area <b>not available</b>.</li> <li>2. Felling of trees: All three states: Completed report <b>not available</b></li> <li>3. Flora and Fauna: Report to be made available by March 2005, <b>not yet available</b> from all the three states.</li> <li>4. Carrying Capacity: Report <b>not available</b> from all three states.</li> <li>5. Fisheries conservation: Final plan <b>not available</b>, implementation not complete in all three states.</li> <li>6. Downstream Environment: Compliance report <b>to be submitted</b> by Gujarat, where this is applicable.</li> <li>7. Health: Compliance report <b>to be submitted</b> by all three states.</li> <li>8. Seismicity &amp; Rim stability: Compliance report <b>to be submitted</b> by all three states.</li> <li>9. Archaeology: Compliance report <b>to be submitted</b> by M.P.</li> </ol> <p>... we are now already in April and it is clear that the reports due to arrive by March 31<sup>st</sup> haven't arrived as yet, and certainly have not been studied by the members as yet. We also very strongly urge that the ESG should under no circumstances give clearances based on assurances, but only after the necessary steps have been taken and proved to have been taken. In fact, ESG clearances should be given based only on actual implementation of the requirements, based on credible evidence of work having been completed satisfactorily. If one looks</p>	



-	Letter to Shekhar	June 2006, from GOMP and GOG	<p>at the status of actions taken so far, it is <b>clear that the assurances given during the Jan 6 meeting have been far from implemented.</b></p> <p>The ground level reality, however, is much starker than even the reports you receive. The claims related to Compensatory Afforestation are absolutely unreliable since in Madhya Pradesh, as well as in Maharashtra and Gujarat, either there is no afforestation done at all, or it is of extremely bad quality or is already dry and dead by now. We can show you the reality in the catchment of SSP, district Nandurbar in Maharashtra, districts Badwani and Dhar in M.P. and district Narmada in Gujarat, if only yourself or the ESG visits the Valley with prior intimation and full transparency. It is unfortunate that the ESG has not visited the field recently, while clearances are granted almost every year without fail. This serious contempt of Court can be avoided if you take the initiative and issue directives for it.</p> <p>[This letter in response to requests made by Shekhar] includes lots of documents and covers:</p> <p>For MP</p> <ul style="list-style-type: none"> <li>• Sanctuaries</li> <li>• CAF</li> <li>• CAT</li> </ul> <p>For Gujarat:</p> <ul style="list-style-type: none"> <li>• Sanctuaries</li> <li>• Canal breaches [written as branches]</li> <li>• Water logging</li> <li>• CAT</li> <li>• CAF</li> <li>• CAD</li> </ul>	<b>Need review:</b> of responses, particularly on canal breaches and CAD
33	A	A2 p2	NSP areas – joint inspection by MOEF and NCA (22-23/12/99).	
38	A	E p19	<p><b>Formation of multi-disciplinary cmte by MOEF</b></p> <p><b>- for appraisal of survey and study reports on various environmental aspects of sardar sarovar project / monitoring</b></p> <p>Cmte constituted during October 2001 by MOEF to examine adequacy of existing reports and surveys as well as plans for mitigative steps and the implementation so far, and suggest any improvement on additional measures which in its opinion are required to supplement the existing plans under implementation, under Chairmanship of Shri CD Thatte, Secretary General, ICID, ND and Dr Nalini Bhat, Director MOEF, ND as its Member Secretary. Since formation, 4 meetings held plus field visit to dam site, CAT sites in Guj and MP. Cmte expected to submit its report by the extended period of <b>March</b></p>	

-	Letter from Shekhar	-	<p><b>2003.</b></p> <p><b>Letter: Shekhar Singh:</b> During the meeting you might recollect that I had repeatedly made the point that there must be independent monitoring of the various environmental measures being reported to the Sub-group, especially catchment area treatment and compensatory afforestation. Unfortunately, this point seems to have been left out of the minutes. I would, therefore, be grateful if this point is inserted before the minutes are approved. I might also draw your attention to page 17, last para, of the minutes wherein I had requested the MoEF to apprise members of the Sub-group of the findings and recommendations of the multi-disciplinary committee formed by the MoEF. As no further information has been received on this matter, could I once again request you to get the needful done.</p>	<p><b>Obtain:</b> agendas, minutes, documents etc of this MOEF committee and independent review of findings. Impartial, independent review needs to be taken of study reports as some of them are clearly weak on methodology and analysis and should have been revised and concluded with clear targets and recommendations</p>
39	M	P2	<p>Request of Dr Shekhar Singh for corrections in minutes for reflecting his view that <b>monitoring of environmental safeguard measures should also be done by an independent</b> body was not considered in view of the fact that there was already a Sub-committee constituted by the Sub-group on the advise of MOEF.</p>	
41	M	B p12	<p>MOEF Director IA: was <b>necessary to assess the status of compliance with help of independent experts/ agencies</b>. Suggested that status of compliance should be assessed in given time frame through such agencies.</p> <p>NVDA VC: NCA is an autonomous organisation, which can be entrusted for any verification that might be required by ESG instead of involving any other agency.</p> <p>Re Chairman's question on mechanism followed by NCA for assessment of compliance status: NCA Director ENV: in accordance with suggestions of ESG, <b>peer groups</b> consisting of experts drawn from premier organisations on identified issues such as flora and fauna, archaeology, seismicity and rim stability, fisheries, health etc were formed earlier . These groups have been reviewing the reports and plans received from the party states and have been suggesting the corrective actions for improvements and avoiding delays. Last review was taken by health experts who visited project sites in MP, Maharashtra, Gujarat during 2001. ESG has also formed committees of experts for visiting project areas, review of action plans etc from time to time. Similar exercises could be taken up for assessment of progress of works in accordance with the requirements.</p>	
42	M	H p11	<p>Dr Shekhar Singh: referred to the minutes of the last meeting wherein considered desirable by Sub-group to assess the status of compliance with help of independent experts/ agencies or by the group of expert committee under NCA.</p> <p>Chairman: desired that field visits for verification/ review of works by project authorities on suggested parameters should be taken up by NCA as already discussed.</p>	

43	A	P2	<p><b>Review of status of envl safeguard measures – visits and verification</b></p> <p>During 42nd meeting NCA was directed to organise field visits of the committee by associating CCF of MoEF to verify the quality and quantity of the forest cover in the catchment, compensatory plantation and also to assess the status of compliance on the actions required to be taken for management of the downstream environment In addition to the above the committee visited command area, submergence areas, sanctuary etc.</p> <p><b>Gujarat</b></p> <p>Visits were undertaken to the areas in <b>Gujarat during June and November, 2005</b>. Command area , compensatory plantations, catchment area treatment, felling in the submergence area, areas downstream of SSP and Shoolpaneshwar sanctuary etc, were inspected. Detailed discussions were also held with the concerned officials of the Govt. of Gujarat, the Managing Director &amp; Chairman of the SSNNL. Copies of the reports along with recommendations were circulated to the members &amp; invitees separately vide letter no Env4 (43)/2450-2485 dated 15/09/06 Key recommendations [summarised] below:</p> <ul style="list-style-type: none"> <li>• Downstream flows – Minimum quality of water required for protection of d/s environment is mandatory and has to be ensured.</li> <li>• Downstream management plan – To be prepared and implemented at the earliest without further delay.</li> <li>• Flora &amp; fauna: conservation of rare species/variants – Part area of sanctuaries should be developed as a garden for multiplication of identified rare species, local areas along the canal to be developed to conserve local herbs, shrubs tree species.</li> <li>• Felling of trees – To be taken up/completed in planned manner commensurate with progressive filling of the reservoir.</li> <li>• Ex-situ &amp; in-situ biodiversity conservation in the command – To be taken up before commencement of irrigation.</li> <li>• Health – Considering reported rise in diseases and consequent high risk, qualified experts may be involved in preventing recurrence of various diseases.</li> <li>• CAD works (protective and restorative) – Implementation of all identified Environment Safeguard measures is required pari-passu with the development of command area for which Government has to take immediate actions.</li> <li>• Efficacy of CAT works – Study to continue at least for a three years period</li> <li>• Compensatory plantation <ul style="list-style-type: none"> <li>○ 1. There is a need to prepare a list of successful species and to keep the germ-plasm ready for plantations to be taken up in future in the same areas.</li> <li>○ 2. There is a need to provide for replacement of casualties due</li> </ul> </li> </ul>	<p>Minimum quality of water required for protection of d/s environment is mandatory and has to be ensured and downstream management plan to be prepared at earliest</p> <p>Felling to be taken up/completed in planned manner commensurate with progressive filling of the reservoir. Biodiversity conservation in the command to be taken up before commencement of irrigation</p> <p>Considering reported rise in diseases and consequent high risk, qualified experts may be involved in preventing recurrence of various diseases</p> <p>Implementation of all identified Environment Safeguard measures is required pari-passu with the development of command area for which Government has to take <b>immediate actions</b>.</p>
----	---	----	---	---

