別添資料

別添資料

別添資料－1　調査団員・氏名

別添資料1. 調査団員・氏名

(1)第一次現地調査　本調査：2016 年 6 月 2 日～7 月 7 日

補完調査：7 月 28 日～9 月 16 日・10 月 17 日～10 月 21 日

氏名	担当業務	所属
大嶋 一成	総括	JICA 国際協力専門員
内藤 武司	計画管理	JICA 産業開発・公共政策部 資源・エネルギー第一チーム
森 和義	業務主任/電力計画	株式会社アジア共同設計コンサルタント
福井 英雄	変電設備	株式会社アジア共同設計コンサルタント
元山 峰夫	施設計画/自然条件/積算	株式会社アジア共同設計コンサルタント
吉田 和芳	系統解析	株式会社アジア共同設計コンサルタント
奥村 哲郎	送電設備	株式会社アジア共同設計コンサルタント
中村 登	配電設備	株式会社アジア共同設計コンサルタント
山本 重成	環境社会配慮/自然条件	株式会社アジア共同設計コンサルタント
花村 信	調達計画/積算	株式会社アジア共同設計コンサルタント
鈴木 悟	調達計画/積算	株式会社アジア共同設計コンサルタント
根本 和明	土木	株式会社アジア共同設計コンサルタント
三戸 拓実	業務調整（自社負担）	株式会社アジア共同設計コンサルタント

(2)第二次現地調査（2017 年 1 月 9 日～20 日）

氏名	担当業務	所属
大嶋 一成	総括	JICA 国際協力専門員
内藤 武司	協力計画	JICA 産業開発・公共政策部 資源・エネルギー第一チーム
花村 信	業務主任/電力計画	株式会社アジア共同設計コンサルタント
吉田 和芳	系統解析	株式会社アジア共同設計コンサルタント
山本 重成	環境社会配慮	株式会社アジア共同設計コンサルタント
三戸 拓実	業務調整（自社負担）	株式会社アジア共同設計コンサルタント

別添資料－２　調査工程

別添資料2. 調査工程

(1) 第 1 次現地調査（本調査：2016 年 6 月 2 日～7 月 7 日）

日付	活動	場所	主要面談者
2016/5/31 (火)	日本を出国		
6/1(水)	資料整理		
6/2(木)	JICA Tajikistan 調査説明 BT&MoEWR 本件プロジェクトカウンターパート決定	JICA Tajikistan MoEWR	JICA Tajikistan: 石井支所長、此原調整員 MoEWR: Mr. Jamshed Shoimzoda (Deputy Minister) MoEWR: Mr. Parviz Atoev (Head of Int'l Dept) MoEWR: Mr. Parviz Yakhyoev (Chief Specialist) BT: Mr. Sharipov Rezvon (Planning Manager) BT: Mr. Giosov Abduvarob (Doshanbe City Electric Deputy Chief Engineer)
6/3(金)	BT & MoEWR とサイト視察	グラポチタント、グラブナヤ、 ラディオスタンツィヤ、 プロミシレンナヤ	MoEWR: Mr. Parviz Atoev (Head of Int'l Dept) MoEWR: Mr. Parviz Yakhyoev (Chief Specialist) BT: Mr. Sharipov Rezvon (Planning Manager) BT: Mr. Giosov (Doshanbe City Electric Deputy Chief Engineer)
6/4(土)	団内会議、資料整理		
6/5(日)			
6/6(月)	JICA Tajikistan 調査説明 BT&MoEWR 本件プロジェクト及び無償スキーム説明	 AM: JICA PM: MoEWR	JICA Tajikistan: 石井所長、此原調整員 JICA 大嶋総括、内藤氏 MoEWR: Mr. Manuecher Safasov (Head of Investment Dept) MoEWR: Mr. Parviz Atoev (Head of Int'l Dept) MoEWR: Mr. Parviz Yakhyoev (Chief Specialist) BT: Mr. Sharipov Rezvon (Planning Manager) BT: Mr. Giosov (Doshanbe City Electric Deputy Chief Engineer)
6/7(火)	サイト視察 現地施工業者からの情報収集	グラポチタント変電所 （既設変電所） グラポチタント ラディオスタンツィヤ変電所 （新設予定地） MoEWR BT Avtostrada 社 Services 社	Mr. Tojiddin JICA 大嶋総括、内藤氏 MoEWR: Mr. Parviz Atoev (Head of Int'l Dept) MoEWR: Mr. Parviz Yakhyoev (Chief Specialist) BT: Mr. Sharipov Rezvon (Planning Manager) Mr. Giosov (Deputy Chief Engineer) Avtostrada 社 Mr. Usmon Sidiko (Director) Eurasian Consulting & Engineering Services 社 Mr. Abdurashid Shukurov(Director)、 Mr. Akhlidin Davlatbekov (Project Manager)
6/8(水)	AM 団内会議 PM 資料整理		
6/9(木)	PM 在タジキスタン日本国大使館 M/D(案)策定	在タジク日本国大使館 MoEWR	EoJ: 二等書記官 田村 知栄 MoEWR: Mr. Parviz Atoev (Head of Int'l Dept) MoEWR: Mr. Parviz Yakhyoev (Chief Specialist) BT: Mr. Sharipov Rezvon (Planning Manager) BT: Mr. Giosov (Doshanbe City Electric Network、 Deputy Chief Engineer)

6/10(金)	AM 他ドナーからの情報入手 BT&MoEWR: M/D 協議、調印	ADB MoEWR	ADB: Mr. Bouadokpheng Chansavat (Portfolio Management Specialist) MoEWR: Mr. Parviz Atoev (Head of Int'l Dept) MoEWR: Mr. Parviz Yakhyoev (Chief Specialist) BT: Mr. Sharipov Rezvon (Planning Manager) Dushanbe City Electric Network: Mr.Ghiyosov Abduvarob (Deputy Chief Engineer)
6/11(土)	AM 現地調査 PM 資料整理	グラブナヤ– グラポチタント 送電線ルート	Integral LLC 社 Mr. Shamsudino Shambe (General Director) Mr. Aliev Mahmadvazir (Chief Engineer) Mr. Sabzov Rasul (Group Leader)
6/12(日)	資料整理		
6/13(月)	カウンターパートからの情報入手	MoEWR BT	MoEWR: Mr. Parviz Yakhyoev (Chief Specialist) BT: Mr. Behruz Misbohov (Duty Manager)
6/14(火)	カウンターパートからの情報入手 エンジニアリングコンサルタントからの情報入手	MoEWR Dushanbe City Electric Network	MoEWR: Mr. Parviz Yakhyoev (Chief Specialist) Dushanbe City Electric Network: Mr.Ghiyosov Abduvarob (Deputy Chief Engineer) Bark Sokhtmon Loihakash 社 Mr. Ibragimov Komiljon Holmurodov (General Director)
6/15(水)	カウンターパートからの情報入手 エンジニアリングコンサルタントからの情報入手 運送業者からの情報入手	Committee for Environmental Protection	Committee for Environmental Protection: Mr. Sudurov Saidismon (Head of Ecological Expertise Department) ARAL-NERU 社 Muzaffari Mukhriddin (Director) Globalink 社 Mr. Masrur Kasimov (Fright Forwarding Manager) ABM 社 Mr. Abdulloev Bakhtyot (Commercial Director)
6/16(木)	カウンターパートからの情報入手 エンジニアリングコンサルタントからの情報入手 運送業者からの情報入手 変圧器販売代理店からの情報入手	Committee for Environmental Protection Integral LLC 社 M&M 社 TLM 社	Mr. Sudurov Saidismon (Head of Ecological Expertise Department) Mr. Shamsudino Shambe (General Director) Mr. Aziz Sharipov (Managing Director) Mr. Sheraliev Tohir (Director) Mr. Cao Yadong (Director)
6/17(金)	カウンターパートからの情報入手 変圧器販売代理店からの情報入手	MoEWR Committee for Environmental Protection Tol Sokhtmon 社	Mr. Parviz Yakhyoev (Chief Specialist) Mr.Sudurov Saidismon(Head of Atmosphere) Mr. Darlatov Azam (Director)
6/18(土)	カウンターパートからの情報入手	Committee for Environmental	Mr. Sudurov Saidismon (Head of Ecological Expertise Department)

		Protection	
6/19(日)	資料整理		
6/20(月)	カウンターパートからの情報入手 エンジニアリングコンサルタントからの情報入手	MoEWR ENERGOSETPROEKT 社	Mr. Parviz Yakhyoev (Chief Specialist) Mr.Makhamdamin Aminov (Director)
6/21(火)	カウンターパートからの情報入手	Committee for Environmental Protection MoEWR	Mr. Sudurov Saidismon (Head of Ecological Expertise Department) Mr. Parviz Yakhyoev (Chief Specialist)
6/22(水)	環境社会配慮コンサルタントへの見積もり入手	COLIBRILAW 社	
6/23(木)	カウンターパートからの情報入手	MoEWR Dushanbe Thermal Power Plant-2	Mr. Parviz Yakhyoev (Chief Specialist) Mr. Murod:Dushanbe Thermal Power Plant-2 Deputy Head
6/24(金)	1.カウンターパートからの情報入手 2.ドゥシャンベ火力発電所訪問 3.Nurek 水力発電所訪問 4.電気工事会社：ENERGOSETPROEKT 社への引合	1.BT 2.Duushanbe Thermal Plant 3.Nurek Power PLant	1.B.T. Mr.Kharimov Mirovich (First Executive Director) 2.D.P.P.2 Mr.Sayfulloev Kiyomidir(Chief Engineer) 3.B.T. Abduvahob Ghiyosov 4.Mr.Makhmandamin Aminov
6/25(土)	資料整理		
6/26(日)	資料整理：現地調査報告概要作成		
6/27(月)	団内 TV 会議： ① M/D 内容確認 ② 3 社見積状況 ③ 技術打合せ	Atlas Hotel	
6/28(火)	カウンターパートからの情報入手	MoEW CEP	Mr. Parrviz Yakhiev (Chief Specialist) Mr. Sudurov Saidismon(Head of Atmosphere)
6/29(水)	カウンターパートからの情報入手	MoEW CEP	Mr. Parrviz Yakhiev (Chief Specialist) Mr.Sudurov Saidismon(Head of Atmosphere)
6/30(木)	カウンターパートからの情報入手	1.MoEW CEP 2.B.T.	1.Mr.Sudurov Saidismon (Head of Atmosphere) 2.Mr.Ghiyosov Abduvarob (Deputy Chief Engineer) Mr.Sharipov
7/1(金)	Promyshelennaya 変電所、BT と共同調査	PromyshelennayaSS	Mr.Kharimov Mirovich (First Executive Director) Mr.Ghiyosov Abduvarob (Deputy Chief Engineer)
7/2(土)	環境社会配慮調査委託契約	Atlas Hotel	Colibri Law Firm LLC：Mr. Khujanazar Aslamshoev
7/3(日)	資料整理、帰国報告準備		
7/4(月)	カウンターパートからの情報入手	MoEW CEP Colibri Law	Mr.Parviz Yakoev (Chief Specialist) Mr.Sudurov Saidismon(Head of Atmosphere) Mr. Alisher Khosimov
7/5(火)	1.カウンターパートからの情報入手 2.帰国報告会（TV 会議）	BT JICA	Mr.Kharimov Mirovich (First Executive Director) Mr. Sharipov、
7/6(水)	資料整理		
7/7(木)	C/N へのサイン取得	BT	Mr.Kharimov Mirovich (First Executive Director)

			Mr. Sharipov Rezvon (Planning Manager)
7/8(金)	資料整理		
7/9(土)	日本へ帰国		

(2) 第 1 次現地調査 (補完調査-1：2016 年 7 月 28 日～9 月 16 日)

日付	活動	場所	主要面談者
7/27(水)	日本を出国	成田	
7/28(木)	カウンターパートからの情報入手 JICA タジキスタン支所訪問	Colibri Law Farm LLC MoEWR CEP JICA タジキスタン支所	Mr. Alisher Khoshimov (Senior Associate) Mr. Shirinbek Milibekov (Senior Associate) Mr. Parviz Yakhiev (Chief Specialist) Mr. Shukurov Isfandiyor (Head of Ecological Expertise Department) Mr. Sudurov Saidismon(Head of Atmosphere) 此原様
7/29(金)	Colibri Law Farm LLC 訪問	Colibri Law Farm LLC	Mr. Shirinbek Milibekov、 Senior Associate
7/30(土)	資料整理		
7/31(日)	資料整理		
8/1(月)	カウンターパートからの情報入手	MoEWR CEP	Mr. Parviz Yakhiev (Chief Specialist) Mr. Shukurov Isfandiyor
8/2(火)	Colibri Law Farm LLC 訪問 カウンターパートからの情報入手 地下ケーブル敷設ルート環境影響調査	Colibri Law Farm LLC MoEWR 地下ケーブル敷設ルート（Ⅰ-Route ドゥシャンベ川沿いルート）	Mr. Shirinbek Milibekov(Senior Associate) Mr. Parviz Yakhiev (Chief Specialist)
8/3(水)	既設の Glavnaya 変電所から新設のグラポチタント変電所への 110kV 電源用地下ケーブル敷設ルートに関する打ち合わせ	ATLAS ホテル	Mr. Farohob Nurkhahob (通訳)
8/4(木)	既設の Glavnaya 変電所から新設のグラポチタント変電所への 110kV 電源用地下ケーブル敷設ルート写真図作成	ATLAS ホテル	
8/5(金)	カウンターパートからの情報入手	MoEWR CEP	Mr. Parviz Yakhiev (Chief Specialist) Mr. Shukurov Isfandiyor (Head of Ecological Expertise Department) Mr. Sudurov Saidismon(Head of Atmosphere)
8/6(土)	資料整理		
8/7(日)	資料整理		
8/8(月)	・地下ケーブル敷設ルート環境影響調査	地下ケーブル敷設ルート（Ⅰ-Route ドゥシャンベ川沿いルート：Ⅰ-B：	

	・Colibri Law Farm LLC 訪問	緑地帯ルート） Colibri Law Farm LLC	Mr Khujanazar Aslamshoev:(General Director) Mr. Alisher Khoshimov(Senior Associate) Mr. Shirinbek Milibekov
8/9(火)	カウンターパートからの情報入手	CEP	Mr. Shukurov Isfandiyor
8/10(水)	カウンターパートからの情報入手	MoEWR	Mr. Parviz Yakhiev　(Chief Specialist)
8/11(木)	Colibri Law Farm LLC 訪問	Colibri Law Farm LLC	Mr Khujanazar Aslamshoev:(General Director) Mr. Alisher Khoshimov(Senior Associate) Mr. Shirinbek Milibekov
8/12(金)	JICA タジキスタン支所訪問	JICA タジキスタン支所	石井支所長、井上職員、此原様
8/13(土)	資料整理		
8/14(日)	資料整理		
8/15(月)	カウンターパートからの情報入手	MoEWR	Mr. Parviz Yakhiev (Chief Specialist)
8/16(火)	Colibri Law Farm LLC 訪問 カウンターパートからの情報入手	Colibri Law Farm LLC CEP	Mr. Khujanazar Aslamshoev(General Director) Mr. Alisher Khoshimov (Senior Associate) Mr. Shirinbek Milibekov (Senior Associate) Mr. Shukurov Isfandiyor (Head of Ecological Expertise Department)
8/17(水)	カウンターパートからの情報入手	MoEWR	Mr. Parviz Yakhiev (Chief Specialist)
8/18(木)	安全対策連絡協議会	在タジキスタン日本大使館	北岡大使、・峰嵜二等書記官・領事、田村二等書記官、柏崎危機管理担当 JICA 石井支所長、井上所員
8/19(金)	GIINTIZ 訪問 Colibri Law Farm LLC 訪問	GIINTIZ Colibri Law Farm LLC	Mr. Saidov R Sfarovich (Director) Mr. Khujanazar Aslamshoev (General Director) Mr. Alisher Khoshimov (Senior Associate) Mr. Shirinbek Milibekov (Senior Associate)
8/20(土)	資料整理		
8/21(日)	資料整理		
8/22(月)	カウンターパートからの情報入手	BT	Mr. Sharipov Rezvon (Planning Manager) Mr. Rahmatov
8/23(火)	現地サイト調査	Glavnaya グラポチタント Radiostansiya Promishlenaya	Mr.Ghiyosov Abduvarob (Deputy Chief Engineer)
8/24(水)	カウンターパートからの情報入手	MoEWR	Mr. Parviz Yakhiev (Chief Specialist)
8/25(木)	Colibri Law Farm LLC 訪問		Mr. Khujanazar Aslamshoev(General Director) Mr. Alisher Khoshimov (Senior Associate) Mr. Shirinbek Milibekov (Senior Associate)
8/26(金)	優先順位、基本設計に関する協議	BT	Mr.Kharimov Mirovich (First Executive Director) Mr. Sharipov Rezvon (Planning Manager)

8/27(土)	資料整理		
8/28 (日)	資料整理		
8/29 (月)	見積・見積情報の入手	Giintiz	
8/30 (火)	見積・見積情報の入手 サイト調査 カウンターパートヒアリング	Giintiz Cable Route BT MoEWR DCEN	Mr. Sharipov Rezvon (Planning Manager) Mr. Manuecher Safasov (Head of Investment Department) Mr. Parviz Atoev (Head of International Department) Mr. Parviz Yakhyoev (Chief Specialist of International Department Mr.Ghiyosov Abduvarob (Deputy Chief Engineer)
8/31 (水)	見積・見積情報の入手	PMK-14	
9/1 (木)	見積・見積情報の入手	Global Group	
9/2 (金)	見積・見積情報の入手 サイト調査 カウンターパートヒアリング	Barksoftmon Cable Route BT MoEWR DCEN	Mr. Sharipov Rezvon (Planning Manager) Mr.Ghiyosov Abduvarob (Deputy Chief Engineer)
9/3 (土)	資料整理		
9/4 (日)	資料整理		
9/5 (月)	見積・見積情報の入手	Asfalt Betcon	
9/6 (火)	見積・見積情報の入手 サイト調査 カウンターパートヒアリング	Integral Cable Route BT MoEWR DCEN	Mr. Sharipov Rezvon (Planning Manager) Mr.Ghiyosov Abduvarob (Deputy Chief Engineer)
9/7 (水)	見積・見積情報の入手	Poyanda	
9/8 (木)	見積・見積情報の入手	Romsar	
9/9 (金)	見積・見積情報の入手	Dilshod-N	
9/10 (土)	資料整理		
9/11 (日)	資料整理		
9/12 (月)	見積・見積情報の入手	Anushico	
9/13 (火)	見積・見積情報の入手	Tajikgidroelectro montaj	
9/14 (水)	見積・見積情報の入手	Integral	

9/15 (木)	見積・見積情報の入手	Barksoftmon	
9/16 (金)	見積・見積情報の入手		
9/17 (土)	日本へ出国		

(3) 第 1 次現地調査 (補完調査-2：2016 年 10 月 17 日～10 月 21 日)

日付	活動	場所	主要面談者
10/15(土)	日本を出国		
10/16 (日)	資料整理		
10/17 (月)	訪問目的説明	MoEWR CEP BT DCEN	Mr. Sharipov Rezvon (Planning Manager) Mr.Ghiyosov Abduvarob (Deputy Chief Engineer)
10/18 (火)	協議 訪問目的説明	MoEWR BT DCEN JICA タジキスタン支所	Mr. Sharipov Rezvon (Planning Manager) Mr.Ghiyosov Abduvarob (Deputy Chief Engineer)
10/19 (水)	サイト協議	3 変電所	
10/20 (木)	CN 協議・サイン	BT MoEWR	Mr. Sharipov Rezvon (Planning Manager)
10/21 (金)	技術協議	BT MoEWR	Mr. Sharipov Rezvon (Planning Manager)
10/22 (土)	日本へ出国		

(4) 第 2 次現地調査（2017 年 1 月 9 日～20 日）

日付	活動	場所	主要面談者
2017/1/6 (金)	日本を出国		
2017/1/7 (土)	移動		
2017/1/8 (日)	＊団内ミーティング		
1/9(月)	プロジェクト説明	MoEWR BT CEP	Mr. Manuecher Safasov (Head of Investment Department) Mr. Parviz Atoev (Head of International Department) Mr. Parviz Yakhyoev (Chief Specialist of International Department Mr. Sharipov Rezvon (Planning Manager) Mr. Shukurov Isfandiyor (Head of Ecological Expertise Department) Mr. Sudurov Saidismon(Head of Atmosphere)
1/10(火)	MD 協議	MoEWR JICA Tajikistan Offfice	Mr. Usmonali Usmonzoda(Minister) Mr. Jamshed Shoimzoda(Duputy Minister) Mr.Asozoda Mahmadumar(First Duputy Chairman) Mr. Manuecher Safasov (Head of Investment Department) Mr. Parviz Atoev (Head of International Department) Mr. Parviz Yakhyoev (Chief Specialist of International Department Mr.Kazunari Oshima Mr.Takeshi Naito
1/11(水)	MD 協議	MoEWR	Mr. Usmonali Usmonzoda(Minister) Mr. Jamshed Shoimzoda(Duputy Minister) Mr.Asozoda Mahmadumar(First Duputy Chairman) Mr. Manuecher Safasov (Head of Investment Department) Mr. Parviz Atoev (Head of International Department) Mr. Parviz Yakhyoev (Chief Specialist of International Department Mr.Kazunari Oshima Mr.Takeshi Naito
1/12(木)	免税項目・免税手続 報告書（案）の協議	Ministry of Finance BT	Mr. Latifov Umed Barotovich Mr. Sharipov Rezvon (Planning Manager)
1/13(金)	会社情報の確認	Tajikgidroelectromantaji	Mr. Muhammadiev Tulkin Rahmatjonovich
1/14(土)	報告書（案）の確認 M/D の内容の最終確認 M/D サイン	BT MoEWR MoEWR	Mr. Sharipov Rezvon (Planning Manager) Mr. Usmonali Usmonzoda(Minister) Mr. Jamshed Shoimzoda(Duputy Minister) Mr.Mirzo Ismoilzoda(Chairman) Mr.Asozoda Mahmadumar(First Duputy Chairman) Mr. Manuecher Safasov (Head of Investment Department) Mr. Parviz Atoev (Head of International Department) Mr. Parviz Yakhyoev (Chief Specialist of International Department Mr. Ken Inoue Mr.Kazunari Oshima Mr.Takeshi Naito
1/15(日)	団内ミーティング		
1/16(月)	現場調査	BT	Mr. Giosov Abduvahob
1/17(火)	報告書（案）最終確認 相手国負担事項確認	BT MoEWR	Mr. Sharipov Rezvon (Planning Manager) Mr. Manuecher Safasov (Head of Investment Department)
1/18(水)	技術協議 報告書（案）サイン	MoEWR BT	Mr. Manuecher Safasov (Head of Investment Department) Mr. Sharipov Rezvon (Planning Manager)
1/19(木)	業者ヒアリング 調査結果報告	Barksoftmon JICA タジキスタン事務所	Mr. Ibragimov Komiljon Holmurodov (General Director) Mr. Ken Inoue
1/20(金)	変圧器輸送ルート調査		
1/21(土)	日本へ出国		

別添資料－３　タジキスタン関係者リスト

別添資料3. タジキスタン関係者リスト

Ministry of Energy and Water Resources of the Republic of Tajikistan (MoEWR)

Mr. Usmonali Usmonzoda	Minister
Mr. Jamshed Shoimzoda	Deputy Minister
Mr. Manuecher Safasov	Head of Investment Department
Mr. Parviz Atoev	Head of International Department
Mr. Parviz Yakhyoev	Chief Specialist of International Department

Barki Tojik

Mr.Mirzo Ismoilzoda	Chair man
Mr.Asozoda Mahmadumar	First Duputy Chairman
Mr. Kharimov Mirovich	First Executive Director
Mr. Sharipov Rezvon	Planning Manager

Dushanbe City Electric Network

Mr. Ghiyosov Abduvahob	Deputy Chief Engineer

Committee for Environmental Protection

Mr. Sudurov Saidismon	Head of Ecological Expertise Department

Mnistry of Finnance

Mr. Latifov Umed Barotovich	Duputy Minister

Asian Development Bank

Mr. Bouadokpheng Chansavat	Portfolio Management Specialist

Embassy of Japan in the Republic of Tajikistan

Mr.Hazime Kitaoka	Ambassador Extraordinary and Plenipotentiary
Mr.Futoshi Minezaki	Second Secretary Consul
Ms.Chie Tamura	Second Secretary
Mr.Takashi Okimoto	Third Secretary

JICA Tajikistan Office

Mr. Kiyoshi Ishii	Resident Representative
Mr. Ken Inoue	Representativ
Ms. Makiko Konohara	Project Formulation Advisor

民間業者

エンジニアリング

Integral LLC 社

Mr. Shamsudino Shambe	General Director
Mr. Aliev Mahmadvazir	Chief Engineer
Mr. Sabzov Rasul	Group Leader

Bark Sokhtmon Loihakash 社

Mr. Ibragimov Komiljon Holmurodov	General Director

Aral-Neru 社

Muzaffari Mukhriddin	Director

Energosetproekt 社

Mr.Makhamdamin Aminov	Director

Tol Sokhtmon 社

Mr. Darlatov Azam	Director

PMK-14

Mr. Halimov Murodbeg	Director

Global Group

Mr.Saylona Saidmuradova	Commercial Director

Tojikhidroelektromontaj

Mr. Muhammadiev Tulkin Rahmatjonovich	Deputy General Director

環境コンサルタント

COLIBRILAW 社

Mr.Khujanazar Aslamshoev	General Director
Mr.Alisher Khoshimov	Senior Associate

建設コンサルタント

Giintiz 社

Mr.Rahmatull Saidov	General Director
Mr.Kamolov Ravshan	Technical Director

輸送業者

Globalink 社

Mr. Masrur Kasimov	Fright Forwarding Manager

ABM Trans Service 社

Mr. Abdulloev Bakhtyot	Commercial Director

M&M Tajikistan LLC

Mr. Aziz Sharipov	Managing Director

販売代理店

TLM 社

Mr. Sheraliev Tohir	Director
Mr. Cao Yadong	Director

Poyanda

Mr. Bekir Bayoglu	Director

Romsar

Mr. Umed	Administrator

Dilshod-N

Mr. Zokirov Narzullo	General Director

Anushico

Mr. Murodov Shodi Kuvatovich	General Director

別添資料－４　協議議事録（M/D）

別添資料4. 協議議事録(M/D)

4-1.協議議事録 (M/D-1)

Minutes of Discussions
on the Preparatory Survey for the Project for
Rehabilitation of Substations in Dushanbe in the Republic of Tajikistan

In response to the request from the Government of the Republic of Tajikistan(hereinafter referred to as "Tajikistan"), the Government of Japan decided to conduct a Preparatory Survey for the Project for Rehabilitation of Substations in Dushanbe (hereinafter referred to as "the Project"), and entrusted the Preparatory Survey to Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Preparatory Survey Team for the Outline Design (hereinafter referred to as "the Team") to Tajikistan, headed by Mr. Kazunari Oshima, Senior Advisor, JICA, and is scheduled to stay in the country from 6 to 10 June, 2016.

The Team held a series of discussions with the officials concerned of the Government of Tajikistan and conducted a field survey in the Project area. In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

Dushanbe, June 30, 2016

Kiyoshi Ishii
Resident Representative
Japan International Cooperation Agency
Tajikistan Office

Jamshed Shoimzoda
Deputy Minister
Ministry of Energy and Water Resources of the Republic of Tajikistan

Asozoda Mahmadumar
First Deputy Chairman
Open Joint Stock Holding Company "Barki Tojik"

ATTACHEMENT

1. Objective of the Project
The objective of the Project is to improve sustainability of stable and efficient power supply in Dushanbe city by construction and rehabilitation of substations, thereby contributing to social and economic development of Tajikistan.

