社会開発調査部報告書

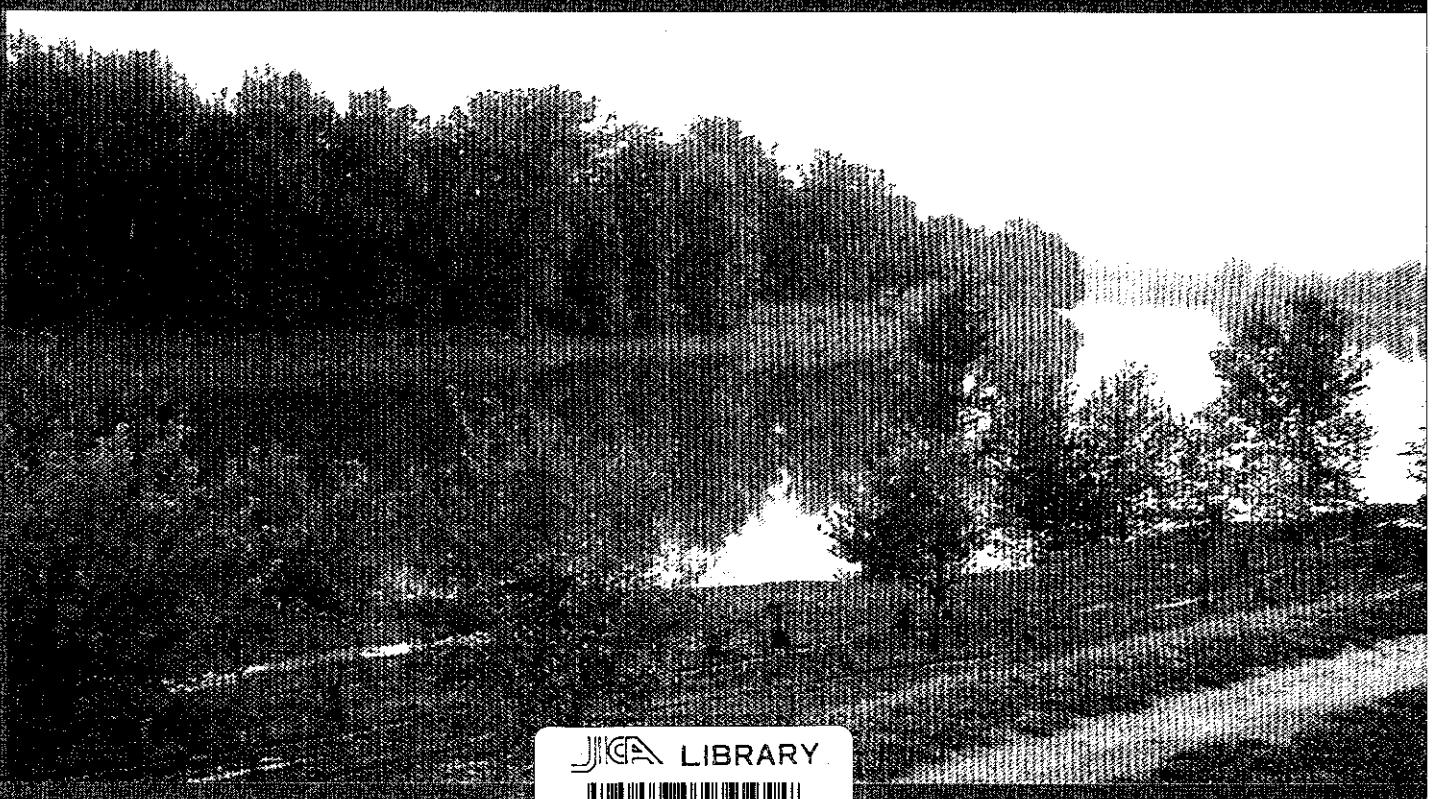
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

No.

MINISTRY OF ECONOMY
MINISTRY OF AGRICULTURE AND FOOD INDUSTRY
THE STATE WATER RESOURCES MANAGEMENT CONCERN
"APELE MOLDOVEI"
THE REPUBLIC OF MOLDOVA

THE STUDY ON WATER SUPPLY SYSTEMS FOR THE NORTHERN REGION IN THE REPUBLIC OF MOLDOVA

FINAL REPORT
Supporting Report



January 2003

PACIFIC CONSULTANTS INTERNATIONAL, TOKYO
TOKYO ENGINEERING CONSULTANTS, TOKYO

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The Study on Water Supply Systems for the Northern Region in the Republic of Moldova

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PROJECTION OF WATER DEMAND

1. Projection of Water Demand

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Table A.1 Population Forecast for the Study Area (Persons)

7 Cities/Towns

Annual population growth rates: Balti: 0.5%, Other 6 Cities/Towns: 0.2%

	1	2	3	4	5	6	7	
Year	Soroca	Balti	Riscani	Falesti	Floresti	Drochia	Singerei	Total
1998	46,000	162,550	16,367	18,963	20,100	22,000	15,969	301,949
1999	46,092	163,362	16,400	19,001	20,140	22,044	16,001	303,040
2000	46,184	164,179	16,433	19,039	20,180	22,088	16,033	304,136
2001	46,369	165,000	16,498	19,115	20,261	22,177	16,097	305,518
2002	46,462	165,825	16,531	19,153	20,302	22,221	16,129	306,624
2003	46,555	166,654	16,564	19,192	20,342	22,265	16,162	307,734
2004	46,648	167,487	16,598	19,230	20,383	22,310	16,194	308,850
2005	46,741	168,325	16,631	19,269	20,424	22,354	16,226	309,970
2006	46,928	169,166	16,697	19,346	20,506	22,444	16,291	311,379
2007	47,022	170,012	16,731	19,384	20,547	22,489	16,324	312,509
2008	47,116	170,862	16,764	19,423	20,588	22,534	16,357	313,644
2009	47,210	171,717	16,798	19,462	20,629	22,579	16,389	314,784
2010	47,305	172,575	16,831	19,501	20,670	22,624	16,422	315,929
2011	47,494	173,438	16,899	19,579	20,753	22,715	16,488	317,365
2012	47,589	174,305	16,932	19,618	20,794	22,760	16,521	318,520
2013	47,684	175,177	16,966	19,657	20,836	22,806	16,554	319,680
2014	47,780	176,053	17,000	19,697	20,878	22,851	16,587	320,845
2015	47,875	176,933	17,034	19,736	20,919	22,897	16,620	322,015

Villages Existing Along the Pipeline Routes

Annual population growth rate: 0.00%

Soroca-Balti

1	2	3	4	5	6	7	8	9
Zastinca	Tepilovo	Ocolina	Vancina	Vancina Mica	Pirlita	Lugovoe	Kotovsk	Cainarii Vechi
2,420	1,065	1,100	368	9	600	200	630	4,028

10	11	12	13	14	15	16	17	18
Bezeni	Izvoare	Alexan-drovca	Frumusica	Trifanesti	Alexandre-ni	Cubolta	Biruinta	Grigoresti
396	1,125	562	1,813	1,105	1,685	2,300	5,000	1,480

Total
25,886

Balti-Riscani

1	2*	3	4*		
Cirlateni	Singureni	Recha	Racaria	Subtotal (2+4)*	Total
5,800	1,800	2,940	1,610	3,410	12,150

Balti-Falesti

1*	2*	3	4		
Reutel	Ciuluc	Catranic	Egorovca	Subtotal (1+2)*	Total
4,780	298	1,650	1,388	5,078	8,116

Balti-Singerei

1*	2*	
Bilicenii Noi	Bilicenii Vechi	Total
982	3,270	4,252

Soroca-Drochia

1	2	3	4	5	
Schineni	Popestii de Sus	Zgurita	Chetrosu	Surii Noi	Total
1,575	2,170	3,568	6,500	673	14,486

Prut-Riscani

1	2*	3*	4*	5*	6*	7	8*	9*
Varatic	Dumeni	Duruitoar-ca Noua	Horodiste	Pociumbe-ui	Hiliuti	Pirjota	Sturzeni	Alexandre-sti
2,400	275	995	1,040	1,018	2,787	2,000	1,540	300

10	11*	12*	13*	14*		
Borosenii Noi	Moseni	Vasileuti	Stubieni	Zaicani	Subtotal *	Total
2,067	744	1,519	497	3,835	14,550	21,017

Prut-Falesti

1*	2*	3*	4	5*	6	7	8	9*
Hrubna Noua	Taxobeni	Vranesti	Horesti	Lucaceni	Risipeni	Bocsa	Musteatsa	Frumusica
416	1,420	41	988	408	1,785	1,715	1,691	485

10*	11		
Socii Vechi	Caluger	Subtotal *	Total
200	2,368	2,970	11,517

Note: * indicates the community not having house connection of water supply in 1998

Table A.2 (1) Forecast of Population Distribution by Facility Level (7Cities/Towns and the Villages Having House Connection of Water Supply in 1998)

1. Soroca

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	46000	46184	46741	47305	47875	46000	46184	46741	47305	47875	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	5%	5%	10%	20%	30%	2320	2320	4674	9461	14363	190
3 Percent without bathroom	50%	50%	55%	60%	65%	23168	23168	25708	28383	31119	140
4 Percent using standposts and yard connections	42%	42%	32%	17%	2%	19500	19500	14957	8042	958	50
5 Percent using dug wells and other sources	2%	3%	3%	3%	3%	1012	1196	1402	1419	1436	
Population served with water supply :						*44988*	*44988*	*45339*	*45886*	*46439*	

2. Balti

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	162550	164179	168325	172575	176933	162550	164179	168325	172575	176933	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	8%	8%	10%	20%	30%	13800	13930	16833	34515	53080	190
3 Percent without bathroom	67%	66%	65%	65%	65%	108400	109500	109411	112174	115006	140
4 Percent using standposts and yard connections	21%	21%	21%	11%	0%	34500	34800	35348	18983	0	50
5 Percent using dug wells and other sources	4%	4%	4%	4%	5%	5850	5949	6733	6903	8847	
Population served with water supply :						156700	158230	161592	165672	168086	

3. Riscani

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	16367	16433	16631	16831	17034	16367	16433	16631	16831	17034	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	3%	3%	5%	15%	30%	530	530	832	2525	5110	190
3 Percent without bathroom	23%	23%	45%	55%	65%	3836	3836	7484	9257	11072	140
4 Percent using standposts and yard connections	0%	0%	0%	0%	0%	0	0	0	0	0	50
5 Percent using dug wells and other sources	73%	73%	50%	30%	5%	12001	12067	8316	5049	852	
Population served with water supply :						4366	4366	8316	11782	16182	

4. Falesti

	Percentage					Population					Unit demand
	1998	*2000*	*2005*	*2010*	*2015*	*1998*	*2000*	*2005*	*2010*	*2015*	*Lcd*
Total population (persons)	18963	19039	19269	19501	19736	18963	19039	19269	19501	19736	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	26%	26%	30%	35%	40%	5000	5000	5781	6825	7894	190
3 Percent without bathroom	24%	24%	35%	45%	55%	4500	4500	6744	8775	10855	140
4 Percent using standposts and yard connections	*0%*	*0%*	*0%*	*0%*	*0%*	*0*	*0*	*0*	*0*	*0*	*50*
5 Percent using dug wells and other sources	50%	50%	35%	20%	5%	9463	9539	6744	3900	987	
Population served with water supply :						9500	9500	12525	15601	18749	

5. Floresti

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	20100	20180	20424	20670	20919	20100	20180	20424	20670	20919	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	22%	22%	30%	35%	40%	4460	4460	6127	7235	8368	190
3 Percent without bathroom	45%	44%	40%	45%	55%	8950	8950	8170	9302	11505	140
4 Percent using standposts and yard connections	24%	23%	20%	10%	0%	4740	4740	4085	2067	0	50
5 Percent using dug wells and other sources	10%	10%	10%	10%	5%	1950	2030	2042	2067	1046	
Population served with water supply :						18150	18150	18382	18603	19873	

6. Drochia

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	22000	22088	22354	22624	22897	22000	22088	22354	22624	22897	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	1%	1%	5%	15%	30%	220	220	1118	3394	6869	190
3 Percent without bathroom	13%	13%	35%	50%	65%	2780	2780	7824	11312	14883	140
4 Percent using standposts and yard connections	28%	28%	20%	10%	0%	6235	6235	4471	2262	0	50
5 Percent using dug wells and other sources	58%	58%	40%	25%	5%	12765	12853	8942	5656	1145	
Population served with water supply :						9235	9235	13412	16968	21752	

7. Singerei

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	15969	16033	16226	16422	16620	15969	16033	16226	16422	16620	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	5%	15%	30%	0	0	811	2463	4986	190
3 Percent without bathroom	0%	0%	30%	55%	65%	0	0	4868	9032	10803	140
4 Percent using standposts and yard connections	65%	65%	40%	15%	0%	10400	10400	6490	2463	0	50
5 Percent using dug wells and other sources	35%	35%	25%	15%	5%	5569	5633	4057	2463	831	
Population served with water supply :						10400	10400	12170	13959	15789	

Balti--Riscani

8. Cirlateni

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	5%	5%	5%	5%	10%	263	263	290	290	580	190
3 Percent without bathroom	14%	14%	20%	25%	35%	820	820	1160	1450	2030	140
4 Percent using standposts and yard connections	0%	0%	15%	30%	35%	0	0	870	1740	2030	50
5 Percent using dug wells and other sources	81%	81%	60%	40%	20%	4717	4717	3480	2320	1160	
Population served with water supply :						1083	1083	2320	3480	4640	

Balti--Riscani

9. Recha

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	2940	2940	2940	2940	2940	2940	2940	2940	2940	2940	
1 Percent with centralized hot wter supply	3%	3%	3%	5%	5%	98	98	98	147	147	250
2 Percent with bathroom and local boilers	6%	6%	7%	8%	10%	180	180	206	235	294	190
3 Percent without bathroom	9%	9%	15%	22%	30%	262	262	441	647	882	140
4 Percent using standposts and yard connections	0%	0%	10%	25%	35%	0	0	294	735	1029	50
5 Percent using dug wells and other sources	82%	82%	65%	40%	20%	2400	2400	1901	1176	588	
Population served with water supply :						540	540	1039	1764	2352	

Balti--Falesti

10. Catranic

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	0%	0%	5%	0	0	0	0	83	190
3 Percent without bathroom	27%	27%	30%	35%	40%	450	450	495	578	660	140
4 Percent using standposts and yard connections	0%	0%	10%	25%	35%	0	0	165	413	578	50
5 Percent using dug wells and other sources	73%	73%	60%	40%	20%	1200	1200	990	660	330	
Population served with water supply :						450	450	660	990	1320	

Balti--Falesti

11. Egorovca

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	1388	1388	1388	1388	1388	1388	1388	1388	1388	1388	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	0%	0%	5%	0	0	0	0	69	190
3 Percent without bathroom	4%	4%	20%	25%	40%	60	60	278	347	555	140
4 Percent using standposts and yard connections	0%	0%	10%	25%	35%	0	0	139	347	486	50
5 Percent using dug wells and other sources	96%	96%	70%	50%	20%	1328	1328	972	694	278	
Population served with water supply :						60	60	416	694	1110	

Riscani water supply

12. Varatic

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	
1 Percent with centralized hot wter supply	3%	3%	5%	5%	5%	60	60	120	120	120	250
2 Percent with bathroom and local boilers	*0%*	*0%*	*0%*	*0%*	*0%*	*0*	*0*	*0*	*0*	*0*	*190*
3 Percent without bathroom	0%	0%	10%	25%	40%	0	0	240	600	960	140
4 Percent using standposts and yard connections	33%	33%	35%	35%	35%	800	800	840	840	840	50
5 Percent using dug wells and other sources	64%	64%	50%	35%	20%	1540	1540	1200	840	480	
Population served with water supply :						860	860	1200	1560	1920	

Riscani water supply

13. Pirjota

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	*2000*	*2000*	*2000*	*2000*	*2000*	*2000*	*2000*	*2000*	*2000*	*2000*	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	3%	3%	3%	5%	5%	50	50	60	100	100	190
3 Percent without bathroom	0%	0%	10%	25%	40%	0	0	200	500	800	140
4 Percent using standposts and yard connections	20%	20%	27%	30%	35%	400	400	540	600	700	50
5 Percent using dug wells and other sources	78%	78%	60%	40%	20%	1550	1550	1200	800	400	
Population served with water supply :						450	450	800	1200	1600	

Riscani water supply

14. Borosenii Noi

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	2067	2067	2067	2067	2067	2067	2067	2067	2067	2067	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	3%	3%	5%	5%	5%	60	60	103	103	103	190
3 Percent without bathroom	1%	1%	10%	25%	40%	30	30	207	517	827	140
4 Percent using standposts and yard connections	12%	12%	20%	25%	35%	250	250	413	517	723	50
5 Percent using dug wells and other sources	84%	84%	65%	45%	20%	1727	1727	1344	930	413	
Population served with water supply :						340	340	723	1137	1654	

Falesti water supply

15. Horesti

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	988	988	988	988	988	988	988	988	988	988	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	5%	5%	5%	0	0	49	49	49	190
3 Percent without bathroom	20%	20%	25%	30%	40%	200	200	247	296	395	140
4 Percent using standposts and yard connections	0%	0%	5%	25%	35%	0	0	49	247	346	50
5 Percent using dug wells and other sources	80%	80%	65%	40%	20%	788	788	642	395	198	
Population served with water supply :						200	200	346	593	790	

Falesti water supply
16. Risipeni

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	1785	1785	1785	1785	1785	1785	1785	1785	1785	1785	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	5%	5%	5%	0	0	89	89	89	190
3 Percent without bathroom	2%	2%	10%	25%	40%	37	37	179	446	714	140
4 Percent using standposts and yard connections	0%	0%	20%	25%	35%	0	0	357	446	625	50
5 Percent using dug wells and other sources	98%	98%	65%	45%	20%	1748	1748	1160	803	357	
Population served with water supply :						37	37	625	982	1428	

Falesti water supply
17. Bocsa

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	1715	1715	1715	1715	1715	1715	1715	1715	1715	1715	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	5%	5%	5%	0	0	86	86	86	190
3 Percent without bathroom	2%	2%	10%	25%	40%	38	38	172	429	686	140
4 Percent using standposts and yard connections	0%	0%	20%	25%	35%	0	0	343	429	600	50
5 Percent using dug wells and other sources	98%	98%	65%	45%	20%	1677	1677	1115	772	343	
Population served with water supply :						38	38	600	943	1372	