			<p>to death decay or wilting and to provide support for artificial propagation of the species planted up. If necessary, help from organisation like Arid Zone Research Institute of Central/State Govts. may be obtained.</p> <ul style="list-style-type: none"> <li>○ 3. There is a need to establish seed orchards / clonal orchards for providing support for the activities suggested in para one.</li> <li>○ 4. There is a need to consider culture of Rhizobium for development of root nodules.</li> <li>○ 5. There is a need to keep in check infestation of termite through Silvi cultural/chemical control.</li> <li>○ 6. In future sufficient number of fruit and fodder trees may be planted up for supporting wildlife in the area of sanctuary.</li> <li>○ 7. These areas may also be utilised for raising palatable grasses to be as valuable source for protection of these plantations.</li> <li>○ 8. There is a need to provide financial support for keeping planted up area in good condition in terms of watch &amp; ward, replacement of casualties and research &amp; development work for promoting natural/artificial regeneration of the identified species.</li> </ul> <p>Observations of independent expert Prof. Ramaseshan and Prof R.K.Katti on the conditions of implementation of command area works are collectively placed at Annex XL-III (1).</p> <p><b>Madhya Pradesh</b></p> <p>Visits were undertaken to the ISP and SSP areas in Madhya Pradesh during March, 2006. Site inspections were carried out for the areas of compensatory plantations, catchment area treatment, seismic monitoring stations, flora and fauna related issues for both ISP &amp; SSP. Besides these areas of felling in the submergence areas and downstream of ISP, detailed discussions were held with the officials of the Health Department of the Govt. of Madhya Pradesh and officials of NVDA. Conclusion was derived and recommendations were made. Copies of the report have been circulated vide letter no ENV 4(43)/ 2450-2485 dated 15th September 2006. Key recommendations are presented below for a review by the Members.</p> <ul style="list-style-type: none"> <li>● FF&amp;CC (terrestrial ecosystem) – not yet started – EIA studies should be expedited and recommendation implemented before submergence. Impacts have commenced but system) safeguards measures are not in place.</li> <li>● Aquatic ecosystem – not yet started – Up-dating of plan and implementation should be high priority. Impacts have commenced but safeguards measures are not in place.</li> </ul>	
--	--	--	---	--

45	M	P19	<ul style="list-style-type: none"> <li>• Health aspects – in progress – Implementation of the action plan on ground should have been completed and disease monitoring required on long term basis.</li> <li>• Felling of trees – coppice crop &amp; secondary species left over in the field, required removal – Coppice crop of the forest felled earlier required removal on priority.</li> <li>• Quality of CAT works – Silt monitoring is to be started as early as possible.</li> <li>• CAT (physical) – Subject to availability of resources, to revisit the areas for maintenance &amp; casualty replacement.</li> <li>• Compensatory plantation physical targets – completed – To revisit the areas for maintenance &amp; casualty replacement.</li> <li>• Quality of CAF works – not yet started – Crop Diameter and Crop height required to be assessed by complete enumeration through identified agencies.</li> <li>• Seismicity &amp; rim stability – in progress – Recommendations of the dam Safety review panel should be put up to the Sub Group from time to time IMD may be requested to provide V-Set communication facilities for all observatories.</li> </ul> <p><b>Reconciliation of status of compliance between party States and NCA Secretariat</b></p> <p>The Chairperson observed that there have been <b>considerable differences in the status of progress presented by the NCA Secretariat and the progress being informed by the State Governments and that these issues could not be verified in such meetings and are required to be</b> sorted out before convening meeting of the Environment Sub-Group at the level of the NCA with the party States.</p>	
45	M	Ann	<p><b>Letter from Shekhar:</b></p> <ul style="list-style-type: none"> <li>• The most important issue before the sub-group is to take a view on the compliance reports on various aspects submitted by the project authorities. As you are aware, even on the basis of the information submitted by the project authorities, the <b>state of compliance is far from satisfactory and in many cases far behind what was required.</b> You had, in the last sub-group meeting, directed that the various outstanding matters'and slippages be resolved in the next three months and accordingly reported. However, this does not appear to have happened and, in fact, <b>some of those issues seem to have dropped off the agenda altogether.</b></li> <li>• However, more important, <b>serious doubts have been raised about the accuracy and adequacy of the reports emanating from the project</b></li> </ul>	Reported progress in dispute.

			<p><b>authorities about various aspects of compliance, especially relating to catchment area treatment and compensatory afforestation</b>, their extent and their quality. I believe you have also been sent some of the relevant reports and photographs. I have also got news from multiple sources that matters are not always as reported to the sub-group.</p> <ul style="list-style-type: none"> <li>• Therefore, I would strongly urge you to please consider once again insisting (in accordance with a decision made four meetings back) that <b>aerial photographs and remote sensing data be urgently collected and analysed by an independent scientific agency and the reports made available to the subgroup on the extent and survival rates of afforestation work done both as a part of the CAT and compensatory afforestation.</b></li> <li>• Similarly, I would strongly urge you to <b>request an independent agency to urgently do a field verification</b> and submit a report to the Sub-group of the claims and counter claims made by the project authorities and the activists, on all the various aspects of compliance. The initial survey could be done quickly and only look at the doubts raised by the movements in the valley. Subsequently, a long term and independent scientific monitoring system needs to be set up - independent of the major stake holders so that there is public confidence in their findings.</li> <li>• I would strongly urge you not to take a view on the compliance reports submitted to the sub-group till analysis of aerial and remote images and rapid field surveys are available.</li> </ul>	<p><b>Collect:</b> aerial photographs and remote sensing data be urgently and analyse by an independent scientific agency, with the reports made available to the subgroup on the extent and survival rates of afforestation work done both as a part of the CAT and compensatory afforestation.</p>
45	M	P17 pdf	<p><b>Request of GOG for permission to raise dam height to full reservoir level</b></p> <p>The Vice Chairman, NVDA stated that there has been <b>substantial compliance</b> with regard to Sardar Sarovar Project on the conditions stipulated at the time of clearance, and hence, permission may be granted for taking up further work on the Sardar Sarovar Dam. He emphasized that power is required to be harnessed at the earliest. He, <b>further, promised submission of compliances on the remaining issues soon.</b></p> <p>Managing Director, SSNNL brought to the notice of the Sub-Group that two major works on dam are remaining before it could be possible to raise water level further, i.e.,</p> <ol style="list-style-type: none"> <li>i) Construction of piers &amp; bridge</li> <li>ii) Fixing of the Radial Gates.</li> </ol> <p>He, further, stated that it will take <b>at least 30 months to complete</b> the above works.</p> <p>Director (Environment), NCA pointed out that though physical targets towards Catchment Area Treatment Phase-I &amp; Compensatory Afforestation have been</p>	<p>Note: <b>substantial</b> compliance statement, unquantified</p> <p><b>Is NVDA VC in a position to make a promise on behalf of others?</b></p> <p>Also see later table on status re FRL</p>

		<p>achieved by the Govt. of Madhya Pradesh but <b>verification of their efficacy, as suggested earlier by the Sub-Group, is yet to be completed.</b> Though submergence has already commenced, <b>issues related to notification of protected areas as recommended in the EIA studies is still under examination.</b> There have also been <b>some deficiencies on implementation of the Health Plan</b> as received from the NVDA.</p> <p>Similarly, measures recommended by the <b>EIA studies on Flora &amp; Fauna in the State of Gujarat &amp; Maharashtra have not been fully implemented.</b> The Management Plan for protection of Aquatic Eco-system has also not been fully implemented in Maharashtra &amp; Madhya Pradesh. It would, therefore, be desirable to review progress of work with reference to the conditions stipulated in the order of clearance in detail before considering further work on the dam.</p> <p>Member (E&amp;R), NCA, further, added that <b>Command Area Development Plan for Gujarat and Rajasthan had not been yet finalized. Moreover, the issue of taking up further work on SSP has not come as an agenda item.</b></p> <p>The Executive Member, NCA pointed out that <b>few Interlocutory Applications on the matters pertaining to previous permission to raise the dam height upto EL 121.92 m is before the Hon'ble Supreme Court. The Hon'ble Court has also given certain directions to the GoMP for compliance. This is still awaited.</b></p> <p>In response to a query from Executive Member, NCA, the Managing Director, SSNNL <b>stated that there would only be a very marginal additional temporary submergence due to construction of piers.</b></p> <p>Additional Director, MoE&amp;F brought to the notice of the Sub-Group that <b>several representations have been received in MoE&amp;F, and there is a need for verification of the facts before the claim of substantial progress could be accepted.</b></p> <p>Dr. B.G Varghese, Expert Member, pointed out that project was already over delayed and stated that purely considering the implications of cost over runs and to ensure draWing of the long awaited benefits from the project at the earliest, he would like to recommend taking up further work on the dam.</p> <p>Prof. R.K Katti, Expert Member agreed with the view of Dr. B.G Verghese. He, however, suggested that <b>implementation of the Environmental Safeguard Measures should be completed before considering raising of water level.</b></p>	<p>Verification of CAT and CAF efficacy not complete. Note: low CAF survival rate reported.</p> <p>Protected area notification awaited Health plan deficiencies</p> <p>Flora &amp; Fauna EIA study recommendations not fully implemented</p> <p>CAD plan for Rajasthan and Gujarat not yet finalised</p> <p>Outstanding Supreme Court issues on earlier dam height permissions. GoMP not yet complied with Court directions.</p> <p>Marginal additional, temporary submergence</p> <p>Need verification. Representations received.</p>
--	--	--	--

46	M	P6 on	<p>During the deliberations that followed, <b>the State Governments concerned promised to take necessary steps expeditiously to remedy the deficiencies in the implementation of the Environmental Safeguards, within the next two to three months.</b> It was decided that except for this there are no other major environmental issues in taking up further works on Sardar Sarovar Project without raising water levels, as far as Environment Sub-Group is concerned.</p> <p>The Sub .Group therefore recommended construction of piers and overhead bridge but NO installation of gates until further review. Construction of piers and overhead bridge <b>will cause additional submergence of 1.62 mt.</b> Environmental Safeguard Measures commensurate with this additional submergence should be completed in time. The Status of compliance on implementation of the Environment Safeguard Measures would be reviewed during next meeting to be convened during June or July 2008.</p> <ul style="list-style-type: none"> <li>• Construction of piers and over head Bridge will cause additional submergence of 1.62 meters which is not insignificant. The decision needs to be reviewed in view of this.</li> <li>• Regarding creation of two Sanctuaries proposed in the report of State Forest Research Institute, the area of which is already submerged, Vice Chairman, NVDA stated that NVDA will provide financial support, if forest department in future decide to set up a Sanctuary, Shri Shekhar Singh however stated that sanctuary has to be established before commencement of submergence and therefore unless environment safeguard measures are duly complied, permission cannot be considered.</li> <li>• Shri Shekhar Singh also stated that in the absence of details regarding felling of trees in the forest and non forest areas in terms of estimate of number of trees either in the agenda or in the discussion, it cannot be claimed that felling has been completed.</li> <li>• [... various updates]</li> <li>• As per the reconciled status Chairperson observed that there has been little progress in the implementation of Environmental Safeguards measures for Sardar (Sarovar Project....</li> <li>• The Chairperson directed that construction of the piers/overhead bridge should be put on hold until the implementation of the requisite plans for addressing Environmental Safeguard Measures are assessed w.r.t. conditions contained in the order of clearance in the field and reviewed by the Environment Sub-group. She further directed to constitute a <b>Committee by the Ministry of Environment and Forest for independent assessment which will assess the same and submit its report within three months for impacts of construction of piers</b></li> </ul>	Compliance promised within two or three months
----	---	-------	---	--