2. Title of the Preparatory Survey
Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Rehabilitation of Substations in Dushanbe".

3. Project Site
Both sides confirmed that the sites of the Project are in Dushanbe, which is shown in Annex 1.

4. Line Agency and Executing Agency
Both sides confirmed the line agency and executing agency as follows:
4-1. The line agency is Ministry of Energy and Water Resources, which would be the agency to supervise the executing agency.
4-2. The executing agency is Barki Tojik. The executing agency shall coordinate with all the relevant agencies to ensure smooth implementation of the Project and ensure that the Undertakings are taken by relevant agencies properly and on time. The organization charts are shown in Annex 2.

5. Items requested by the Government of Tajikistan
5-1. As a result of discussions, both sides confirmed that the items requested by the Government of Tajikistan are as follows:
- Rehabilitation of Promishlennaya substation (Replacement of all the equipment and connecting works between existing transmission line and distribution line and equipment in Promishlennaya substation).
- Construction of Substations in Radiostansiya and Glavpochtamt and connecting works between existing transmission line and distribution line and equipment in each new substation.

5-2. JICA will assess the appropriateness of the above requested items through the survey and will report findings to the Government of Japan. The final components of the Project would be decided by the Government of Japan.

6. Japanese Grant Scheme
6-1. The Tajikistan side understands the Japanese Grant Scheme and its procedures as described in Annex 3 and Annex 4, and necessary measures to be taken by the Government of Tajikistan.
6-2. The Tajikistan side understands to take the necessary measures, as described in Annex 6, for smooth implementation of the Project, as a condition for the Japanese Grant to be implemented. The detailed contents of the Annex 6 will be worked out during the survey and shall be agreed no later than by the Explanation of the Draft Preparatory Survey Report.
The contents of Annex 6 will be used to determine the following:
(1) The scope of the Project.
(2) The timing of the Project implementation.
(3) Timing and possibility of budget allocation.

Contents of Annex 6 will be updated as the Preparatory Survey progresses, and will finally be the Attachment to the Grant Agreement.

7. Schedule of the Survey

7-1. The Team will proceed with further survey in Tajikistan until 8 July, 2016.

7-2. JICA will prepare a draft Preparatory Survey Report in English and dispatch a mission to Tajikistan in order to explain its contents around December 2016.

7-3. If the contents of the draft Preparatory Survey Report is accepted in principle and the Undertakings are fully agreed by the Tajikistan side, JICA will complete the final report in English and send it to Tajikistan around April 2017.

7-4. The above schedule is tentative and subject to change.

8. Environmental and Social Considerations

8-1. The Tajikistan side confirmed to give due environmental and social considerations during implementation of the Project, and after completion of the Project, in accordance with the JICA Guidelines for Environmental and Social Considerations (April, 2010).

8-2. The Project is categorized as "B" because the Project is not located in a sensitive area, nor has sensitive characteristics, nor falls into sensitive sectors under the JICA guidelines for environmental and social considerations April 2010 , and its potential adverse impacts on the environment are not likely to be significant. The Tajikistan side confirmed to conduct the necessary procedures concerning the environmental assessment (including stakeholder meetings, Environmental Impact Assessment (EIA) /Initial Environmental Examination (IEE) and information disclosure,etc.) and make EIA/IEE report of the Project. The EIA/IEE approval shall be received from the responsible authorities and submitted to JICA by the end of October 2016. The first stakeholder meeting will be held by the end of June and informed the result JICA.

9. Other Relevant Issues

9-1. Transmission line connecting Glavnaya Substation (existing substation) and Glavpochtamt Substation (new substation)

The team and Tajikistan side confirmed that necessity of construction of 110kV transmission line cum necessary equipment from the existing Glavnaya Substation to Glavpochtamt Substation. JICA will discuss GOJ to add this component to the scope of study. After getting confirmation by GOJ, JICA will discuss with Tajikistan side the type of line (Underground or Overhead) and route.

9-2. Upgrade of transmission line to Radiostansiya Substation (new substation)

Tajikistan side will consider availability of upgrading (voltage up from 35kV to 110kV) transmission line to Radiostansiya Substation and inform the result JICA by the end of June.

9-3. Specifications of equipment in substations

The team suggests that both candidate sites for Glavapochtamt Substation and Radiostansiya Substation have enough space to install AIS type switchgear. The final selection on switchgear type will be made based on the result of geographical survey. Tajikistan side proposed that capacity of transformers in Glavapochtamt Substation is 2 X 25MVA and Radiostansiya Substation is 2 X 40MVA. Voltage class of Glavapochtamt Substation is 110/10/6 kV and Radiostansiya Substation is 110/35/10 kV. Further, Tajikistan side proposed to mount communication systems in Glavpochtamt and Radiostantsiya substations for connecting with SCADA system, which will be operational in spring 2017. As for the specifications of transformers, it will be finalized based on the result of study of demand forecast and power flow analysis.

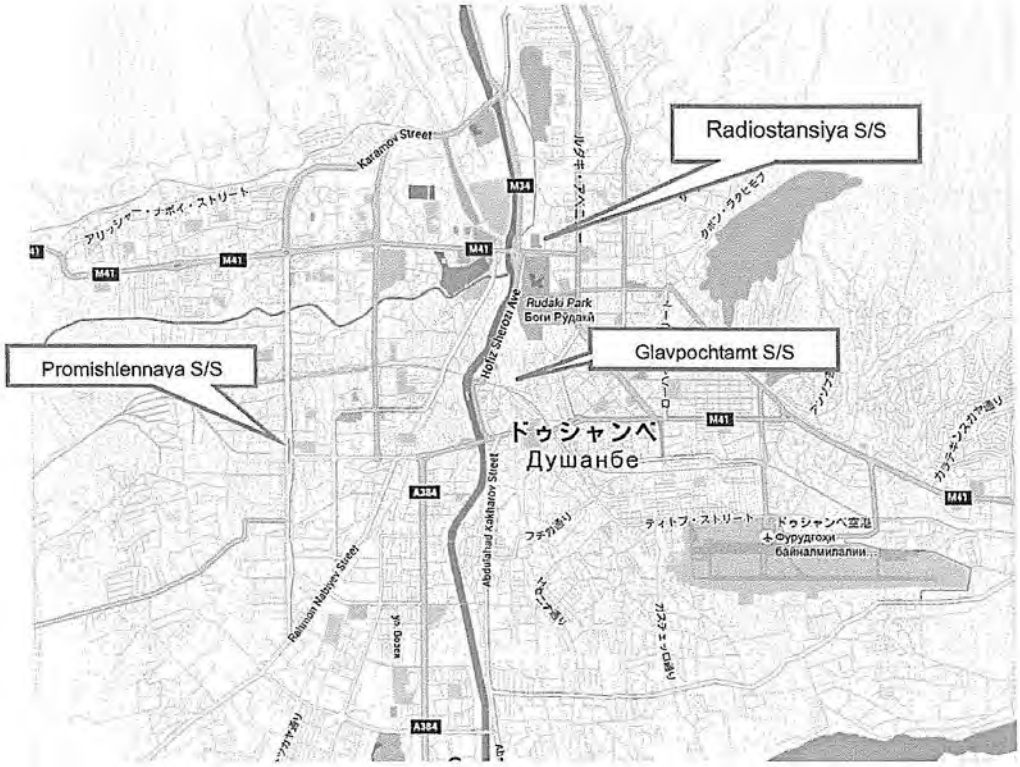
9-4. Prioritizing contents of the project

The team explained that items that requested from Tajikistan, mentioned in 5-1, will be studied and made prioritizing from the viewpoints of its urgency and effectiveness contribution to stable power supply in Dushanbe city.

Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Japanese Grant
Annex 4 Flow Chart of Japanese Grant Procedures
Annex 5 Financial Flow of Japanese Grant
Annex 6 Major Undertakings to be taken by Each Government (Tentative)
Annex 7 Sample of Project Monitoring Report

Annex 1

Project Site



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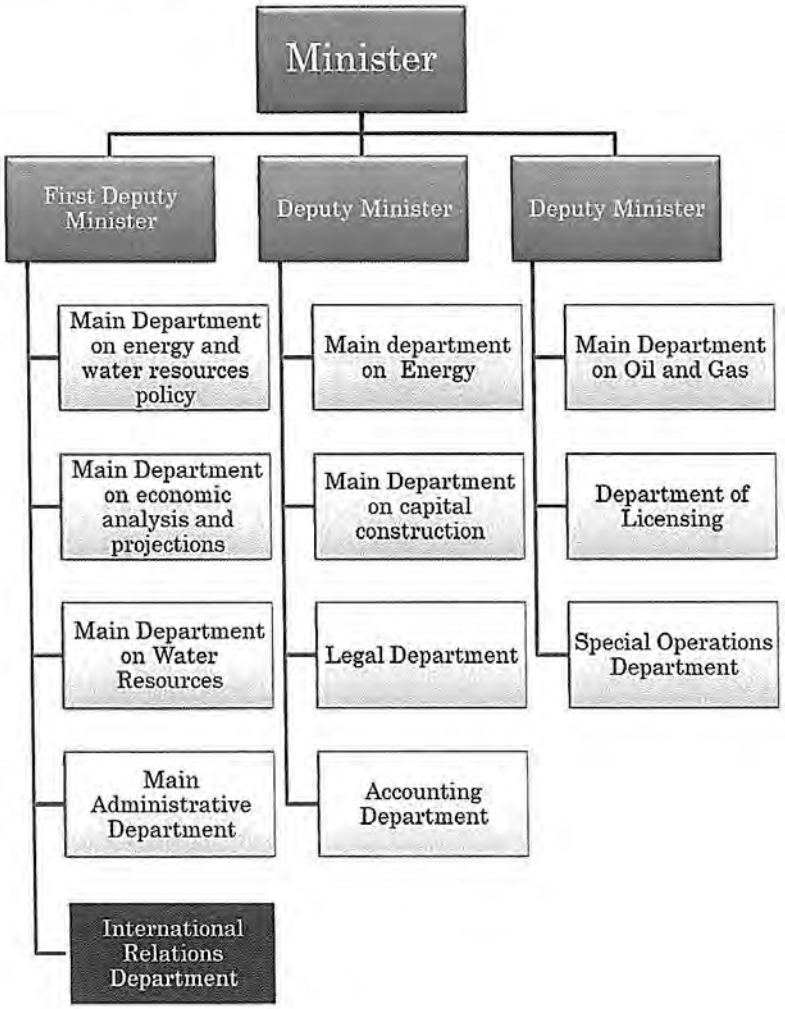
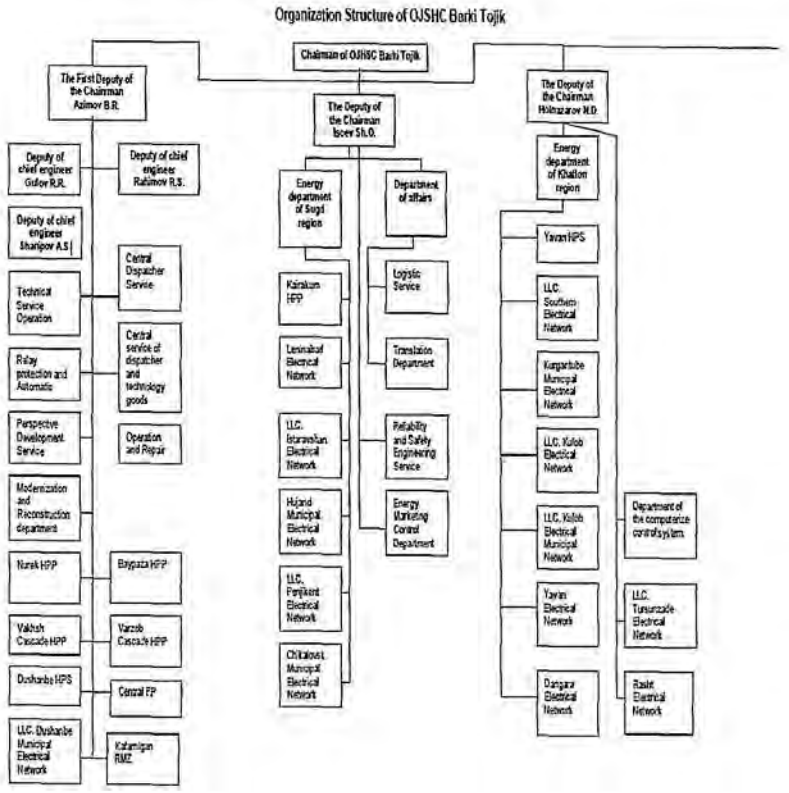
Annex 2
Organization Chart of Ministry of Energy and Water Resources

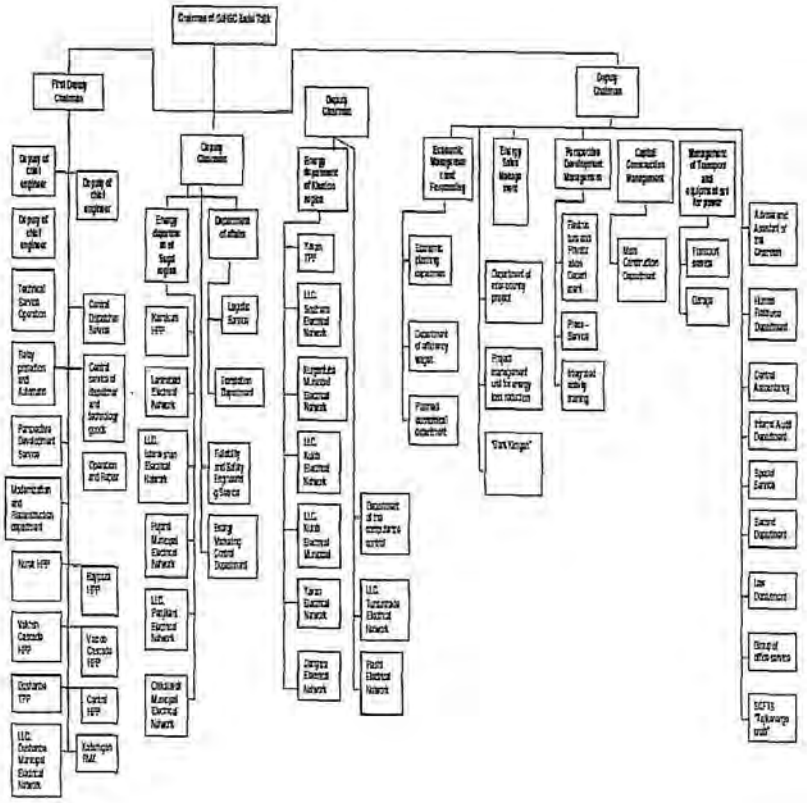


Organization Chart of Barki Tojik



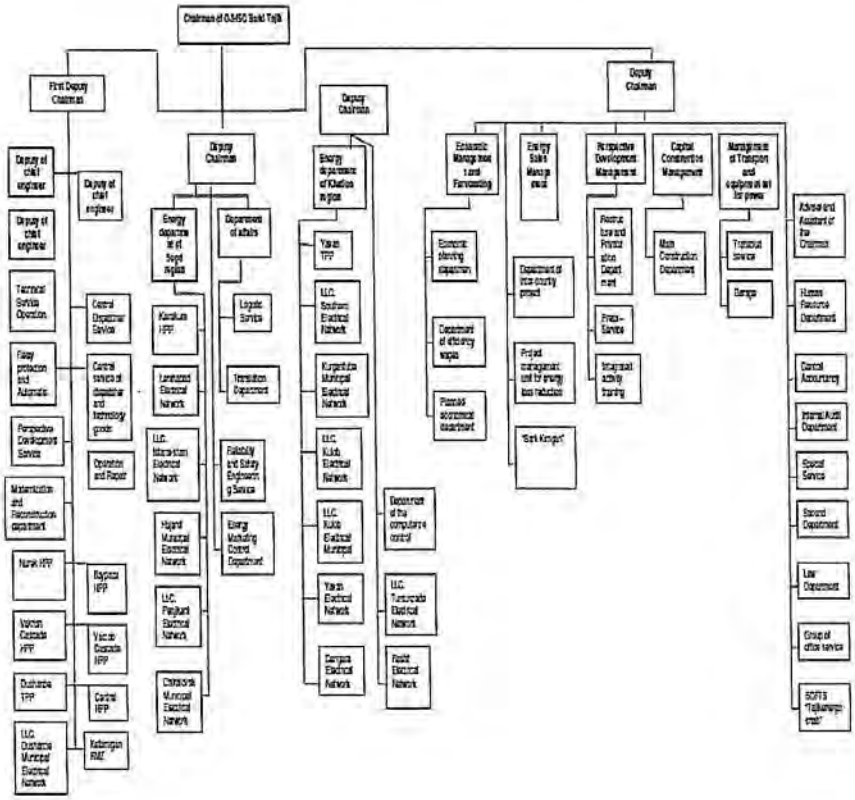
Annex A-2

Organization Structure of OJSHC Barki Tojik



Annex A-2

Organization Structure of OJSHC Barki Tojik



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Annex 3

JAPANESE GRANT

The Japanese Grant (hereinafter referred to as the "Grant") is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant is not supplied through the donation of materials as such.
Based on a JICA law which was entered into effect on October 1, 2008 and the decision of the GOJ, JICA has become the executing agency of the Japanese Grant for Projects for construction of facilities, purchase of equipment, etc.

1. Grant Procedures

The Grant is supplied through following procedures :

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal &Approval
  - -Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - -The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - -Agreement concluded between JICA and a recipient country
- Implementation
  - -Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant project. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japanese Grant Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be singed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles, in accordance with the E/N, to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. The Grant may be used for the purchase of the products or services of a third country, if necessary, taking into account the quality, competitiveness and economic rationality of products and services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals", in principle.

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals, in principle. Those contracts shall be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Project, the recipient country is required to undertake such necessary measures as Annex. The Japanese Government requests the Government of the recipient country to exempt all customs duties, internal taxes and other fiscal levies such as VAT, commercial tax, income tax, corporate tax, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract, since the Grant fund comes from the Japanese taxpayers.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant.

(7) "Export and Re-export"

The products purchased under the Grant should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"), in principle. JICA will execute the Grant by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Environmental and Social Considerations

The Government of the recipient country must carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the recipient country and JICA Guidelines for Environmental and Social Consideration (April, 2010) .

(11) Monitoring

The Government of the recipient country must take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and must regularly report to JICA about its status by using the Project Monitoring Report (PMR).

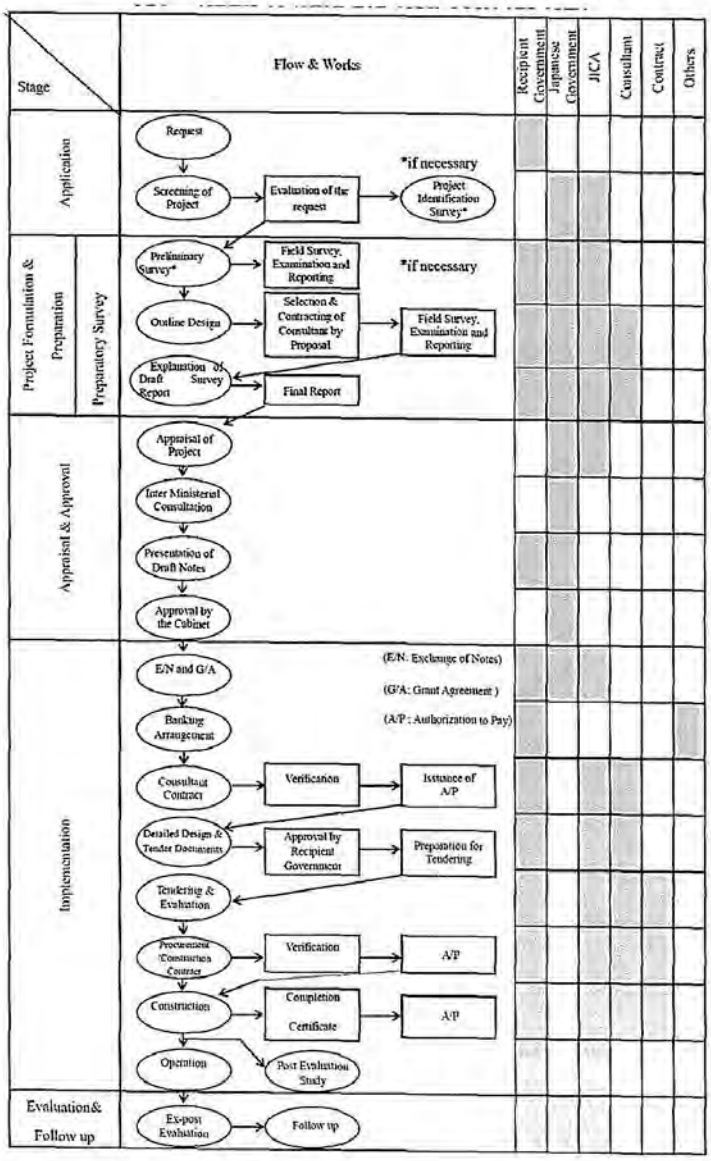
(12) Safety Measures

The Government of the recipient country must ensure that the safety is highly observed during the implementation of the Project.

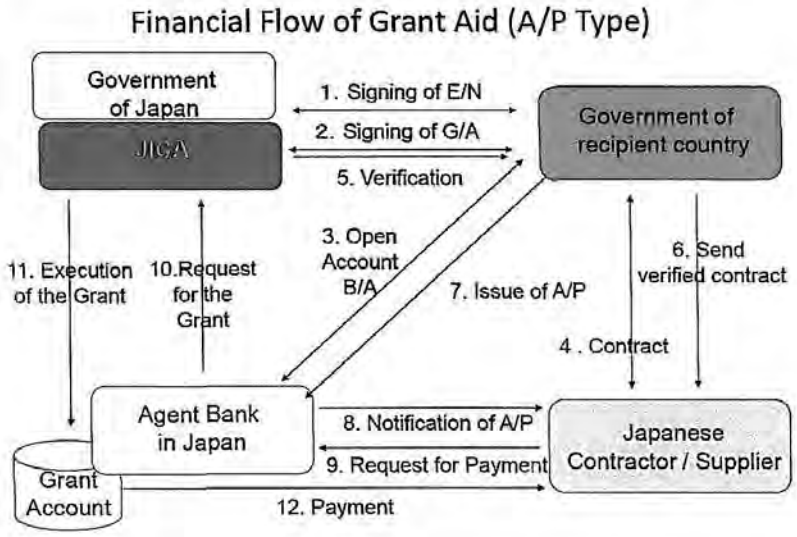
end

Annex 4

FLOW CHART OF JAPANESE GRANT PROCEDURES



Annex 5


Financial Flow of Grant Aid (A/P Type)
Government of Japan
JICA
1. Signing of E/N
2. Signing of G/A
5. Verification
Government of recipient country
3. Open Account B/A
7. Issue of A/P
6. Send verified contract
4 . Contract
11. Execution of the Grant
10.Request for the Grant
Agent Bank in Japan
8. Notification of A/P
9. Request for Payment
Japanese Contractor / Supplier
Grant Account
12. Payment

Annex 6

Major Undertakings to be taken by Recipient Government
(Tentative)

1. Before the Tender

NO	Items	Deadline	In charge	Cost	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after G/A			
2	To approve IEE/EIA	within 1 month after G/A			
3	To implement EIA	before start of the construction			
4	To secure the following lands	before notice of the tender document			
5	To obtain the planning, zoning, building permit	before notice of the tender document			
6	To clear, level and reclaim the following sites	before notice of the tender document			
7	To submit the result of DD	end of DD			

2. During the Project Implementation

NO	Items	Deadline	In charge	Cost	Ref.
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A				
	1) Advising commission of A/P	within 1 month after the singing of the contract			
	2) Payment commission for A/P	every payment			
2	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country				
	1) Tax exemption and customs clearance of the products at the port of disembarkation	during the Project			
	2) Internal transportation from the port of disembarkation to the project site	during the Project			

3	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	during the Project			
4	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted. Such customs duties, internal taxes and other fiscal levies mentioned above include VAT, commercial tax, income tax and corporate tax of Japanese nationals, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract	during the Project			
5	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment	during the Project			
6	To submit Project Monitoring Report	during the Project			
7	To implement EMP and EMoP	during the construction			
	To submit results of environmental monitoring to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report	during the construction			
	To implement RAP (livelihood restoration program, if needed)	for a period based on livelihood restoration program			
	To implement social monitoring, and to submit the monitoring results to JICA, by using the monitoring form, on a quarterly basis as a part of Project Monitoring Report - Period of the monitoring may be extended if affected persons' livelihoods are not sufficiently restored. Extension of the monitoring will be decided based on agreement between implementation organization of Tajikistan and JICA.	- until the end of livelihood restoration program (In case that livelihood restoration program is provided) *- for two years after land acquisition and resettlement complete (In case that livelihood restoration program is not provided)*			

3. After the Project

NO	Items	Deadline	In charge	Cost	Ref.
1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction			
2	To implement EMP and EMoP	for a period based on EMP and EMoP			
	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between implementation organization of Tajikistan and JICA.	for three years after the Project			

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

Major Undertakings to be Covered by the Japanese Grant

No	Items	Deadline	Cost Estimated (Million Japanese Yen)*	
1	To construct xx facility and provide equipment			
	1) To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country			
	a) Marine(Air) transportation of the products from Japan to the recipient country		XX.XX	
	b) Internal transportation from the port of disembarkation to the project site			
	2) To construct facilities			
	3) To provide equipment with installation and commissioning			
2	To implement detailed design, tender support and construction supervision (Consultant)		YY.YY	
3	Contingencies		ww.ww	
	Total		ZZ.ZZ	

*; The cost estimates are provisional. This is subject to the approval of the Government of Japan.

Annex 7

SAMPLE of Project Monitoring Report

Project Monitoring Report

on

Project Name

Grant Agreement No. XXXXXXX 20XX, Month

Organization Information

1) Authority (Signer of the G/A)	Person in Charge (Division) Contacts Address: Phone/FAX: Email:
Executing Agency	Person in Charge (Division) Contacts Address: Phone/FAX: Email:
Line Agency	Person in Charge (Division) Contacts Address: Phone/FAX: Email:

Outline of Grant Agreement:

Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____
Project Title	

E/N	Signed date: Duration:
G/A	Signed date: Duration:

1: Project Description

1-1 Project Objective

1-2 Necessity and Priority of the Project

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

1-3 Effectiveness and the indicators

- Effectiveness by the project

Quantitative Effect (Operation and Effect indicators)		
Indicators	Original (Yr)	Target (Yr)
Qualitative Effect		

2: Project Implementation

2-1 Project Scope

Table 2-1-1a: Comparison of Original and Actual Location

Location	**Original:** *(M/D)* **Attachment(s):Map**	**Actual:** *(PMR)* **Attachment(s):Map**

Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
(M/D)	*(M/D)*	*(PMR)*

'Soft component' shall be included in 'Items'.		Please state not only the most updated schedule but also other past revisions chronologically. All change of design shall be recorded regardless of its degree.

Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
1. Primary and Secondary Surveillance Radars at Chittagong Int'l Airport	i) OSR/SSR 1 set ii) RDP 1 set iii) VHF Transmitters 2 sets	Ditto
2. Access Control System for Dhaka Int'l Airport	1 set	Ditto
3. Doppler VOR/DME at Saidpur Airport	1 set	Ditto
4. Aerodrome Simulator for Civil Aviation Training Center	1 set	Ditto
5. Baggage Inspection System for Dhaka Int'l Airport	i) Hold Baggage Xray Inspectin system 7sets ii) Hold Baggage Explosive Trace Detecting System 7sets iii) Cabin Baggage Xray Inspection System 2sets	Ditto
6. Airport Fire Fighting Vehicles for Dhaka Int'l Airport	2 sets	3 sets

2-1-2 Reason(s) for the modification if there have been any.