Falesti water supply
18. Musteats

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	1691	1691	1691	1691	1691	1691	1691	1691	1691	1691	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	5%	5%	5%	0	0	85	85	85	190
3 Percent without bathroom	7%	7%	10%	25%	40%	120	120	169	423	676	140
4 Percent using standposts and yard connections	0%	0%	20%	25%	35%	0	0	338	423	592	50
5 Percent using dug wells and other sources	93%	93%	65%	45%	20%	1571	1571	1099	761	338	
Population served with water supply :						120	120	592	930	1353	

Falesti water supply
19. Caluger

	Percentage					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	2368	2368	2368	2368	2368	2368	2368	2368	2368	2368	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	5%	5%	5%	0	0	118	118	118	190
3 Percent without bathroom	3%	3%	10%	25%	40%	60	60	237	592	947	140
4 Percent using standposts and yard connections	0%	0%	20%	25%	35%	0	0	474	592	829	50
5 Percent using dug wells and other sources	97%	97%	65%	45%	20%	2308	2308	1539	1066	474	
Population served with water supply :						60	60	829	1302	1894	

Table A.2 (2) Forecast of Population Distribution by Facility Level
(Villages Not Having House Connection of Water Supply in 1998)

1. Soroca-Balti

	Percentages					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	25,886	25,886	25,886	25,886	25,886	25,886	25,886	25,980	25,886	25,886	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	0%	0%	0%	0	0	0	0	0	190
3 Percent without bathroom	0%	0%	0%	15%	30%	0	0	0	3,883	7,766	140
4 Percent using standposts and yard connections	26%	26%	26%	40%	50%	6,757	6,757	6,757	10,354	12,943	50
5 Percent using dug wells and other sources	74%	74%	74%	45%	20%	19,129	19,129	19,223	11,649	5,177	
	Population served with water supply :					6,757	6,757	6,757	14,237	20,709	

2. Balti-Riscani

	Percentages					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	3,410	3,410	3,410	3,410	3,410	3,410	3,410	3,434	3,410	3,410	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	0%	0%	0%	0	0	0	0	0	190
3 Percent without bathroom	0%	0%	0%	15%	30%	0	0	0	512	1,023	140
4 Percent using standposts and yard connections	50%	50%	49%	50%	50%	1,700	1,700	1,700	1,705	1,705	50
5 Percent using dug wells and other sources	50%	50%	51%	35%	20%	1,710	1,710	1,734	1,194	682	
	Population served with water supply :					1,700	1,700	1,700	2,217	2,728	

3. Balti-Falesti

	Percentages					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	5,078	5,078	5,078	5,078	5,078	5,078	5,078	5,078	5,078	5,078	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	*0%*	*0%*	*0%*	*0%*	*0%*	*0*	*0*	*0*	*0*	*0*	*190*
3 Percent without bathroom	0%	0%	0%	15%	30%	0	0	0	762	1,523	140
4 Percent using standposts and yard connections	0%	0%	0%	25%	50%	0	0	0	1,270	2,539	50
5 Percent using dug wells and other sources	100%	100%	100%	60%	20%	5,078	5,078	5,078	3,047	1,016	
	Population served with water supply :					0	0	0	2,031	4,062	

4. Balti-Singerei

	Percentages					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	4,252	4,252	4,252	4,252	4,252	4,252	4,252	4,252	4,252	4,252	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	0%	0%	0%	0	0	0	0	0	190
3 Percent without bathroom	0%	0%	0%	15%	30%	0	0	0	638	1,276	140
4 Percent using standposts and yard connections	0%	0%	0%	25%	50%	0	0	0	1,063	2,126	50
5 Percent using dug wells and other sources	100%	100%	100%	60%	20%	4,252	4,252	4,252	2,551	850	
	Population served with water supply :					0	0	0	1,701	3,402	

5. Soroca-Drochia

	Percentages					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	14,486	14,486	14,486	14,486	14,486	14,486	14,486	14,513	14,486	14,486	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	0%	0%	0%	0	0	0	0	0	190
3 Percent without bathroom	0%	0%	0%	15%	30%	0	0	0	2,173	4,346	140
4 Percent using standposts and yard connections	14%	14%	14%	25%	50%	1,960	1,960	1,960	3,622	7,243	50
5 Percent using dug wells and other sources	86%	86%	87%	60%	20%	12,526	12,526	12,553	8,692	2,897	
	Population served with water supply :					1,960	1,960	1,960	5,794	11,589	

6. Prut-Riscani

	Percentages					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	14,550	14,550	14,550	14,550	14,550	14,550	14,550	14,586	14,550	14,550	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	0%	0%	0%	0	0	0	0	0	190
3 Percent without bathroom	0%	0%	0%	15%	30%	0	0	0	2,183	4,365	140
4 Percent using standposts and yard connections	18%	18%	18%	25%	50%	2,593	2,593	2,593	3,638	7,275	50
5 Percent using dug wells and other sources	82%	82%	82%	60%	20%	11,957	11,957	11,993	8,730	2,910	
Population served with water supply :						2,593	2,593	2,593	5,820	11,640	

7. Prut- Falesti

	Percentages					Population					Unit demand
	1998	2000	2005	2010	2015	1998	2000	2005	2010	2015	Lcd
Total population (persons)	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	
1 Percent with centralized hot wter supply	0%	0%	0%	0%	0%	0	0	0	0	0	250
2 Percent with bathroom and local boilers	0%	0%	0%	0%	0%	0	0	0	0	0	190
3 Percent without bathroom	0%	0%	0%	15%	30%	0	0	0	446	891	140
4 Percent using standposts and yard connections	0%	0%	0%	25%	50%	0	0	0	743	1,485	50
5 Percent using dug wells and other sources	100%	100%	100%	60%	20%	2,970	2,970	2,970	1,782	594	
Population served with water supply :						0	0	0	1,188	2,376	

Table A.3 Changes of the Population Served Until 2015 (as % of the Total Population in 1998)

(These percentage data are used for estimating livestock water demand in 2000 and beyond in reference to the calculated demand in 1998.)

	1998	2000		2005		2010		2015	
	Total Population (Persons)	Population served (Persons)	(%)	Population served (Persons)	(%)	Population served (Persons)	(%)	Population served (Persons)	(%)
	1	2	2/1	3	3/1	4	4/1	5	5/1
Cities/Towns									
1 Soroca	46000	44988	98%	45339	99%	45886	100%	46439	101%
2 Balti	162550	158230	97%	161592	99%	165672	102%	168086	103%
3 Riscani	16367	4366	27%	8316	51%	11782	72%	16182	99%
4 Falesti	18963	9500	50%	12525	66%	15601	82%	18749	99%
5 Floresti	20100	18150	90%	18382	91%	18603	93%	19873	99%
6 Drochia	22000	9235	42%	13412	61%	16968	77%	21752	99%
7 Singerei	15969	10400	65%	12170	76%	13959	87%	15789	99%
Soroca-Balti									
1 Zastinca	2420	420	17%	420	17%	1331	55%	1936	80%
2 Tepilovo	1065	0	0%	0	0%	586	55%	852	80%
3 Ocolina	1100	0	0%	0	0%	605	55%	880	80%
4 Vancina	368	0	0%	0	0%	202	55%	294.4	80%
5 Vancina Mica	9	0	0%	0	0%	5	55%	7.2	80%
6 Pirlita	600	10	2%	10	2%	330	55%	480	80%
7 Lugovoe	200	80	40%	80	40%	110	55%	160	80%
8 Kotovsk	630	0	0%	0	0%	347	55%	504	80%
9 *Cainarii Vechi*	*4028*	*42*	*1%*	*42*	*1%*	*2215*	*55%*	*3222.4*	*80%*
10 Bezeni	396	0	0%	0	0%	218	55%	316.8	80%
11 Izvoare	1125	50	4%	50	4%	619	55%	900	80%
12 Alexan- drovca	562	160	28%	160	29%	309	55%	449.6	80%
13 Frumusica	1813	1575	87%	1576	87%	1576	87%	1722	95%
14 Trifanesti	1105	220	20%	220	20%	608	55%	884	80%
15 Alexandre-ni	1685	600	36%	600	36%	927	55%	1348	80%
16 Cubolta	2300	400	17%	400	17%	1265	55%	1840	80%
17 Biruinta	5000	3201	64%	3201	64%	3200	64%	4000	80%
18 Grigoresti	1480	0	0%	0	0%	814	55%	1184	80%
Balti-Riscani									
1@ Cirlateni	5800	1083	19%	2320	40%	3480	60%	4640	80%
2 Singureni	1800	1401	78%	1401	78%	1401	78%	1440	80%
3@ Recha	2940	540	18%	1029	35%	1764	60%	2352	80%
4 Racaria	1610	300	19%	300	19%	644	40%	1288	80%
Balti-Falesti									
1 Reutel	4780	0	0%	0	0%	1912	40%	3824	80%
2 Ciuluc	298	0	0%	0	0%	119	40%	238.4	80%
3@ Catranic	*1650*	*450*	*27%*	*660*	*40%*	*990*	*60%*	*1320*	*80%*
4@ Egorovca	1388	60	4%	416	30%	694	50%	1110	80%
Balti-Singerei									
1 Bilicenii Noi	982	0	0%	0	0%	393	40%	785.6	80%
2 Bilicenii Vechi	3270	0	0%	0	0%	1308	40%	2616	80%
Soroca-Drochia									
1 Schineni	1575	70	4%	70	4%	630	40%	1260	80%
2 Popestii de Sus	2170	650	30%	650	30%	868	40%	1736	80%
3 *Zgurita*	*3568*	*520*	*15%*	*520*	*15%*	*1427*	*40%*	*2854.4*	*80%*
4 Chetrosu	6500	720	11%	720	11%	2600	40%	5200	80%
5 Surii Noi	673	0	0%	0	0%	269	40%	538	80%
Prut-Riscani									
1@ Varatic	2400	860	36%	1200	50%	1560	65%	1920	80%
2 Dumeni	275	0	0%	0	0%	110	40%	220	80%
3 Duruitoar-ca	995	0	0%	0	0%	398	40%	796	80%
4 Horodiste	1040	0	0%	0	0%	416	40%	832	80%
5 Pociumbe-ui	1018	105	10%	105	10%	407	40%	814	80%
6 *Hiliuti*	*2787*	*300*	*11%*	*300*	*11%*	*1115*	*40%*	*2230*	*80%*
7@ Pirjota	2000	450	23%	800	40%	1200	60%	1600	80%
8 Sturzeni	1540	0	0%	0	0%	616	40%	1232	80%
9 Alexandre-sti	300	50	17%	50	17%	120	40%	240	80%
10@ Borosenii Noi	2067	340	16%	723	35%	1137	55%	1654	80%
11 Moseni	744	40	5%	40	5%	298	40%	595	80%
12 Vasileuti	1519	300	20%	300	20%	608	40%	1215	80%
13 Stubieni	497	0	0%	0	0%	199	40%	398	80%
14 Zaicani	3835	1800	47%	1800	47%	1800	47%	3068	80%
Prut-Falesti									
1 Hrubna Noua	416	0	0%	0	0%	166	40%	333	80%
2 Taxobeni	1420	0	0%	0	0%	568	40%	1136	80%
3 Vranesti	41	0	0%	0	0%	16	40%	33	80%
4@ Horesti	988	200	20%	346	35%	593	60%	790	80%
5 Lucaceni	408	0	0%	0	0%	163	40%	326	80%
6@ Risipeni	1785	37	2%	625	35%	982	55%	1428	80%
7@ Bocsa	*1715*	*38*	*2%*	600	35%	943	*55%*	*1372*	80%
8@ Musteatsa	1691	120	7%	592	35%	930	55%	1353	80%
9 Frumusica	485	0	0%	0	0%	194	40%	388	80%
10 Socii Vechi	200	0	0%	0	0%	80	40%	160	80%
11@ Caluger	2368	60	3%	829	35%	1302	55%	1894	80%

Table A.4 Livestock Water Demand Until 2015 (m^3/day)

	Livestock	Horses 55 Lud 0.055	Cows 60 Lud 0.06	Pigs 15 Lud 0.015	Sheep/goats 8 Lud 0.008	Poultry 1 Lud 0.001	1998 Calculated Demand x 1/2	2000 Percent to 1998	2000 Demand (m3/d)	2005 Percent to 1998	2005 Demand (m3/d)	2010 Percent to 1998	2010 Demand (m3/d)	2015 Percent to 1998	2015 Demand (m3/d)
	Cities/Towns														
1	Soroca	21	283	246	385	11680	18	98%	18	99%	18	100%	18	101%	18
2	Balti	559	2915	9336	8010	121000	265	97%	258	99%	264	102%	270	103%	274
3	Riscani		824	1005	781	15165	43	27%	11	51%	22	72%	31	99%	42
4	Falesti	78	540	1980	540	16000	43	50%	22	66%	29	82%	36	99%	43
5	Floresti	73	387	1875	1872	33280	52	90%	47	91%	47	93%	48	99%	51
6	Drochia	11	217	308	387	13576	17	42%	7	61%	11	77%	13	99%	17
7	Singerei	47	844	1098	2337	16587	52	65%	34	76%	40	87%	46	99%	52
	Villages (Soroca-Balti)														
1	Zastinca	10	140	120	190	5840	9	17%	2	17%	2	55%	5	80%	7
2	Tepilovo	30	300	170	700	4502	16	0%	0	0%	0	55%	9	80%	13
3	Ocolina	40	620	410	1000	10120	32	0%	0	0%	0	55%	18	80%	25
4	Vancina	12	140	103	120	3008	7	0%	0	0%	0	55%	4	80%	6
5	Vancina Mica		5	5	12	148	0	0%	0	0%	0	55%	0	80%	0
6	Pirlita	53	230	305	340	5040	15	2%	0	2%	0	55%	8	80%	12
7	Lugovoe	22	193	135	95	1500	9	40%	3	40%	3	55%	5	80%	7
8	Kotovsk	12	334	230	145	5400	15	0%	0	0%	0	55%	8	80%	12
9	Cainarii Vechi	79	617	579	1874	10454	38	1%	0	1%	0	55%	21	80%	30
10	Bezeni		110	118	575	2225	8	0%	0	0%	0	55%	4	80%	6
11	Izvoare	17	314	290	1300	5000	20	4%	1	4%	1	55%	11	80%	16
12	Alexan- drovca	10	115	80	266	4000	7	28%	2	29%	2	55%	4	80%	6
13	Frumusica		430	270	1636	9000	26	87%	23	87%	23	87%	23	95%	25
14	Trifanesti	23	237	166	620	4034	13	20%	3	20%	3	55%	7	80%	11
15	Alexandre-ni	11	80	425	235	2890	8	36%	3	36%	3	55%	5	80%	7
16	Cubolta	17	272	494	262	7552	17	17%	3	17%	3	55%	9	80%	14
17	Biruinta		45	141	168	1194	4	64%	2	64%	2	64%	2	80%	3
18	Grigoresti	31	266	360	490	2495	15	0%	0	0%	0	55%	8	80%	12
	Villages (Balti-Riscani)														
1	Cirlateni		466	790	1100	18453	34	19%	6	40%	13	60%	20	80%	27
2	Singureni		280	410	390	8794	17	78%	14	78%	14	78%	14	80%	14
3	Recha		282	681	551	6956	19	18%	4	35%	7	60%	12	80%	15
4	Racaria		550	400	350	3000	22	19%	4	19%	4	40%	9	80%	18
	Villages (Balti-Falesti)														
1	Reutel	42	353	1438	1570	13800	36	0%	0	0%	0	40%	14	80%	29
2	Ciuluc		32	40	145	667	2	0%	0	0%	0	40%	1	80%	2
3	Catranic	13	200	160	850	7300	15	27%	4	40%	6	60%	9	80%	12
4	Egorovca	21	62	199	70	2652	6	4%	0	30%	2	50%	3	80%	4
	Villages (Balti-Singerei)														
1	Bilicenii Noi	35	121	600	420	3000	12	0%	0	0%	0	40%	5	80%	10
2	Bilicenii Vechi	29	700	1500	4000	6000	52	0%	0	0%	0	40%	21	80%	42
	Villages (Soroca-Drochia)														
1	Schineni		530	188	110	4950	20	4%	1	4%	1	40%	8	80%	16
2	Popestii de Sus	48	362	191	579	6236	19	30%	6	30%	6	40%	8	80%	15
3	Zgurita	42	423	148	1008	15000	26	15%	4	15%	4	40%	11	80%	21
4	Chetrosu	76	1130	1573	430	23450	61	11%	7	11%	7	40%	24	80%	49
5	Surii Noi		280	450	130	4000	14	0%	0	0%	0	40%	6	80%	11
	Villages (Prut-Riscani)														
1	Varatic		560	560	830	8000	28	36%	10	50%	14	65%	18	80%	23
2	Dumeni		93	98	153	3000	6	0%	0	0%	0	40%	2	80%	5
3	Duruitoar-ca		220	215	350	5000	12	0%	0	0%	0	40%	5	80%	10
4	Horodiste		268	104	600	5000	14	0%	0	0%	0	40%	5	80%	11
5	Pociumbe-ui		273	242	960	3600	16	10%	2	10%	2	40%	6	80%	13
6	Hiliuti		627	530	1556	10510	34	11%	4	11%	4	40%	14	80%	27
7	Pirjota		349	285	1293	6159	21	23%	5	40%	8	60%	13	80%	17
8	Sturzeni		341	408	1267	3000	20	0%	0	0%	0	40%	8	80%	16
9	Alexandre-sti		20	41	200	500	2	17%	0	17%	0	40%	1	80%	2
10	Borosenii Noi		450	1400	900	7000	31	16%	5	35%	11	55%	17	80%	25
11	Moseni		140	439	352	1017	9	5%	1	5%	1	40%	4	80%	8
12	Vasileuti		508	503	420	2001	22	20%	4	20%	4	40%	9	80%	17
13	Stubieni		130	205	190	517	6	0%	0	0%	0	40%	3	80%	5
14	Zaicani		1100	1800	2300	34000	73	47%	34	47%	34	47%	34	80%	58
	Villages (Prut-Falesti)														
1	Hrubna Noua		64	142	96	582	4	0%	0	0%	0	40%	1	80%	3
2	Taxobeni	18	547	516	520	7562	27	0%	0	0%	0	40%	11	80%	21
3	Vranesti		12	14	28	198	1	0%	0	0%	0	40%	0	80%	1
4	Horesti	12	120	200	250	5200	9	20%	2	35%	3	60%	5	80%	7
5	Lucaceni		60	120	195	3600	5	0%	0	0%	0	40%	2	80%	4
6	Risipeni	37	205	510	1020	4590	17	2%	0	35%	6	55%	10	80%	14
7	Bocsa	35	195	490	980	4410	17	2%	0	35%	6	55%	9	80%	13
8	Musteatsa	91	760	1200	1500	5000	43	7%	3	35%	15	55%	24	80%	34
9	Frumusica		55	90	200	2000	4	0%	0	0%	0	40%	2	80%	3
10	Socii Vechi	4	30	50	75	800	2	0%	0	0%	0	40%	1	80%	2
11	Caluger	11	349	386	1520	6812	23	3%	1	35%	8	55%	13	80%	19