			<p><b>and overhead bridge and w.r.t. permission for raising dam height upto FRL</b>, the report could be submitted within 6 to 9 months time. The report, thereafter, would be reviewed by the Environment Sub-group before permitting any further construction.</p> <ul style="list-style-type: none"> <li>• ... [Shekhar reported] many of the measures required to be under-taken in advance of commencement of the submergence are yet to be planned / implemented. He stated that implementation of the Catchment Area Treatment of Phase-II, notification of the Non-forest areas as forest, felling of trees from the forest I non forest areas, notification of the sanctuary areas to compensate I rehabilitate the wildlife impacted by submergence, preparation &amp; implementation of the plan for Command Area and Environmental Management Plan of downstream areas in Gujarat are not yet fully presented to the Sub-group</li> </ul>	
--	--	--	---	--

### ***Dam Height Raising, 100m***

M35 9 p13 (under Downstream environment). Concluding the discussions Chairman observed that for enabling a decision on raising of dam height up to 100 m by June 2002, State Govts should submit following information which could be considered at next ESG meeting.

	Item
<b>GUJARAT</b>	
1	Tabular information on recommendations, action plans and present status of various studies and surveys carried out for Shoolpaneshwar Sanctuary
2	Command area development details, particularly with reference to the proposed monitoring and controlled release of water for avoiding water logging, salinity etc
3	Final health plan incorporating the preventative and curative measures proposed for malaria control and other diseases
<b>MADHYA PRADESH</b>	
1	Proposal for completion of remaining Catchment Area Treatment covering an area of 40,240 ha for Phase I by June 2002
2	Proposal for felling of trees in submergence zone prior to impoundment of reservoir
3	Write-up on recommendations, action plan and present status of various studies and surveys relating to flora and fauna affected due to impoundment
4	Plan for relocation of archaeological sites/ monuments getting affected at EL 100 m including ones in villages getting affected due to backwater effect
5	Report on health aspects and the additional districts required to be covered by NICD
<b>MAHARASHTRA</b>	
1	Phased felling plan for forests coming under submergence at EL 100 m
2	Information on recommendations of study group on flora and fauna and proposed action plan for their dispersal/migration
3	Health plan
<b>RAJASTHAN</b>	
1	Command area development plan

***Dam Height Raising, 121.92m***

41M Annex 4

42A: note some parts of table in agenda muddled up (one row out of correct place)

43A: (meeting will be Nov 06, ATR as of 30<sup>th</sup> June 2006)

		<b>Requirements for pari-passu compliance</b>	<b>Gujarat</b>	<b>Maharashtra</b>	<b>MP</b>	<b>Follow-up action</b>
CAT	Physical	Treatment of CA for Phase I	Completed	Completed	Completed	
	Qualitative	Assessment of adequacy: Final reports assured for submission by March 2005	FA: report under updating NFA: Interim report submitted  42A: awaited 43A: draft rept observations in Ann XLII	FA: FSI updating report NFA: negotiations with CSR&TI are progressing (to establish 2 silt monitoring stations). Reports assured  42A, 43A: awaited	FA: FSI updating report NFA: negotiations with CSR&TI are progressing. Reports assured  42A, 43A: awaited	
CAF	Qualitative	[ADD FROM 41M] Afforested areas to be declared as forest	42A: Works are progressing, completion report awaited 43A: 96% area initiated. Details of completed work awaited.	42A: Works are progressing, completion report awaited. 43A: 80% area initiated. Most declaration proposals pending. Details of completed work awaited.	42A: Works are progressing, completion report awaited. 43A: entire area initiated, 80% areas already covered. Details awaited.	
		Survival %, crop composition to be assessed	43A: Awaited	43A: The average survival rate for plantation over an area of 14,710 ha. Land as report by GoM was 48% (09-06-2005).	43A: Awaited	
Felling of trees		Entire tree growth inc coppice crop from submergence areas should be removed before commencement of impoundment. Final reports assured for submission by March 2005	Completed reports on coppice crop assured  42A: awaited 43A: About 30% of the tree growth coppice from the submergence zone w.r.t. EL 121.92m was removed. Balance	Completed up to 110 MRL except 27 ha. Work progressing for 120.92m RL. [TYPO]  Completion reports assured 42A: awaited, completion reports for 110m - 110.64m, 27 ha in village Bamni, 110.64m – 121.92	Completed in forest areas. Reports on NFA assured (on coppice crop removal). Completion reports assured  42A: awaited 43A: Felling in entire forest area coming under submergence is completed. However 8,159	

			area is yet to be felled. ' Secondary species are to be removed.	43A: Felling of trees except in 27 ha completed between EL 110.64 & 121.92 m.	trees in non-forest area ( beyond EL 121.92m) up to FRL were yet to be felled. Now coppice crop required to be felled.	
Flora Fauna	Completion reports assured for submission by March 2005	Implementation report on recommendations of the EIA studies.  42A: awaited. Progress on development of sanctuary (satisfactory) 43A: Implementation of the recmdtn of the committee (field visit) of ESG, Jun 05 awaited. Progressing.	Implementation report on recommendations of EIA studies such as buffer zone plantations, as planned could not be taken up for allocation of resources.  Plantations over 218 ha were completed. It was assured to take up advanced works in the coming seasons to cover the backlog.  42A, 43A: awaited	Draft plan to be finalised and implemented. Implementation report on recommendations of studies and social forestry plan assured EIA report on proposed sanctuaries assured.  42A: awaited 43A: Implementation of social forestry plan started. Observations of the committee are discussed in the report presented in the agenda. EIA report on proposed sanctuaries was directed by the ESG. NVDA is negotiating with Wildlife Institute of India, Dehradun. Progress awaited.		
Carrying capacity		Estimated for sanctuary, being ensured through sanctuary development 42A: progressing 43A: studies completed, implementation awaited.	Not estimated Reports assured  42A: awaited 43A: No progress reported. No progress due to non allocation of resources	Not estimated Reports assured  42A: awaited 43A: Implementation is in progress. Revised plan awaited.		

Fisheries conservation aspects		<p>Draft plan available. Implementation progressing.</p> <p>42A: progressing 43A: Draft blue print submitted by Prof. S. Dutta (IIMA) was circulated to all States concerned for comments which are yet awaited. Compliance on the issues raised during the meeting to be submitted.</p>	<p>Studies entrusted to CICFRI assured for completion. <b>Implementation of plan could not be taken up due to problems both legal and allocation of resource</b> Revised plan submitted. 42A: Studies – no progress reported 43A: Actions on the directions of the high level Expert group on fisheries development and conservation awaited.</p>	<p>Implementation progressing</p> <p>Revised Plan assured</p> <p>42A: awaited 43A: no progress reported.</p>	
Downstream environment	Detailed plan & implementation of the recmdtns of Wallingford Inst. to be submitted by March 2005.	<p>Compliance on issues raised during the meeting to be submitted 43A: Compliance on the recommendations of the EIA report submitted by Wallingford Institute on safeguarding downstream flora &amp; fauna was awaited.</p>	Not applicable (NA)	NA	
Downstream flows	To ensure 600 cusecs of water flows downstream from Environmental Consideration, specially during the non monsoon months	GoG may provide details of the mechanism put in place for ensuring release of 600 cusecs water in downstream on continuous basis during non monsoon months.	NA	NA	

CAD	<p>Implementation of the planned measures commensurate with progressive irrigation in the command.</p> <p>Submission of the Volume II of the Phase II plan</p>	<p>Compliance to be submitted by March 2005</p> <p>42A: compliance awaited</p> <p>42A: not submitted yet</p> <p>43A: Irrigation to commence after implementation of approved command area development plan.</p> <ul style="list-style-type: none"> <li>• Submission of Micro-Plan for 44,000 ha. Area proposed to be brought under irrigation.</li> <li>• Issues related with migration of wild ass across Rann of Kutch to be resolved through consultation/ discussion.</li> </ul> <p>Status 43A: Plan for 41,305 ha received on 27<sup>th</sup> December 2005 is under scrutiny of the Members.</p> <p>43M: Irrigation already commenced over 2.5lac ha area, for which even plan awaited. <b>Infringement of Clearance Order</b></p>	<p>43A: Rajasthan: 1. GoR to revise the CAD plan to include concern of Members and make detailed presentation on revised plan in the next meeting.</p> <p>43A Status: compliance awaited</p>	NA	
-----	--	--	--	----	--