(PMR)

2-2 Implementation Schedule

2-2-1 Implementation Schedule

Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
[M/D]	*(M/D)*		*(PMR)* As of (Date of Revision)
'Soft component' shall be stated in the column of 'Items'.			Please state not only the most updated schedule but also other past revisions chronologically.
Project Completion Date*			

*Project Completion was defined as _____ at the time of G/A.

(Sample)Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
Cabinet Approval	11/2015	-	-
E/N	12/2015	1/2016	24/1/2016
G/A	12/2015	1/2016	24/1/2016 Amended 13/3/2017
Detailed Design	12/2015-4/2016	1/2016-5/2016	1/2016-5/2016
Tender Notice	5/2016	5/2016	1/6/2016
Tender	6/2016	6/2016	15/7/2016
(Lot1) Construction Period	7/2016-11/2018	7/2016-11/2018	8/8/2016-30/11/2018
(Lot2) Installarion of Equipement	7/2016-6/2018	7/2016-6/2018	6/8/2016-30/60/2017
Project Completion Date	11/2018	11/2018	30/11/2018
Defect Liability Period	11/2019	11/2019	30/11/2019

*Project Completion was defined as Check-out of Construction work at the time of G/A.

2-2-2 Reasons for any changes of the schedule, and their effects on the project.

2-3 Undertakings by each Government

2-3-1 Major Undertakings

See Attachment 2.

2-3-2 Activities

See Attachment 3.

2-3-3 Report on RD

See Attachment 4.

2-4 Project Cost
2-4-1 Project Cost

Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan

(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original	Actual
Construction Facilities (or Equipment)	'Soft component' shall be included in 'Items'.			Please state not only the most updated schedule but also other past revisions chronologically.
Consulting Services	- Detailed design -Procurement Management -Construction Supervision			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

Table 2-4-1b Comparison of Original and Actual Cost by the Government of XX

Items	Cost (Million USD)

	Original	Actual	Original	Actual
				Please state not only the most updated schedule but also other past revisions chronologically.
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = (local currency)

(Sample)Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan

(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original[1,2]	Actual
Construction Facilities	1. Outpatient Department 2. Operation Theatre, Casualty Unit, Maternity Ward	Ditto Ditto	[redacted]	[redacted]
Equipment	1) Primary and Secondary Surveillance Radars at Chittagong Int'l Airport 2) Access Control System for Dhaka Int'l Airport 3) Doppler VOR/DME at Saidpur Airport 4) Aerodrome Simulator for	Ditto	[redacted]	[redacted]

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	Civil Aviation Training Center 5) Baggage Inspection System for Dhaka Int'l Airport 6) Airport Fire Fighting Vehicles for Dhaka Int'l Airport			
Consulting Services	- Detailed design -Procurement Management -Construction Supervision -Soft Component	Ditto	[redacted]	[redacted]
Total			[redacted]	[redacted]

Note: 1) Date of estimation: October, 2014
2) Exchange rate: 1 US Dollar = 99.93 Yen

(Sample)Table 2-4-1b Comparison of Original and Actual Cost by the Government of Bangladesh

Items			Cost (1,000 Taka)	
	Original	Actual	Original[1),2)]	Actual
Dhaka International Airport	Modification of software of existing Rader Data Processing System	Ditto	[redacted]	[redacted]
	Provision of a partition, lighting, air conditioning and electric power supply at transfer hold baggage check point	Ditto	[redacted]	[redacted]
	Replacement of five doors in the international passenger terminal building	Ditto	[redacted]	[redacted]
Chittagong Int'l Airport	Preparation of the radar site including felling of trees, clearing and grabbing	Ditto	[redacted]	[redacted]
Total			[redacted]	[redacted]

Note: 1) Date of estimation: October, 2014

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2) Exchange rate: 1 US Dollar = 0.887 Bangladesh Taka (local currency)

2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

(PMR)

2-5 Organizations for Implementation

2-5-1 Executing Agency:

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original: *(M/D)*
Actual, if changed: *(PMR)*

2-6 Environmental and Social Impacts

- The results of environmental monitoring as attached in Attachment 5 in accordance with Schedule 4 of the Grant Agreement.
- The results of social monitoring as attached in Attachment 5 in accordance with Schedule 4 of the Grant Agreement.
- Information on the disclosed results of environmental and social monitoring to local stakeholders, whenever applicable.

3: Operation and Maintenance (O&M)

3-1 O&M and Management

- Organization chart of O&M
- Operational and maintenance system (structure and the

number ,qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

Original: *(M/D)*
Actual: *(PMR)*

3-2 O&M Cost and Budget

- The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

Original: *(M/D)*

4: Precautions (Risk Management)

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

Original Issues and Countermeasure(s): *(M/D)*	
Potential Project Risks	Assessment
1.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L

	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
3.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
Actual issues and Countermeasure(s)	
(PMR)	

5: Evaluation at Project Completion and Monitoring Plan

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan for the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Undertakings to be taken by each Government
3. Monthly Report
4. Report on RD
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
   (Final Report Only)

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment Price (Decreased) E=C−D	Condition of payment Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials
(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)
-
-
-

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)

(Actual Expenditure by Construction and Equipment each)

		Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost		(A/D%)	(B/D%)	(C/D%)	
	Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
	others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost		(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost		(A/D%)	(B/D%)	(C/D%)	
Total		(A/D%)	(B/D%)	(C/D%)	

4-2.協議議事録(M/D-2)

Minutes of Discussions
on the Preparatory Survey for
the Project for Improvement of Substation Facilities in Dushanbe
in the Republic of Tajikistan

(Explanation on Draft Preparatory Survey Report)

With reference to the minutes of discussions signed between Ministry of Energy and Water Resources (hereinafter referred to as "MoEWR") and Barki Tojik (hereinafter referred to as "BT") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 30 June, 2016 and in response to the request from the Government of Tajikistan (hereinafter referred to as "GOT") dated August, 2014, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for Improvement of substation facilities in Dushanbe in the Republic of Tajikistan (hereinafter referred to as "the Project"), headed by Mr. Kazunari OSHIMA,Senior Advisor, Industrial Development and Public Policy Department, JICA from 9 to14,January, 2017.

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Dushanbe, 14 January, 2017

Kazunari OSHIMA
Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Usmonali USMONZODA
Minister
Ministry of Energy and Water Resources
Republic of Tajikistan

Mirzo ISMOILZODA
Chairman
Open Joint Stock Holding Company
Barki Tojik
Republic of Tajikistan

ATTACHEMENT

1. Objective of the Project
The objective of the Project is to improve sustainability of stable and efficient power supply in Dushanbe city by rehabilitation of Promishlennaya substation and construction of new Radiostansiya substation, thereby contributing to social and economic development of the Republic of Tajikistan.

2. Title of the Preparatory Survey
Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for "Improvement of substation facilities in Dushanbe in the Republic of Tajikistan".

3. Project site
Both sides confirmed that the sites of the Project are in Dushanbe city, which is shown in Annex 1.

4. Contents of the Draft Report
After the explanation of the contents of the Draft Report by the Team, the Tajikistan side agreed to its contents.

5. Cost estimate
Both sides confirmed that the cost estimate including the contingency described in the Draft Report is provisional and will be examined further by the Government of Japan for its approval. The contingency would cover the additional cost against natural disaster, unexpected natural conditions, etc.

6. Confidentiality of the cost estimate and technical specifications
Both sides confirmed that the cost estimate and technical specifications in the Draft Report should never be duplicated or disclosed to any third parties until all the contracts under the Project are concluded.

7. Timeline for the project implementation
The expected timeline for the project implementation is as attached in Annex 3.

8. Expected outcomes and indicators
Both sides agreed that key indicators for expected outcomes are as follows. The Tajikistan side will be responsible for the achievement of agreed key indicators targeted in year 2022 and shall monitor the progress based on those indicators.
[Quantitative indicators]
- Promishlennaya substation: Increace the capacity of transformer (MVA) and the amout of capable power supply (MWh/year)
- Radiostantsiya substation: Increace the capacity of transformer (MVA) and the amout of capable power supply (MWh/year)
- Reduce the number of power outages which are caused by over load of transformers in the area where Promishlennaya substation and Radiostansiya substation supply electricity.

[Qualitative indicators]
- The quality (Frequency and Voltage level) of power supply in Dushanbe is improved.
- The economic and social development in Dushabe is promoted.

9. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 4. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in 4 of Annex 4, both sides confirmed that such customs duties, internal taxes and other fiscal levies include VAT, and income tax, which shall be clarified in the bid documents by BT during the implementation stage of the Project.

The Tajikistan side assured to take the necessary measures and coordination including allocation of the necessary budget by BT which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e. at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 5 will be used as an attachment of G/A.

10. Monitoring during the implementation

The Project will be monitored by the Executing Agency (BT) under the leadership and surpervison of MoEWR and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 5. The timing of submission of the PMR is described in Annex 4.

11. Project completion

Both sides confirmed that the project completes when all the facilities constructed and equipment procured by the grant are in operation. The completion of the Project will be reported to JICA promptly, but in any event not later than six months after completion of the Project.

12. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to five evaluation criteria (Relevance, Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Tajikistan side is required to provide necessary support for the data collection.

13. Schedule of the Study

JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Tajikistan side around April 2017.

14. Environmental and Social Considerations

14-1. Environmental Guidelines and Environmental Category

The Team explained that 'JICA Guidelines for Environmental and Social Considerations (April 2010)' (hereinafter referred to as "the Guidelines") is applicable for the Project. The Project is categorized as C because the Project is likely to have minimal adverse impact on the environment under the Guidelines.

15. Other Relevant Issues

15-1. Project compornent

The Tajikistan side understand that the Project will cover two out of three compornents which the Tajikistan side requested in "Application Form for Grant Aid". The Tajikistan side requested the team to conduct continuously the study to formulate new cooperation project to overcome vulnerability of stable power supply in Dushanbe city as soon as possible. The team took note of this request and report JICA Head Quarters.

15-2. Tax exemption

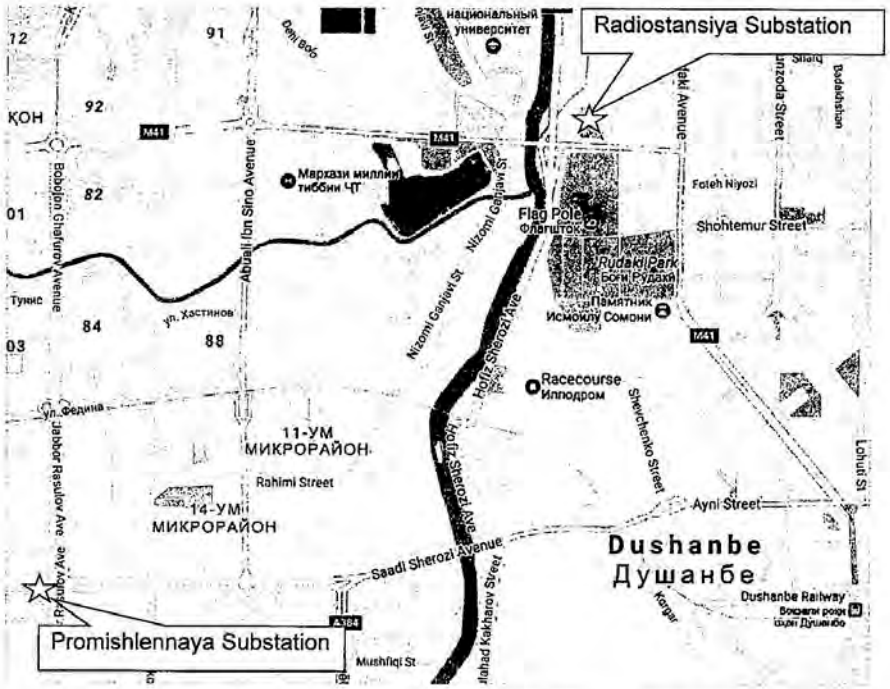
The Tajikistan side suggested that the Grant Agreement should mention tax exemption again.

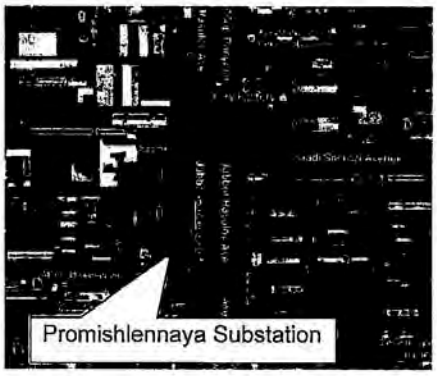
15-3 Disclosure of Information

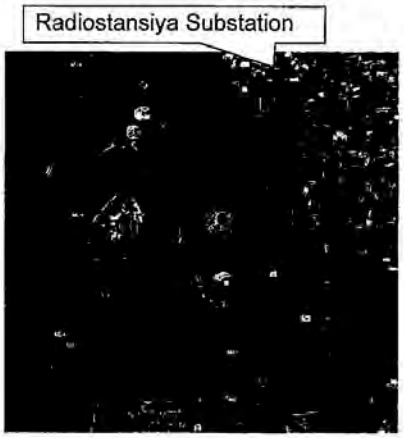
Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Project Implementation Schedule
Annex 4 Major Undertakings to be taken by the Government of Tajikistan
Annex 5 Sample of Project Monitoring Report

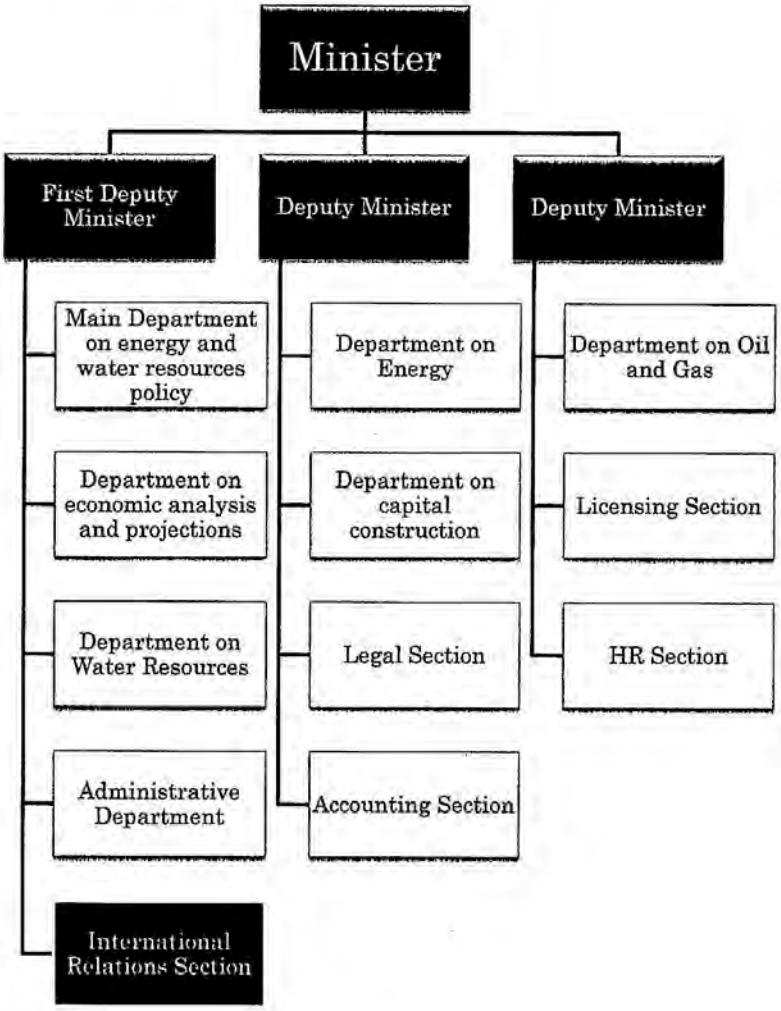
Annex 1 Project Site



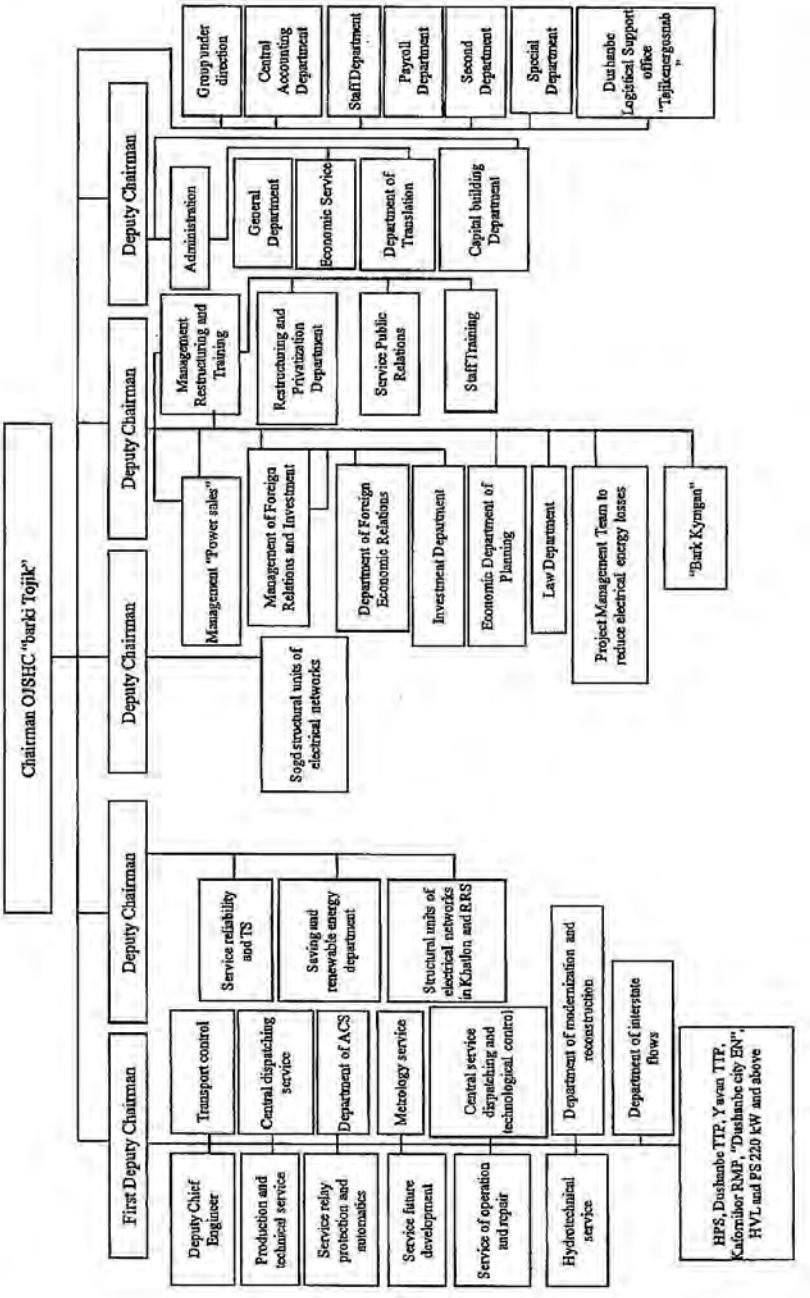




Annex 2
Organization Chart of Ministry of Energy and Water Resources



Organization Chart of Barki Tojik



Annex 3. Timeline for the project implementation

Year	2017	2018	2019	2020
① Detail Design	May — Oct			
② Procurement Supervision	Oct —		— March	
③ One Year Inspection				— March

Annex 4

Major Undertakings to be taken by Government of Tajikistan

1. Specific obligations of the Government of Tajikistan which will not be funded with the Grant
(1) Before the Tender

NO	Items	Deadline	In charge	Cost (Thousand TJS)	Ref.
1	To open Bank Account (Banking Arrangement (B/A))	within 1 month after G/A	MOF		
2	To issue Authorization to Pay (A/P) to a bank in Japan (the Agent Bank) for the payment to the consultant	within 1 month after the signing of the contract	MEWR BT		
3	To secure and clear the following project sites				
	1) Promishlennaya Substation To secure the space for equipments that the Project will install and the temporary storage space for existing equipments that the Project will remove in Promishlennaya Substation	before notice of the bidding document	BT		
	2) Radiostansiya Substation To clear, level and reclaim the Radiostantsiya substation site	within 3 months after the signing of G/A	BT	[redacted]	
4	To obtain the planning, zoning, building, electricity, telephone, water supply, sewage permit	before notice of the tender document	BT		
5	To construct access roads to Radiostantsiya substation	before notice of the tender document	BT		
6	To draw electrical power supply cable to Radiostantsiya substation for the construction	before the start of construction	BT		
7	To submit Project Monitoring Report (with the result of Detail Design)	before preparation of bidding documents	BT		

(2) During the Project Implementation

No.	Items	Deadline	In charge	Cost (Thousand TJS)	Ref.
1	To issue A/P to a bank in Japan (the Agent Bank) for the payment to the Supplier(s)	within 1 month after the signing of the contract(s)	MEWR BT		
2	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		BT	[redacted]	
	1) Advising commission of A/P	within 1 month after the singing of the contract	BT		
	2) Payment commission for A/P	every payment	MoF	* equivalent to 0.1% of total payment	
3	To ensure prompt customs clearance and to assist the Supplier(s) with internal transportation in recipient country	during the Project	BT		
4	To accord Japanese nationals and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work	during the Project	BT		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the Products and/or the Services be exempted. Such customs duties, internal taxes and other fiscal levies mentioned above include VAT, commercial tax, income tax and corporate tax of Japanese nationals, resident tax, fuel tax, but not limited, which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract	during the Project	BT		
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment	during the Project	BT	[redacted]	
	1) To boost up 35kV existing transmission lines to 110kV at Radiostansiya	By the end of August, 2018			
	2) To connect the 110kV transmission lines to the small tower set up by the Project side at Radiostansiya	By the end of August, 2018			
	3) To remove the transmission lines between 35kV tower and the 110kV tower boosted up at Radiostansiya	By the end of August, 2018			
	4) To connect water supply and sewage system to Radiostansiya and Promishlennaya	By completion of building construction			
	5) To connect telephone line for electricity power security to Radiostansiya and Promishlennaya	By completion of building construction			
7	To submit Project Monitoring Report	during the Project	BT		
8	1) To submit Project Monitoring Report after each work under the contract(s) such as shipping, hand over, installation and operational training	within one month after completion of each work	BT		
	2) To submit Project Monitoring Report (final)	within one month after signing of Certificate of Completion for the works under the contract(s)	BT		
9	To submit a report concerning completion of the Project	within six months after completion of the Project	BT		

(3) After the Project

NO	Items	Deadline	In charge	Cost (Thousand TJS)	Ref.

1	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Setting up operation and maintenance structure 3) Routine check/Periodic inspection	After completion of the construction	BT		

(B/A: Banking Arrangement, A/P: Authorization to pay, N/A: Not Applicable)

2. Other obligations of the Government of Tajikistan funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To rehabilitate deteriorated Promishlennaya substation and construct Radiostansiya substation and provide equipment i) To conduct the following transportation a) Marin (Air) transportation of the products from Japan to Tajikistan b) Internal transportation from the port of disembarkation to the project site	March, 2019	
	2) To provide equipment with installation and commissioning		
2	To implement detailed design, bidding support and procurement supervision (Consulting Service)		
	Total		[redacted]

*; The cost estimates are provisional. This is subject to the approval of the Government of Japan.

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Annex 5

SAMPLE of Project Monitoring Report

Project Monitoring Report

on

The Project for Improvement of Substation Facilities in Dushanbe

Grant Agreement No. XXXXXXX 20XX, Month

Organization Information

Authority (Signer of the G/A)	Person in Charge _____ (Division) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Executing Agency	Person in Charge _____ (Division) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____
Line Agency	Person in Charge _____ (Division) _____ Contacts Address: _____ Phone/FAX: _____ Email: _____

Outline of Grant Agreement:

Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of Tajikistan: _____
Project Title	The Project for Improvement of Substation Facilities in Dushanbe
E/N	Signed date: Duration:
G/A	Signed date: Duration:

1: Project Description

1-1 Project Objective

The objective of the Project is to improve sustainability of stable and efficient power supply in Dushanbe city by rehabilitation of Promishlennaya substation and construction of Radiostansiya substations, thereby contributing to social and economic development of Tajikistan.

1-2 Necessity and Priority of the Project

- Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

1-3 Effectiveness and the indicators

- Effectiveness by the project

Quantitative Effect (Operation and Effect indicators)			
Indicators		Original (Yr)	Target (Yr)
Promishlennaya substation	Increace the capacity of transformer (MVA)		
	Increace the amout of capable power supply (MWh/year)		
Radiostantsiya substation	Increace the capacity of transformer (MVA)		
	Increace the amout of capable power supply (MWh/year)		
Reduce the number of power outages which are caused by over load of transformers in the area where Promishlennaya substation and Radiostantsiya substation supply electricity			
Qualitative Effect			
The quality (Frequency and Voltage level) of power supply in Dushanbe is improved. The economic and social development in Dushabe is promoted.			

2: Project Implementation

2-1 Project Scope

Table 2-1-1a: Comparison of Original and Actual Location

Location	**Original:** *(M/D)* **Attachment(s):Map**	**Actual:** *(PMR)* **Attachment(s):Map**

Table 2-1-1b: Comparison of Original and Actual Scope

Items	Original	Actual
1.Promishlennaya	・Transformer (110/35/10kV 40/20/40MVA) ・Circuit Breaker (110kV Gas(SF6) Circuit Breaker Type: 3-pole,Outdoor use,) ・Disconnector Switch (Type: 3-Pole, Outdoor use) ・35kV Switchgear Indoor Cubicle type ・10kV Switchgear Indoor Cubicle type ・Protection and control equipment ・DC power supply system AC440V/DC220V, 200Ah	
2. Radiostantsiya	・Transformer (110/35/10kV 40/20/20MVA) ・Circuit Breaker (110kV Gas(SF6) Circuit Breaker Type: 3-pole,Outdoor use,) ・Disconnector Switch (Type: 3-Pole, Outdoor use) ・35kV Switchgear Indoor Cubicle type ・10kV Switchgear Indoor Cubicle type ・Protection and control equipment ・DC power supply system AC440V/DC220V 200Ah ・One one-story building 210m2 ・Two one-story buildings 230m2 for 10kV switchgear and 48m2 for 35kV switchgear	

2-1-2 Reason(s) for the modification if there have been any.

(PMR)

2-2 Implementation Schedule
2-2-1 Implementation Schedule

Table 2-2-1: Comparison of Original and Actual Schedule

Items	Original		Actual
	DOD	G/A	
Cabinet Approval	3/2017		-
E/N	4/2017		
G/A	4/2017		
Detailed Design	5/2017-10/2017		
Tender Notice	10/2017		
Tender	10/2017		
Installarion of Equipement	10/2017-4/2019		
Project Completion Date	4/2019		
Defect Liability Period	4/2020		

*Project Completion was defined as Check-out of Construction work at the time of G/A.

2-2-2 Reasons for any changes of the schedule, and their effects on the project.

2-3 Undertakings by each Government
2-3-1 Major Undertakings
See Attachment 2.

2-3-2 Activities
See Attachment 3.

2-3-3 Report on RD
See Attachment 4.