Table A.5 (1) Domestic Water Demand in Yrear 2000 (Daily Average, m^3/day)

Domestic water demand in 2000 (m3/day)

			Population 2000	1 With centralized hot water supply		2 With bathroom and local boilers		3 Without bathroom		4 Using standposts and yard connection		5 Using dug well and other sources	Total popuration	Total average day demand
			Persons	Persons	demand 0.25	Persons	Demand 0.19	Persons	Demand 0.14	Persons	Demand 0.05	Persons	Persons	m3/d
		Per person												
		Cities/Towns												
@	1	Soroca	46,184	0	0	2,320	441	23,168	3244	19500	975	1196	46,184	4659
@	2	Balti	164,179	0	0	13,930	2647	109,500	15330	34800	1740	5949	164,179	19717
@	3	Riscani	16,433	0	0	530	101	3,836	537	0	0	12067	16,433	638
@	4	Falesti	19,039	0	0	5,000	950	4,500	630	0	0	9539	19,039	1580
@	5	Floresti	20,180	0	0	4,460	847	8,950	1253	4740	237	2030	20,180	2337
@	6	Drochia	22,088	0	0	220	42	2,780	389	6235	312	12853	22,088	743
@	7	Singerei	16,033	0	0	0	0	0	0	10400	520	5633	16,033	520
		Villages (Soroca-Balti)												
*	1	Zastinca	2,420					0	0	420	21	2000	2,420	21
	2	Tepilovo	1,065					0	0	0	0	1065	1,065	0
	3	Ocolina	1,100					0	0	0	0	1100	1,100	0
	4	Vancina	368					0	0	0	0	368	368	0
	5	Vancina Mica	9					0	0	0	0	9	9	0
*	6	Pirlita	600					0	0	10	1	590	600	1
*	7	Lugovoe	200					0	0	80	4	120	200	4
	8	Kotovsk	630					0	0	0	0	630	630	0
*	9	Cainarii Vechi	4,028					0	0	42	2	3986	4,028	2
	10	Bezeni	396					0	0	0	0	396	396	0
*	11	Izvoare	1,125					0	0	50	3	1075	1,125	3
*	12	Alexan- drovca	562					0	0	160	8	402	562	8
*	13	Frumusica	1,813					0	0	1575	79	238	1,813	79
*	14	Trifanesti	1,105					0	0	220	11	885	1,105	11
*	15	Alexandre-ni	1,685					0	0	600	30	1085	1,685	30
*	16	Cubolta	2,300					0	0	400	20	1900	2,300	20
*	17	Biruinta	5,000					0	0	3200	160	1800	5,000	160
	18	Grigoresti	1,480					0	0	0	0	1480	1,480	0
		Villages (Balti-Riscani)												
@	1	Cirlateni	5,800	0	0	263	50	820	115	0	0	4717	5,800	165
*	2	Singureni	1,800					0	0	1400	70	400	1,800	70
@	3	Recha	2,940	98	25	180	34	262	37	0	0	2400	2,940	95
*	4	Racaria	1,610					0	0	300	15	1310	1,610	15
		Villages (Balti-Falesti)												
	1	Reutel	4,780					0	0	0	0	4780	4,780	0
	2	Ciuluc	298					0	0	0	0	298	298	0
@	3	Catranic	1,650	0	0	0	0	450	63	0	0	1200	1,650	63
@	4	Egorovca	1,388	0	0	0	0	60	8	0	0	1328	1,388	8
		Villages (Balti-Singerei)												
	1	Bilicenii Noi	982					0	0	0	0	982	982	0
	2	Bilicenii Vechi	3,270					0	0	0	0	3270	3,270	0
		Villages (Soroca-Drochia)												
*	1	Schineni	1,575					0	0	70	4	1505	1,575	4
*	2	Popestii de Sus	2,170					0	0	650	33	1520	2,170	33
*	3	Zgurita	3,568					0	0	520	26	3048	3,568	26
*	4	Chetrosu	6,500					0	0	720	36	5780	6,500	36
	5	Surii Noi	673					0	0	0	0	673	673	0
												101,607	369,026	31,046
		Villages (Prut-Riscani)												
@	1	Varatic	2,400	60	17	0	0	0	0	800	40	1,540	2,400	57
	2	Dumeni	275					0	0	0	0	275	275	0
	3	Duruitoar-ca Noua	995					0	0	0	0	995	995	0
	4	Horodiste	1,040					0	0	0	0	1040	1,040	0
*	5	Pociumbe-ui	1,018					0	0	105	5	913	1,018	5
*	6	Hiliuti	2,787					0	0	300	15	2487	2,787	15
@	7	Piriota	2,000	0	0	50	10	0	0	400	20	1550	2,000	30
	8	Sturzeni	1,540					0	0	0	0	1540	1,540	0
*	9	Alexandre-sti	300					0	0	50	3	250	300	3
@	10	Borosenii Noi	2,067	0	0	60	11	30	4	250	13	1727	2,067	28
*	11	Moseni	744					0	0	40	2	704	744	2
*	12	Vasileuti	1,519					0	0	300	15	1219	1,519	15
	13	Stubieni	497					0	0	0	0	497	497	0
*	14	Zaicani	3,835					0	0	1800	90	2035	3,835	90
		Villages (Prut-Falesti)												
	1	Hrubna Noua	416					0	0	0	0	416	416	0
	2	Taxobeni	1,420					0	0	0	0	1420	1,420	0
	3	Vranesti	41					0	0	0	0	41	41	0
@	4	Horesti	988	0	0	0	0	200	28	0	0	788	988	28
	5	Lucaceni	408					0	0	0	0	408	408	0
@	6	Risipeni	1,785	0	0	0	0	37	5	0	0	1748	1,785	5
@	7	Bocsa	1,715	0	0	0	0	38	5	0	0	1677	1,715	5
@	8	Musteatsa	1,691	0	0	0	0	120	17	0	0	1571	1,691	17
	9	Frumusica	485					0	0	0	0	485	485	0
	10	Socii Vechi	200					0	0	0	0	200	200	0
@	11	Caluger	2,368	0	0	0	0	60	8	0	0	2308	2,368	8

Table A.5 (2) Maximum Daily Water Demand in Year 2000 (m^3/day)

Max day demand in 2000

		1 Domestic demand	2 Commercial & institutional (10% of domestic)	3 Max day demand (1+2) x (1.2 or 1.3)	4 Livestock demand	5 Industrial demand (10% or 0% of domestic)	6 Max day demand (3+4+5)	7 Losses (6 x 0.2)	8 Total max day demand (6+7)
		m3/d	m3/d	m3/d	m3/d	m3/d	m3/d	m3/d	m3/d
	Cities/Towns		10%	1.2		10%			
1	Soroca	4,659	466	6,150	18	466	6,634	1,327	7,961
2	Balti	19,717	1,972	26,026	258	1972	28,256	5,651	33,907
3	Riscani	638	64	842	11	64	917	183	1,100
4	Falesti	1,580	158	2,086	22	158	2,265	453	2,718
5	Floresti	2,337	234	3,085	47	234	3,366	673	4,039
6	Drochia	743	74	980	7	74	1,062	212	1,274
7	Singerei	520	52	686	34	52	773	155	927
		30,194	3,019	39,856	398	3,019	43,273	8,655	51,928
	Villages (Soroca-Balti)			1.3		0%			
1	Zastinca	21	2	30	2		32	6	38
2	Tepilovo	0	0	0	0		0	0	0
3	Ocolina	0	0	0	0		0	0	0
4	Vancina	0	0	0	0		0	0	0
5	Vancina Mica	0	0	0	0		0	0	0
6	Pirlita	1	0	1	0		1	0	1
7	Lugovoe	4	0	6	3		9	2	11
8	Kotovsk	0	0	0	0		0	0	0
9	Cainarii Vechi	2	0	3	0		3	1	4
10	Bezeni	0	0	0	0		0	0	0
11	Izvoare	3	0	4	1		4	1	5
12	Alexan- drovca	8	1	11	2		14	3	16
13	Frumusica	79	8	113	23		135	27	162
14	Trifanesti	11	1	16	3		18	4	22
15	Alexandre-ni	30	3	43	3		46	9	55
16	Cubolta	20	2	29	3		32	6	38
17	Biruinta	160	16	229	2		231	46	277
18	Grigoresti	0	0	0	0		0	0	0
		338	34	483	42	0	525	105	630
	Villages (Balti-Riscani)								
1	Cirlateni	165	16	236	6		242	48	290
2	Singureni	70	7	100	14		114	23	136
3	Recha	95	10	136	4		140	28	168
4	Racaria	15	2	21	4		26	5	31
		345	35	494	28	0	521	104	625
	Villages (Balti-Falesti)								
1	Reutel	0	0	0	0		0	0	0
2	Ciuluc	0	0	0	0		0	0	0
3	Catranic	63	6	90	4		94	19	113
4	Egorovca	8	1	12	0		12	2	15
		71	7	102	4	0	106	21	128
	Villages (Balti-Singerei)								
1	Bilicenii Noi	0	0	0	0		0	0	0
2	Bilicenii Vechi	0	0	0	0		0	0	0
		0	0	0	0	0	0	0	0
	Villages (Soroca-Drochia)								
1	Schineni	4	0	5	1		6	1	7
2	Popestii de Sus	33	3	46	6		52	10	63
3	Zgurita	26	3	37	4		41	8	49
4	Chetrosu	36	4	51	7		58	12	70
5	Surii Noi	0	0	0	0		0	0	0
		98	10	140	17	0	157	31	189
	Grand total	31,046	3,105	41,075	489	3,019	44,583	8,917	53,500

	Villages (Prut-Riscani)								
1	Varatic	57	6	82	10		92	18	111
2	Dumeni	0	0	0	0		0	0	0
3	Duruitoar-ca Noua	0	0	0	0		0	0	0
4	Horodiste	0	0	0	0		0	0	0
5	Pociumbe-ui	5	1	8	2		9	2	11
6	Hiliuti	15	2	21	4		25	5	30
7	Pirjota	30	3	42	5		47	9	56
8	Sturzeni	0	0	0	0		0	0	0
9	Alexandre-sti	3	0	4	0		4	1	5
10	Borosenii Noi	28	3	40	5		45	9	54
11	Moseni	2	0	3	1		3	1	4
12	Vasileuti	15	2	21	4		26	5	31
13	Stubieni	0	0	0	0		0	0	0
14	Zaicani	90	9	129	34		163	33	195
		245	24	350	65	0	415	83	497
	Villages (Prut-Falesti)								
1	Hrubna Noua	0	0	0	0		0	0	0
2	Taxobeni	0	0	0	0		0	0	0
3	Vranesti	0	0	0	0		0	0	0
4	Horesti	28	3	40	2		42	8	50
5	Lucaceni	0	0	0	0		0	0	0
6	Risipeni	5	1	7	0		8	2	9
7	Bocsa	5	1	8	0		8	2	10
8	Musteatsa	17	2	24	3		27	5	32
9	Frumusica	0	0	0	0		0	0	0
10	Socii Vechi	0	0	0	0		0	0	0
11	Caluger	8	1	12	1		13	3	15
		64	6	91	6	0	97	19	117

Table A.5 (3) Water Volume for Each Supply System in Year 2000 (m^3/day)

Water volume of each supply system

(m3/day)

Soroca-Balti System

Intake-P3

Soroca	Drochia	Floresti	Balti	Riscani	Falesti	Singerei	Total
7,961	1,463	4,093	34,484	1,726	2,846	927	**53,500**
					Intake:	plus 3%	**55,105**

P3-Reservoir

	Drochia	Floresti	Balti	Riscani	Falesti	Singerei	Total
	1,463	4,093	34,484	1,726	2,846	927	**45,539**

Reservoir-Floresti

		Floresti	Balti	Riscani	Falesti	Singerei	Total
		4,093	34,484	1,726	2,846	927	**44,075**

Floresti-Balti

			Balti	Riscani	Falesti	Singerei	Total
			34,484	1,726	2,846	927	**39,982**

Soroca-Drochia			**1,463**
Balti-Riscani			**1,726**
Balti-Falesti			**2,846**
Balti-Singerei			**927**
Prut-Riscani			**1,598**
	Intake:	plus 3%	**1,646**
Prut-Falesti			**2,835**
	Intake:	plus 3%	**2,920**

Table A.6 (1) Domestic Water Demand in Year 2005 (Daily Average, m^3/day)

Domestic water demand in 2005 (m3/day)

				1		2		3		4		5		
			Population 2005	With centralized hot water supply		With bathroom and local boilers		Without bathroom		Using standposts and yard connection		Using dug well and other sources	Total popuration	Total average day demand
			Persons	Persons	Demand 0.25	Persons	Demand 0.19	Persons	Demand 0.14	Persons	Demand 0.05	Persons	Persons	m3/d
		Per person												
		Cities/Towns												
@	1	Soroca	46,741	0	0	4,674	888	25,708	3,599	14,957	748	1,402	46,741	5,235
@	2	Balti	168,325	0	0	16,833	3,198	109,411	15,318	35,348	1,767	6,733	168,325	20,283
@	3	Riscani	16,631	0	0	832	158	7,484	1,048	0	0	8,316	16,632	1,206
@	4	Falesti	19,269	0	0	5,781	1,098	6,744	944	0	0	6,744	19,269	2,043
@	5	Floresti	20,424	0	0	6,127	1,164	8,170	1,144	4,085	204	2,042	20,424	2,512
@	6	Drochia	22,354	0	0	1,118	212	7,824	1,095	4,471	224	8,942	22,355	1,531
@	7	Singerei	16,226	0	0	811	154	4,868	682	6,490	325	4,057	16,226	1,160
		Villages (Soroca-Balti)												
•	1	Zastinca	2,420					0	0	420	21	2,000	2,420	21
	2	Tepilovo	1,065					0	0	0	0	1,065	1,065	0
	3	Ocolina	1,100					0	0	0	0	1,100	1,100	0
	4	Vancina	368					0	0	0	0	368	368	0
	5	Vancina Mica	9					0	0	0	0	9	9	0
•	6	Pirlita	600					0	0	10	1	590	600	1
•	7	Lugovoe	200					0	0	80	4	120	200	4
	8	Kotovsk	630					0	0	0	0	630	630	0
•	9	Cainarii Vechi	4,028					0	0	42	2	3,986	4,028	2
	10	Bezeni	396					0	0	0	0	396	396	0
•	11	Izvoare	1,125					0	0	50	3	1,075	1,125	3
•	12	Alexan- drovca	562					0	0	160	8	402	562	8
•	13	Frumusica	1,813					0	0	1,575	79	238	1,813	79
•	14	Trifanesti	1,105					0	0	220	11	885	1,105	11
•	15	Alexandre-ni	1,685					0	0	600	30	1,085	1,685	30
•	16	Cubolta	2,300					0	0	400	20	1,900	2,300	20
•	17	Biruinta	5,000					0	0	3,200	160	1,800	5,000	160
	18	Grigoresti	1,480					0	0	0	0	1,480	1,480	0
		Villages (Balti-Riscani)												
@	1	Cirlateni	5,800	0	0	290	55	1,160	162	870	44	3,480	5,800	261
•	2	Singureni	1,800					0	0	1,400	70	400	1,800	70
@	3	Recha	2,940	98	25	206	39	441	62	294	15	1,901	2,940	140
•	4	Racaria	1,610					0	0	300	15	1,310	1,610	15
		Villages (Balti-Falesti)												
	1	Reutel	4,780					0	0	0	0	4,780	4,780	0
	2	Ciuluc	298					0	0	0	0	298	298	0
@	3	Catranic	1,650	0	0	0	0	495	69	165	8	990	1,650	78
@	4	Egorovca	1,388	0	0	0	0	278	39	139	7	972	1,389	46
		Villages (Balti-Singerei)												
	1	Bilicenii Noi	982					0	0	0	0	982	982	0
	2	Bilicenii Vechi	3,270					0	0	0	0	3,270	3,270	0
		Villages (Soroca-Drochia)												
•	1	Schineni	1,575					0	0	70	4	1,505	1,575	4
•	2	Popestii de Sus	2,170					0	0	650	33	1,520	2,170	33
•	3	Zgurita	3,568					0	0	520	26	3,048	3,568	26
•	4	Chetrosu	6,500					0	0	720	36	5,780	6,500	36
	5	Surii Noi	673					0	0	0	0	673	673	0
												88,274	374,863	35,016
		Villages (Prut-Riscani)												
@	1	Varatic	2,400	120	35	0	0	240	34	840	42	1,200	2,400	110
	2	Dumeni	275					0	0	0	0	275	275	0
	3	Durnitoar-ca Noua	995					0	0	0	0	995	995	0
	4	Horodiste	1,040					0	0	0	0	1,040	1,040	0
•	5	Pociumbe-ui	1,018					0	0	105	5	913	1,018	5
•	6	Hiliuti	2,787					0	0	300	15	2,487	2,787	15
@	7	Pirjota	2,000	0	0	60	11	200	28	540	27	1,200	2,000	66
	8	Sturzeni	1,540					0	0	0	0	1,540	1,540	0
•	9	Alexandre-sti	300					0	0	50	3	250	300	3
@	10	Borosenii Noi	2,067	0	0	103	20	207	29	413	21	1,344	2,067	69
•	11	Moseni	744					0	0	40	2	704	744	2
•	12	Vasileuti	1,519					0	0	300	15	1,219	1,519	15
	13	Stubieni	497					0	0	0	0	497	497	0
•	14	Zaicani	3,835					0	0	1,800	90	2,035	3,835	90
		Villages (Prut-Falesti)												
	1	Hrubna Noua	416					0	0	0	0	416	416	0
	2	Taxobeni	1,420					0	0	0	0	1,420	1,420	0
	3	Vranesti	41					0	0	0	0	41	41	0
@	4	Horesti	988	0	0	49	9	247	35	49	2	642	987	46
	5	Lucaceni	408					0	0	0	0	408	408	0
@	6	Risipeni	1,785	0	0	89	17	179	25	357	18	1,160	1,785	60
@	7	Bocsa	1,715	0	0	86	16	172	24	343	17	1,115	1,716	58
@	8	Musteatsa	1,691	0	0	85	16	169	24	338	17	1,099	1,691	57
	9	Frumusica	485					0	0	0	0	485	485	0
	10	Socii Vechi	200					0	0	0	0	200	200	0
@	11	Caluger	2,368	0	0	118	22	237	33	474	24	1,539	2,368	79