Health	Additional facilities as required must be provided. Monitoring reports should also be available. Data to be put up on the website.	Compliance to be submitted by March 2005 42A: no compliance reported 43A: Committee of the ESG interacted with Joint Director Health, Gujarat during June 05 & recommended that <ul style="list-style-type: none"> <li>• Increase in trends of malaria need to be halted.</li> <li>• Monitoring should be projected specifically.</li> <li>• Health expert should visit the areas.</li> </ul>	Compliance to be submitted by March 2005 42A: no compliance reported 43A: Implementation report received is not in consonance with the action plan submitted by GoM earlier. Revised action plan awaited. Report on Epidemiological Surveillance Studies received is also not based on the identified impacts of SSP but showed general Malaria pattern in Nandurbar District All other information is awaited.	Compliance to be submitted by March 2005 42A: no compliance reported 43A: Implementation report received is not in consonance with the action plan submitted by GoM earlier. Revised action plan awaited. Report on Epidemiological Surveillance Studies received is also not based on the identified impacts of SSP but showed general Malaria pattern in Nandurbar District All other information is awaited.	
Seismicity & Rim Stability	Collection and analysis of data should be a continuous process. 43A: Equipments were to be updated, as per recommendation of the IMD	Compliance to be submitted by March 2005 43A: latest status awaited			
Archaeology	Relocation/ protection	Completed  43A: Progressing as per plan submitted.	NA  43A: Progressing as per plan submitted	Compliance to be submitted by March 2005 43A: Progressing as per plan submitted	
Anthropology	Protection/ excavation	NA	NA	Completed	

***Dam height raising 121m, Annex 3, 41M.***

Table: abstract of ATR received from states of Gujarat, Maharashtra and MP after circulation of the agenda papers of 41<sup>st</sup> meeting of ESG:

**GOM:**

- ESMs: D-2/Plan/CR-71/03-04/ow. 548 of 04-05 dtd 22.11.04
- Fisheries conservation & devt: Matsya(I)/011403/2168 date 4.12.04
- Wildlife rehabilitation: D-2/Pln/CR-58/02-03/644 of 2004-05 dtd 24.12.04
- Health: DHS/PDE/Environment study/7A/04 dated 1.1.05 and DHS/PDE/Narmada Control/D-7a/04 dated 17.11.04

**GOMP:**

- ESM: NVDA/E&R/Tech./1925 dated 4.12.04
- Health: DO No. SMS/4/04/198 dated 1.1.05
- ESM: NVDA/E&F/Tech./18

**GOG:**

- Supplementary ATR on CAD: SSNNL/Env/ESG-41/1057 dated 01.01.05
- Height increase request: SSNNL/Env/ESG-41/798-99 dated 19.10.04
- CAF: SSNNL/Env/ESG-41/1017 dated 27-28.12.04
- ESM: SSNNL/Env/ESG-41/1007 dated 27 December 2004. ESM. Information submitted for forwarding to Dr Shekhar Singh.
- ESM: SSNNL/Env/ESG-41/1971 dated 07 December 2004 and SSNNL/Env/ESG-41/958 dated 07 December 2004. ESM. Reports on progress of survey/ studies/ implementation of ESMs.
- CAT: SSNNL/Env/ESG-41/888-89 dated 09.11.04
- CAD & downstream: SSNNL/Env/ESG-41/982 dated 10/13.12.04
- Sanctuary: SSNNL/Env/Nal/AP/929 to 37 dated 01.12.04

**GOR**

- Command area: SE/NCPC/T-23/04-05/3270 dtd 13.12.04
- Command area: SE/NCPC/T-23/04-05/38 dated 3.1.05 fax message
- CAD: TF(3)1/NMC/ACE/11127 dtd 28.10.04
- CAD: TF(3)1/NMC/Env/ACE/Ju/11654 dated 16.11.04 replies sent to Dr Ramaseshan



***Dam Height Raising, full reservoir level: current status of ESM implementation***43A: (meeting will be Nov 06, ATR as of 30<sup>th</sup> June 2006)

		<b>Requirements for pari-passu compliance</b>	<b>Gujarat</b>	<b>Maharashtra</b>	<b>MP</b>	<b>Follow-up action</b>
CAT	Phase I	Phase I efficacy: FA – remote sensing, aerial photography NFA – silt monitoring	FA: updating under progress  NFA: Further report <b>awaited</b>	FA: updating under progress  NFA: 2 stations established, report awaited	FA: <b>Awaited</b>  NFA: <b>Awaited</b>	
	Phase II	Works	Completed under Ph I	The gross area for which plans are required to be submitted for Phase-II programme is 77568 ha, the progress reported was 14904 ha. Forest Area: An area of 7218.96 ha of forest area was treated during the last 10 years. Non Forest Area: Agricultural areas in 5 sub-watersheds were treated at an estimated cost of Rs.9.86 crores and for treating the balance area Rs.5.02 crores are required for the agricultural department of which Rs.3.26 crores during 2005-06 and Rs.1.76 crores during 2006-07.	The gross area for which plans are required to be submitted for Phase-II programme is 3,18,118 ha, the progress reported was 35,312 ha. However, Govt. of M.P. have expressed inability in treating these areas commensurate with progressive filling of the reservoir <b>due to lack of funds and manpower.</b>	
CAF	Quantitative		It was informed by the Party States that the physical works on the available areas were completed.	It was informed by the Party States that the physical works on the available areas were completed.	It was informed by the Party States that the physical works on the available areas were completed.	
	Qualitative	In terms of the order of clearance, the non forest areas planted up by the project authorities are required to be handed over to the regular territorial forest divisions for regular upkeep & maintenance and till such time these	96% non-forest area is covered under section-4 of the Forest Act of 1927. Assessment of survival percentage and crop composition being updated.	About 80% of non-forest area is covered under section-4 of the Forest Act of 1927. <b>Assessment of survival percentage was reported to be 48% and crop composition is awaited.</b>	96% non-forest area is covered under section-4 of the Forest Act of 1927. Assessment of survival percentage and crop composition being updated.	

		were to be handed over to the regular department plantations were required to be maintained with watch & ward as per the planned programme. Besides, survival count, species composition, year of count and the areas under each category was required.				
Felling of trees						
Flora Fauna						
Carrying capacity						
Fisheries conservation aspects						
Downstream environment						
Downstream flows						
CAD		Implementation of the planned measures commensurate with progressive irrigation in the command.  Submission of the Volume II of the Phase II plan				
Health		Additional facilities as required must be provided. Monitoring reports should also be available. Data to be put up on the website.	•			
Seismicity & Rim Stability		Collection and analysis of data should be a continuous process. 43A: Equipments were to be updated, as per recommendation of the IMD				
Archaeology		Relocation/ protection				
Anthropology		Protection/ excavation				



## Shekhar Singh's letters to Sub-Group

### *Shekhar Singh letter of 2001 on pari passu (also letter of 1998 on same)*

17 January, 2001

Dear Shri Jaya Krishnan,

This has reference to letter No Env 3(35)/2000/ dated 3 January, 2001, from the NCA regarding the rescheduling of the NCA environment sub-group meeting from 10<sup>th</sup> to 19<sup>th</sup> January. Unfortunately, I have an earlier commitment for the 19<sup>th</sup> and, therefore, will not be able to attend.

I received the agenda papers for the meeting yesterday and was alarmed to see that there is a proposal to approve the raising of the height of Sardar Sarovar to 100m. Given our discussions in the last meeting, I was expecting to get some response from the Ministry before this issue was taken up again.

Though time is short, I am putting down some of my comments on this item of the agenda. I have not had the time to look at the other items.

I would be grateful if, in light of what I have stated, any decision on raising the height of the dam is deferred till the outstanding issues are sorted out. As I have said in my earlier letter, we are now functioning under the orders of the Supreme Court and must ensure that we do not, in any way, disregard their orders.

I am giving below my comments on agenda item No. XXXV-2(162) regarding the proposed raising of the dam height to RL 1000M.

1. As I have already mentioned in my earlier letter to the Chairman of the sub-group, we are now working under the orders of the Supreme Court and are charged, among other things, with the responsibility of ensuring that the conditions of clearance are complied with.
2. The terms of reference of our sub-group, as quoted in the agenda papers (Annex p 1-2) state that the sub group is to: "work out the environmental safeguard measures to be planned and implemented for the entire Narmada basin so that the environmental safeguard measures are executed and remain fully in consonance with the clearance accorded to the Narmada Sagar and Sardar Sarovar Projects" (emphasis added).
3. The first condition of clearance says that "The Narmada Control Authority (NCA) will ensure that environmental safeguard measures are planned and implemented *pari passu* with progress of work on projects." I had, in my letter of 31.10.2000 pointed out that we still do not have an agreement on what exactly *pari passu* means in terms of the Narmada Projects. I had brought to the Chairman's notice a definition that I had proposed. In the last meeting the Chairman had agreed to send me a reply on the points raised in my letter, as was also recorded in the minutes (p 4). However, no reply has yet been received and, as such, the matter is still pending.
4. The enclosure to my said letter was also discussed in the 32<sup>nd</sup> meeting of the subgroup held on 14 October, 1998. The minutes of that meeting state that:

"The note on the time frame circulated by Dr Shekhar Singh was taken up for discussions. A copy of the note is placed at Annex-XXXII.Min.(2).

*"Chairman desired to review the broad time frame on compliance and suggested that while discussing this, the views expressed by Dr Shekhar Singh in his note may also be kept in view". (p 3)*

The minutes go on to say that:

*"Summing up the discussion on the time frame the Chairman clarified that all these issues were considered prior to according environmental clearance by the MoEF. He however, desired that a tabular statement on the lines discussed above may be prepared for a review, while preparing the statement the submergence would be the criteria for assessing the *pari passu* compliance in general. However, on the issue like flora-fauna, archeology etc. which are impacted by the submergence directly, steps for their mitigation have to be taken, prior to submergence. He further clarified that the sub-group accepted the spirit of the Dr Shekhar Singh's letter". (P 4, emphasis added)*

However, despite this, no such tabular statement has yet been prepared. Therefore, it cannot be argued that the matter of compliance with pari passu has been settled.