2-4 Project Cost
2-4-1 Project Cost

Table 2-4-1a Comparison of Original and Actual Cost by the Government of Japan

(Confidential until the Tender)

Items			Cost (Million Yen)	
	Original	Actual	Original	Actual
Equipment	1.Promishlennaya Transformer			

	(110/35/10kV 40/20/40MVA) ・Circuit Breaker (110kV Gas(SF6) Circuit Breaker Type: 3-pole,Outdoor use,) ・Disconnector Switch (Type: 3-Pole, Outdoor use) ・35kV Switchgear Indoor Cubicle type ・10kV Switchgear Indoor Cubicle type ・Protection and control equipment ・DC power supply system AC440V/DC220V 200Ah ・Two one-story buildings 230m2 for 10kV switchgear and 48m2 for 35kV switchgear 2.Radiostantsiya ・Transformer (110/35/10kV 40/20/20MVA) ・Circuit Breaker (110kV Gas(SF6) Circuit Breaker Type: 3-pole,Outdoor use,) ・Disconnector Switch (Type: 3-Pole, Outdoor use) ・35kV Switchgear Indoor Cubicle type ・10kV Switchgear Indoor Cubicle type ・Protection and control equipment ・DC power supply system AC440V/DC220V 200Ah ・One one-story building 210m2			
Consulting Services				
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

Table 2-4-1b Comparison of Original and Actual Cost by the Government of

Tajikistan

Items			Cost (Million USD)	
	Original	Actual	Original	Actual
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = (local currency)

2-4-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

(PMR)

2-5 Organizations for Implementation

2-5-1 Executing Agency:

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original: *(M/D)*
Actual, if changed: *(PMR)*

2-6 Environmental and Social Impacts

- The results of environmental monitoring as attached in Attachment 5 in accordance with Schedule 4 of the Grant Agreement.

- The results of social monitoring as attached in Attachment 5 in accordance with Schedule 4 of the Grant Agreement.
- Information on the disclosed results of environmental and social monitoring to local stakeholders, whenever applicable.

3: Operation and Maintenance (O&M)

3-1 O&M and Management

- Organization chart of O&M
- Operational and maintenance system (structure and the number ,qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

Original: *(M/D)*
Actual: *(PMR)*

3-2 O&M Cost and Budget

- The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

Original: *(M/D)*

4: Precautions (Risk Management)

- Risks and issues, if any, which may affect the project implementation, outcome, sustainability and planned countermeasures to be adapted are below.

Original Issues and Countermeasure(s): *(M/D)*	
Potential Project Risks	Assessment
1.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:

	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
2.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
3.	Probability: H/M/L
(Description of Risk)	Impact: H/M/L
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action during the Implementation:
	Contingency Plan (if applicable):
Actual issues and Countermeasure(s)	
(PMR)	

5: Evaluation at Project Completion and Monitoring Plan

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

5-3 Monitoring Plan for the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

Attachment

1. Project Location Map
2. Undertakings to be taken by each Government
3. Monthly Report
4. Report on Record of Discussions
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
   (Final Report Only)

Attachment 6

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C−D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	●
2	Item 2	●●t	●	●	●		
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials
(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ○month, 2015	2nd ○month, 2015	3rd ○month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)
-
-
-

別添-78

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)

(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

別添資料－５　協議議事録（C/N）

別添資料5. 技術協議録(C/N)

5-1 技術協議録 (C/N-1)

Confirmation Note

on the Preparatory Survey

for the Project for Rehabilitation of Substations in Dushanbe

in Republic of Tajikistan

(First Field Survey)

In response to the request from the Government of the Republic of Tajikistan for Japanese Technical Cooperation on the Project for Rehabilitation of substations in Dushanbe (hereinafter referred to as "the Project"), Japan International Cooperation Agency (hereinafter refer to as "JICA") dispatched the JICA Expert team (hereinafter refer to as "the team") first field survey since June, 2016 to survey the Project feasibility in Barki Tojik (hereinafter refer to as "BT") under relevant agencies surrounding BT such as Dushanbe Power Grid and Committee for Environmental Protection (hereinafter refer to as "CEP"), and the line agency i.e. Ministry of Energy and Water Resources (hereinafter refer to as "MoEWR")

The first field survey was mainly implemented to discuss the Project feasibility, and confirm the request of general specification of the substations from June 2nd to July 6th, 2016. As a result of the discussions, the contents of agreed and confirmed topics are described in the Confirmation Note hereby. If any discrepancy occurs between English and Russian versions, then English version shall prevail.

Dushanbe, July 6, 2016

Sharipov Rezvon
Planning & Technology Manager
Barki Tojik

Kazuyoshi Mori
Team Leader
JICA Expert

Khalimov Rajabali Mirovich
First Executive Director
Barki Tojik

1. Items requested by the Government of Tajikistan

Both sides confirmed the request from Tajikistan side for specifications of the substations as follows

1-1. Rehabilitation of Promishlenaya SS

The requested items are as follows. Please refer to the annex 1. "Layout Drawing (hereinafter refer to as "DWG") Promishlenaya", the annex 2. "Single Line DWG Promishlenaya A", and the annex 3. "Single Line DWG Promishlenaya B" for details.

- 110kV AIS
- 110/35/10kV transformer
- 35kV GIS (SF6) and 10kV indoor switch gears (changed)
- Control room

1-2.Construction of Glavpochtamt SS

The requested items are as follows. Please refer to the annex 4. "Layout DWG Glavpochtamt" and the annex 5. "Single Line DWG Glavpochtamt" for details.

- 110kV AIS
- Two 110/10/6kV (three-winding) 25MVA transformers Although two 110/6kv 16MVA transformers were requested in the request letter from the government of Tajikistan. (Changed)
- 10kV and 6kV outdoor switch gears IN PREMISES
- Control room
- Transmission line from Glavnaya to Glavpochtamt

(110kV (two-lines about 1.7km /underground cable) (Changed)

Please refer to the annex 6. "Layout DWG Glavnaya" and the annex 7. "Single Line DWG Glavnaya" for details.

1-3.Construction of Radiostansiya SS

The requested items are as follows. Please refer to the annex 8. "Layout DWG Radiostansiya" and the annex 9. "Single Line DWG Radiostansiya" for details.

- 110kV AIS
- Two 110/35/10kV (three-winding) 40MVA transformers Although two *110/6kv 16MVA** transformers were requested in the request letter from the government of Tajikistan. (Changed)
- 35kV and 10kV outdoor switch gears IN PREMISES
- Control room

・Barki Tojik is in charge of implementing voltage boost to 110kV (Changed)

**Note: Recommendation – Since the connection of "Radiostansiya" SS is going to be made from the transmission line 35kV "L-2G-1 and L-2G-2" [DTES-2 (Dushanbe Heat Power Plant) – "Glavnaya" SS], taking into account the voltage boost of PTL 35kV to 110kV, 35/6kV "Centralnaya" SS will be left without power supply. At the present time, 35/6kV "Centralnaya" SS is supplied through these lines, and it has two transformers, 2 x 16 MVA, which operate at 80÷85% of the load level. Hereby, the construction of 110/6kV SS in this area, with two transformers, each with capacity of 16 MVA, is considered to be not effective. Taking into account the existing loads of 35/6kV "Centralnaya" SS, and the rapid increase in the power demand in this area, the following option is offered for consideration and implementation.*

1-4.Environmental and Social consideration

・Decision No. 253 categorizes a project into category Ⅰ, Ⅱ, Ⅲ or Ⅳ in relation to damage to the environment. Decision No. 509 shows an environmental damage assessment procedure as below

Decision No. 509

		・EIA Program ・EIA Report ・Stakeholder Meeting	Section Environmental Protection	Statement of EIA	Impact	Example (Construction of)
CATEGORY	Ⅰ	○	—	—	Much ↑ Less	・Express way
	Ⅱ	—	○	—		・Local Roads
	Ⅲ	—	○	—		・Grain Storage Plant
	Ⅳ	—	—	○		・Bread Making Factory
Days to assess		○ 60days	○ 30days	○ 30days		
JICA		Category A	Category B	Category C		
		EIA	IEE	—		

EIA : Environmental Impact Assessment

IEE : Initial Environmental Examination

・Construction of substation is categorized into the category Ⅱ and rehabilitation of substation is categorized into the category Ⅲ.

2. Data requested to be submitted

Both sides confirmed data requested and time limit as below

No.	Item	Questioner	Respondent	Time Limit
1	1)SCADA System Diagram 2)Kind of Signal for SCADA Remote Terminal Unit (Ex : Current, Power, Voltage and so forth)	Mori and Yoshida	Khalimov Rajabali Mirovich	7/15
2	Financial report of BT and information of budget for management and maintenance of the substations	Mori and Suzuki	Yakhyoev Parviz	7/15
3	Demand prediction for the substations after 2013	Mori and Fukui	Ghiyosov Abduvahob	7/15
4	1)Department which is in charge of tax exemption for imports and local items 2) The procedure of tax exemption	Mori and Suzuki	Yakhyoev Parviz	7/15

3. Survey Schedule

Both sides confirmed Survey Schedule as below

3-1 Survey Plan for the substations and, environmental and social consideration

Promishlenaya substation
・The team discusses method of rehabilitation, duration and work schedule with the minimum duration of power failure.
Glavpochtamt substation site
・The team will implement geological survey to ensure that foundations to support heavy facilities such as transformer can be safely constructed in July. ・The team will discuss method and cost of laying underground type cable. ・The team will discuss necessity and validity of installing two 110/10/6kV(three-winding) 25MVA transformers instead of two 110/6kV 16MVA transformers by considering power demand prediction and lineage system analysis.
Radiostansiya substation site
・The team will implement geological survey to ensure that foundations to support heavy facilities such as transformer can be safely constructed in July. ・The team will discuss method, duration and work schedule of constructing foundation.

・The team will discuss necessity and validity of installing two 110/35/10kV(three-winding) 40MVA transformers instead of two 110/6kV 16MVA transformers by considering power demand prediction and system analysis. ・Barki Tojik is going to implement voltage boost for overhead power line 35kV from "Karamova" SS to the connection point of "Radiostansiya" SS to 110kV.
Environment and social consideration
・The team will inform some recommended project designs to MoEWR by the end of August at the latest.[1] ・The CEP is going to assess some recommended project designs, including zero option. ・The team will prepare the environment and social consideration report which includes environment impact assessment. ・The team will discuss and prepare necessary information and project impact (reduced loss electricity: GWh) for the three substations by the end of July in order for the CEP to assess some recommended project designs in terms of environmental damage during construction and after the substations start to operate. ・A project in the category I needs to hold Stakeholder Meeting[2], whereas the project does not need to hold Stakeholder Meeting according to Decision No. 509. However, M/D between JICA and MoEWR requires MoEWR to start preparing Stakeholder Meeting in June. ・The team will inform some recommended project designs to MoEWR with consent of people concerned by the end of August at the latest to ensure that MoEWR holds Stakeholder Meeting in October 2016 because Stakeholder Meeting is going to be held at the same period of obtaining environmental approval and MoEWR needs to advertise it in television and newspaper.

[1] Because MoEWR needs 30 days to prepare documents for applying environment approval.

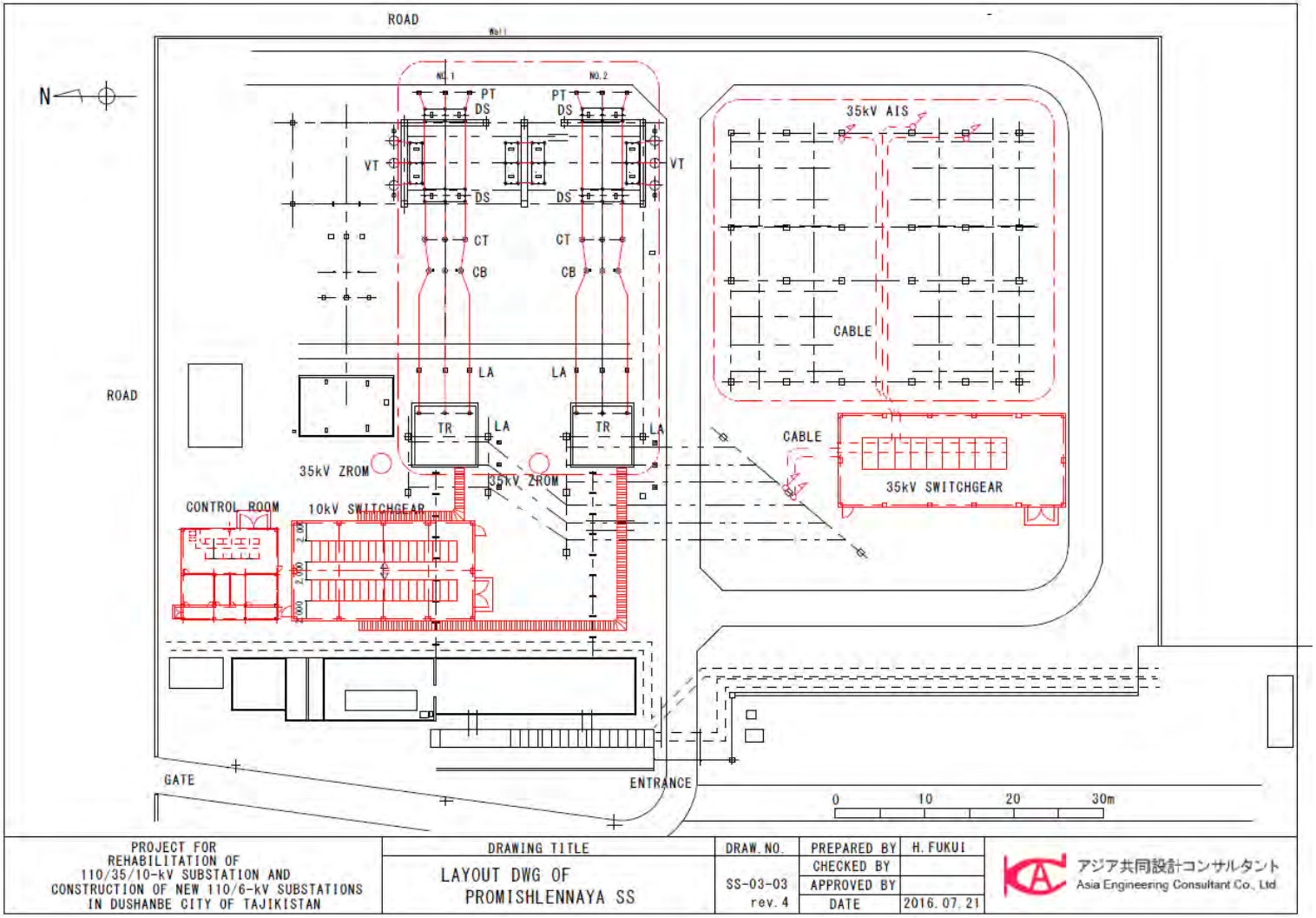
[2] Advertising Stakeholder Meeting needs much time and effort to let people concerned to know schedule and a result of Stakeholder meeting through TV and newspapers.

3-2 Survey Schedule afterward

Month	Place	Item
Jul.	Tajikistan	・Obtaining data and answers to the questionnaires from MoEWR and Barki Tojik by visiting and phone call. ・Implementing geological survey (Boring investigation). ・Confirming the items on environmental and social consideration by signing a contract with local environmental consultant. ・Proposing and explaining some recommended project designs , including zero option and necessary information for environmental impact assessment such as outlines of the project, drawing of construction area including residents around, diagram of construct implementation, construction method, carry method of materials, material list, facility list and waste list. ・Proposing explanations and reasons of project impact (reduced loss electricity: GWh) for the three substations
	Japan	・Supporting MoEWR to hold Stakeholder meeting which should take place in October. ・Obtaining data from MoEWR and Barki Tojik by E-mail and phone call. ・Obtaining quotation from local civil engineering and electric construction company
Aug.	Tajikistan	・Obtaining data, if left unanswered in July, from MoEWR and Barki Tojik by visiting and phone call. ・Revisiting the substations.
	Japan	・Setting the specification for main facility, obtaining quotation from Japanese manufacturer for it, and estimating costs. ・The first design verification ・Estimating outline costs, including local equipment.
Sep.	Tajikistan	
	Japan	・Estimating outline costs and holding verification council. ・Making preparatory survey report in Japanese and discussing it.
Oct.	Tajikistan	
	Japan	・Making draft final report of preparatory survey in Japanese and English and examining it.
Nov.	Tajikistan	
	Japan	・Sending draft final report of preparatory survey and outline costs of the project to Tajikistan. ・The second design verification.
Dec.	Tajikistan	・Explaining draft final report of preparatory survey to Tajikistan and discussing modifications and additional information.
	Japan	
Jan.~ Feb.	Tajikistan	
	Japan	・Making equipment specification and detailed statement of outline costs ・Competing final report of preparatory survey and submitting it to JICA

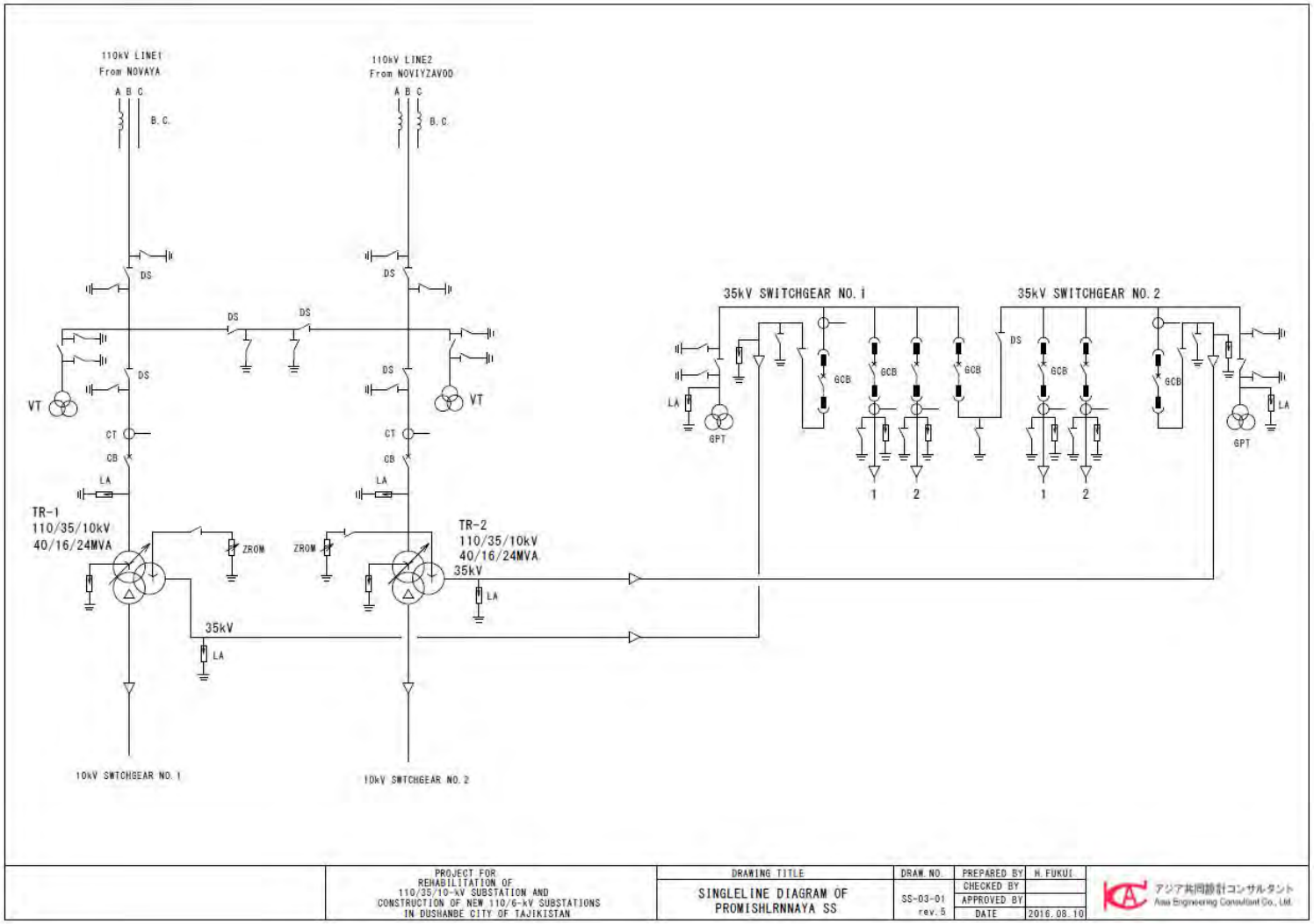
Annex List

Annex 1. Layout DWG Promishlenaya
Annex 2. Single Line DWG Promishlenaya A
Annex 3. Single Line DWG Promishlenaya B
Annex 4. Layout DWG Glavpochtamt
Annex 5. Single Line DWG Glavpochtamt
Annex 6. Layout DWG Glavnaya
Annex 7. "Single Line DWG Glavnaya
Annex 8. Layout DWG Radiostansiya
Annex 9. Single Line DWG Radiostansiya



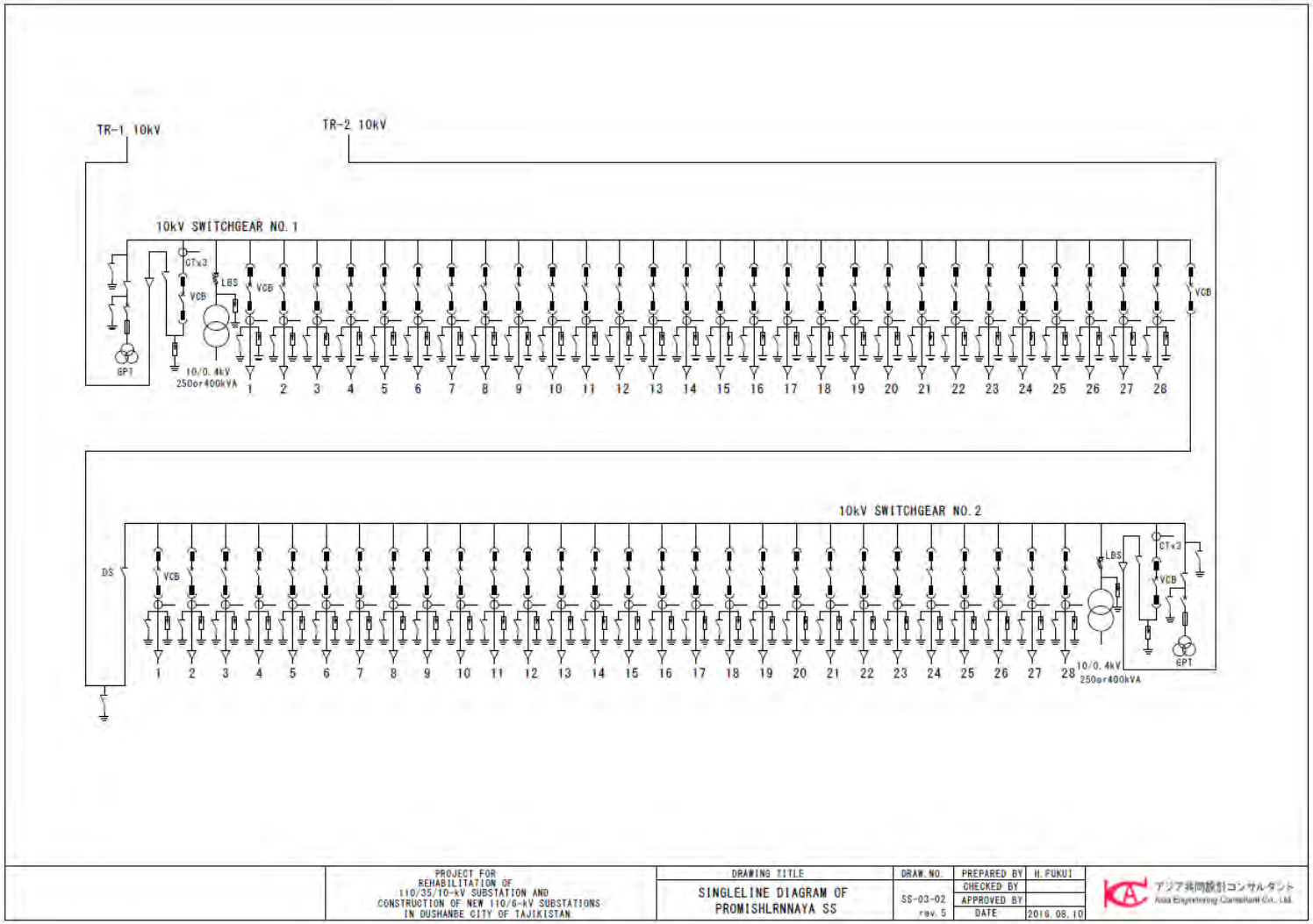
PROJECT FOR REHABILITATION OF 110/35/10-kV SUBSTATION AND CONSTRUCTION OF NEW 110/6-kV SUBSTATIONS IN DUSHANBE CITY OF TAJIKISTAN	DRAWING TITLE	DRAW. NO.		
	LAYOUT DWG OF PROMISHLENNAYA SS	SS-03-03 rev. 4	PREPARED BY	H. FUKUI
			CHECKED BY	
			APPROVED BY	
			DATE	2016. 07. 21

アジア共同設計コンサルタント
Asia Engineering Consultant Co., Ltd.



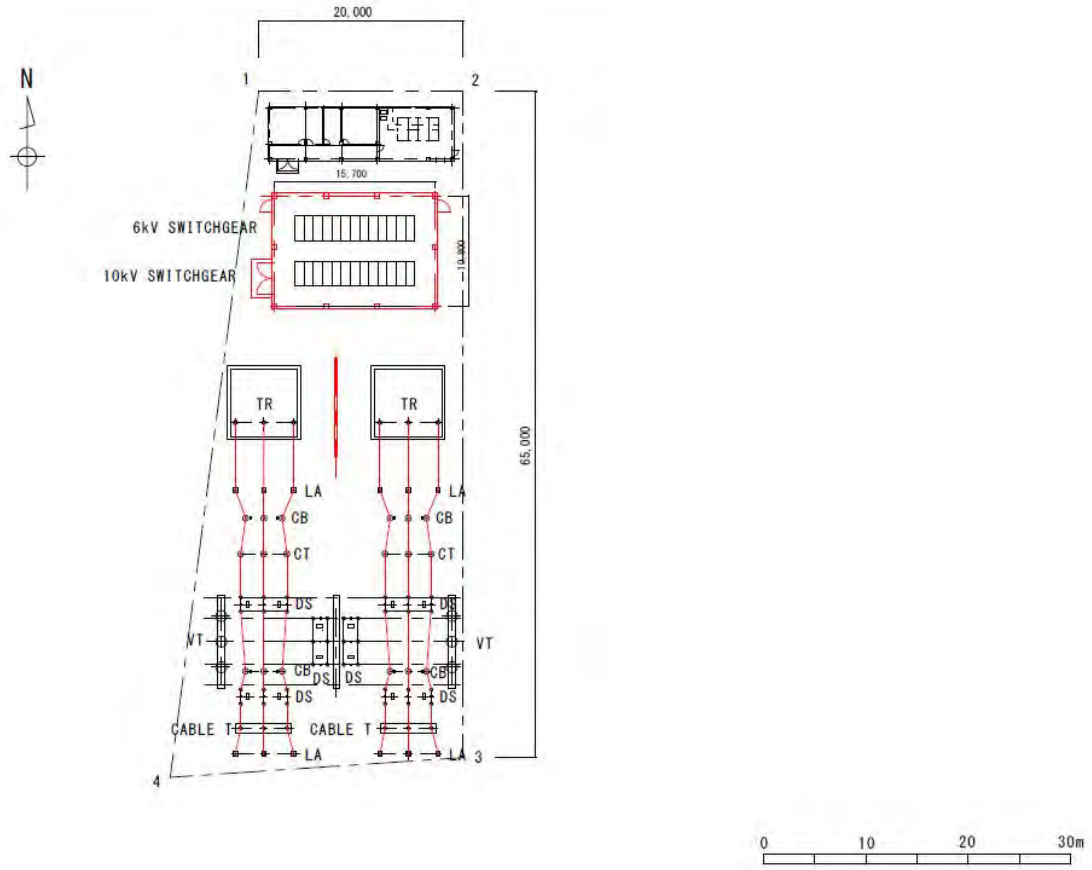
	PROJECT FOR REHABILITATION OF 110/35/10-kV SUBSTATION AND CONSTRUCTION OF NEW 110/6-kV SUBSTATIONS IN DUSHANBE CITY OF TAJIKISTAN	DRAWING TITLE	DRAW. NO.	PREPARED BY	H. FUKUI
		SINGLELINE DIAGRAM OF PROMISHLRNNAYA SS	SS-03-01 rev.5	CHECKED BY	
				APPROVED BY	
				DATE	2016.08.10

アジア共同設計コンサルタント
Asia Engineering Consultant Co., Ltd.