Table A.6 (2) Maximum Daily Water Demand in Year 2005 (m^3/day)

Max day demand in 2005

		1 Domestic demand m3/d	2 Commercial & institutional (10% of domestic) m3/d	3 Max day demand (1+2) x (1.2 or m3/d	4 Livestock demand m3/d	5 Industrial demand (10% or 0% of domestic) m3/d	6 Max day demand (3+4+5) m3/d	7 Losses (6 x 0.2) m3/d	8 Total max day demand (6+7) m3/d
	Cities/Towns		10%	1.2		10%			
1	Soroca	5,235	524	6,910	18	524	7,452	1,490	8,942
2	Balti	20,283	2,028	26,774	264	2,028	29,066	5,813	34,879
3	Riscani	1,206	121	1,592	22	121	1,734	347	2,081
4	Falesti	2,043	204	2,696	29	204	2,929	586	3,515
5	Floresti	2,512	251	3,316	47	251	3,615	723	4,338
6	Drochia	1,531	153	2,021	11	153	2,185	437	2,622
7	Singerei	1,160	116	1,531	40	116	1,687	337	2,025
		33,970	3,397	44,841	430	3,397	48,668	9,734	58,402
	Villages (Soroca-Balti)			1.3		0%			
1	Zastinca	21	2	30	2		32	6	38
2	Tepilovo	0	0	0	0		0	0	0
3	Ocolina	0	0	0	0		0	0	0
4	Vancina	0	0	0	0		0	0	0
5	Vancina Mica	0	0	0	0		0	0	0
6	Pirlita	1	0	1	0		1	0	1
7	Lugovoe	4	0	6	3		9	2	11
8	Kotovsk	0	0	0	0		0	0	0
9	Cainarii Vechi	2	0	3	0		3	1	4
10	Bezeni	0	0	0	0		0	0	0
11	Izvoare	3	0	4	1		4	1	5
12	Alexan- drovca	8	1	11	2		14	3	16
13	Frumusica	79	8	113	23		135	27	162
14	Trifanesti	11	1	16	3		18	4	22
15	Alexandre-ni	30	3	43	3		46	9	55
16	Cubolta	20	2	29	3		32	6	38
17	Biruinta	160	16	229	2		231	46	277
18	Grigoresti	0	0	0	0		0	0	0
		338	34	483	42	0	525	105	630
	Villages (Balti-Riscani)								
1	Cirlateni	261	26	373	13		387	77	464
2	Singureni	70	7	100	14		114	23	136
3	Recha	140	14	200	7		207	41	248
4	Racaria	15	2	21	4		26	5	31
		486	49	695	38	0	733	147	880
	Villages (Balti-Falesti)								
1	Reutel	0	0	0	0		0	0	0
2	Ciuluc	0	0	0	0		0	0	0
3	Catranic	78	8	111	6		117	23	140
4	Egorovca	46	5	66	2		67	13	81
		123	12	176	8	0	184	37	221
	Villages (Balti-Singerei)								
1	Bilicenii Noi	0	0	0	0		0	0	0
2	Bilicenii Vechi	0	0	0	0		0	0	0
		0	0	0	0	0	0	0	0
	Villages (Soroca-Drochia)								
1	Schineni	4	0	5	1		6	1	7
2	Popestii de Sus	33	3	46	6		52	10	63
3	Zgurita	26	3	37	4		41	8	49
4	Chetrosu	36	4	51	7		58	12	70
5	Surii Noi	0	0	0	0		0	0	0
		98	10	140	17	0	157	31	189
	Grand total	35,016	3,502	46,336	535	3,397	50,268	10,054	60,321

	Villages (Prut-Riscani)								
1	Varatic	110	11	158	14		172	34	206
2	Dumeni	0	0	0	0		0	0	0
3	Duruitoar-ca Noua	0	0	0	0		0	0	0
4	Horodiste	0	0	0	0		0	0	0
5	Pociumbe-ui	5	1	8	2		9	2	11
6	Hiliuti	15	2	21	4		25	5	30
7	Pirjota	66	7	95	8		103	21	124
8	Sturzeni	0	0	0	0		0	0	0
9	Alexandre-sti	3	0	4	0		4	1	5
10	Borosenii Noi	69	7	99	11		110	22	132
11	Moseni	2	0	3	1		3	1	4
12	Vasileuti	15	2	21	4		26	5	31
13	Stubieni	0	0	0	0		0	0	0
14	Zaicani	90	9	129	34		163	33	195
		376	38	537	78	0	615	123	738
	Villages (Prut-Falesti)								
1	Hrubna Noua	0	0	0	0		0	0	0
2	Taxobeni	0	0	0	0		0	0	0
3	Vranesti	0	0	0	0		0	0	0
4	Horesti	46	5	66	3		69	14	83
5	Lucaceni	0	0	0	0		0	0	0
6	Risipeni	60	6	86	6		92	18	110
7	Bocsa	58	6	82	6		88	18	106
8	Musteatsa	57	6	81	15		96	19	115
9	Frumusica	0	0	0	0		0	0	0
10	Socii Vechi	0	0	0	0		0	0	0
11	Caluger	79	8	113	8		122	24	146
		300	30	429	38	0	467	93	560

Table A.6 (3) Water Volume for Each Supply System in Year 2005 (m^3/day)

Water volume of each supply system

(m3/day)

Soroca-Belti System

Intake-P3

Soroca	Drochia	Floresti	Belti	Riscani	Falesti	Singerei	Total
8,942	2,811	4,392	35,456	2,961	3,736	2,025	**60,321**
					Intake:	plus 3%	**62,131**

P3-Reservoir

	Drochia	Floresti	Belti	Riscani	Falesti	Singerei	Total
	2,811	4,392	35,456	2,961	3,736	2,025	**51,379**

Reservoir-Floresti

		Floresti	Belti	Riscani	Falesti	Singerei	Total
		4,392	35,456	2,961	3,736	2,025	**48,568**

Floresti-Balti

			Belti	Riscani	Falesti	Singerei	Total
			35,456	2,961	3,736	2,025	**44,177**

Soroca-Drochia			**2,811**
Balti-Riscani			**2,961**
Balti-Falesti			**3,736**
Balti-Singerei			**2,025**
Prut-Riscani			**2,819**
	Intake:	plus 3%	**2,904**
Prut-Falesti			**4,075**
	Intake:	plus 3%	**4,197**

Table A.7 (1) Domestic Water Demand in Year 2010 (Daily Average, m^3/day)

Domestic water demand in 2010 (m3/day)

		Cities/Towns	Population 2010	1 With centralized hot water supply		2 With bathroom and local boilers		3 Without bathroom		4 Using standposts and yard connection		5 Using dug well and other sources	Total popuration	Total average day demand m3/d
		Per person		Persons	Demand 0.25	Persons	Demand 0.19	Persons	Demand 0.14	Persons	Demand 0.05	Persons	Persons	
@	1	Soroca	47,305	0	0	9,461	1,798	28,383	3,974	8,042	402	1,419	47,305	6,173
@	2	Balti	172,575	0	0	34,515	6,558	112,174	15,704	18,983	949	6,903	172,575	23,211
@	3	Riscani	16,831	0	0	2,525	480	9,257	1,296	0	0	5,049	16,831	1,776
@	4	Falesti	19,501	0	0	6,825	1,297	8,775	1,229	0	0	3,900	19,500	2,525
@	5	Floresti	20,670	0	0	7,235	1,375	9,302	1,302	2,067	103	2,067	20,671	2,780
@	6	Drochia	22,624	0	0	3,394	645	11,312	1,584	2,262	113	5,656	22,624	2,342
@	7	Singerei	16,422	0	0	2,463	468	9,032	1,264	2,463	123	2,463	16,421	1,856
		Villages (Soroca-Balti)												
*	1	Zastinca	2,420					363	51	968	48	1,089	2,420	99
	2	Tepilovo	1,065					160	22	426	21	479	1,065	44
	3	Ocolina	1,100					165	23	440	22	495	1,100	45
	4	Vancina	368					55	8	147	7	166	368	15
	5	Vancina Mica	9					1	0	4	0	4	9	0
*	6	Pirlita	600					90	13	240	12	270	600	25
*	7	Lugovoe	200					30	4	80	4	90	200	8
	8	Kotovsk	630					95	13	252	13	284	630	26
*	9	Cainarii Vechi	4,028					604	85	1,611	81	1,813	4,028	165
	10	Bezeni	396					59	8	158	8	178	396	16
*	11	Izvoare	1,125					169	24	450	23	506	1,125	46
*	12	Alexan- drovca	562					84	12	225	11	253	562	23
*	13	Frumusica	1,813					725	102	907	45	181	1,813	147
*	14	Trifanesti	1,105					166	23	442	22	497	1,105	45
*	15	Alexandre-ni	1,685					253	35	674	34	758	1,685	69
*	16	Cubolta	2,300					345	48	920	46	1,035	2,300	94
*	17	Biruinta	5,000					750	105	2,000	100	2,250	5,000	205
	18	Grigoresti	1,480					222	31	592	30	666	1,480	61
		Villages (Balti-Riscani)						15%		50%		35%		
@	1	Cirlateni	5,800	0	0	290	55	1,450	203	1,740	87	2,320	5,800	345
*	2	Singureni	1,800					270	38	900	45	630	1,800	83
@	3	Recha	2,940	147	37	235	45	647	91	735	37	1,176	2,940	209
*	4	Racaria	1,610					242	34	805	40	564	1,610	74
		Villages (Balti-Falesti)						15%		25%		60%		
	1	Reutel	4,780					717	100	1,195	60	2,868	4,780	160
	2	Ciuluc	298					45	6	75	4	179	298	10
@	3	Catranic	1,650	0	0	0	0	578	81	413	21	660	1,651	102
@	4	Egorovca	1,388	0	0	0	0	347	49	347	17	694	1,388	66
		Villages (Balti-Singerei)						15%		25%		60%		
	1	Bilicenii Noi	982					147	21	246	12	589	982	33
	2	Bilicenii Vechi	3,270					491	69	818	41	1,962	3,270	110
		Villages (Soroca-Drochia)						15%		25%		60%		
*	1	Schineni	1,575					236	33	394	20	945	1,575	53
*	2	Popestii de Sus	2,170					326	46	543	27	1,302	2,170	73
*	3	Zgurita	3,568					535	75	892	45	2,141	3,568	120
*	4	Chetrosu	6,500					975	137	1,625	81	3,900	6,500	218
	5	Surii Noi	673					101	14	168	8	404	673	23
													380,818	43,473
		Villages (Prut-Riscani)						15%		25%		60%		
@	1	Varatic	2,400	120	35	0	0	600	84	840	42	840	2,400	161
	2	Dumeni	275					41	6	69	3	165	275	9
	3	Durnitoar-ca Noua	995					149	21	249	12	597	995	33
	4	Horodiste	1,040					156	22	260	13	624	1,040	35
*	5	Pociumbe-ui	1,018					153	21	255	13	611	1,018	34
*	6	Hiliuti	2,787					418	59	697	35	1,672	2,787	93
@	7	Pirjota	2,000	0	0	100	19	500	70	600	30	800	2,000	119
	8	Sturzeni	1,540					231	32	385	19	924	1,540	52
*	9	Alexandre-sti	300					45	6	75	4	180	300	10
@	10	Borosenii Noi	2,067	0	0	103	20	517	72	517	26	930	2,067	118
*	11	Moseni	744					112	16	186	9	446	744	25
*	12	Vasileuti	1,519					228	32	380	19	911	1,519	51
	13	Stubieni	497					75	10	124	6	298	497	17
*	14	Zaicani	3,835					575	81	959	48	2,301	3,835	128
		Villages (Prut-Falesti)						15%		25%		60%		
	1	Hrubna Noua	416					62	9	104	5	250	416	14
	2	Taxobeni	1,420					213	30	355	18	852	1,420	48
	3	Vranesti	41					6	1	10	1	25	41	1
@	4	Horesti	988	0	0	49	9	296	41	247	12	395	987	63
	5	Lucaceni	408					61	9	102	5	245	408	14
@	6	Risipeni	1,785	0	0	89	17	446	62	446	22	803	1,784	102
@	7	Bocsa	1,715	0	0	86	16	429	60	429	21	772	1,716	98
@	8	Musteatsa	1,691	0	0	85	16	423	59	423	21	761	1,692	97
	9	Frumusica	485					73	10	121	6	291	485	16
	10	Socii Vechi	200					30	4	50	3	120	200	7
@	11	Caluger	2,368	0	0	118	22	592	83	592	30	1,066	2,368	135

Table A.7 (2) Maximim Daily Water Demand in Year 2010 (m^3/day)

Max day demand in 2010

		1 Domestic demand m3/d	2 Commercial & institutional (10% of domestic) m3/d	3 Max day demand (1+2) x (1.2 or 1.3) m3/d	4 Livestock demand m3/d	5 Industrial demand (10% or 0% of domestic) m3/d	6 Max day demand (3+4+5) m3/d	7 Losses (6 x 0.2) m3/d	8 Total max day demand (6+7) m3/d
	Cities/Towns		10%	1.2		10%			
1	Soroca	6,173	617	8,149	18	617	8,784	1757	10,541
2	Balti	23,211	2,321	30,639	270	2321	33,231	6646	39,877
3	Riscani	1,776	178	2,344	31	178	2,552	510	3,063
4	Falesti	2,525	253	3,333	36	253	3,622	724	4,346
5	Floresti	2,780	278	3,670	48	278	3,996	799	4,795
6	Drochia	2,342	234	3,091	13	234	3,339	668	4,006
7	Singerei	1,856	186	2,449	46	186	2,681	536	3,217
		40,663	4,066	53,675	463	4,066	58,204	11,641	69,845
	Villages (Soroca-Balti)			1.3		0%			
1	Zastinca	99	10	142	5		147	29	176
2	Tepilovo	44	4	62	9		71	14	86
3	Ocolina	45	5	64	18		82	16	98
4	Vancina	15	2	22	4		26	5	31
5	Vancina Mica	0	0	1	0		1	0	1
6	Pirlita	25	2	35	8		43	9	52
7	Lugovoe	8	1	12	5		16	3	20
8	Kotovsk	26	3	37	8		45	9	54
9	Cainarii Vechi	165	17	236	21		257	51	308
10	Bezeni	16	2	23	4		27	5	33
11	Izvoare	46	5	66	11		77	15	92
12	Alexan- drovca	23	2	33	4		37	7	44
13	Frumusica	147	15	210	23		233	47	279
14	Trifanesti	45	5	65	7		72	14	87
15	Alexandre-ni	69	7	99	5		103	21	124
16	Cubolta	94	9	135	9		144	29	173
17	Biruinta	205	21	293	2		296	59	355
18	Grigoresti	61	6	87	8		95	19	114
		1,134	113	1,621	151	0	1,772	354	2,127
	Villages (Balti-Riscani)								
1	Cirlateni	345	35	493	20		514	103	616
2	Singureni	83	8	118	14		132	26	158
3	Recha	209	21	298	12		310	62	372
4	Racaria	74	7	106	9		115	23	138
		711	71	1,016	54	0	1,070	214	1,285
	Villages (Balti-Falesti)								
1	Reutel	160	16	229	14		243	49	292
2	Ciuluc	10	1	14	1		15	3	18
3	Catranic	102	10	145	9		154	31	185
4	Egorovca	66	7	94	3		97	19	116
		338	34	483	27	0	509	102	611
	Villages (Balti-Singerei)								
1	Bilicenii Noi	33	3	47	5		52	10	62
2	Bilicenii Vechi	110	11	157	21		177	35	213
		142	14	204	26	0	229	46	275
	Villages (Soroca-Drochia)								
1	Schineni	53	5	75	8		84	17	100
2	Popestii de Sus	73	7	104	8		112	22	134
3	Zgurita	120	12	171	11		182	36	218
4	Chetrosu	218	22	311	24		336	67	403
5	Surii Noi	23	2	32	6		38	8	46
		485	49	694	57	0	750	150	901
	Grand total	43,473	4,347	57,694	777	4,066	62,537	12,507	75,044

	Villages (Prut-Riscani)								
1	Varatic	161	16	230	18		248	50	298
2	Dumeni	9	1	13	2		15	3	19
3	Duruitoar-ca Noua	33	3	48	5		53	11	63
4	Horodiste	35	3	50	5		55	11	66
5	Pociumbe-ui	34	3	49	6		55	11	66
6	Hiliuti	93	9	134	14		147	29	177
7	Pirjota	119	12	170	13		183	37	219
8	Sturzeni	52	5	74	8		82	16	98
9	Alexandre-sti	10	1	14	1		15	3	18
10	Borosenii Noi	118	12	168	17		186	37	223
11	Moseni	25	2	36	4		39	8	47
12	Vasileuti	51	5	73	9		81	16	98
13	Stubieni	17	2	24	3		26	5	32
14	Zaicani	128	13	184	34		218	44	261
		885	89	1,266	138	0	1,404	281	1,685
	Villages (Prut-Falesti)								
1	Hrubna Noua	14	1	20	1		21	4	26
2	Taxobeni	48	5	68	11		79	16	94
3	Vranesti	1	0	2	0		2	0	3
4	Horesti	63	6	90	5		96	19	115
5	Lucaceni	14	1	20	2		22	4	26
6	Risipeni	102	10	145	10		155	31	186
7	Bocsa	98	10	140	9		149	30	179
8	Musteatsa	97	10	138	24		162	32	194
9	Frumusica	16	2	23	2		25	5	30
10	Socii Vechi	7	1	10	1		10	2	12
11	Caluger	135	13	193	13		206	41	247
		594	59	849	77	0	926	185	1,111

Table A.7 (3) Water Volume for Each Supply System in Year 2010 (m^3/day)

Water volume of each supply system

(m3/day)

Soroca-Balti System

Intake-P3

Soroca	Drochia	Floresti	Balti	Riscani	Falesti	Singerei	Total
10,541	4,907	5,654	41,145	4,348	4,957	3,492	**75,044**
					Intake:	plus 3%	**77,295**

P3-Reservoir

	Drochia	Floresti	Balti	Riscani	Falesti	Singerei	Total
	4,907	5,654	41,145	4,348	4,957	3,492	**64,503**

Reservoir-Floresti

		Floresti	Balti	Riscani	Falesti	Singerei	Total
		5,654	41,145	4,348	4,957	3,492	**59,596**

Floresti-Balti

			Balti	Riscani	Falesti	Singerei	Total
			41,145	4,348	4,957	3,492	**53,942**

Soroca-Drochia			**4,907**
Balti-Riscani			**4,348**
Balti-Falesti			**4,957**
Balti-Singerei			**3,492**
Prut-Riscani			**4,748**
	Intake:	plus 3%	**4,890**
Prut-Falesti			**5,457**
	Intake:	plus 3%	**5,621**