5. Surprisingly, in the note on past discussions on the pari passu clause included in the agenda papers (Annex XXXV –(1)), this recent discussion has been left out, thereby presenting a misleading picture. Consequently, till a tabular presentation is made, discussed and agreed upon, in accordance with the decisions made in the in the 32<sup>nd</sup> meeting, we cannot proceed with determining whether the project is pari passu or not.
6. The second condition of clearance specifies that: “The detailed surveys/studies assured will be carried out as per the schedule proposed and details made available to the Department for assessment”. This clause is not involved with our understanding of pari passu. Your Ministry can confirm to you that almost all the studies/surveys assured were not carried out as per the schedule proposed and, what is more important, many of them have still not finished nor have they been assessed by your Ministry. In light of this, we can certainly not certify that progress is ‘fully in consonance’ with conditions of clearance.
7. The third condition specifies that: “The Catchment Area Treatment programme and the Rehabilitation plans be so drawn as to be completed ahead of reservoir filling” (emphasis added). The meaning of this clause was further clarified by Mr TN Seshan, then Secretary, MOEF, in his letter of 4/2/88 addressed to the Secretary, MoWR, GOI, wherein he states that: “Catchment Area Treatment should cover both submergence area as well as free draining catchment”. The agenda papers of this (35<sup>th</sup>) meeting seem to suggest that the conditions of clearance require the treatment of only directly draining watersheds. However, this is factually incorrect and has been so determined in earlier meetings of the sub-group. I give below the relevant quote from the minutes of the 22<sup>nd</sup> meeting (Item No. XXII-2(112), p 3-4):

“Shri D. Rajgopalan, Secretary (R&R), Govt. of Gujarat made a reference to the suggestion of the committee of Secretaries & pointed out that only those critically degraded sub-watersheds, which are directly draining into the reservoir are to be treated at the project cost. Whereas, for the balance critically degraded subwatersheds he pointed that according to the above decision the issue was to be decided by the Planning Commission in consultation with Ministry of Environment & Forests & Ministry of Agriculture. He also referred to the report of the committee of Environment Sub-group submitted in July, 1993 and proceedings of the 15<sup>th</sup> meeting of the Environment Subgroup, to state that treatment of freely draining sub-watershed is to be kept outside the conditionalities of pari-passu. To explain his point further he stated that the CAT works in directly draining areas, in all the three states put together have been completed in more than 55% area as against the submergence of the land which is likely to be only 15% of the total by the monsoon of 1994. He emphasized

Chairman however disagreed with this analysis & stated that the stand of Ministry of Environment & Forests (MOE&F) regarding this has been made very clear on more than one occasion. He stated that the completion of works on entire critically degraded subwatersheds within the freely draining areas are also to be completed. He also stated that the view expressed by Shri Rajagopalan to treat only the directly draining sub-watersheds for satisfying the pari-passu clause was conceived and advocated by the project authorities and not by the Ministry of Environment & Forests. He further made it clear that it is the responsibility of the project authorities to locate the source of funding for this programme” (emphasis added).

It is not clear, therefore, why this question is brought up again and again.

8. Given this, the factual position for Sardar Sarovar is as follows:

1. Total catchment area to be treated “ahead of reservoir filling”	606,640 ha (682,769 or 682,789ha)	Source: 35 <sup>th</sup> meeting agenda, p 19
2. Total treated to date	134,832 ha	Source: 35 <sup>th</sup> meeting agenda, p 21
3. Percentage of catchment treated to date	22.2%	
4. Percentage to be treated in order to comply with conditions of clearance (ahead of reservoir filling)	100%	Considering the reservoir has already been filled,

Clearly, by no stretch of imagination can the sub-group certify that, in catchment area treatment, the Sardar Sarovar project is in compliance with the conditions of clearance.

Consequently, I would be grateful if the required tabular statement regarding the implications of pari passu is discussed and decided by the MoEF and presented to the sub-group, before any effort is made to determine whether the pari passu clauses are being complied with. For the other clauses of clearance, the issues that I have raised need to be clarified before any view can be taken.

### ***Shekhar Singh letter of 8<sup>th</sup> February 2002***

1. On page 2 of the agenda papers it is stated that the NCA approved the construction of the dam up to 100 m height by June 2002, in its 81<sup>st</sup> meeting held on 17.11.2000. However, as per the Supreme Court order, they can do this only after the various sub groups have approved the raising of height. **Therefore, this may kindly be explained.**
2. On page 3 it is mentioned that at 100 m level the impoundment would extend up to 105 km. All other calculations seemed to be based on this figure. However, this is only the permanent impoundment, there would likely to be significant temporary impoundment due to build up of backwaters. Where are the calculation and implications of that. **This may kindly be explained.**
3. On page 34-35 it is stated (in Marathi) that only a sample survey has been carried and sample counting has been carried out, for areas to be affected at 100 m. However, there is no report of any final survey or counting. Even the marking of the area that would be submerged at 100 m is not complete. **This may be clarified.**
4. Further, it is stated that the forest department counted 1758 trees per ha while the FDCM (Corporation) counted only 765 trees per ha. The reason for this discrepancy is not understandable. Besides, the discrepancy does not allow confidence. **This may kindly be explained.**
5. The agenda papers state that the total catchment of SSP, below Narmada Sagar Dam 24,42,440 ha out of which 6,82,769 ha has been identified as critically degraded (p 90). **It may be clarified when the studies for identification of critically degraded land were done.**
6. The agenda papers state that out of this, an area of 1,43,351 ha has so far been treated (p 3). However, this works out to only 20.1% of the catchment area to be treated, as per the conditions of clearance, and not 80%, as has been claimed in the agenda papers. **This may kindly be clarified.**
7. Besides, the conditions of clearance stipulate that the entire catchment area treatment must be completed prior to impoundment. As impoundment started many years back, it is not clear how the project can be considered to be in compliance with the conditions of clearance. **This may kindly be explained.**
8. On page 201 there is a letter from the Secretary, Dept. of Agriculture and Cooperation, stating that insufficient funds are being made available for catchment area treatment. This would mean that even the announced schedules cannot be adhered to. **Therefore, the revised schedule may kindly be reported.**
9. The agenda papers (p 16) states that even treatment of the directly draining catchment for the 100 m level was not complete and 7508 ha remained to be done. **The current status may kindly be reported.**
10. In activities related to the Shoolpaneshwar Sanctuary, it is listed that fuelwood, timber, MFP and fruit trees are being planted and made available to the tribals (p 19). However, this appears to be in violation of the Wildlife (Protection) Act of 1972. **This may kindly be clarified.**
11. On page 29 it is stated that the committee set up by the MoEF "has not approved the creation of these (Mathwad and Bokarata) sanctuaries keeping in view the local conditions." **Therefore, what alternate measures for the protection of wildlife have been planned and implemented.**
12. Page 193 lists some of the safeguards needed while raising the dam height to 100 m. **The status of implementation of these safeguards may kindly be reported.**
13. On p 209 there is the mention of an appraisal committee formed by the MoEF. However, no further details, including membership and TOR are given. **This may kindly be provided.**
14. Has there been any independent assessment of the quantity and quality of the actions claimed to be taken? Field reports and my own earlier visits suggest that this is needed before a final view can be taken. Could a committee be set up of Env. Sub. Group members, involving all the non-official members, and the representatives of MoEF and other concerned departments?

***Shekhar Singh note of dissent on raising dam height to 100m (first 4 points not shown)***

5. Given this background, the decision of the ESG to approve the raising of height of the SSP to 100 m is flawed on the following basis
6. First, there is evidence before us that even the requirements pertaining to 100 m height have not been fulfilled. Specifically, Government of Madhya Pradesh reported that it had not yet been able to fell trees in all the submergence zone and it was unlikely that they would be able to do so before submersion. This violates the directions given by the Sub-group and the MoEF.
7. Further, Government of Madhya Pradesh reported that they had not completed catchment area treatment of even the critically degraded catchments directly draining into the reservoir at 100 m. This is, consequently, a violation of even their own limited undertaking of treating all directly draining catchments prior to the reservoir reaching that level. This was also as per the stipulation of the MoEF.
8. The Government of Maharashtra stated that they had only done a sample counting of the trees that would be submerged at 100 m level, and that the area had still not been demarcated. Further, there were major discrepancies even in this sample counting, between the counts done by the Forest Department and the Forest Corporation.
9. There was no clarity given, despite it being asked for, whether all the calculations were based on 100 m dam with additional humps of 3 m, or with the total height being 100 m, including the humps. This matter was left for the NCA to decide
10. There was also no clarification given on why back water build up areas where temporary submergence would take place were not considered while assessing the status of preparation for raising the height to 100 m.
11. There was no information about the status of safeguards that need to be taken before the dam height is raised to 100 m
12. There was no information on the alternate plans to protect wildlife, considering the earlier recommendation by the expert institution asked to study the problem, namely the setting up of two wildlife sanctuaries, had been rejected by the state government committee because “local conditions were not feasible”.
13. The MoEF was not able to give a statement on how many of the studies and plans had been assessed by it, as required under the conditions of clearance, and what were the outcomes of such an assessment.
14. Further, there appears to have been no effort by the ESG to independently verify the claims of the project authorities about the quantity and quality of the environmental measures taken, as enjoined upon it by, before taking this decision. A look at the documents themselves shows the urgent need to do that. For example, in the agenda papers for the 36<sup>th</sup> meeting, held on 2<sup>nd</sup> May, 2001, the Government of Madhya Pradesh had reported that “the entire area commensurate with EL 100m was felled” (Page 7). However, in the 37<sup>th</sup> meeting, held on 8 February, 2002, over nine months later, the Vice-Chairman of NVDA informed the Sub-Group that some 300 ha still remained and had not yet been felled. Similar discrepancies can be found repeatedly in the agendas and minutes of various meetings.
15. Reports from the field and my own observations during earlier visits also suggest that there is a real need for the Sub-Group to monitor and assess the field realities on their own before any further clearance is given.
16. At a more general level, as there is still no clear understanding of what exactly *pari passu* means, If we, for the moment, forget the linguistic questions and look at the substantive issues. Then:
  - I. Catchment area treatment is done in order to ensure that silt does not flow into the reservoir and start silting it up. This means that, unless we ensure that silt flow is minimized before its trapping starts, all the money and effort we spend on the treatment goes to waste.
  - II. Also. It is well known that during the treatment of a catchment the flow of silt temporarily goes up as a lot of earth work is involved, Therefore, if we allow the impoundment to start before catchment area treatment has been completed, then we not only allow the normal silt to accumulate in the reservoir, without minimizing it through the required treatment but we also add to this load additional silt dislodged because of the treatment activity itself.
  - III. Protection of wildlife enjoins that we make provisions to give at least the animals of the submersion area the opportunity to be able to find some safe haven as the waters advance. Therefore, we cannot here apply

blindly the rule of percentage of reservoir matching percentage of action. Before even an inch of land is submerged, the arrangements for the movement of wildlife must be fully complete at least from the submergence area.