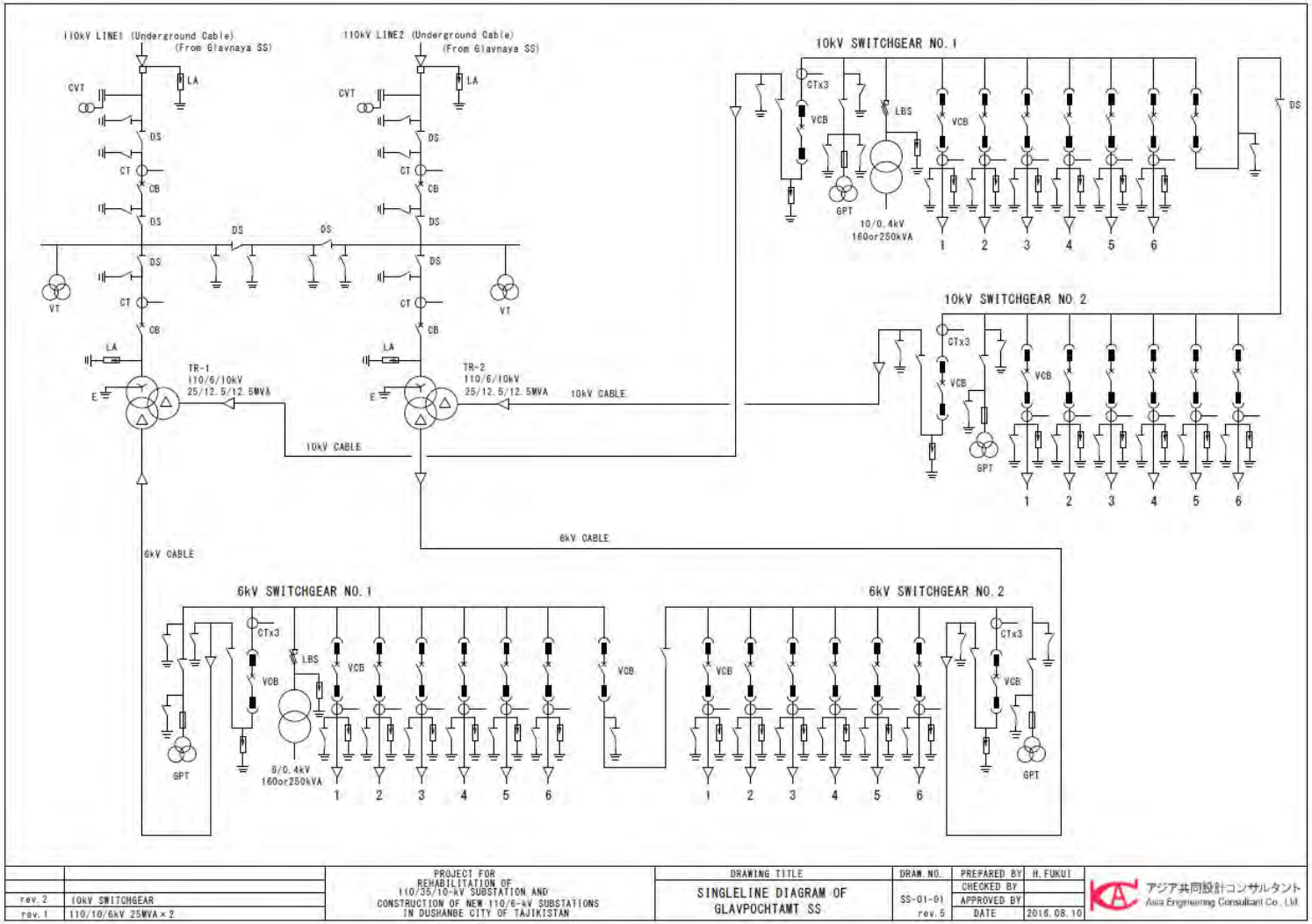


	PROJECT FOR REHABILITATION OF 110/35/10-kV SUBSTATION AND CONSTRUCTION OF NEW 110/6-kV SUBSTATIONS IN DUSHANBE CITY OF TAJIKISTAN	DRAWING TITLE	DRAW. NO.	PREPARED BY	H. FUKUI
		SINGLELINE DIAGRAM OF PROMISHLRNNAYA SS	SS-03-02 rev. 5	CHECKED BY	
				APPROVED BY	
				DATE	2016. 08. 10

アジア共同設計コンサルタント
Asia Engineering Consultant Co., Ltd.

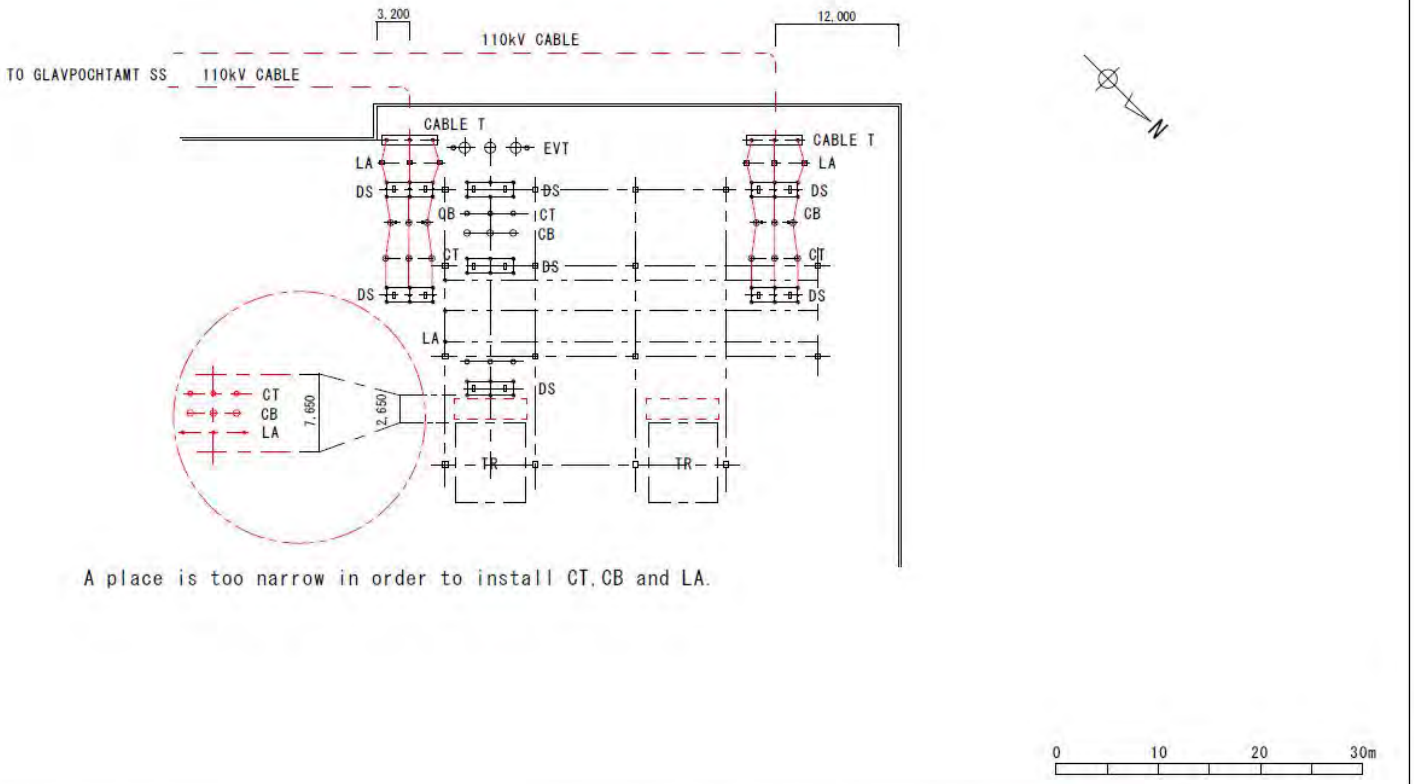


PROJECT FOR REHABILITATION OF 110/35/10-kV SUBSTATION AND CONSTRUCTION OF NEW 110/6-kV SUBSTATIONS IN DUSHANBE CITY OF TAJIKISTAN	DRAWING TITLE	DRAW. NO.	PREPARED BY	H. FUKUI	アジア共同設計コンサルタント Asia Engineering Consultant Co., Ltd.
	LAYOUT DWG OF GLAVPOCHTAMT SS	SS-01-02 rev. 4	CHECKED BY		
			APPROVED BY		
			DATE	2016. 07. 21	



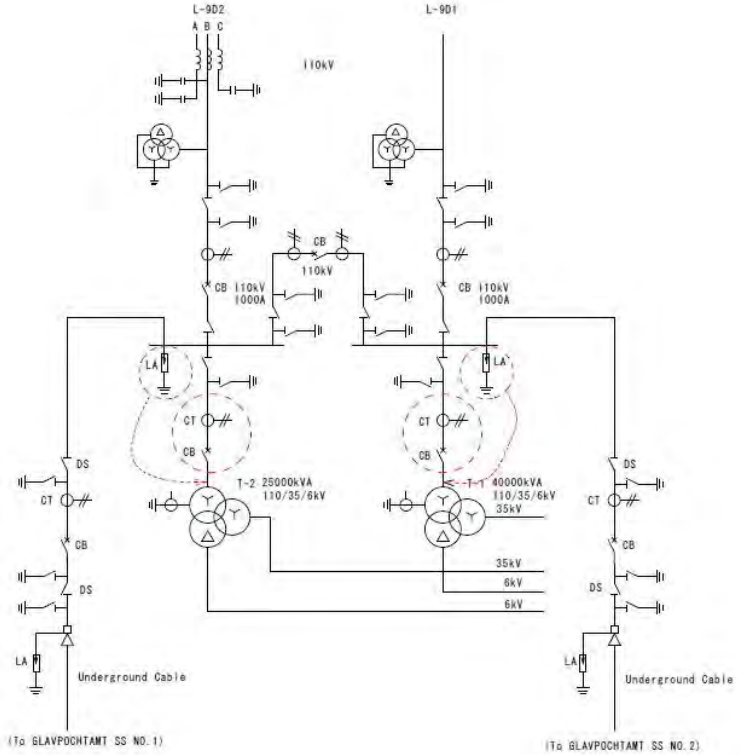
		PROJECT FOR REHABILITATION OF 110/35/10-kV SUBSTATION AND CONSTRUCTION OF NEW 110/6-kV SUBSTATIONS IN DUSHANBE CITY OF TAJIKISTAN	DRAWING TITLE	DRAW. NO.	PREPARED BY	H. FUKUI
			SINGLELINE DIAGRAM OF GLAVPOCHTAMT SS	SS-01-01 rev. 5	CHECKED BY	
rev. 2	10kV SWITCHGEAR				APPROVED BY	
rev. 1	110/10/6kV 25MVA×2				DATE	2016.08.10

アジア共同設計コンサルタント
Asia Engineering Consultant Co., Ltd.



PROJECT FOR REHABILITATION OF 110/35/10-kV SUBSTATION AND CONSTRUCTION OF NEW 110/6-kV SUBSTATIONS IN DUSHANBE CITY OF TAJIKISTAN	DRAWING TITLE	DRAW. NO.	PREPARED BY	H. FUKUI
	LAYOUT DWG OF GIAVNAYA SS	SS-04-02 rev. 5	CHECKED BY	
			APPROVED BY	
			DATE	2016. 08. 10

アジア共同設計コンサルタント
Asia Engineering Consultant Co., Ltd.



	PROJECT FOR REHABILITATION OF 110/35/10-kV SUBSTATION AND CONSTRUCTION OF NEW 110/6-kV SUBSTATIONS IN DUSHANBE CITY OF TAJIKISTAN	DRAWING TITLE	DRAW. NO.	PREPARED BY	H. FUKUI	アジア共同設計コンサルタント Asia Engineering Consultant Co., Ltd.
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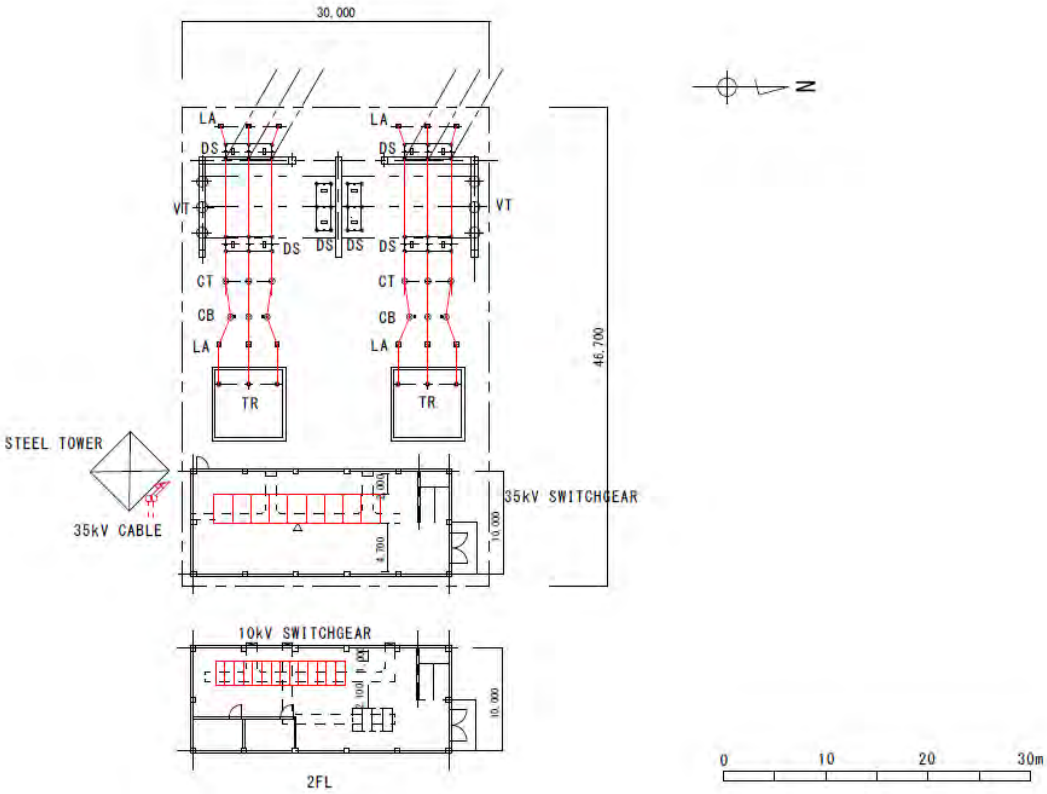
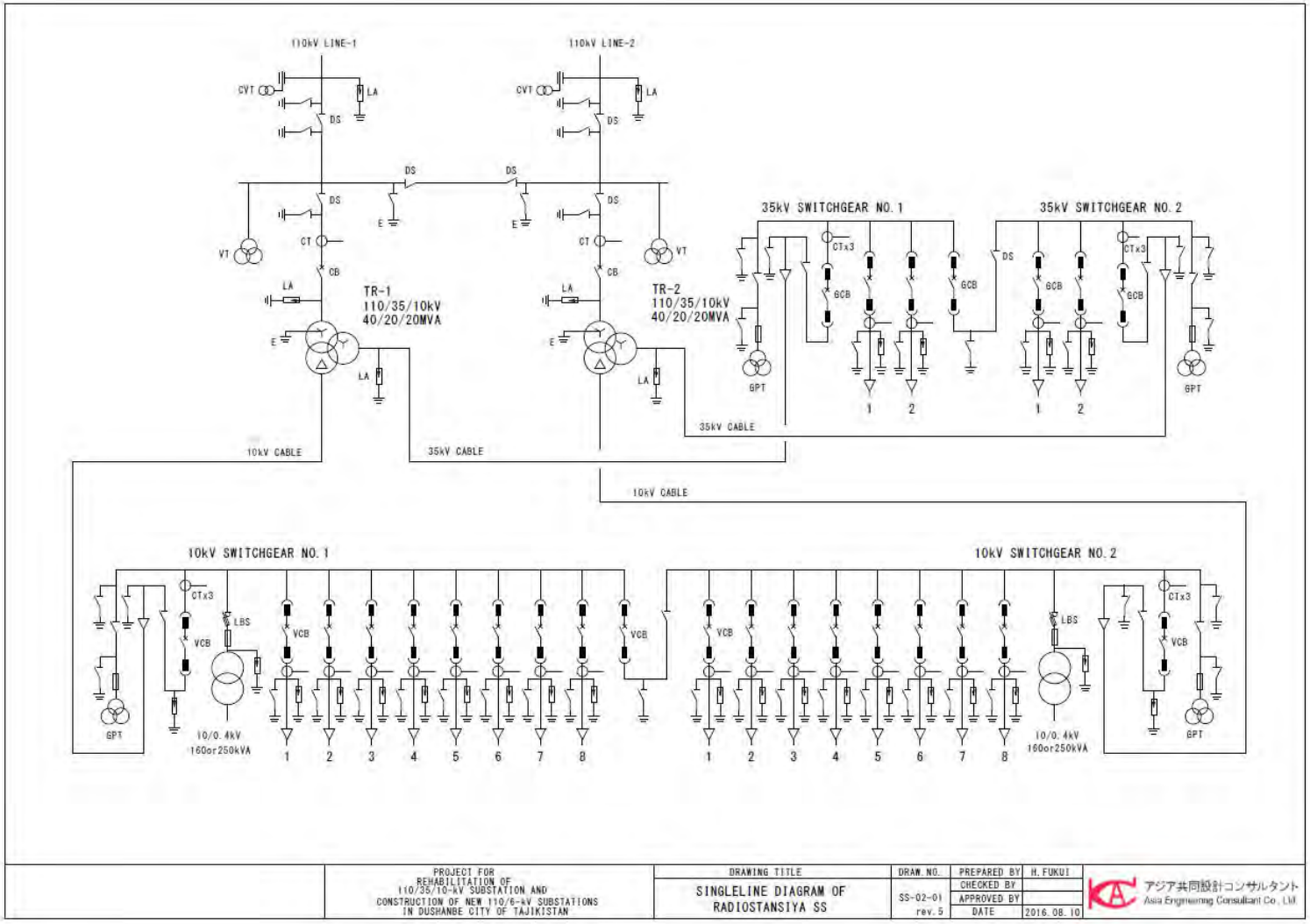
				APPROVED BY		
				DATE	2016.08.10	



PROJECT FOR REHABILITATION OF 110/35/10-kV SUBSTATION AND CONSTRUCTION OF NEW 110/6-kV SUBSTATIONS IN DUSHANBE CITY OF TAJIKISTAN	DRAWING TITLE	DRAW. NO.	PREPARED BY	H. FUKUI	アジア共同設計コンサルタント Asia Engineering Consultant Co., Ltd
	LAYOUT DWG OF RADIOSTANSIYA SS	SS-02-02 rev. 4	CHECKED BY		
			APPROVED BY		
			DATE	2016. 07. 21	


110kV LINE-1
110kV LINE-2
CVT
LA
DS
E
VT
CT
CB
TR-1
110/35/10kV
40/20/20MVA
TR-2
110/35/10kV
40/20/20MVA
35kV SWITCHGEAR NO. 1
35kV SWITCHGEAR NO. 2
CTx3
GCB
GPT
1
2
10kV CABLE
35kV CABLE
10kV SWITCHGEAR NO. 1
10kV SWITCHGEAR NO. 2
LBS
VCB
10/0.4kV
160or250kV
3
4
5
6
7
8
PROJECT FOR
REHABILITATION OF
110/35/10-kV SUBSTATION AND
CONSTRUCTION OF NEW 110/6-kV SUBSTATIONS
IN DUSHANBE CITY OF TAJIKISTAN
DRAWING TITLE
SINGLELINE DIAGRAM OF
RADIOSTANSIYA SS
DRAW. NO.
SS-02-01
rev.5
PREPARED BY
H. FUKUI
CHECKED BY
APPROVED BY
DATE
2016.08.10
アジア共同設計コンサルタント
Asia Engineering Consultant Co., Ltd.

5-2 技術協議録(C/N-2)

Confirmation Note

on the Preparatory Survey

for the Project for Rehabilitation of Substations in Dushanbe

in Republic of Tajikistan

(Second Field Survey)

In response to the request from the Government of the Republic of Tajikistan for Japanese Grant Cooperation on the Project for Rehabilitation of substations in Dushanbe (hereinafter referred to as "the Project"), Japan International Cooperation Agency (hereinafter refer to as "JICA") dispatched the JICA Expert team (hereinafter refer to as "the team") to Second field survey in August, 2016 to survey the Project feasibility with Barki Tojik (hereinafter refer to as "BT") under relevant agencies surrounding BT such as Dushanbe Power Grid and Committee for Environmental Protection (hereinafter refer to as "CEP"), and the line agency i.e. Ministry of Energy and Water Resources (hereinafter refer to as "MoEWR")

The second field survey was conducted from August 21st to 27th, 2016.As a result of the discussions, the contents of agreed and confirmed topics are described in the Confirmation Note hereby.
If any discrepancy occurs between English and Russian versions, then English version shall prevail.

Dushanbe, October 20th, 2016

山本重成

Shigenari Yamamoto
Survey Team Leader
JICA Expert

Sharipov Rezvon
Planning & Technology Manager
Barki Tojik

Tajikistan side and Japanese side discussed mainly the five significant points as written below.

1. 110kV Cable

Cable laying route options in question (Appendix 1) are Route I – through the so-called "Green Belt" that is strip of lawn, trees and bushes, along the automobile road in Khafiz Sherozi Street, down to cross-section with the main railway, and Route II – through the populated area. The parties concluded that in order to make final decision, as to cable laying route, it would be necessary to jointly discuss technical feasibility of the options for further operation, and make their economic comparison. To define the cable laying type, both parties have agreed on embedded method, vertically arranged, and inserting every single cable into flexible and protective PE pipes one by one. Manholes are to be installed in cable joint boxes.

2. The Number of Cubicles for Outgoing in Promishlennaya

Japanese side is not going to supply 56 cubicles for outgoing in Promishlennaya, the number of which shall depend on the number of actually functioning cubicles at this substation. The Tajikistan side requested that in order to make final decision on the selection of the number of 10kV cubicles at Promishlennaya SS, BT and representatives of Dushanbe Power Grid would clarify the number of functioning 10kV cubicles taking into account two backup cubicles (two cubicles per each bus section). Besides, the Tajikistan side, having based on actual loads of power transformer windings at 10kV and 35kV side, requested the alteration of the rated capacity of power transformers specified in the project as below, in terms of the project budget. Both parties have agreed to continue discussing on this matter.

kV	110kV	35Kv	10kV
Previous Request	40MVA	16MVA	24MVA
Present Request	40MVA	20MVA	40MVA

It means that the rated capacity of power transformer windings, Sн = 40000/20000/40000 kVA (100/50/100%).

3. Petersen Coil in Promishlennaya

The Japanese side suggested that BT would use ground-fault protection relays instead of Petersen Coils. Both parties agreed that the Japanese side would send a document on details of Japanese digital type ground-fault protection relay operation, and the Tajikistan side would consider the necessity of Petersen Coil.

山本重成

с текстом Протокола переговоров

4. The Lightning/Surge Arresters between 110kV Underground Cable for switching surge protection

The Japanese side explained unnecessary status of Lightning/Surge Arresters to the Tajikistan side from technical point of view. The Tajikistan side, keeping in mind the serious accident happened at new 500kV indoor gas-insulated switchgear at Nurek Hydropower Plant, because of absence of Lightning/Surge Arresters in cable lines, and in accordance with the Electric Installation Code (7th Edition), deemed that it would be obligatory to install Lightning/Surge Arresters in cable line connection terminals.

5. Priority for the Substations

The Japanese side suggested starting, first, the construction of two new substations, 110/6-10kV Glavpochtamt and 110/35/10kV Radiostansiyat, and finally rehabilitate the existing substation Promishlennaya. On the contrary, the Tajikistan side proposed that we would rehabilitate, first, the existing substation Promishlennaya, and then build Radiostansiya considered to be crucially important facility to overcome the issue of overloading the existing power networks around it and significantly improving the power supply security in the city, and then get down to construction of Glavpochtamt SS. Taking this into consideration, both parties agreed to make maximum effort to start all the three substations at the same time by reducing project cost.

6. Power System Analysis Data

The Tajikistan side is going to offer data on Circuit Breaker Operation Condition, Transformer, Power Load, and Generator Data.

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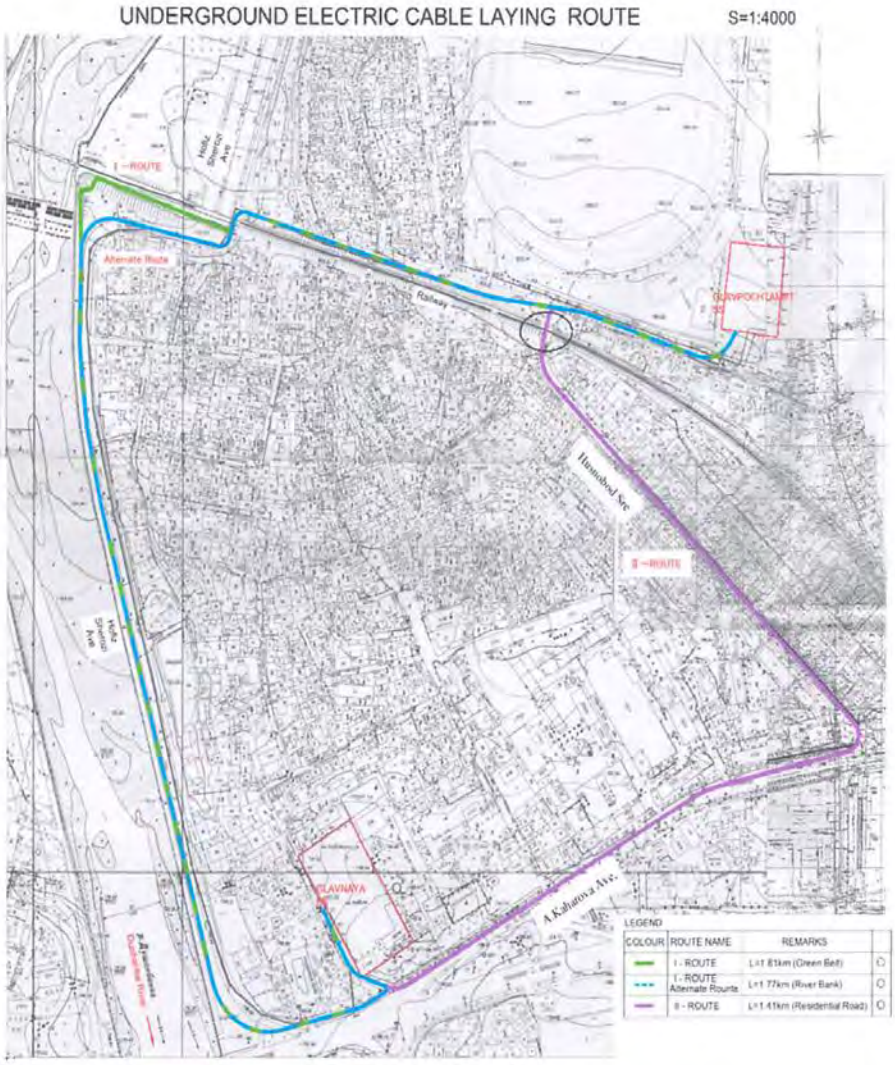
Appendix List

Appendix 1: 110kV UNDER GROUND ELECTRIC CABLE ROUTE

Appendix 1: UNDERGROUND ELECTRIC CABLE ROUTE


UNDERGROUND ELECTRIC CABLE LAYING ROUTE
S=1:4000
I ~ROUTE
Alternate Route
Railway
II ~ROUTE
A.Kabanova Ave.
LEGEND
COLOUR
ROUTE NAME
REMARKS
I - ROUTE
L=1.81km (Green Belt)
I - ROUTE Alternate Rounte
L=1.77km (River Bank)
II - ROUTE
L=1.41km (Residential Road)

5-3 技術協議録(C/N-3)

Confirmation Note

on the Preparatory Survey

for the Project for Rehabilitation of Substations in Dushanbe

in Republic of Tajikistan

(Third Field Survey)

In response to the request from the Government of the Republic of Tajikistan for Japanese Grant Cooperation on the Project for Rehabilitation of substations in Dushanbe (hereinafter referred to as "the Project"), Japan International Cooperation Agency (hereinafter refer to as "JICA") dispatched the JICA Expert team (hereinafter refer to as "the team") to Third field survey in October, 2016 to survey the Project feasibility with Barki Tojik (hereinafter refer to as "BT") under relevant agencies surrounding BT such as Dushanbe Power Grid and Committee for Environmental Protection (hereinafter refer to as "CEP"), and the line agency i.e. Ministry of Energy and Water Resources (hereinafter refer to as "MoEWR")

The Third field survey was conducted from October 17st to 21st, 2016.As a result of the discussions, the contents of agreed and confirmed topics are described in the Confirmation Note hereby.
If any discrepancy occurs between English and Russian versions, then English version shall prevail.