Table A.8 (1) Domestic Water Demand in Year 2015 (Daily Average, m^3/day)

Domestic water demand in 2015 (m3/day)

			Population 2015	1 With centralized hot water supply		2 With bathroom and local boilers		3 Without bathroom		4 Using standposts and yard connection		5 Using dug well and other sources	Total population	Total average day demand m3/d
			Persons	Persons	Demand 0.25	Persons	Demand 0.19	Persons	Demand 0.14	Persons	Demand 0.05	Persons	Persons	
		Per person												
		Cities/Towns												
@	1	Soroca	47,875	0	0	14,365	2,729	31,119	4,357	958	48	1,436	47,878	7,134
@	2	Balti	176,933	0	0	53,080	10,085	115,006	16,101	0	0	8,847	176,933	26,186
@	3	Riscani	17,034	0	0	5,110	971	11,072	1,550	0	0	852	17,034	2,521
@	4	Falesti	19,736	0	0	7,894	1,500	10,855	1,520	0	0	987	19,736	3,020
@	5	Floresti	20,919	0	0	8,368	1,590	11,505	1,611	0	0	1,046	20,919	3,201
@	6	Drochia	22,897	0	0	6,869	1,305	14,883	2,084	0	0	1,145	22,897	3,389
@	7	Singerei	16,620	0	0	4,986	947	10,803	1,512	0	0	831	16,620	2,460
		Villages (Soroca-Balti)												
*	1	Zastinca	2,420					726	102	1,210	61	484	2,420	162
	2	Tepilovo	1,065					320	45	533	27	213	1,065	71
	3	Ocolina	1,100					330	46	550	28	220	1,100	74
	4	Vancina	368					110	15	184	9	74	368	25
	5	Vancina Mica	9					3	0	5	0	2	9	1
*	6	Pirlita	600					180	25	300	15	120	600	40
*	7	Lugovoe	200					60	8	100	5	40	200	13
	8	Kotovsk	630					189	26	315	16	126	630	42
*	9	Cainarii Vechi	4,028					1,208	169	2,014	101	806	4,028	270
	10	Bezeni	396					119	17	198	10	79	396	27
*	11	Izvoare	1,125					338	47	563	28	225	1,125	75
*	12	Alexan- drovca	562					169	24	281	14	112	562	38
*	13	Frumusica	1,813					725	102	907	45	181	1,813	147
*	14	Trifanesti	1,105					332	46	553	28	221	1,105	74
*	15	Alexandre-ni	1,685					506	71	843	42	337	1,685	113
*	16	Cubolta	2,300					690	97	1,150	58	460	2,300	154
*	17	Biruinta	5,000					1,500	210	2,500	125	1,000	5,000	335
	18	Grigoresti	1,480					444	62	740	37	296	1,480	99
		Villages (Balti-Riscani)												
@	1	Cirlateni	5,800	0	0	580	110	2,030	284	2,030	102	1,160	5,800	496
*	2	Singureni	1,800					540	76	900	45	360	1,800	121
@	3	Recha	2,940	147	37	294	56	882	123	1,029	51	588	2,940	268
*	4	Racaria	1,610					483	68	805	40	322	1,610	108
		Villages (Balti-Falesti)												
	1	Reutel	4,780					1,434	201	2,390	120	956	4,780	320
	2	Ciuluc	298					89	13	149	7	60	298	20
@	3	Catranic	1,650	0	0	83	16	660	92	578	29	330	1,651	137
@	4	Egorovca	1,388	0	0	69	13	555	78	486	24	278	1,388	115
		Villages (Balti-Singerei)												
	1	Bilicenii Noi	982					295	41	491	25	196	982	66
	2	Bilicenii Vechi	3,270					981	137	1,635	82	654	3,270	219
		Villages (Soroca-Drochia)												
*	1	Schineni	1,575					473	66	788	39	315	1,575	106
*	2	Popestii de Sus	2,170					651	91	1,085	54	434	2,170	145
*	3	Zgurita	3,568					1,070	150	1,784	89	714	3,568	239
*	4	Chetrosu	6,500					1,950	273	3,250	163	1,300	6,500	436
	5	Surii Noi	673					202	28	337	17	135	673	45
			386,904									27,942	386,908	52,509
		Villages (Prut-Riscani)												
@	1	Varatic	2,400	120	35	0	0	960	134	840	42	480	2,400	211
	2	Dumeni	275					83	12	138	7	55	275	18
	3	Duruitoar-ca Noua	995					299	42	498	25	199	995	67
	4	Horodiste	1,040					312	44	520	26	208	1,040	70
*	5	Pociumbe-ui	1,018					305	43	509	25	204	1,018	68
*	6	Hiliuti	2,787					836	117	1,394	70	557	2,787	187
@	7	Pirjota	2,000	0	0	100	19	800	112	700	35	400	2,000	166
	8	Sturzeni	1,540					462	65	770	39	308	1,540	103
*	9	Alexandre-sti	300					90	13	150	8	60	300	20
@	10	Borosenii Noi	2,067	0	0	103	20	827	116	723	36	413	2,066	172
*	11	Moseni	744					223	31	372	19	149	744	50
*	12	Vasileuti	1,519					456	64	760	38	304	1,519	102
	13	Stubieni	497					149	21	249	12	99	497	33
*	14	Zaicani	3,835					1,151	161	1,918	96	767	3,835	257
		Villages (Prut-Falesti)												
	1	Hrubna Noua	416					125	17	208	10	83	416	28
	2	Taxobeni	1,420					426	60	710	36	284	1,420	95
	3	Vranesti	41					12	2	21	1	8	41	3
@	4	Horesti	988	0	0	49	9	395	55	346	17	198	988	82
	5	Lucaceni	408					122	17	204	10	82	408	27
@	6	Risipeni	1,785	0	0	89	17	714	100	625	31	357	1,785	148
@	7	Bocsa	1,715	0	0	86	16	686	96	600	30	343	1,715	142
@	8	Musteatsa	1,691	0	0	85	16	676	95	592	30	338	1,691	140
	9	Frumusica	485					146	20	243	12	97	485	32
	10	Socii Vechi	200					60	8	100	5	40	200	13
@	11	Caluger	2,368	0	0	118	22	947	133	829	41	474	2,368	196

Table A.8 (2) Maximum Daily Water Demand in Year 2015 (m^3/day)

Max day demand in 2015

			1 Domestic demand	2 Commercial & institutional (10% of domestic)	3 Max day demand (1+2) x (1.2 or 1.3)	4 Livestock demand	5 Industrial demand (10% or 0% of domestic)	6 Max day demand (3+4+5)	7 Losses (6 x 0.2)	8 Total max day demand (6+7)
			m3/d	m3/d	m3/d	m3/d	m3/d	m3/d	m3/d	m3/d
		Cities/Towns		10%	1.2		10%			
@	1	Soroca	7,134	713	9,417	18	713	10,149	2,030	12,178
@	2	Balti	26,186	2,619	34,566	274	2619	37,459	7,492	44,950
@	3	Riscani	2,521	252	3,328	42	252	3,622	724	4,347
@	4	Falesti	3,020	302	3,986	43	302	4,331	866	5,197
@	5	Floresti	3,201	320	4,225	51	320	4,596	919	5,515
@	6	Drochia	3,389	339	4,473	17	339	4,829	966	5,795
@	7	Singerei	2,460	246	3,247	52	246	3,545	709	4,254
			47,910	4,791	63,241	499	4,791	68,530	13,706	82,236
		Villages (Soroca-Balti)		10%	1.3		0%			
*	1	Zastinca	162	16	232	7		239	48	287
	2	Tepilovo	71	7	102	13		115	23	138
	3	Ocolina	74	7	105	25		131	26	157
	4	Vancina	25	2	35	6		41	8	49
	5	Vancina Mica	1	0	1	0		1	0	1
*	6	Pirlita	40	4	57	12		69	14	83
*	7	Lugovoe	13	1	19	7		26	5	31
	8	Kotovsk	42	4	60	12		73	15	87
*	9	Cainarii Vechi	270	27	386	30		416	83	499
	10	Bezeni	27	3	38	6		44	9	53
*	11	Izvoare	75	8	108	16		124	25	148
*	12	Alexan- drovca	38	4	54	6		60	12	72
*	13	Frumusica	147	15	210	24		234	47	281
*	14	Trifanesti	74	7	106	11		117	23	140
*	15	Alexandre-ni	113	11	161	7		168	34	202
*	16	Cubolta	154	15	220	14		234	47	281
*	17	Biruinta	335	34	479	3		482	96	578
	18	Grigoresti	99	10	142	12		154	31	184
			1,760	176	2,516	211	0	2,727	545	3,272
		Villages (Balti-Riscani)								
@	1	Cirlateni	496	50	709	27		736	147	883
*	2	Singureni	121	12	172	14		186	37	224
@	3	Recha	268	27	383	15		398	80	478
*	4	Racaria	108	11	154	18		172	34	207
			992	99	1,418	74	0	1,493	299	1,791
		Villages (Balti-Falesti)								
	1	Reutel	320	32	458	29		487	97	584
	2	Ciuluc	20	2	29	2		30	6	36
@	3	Catranic	137	14	196	12		208	42	249
@	4	Egorovca	115	12	165	4		169	34	203
			592	59	847	46	0	894	179	1,072
		Villages (Balti-Singerei)								
	1	Bilicenii Noi	66	7	94	10		104	21	125
	2	Bilicenii Vechi	219	22	313	42		355	71	426
			285	28	407	51	0	459	92	551
		Villages (Soroca-Drochia)								
*	1	Schineni	106	11	151	16		167	33	200
*	2	Popestii de Sus	145	15	208	15		223	45	268
*	3	Zgurita	239	24	342	21		363	73	436
*	4	Chetrosu	436	44	623	49		672	134	806
	5	Surii Noi	45	5	64	11		76	15	91
			971	97	1,388	113	0	1,501	300	1,801
		Grand Total	52,509	5,251	69,818	994	4,791	75,603	15,121	90,724

		Villages (Prut-Riscani)								
@	1	Varatic	211	21	302	23		325	65	390
	2	Dumeni	18	2	26	5		31	6	37
	3	Duruitoar-ca Noua	67	7	95	10		105	21	126
	4	Horodiste	70	7	100	11		111	22	133
*	5	Pociumbe-ui	68	7	98	13		110	22	132
*	6	Hiliuti	187	19	267	27		294	59	353
@	7	Pirjota	166	17	237	17		254	51	305
	8	Sturzeni	103	10	148	16		163	33	196
*	9	Alexandre-sti	20	2	29	2		30	6	36
@	10	Borosenii Noi	172	17	245	25		270	54	324
*	11	Moseni	50	5	71	8		79	16	95
*	12	Vasileuti	102	10	146	17		163	33	195
	13	Stubieni	33	3	48	5		53	11	63
*	14	Zaicani	257	26	367	58		426	85	511
			1,524	152	2,179	235	0	2,414	483	2,896
		Villages (Prut-Falesti)								
	1	Hrubna Noua	28	3	40	3		43	9	51
	2	Taxobeni	95	10	136	21		157	31	189
	3	Vranesti	3	0	4	1		4	1	5
@	4	Horesti	82	8	117	7		124	25	149
	5	Lucaceni	27	3	39	4		43	9	52
@	6	Risipeni	148	15	212	14		226	45	271
@	7	Bocsa	142	14	204	13		217	43	260
@	8	Musteatsa	140	14	201	34		235	47	282
	9	Frumusica	32	3	46	3		50	10	60
	10	Socii Vechi	13	1	19	2		21	4	25
@	11	Caluger	196	20	281	19		299	60	359
			908	91	1,299	121	0	1,420	284	1,704

Table A.8 (3) Water Volume for Each Supply System in Year 2015 (m^3/day)

Water volume of each supply system

(m3/day)

Soroca-Balti System

Intake-P3

Soroca	Drochia	Floresti	Balti	Riscani	Falesti	Singerei	Total
12,178	7,596	6,901	46,837	6,138	6,269	4,804	**90,724**
					Intake:	plus 3%	**93,445**

P3-Reservoir

	Drochia	Floresti	Balti	Riscani	Falesti	Singerei	Total
	7,596	6,901	46,837	6,138	6,269	4,804	**78,545**

Reservoir-Floresti

		Floresti	Balti	Riscani	Falesti	Singerei	Total
		6,901	46,837	6,138	6,269	4,804	**70,949**

Floresti-Balti

			Balti	Riscani	Falesti	Singerei	Total
			46,837	6,138	6,269	4,804	**64,048**

Soroca-Drochia			**7,596**
Balti-Riscani			**6,138**
Balti-Falesti			**6,269**
Balti-Singerei			**4,804**
Prut-Riscani			**7,243**
	Intake:	plus 3%	**7,460**
Prut-Falesti			**6,901**
	Intake:	plus 3%	**7,108**

ANNEX B

EVALUATION OF THE EXISTING MECHANICAL AND ELECTRICAL FACILITIES IN THE APA-CANAL SOROCA-BALTI WATER SUPPLY SYSTEM

1. General

Soroca-Balti water supply system is composed of the one water treatment plant, 4 pumping stations, 64 km water transmission pipeline and the related reservoirs. Most of the water supply facilities in the Soroca-Balti water supply system were constructed and/or installed in the early 1980. The economic lives of the pumps, blowers, motors, valves and other mechanical facilities in the pumping stations and the water treatment plant are likely to expire soon.

2. Evaluated Facilities

Main evaluated facilities in the Soroca-Balti water supply system are as follows:

- Pumping Station; Pumps (Mechanical)
  Catheads and Telphers (Mechanical)
  Valves (Mechanical)
  10KV Metal-enclosed Switchgear (Electrical)
  Motors (Electrical)
  External Power Supply network (Electrical)

- Water Treatment Plant Pumps (Mechanical)
  Catheads and Telphers (Mechanical)
  Compressors (Mechanical)
  Valves (Mechanical)
  Motors (Electrical)
  Control System (Electrical)

3. Evaluation

The main mechanical and electrical equipments in the Soroca-Balti water supply system are evaluated based on the guideline for operation and maintenance of water supply facilities, 1998 (JWWA).

As the result of the life assessment of metal-enclosed switchgear for PS-1, 2, 3 and 4, the total points evaluated are 36. It means that it is considered necessary to take the following measures:

- To perform major maintenance and testing
- To establish newly replacement plan

As the result of the life assessment of 1250 kW synchronous motors for main water supply pump, the total points evaluated are 24. It means that it is considered to take the following measure:

- To perform major maintenance and testing

For the mechanical equipment, pumps have been operated for more than 17 years. It means that economic lives appear to expire soon and pump replacement will be required. Other mechanical equipment such as catheads, telphers, compressors and valves will be working, however, good maintenance will be required.

The detailed results of the evaluation of mechanical and electrical facilities are shown in Tables B.1 through B.10.

Table B.1 Evaluation of Mechanical Facilities (Pumps 1/5)

Type of Machines	*Machines*	Survey Items				Used since	Overall Evaluation	Remarks
		Appearance	Operation					
		Deformation	Noise	Working	Capacity			
Pumping Station-I								
Pumps	Horizontal centrifuge pump with double inlet 22 HPC, N=1 (Pumps No.3	No, but repainting needed	High noise at start up	O	Q=1160 l/s, H=79m	1985	The economic lives appear to expire soon ×	Motor capacity 1250 kW main working pump
	The same N=2	No, but repainting needed	High noise at start up	O	Q=1110 l/s H=79m	1985	Same as above ×	Motor capacity 1250 kW
	Self-suction pump C-569 N=2			O	Q=15 l/s, H=20m	1985	Same as above ×	Motor capacity 13 kW
Catheads and telphers	Radial manual cathead	Repainting needed	--	O	8 t	1985	Good for operation	
	Radial manual cathead	Repainting needed	--	O	5 t	1985	Good for operation	
	Electric telpher TE1010	Repainting needed	--	O	3.2 t	1985	Good for operation	
Other equipment	Auto screen T2000 electrical move N=2	Completely corroded	--	×	Q=1110 l/s	1985	Unusable ×	
Pumping station II								
Pumps	Horizontal centrifuge pump with double inlet 22 HPC, No. 3	Cracked bottom, defective working wheel		X	Q=1160 l/s, H=79m	1985	Unusable ×	Motor capacity 1250 kW
	The same Nos. 2 and 1	Normal	Normal	O	Q=1110 l/s H=80m	1985	The economic lives appear to expire soon ×	Motor capacity 1250 kW
Catheads and telphers	Radial manual cathead	Normal	--	O	12,5 t	1985	Good for operation	
Pumping station III								
Pumps	Horizontal centrifuge pump with double inlet 22 HPC, No. 1 and 2	Normal	Normal	O	Q=1110 l/s H=80m	1985	The economic lives appear to expire soon ×	Motor capacity 1250 kW

Table B.1 Evaluation of Mechanical Facilities (Pumps 2/5)

Type of Machines	*Machines*	Survey Items				Used since	Overall Evaluation	Remarks
		Appearance	Operation					
		Deformation	Noise	Working	Capacity			
Pumps	Horizontal centrifuge pump with double inlet 22 HPC, No.3	Normal	Normal	O	Q=1110 l/s H=80m		The economic lives appear to expire soon ×	
	Centrifuge pump with double inlet ,D400 N=2				Q=1250 m3/h H=65 m		Same as above ×	
Catheads and telphers	Radial manual cathead with electric telpher	Normal	--	O	12,5 t	1985	Good for operation	
Pumping station IV								
Pumps	Horizontal centrifuge pump with double inlet 22 HPC, No. 2 and 3	Normal	Normal	O	Q=3600m3/h H=84m	1985	The economic lives appear to expire soon ×	Motor capacity 1250 kW
	The same, pump No. 1	Normal	Normal	Dismantled. Drive wheel missing	Q=3600m3/h H=84m	1985	Unusable ×	Motor capacity 1250 kW
Catheads and Telphers	Radial manual cathead	Normal	--	O	12,5 t	1985	Good for operation	
Filters and chemical dosing compartment at water treatment station								
Pumps	Dosing pump HD 1600/10 N=2	No, but repainting is *required*	Normal	○	Q=1600 l/h, H=100 m	1985	The economic lives appear to expire soon ×	3 kW poly
	Dosing pump HD 1600/10 N=4	Dismantled, heavy corrosion	--	▲	Q=1600 l/h, H=100 m	1985	Unusable ×	3 kW poly(na2sif4)
	Dosing pump HD 2500/10, N=2	Dismantled, heavy corrosion	--	▲	Q=2500 l/h, H=100 m	1985	Unusable ×	3 kW (soda) coagulant
	Centrifuge console chemical pump X20/31 N=3	Dismantled (motor missing)	--	▲	Q=20m3/h, H=31m	1985	Evaluation impossible	coagulant
	The same X 80/50-200 N=3	Heavy corrosion	--	▲	Q=50m3/h, H=90m	1985	Unusable ×	30 kW coagulant
	The same X 65-50-125 N=3	No deformation, but repainting required	Normal	O	Q=25m3/h, H=20m	1985	The economic lives appear to expire soon ×	5.5 kW coagulant