- IV. In fact, as I had already written to you in my letter of 17 January, 2001, the matter of what *pari passu* means had not been closed. I had quoted the following passage from the minutes of the 32<sup>nd</sup> meeting:

” The note on the time frame circulated by Dr Shekhar Singh was taken up for discussions. A copy of the note is placed at Annex-XXXII.Min.(2).

*“Chairman desired to review the broad time frame on compliance and suggested that while discussing this, the views expressed by Dr Shekhar Singh in his note may also be kept in view”. (p 3)*

*The minutes go on to say that:*

*“Summing up the discussion on the time frame the Chairman clarified that all these issues were considered prior to according environmental clearance by the MoEF. He however, desired that a tabular statement on the lines discussed above may be prepared for a review, while preparing the statement the submergence would be the criteria for assessing the *pari passu* compliance in general. However, on the issue like flora-fauna, archeology etc. which are impacted by the submergence directly, steps for their mitigation have to be taken, prior to submergence. He further clarified that the sub-group accepted the spirit of the Dr Shekhar Singh’s letter”. (P 4, emphasis added).*

*However, till today, no such statement has been prepared and it is argued that the Supreme Court has determined that environmental activities are *pari passu* with construction work.*

17. *However, a close reading of the judgement does not bear this out. The court, in its directions has said that “Even though there has been substantial compliance with the conditions imposed under the environment clearance the NCA and the Environment Sub-group will continue to monitor and ensure that all steps are taken not only to protect but to restore and improve the environment.” The operative word here is “substantial”. The court did not say total.*
18. Besides, even this observation seems to be based on what was reported to them to be observations of the Environment Sub-Group:
 

*“The status of compliance with respect to *pari passu* conditions indicated that in the year 1999, the reservoir level was 88.0 meter, the impoundment was 6881 hectares (19%) and the area where catchment treatment had been carried out was 128230 hectares being 71.56% of the total work required to be done. The Minutes of the Environment Sub-group as on 28<sup>th</sup> September, 1999 stated that catchment area treatment works were nearing completion in the states of Gujarat and Maharashtra. Though, there was some slippage in Madhya Pradesh, however, overall works by and large were on schedule. This clearly showed that the monitoring of the catchment treatment plan was being done by the Environmental Sub-group quite effectively.”*

*Therefore, the Sub-group continues to have the responsibility of ensuring compliance to the conditions of clearance and we cannot hide behind the Supreme Court judgement.*
19. This brings us to the final point. I have raised this repeatedly in the Sub-Group. The conditions of clearance clearly state that all of the critically degraded catchment has to be treated and not just the “directly draining” one. This point was amply clarified by Mr. TN Seshan, the then Secretary (E&F), in his letter of clarification to the then Secretary of Water Resources when he said that “ Catchment Area Treatment should cover both submergence area as well as free draining catchment” (Letter of 4.2.1988).
20. I have also not found any mention in the Supreme Court order suggesting that the Supreme Court has relaxed this condition and now requires only the directly draining areas to be treated. The quotation from the judgement, given above, only repeats what the sub-group seems to have said.
21. As there is also no letter from the MoEF subsequently changing the conditions of clearance, the Sub-Group allowing construction to take place when only 20% of the required catchment area had been treated is not only a violation of the conditions of clearance but also a violation of the Supreme Court order, that has asked us to ensure that the construction is as per the conditions of clearance.



***Dams, Conditional Environmental Clearances and the pari-passu clause: note from Shekhar Singh***

1. In the last 15 years or so, there has been a tendency to grant conditional environmental clearance to major dams with a *pari-passu* clause. This means that the environmental studies and assessments that need to be done, and the action that needs to be taken in advance of project clearance would have to be done concurrently with project construction.
2. Presumably, such clearances are given when there is a need to expedite initiation of the construction of the project. The desirability, or otherwise, of this is not being discussed here.
3. There are three distinct sets of environmental issues relating to dam projects. These are:
  - i) Whether the project is environmentally viable? In other words, are the inevitable environmental costs of the project justified?
  - ii) What measures need to be taken, if the project is to be made environmentally viable, to minimise its negative impacts on the environment?
  - iii) What are the costs of such measures and how do they affect the financial viability of the project?
4. In order to answer question (i), detailed environmental impact studies need to be carried out and their findings assessed. On the basis of these, it can be determined whether the benefits from the project justify its inevitable environmental costs.
5. If, based on the earlier exercise, the project is found viable then the earlier studies have to be built-upon and action plans have to be formulated to minimise environmental damage.
6. Once the measures required for minimising environmental damage have been clearly determined, then they need to be costed in order to ensure that even if the project is considered environmentally viable, does it remain financially viable if all that is required to protect the environment is done.
7. Clearly, if proper decisions have to be made, all these questions have to be asked and answered prior to a project being considered for environmental clearance.
8. When a conditional *pari-passu* clearance is given, it usually means that these three questions have not been answered to the point where a final decision can be made. In other words, when a project is given conditional *pari-passu* clearance, there is a possibility that the project might subsequently be proved to be environmentally and/or financially non-viable.
9. There is also the practical danger that, due to the inadequate monitoring system of the Ministry of Environment and Forests (MoEF), once clearance is given, albeit conditional, the required studies and action plans would not be finished in time. Even where the studies and action plans are completed, there is the danger that the required remedial measures will not be implemented in time or properly. Therefore, in those cases where the government has seen fit to grant environmental clearance even before the environmental and financial viability of a project is

established, there is a special responsibility on the MoEF to ensure that at least the pari-passu clause, with all its inherent weaknesses, is properly adhered to.

10. It also has to be ensured that the decisions relating to the environment are being made in a democratic, participatory and transparent manner, especially by consulting and keeping informed all the main stakeholders, especially the communities most directly affected by the project.
11. The question of how exactly to determine what constitutes adherence to the pari-passu clause has never been settled. This is clear from the debates which surround this aspect of three of the major projects which have been given such conditional clearance: the Indira Sagar project in Madhya Pradesh, the Sardar Sarovar project in Gujarat and the Tehri project in Uttar Pradesh.
12. Recently, the Sardar Sarovar and Narmada Sagar project authorities have suggested that compliance with the pari-passu clause should be judged based on the proportion of submergence. In other words, they seem to suggest that the pari-passu condition would be fulfilled if, overall, the proportion of studies, action plans or action completed is not less than the proportion of the reservoir filled. This, however, appears to be an unsatisfactory and erroneous way to determining compliance with the pari-passu clause.
13. The correct interpretation of the pari-passu clause involves identifying the different types of environmental activities required under a conditional clearance, and the purpose of each. It must also be remembered that pari-passu means concurrent and not co-terminus action.
14. As already mentioned earlier, by giving conditional clearance with a pari-passu clause the government in effect allows project work to start without determining the environmental or financial viability of the project. However, this does not take away the right of the government to re-assess the clearance that it has given if findings of the required studies begin to establish that the project is environmentally non-viable. In other words, the government has the obligation to reverse its decision on the project if subsequent evidence suggests that the environmental costs of the project are unacceptable, or that their mitigation to within acceptable limits would make the project financially non-viable. For this purpose, all the required studies that assess the environmental impact of the project and determine costs of mitigation should be completed as soon as possible. This is essential in order to minimise the financial loss in case the project is proved to be non-viable and consequently scrapped. That is why conditional clearances often prescribe a time frame within which studies, action plans and even some action has to be completed.
15. The second objective of the various studies and action plans is to ensure that the environmental impacts of the project are minimised. For this purpose, it is essential that these studies and action plans are completed and action taken, before project related activities cause irreversible damage to the environment. In fact, where project activities threaten an ecosystem or species that is to be rehabilitated, not only studies and action plans but even successful rehabilitation must be completed before such project activities are allowed to commence. There could, for example, be an ecosystem or species that would disappear even if 10% of the area was submerged. Consequently, it cannot be argued that if 10% of the surveys of wildlife have been completed and 10% of the remedial action taken, then it does not violate the pari-passu clause

if 10% of the area is submerged. Clearly, 100% of the surveys and action plans and 100% of the rehabilitation must be completed before such submergence is allowed.

16. Similarly, degraded catchments would have a negative impact on the project by silting up the reservoir. Where any impoundment starts before the catchments (at least the very high and high erodibility categories) are adequately treated and stabilised, an important purpose of catchment area treatment is defeated. Clearly, if all this is kept in mind, the simple formula of percentage of impoundment being co-related to the percentage of environmental study and action is not correct.
17. Many other such examples can be given to establish that if proper management of the environment is to take place, a simple formula equating the proportion of impoundment to the proportion of environmental studies and action taken, would not work.
18. I have attempted below to suggest some sort of a timetable for many of the specific aspects relating to the environment. My belief is that, unless this or a similar timetable is followed, the pari-passu clause for these projects could not be considered as having been complied with.