Dushanbe, October 20th, 2016

山本重成

Shigenari Yamamoto
Survey Team Leader
JICA Expert

Manuchekhr Safarov
Head of Department of Management Development & implementation investment projects in energy & water resources

Asozoda Mahmadumar
First Deputy Chairman of
Barki Tojik

Tajikistan side and Japanese side discussed mainly the five significant points as written below.

1. Both sides agreed to the Tajikistan side proposal which is the first, Rehabilitation of Promishlenaya substation, the second, newly construction of Radiostansiya substation and the third, newly construction of Glavpochtamt substation.

2. Both sides have agreed on transformer specifications in Promishlennaya and Radiostansiya as below.

Substation		Promishlennaya	Radiostansiya
Voltage		110kV/35kV/10kV	110kV/35kV/10kV
Capacity		40MVA/20MVA/40MVA	40MVA/20MVA/20MVA
Winding		Y-Y-Δ Yo/Y/Δ	Y-Y-Δ Yo/Y/Δ
Tap	110kV-19tap	115kV±~~9kV×1.28%~~ ±9×1.78%	
	35kV-5tap	38.5kV±2×2.5%	

3. Both sides have confirmed that both sides can complete all processes of rehabilitation for Promishlennaya by the end of the project period as shown in Appendix1 that Tajikistan side made.

4. Both sides have agreed on major undertakings to be implemented by BT as shown in Appendix2.

5. Both sides have agreed that both sides would set Japanese digital ground- fault protection relay operation instead of PC(Petersen Coil).

Confirmed by Yamamoto 21st October, 2016

山本重成

Steps of works implementation to change the transformers T-1 and T-2 at the 110/35/10kV Promishlennaya.

1. With the energy organization prepare a plan-scedule for dismantling works on the present equipment and installation of the new equipment;
2. Move the part of loading from the transformer No. 2 to the nearest electric substations and the part of loading to the transformer No.1. (these works shall be done in the lowest loading period – from April to September);
   Shut down the feeding of equipment, which is working on transformer No. 2 from the low (10kV), middle (35kV) and high (110kV) sides of loading with disconnected switch, shut down the feeding of the second circuit as well. Dismantling the power transformer T-2, 110kV equipment, 10kV bridge bus bar from the transformer`s input to the indoor switchgear-10kV building and 35kV bus bar cable to the input cubicle of the transformer No.1 at the outdoor switchgear-35kV;
3. Move the transformer No.2 and the equipment, which was dismantled, and materials to the place, inducted by the Customer;
4. Set of the new 110kV equipment, construct the new building indoor switchgear -10kV and 35kV, taking into the consideration the equipment complect, mounting and equipment regulation, taking into the consideration the second circuit;
5. Set up the new transformer No.2;
6. Mounting and the regulation of the power transformer, mechanic and electric checks of the equipment of high loud and equipment on the second circuit;
7. Start up the new transformer No.2;
8. Connect the 35kV and 10kV switchgears to the new transformer No 2;
9. Move the 10kV and 35kV loud to the new switchgears;
10. Works on dismountling of the other part of substation and mountling of the new equipment shall be done by the same scheme.

山本重成

Подтверждение договорённостей

О подготовительном исследовании по

Проекту восстановления электрических подстанций

в городе Душанбе в Республике Таджикистан

(Третье исследование на местах)

В ответ на запрос Правительства Республики Таджикистан о японской грантовой помощи по Проекту восстановления электрических подстанций в городе Душанбе (здесь и далее в тексте именуемого как «Проект»), в октябре 2016 года Японское агентство по международному сотрудничеству (здесь и далее в тексте именуемое как «JICA») направило в Таджикистан экспертную группу JICA (здесь и далее в тексте именуемая как «Группа») для проведения третьего исследования на месте с целью оценки осуществимости Проекта вместе с Барки Точик (здесь и далее в тексте именуемое как «БТ»), с привлечением таких заинтересованных организаций как Душанбинские городские электрические сети, Комитет по защите окружающей среды (здесь и далее в тексте именуемый как "КЗС»), и отраслевое министерство, то есть Министерство энергетики и водных ресурсов Республики Таджикистан (здесь и далее в тексте именуемое как «МЭВР»).

Третье исследование на месте было проведено с 17 октября по 21 октября 2016 года. В результате обсуждений, в настоящем документе о подтверждении договорённостей описывается содержание согласованных и подтверждённых вопросов.

В случае расхождений между английской и русской версиями документа, преимущественную силу имеет английская версия.

Душанбе, 20 октября 2016 года

山本重成

Ямамото Сигенари
Лидер исследовательской группы
Эксперт JICA

Сафаров Манучехр Баходурович
Начальник Департамента по управлению инвестиционными проектами в области энергетики и водных ресурсов

Асозода Махмадумар
Первый заместитель Председателя
ОАХК «Барки Точик»

Таджикская и японская стороны обсудили, в основном, нижеследующие пять пунктов.

1. Обе стороны согласились с предложенем Таджикской стороны, что первым этапом будет реализация реконструкции подстанции «Промышленная», вторым этапом – строительство подстанции «Радиостанция» и третьим – строительство подстанции «Главпочтамт».

2. Обе стороны пришли к соглашению по стоявшему ранее вопросу касательно технической характеристики трансформаторов ПС «Промышленная» и ПС «Радиостанция», как указано ниже.

Параметр		Промышленная	Радиостанция
Электронапряжение		110кВ/35кВ/10кВ	110кВ/35кВ/10кВ
Мощность		40MBA/20MBA/40MBA	40MBA/20MBA/20MBA
Соединение обмоток		Звезда/ звезда/ треугольник	Звезда/ звезда/ треугольник
Количество ответвлений	110kB-19	115кВ ± 9кВ×1,28%	115кВ ± 9 × 1,43%
	35kB-5	38.5кВ ± 2×2.5%	

3. Порядок проведения работ по реконструкционным работам на ПС «Промышленная» был составлен Таджикской стороной и указан в Приложении 1, было также проверено, что работы могут быть завершены в пределах сроках Проекта.

4. Были согласованы пункты обязанностей Таджикской стороны по настоящему Проекту, как указано в Приложении 2.

5. Было согласовано применение японского цифрового реле защиты от замыканий на землю на ПС «Промышленная» вместе с тем, что в рамках данного Проекта ЗРОМ устанавливаться не будет.

Confirmed by Yamamoto 21st, October 2016

山本重成

Порядок выполнения работ по замене трансформаторов: Т-1 и Т-2 на ПС 110/35/10 кВ «Промышленная»

1. Совместно с энергоснабжающей организации разработать график выполения демонтажных работ по действующему оборудованию и мантаж новых оборудовании;
2. Перевод нагрузки с трансформатора №1 на других ближайших электрических Подстанции и часть нагрузки на трансформатор №1 (данная работа должна выполняться в период минимальной нагрузки подстанции, т.е с апреля по сентябрь);
3. Отключения питания оборудований работающих на трансформаторе Т-1 со стороны низкого (10 кВ), среднего (35 кВ) и высокого (110 кВ) напряжения с видимым разрывом, а также отключение питания вторичных цепей. Демонтаж силового трансформатора Т-1 оборудования 110 кВ, шинного моста 10 кВ от ввода трансформатора то здании ЗРУ-10 кВ и шинопровода 35 кВ до ячейка ввода трансформаторов Т-2 на ОРУ-35 кВ;
4. Перенос трансформатора №1 и демонтируемых оборудовании 110 кВ и материалов до место назначения Заказчиком;
5. Установка новых оборудований 110 кВ, строительство новой здании ЗРУ-10кВ и 35 кВ с учетом комплектации оборудовании, монтаж и наладки оборудовании с учетом вторичных цепей;
6. -
7. Установка нового трансформатора №1
8. Мантах и наладка силового трансформатора, механическое и электрическое испытания оборудования высокого напряжения и оборудования на вторичных цепях;
9. Пуск нового трансформатора №1
10. Подсоединение распределителей 35кВ и 10кВ к новому трансформатору №1
11. Перевод нагрузки 10кВ и 35кВ на новые распределительные устройства
12. Работа по демонтажу второй части подстанции и монтаж новых оборудовании выполняется по аналогичному схему

Confirmed by Yamamoto 21st October, 2016

山本重成

負 担 事 項
Major undertaking to be implemented by BT
Приложение 2: Основные обязательства, которые должны быть выполнены «Барки Точик»

番号 No **№ п/п**	負 担 事 項 Major undertaking to be implemented by BT **Обязательства стороны ОАХК «БТ»**	備 考 Notes **Примечания**
1 (Promishlenaya)	(1) 変圧器の敷地外への撤去 Removal of the transformers from the Project site **Перемещение трансформаторов за пределы площадки Проекта** Демонтаж оборудования вспомогательных подразделений	
2 (P)	工事中の需要家に対する停電計画や安全対策実施時の連絡及び停電の補償 Notification of the plan for temporary electricity outage and security commitment during the constructions and compensation for customers **Уведомление о плановых отключениях электроэнергии и принимаемых мерах по безопасности в ходе строительства, и компенсации для потребителей электроэнергии**	
3 (Radiostansiya)	(1)プロジェクトサイト用地の確保 Securing of the land for Project sites **Обеспечение земельных участков для строительства** (2)プロジェクトサイト内の整地及び障害物の撤去 Land leveling and clearing the obstacles **Выравнивание участков и удаление препятствующих объектов**	

Confirmed by Yamamoto 21st October, 2016
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Приложение 2: Основные обязательства, которые должны быть выполнены «Барки Точик»

4 (R)	(1) 110kV 既設送電線昇圧工事は BT 側で実施する。なお、110kV 送電線引き込みのための引留め小型鉄塔はコンサルタントが JICA 側に要請することとした。 BT implements boost up to existing 110kV transmitting line, and the consultant requests JICA to construct a small size 110kV ending transmission tower for the transmission line to the substation **Работы по увеличению напряжения существующих линий передач до 110кВ выполняет сторона Барки Точик. Однако Консультант обратится с заявкой в адрес JICA по поводу небольшой концевой опоры для подсоединения ЛЭП 110кВ**	Обеспечение бюджета На что распространяется бюджет Какая сумма бюджета Какой период работ
5 (R)	新設変電所建設工事のうち Construction for new substation for: **В рамках строительства новой подстанции:** (1)　敷地整地工事 Land leveling **Выравнивание земельных участков** (2)　プロジェクトサイトへのアクセス道路 Access road to Project sites **Подъездная дорога к строительным площадкам** (3)　プロジェクトサイト内に排水路がある場合、その付け替え Shifting channel of drainage path, if it is on the project site **Замена дренажного канала на проектной площадке, если таковой имеется**	

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Приложение 2: Основные обязательства, которые должны быть выполнены «Барки Точик»

6 (R)	新設変電所用附帯設備工事 Communication works at the new substation **Коммуникационные работы на новой подстанции** (1) 水道工事 水道本管からサイトへの引込工事 Water supply works: leading in from water main to the site **Работы по водоснабжению: подсоединение от магистрального трубопровода к площадке** (2) 排水工事 サイト外排水 Drain work: from Project site to outside **Работы по отводу сточных вод: за пределы объекта**	
7 (P and R)	資機材の輸送に係る通関手続き及び諸税の取扱い Customs clearance and tax exemption pertaining to transportation **Таможенное оформление и освобождение от уплаты налогов при транспортировке оборудования** (1) ドゥシャンベ第２駅での免税措置及び通関手続き Tax exemption and customs clearance at Dushanbe II railway station **Освобождение от уплаты налогов и таможенное оформление на ж/д станции «Душанбе II»** (2) タジキスタン側の原因によりドゥシャンベ第２駅での免税措置及び通関手続きに時間がかかる場合、資機材輸送保管庫の提供、費用負担 Provision of storage house and payment for the storage fee in case that tax exemption and transportation	

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Приложение 2: Основные обязательства, которые должны быть выполнены «Барки Точик»

	procedures take a time, in case if it happened by fault of Customer. **Предоставление складских помещений и расходы по хранению грузов на ж/д станции Душанбе II в случае задержки процедур по освобождению от налогов и процедур по транспортировке, если это произошло по вине Заказчика.**	
8 (P and R)	現地調達資機材に係る付加価値税の免除 VAT exemption **Освобождение от уплаты НДС**	
9 (P and R)	「タ」国内への入国許可に必要な措置 Measures of entry permit for Contractor's staff **Меры по выдаче въездных виз в Таджикистан сотрудникам подрядчика**	
10 (P and R)	工事用電気、水道の設置、費用負担 Electricity and water works for constructions and payment for the utility **Электроснабжение и водоснабжение, необходимые для проведения строительных работ и связанные с этим расходы**	
11 (P and R)	銀行取極（B/A）に基づく以下の手数料の支払い Payment for the Banking Arrangement as below: **Расходы по Соглашению на банковскоеобслуживание, как указано ниже:** (1)A/P 授権手数料 Authorization to Pay **Расходы на платежное поручение** (2)支払手数料 Commission to remit **Комиссия за денежный перевод**	
12 (P and R)	プロジェクト実施に必要な環境社会配慮の申請と承認取得の予算確保及び実施 Application for Environment and Society attention and	

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Приложение 2: Основные обязательства, которые должны быть выполнены «Барки Точик»

	Budgeting for the approve and implementation **Заявка на учет социально-экологических факторов, необходимого для реализации Проекта и обеспечение бюджета для получения утверждения и реализации**	
13 (P and R)	以下に示す許可取得のための必要な措置： Measures of authorization as below: **Меры по получению разрешительных документов, как указано ниже:** (1)据付工事に必要な許可 Approval for Installation of the Equipment **Разрешение на монтаж оборудования** (2)プロジェクト対象変電所の制限地区への進入許可 - Access permit for restricted area of project substations **Разрешение на доступ в закрытую зону проектных подстанций**	
14 (P and R)	プロジェクト対象変電所の仮設資機材置場用地は、プロミシレネヤ変電所に確保 Securing of the land for the makeshift equipment storage at Promishlennaya **Обеспечение площадей для временного хранения оборудования на проектной площадке ПС «Промышленная»**	
15 (P and R)	工事期間中の駐車場の確保 Securing of the parking lot during construction **Обеспечение мест парковки строительной техники и транспортных средств в ходе строительства**	

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Приложение 2: Основные обязательства, которые должны быть выполнены «Барки Точик»

16 (P and R)	既設架空線/地中ケーブルまたはパイプの移設及び許可取得（電力、電話、水道、下水等） Transferal of overhead wire/underground cable and piping and obtaining the necessary permissions (e.g. Electricity, Telephone, Water Supply, Sewage) **Перемещение существующих проводов воздушных линий /подземных кабелей и трубопроводов и получение необходимых для этого разрешений (например, электрические кабели, телефонные линии, трубопроводы системы водоснабжения и канализации)**	
17 (P and R)	残土及び工事雑水の廃棄場所の提供 Provision of the land for discarding the surplus soil and gray water of construction **Обеспечение мест для утилизации излишнего разработанного грунта и бытовых сточных вод**	
18 (P and R)	日本側工事実施者とBT側が協議の上停電作業計画を作成し、BTが停電のための必要な操作を行う Japanese construction company and BT discuss and make a plan for temporary electricity outage operation. BT operates for temporary electricity outage operation in accordance with the plan. **Временные отключения электроэнергии, необходимые для строительства, осуществляемые по графику, составленному совместно специалистом японской стороны и стороной Барки Точик в результате обсуждений**	
19 (P and R)	プロジェクト工事サイトにおけるプロジェクト関係者への安全情報の共有。 Security commitment for all concerned parties on project	

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Приложение 2: Основные обязательства, которые должны быть выполнены «Барки Точик»

	construction sites, such as sharing security information **Предоставление информации о безопасности всем связанным с проектом лицам на строительных площадках Проекта**	
20 (P and R)	コンサルタント用事務所の部屋提供 Provision of the office for Consultant **Предоставление офисного помещения для консультанта**	

山本重成

別添資料－６　電力系統解析

別添資料6. 電力系統解析

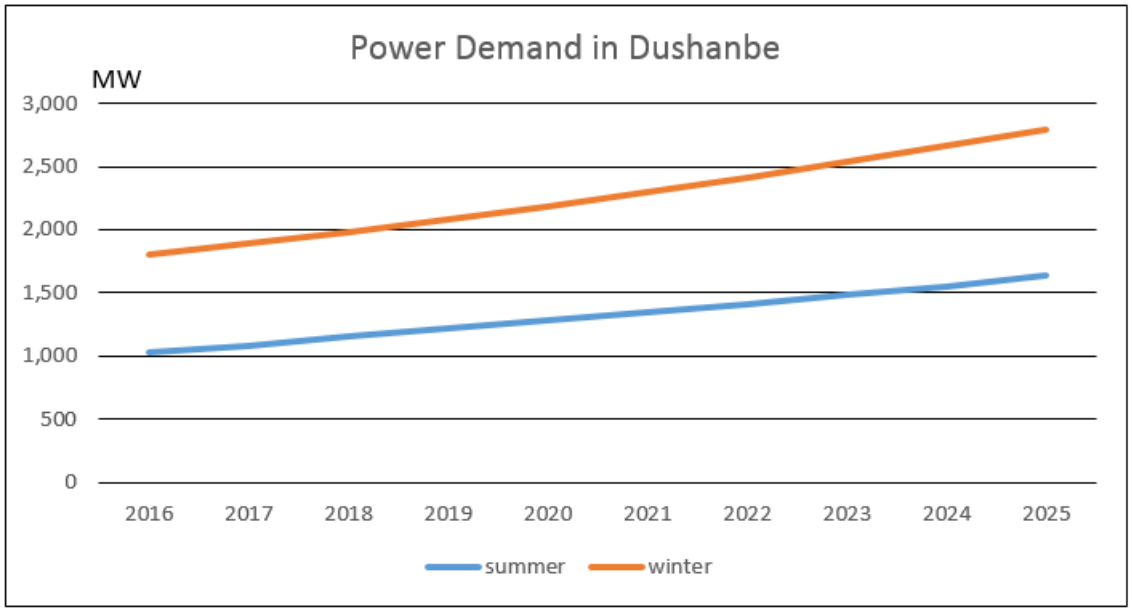
6-1 電力系統解析に係る基礎データ

6-1-1 需要想定

BT より提示のあった別添表 6-1 のドゥシャンベの最大需要の 2025 年度までの想定値を用いた。なお、別添図 6-1 に最大需要の推移を示す。

別添表 6-1 ドゥシャンベの最大需要予想（人・kW）

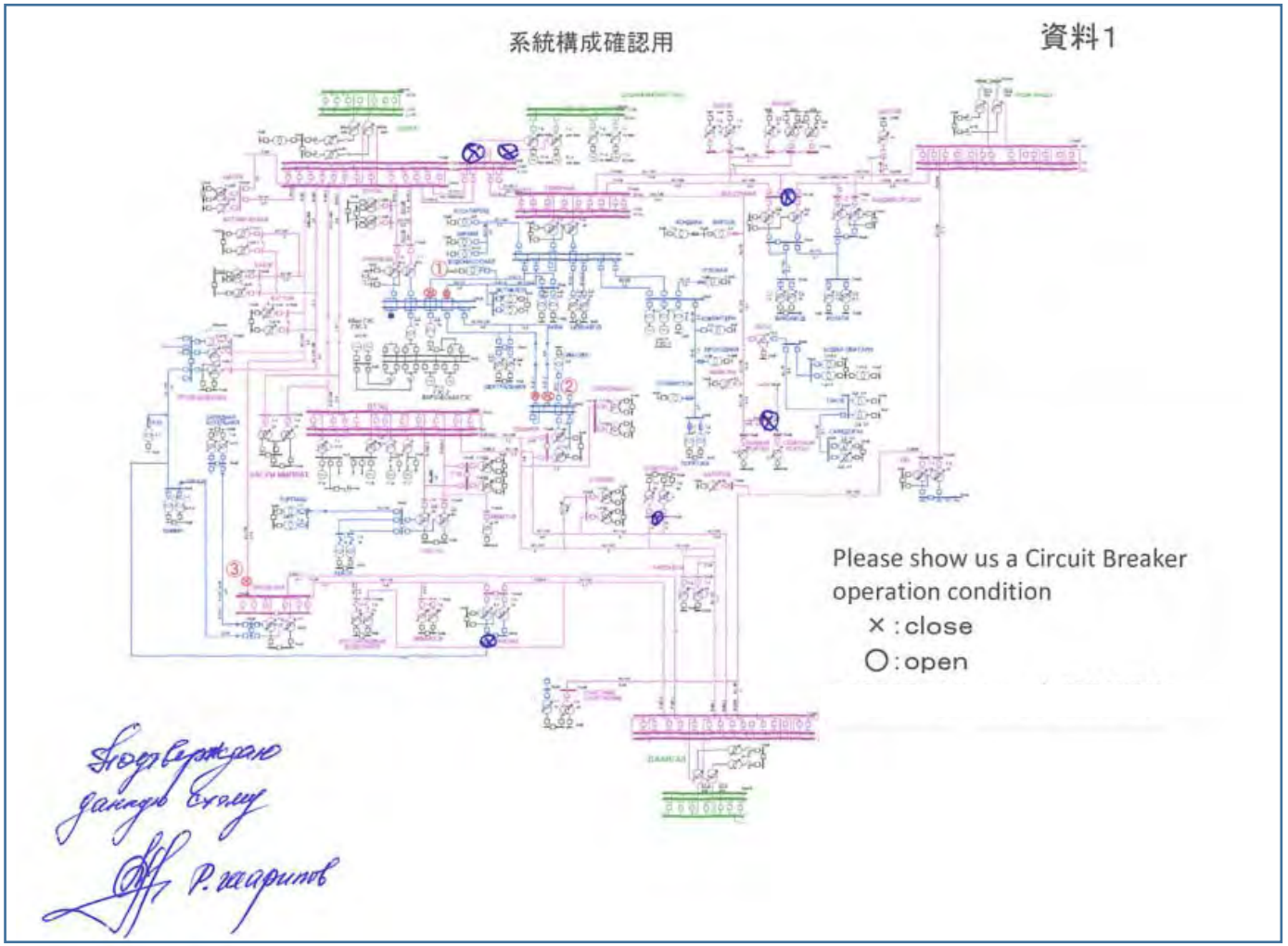
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Population	810,700	832,000	860,000	895,000	910,000					925,000
summer	1,026.000	1,077.300	1,160.575	1,218.603	1,279.533	1,343.510	1,410.685	1,481.219	1,555.280	1,633.044
winter	1,800.000	1,890.000	1,984.500	2,083.725	2,187.911	2,297.307	2,412.172	2,532.781	2,659.420	2,792.391