Table B.1 Evaluation of Mechanical Facilities (Pumps 3/5)

Type of Machines	*Machines*	Survey Items					Overall Evaluation	Remarks
		Appearance	Operation			Used since		
		Deformation	Noise	Working	Capacity			
Pumps	The same X 50-32-125 N=2	No deformation, but repainting required	Normal	O	Q=12.5 m3/h, H=20m	1985	Same as above ×	4.0 kW poly conveyed to the mixer
	Double inlet centrifuge pump D320-70 N=2	Frozen and cracked	--	▲	Q=320 m3/h, H=70m	1985	Unusable ×	100 kW water conveyed
Other equipment	Mechanical mixer	No deformation	Normal	▲	Q= 6 m3/h	1985		
	Mechanical mixer	No deformation	Normal	▲	--	1985	Unusable ×	
Water Treatment station- filters and chemical dosing facility - coagulant pumping station								
Pumps	Chemical pump X 65-50-125 N=4	Extreme corrosion, no motors	--	X	Q=25m3/h, H=20m	1985	Unusable ×	Circular pump for motor 5.5 kW coagulant
	Horizontal double inlet pump D 320-70 N=2	Frozen, upper covers cracked	--	X	Q=320m3/h, H=70m	1985	Unusable ×	motor capacity 110 kW for water
Catheads and telphers	Electric telpher	Repainting needed	Normal	O	1.0 t	1985	Good for operation	
Char coal mixing facilities								
PUMPS	Sewage pump FG 57.5/9.5	Repainting needed	--	--	Q=320m3/h, H=70m	1985	Evaluation impossible as never worked since installed ×	Design motor capacity 40 kW
	Dosing device HD 630/10 N=3	Repainting needed	--	--	Q=630 m3/h H=100 m	1985	Evaluation impossible as never worked since installed ×	Design motor capacity 1,1 kW
	Vacuum pump BBH-3 N=2	Repainting needed	--	--	Q=3 m3/min	1985	--	Design motor capacity 11 kW
Other equipment	Hydraulic circular mixer M-14 N=2	Repainting needed	--	--	--	1985	--	--

Table B.1 Evaluation of Mechanical Facilities (Pumps 4/5)

Type of Machines	*Machines*	Survey Items				Used since	Overall Evaluation	Remarks
		Appearance	Operation					
		Deformation	Noise	Working	Capacity			
Air compressor room								
Compressors	Compressor BK-12 M N=3	No deformation, but repainting required	Normal	O	Q=12 m3/min	1985	Good for operation	Motor capacity 40 kW
	Compressor BM 300, N=2	No deformation, but repainting required	Normal	O	Q=12 m3/min	1985	Good for operation	Motor capacity 40 kW
	Electric cathead	No deformation, but repainting required	Normal	O	2.0 t	1985	Good for operation	
	Manual telpher	No deformation, but repainting required	Normal	O	1.0 t	1985	Good for operation	
Water treatment facility- Rapid sand filters room								
Catheads and telphers	Electric cathead N=2	No deformation	Normal	O	3.2 t	1985	Good for operation	Room I
	Electric cathead N=1	No deformation	Normal	O	3.2 t	1985	Good for operation	Room II
	Electric cathead N=1	No deformation	Normal	X	3.2 t	1985	Unusable	Room II
Sedimentation tanks								
Catheads and telphers	Manual telpher	Normal	Normal	O	3.2 t	1985	Good for operation	
	Manual telpher	Normal	Normal	O	1.0 t	1985	Good for operation	
	Gear coupling telpher	Normal	Normal	O	2.0 t	1985	Good for operation	

Table B.1 Evaluation of Mechanical Facilities (Pumps 5/5)

Type of Machines	*Machines*	Survey Items					Overall Evaluation	Remarks
		Appearance	Operation			Used since		
		Deformation	Noise	Working	Capacity			
Water treatment facility – compensation reservoirs								
Pumps	Double inlet centrifuge pump 12 HDc N=2	Heavy corrosion	--	--	Q=1250 m3/h H=65 m	1985	Evaluation impossible as never worked since installed. ×	Designed motor capacity 320 kW
	The same 5 HDb, N=1	Heavy corrosion	Normal	-/-	Q=200 m3/h H=36 m	1985	Presumably unusable ×	40 kW
	Vortical Self-suction console pump BKC 1/16	Heavy corrosion	--		Q=3.6 m3/h H=16 m	1985	Presumably unusable ×	1.5 kW
Telphers	Manual telpher	Cor. repaint req.	--	O	3.2 t	1985	Good	
Chlorination facility and chlorine storage room								
Compressors	Compressor GARO M-155-2 N=2	Good, but repainting req.	No	--	155 m3/h	1985	Evaluation impossible as never worked since installed ×	Not working
	Chlorination device LOONII 100, N=2	Good, but repainting req.	No	--	6 kg/h	1985	Evaluation impossible as never worked since installed ×	Not working
Catheads and telphers	Electric telpher	Repainting	Normal	O	3.2 t	1985	Good	Installed in the chlorine storage room.
	Electric cathead	Repainting	Normal	O	3.2 t	1985	Good	
	Manual telpher	Repainting	Normal	O	3.2 t	1985	Good	
Storage facility, workshops, garage								
Catheads	Electric cathead	NO	Normal	O	1.0 t	1985	Good	Storage room
	The same	NO	Normal	O	2.0 t	1985	Good	Workshop
	The same	NO	Normal	O	2.0 t	1985	Good	Garage

Table B.1 Evaluation of Mechanical Facilities (Valves 1/5)

Valve	*Specification (Type/diameter)*	*External appearance And Corrosion*	*Operation*		*Year of installation*	*Evaluation*
			Open/close	*Leakage*		
Pumping station I						
Parallel wedged valve electrically driven	304 915 bp Dy 1000 mm Py=1.0 MPa Cast iron, N=3	Good, small corrosion	Good	No	1985	O
The same	304 925 bp Dy 800 mm, Py=0.25 MPa Cast iron, N=4	Good, small corrosion	Good	No	1985	O
The same	304 915 bp Dy 800 mm Py=1.0 MPa Cast iron,N=3	Good, small corrosion	Good	No	1985- 2 1996- 1	O
Parallel flanged valve with ext. spindle, Manual	30 4 6 bp Dy=200 mm Py=1.0 MPa, N=6 Cast iron	Good, small corrosion	Good	No	1985	O
Rotary checkvalve	19c47nJ Dy=800, Py=4.0 MPa, n=3, steel	Small corrosion	Working	No	1988	O
Automatic w hammer protection valve	D200 mm, Steel, N=2	Heavy corrosion	Not working	No	1985	X
Pumping Station II						
Wedged valve with flange and unext. spindle , electrical drive	30 4 925 bp Dy 800mm, Py=0.25 MPa, Cast iron, N=2	Good, small corrosion	Working	No	1985	O
The same	30 4 925 bp Dy 800mm, Py=0.25 MPa, Cast iron, N=1	Good, small corrosion	Working	No	1990-1992	O
The same with conical transmission	30 4 930 bp Dy 600mm, Py=0.25 MPa, Cast iron. N=3	Good, small corrosion	Working	No	1985	O
Rotary check valve	19 C 47 nj, Py=4.0 MPa, Dy=600 mm, Steel, N=3	Good, small corrosion	Working	No	1988	O
Pumping station II (external communications)						
Wedged valve, unextendable spindle, flanged, electrical move	30 4 925 Dy=800, Py=0.25 MPa Cast iron, n=2	Good, small corrosion	Not working, motor defective	No	1985	X

Table B.1 Evaluation of Mechanical Facilities (Valves 2/5)

Valve	*Specification (Type/diameter)*	*External appearance And Corrosion*	*Operation*		*Year of installation*	*Evaluation*
			Open/close	*Leakage*		
Pumping station II (external communications)						
The same with conical transmission	30 4 930 bp Dy=600, Py=1.0.MPa Cast iron, N=2	Good, small corrosion	Working	Small	1985	O
Parallel valve with extendable spindle, flanged	30 4 6bp Dy=300 mm, Py=1.0 MPa, cast iron, N=2	Good, small corrosion	Working	Small	1985	O
The same	30 4 6bp Dy=200 mm, Py=1.0 MPa, cast iron, N=6	Good, small corrosion	Working	Small	1985	O
Automatic water hammer valve	Dy=200 mm, N=3	Good, small corrosion	Not working	No	1985	X
Pumping station III						
Wedged valve, unext. spindle, flanged, electrical move	30 4 925 Dy=1200, Py=0.25 MPa Cast iron, n=1	Good, small corrosion	Working	No	1985	O
The same	30 4 925 Dy=1000, Py=0.25 MPa Cast iron, n=3	Good, small corrosion	Working	No	1985	O
The same	30 4 930 bp Dy=600, Py=1.0.MPa Cast iron, N=3	Good, small corrosion	Working	Small	1985	O
Rotary valve , electrical move	IA 99044 Dy=800 mm, Py 1.0 MPa, Cast iron N=3	Good, small corrosion	Working	No	1985	O
Parallel valve with Extendable spindle, Flanged, el. move	30 4 906 bp Dy =800 mm, Py= 1.0 MPa, cast iron, N=3	Good, small corrosion	Working	No or small	1985	O
Rotary check valve	19 C 47 nj, Py=1.0 MPa, Dy 400 mm, cast iron N=2	Good, small corrosion	Working	No	1985	O
The same	19 C 47 nj, Py=4.0 MPa, Dy=600 mm, Steel, N=3	Good, small corrosion	Working	No	1985	O
Parallel valve with extendable spindle, flanged, manual	30 4 6 bp, Dy =300mm, Py= 1.0 MPA, cast iron. N=1	Good, small corrosion	Not working	Considerable	1985	X

Table B.1 Evaluation of Mechanical Facilities (Valves 3/5)

Valve	*Specification (Type/diameter)*	*External appearance And Corrosion*	*Operation*		*Year of installation*	*Evaluation*
			Open/close	*Leakage*		
Pumping station IV and clean water reservoirs at divide						
Wedged valve with unext. Spindle, flanged, manual	30 4 525 bp, Dy=1000, Py 0.25 MPa cast iron N=4	Good, small corrosion	Working	No	1985 at reservoir	O
The same , electric move with conical transmission	30 4 930 bp Dy=600 mm, Py=1.0 MPa, Cast iron, N=2	Good, small corrosion	Working	No	1985 at pump house	O
The same	30 4 930 bp, Dy=600 mm, Py 1.0 MPa Cast iron, N=1	Good, small corrosion	Not working, as motor is missing	No	1985 at pump house	▲
Rotary disk-type valve, elect. Move	IA 99044 Dy=800 mm, Py 1.0 MPa, Cast iron N=3	Small corrosion	Working	No	1985 at pump house	O
Parallel valve with unext. Spindle, flanged, manual	30 4 3 bp, Dy=800mm, Py=1.0 MPa, cast iron N=2	Small corrosion	Working	No	1985 at reservoir	O
The same	30 4 3 bp, Dy=600mm, Py=1.0 MPa, cast iron N=2	Small corrosion	Working	No	1985at reservoir	O
Parallel valve with unext. Spindle, flanged, manual	30 4 6 bp, Dy=200mm, Py=1.0 MPa, cast iron N=3 Protect water hummer	Small corrosion	Working	No	1985	O
W/ hammer valve	Dy=200 mm, N=3 Protect water hummer	Small corrosion	Working	No	1985	O
Rotary check valve	19 C 47 nj, Py=1.0 MPa, Dy 600 mm, cast iron N=3	Good, small corrosion	Working	No	1985	O
Water treatment facility -Rapid sand filter room						
Wedged valve, unext. Spindle, flanged, el. Move	30 4 930 bp Dy 1000mm Py 1.0MPa,N=18 Cast iron	Good, small corrosion	Working	No	1985	O
The same	30 4 930 bp Dy 1200mm Py 1.0MPa,N=6, Cast iron	Good, small corrosion	Working	No	1985	O
The same	30 4 915 bp Dy 800mm Py 1.0MPa,N=4, Cast iron	Good, small corrosion	Working	No	1985	O
The same	30 4 915 bp Dy 600mm Py 1.0MPa,N=18,Cast iron	Good, small corrosion	Working	No	1985	O
Rotary disk valve, electric move	IA 99044 Dy=600 mm, Py1.0 MPa, steel , N=12	Good, small corrosion	Working	No	1985	O

Table B.1 Evaluation of Mechanical Facilities (Valves 4/5)

Valve	*Specification (Type/diameter)*	*External appearance And Corrosion*	*Operation*		*Year of installation*	*Evaluation*
			Open/close	*Leakage*		
Water treatment facility -Rapid sand filter room						
Parallel valve, manual move	30 4 6 bp Dy 200 mm Py= 1.0 MPa, N=13	Good, small corrosion	Working	No	1985	O
The same	30 4 6 bp Dy 200 mm Py= 1.0 MPa, N=5	Heavy corrosion, previously frozen	Not working	--//--	1985	X
Wedged valve, unext. Spindle, flanged, el. Move	30 4 930 bp Dy 1200mm Py 1.0MPa,N=4 Cast iron	Good, small corrosion	Working	No	1985	O
The same	30 4 925 bp Dy 1200mm Py 1.0MPa,N=2 Cast iron	Good, small corrosion	Working	No	1985	O
The same	30 4 930 bp Dy 1000mm Py 1.0MPa,N=20 Cast iron	Good, small corrosion	Working	No	1985	O
Rotary disk valve, manual move	IA 99044 Dy=600 mm, Py1.0 MPa, steel , N=4	Good, small corrosion	Working	No	1985	O
Parallel valve, ext. spindle, el. move	30 4 90 bp, Dy 300mm, Py1.0 MPa,cast iron, N=16		Manual mode, motor dismantled	No	1985	O
The same manual	30 4 6 bp Dy 300 mm Py 1.0 MPa,cast iron N=32	Good	Working	No	1985	O
The same	30 4 6 bp Dy 200 mm Py 1.0 MPa,cast iron N=16	Good	Working	No	1985	O
Water treatment facility - Compensation reservoir						
Wedged valve, unext. Spindle, flanged, el. Move	30 4 930 bp Dy 1000mm Py 1.0MPa,N=1 Cast iron	Heavy corrosion	--//--	--//--	1985	Never worked since installed. ×
Parallel valve, ext. spindle, el. move	30 4 90 bp, Dy 300mm, Py1.0 MPa,cast iron, N=8	Heavy corrosion	--//--	--//--	1985	Never worked since installed. ×
The same	30 4 90 bp, Dy 400mm, Py1.0 MPa,cast iron, N=5	Heavy corrosion	--//--	--//--	1985	Never worked since installed. ×
Rotary checkvalve	19 4 21 bp Dy=400mm Py=1.0MPa, N=2	Heavy corrosion	--//--	--//--	1985	Never worked since installed. ×

Table B.1 Evaluation of Mechanical Facilities (Valves 5/5)

Valve	*Specification (Type/diameter)*	*External appearance And Corrosion*	*Operation*		*Year of installation*	*Evaluation*
			Open/close	*Leakage*		
Water treatment facility -Clean water reservoirs						
Wedged valve, unext. Spindle, flanged, el. Move	30 4 930 bp Dy 1000mm Py 1.0MPa,N=4 Cast iron	Heavy corrosion	Working	Small	1985	
The same	30 4 937 bp Dy 800mm Py 1.0MPa,N=4 Cast iron	Heavy corrosion	Working	Small	1985	
The same	30 4 930 bp Dy 600mm Py 1.0MPa,N=1 Cast iron	Heavy corrosion	Working	Small	1985	
Parallel valve, ext. spindle, el. move	30 4 6 bp, Dy 400mm, Py1.0 MPa,cast iron, N=2	Heavy corrosion	Working	Small	1985	
Water treatment facility Water tower for filter backwashing						
Wedged valve, unext. Spindle, flanged, el. Move	30 4 930 bp Dy 1000mm Py 1.0MPa,N=2 Cast iron	Slight corrosion	Working	No	1985	O

Table B.2 ***Replacement Time of Electrical Equipment in Water Works in Japan (Life time)***

Commodity	Sample size	30 years and above	25 and above up to 30 years	20 and above up to 25 years	15 and above up to 20 years	10 and above up to 15 years	5 and above up to 10 years	less than 5 years	Maximum life of year	Average life of year	Standard Deviation (STDEV)
A lump of facility	166	13	29	60	40	18	6	0	36	20.6	5.7
HV AC circuit breaker	162	7	26	44	49	26	10	0	33	19	6
HV disconnecting switch	173	2	25	42	58	34	11	1	30	17.9	5.6
Transformers	173	9	24	45	50	30	13	2	33	18.6	6.4
Capacitors	167	6	25	50	49	29	6	2	30	18.9	5.8
HV cables	235	5	20	54	86	53	16	1	33	17.3	5.4
Relay panels & similar	134	3	17	41	49	14	10	0	30	18.8	5.4
Motor control centers	64	2	8	19	25	9	1	0	30	19.6	5.1
Motors less than 30KW	190	11	19	40	52	53	14	1	36	17.7	6.4
Motors 30KW and above	178	20	18	57	58	19	6	0	58	20.7	6.9
Motor starters	101	11	14	37	23	12	4	0	58	21.1	7.4
Metal resistors	11	0	1	4	5	1	0	0	28	14.8	4
Liquid resistors	9	2	0	1	3	2	1	0	35	18.6	8.7
Celbius staters	6	0	0	3	1	2	0	0	24	18.5	4.6
Primary frequency controller	12	0	0	2	6	1	3	0	23	14.8	4.6
Lead acid batteries	122	0	0	8	29	45	34	6	23	11.6	4.7
Alkaline batteries	199	0	4	31	89	63	11	1	27	15.5	4.1
Battery chargers	130	0	5	33	61	26	4	1	27	17.1	4.4
Inverters	48	0	3	7	26	10	2	0	27	16.5	4.4
Generators	58	6	13	19	9	9	2	0	35	21.3	6.6
UPS	26	1	2	3	10	6	3	1	30	15.8	6.7
Total	2364	98	253	600	778	462	157	16	32.7	17.8	5.7
Weighted % of samples	%	4.1	10.7	25.4	32.9	19.5	6.6	0.7			
Reference											
Pumps less than 30KW	209	10	22	49	57	52	18	1	36	17.7	6.4
Pumps 30KW and above	174	20	18	57	52	22	5	0	62	20.9	7.5
Submersible pumps less than 30KW	219	2	4	26	61	73	49	4	35	13.4	5.4
Submersible pumps 30KW and above	138	2	4	21	47	37	21	6	35	14.8	6
Diesel driven machines	59	7	15	17	8	11	1	0	35	21.8	6.6
Gas turbine driven machines	3	0	2	0	1	0	0	0	29	25	5

Table B.3 Life Assessment for Motors

Plant	PS I	**Date**	31-Jul-01
Location	Cosauti	**Evaluated by**	T.Furukawa
Objective	SM No.1/HS1, No.2/HS2, No.3/HS3	**Replacement Class**	C
Rating	10KV, 1250KW, 6P	**Class C: to replace equipment when approaching life of core compornents**	

	No.	Evaluation Items	Weighted points	Points evaluated	Remarks
Duration year	A1	over 36 years	#25		
	A2	between 31 to 35 years	#20		
	A3	between 26 to 30 years	15		
	A4	between 21 to 25 years	8	8	
	A5	between 16 to 20 years	4		
	A6	between 10 to 15 years	2		
Deterioratied conditions	B1	Decreasing insulation resistance of stator winding when measured.	8	8	enable to restore after drying process
	B2	Result of Insulation monitoring by means of insulation analyzer	-		apply points accord. to the result.
	B3	Overheat or discoloured areas on lead wires of stator	*15		
	B4	Overheat or discoloured areas on lead wires of rotor winding	*15		
	B5	Consumed carbone brush	15		extremely consumed
	B6	Cracks or chips on slip ring	*15		
	B7	Water leak from radiator	*15		
	B8	Deterioration of bearing oil	*15		to find cause of trouble
	B9	Abnormal noize or overheat on bearings	15		
	B10	Result of bearing monitoring by means of analyzer	-		apply points accord. to the result.
Enviromental conditions	C1	Extremely Long term operation	15		
	C2	Exposure of chlorine atmosphere	10		
	C3	Lasting heavy loaded operation	5	5	
	C4	Operation under high humidity	3	3	
abnormal conditions	D1	Fluctuation of stator current	*15		
	D2	Abnormal sound from electric discharge or an offensive smell	*15		
	D3	Evidence of flush over at slip rings	*15		
Others	E1	Inundfation or flood	*15		
	E2				
Total points evaluated (TPE)				24	

Code	TPE	Necessary measusures	Remarks
(I)	over 30	to perform major maintenance and testing	Note A
(II)	25 to 29	to perform major maintenance and testing	Note B
(III)	20 to 24	to perform major maintenance and testing	
(IV)	less than 19	to perform periodical maintenance	

Note A: to replace stator winding with new one or to establish newly replacement plan when total points including points marked with # are over 30.