Paripas2.doc

#### **Pari-passu timetable attached to note from Shekhar Singh**

Issue	Required Time Frame*			Remarks
	Study (to be completed)	Action plan (to be completed)	Implementation (to be completed)	
1. Catchment Area Treatment	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Two years prior to any impoundment (Of at least the very high and high erodibility categories of the catchment)	All very high and high erodibility catchments must be treated and allowed to stabilise before any impoundment is permitted, in order to prevent siltation. In fact, the actual activity of catchment area treatment, which often involves pit digging and other earthwork, can temporarily enhance rates of siltation. Therefore, it is important that all these activities are completed before any trapping of silt through impoundment starts.
2. Rehabilitation	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Two years prior to impoundment	The rehabilitation component of the project is perhaps the most critical and is the one which usually requires the largest financial outlays. As such, it is essential that all studies and action plans must be completed before any impoundment, including that due to building-up of back waters, takes place. This also includes the identification of land and its acquisition. However, the shifting of families should start only when the impoundment schedule is final. The process should start at least two years in advance of impoundment, with the families having the option to maintain both sites while they settle down in their new homes. The final shifting of project affected persons should be done only when submergence of an area is imminent.
3. Seismicity and dam safety	Prior to start of any construction	Prior to start of any construction	Prior to start of any construction	Critical for ensuring the safety of the dam and other structures. It is therefore important that construction should not be started till all the safety-related studies are completed and the resultant modifications, if any, to the structural designs have been incorporated.
4. Impact on human health	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Prior to impoundment	The negative impacts of reservoirs on human health, especially as they breed vectors, are well documented. Even in the Narmada project there is concrete evidence of this. Therefore, preventive measures must be in position prior to impoundment.

Issue	Required Time Frame*			Remarks
	Study (to be completed)	Action plan (to be completed)	Implementation (to be completed)	
5. Impact on aquatic ecosystems	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Prior to diversion/ impoundment	The diversion of the river, building of a coffer dam and the creation of reservoirs have major negative impacts on aquatic ecosystems, especially on fish diversity, other biodiversity, and on water quality. As this is an irreversible process once diversion or impoundment starts, it is important that studies and action plans be completed prior to any diversion. Implementation of preventive measures should be completed prior to the affecting activity (diversion or impoundment) being permitted.
6. Dust and noise pollution at construction site	Prior to any construction	Prior to any construction	Prior to any construction	The construction activities related with such projects pose a significant threat of dust and noise pollution on the surrounding ecosystem and human settlements. It is, therefore, essentially to study the surrounding ecosystems and to develop and implement action plans for the minimisation of the impacts and for the rehabilitation of species and ecosystems, prior to the start of construction.
7. Submergence of terrestrial biodiversity	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Prior to impoundment	All wildlife (flora and fauna) studies and action plans must be completed prior to any impoundment being allowed. Rehabilitation programmes, as required, must be implemented so as to ensure that species or ecosystems are adequately rehabilitated before their original locations are submerged.
8. Archaeological monuments and sites	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Prior to submergence of site/ monument	Archaeological monuments must be identified and shifted out prior to their sites being submerged. More importantly, all archaeological sites must be investigated and the findings evaluated prior to their being submerged. Where required, salvage of archaeological objects must be done prior to impoundment.
9. Impact on downstream aquatic ecosystems	Prior to start of construction of diversion canal/ coffer dam/ main dam	Prior to start of construction of diversion canal/ coffer dam/ main dam	Prior to diversion/ impoundment	The blocking of a river by a dam has significant negative impacts on the downstream aquatic ecosystems. These include a loss of nutrients due to the trapping of silt by the dam. The change in water flow regimes and the blockage of passage of migratory fish. Even the diversion of the river waters has many such impacts. As these are irreversible impacts, studies, action plans and implementation must be completed before any diversion or impoundment is permitted.
10. Water logging	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	Prior to impoundment	The social and economic justifications for large dams are usually very critically dependent on the benefits from irrigation. However, these benefits are often not realised because of significant problems relating to water logging in the command area. Consequently, the possibility of water logging and the modalities of preventing such water logging must be determined before permitting any impoundment. Very often, when the modalities of preventing water logging are properly understood, there is a requirement to change the water use patterns determined for the project. This becomes impossible if the project has progressed to a stage where impoundment has been permitted.
11. Compensatory afforestation	Prior to start of construction of coffer dam/ main dam	Prior to start of construction of coffer dam/ main dam	At least five years prior to the cutting of trees in the submergence zone	Compensatory afforestation, as the name suggests, is meant to compensate for the forests that would be felled or submerged as part of the project. Consequently, the compensatory forests must be established before the original ones are cut or submerged.
12. Other environmental issues				A similar analysis has to be done for each of the other environmental issues to determine what is the proper timeframe within which they should be studied, their action plans developed and implementation started and completed.

\* *If specific dates have been prescribed in the clearance letter, by which any or all of these steps have to be completed, then those dates have to be adhered to, if they are earlier.*

## Review of status of Narmada Control Authority environmental sub-group related aspects of Sardar Sarovar Project

---

### References

*From [www.narmada.org](http://www.narmada.org):*

1. Ackermann, et.al. (eds.). 1973. Man-made Lakes: Their Problems and Environmental Effects. American
2. Geophysical Union, Washington D.C. Referred to in Goldsmith and Hildyard 1984.
3. Baviskar, A. 1992. Development, Nature and Resistance: The Case of Bhilala Tribals in the Narmada valley. Ph.D. Thesis. Cornell University, Ithaca, New York.
4. CES. 1992. Pre-Feasibility Level Drainage Study for SSP Command Beyond River Mahi. CES Water Resources Development and Management Consultancy Private Limited, New Delhi. Study for Narmada Planning Group, Sardar Sarovar Narmada Nigam Limited, Government of Gujarat.
5. Core Consultants. 1982. Main Report: Narmada Mahi Doab Drainage Study. Study commissioned by Narmada Planning Group, Government of Gujarat.
6. CSE. 1991. State of India's Environment. Third Report. Water. Centre for Science and the Environment, New Delhi.
7. CWC. 1975. Guidelines for Investigations of Major Irrigation and Hydro-electric Projects. Central Water Commission, Government of India.
8. CWC. 1992. Monthly Observed Flows of the Narmada at Garudeshwar. Hydrology Studies Organisation. Central Water Commission. Government of India.
9. DOE. 1985. Guidelines for Environmental Impact Assessment of River Valley Projects. Department of Environment, Ministry of Environment and Forests, Government of India.
10. Elgabal, M.M. 1980. Salinity and Waterlogging in the Near-East Region. In: A.K. Biswas, M.A.H. Samaba, M.H. Amer and M. Abu-Zeid (Eds.) Water Management for Arid Lands in Developing Countries. Pergamon Press, Oxford.
11. ESG. Minutes and Agenda Notes of the Environment Sub-Group, Narmada Control Authority. (Twenty-two meetings of the sub-group have been held from 1988 to 1994, and are not listed individually here.)
12. Farvar, M.T. and Milton, J.P. (eds.). 1973. The Careless Technology. Tom Stacey, London. Referred to in Goldsmith and Hildyard 1984.
13. GOI. 1990. Wetlands of India: A Directory. Government of India, New Delhi.
14. Hildyard, N. and Goldsmith, E. 1984. The Social and Environmental Effects of Large Dams. Volume 1: Overview. Wadebridge Ecological Centre, United Kingdom.
15. ICR. 1972. Irrigation Committee Report. Government of India.
16. Jhingran, V.G. 1991. Fish and Fisheries in India. Hindustan Publishing Corporation, New Delhi.
17. Kalra, N. L. 1992. Status Report on Malaria and Other Health-Related Aspects of the SSP Projects, and Recommendations Regarding Short-Term and Long-Term Remedial Measures. Report submitted to the World Bank.
18. Kushalapa, K.A. 1992. Special Monitoring of Compensatory Afforestation in Kachch District - Gujarat: A Report. Bhopal. Annexed to the Agenda for the 15th Meeting of the Environment Sub-Group of the Narmada Control Authority, August 1992.
19. Maudgal, S. 1993. Environmental Assessment Process for Sardar Sarovar Project - Lessons. Paper presented for the Narmada Forum (December 21-23, Delhi), a workshop organised by the Centre for Development Economics, Delhi School of Economics.
20. MoEF. 1986. Environmental Aspects of Narmada Sagar and Sardar Sarovar Multi-purpose Projects. Department of Environment and Forests, Government of India.
21. MoEF. 1987a. Approval of Narmada Sagar Project, Madhya Pradesh and Sardar Sarovar Project, Gujarat from Environmental Angle. Office Memorandum No. 3087/80-IA, dated June 24, 1987.
22. MoEF. 1987b. Diversion of 13385.45 ha. (6488.54 ha. in Maharashtra, 4165.91 ha. to Gujarat and 2731.00 Ha. in Madhya Pradesh) of forest land in Dhule, Bharuch, and Khargone District respectively for Sardar Sarovar Project. Letter No. 8-372/83-FC, dated 8 September, 1987.
23. MSU. 1983. The Sardar Sarovar Narmada Project Studies on Ecology and Environment. Department of Botany, The M.S. University of Baroda, Baroda. Sponsored by Narmada Planning Group, Government of Gujarat.
24. MSU. 1989. Ecological and Environmental Studies on Narmada - In Depth Studies: Biological Resources Inventory and Eco-enhancement Studies on Sardar Sarovar Submergence in Gujarat. The M.S. University of Baroda, Baroda.