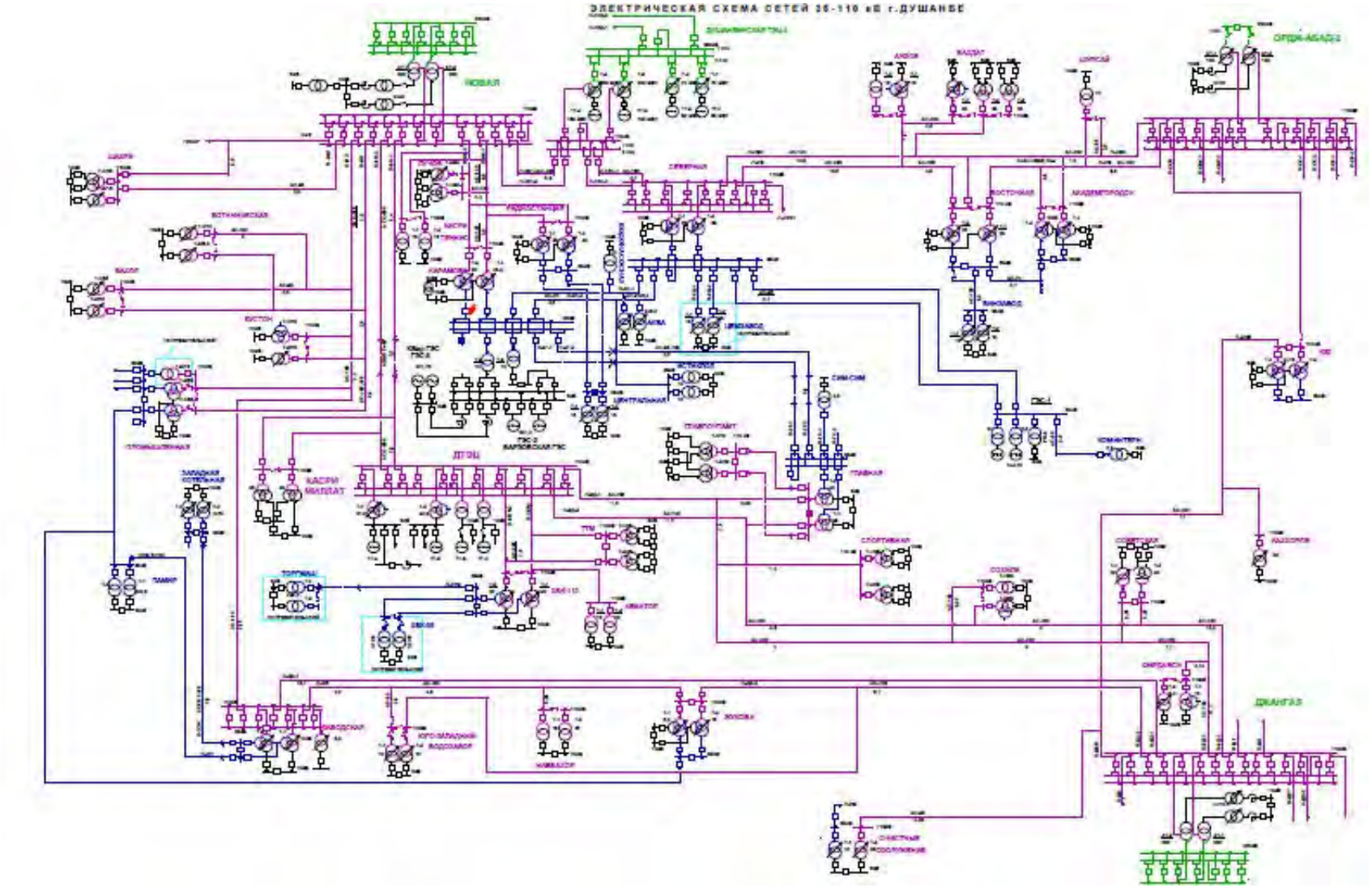
別添図 6-1 ドゥシャンベの最大電力需要の推移

6-1-2 電力系統解析に係る基礎データ（系統構成）

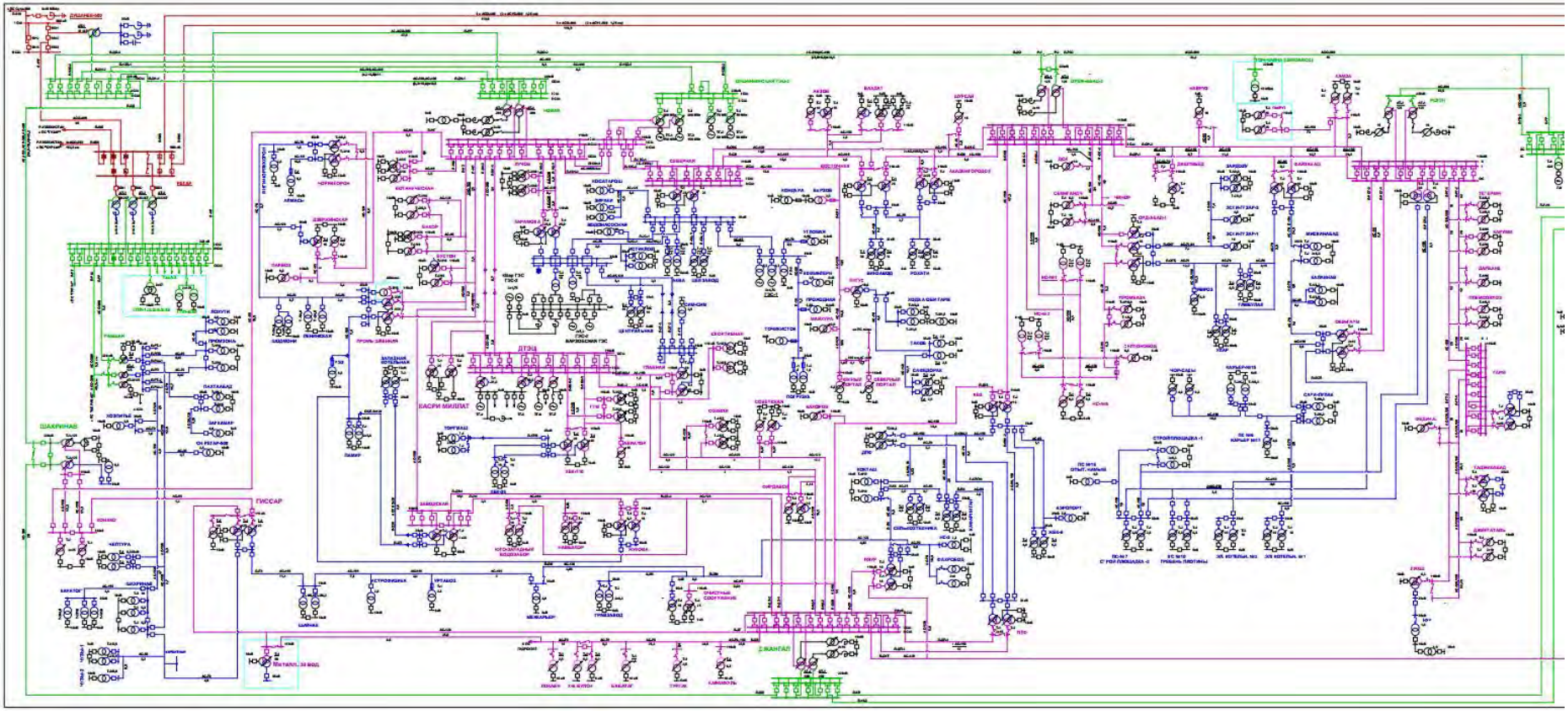
系統解析にあたり、解析計算の模擬系統範囲と系統構成を BT に確認を行った。BT から提供のあったタジキスタン全域の電力系統図及びドゥシャンベ内供給系統図を基に系統分断などの系統構成の確認を BT に依頼した結果、現状の系統運用状況を反映した別添図 6-2 の市内供給系統の提示があった。BT から提供のあった全域電力系統図については、別添図 6-3、別添図 6-4、別添図 6-5 に示す。



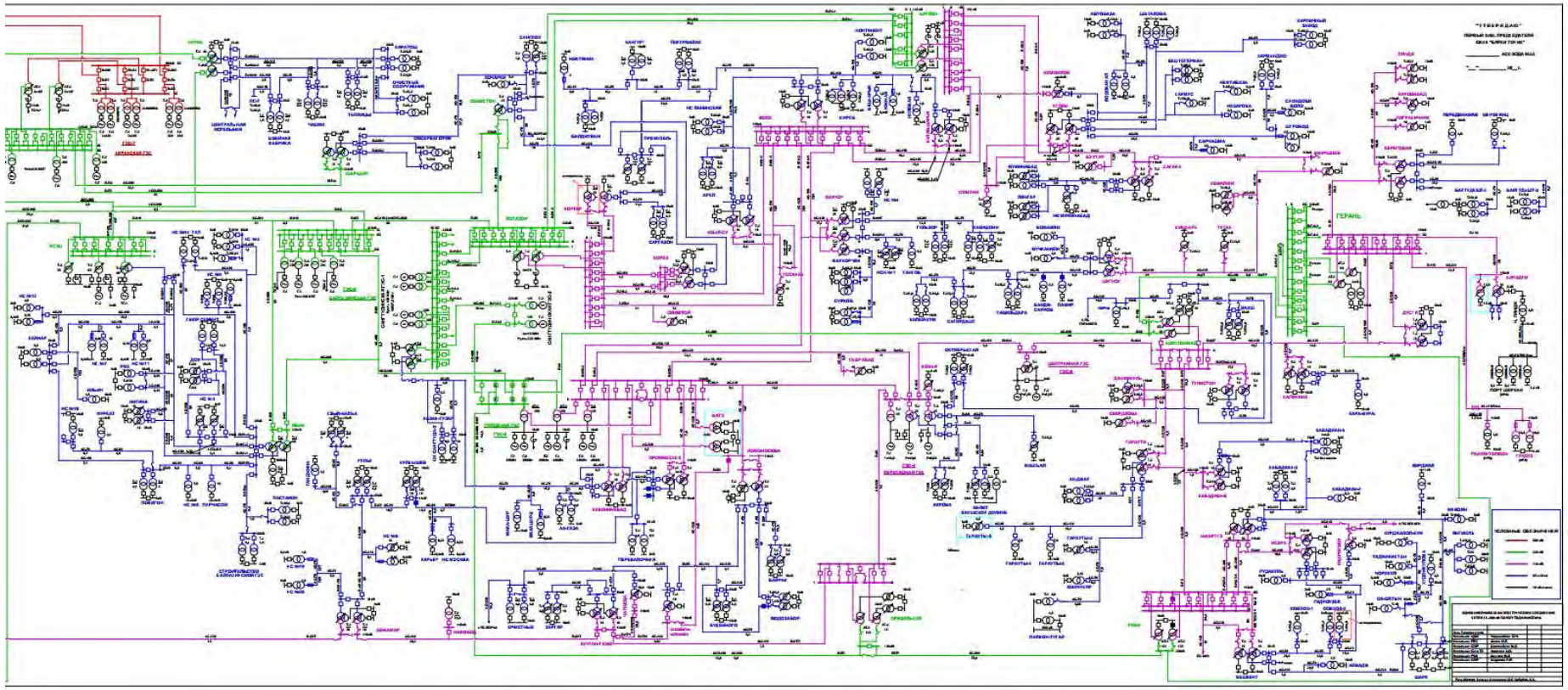
別添図 6-2 ドゥシャンベ内供給系統



別添図 6-3 ドゥシャンベ内電力系統図（BT 提供図面）



別添図 6-4 タジキスタン電力システム（北部、南部、西部系統）



別添図 6-5 タジキスタン電力系統図　（東部系統）

6-1-3　電力系統解析に係る基礎データ（供給設備）

送電線については電力系統図に示された線種と亘長をもとに線路定数を算出した。発電機及び変圧器については、対象機器の標準的な定数を提示し BT に確認と修正を依頼した。別添 8 に提供データを示す。

6-1-4 電力系統解析に係る基礎データ（負荷潮流）

負荷潮流についてはドゥシャンベ内における 2016 年度冬期ピーク予想負荷 155 万 kW をもとに BT より提示された変電所毎の負荷潮流値を用いた。別添 8 に各変電所の負荷潮流を示す。2017 年度以降の電力系統解析に用いた負荷潮流は、2016 年度の予想負荷からの伸び率を有効電力及び無効電力に乗じて算出したが、プロミシレンナヤ変電所とラディオスタンツィヤ変電所の有効電力については BT から提示された予想負荷潮流を用いた。

6-2 系統モデルの構築

前述の基礎データをもとにドゥシャンベ内供給電力系統モデル（解析ソフトウェア：PSS/E）を構築した。

6-3 解析結果及び本事業の妥当性、有効性の確認

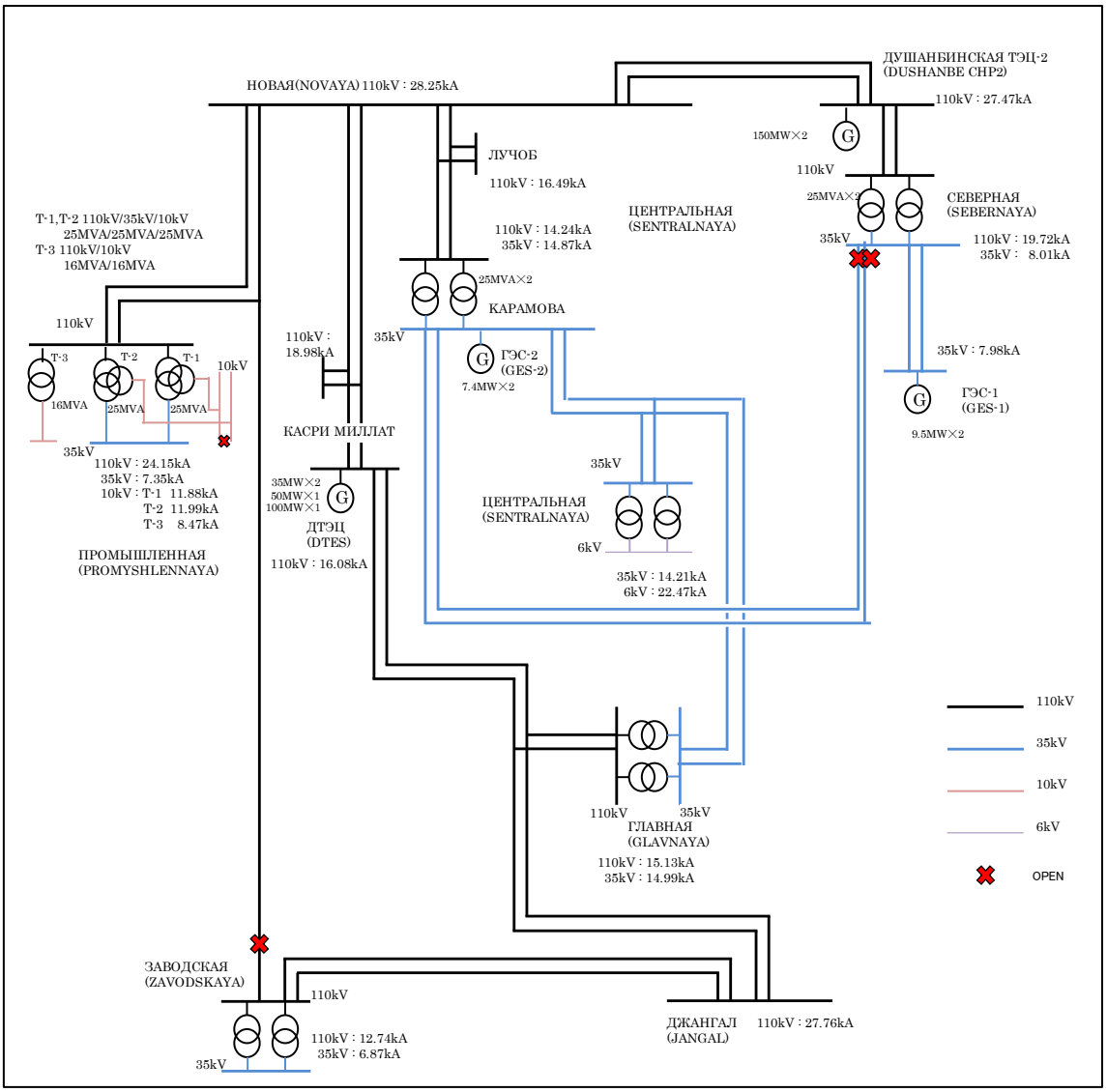
6-3-1 短絡電流

プロミシレンナヤ変電所改修とラディオスタンツィヤ変電所新設にあたり受電遮断器の必要遮断容量を確認したところ設計仕様の 31.5kA で問題がないことが確認できた。また、他の変電所においても現在の短絡電流が増加することのないことが確認できた。

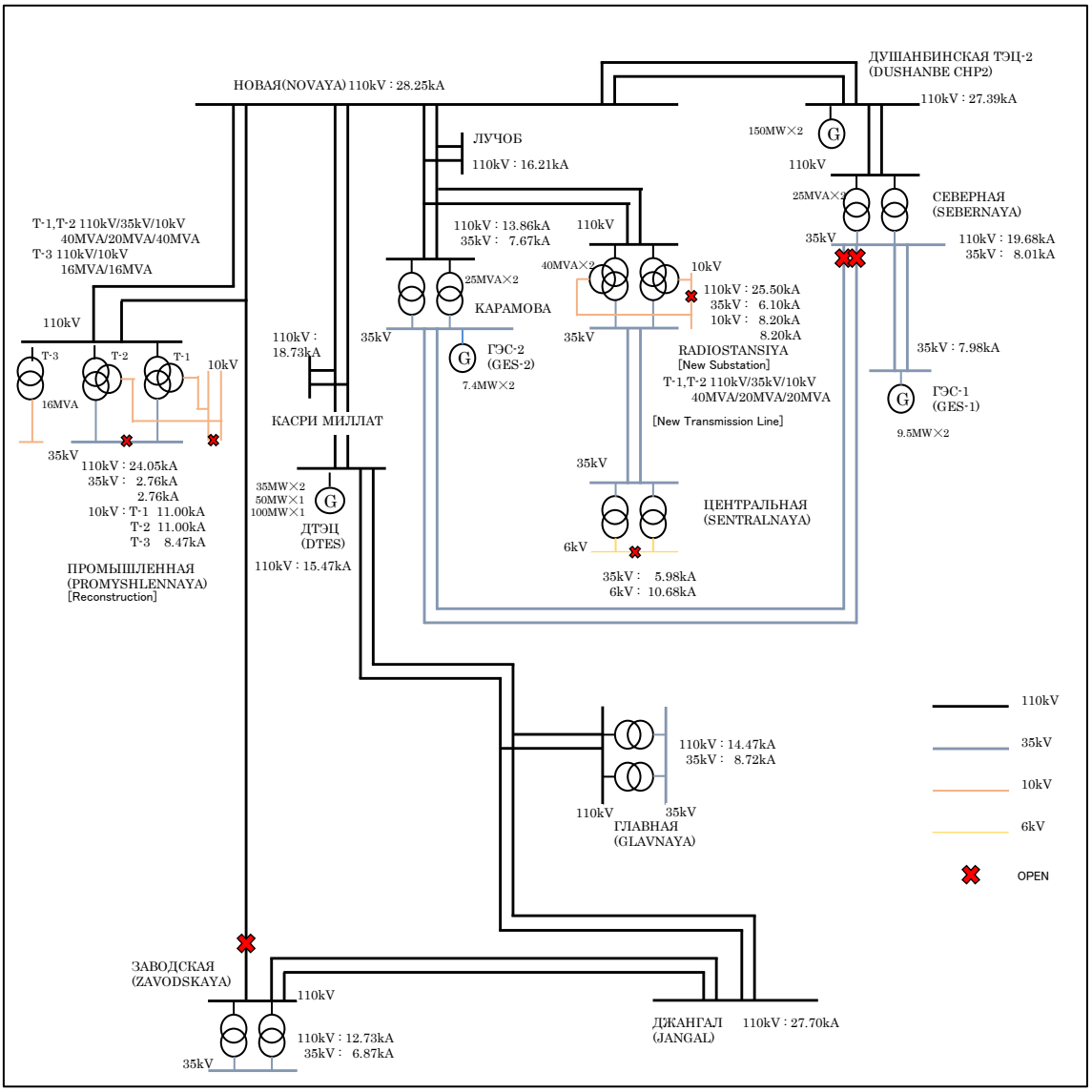
改修及び新設前後の結果を別添表 6-2 と別添図 6-6、別添図 6-7 に示す。また、改修・新設後の解析計算結果の帳票を別添 8-2 に示す。

別添表 6-2 短絡電流計算結果

変電所名	電圧階級（kV）	改修前(kA)	改修・新設後(kA)
プロミシレンナヤ	110	24.15	24.05
	35	7.35	5.88
	10	11.99	11.19
ラディオスタンツィヤ	110	--	25.50
	35	--	6.10
	10	--	5.33



別添図 6-6 短絡電流図（改修前）



別添図 6-7 短絡電流図（改修・新設後）

6-3-2 負荷潮流

プロミシレンナヤ変電所の改修前後の負荷潮流及びラディオスタンツィヤ変電所新設時の負荷潮流については BT からの想定値から必要性が示されている。負荷潮流の解析計算において他の変電所の負荷状況も含め将来的な電力系統状況を確認した。

別添表 6-3 にラディオスタンツィヤ変電所近傍のカラモバ変電所とセベルナヤ変電所の負荷潮流想定も表示しているが、両変電所とも、過負荷或は重負荷の状況からラディオスタンツィヤ変電所新設に伴い大幅な負荷潮流軽減となっている。なお、2025 年断面では変電所稼働率がプロミシレンナヤ変電所は 88%、ラディオスタンツィヤ変電所は 103%となっている。中期的需要予測では、下表の 2025 年に示す通り各々88%，103%となっていること

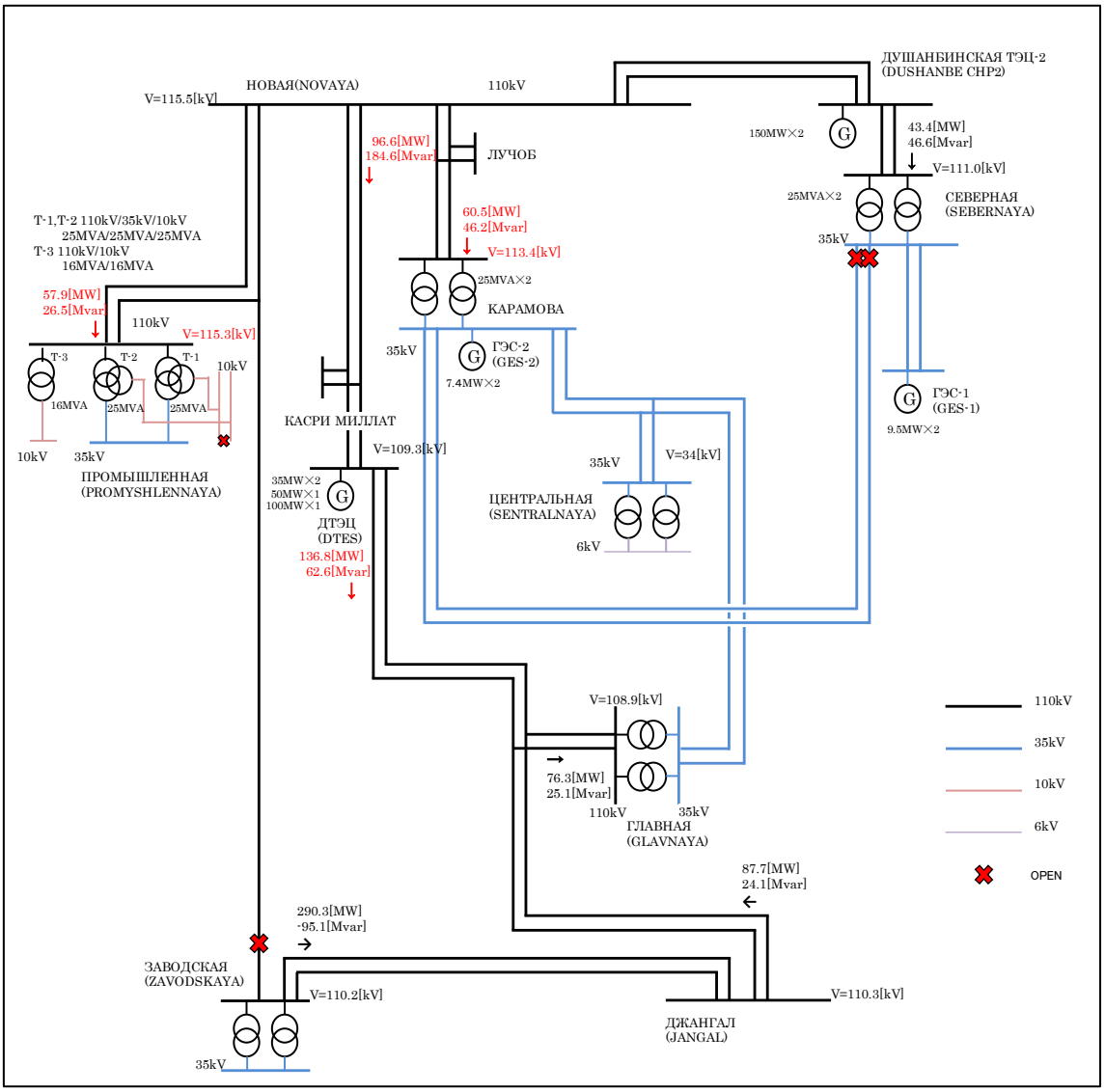
がわかる。別添図 6-8 と別添図 6-9 に 2018 年度冬期の改修・新設前及び改修後の潮流図、2020 年度及び 2025 年度の冬期潮流を別添図 6-10、別添図 6-11 に示す。なお、2018 年冬期の改修・新設後潮流計算結果の帳票を別添 8－3 に示す。

別添表 6-3 プロミシレンナヤ変電所とラディオスタンツィヤ変電所及び近傍変電所負荷潮流予想

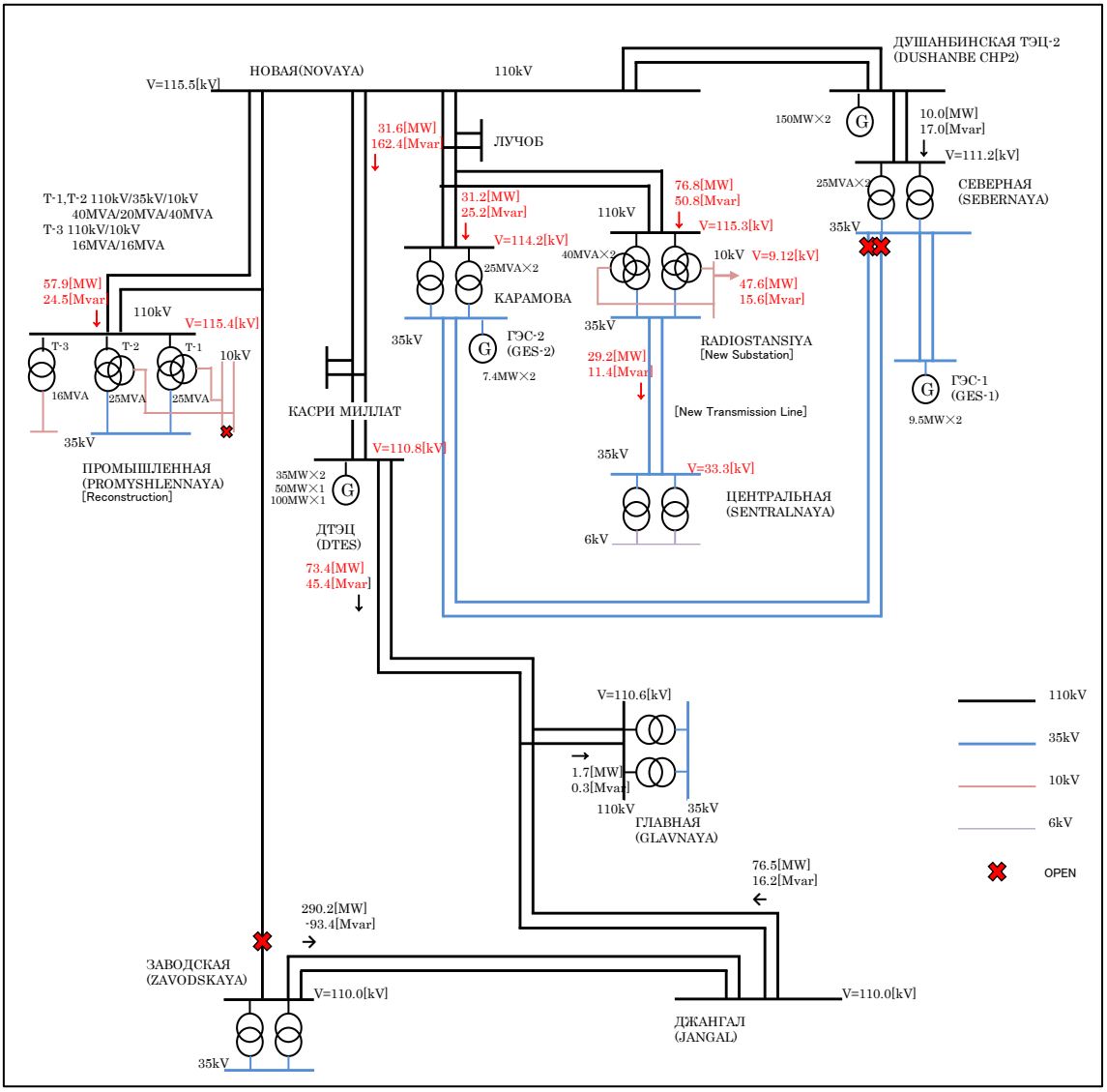
変電所名	設備容量	2017				2018						
		夏（MW）	稼働率	冬（MW）	稼働率	夏（MW）	稼働率	冬 工事前（MW）	稼働率	設備容量更新	冬 工事後（MW）	稼働率
プロミシレナヤ（PROMISHLENNAYA）	66MVA（25MVA×2、16MVA×1）	48%	96%	54	108%	49.2	58%	55.9	112%	96MVA（40MVA×2、16MVA×1）	55.9	70%
ラジオスタンシヤ（RADIOSTANSIA）	0MVA									80MVA（40MVA×2）	63.5	79%
カラモバ（KARAMOVA）	50MVA（25MVA×2）	31.2	62%	54.8	110%	33.6	67%	57.6	115%	50MVA（25MVA×2）	24.2	48%
セベルナヤ（SEBERNAYA）	50MVA（25MVA×2）	19	38%	38.8	78%	21	42%	41.2	82%	50MVA（25MVA×2）	11.4	23%