Note B: to perform insulation monitor and bearing monitor by means of analyzer.

Mark * It is considered necessary to take immediate repair.

Mark # It is considered necessary to establish replacement plan.

Table B.4 Life Assessment for Motors

Plant	PS II	**Date**	31-Jul-01
Location	Cosauti	**Evaluated by**	T.Furukawa
Objective	SM No.1/HS1, No.2/HS2, No.3/HS3	**Replacement Class**	C
Rating	10KV, 1250KW, 6P	**Class C: to replace equipment when approaching life of core compornents**	

	No.	Evaluation Items	Weighted points	Points evaluated	Remarks
Duration year	A1	over 36 years	#25		
	A2	between 31 to 35 years	#20		
	A3	between 26 to 30 years	15		
	A4	between 21 to 25 years	8	8	
	A5	between 16 to 20 years	4		
	A6	between 10 to 15 years	2		
Deterioratied conditions	B1	Decreasing insulation resistance of stator winding when measured.	8	8	enable to restore after drying process
	B2	Result of Insulation monitoring by means of insulation analyzer	-		apply points accord. to the result.
	B3	Overheat or discoloured areas on lead wires of stator	*15		
	B4	Overheat or discoloured areas on lead wires of rotor winding	*15		
	B5	Consumed carbone brush	15		extremely consumed
	B6	Cracks or chips on slip ring	*15		
	B7	Water leak from radiator	*15		
	B8	Deterioration of bearing oil	*15		to find cause of trouble
	B9	Abnormal noize or overheat on bearings	15		
	B10	Result of bearing monitoring by means of analyzer	-		apply points accord. to the result.
Enviromental conditions	C1	Extremely Long term operation	15		
	C2	Exposure of chlorine atmosphere	10		
	C3	Lasting heavy loaded operation	5	5	
	C4	Operation under high humidity	3	3	
abnormal conditions	D1	Fluctuation of stator current	*15		
	D2	Abnormal sound from electric discharge or an offensive smell	*15		
	D3	Evidence of flush over at slip rings	*15		
Others	E1	Inundfation or flood	*15		
	E2				
		Total points evaluated (TPE)		24	

Code	TPE	Necessary measusures	Remarks
(I)	over 30	to perform major maintenance and testing	Note A
(II)	25 to 29	to perform major maintenance and testing	Note B
(III)	20 to 24	to perform major maintenance and testing	
(IV)	less than 19	to perform periodical maintenance	

Note A: to replace stator winding with new one or to establish newly replacement plan when total points including points marked with # are over 30.

Note B: to perform insulation monitor and bearing monitor by means of analyzer.

Mark * It is considered necessary to take immediate repair.

Mark # It is considered necessary to establish replacement plan.

Table B.5 Life Assessment for Motors

Plant	PS III	**Date**	31-Jul-01
Location	Soroca	**Evaluated by**	T.Furukawa
Objective	SM No.1/HS1, No.2/HS2, No.3/HS3	**Replacement Class**	C
Rating	10KV, 1250KW, 6P	**Class C: to replace equipment when approaching life of core compornents**	

	No.	Evaluation Items	Weighted points	Points evaluated	Remarks
Duration year	A1	over 36 years	#25		
	A2	between 31 to 35 years	#20		
	A3	between 26 to 30 years	15		
	A4	between 21 to 25 years	8	8	
	A5	between 16 to 20 years	4		
	A6	between 10 to 15 years	2		
Deterioratied conditions	B1	Decreasing insulation resistance of stator winding when measured.	8	8	enable to restore after drying process
	B2	Result of Insulation monitoring by means of insulation analyzer	-		apply points accord. to the result.
	B3	Overheat or discoloured areas on lead wires of stator	*15		
	B4	Overheat or discoloured areas on lead wires of rotor winding	*15		
	B5	Consumed carbone brush	15		extremely consumed
	B6	Cracks or chips on slip ring	*15		
	B7	Water leak from radiator	*15		
	B8	Deterioration of bearing oil	*15		to find cause of trouble
	B9	Abnormal noize or overheat on bearings	15		
	B10	Result of bearing monitoring by means of analyzer	-		apply points accord. to the result.
Enviromental conditions	C1	Extremely Long term operation	15		
	C2	Exposure of chlorine atmosphere	10		
	C3	Lasting heavy loaded operation	5	5	
	C4	Operation under high humidity	3	3	
abnormal conditions	D1	Fluctuation of stator current	*15		
	D2	Abnormal sound from electric discharge or an offensive smell	*15		
	D3	Evidence of flush over at slip rings	*15		
Others	E1	Inundfation or flood	*15		
	E2				
Total points evaluated (TPE)				24	

Code	TPE	Necessary measusures	Remarks
(I)	over 30	to perform major maintenance and testing	Note A
(II)	25 to 29	to perform major maintenance and testing	Note B
(III)	20 to 24	to perform major maintenance and testing	
(IV)	less than 19	to perform periodical maintenance	

Note A: to replace stator winding with new one or to establish newly replacement plan when total points including points marked with # are over 30.

Note B: to perform insulation monitor and bearing monitor by means of analyzer.

Mark * It is considered necessary to take immediate repair.

Mark # It is considered necessary to establish replacement plan.

Table B.6 Life Assessment for Motors

Plant	PS IV	**Date**	31-Jul-01
Location	TsepiLovo	**Evaluated by**	T.Furukawa
Objective	SM No.1/HS1, No.2/HS2, No.3/HS3	**Replacement Class**	C
Rating	10KV, 1250KW, 6P	**Class C: to replace equipment when approaching life of core compornents**	

	No.	Evaluation Items	Weighted points	Points evaluated	Remarks
Duration year	A1	over 36 years	#25		
	A2	between 31 to 35 years	#20		
	A3	between 26 to 30 years	15		
	A4	between 21 to 25 years	8	8	
	A5	between 16 to 20 years	4		
	A6	between 10 to 15 years	2		
Deterioratied conditions	B1	Decreasing insulation resistance of stator winding when measured.	8	8	enable to restore after drying process
	B2	Result of Insulation monitoring by means of insulation analyzer	-		apply points accord. to the result.
	B3	Overheat or discoloured areas on lead wires of stator	*15		
	B4	Overheat or discoloured areas on lead wires of rotor winding	*15		
	B5	Consumed carbone brush	15		extremely consumed
	B6	Cracks or chips on slip ring	*15		
	B7	Water leak from radiator	*15		
	B8	Deterioration of bearing oil	*15		to find cause of trouble
	B9	Abnormal noize or overheat on bearings	15		
	B10	Result of bearing monitoring by means of analyzer	-		apply points accord. to the result.
Enviromental conditions	C1	Extremely Long term operation	15		
	C2	Exposure of chlorine atmosphere	10		
	C3	Lasting heavy loaded operation	5	5	
	C4	Operation under high humidity	3	3	
abnormal conditions	D1	Fluctuation of stator current	*15		
	D2	Abnormal sound from electric discharge or an offensive smell	*15		
	D3	Evidence of flush over at slip rings	*15		
Others	E1	Inundfation or flood	*15		
	E2				
Total points evaluated (TPE)				24	

Code	TPE	Necessary measusures	Remarks
(I)	over 30	to perform major maintenance and testing	Note A
(II)	25 to 29	to perform major maintenance and testing	Note B
(III)	20 to 24	to perform major maintenance and testing	
(IV)	less than 19	to perform periodical maintenance	

Note A: to replace stator winding with new one or to establish newly replacement plan when total points including points marked with # are over 30.

Note B: to perform insulation monitor and bearing monitor by means of analyzer.

Mark * It is considered necessary to take immediate repair.

Mark # It is considered necessary to establish replacement plan.

Table B.7 Life Assessment for Metal-enclosed Switchgear

			Date	July 31.2001
Plant	Soroca-Balti		**Evaluated by**	T.furukawa
Location	PS-I		**Replacement Class**	A
Objective	10KV switchgear		Class A: to replace equipment when approaching average of life of parts	
Rating	10KV, 630A, 20KA			

	No.	Evaluation Items	Weighted points	Points evaluated	Remarks
Duration year	A1	over 25 years	#7		
	A2	between 20 to 24 years	#5	5	
	A3	between 15 to 19 years	3		
	A4	between 10 to 14 years	1		
Deteriorated conditions	B1	Cracks, discolored area, or corona tracking on molded transformer, PCT, and DS	*25		
	B2	Cracks, discolored area, or corona tracking on bushings	*25		
	B3	Overheat or discolored areas on main conductors and termination of power cables	*20		
	B4	Corrosion on main conductors and termination of power cables	10		
	B5	Loose connection on auxiliary relays	10	10	
	B6	Damage, corrosion, or discolored areas on terminal boards of control circuits	*10	10	
	B7	Out of tolerance of characteristic on instruments and relays	*10		
	B8	Evidence of silver migration on insulation plate for electrical parts and devices	*10		
	B9	Deterioration of insulation materials for electrical parts and devices owing to UV rays	10		
	B10	Water leak from cover plate or door owing to it's corrosion	10		
	B11	Dirt on filters which block ventilation	5		
	B12	Dirt on insulation material of main conductors	5	5	
	B13	Deterioration of insulation resistance on control circuits	5		
	B14	Excess use of fuses over guaranteed period or excess use of relays which replacement parts are not available.	3	3	
	B15	Corrosion partly on cover plate, ventilator, floor, or front/or rear side of door.	3	3	
Environmental conditions	C1	Rain water remained in cable pits for a long period	10		
	C2	Exposure of corrosive atmosphere such as sea breeze, a chlorine stench, dirt.	10		
	C3	Presence of vermin (a footprint)	5		
	C4	Presence of high humidity (condensation)	3		
	C5	Ambient temperature exceeding design value	3		
	C6	Location close to abnormal vibration source	3		
Abnormal conditions	D1	**Presence of an offensive smell such as overheat or ozone, or presence of abnormal sound**	*25		
	D2	Inundation or flood	*25		
	D3	Mechanical noise such as a groan	*10		
	D4	**Excessive corrosion or excessive stain on front /or rear surface of enclosure or electrical devices**	*15		
Total points evaluated (TPE)				36	

Code	TPE	Necessary measures	Remarks
(I)	over 25	to perform major maintenance and testing	Note A
(II)	15 to 24	to perform major maintenance and testing	Note B
(III)	less than 14	to perform major maintenance and testing	
(IV)	less than 10	to perform inspection or repair at convenient occasion	

Note A: to establish newly replacement plan when total points include points marked with *.
Note B: to establish long term replacement plan.
Mark * It is considerd necessary to take immediate repaire.
Mark # It is considered necessary to establish replacement plan.

Table B.8 Life Assessment for Metal-enclosed Switchgear

Plant	Soroca-Balti	**Date**		July 31,2001
Location	PS-II	**Evaluated by**		T.furukawa
Objective	10KV switchgear	**Replacement Class**		A
Rating	10KV, 630A, 20KA	Class A: to replace equipment when approaching average of life of parts		

	No.	Evaluation Items	Weighted points	Points evaluated	Remarks
Duration year	A1	over 25 years	#7		
	A2	between 20 to 24 years	#5	5	
	A3	between 15 to 19 years	3		
	A4	between 10 to 14 years	1		
Deteriorated conditions	B1	Cracks, discolored area, or corona tracking on molded transformer, PCT, and DS	*25		
	B2	Cracks, discolored area, or corona tracking on bushings	*25		
	B3	Overheat or discolored areas on main conductors and termination of power cables	*20		
	B4	Corrosion on main conductors and termination of power cables	10		
	B5	Loose connection on auxiliary relays	10	10	
	B6	Damage, corrosion, or discolored areas on terminal boards of control circuits	*10	10	
	B7	Out of tolerance of characteristic on instruments and relays	*10		
	B8	Evidence of silver migration on insulation plate for electrical parts and devices	*10		
	B9	Deterioration of insulation materials for electrical parts and devices owing to UV rays	10		
	B10	Water leak from cover plate or door owing to it's corrosion	10		
	B11	Dirt on filters which block ventilation	5		
	B12	Dirt on insulation material of main conductors	5	5	
	B13	Deterioration of insulation resistance on control circuits	5		
	B14	Excess use of fuses over guaranteed period or excess use of relays which replacement parts are not available.	3	3	
	B15	Corrosion partly on cover plate, ventilator, floor, or front/or rear side of door.	3	3	
Environmental conditions	C1	Rain water remained in cable pits for a long period	10		
	C2	Exposure of corrosive atmosphere such as sea breeze, a chlorine stench, dirt.	10		
	C3	Presence of vermin (a footprint)	5		
	C4	Presence of high humidity (condensation)	3		
	C5	Ambient temperature exceeding design value	3		
	C6	Location close to abnormal vibration source	3		
Abnormal conditions	D1	**Presence of an offensive smell such as overheat or ozone, or presence of abnormal sound**	*25		
	D2	Inundation or flood	*25		
	D3	Mechanical noise such as a groan	*10		
	D4	**Excessive corrosion or excessive stain on front /or rear surface of enclosure or electrical devices**	*15		
		Total points evaluated (TPE)		36	

Code	TPE	Necessary measures	Remarks
(I)	over 25	to perform major maintenance and testing	Note A
(II)	15 to 24	to perform major maintenance and testing	Note B
(III)	less than 14	to perform major maintenance and testing	
(IV)	less than 10	to perform inspection or repair at convenient occasion	

Note A: to establish newly replacement plan when total points include points marked with *.
Note B: to establish long term replacement plan.
Mark * It is considerd necessary to take immediate repaire.
Mark # It is considered necessary to establish replacement plan.

Table B.9 Life Assessment for Metal-enclosed Switchgear

Plant	Soroca-Balti	**Date**		July 31,2001
Location	PS-III	**Evaluated by**		T.furukawa
Objective	10KV switchgear	**Replacement Class**		A
Rating	10KV, 630A, 20KA	Class A: to replace equipment when approaching average of life of parts		

	No.	Evaluation items	Weighted points	Points evaluated	Remarks
Duration year	A1	over 25 years	#7		
	A2	between 20 to 24 years	#5	5	
	A3	between 15 to 19 years	3		
	A4	between 10 to 14 years	1		
Deteriorated conditions	B1	Cracks, discolored area, or corona tracking on molded transformer, PCT, and DS	*25		
	B2	Cracks, discolored area, or corona tracking on bushings	*25		
	B3	Overheat or discolored areas on main conductors and termination of power cables	*20		
	B4	Corrosion on main conductors and termination of power cables	10		
	B5	Loose connection on auxiliary relays	10	10	
	B6	Damage, corrosion, or discolored areas on terminal boards of control circuits	*10	10	
	B7	Out of tolerance of characteristic on instruments and relays	*10		
	B8	Evidence of silver migration on insulation plate for electrical parts and devices	*10		
	B9	Deterioration of insulation materials for electrical parts and devices owing to UV rays	10		
	B10	Water leak from cover plate or door owing to it's corrosion	10		
	B11	Dirt on filters which block ventilation	5		
	B12	Dirt on insulation material of main conductors	5	5	
	B13	Deterioration of insulation resistance on control circuits	5		
	B14	Excess use of fuses over guaranteed period or excess use of relays which replacement parts are not available.	3	3	
	B15	Corrosion partly on cover plate, ventilator, floor, or front/or rear side of door.	3	3	
Environmental conditions	C1	Rain water remained in cable pits for a long period	10		
	C2	Exposure of corrosive atmosphere such as sea breeze, a chlorine stench, dirt.	10		
	C3	Presence of vermin (a footprint)	5		
	C4	Presence of high humidity (condensation)	3		
	C5	Ambient temperature exceeding design value	3		
	C6	Location close to abnormal vibration source	3		
Abnormal conditions	D1	**Presence of an offensive smell such as overheat or ozone, or presence of abnormal sound**	*25		
	D2	Inundation or flood	*25		
	D3	Mechanical noise such as a groan	*10		
	D4	**Excessive corrosion or excessive stain on front /or rear surface of enclosure or electrical devices**	*15		
		Total points evaluated (TPE)		36	

Code	TPE	Necessary measures	Remarks
(I)	over 25	to perform major maintenance and testing	Note A
(II)	15 to 24	to perform major maintenance and testing	Note B
(III)	less than 14	to perform major maintenance and testing	
(IV)	less than 10	to perform inspection or repair at convenient occasion	

Note A: to establish newly replacement plan when total points include points marked with *.
Note B: to establish long term replacement plan.
Mark * It is considerd necessary to take immediate repaire.
Mark # It is considered necessary to establish replacement plan.