## **Review of status of Narmada Control Authority environmental sub-group related aspects of Sardar Sarovar Project**

---

25. MSU. 1992. Eco-Environmental Studies of Sardar Sarovar Environs. Departments of Botany and Zoology, M.S. University, Baroda. Sponsored by SSNNL. Narmada Planning Group, Government of Gujarat.
26. NCA. 1993. Sardar Sarovar Project: Environmental Overview and Prioritised Action Plan. June. Narmada Control Authority, Indore.
27. NPG. 1986. Sardar Sarovar Project Work Plan for Environmental Effects: Sector - Forests and Wildlife. Narmada Planning Group, Government of Gujarat, Gandhinagar.
28. NWDT. 1979. Report of the Narmada Water Disputes Tribunal Vol. II. Government of India.
29. Ojha, R.K. 1989. Letter to the Chief Conservator of Forests (Central), Ministry of Environment and Forests, Western Region Office, Bhopal, dated 25 July 1989, regarding inspection of compensatory afforestation sites in Gujarat.
30. ORG. 1981. Critical Zones in Narmada Command - Problems and Prospects. Report 1, Zone 7. Operations Research Group, Baroda.
31. ORG. 1982. Regionalisation of Narmada Command. Operations Research Group, Gandhinagar.
32. ORG. 1983. Simulation Study of Sardar Sarovar Operation: 4th Reservoir Model. Operations Research Group, Baroda.
33. PAC. 1983. Planning Process and Monitoring Mechanism with Reference to Irrigation Projects. 141st report (1992-93), Public Accounts Committee, Seventh Lok Sabha. Ministry of Planning, (Planning Commission), Lok Sabha Secretariat, New Delhi.
34. Patel, C.D. 1993. Submission to the Review Group of the Ministry of Water Resources. Department of Geology, M.S. University, Baroda.
35. Patel, P.P. 1993. Water Problem of Gujarat: Resource Development and Management. Department of Geology, M.S. University, Baroda.
36. Pathak, M. 1989. Environmental Aspects of SSP. Unpublished paper.
37. Prakash, I. 1992. Conservation of Biological Resources in the Risk Prone Indira Gandhi Nahar Command Area in the Thar Desert. Zoological Survey of India. Unpublished paper.
38. Prakash, I. and Ghosh, P.K. 1980. Human Animal Interactions in the Rajasthan Desert. Journal of the Bombay Natural History Society 75: 1259-1261.
39. Raj, P.A. 1990. Facts: Sardar Sarovar Project. Sardar Sarovar Narmada Nigam Ltd., Gandhinagar.
40. Ram, R. N. 1993. Muddy Waters: A Critical Assessment of the Benefits of Sardar Sarovar Project. Kalpavriksh, New Delhi.
41. Russell, P.F. 1938. Malaria due to Defective and Untidy Irrigation. A Preliminary Discussion. Journal of the Malaria Institute of India, Vol. 1, December 1938.
42. Sridharan, R. and Vedula, S. 1985. Groundwater Modeling for the Composite Command of Narmada Sagar and Omkareshwar Reservoir (Vol. 5). Narmada Planning Group and Indian Institute of Science, Bangalore.
43. SSNNL. 1989. Planning for Prosperity. Sardar Sarovar Development Plan. Narmada Planning Group. Sardar Sarovar Narmada Nigam Limited. Government of Gujarat.
44. TOR Nal Sarovar. 1992. Terms of Reference for the Expert Multi- disciplinary Group on Nal Sarovar Bird Sanctuary. Sardar Sarovar Narmada Nigam Ltd.
45. TOR Wild Ass. 1992. Terms of Reference for the Expert Multi-disciplinary Group on Wild Ass Sanctuary in Little Rann of Kachchh. Sardar Sarovar Narmada Nigam Ltd.
46. Vijayan, V.S. 1991. Keoladeo National Park-Ecology Study 1980-1990: Final Report. Bombay Natural History Society, Bombay.
47. Wallingford. 1993. Environmental Changes Downstream of Sardar Sarovar. HR Wallingford, Oxfordshire, UK. Report No. EX 2750.
48. WB. 1985. Staff Appraisal Report. India. Narmada River Development - Gujarat. Water Delivery and Drainage Project. South Asia Projects Department. Irrigation II Division. The World Bank, Washington. Report No. 5108-IN.
49. WWF. 1992. India's Wetlands, Mangroves, and Coral Reefs. World Wide Fund for Nature - India, for the Ministry of Environment and Forests, Government of India, New Delhi.

## **Review of status of Narmada Control Authority environmental sub-group related aspects of Sardar Sarovar Project**

---

### ***References – CAT***

1. 1985 – preliminary survey of state of soil. Report of Interdepartmental Committee on Soil Conservation and Afforestation (the Dewan Committee Report)
2. 1986 – GoG. CAT Action Plan – part of works plan for Environmental Effects
3. 1988 – GOM. CAT Action Plan. To MOEF (annual schemes 1996 onwards)
4. 1991 – Report on Prioritisation of Subwatersheds in Sub-catchments of Narmada Catchment – results of 3 year study by AISLUSO in accordance with recommendations of Dewan Committee. SSP catchment -> 8 subcatchments -> 1000 subwatersheds, then each surveyed for potential for erosion (slope, vegetation cover, soil characteristics, surface conditions, physiography, etc), AIS&LUSO, New Delhi
5. After 1991, AISLUSO Survey, revised Action Plans
6. 1991-2 – GOMP prepared plan (10 year plan), (annual schemes from 1997 onwards)
7. June 1992 GOI Directive – for SSP, project would bear costs of treatment of all critically degraded sub-watersheds draining directly into the reservoir and areas directly damaged by project activities. Critically degraded watersheds are those defined by All India Soil and Land Use Survey Organisation (AISLUSO) as “very high” or “high priority” subwatersheds in SSP catchments. Cost of balance of critically degraded watersheds to be met by States. CAT – MOA for agricultural lands, MOEF forest lands

## **Review of status of Narmada Control Authority environmental sub-group related aspects of Sardar Sarovar Project**

---

### ***References – Compensatory Afforestation***

1. 1980 Forest (Conservation) Act – offices of Regional Chief Conservator monitor implementation of provisions of Act. 5 offices including one at Bhopal which is responsible for monitoring CAF for SSP on behalf of MOEF.  
Forest management and protection policies: 1980 FCA restricts transfer of land designated as forest for development without prior clearance from MOEF. Clearance subject to condition that Compensatory Afforestation (CAF) be undertaken on equivalent land area to forest area submerged
2. 1983 – SS (Narmada) Project Development Plan, vol II, Narmada Planning Group – environmental chapter includes details of land use + forest cover (aerial photo derived)
3. 1983 – studies on ecology and environment by MS University of Baroda (MSU) identified density, species composition and productivity in forests in submergence areas in Gujarat
4. 1987, 1990, 1993 – clearance for diversion of forest land, 11 conditions in planning clearance in Gujarat (more detail on Gujarat forests)
5. 1988 – SSP: Preparation of Environmental Work Plan, forests department, Maharashtra – survey listed all important flora in submergence areas of Maharashtra
6. Nov 1989-May 1992: Work done by MSU reported on Eco-Environmental + Wildlife Management Studies on SS submergence area
7. 1994 – impact assessment of MP land to be submerged under SSP and Adjoining Ecosystems – conducted by State Forest Research Institute
8. Plantations along canal banks – Gujarat Forest Department under scrutiny by SSNNL (NCA 2000)



## **Review of status of Narmada Control Authority environmental sub-group related aspects of Sardar Sarovar Project**

---

### ***References – Terrestrial and aquatic flora and fauna***

1. Wildlife Protection Act 1972 – contains schedules listing rare, endangered and threatened species requiring special protection
2. MOEF guidelines regulate terrestrial ecology surveys
3. 1987 clearance
4. 1988 letter from MOEF on environmental data collection for environmental action plan

### ***Aquatic environment – upstream effects***

Central Inland Capture Fisheries Research Institute (CICFRI) studies:

1. July 1983 – EI Analysis, in AA(N) Project Studies on Ecology and Environment by Department of Botany, MS University Vadodara (site visits Feb-Jul 82)
2. May 83 – SS(N)P Development Plan Vol II, Chapter 11 – Environmental Aspects
3. 1984 – Narmada Basin Water Development Plan for Development for Development of Fisheries by Narmada Planning Agency, GoMP
4. 1984 – Rapid Reconnaissance Survey of Limnological Aspects Pt I, II and III, University of Bhopal, Vikram + Rani Durgavahi for GoMP
5. 1984-5 – Report on Rapid Survey Pre-impoundment Limnological Survey of Narmada River for Water Quality + Aquatic Aspects under Narmada Planning Agency, Department Limnology, Bhopal Univ. (MP)
6. Feb 86 – SSP – Work Plan for Environmental Effects (Sector – Fish & Fisheries)
7. 1987 – Note on SSP – Preparation of Environmental Work Plan for Fisheries Development in Maharashtra
8. 1988 – ecology and Fisheries of the Narmada Estuarine System with Special Reference to Proposed Impoundment (SS Dam), CICFRI
9. 1991 – Aquatic fauna (fish) studies in Indira Sagar submergence area. Friends of Nature Society on behalf of NVDA
10. 1991 – Sociological Survey of the Fishing Families of the Narmada River, CICFRI
11. 1991 – Narmada River Basin Development Project – Fisheries Component, GoPA cons to W. Bah
12. 1994 – studies on Fish Conservation in Narmada Sagar, SS and its Downstream CICFRI for NCA

### ***Fauna: Estuary and marine environment***

1. 1983 SS(N) Project: Studies on Ecology & Environment, MSU
2. 1988 onwards, studies in estuary, CICFRI
3. 1991 State of Forest Report, Forest Survey of India – landsat interpretation 1987-1989
4. 1991 Narmada Basin Development Project Staff Appraisal Report, for World Bank
5. Outline plan and detailed cost summary prepared for World Bank by GoPA for mangrove reforestation
6. 1992 Approach paper on EIA for river downstream of SS Dam, SSNNL
7. Water quality data – Central Water Commission, Gujarat, Pollution Control Board, National Institute of Oceanography
8. Modelling of downstream impact by Central Water + Power research Station (CWPRS)
9. Several studies on fisheries, agricultural run-off etc that may affect estuary + marine environment.
10. Mangrove areas – near freshwater outlets to marine environment  
- inhibit erosion by stabilising riverbanks + coastline
11. SSP affected by:  
- decreased sediment loading therefore island building + scouring of islands  
- decreased freshwater flow in years + then average rainfall + increased salinity beyond tolerance of mangroves