Table B.10 Life Assessment for Metal-enclosed Switchgear

Plant	Soroca-Balti	**Date**		July 31.2001
Location	PS-IV	**Evaluated by**		T.furukawa
Objective	10KV switchgear	**Replacement Class**		A
Rating	10KV, 630A, 20KA	Class A: to replace equipment when approaching average of life of parts		

	No.	Evaluation Items	Weighted points	Points evaluated	Remarks
Duration year	A1	over 25 years	#7		
	A2	between 20 to 24 years	#5	5	
	A3	between 15 to 19 years	3		
	A4	between 10 to 14 years	1		
Deteriorated conditions	B1	Cracks, discolored area, or corona tracking on molded transformer, PCT, and DS	*25		
	B2	Cracks, discolored area, or corona tracking on bushings	*25		
	B3	Overheat or discolored areas on main conductors and termination of power cables	*20		
	B4	Corrosion on main conductors and termination of power cables	10		
	B5	Loose connection on auxiliary relays	10	10	
	B6	Damage, corrosion, or discolored areas on terminal boards of control circuits	*10	10	
	B7	Out of tolerance of characteristic on instruments and relays	*10		
	B8	Evidence of silver migration on insulation plate for electrical parts and devices	*10		
	B9	Deterioration of insulation materials for electrical parts and devices owing to UV rays	10		
	B10	Water leak from cover plate or door owing to it's corrosion	10		
	B11	Dirt on filters which block ventilation	5		
	B12	Dirt on insulation material of main conductors	5	5	
	B13	Deterioration of insulation resistance on control circuits	5		
	B14	Excess use of fuses over guaranteed period or excess use of relays which replacement parts are not available.	3	3	
	B15	Corrosion partly on cover plate, ventilator, floor, or front/or rear side of door.	3	3	
Environmental conditions	C1	Rain water remained in cable pits for a long period	10		
	C2	Exposure of corrosive atmosphere such as sea breeze, a chlorine stench, dirt.	10		
	C3	Presence of vermin (a footprint)	5		
	C4	Presence of high humidity (condensation)	3		
	C5	Ambient temperature exceeding design value	3		
	C6	Location close to abnormal vibration source	3		
Abnormal conditions	D1	**Presence of an offensive smell such as overheat or ozone, or presence of abnormal sound**	*25		
	D2	Inundation or flood	*25		
	D3	Mechanical noise such as a groan	*10		
	D4	**Excessive corrosion or excessive stain on front /or rear surface of enclosure or electrical devices**	*15		
		Total points evaluated (TPE)		36	

Code	TPE	Necessary measures	Remarks
(I)	over 25	to perform major maintenance and testing	Note A
(II)	15 to 24	to perform major maintenance and testing	Note B
(III)	less than 14	to perform major maintenance and testing	
(IV)	less than 10	to perform inspection or repair at convenient occasion	

Note A: to establish newly replacement plan when total points include points marked with *.
Note B: to establish long term replacement plan.
Mark * It is considerd necessary to take immediate repaire.
Mark # It is considered necessary to establish replacement plan.

ANNEX C

DETERMINATION OF DIAMETERS OF TRANSMISSION PIPELINES TO RISCANI AND FALESTI

1. Distribution Plan for the Villages Along the Routes of the Transmission Pipelines to Riscani and Falestiin

In the priority project, the water supply quantity has been planned to meet the water demands of the 4 cities/towns only. However, for determining the diameters of the new pipelines to Riscani and Falesti, the water demands from the villages existing along the routes of the pipelines should be also taken into consideration for enabling future supply of water to these villages. In the Master Plan, the water demands from these villages in 2015 were projected as shown below with the distances between the distribution points.

Riscani Pipeline Section

Name of village	Water demand (m^3/day)	Distance (m)
Cirlateni	800	8,000*
Singureni	300	7,000
Recha	400	8,600
Racaria	300	6,000
Riscani	4,300	7,000
Total	6,100	36,600

Falesti Pipeline Section

Name of village	Water demand (m^3/day)	Distance (m)
Rentel	600	10,000*
Culuc	100	4,600
Catranic	200	6,000
Egorovca	200	4,600
Falesti	5,200	1,700
Total	6,300	26,900

* Distance from the branch at the end of the common section from Balti

Flow rate of the common section is estimated as 12,400 m^3/day according to the above tables. Diagram of distribution plan and lengths of pipeline sections are shown in Figure C.1.

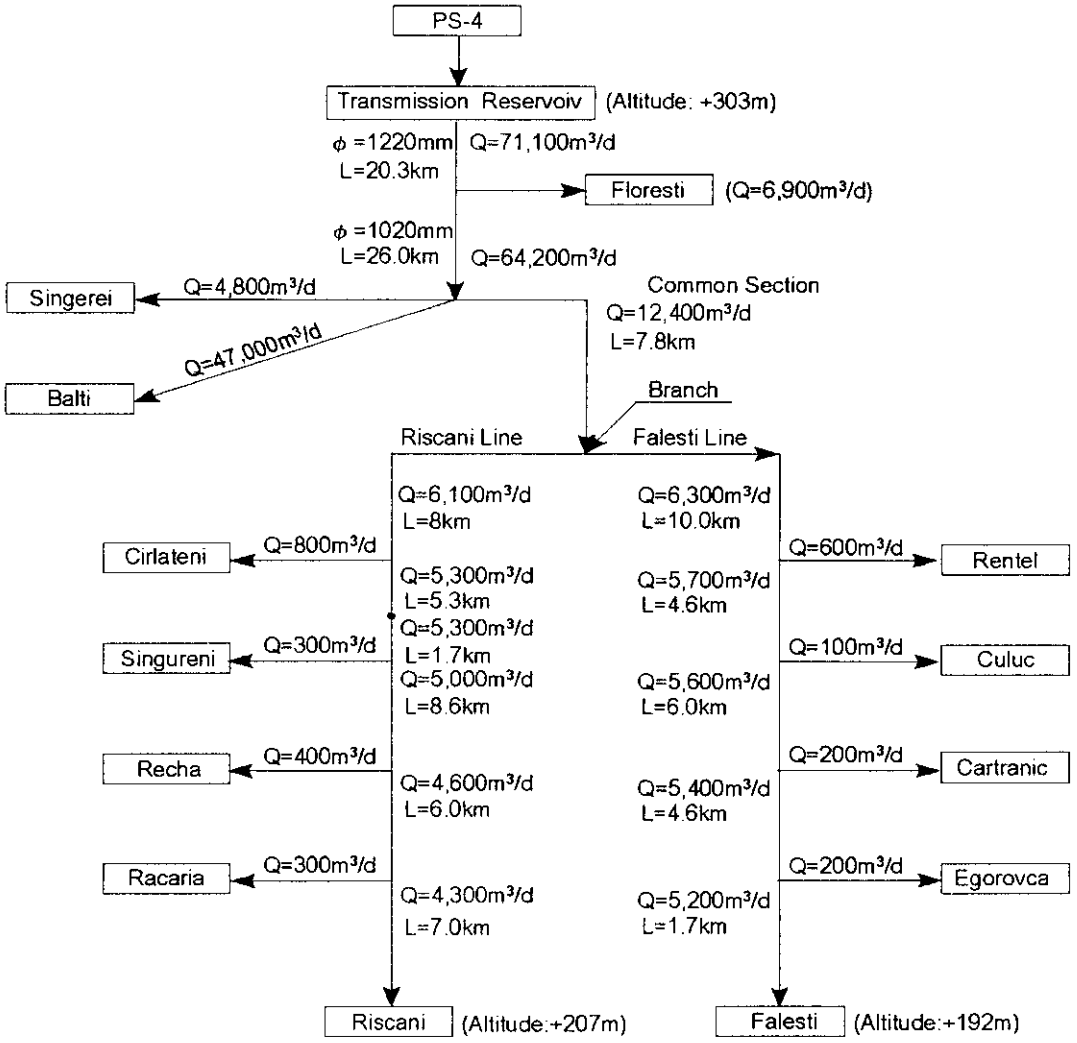

Figure C.1 Diagram of Water Distribution Plan Through the Pipelines to Riscani and Falesti

2. Computation of Friction Loss of the Pipes

Hazen-Williams formula shown below is most widely used to obtain the friction loss of pipe.

$$H=10.666 \times C^{-1.85} \times D^{-4.87} \times Q^{1.85} \times L$$

Where, H: Friction loss of pipe (m)

C: Coefficient of flow (100 for existing pipes and 110 for new ones)

D: Diameter of Pipe (m)

Q: Flow Rate (m^3/s)

L: Pipe Length (m)

Tables C.1 and C.2 show the results of computation of friction loss for Riscani and Falesti pipeline sections.

Table C.1 Optimum Size of Transmission Main to Riscani in 2015

	Name	C	D(m)	Q(m3/s)	L(m)	V(m/s)	H1(m)	H3(m)	H4 (Total Pipe Loss Head; m)	Hydrostatic Elevation(m)	Ground Elevation(m)
	No2 Transmission Reservoir									303	303m
	No2 Transmission Reservoir-Branch of Floresti	100	1.2	0.82	20300	0.73	12.32	0	12.32	290.68	
	Branch of Floresti-Reservoir in Balti	100	1	0.74	26000	0.94	31.70	0	31.70	258.98	
1	Common Section	110	0.6	0.14	7800	0.50	4.41	0	4.41	254.57	
		110	0.5	0.14	7800	0.71	10.71	0	10.71	248.27	
2	Common Section-Cirlateni	110	0.4	0.07	8000	0.56	9.03	0	9.03	245.54	
		110	0.5	0.07	8000	0.36	3.05	0	3.05	245.22	
		110	0.35	0.07	8000	0.73	17.31	0	17.31	237.26	x
3	Cirlateni-Singureni(1)	110	0.5	0.06	5300	0.31	1.52	0	1.52	243.70	239+3=242m
		110	0.4	0.06	5300	0.48	4.50	0	4.50	247.02	239+3=242m
4	Cirlateni-Singureni(2)	110	0.4	0.06	1700	0.48	1.44	0	1.44	242.26	
		110	0.35	0.06	1700	0.62	2.77	0	2.77	240.94	
5	Singureni-Recha	110	0.4	0.058	8600	0.46	6.86	0	6.86	235.40	
		110	0.35	0.058	8600	0.60	13.14	0	13.14	229.12	
6	Recha-Racaria	110	0.35	0.053	6000	0.55	7.76	0	7.76	227.64	
		110	0.4	0.053	6000	0.42	4.05	0	4.05	231.35	
7	Racaria-Riscani	110	0.35	0.05	7400	0.52	8.59	2	10.59	218.52	207m+4m = 211m
		110	0.3	0.05	7400	0.71	18.20	2	20.20	211.15	207m+4m = 211m
		110	0.4	0.05	7400	0.63	4.48	2	6.48	224.87	207m+4m = 211m

Table C.2 Optimum Size of Transmission Main to Falesti

Number	Name	C	D(m)	Q(m3/s)	L(m)	V(m/s)	H1(m)	H3(m)	H4 (Total Head; m)	Hydrostatic Elevation(m)	Ground Elevation(m)
	No2 Transmission Reservoir									303	303m
	No2 Transmission Reservoir-Branch of Floresti	100	1.2	0.82	20300	0.73	12.32	0	12.32	290.68	
	Branch of Floresti-Reservoir in Balti	100	1	0.74	26000	0.94	31.70	0	31.70	258.98	
1	Common Section	110	0.6	0.14	7800	0.50	4.41	0	4.41	254.57	
		110	0.5	0.14	7800	0.71	10.71	0	10.71	248.27	
2	Common Section-Reutel	110	0.4	0.07	10000	0.56	11.29	0	11.29	236.98	187m
		110	0.35	0.07	10000	0.73	21.64	0	21.64		
3	Reutel-Ciuluc	110	0.4	0.066	4600	0.53	4.66	0	4.66	232.32	
		110	0.35	0.066	4600	0.69	8.93	0	8.93	228.05	
4	Ciuluc-Catranic	110	0.4	0.065	6000	0.52	5.91	0	5.91	226.41	186m
		110	0.35	0.065	6000	0.68	11.32	0	11.32	216.73	
5	Catranic-Egorovca	110	0.4	0.063	4600	0.50	4.27	0	4.27		
		110	0.35	0.063	4600	0.65	8.19	0	8.19	208.54	
6	Egorovca-Falesti	110	0.35	0.06	1600	0.62	2.60	2	4.60	203.93	196m
		110	0.3	0.06	1600	0.85	5.51	2	7.51		196m
		110	0.4	0.06	1600	0.48	1.36	2	3.36		196m

3. Selection of Combination System for the Pipelines

There are several cases of combination system to meet the condition that the hydrostatic elevations at the reservoirs in Riscani and Falesti are over the planned high water levels. The following tables show the cases of combination system for the Riscani and Falesti pipelines.

CASE 4 and CASE 7 are selected for Riscani pipeline section and CASE 3 and CASE 5 are selected for Falesti pipeline section because the hydrostatic elevation at the reservoir is close to the planned high water level.

Riscani Pipeline Section

Section	1	2	3	4	5	6	7	Hydrostatic Elevation at the Reservoir (m)	Planmed High Water Lavel(m)	Adoption
	7.8km	8km	5.3km	1.7km	8.6km	6km	7.4km			
CASE 1	φ600	φ400	φ400	φ400	φ400	φ400	φ400	222.20	211m	
CASE 2	φ600	φ500	φ500	φ400	φ400	φ350	φ350	223.35	211m	
CASE 3	φ600	φ500	φ400	φ400	φ400	φ350	φ350	220.37	211m	
CASE 4	φ600	φ400	φ400	φ400	φ400	φ350	φ350	215.86	211m	○
CASE 5	φ500	φ500	φ500	φ400	φ400	φ350	φ350	217.05	211m	
CASE 6	φ500	φ500	φ500	φ400	φ350	φ350	φ350	210.76	211m	×
CASE7	φ500	φ500	φ400	φ400	φ400	φ350	φ350	214.07	211m	○

Falesti Pipeline Section

Section	1	2	3	4	5	6	Hydrostatic Elevation at the Reservoir (m)	Planned High Water Level (m)	Adoption
	7.8km	10km	4.6km	6km	4.6km	1.6km			
CASE 1	φ600	φ400	φ400	φ400	φ400	φ400	225.08	200m	
CASE 2	φ600	φ400	φ350	φ350	φ350	φ350	210.24	200m	
CASE 3	φ600	φ400	φ350	φ350	φ350	φ300	207.32	200m	○
CASE 4	φ500	φ400	φ400	φ350	φ350	φ350	208.20	200m	
CASE 5	φ500	φ400	φ350	φ350	φ350	φ350	203.93	200m	○

4. Determination of Optimum Combination of Pipeline Diameters

Unit construction cost of pipe installation is shown in the following table.

Pipe Diameter (mm)	Material Cost (US$/m)	Installation Cost (US$/m)	Unit Construction Cost (US$/m)
ϕ 300	70	29	99
ϕ 350	75	29	104
ϕ 400	86	34	120
ϕ 500	115	38	153
ϕ 600	140	48	188

Construction cost of the combination of CASE 4 (Riscani) and CASE 3 (Falesti) estimated based on above unit costs is shown below.

Pipe Diameter (mm)	Length (m)	Unit Cost (US$/m)	Construction Cost (US$)
ϕ 300	1,600	99	158,400
ϕ 350	28,600	104	2,974,400
ϕ 400	33,600	120	4,032,000
ϕ 600	7,800	188	1,466,400
Total	71,600		8,631,200

Construction cost of the combination of CASE 7 (Riscani) and CASE 5 (Falesti) is shown below.

Pipe Diameter (mm)	Length (m)	Unit Cost (US$/m)	Construction Cost (US$)
ϕ 350	30,200	104	3,140,800
ϕ 400	25,600	120	3,072,000
ϕ 500	15,800	153	2,417,400
Total	71,600		8,630,200

The combination of CASE 7 (Riscani) and CASE 5 (Falesti) is selected as the optimum combination of diameters for the transmission pipelines because of economy and simplicity.

5. Hydraulic Profile Corresponding to the Water Demand in the Priority Project

Hydraulic profile of transmission pipeline to Riscani and Falesti corresponding to the water demand in the priority project is obtained using the Hazen-Williams formula. The result of the computation is shown in the following tables.

Table. Pipe Loss Computation for F/S from No. 2 Transmissin Reservoir to Receiving Reservoir in Riscani

Name	C	D (m)	Q (m3/s)	L (m)	V (m/s)	H1 (m)	H2 (m)	H3 (Total Pipe Loss;m)	Hydrostatic Elevation (m)
No.2 Transmission Reservoir									303
No.2 Transmission Reservoir-Branch Point to Floresti	100	1.2	0.63	20300	0.56	7.56	0	7.56	295.44
Branch Point to Floresti-Reservoir in Balti	100	1	0.63	26000	0.8	23.54	0	23.54	271.9
Reservoir in Balti-Common Section	110	0.5	0.11	7800	0.56	6.86	0	6.86	265.04
Common Section-Riscani (1)	110	0.5	0.05	8000	0.25	1.64	0	1.64	263.4
Common Section-Riscani (2)	110	0.4	0.05	15600	0.4	9.45	0	9.45	253.95
Common Section-Riscani (3)	110	0.35	0.05	13400	0.52	15.56	0	15.56	238.39
Total				91100				64.61	

Table. Pipe Loss Computation for F/S from No. 2 Transmissin Reservoir to Receiving Reservoir in Falesti

Name	C	D (m)	Q (m3/s)	L (m)	V (m/s)	H1 (m)	H2 (m)	H3 (Total Pipe Loss;m)	Hydrostatic Elevation (m)
No.2 Transmission Reservoir									303
No.2 Transmission Reservoir-Branch Point to Floresti	100	1.2	0.63	20300	0.56	7.56	0	7.56	295.44
Branch Point to Floresti-Reservoir in Balti	100	1	0.63	26000	0.8	23.54	0	23.54	271.9
Reservoir in Balti-Common Section	110	0.5	0.11	7800	0.56	6.86	0	6.86	265.04
Common Section-Falesti (1)	110	0.4	0.06	10000	0.48	8.49	0	8.49	256.55
Common Section-Falesti (2)	110	0.35	0.06	16800	0.62	27.33	0	27.33	229.22
Total				80900				73.78	