変電所名	設備容量	2019				2020				2025			
		夏（MW）	稼働率	冬（MW）	稼働率	夏（MW）	稼働率	冬（MW）	稼働率	夏（MW）	稼働率	冬（MW）	稼働率
プロミシレナヤ（PROMISHLENNAYA）	96MVA（40MVA×2、16MVA×1）	50.4	63%	57.9	72%	59.2	74%	59.9	75%	66.3	83%	70.4	88%
ラジオスタンシヤ（RADIOSTANSIA）	80MVA（40MVA×2）	55.2	69%	76.8	96%	56.7	70%	79.5	99%	58.3	73%	82.3	103%
カラモバ（KARAMOVA）	50MVA（25MVA×2）	18.4	37%	31.2	62%	19.2	38%	32.8	66%	24.6	49%	42	84%
セベルナヤ（SEBERNAYA）	50MVA（25MVA×2）	2.8	6%	10	20%	3.2	6%	10.8	22%	6.2	12%	16	32%

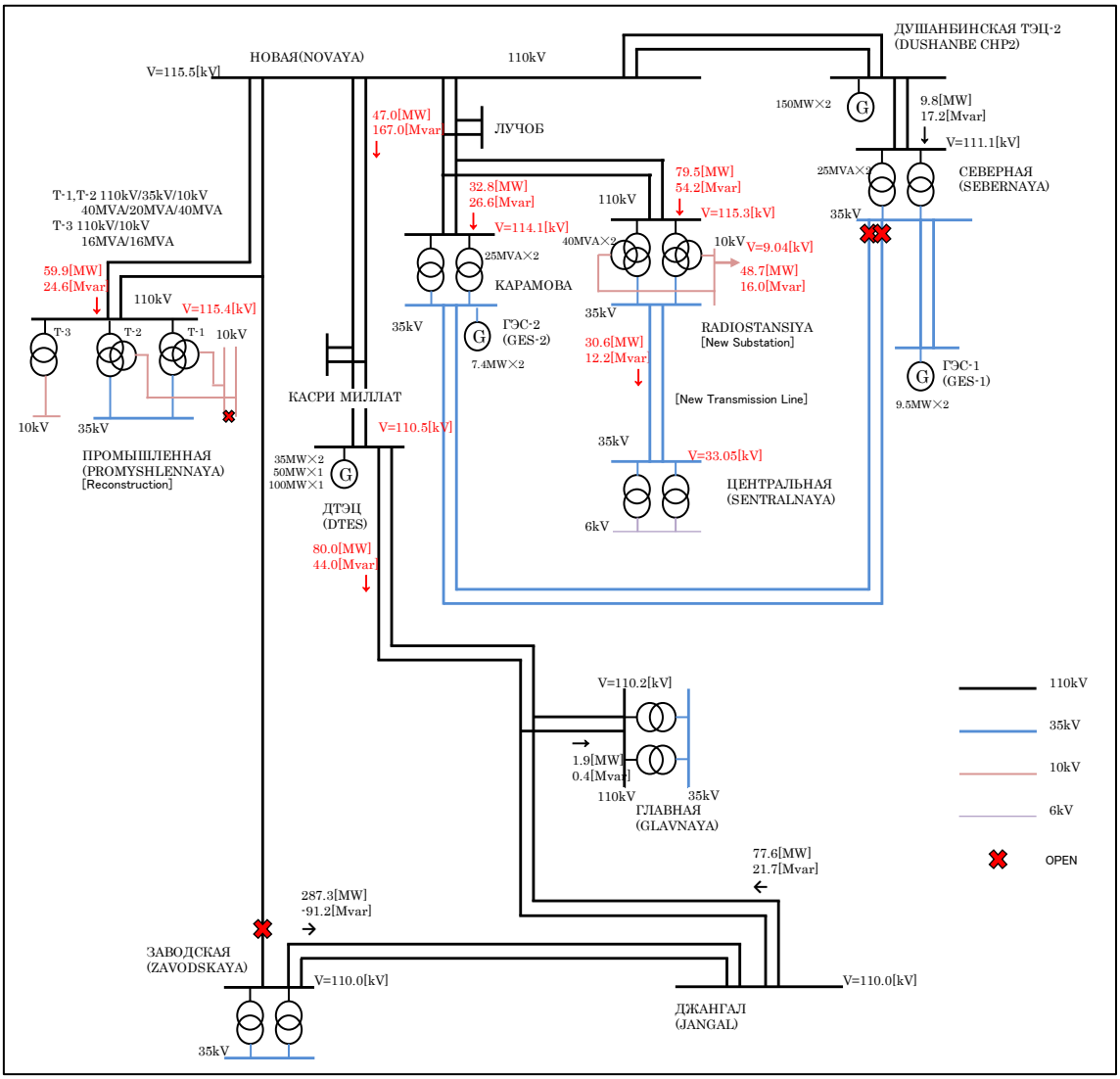
※2025年の下段（ ）は負荷電流の増加率を5%／年とした場合の数字



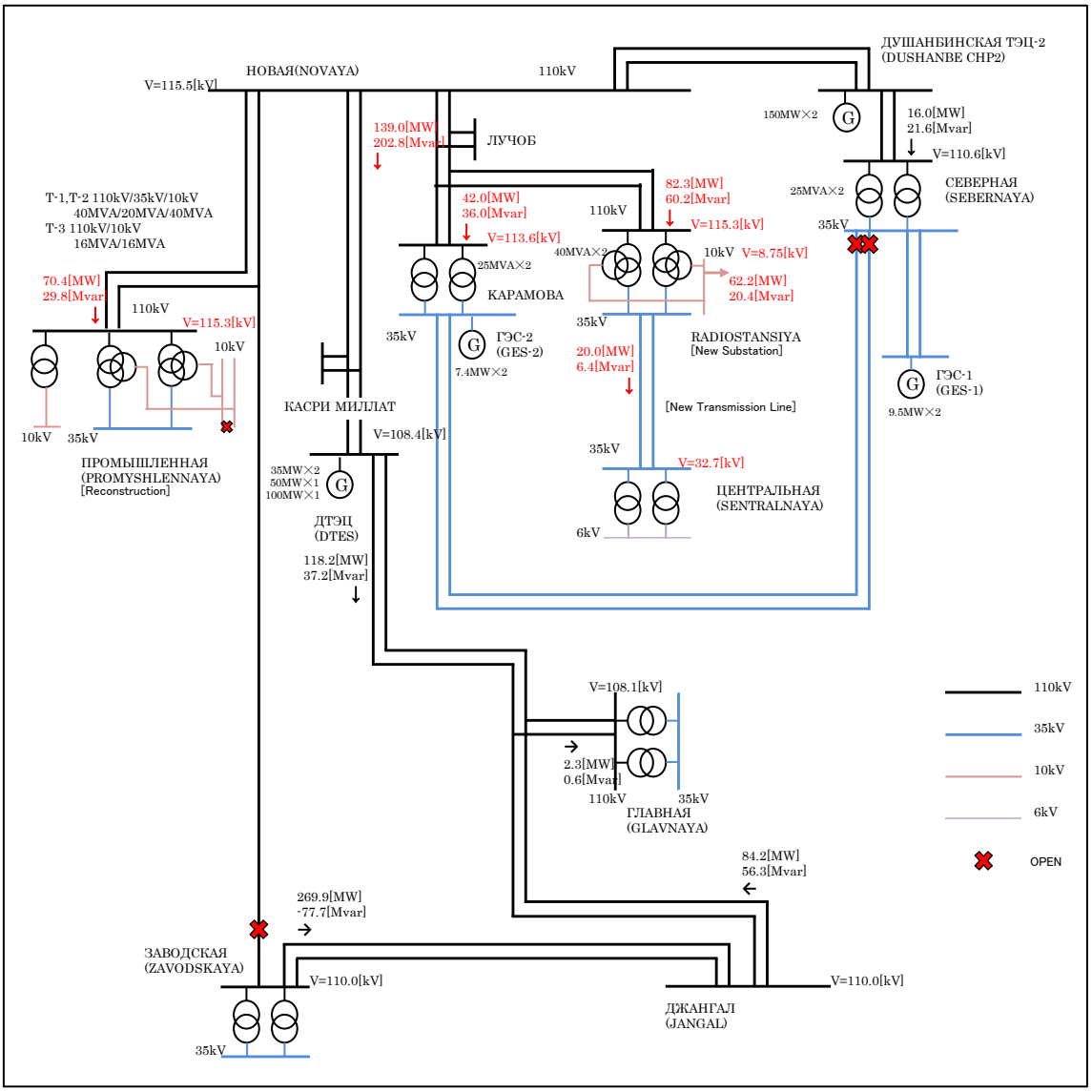
別添図 6-8 2019 年度冬期潮流図（改修・新設前）



別添図 6-9 2019 年度冬期潮流図（改修・新設後）



别添图 6-10 2020 年度冬期潮流图



别添図 6-11 2025 年度冬期潮流図

6-3-3　電圧

別添表 6-4 に示した電圧感度計算結果は、各変電所の 35kV 母線に無効電力 1 Mvar を注入した時の電圧変化を見たものであるが、結果的には 1Mvar の無効電力増加に対して平均して 0.048%（35kV 母線で 0.02kV）程度しか変動しないことから電圧の運用幅±10%（35kV 母線で±3kV）程度と考えた場合、当面は問題を生じないと考えられる。ただし、ドゥシャンベ内全体で 2025 年には現状より約 90 万 kW の需要増加が見込まれており、力率 90%として無効電力も 45 万 kVar 増加することから平均感度から換算すると 20%以上電圧変動が発生することとなる。従って長期的には無効電力増加分に対応した調相設備を計画的に設置し、常に変圧器のタップ調整における上下電圧運用幅に余裕をもたせることが必要と考えられる。

別添表 6-4 電圧感度計算結果

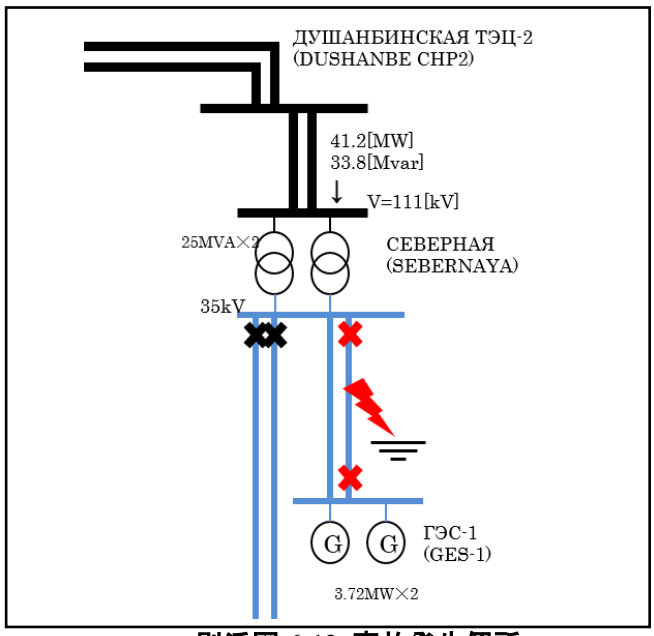
Sensitivity calculation Result(δV/δQ)　at　35kV Bus　　(%kV/Mvar)

СЕВЕРНАЯ (SEBERNAYA S/S)	0.003%
КАРАМОВА (KARAMOVA S/S)	0.077%
ПРОМЫШЛЕННАЯ (PROMYSHENNAYA S/S)	0.063%
average	0.048%

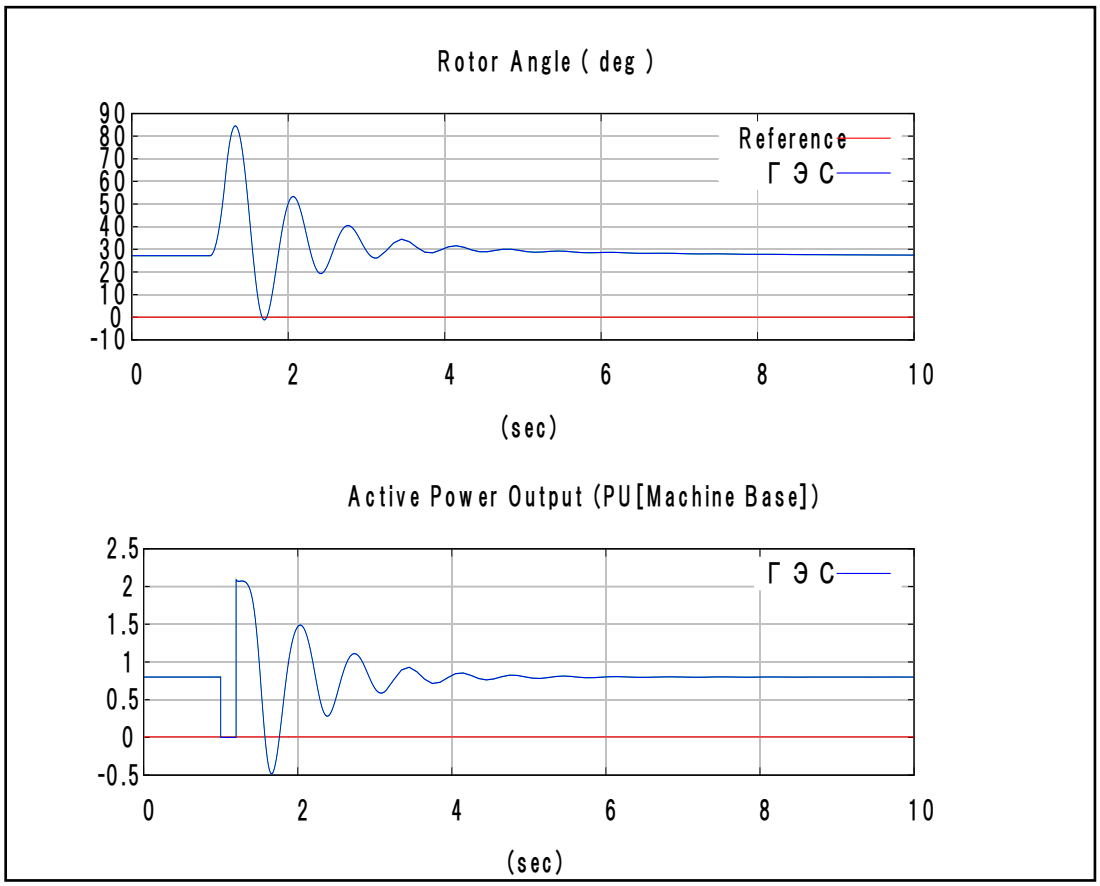
Result	0.02kV/1MVar(35kVbase)
	0.2kV/10MVar(35kVbase)

6-3-4 過渡安定度

今回の改修・新設工事では電源や送電線の変更が伴わないことから送電線事故時の発電機の過渡安定度の新たな問題は発生しないと考えられるが、変電所の負荷潮流の変化もあることから、電源送電線の 1 回線 3 相地絡事故時が発生した場合の時間域シミュレーションを実施した。対象発電機は ГЭС-1（GES1）とし、2018 年冬期の改修・新設後の断面で計算を行った。事故発生から 200ms で線路遮断器が開放（故障継続時間 200ms）となるが、結果的に電力動揺が短時間で収束し全く問題がないことが確認できた。事故発生個所を別添図 6-12 に、1 回線事故時の過渡安定度計算結果を別添図 6-13 に示す。



別添図 6-12 事故発生個所



別添図 6-13 1 回線事故時の過渡安定度計算結果

別添資料－７　ドゥシャンベの配電系統

別添資料7. ドゥシャンベの配電系統

7-1 ドゥシャンベの配電系統の現状

ドゥシャンベの配電系統は 35kV 及び 10kV、6kV にて供給を行っている。配電系統の変圧器容量合計は約 910MVA 程度であり、そのうち 120MVA が 35kV 系統への供給分となっており規模の大きな工場などが受電している。10kV 及び 6kV 系統は一般家庭などへの供給が主体であり暖房需要が旺盛な冬期夜間に需要が最大となっている。近年の需要増の対策として 6kV を 10kV に昇圧することとしており、現状は両電圧が混在している状況である。

旧ソビエト時代に建設された都市であり、独立後の首都であることから中心部は配電線の地中化がなされているが、郊外においては配電柱に添架した被覆されていない架空線にて供給されている。別添図 7-1 に示す通り、配電線の碍子接続などは手作業による巻きつけで実施しており、作業者の熟練度の相違による完成度の相違などで経年による緩みなどが懸念される。

別添図 7-1 配電線の碍子への添架状況（BT 研修室にて）

配電柱についてはコンクリート柱等の強固なものではなく 2 本のコンクリート杭で木柱を固定させる方式が大半であるため、一般家庭等への 220V 配電は柱上変圧器ではなく地上に設置した変圧器により降圧したのち再び電柱に添架しているものが大半である。各需要家への引込み線は 220V 配電線から被覆ケーブルにて地上に降ろしており、地上 2m 程度のところに計量メーターが設置されているのが一般的である。別添図 7-2 にドゥシャンベ内等で調査した配電柱の写真を示した。

写真 A は BT の研修室内に展示されていた木柱モデルである。写真Ｂは 2 本のコンクリート製補助柱に木柱をワイヤーで挟み込んで固定したもので、市内中心地以外で多数見かけるものである。横にあるのが各需要箇所への 220V 配電の計量メーター箱である。写真 C は 10kV または 6kV から 220V に変圧するために地上に設置された変電設備を格納しているコンテナである。なお、写真 D にみられるようなコンクリート柱も市内の一部で見受けられた。

別添図 7-2 ドゥシャンベ内の配電線施設状況

調査の結果、各変電所からの配電系統間の連系はなされており、区分用の開閉器も設置しているとのことであったが、いずれも遠方制御ではなく手動により入り切りの操作を実施している。ドゥシャンベにおいては冬期の需要の増大により停電が頻発しているとのこと

であるが、今回のプロミシレンナヤ変電所の改修に当たり、10kV スイッチギア 1 箱から 3 回線の配電線を引き出していることが判明し、冬期の需要増で容量超過となり停電に至っていることがわかった。計画ベースで配電線の組み合わせを考慮する等の方法である程度は対処できると考えられる。

配電系統の地絡保護については非接地系統であることから消弧リアクトル（Petersen Coil：PC）を用いた保護を実施しており、一線地絡事故時には健全 2 相については送電を継続することとしている。PC を用いた場合には系統変更時に適正なリアクトル量の設定を行うための整定変更が必要であるが、大きな系統の変更がないため変更頻度は少ないとのことである。

別添図 7-3 プロミシレンナヤ変電所 10kV スイッチギア

別添図 7-4 消弧リアクトル（プロミシレンナヤ変電所）

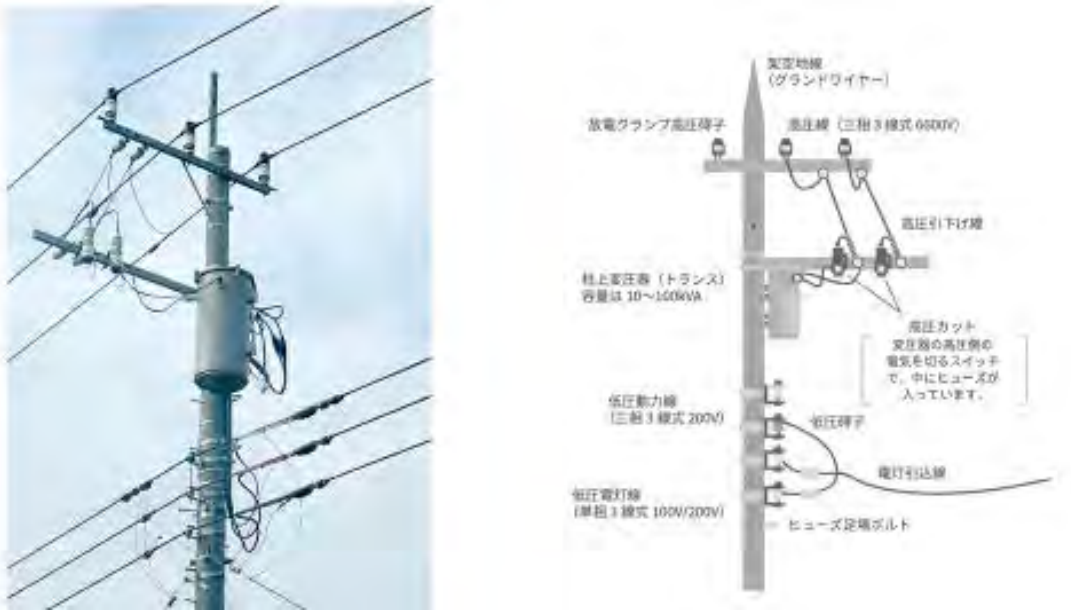
7-2 ドゥシャンベの配電系統の計画

年間 7.5～8.0%の経済成長に伴い 2030 年には生活スペースの倍増も想定されており、住

居の高層化も進むと考えられる。また、商業施設なども増加することから市内の変電所の新設、増設（設備更新）も急務である。また、SCADA を用いた容量管理、事故復旧の自動化なども合わせて実施していく必要がある。

7-2-1 電線の被覆化と電柱のコンクリート柱化

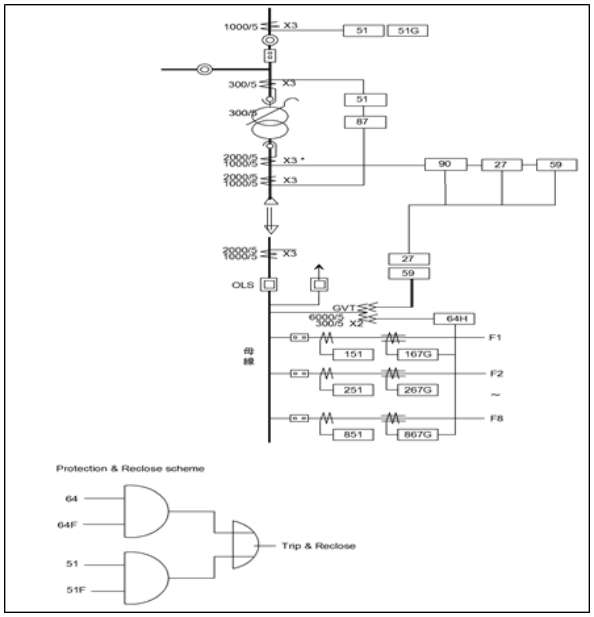
ドゥシャンベの中心（The Inner City）では配電線は地中化されているが、市街区域では電柱にて送電している。被覆されていない裸線が木々の中を通過していることや、家屋の屋根に近接している状況が散見されることから、今後は被覆化することが公衆安全面で必要と考える。合わせてコンクリート柱等の強固な電柱にして、柱上変圧器（ポールトランス）により、一旦地上に引き下ろして低位電圧に変圧して再度電柱に添架する手間を省き、一層の公衆安全を実現することが望ましい。日本国内の柱上トランスと標準的な電柱装備の例を別添図 7-5 に示す。



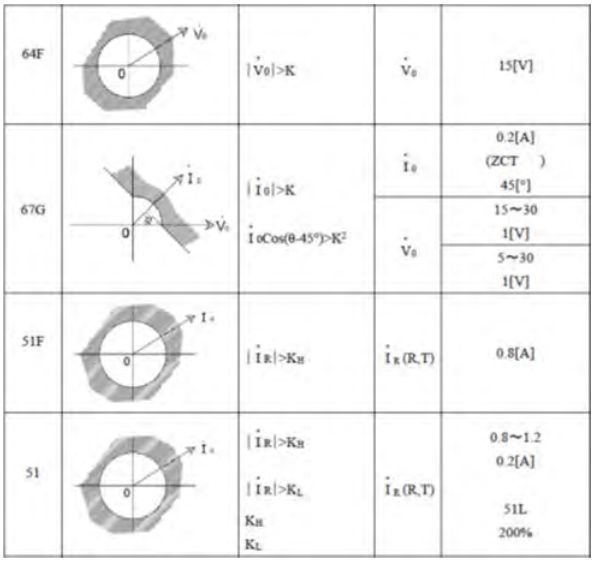
別添図 7-5 日本国内の柱上トランスと標準的な電柱装備の例

7-2-2 地絡方向継電器（DGR）による配電線保護と自動区分開閉器の設置

現在 PC による一線地絡事故の消去を実施しているが、健全相の電圧上昇や事故継続時の安全面のリスク、さらに PC 設備の新設及び維持に係る経済的損失を考慮すると方向地絡保護継電器（DGR）を用いた保護方式とするべきである。具体的な保護方式の適用事例を別添図 7-6 と別添図 7-7 に示す。



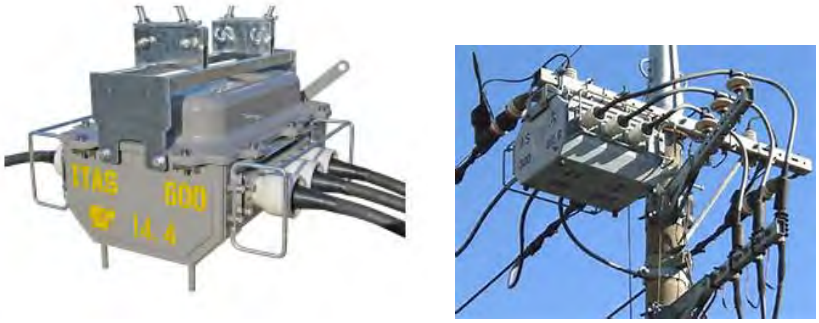
別添図 7-6 保護方式の適用事例 その 1



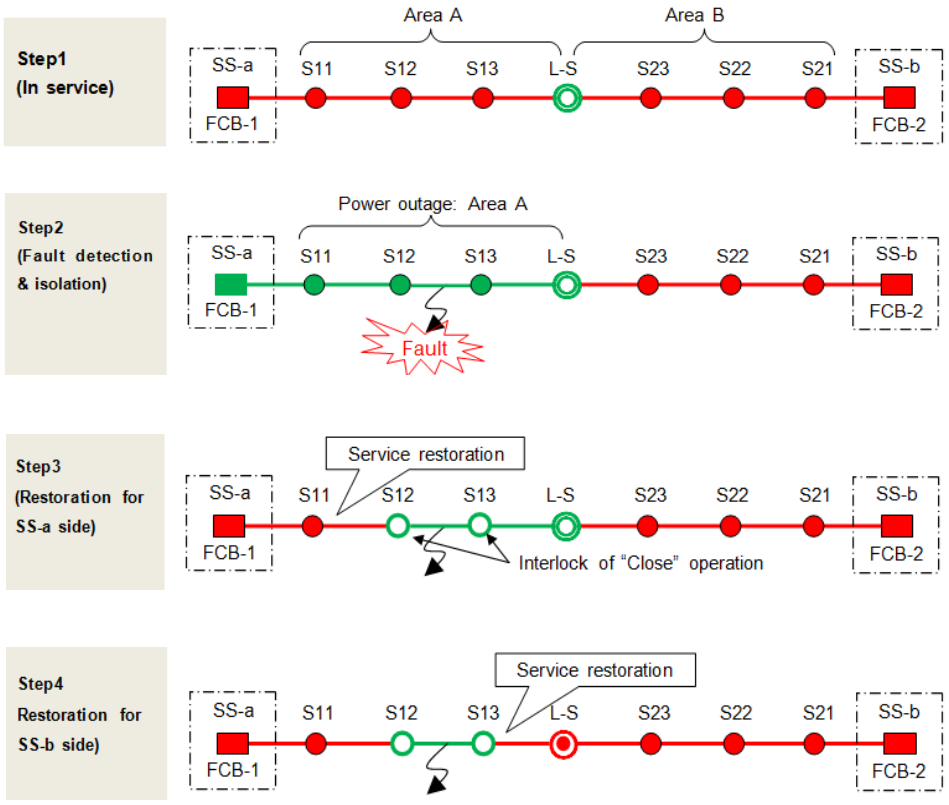
別添図 7-7 保護方式の適用事例 その 2

なお、DGR により一線地絡事故時には一旦 3 相とも遮断され、一定時間後再投入される。この際に自動区分開閉器が設置されていると、事故時に一旦解放された開閉器が変電所側に近いものから順次投入され、もし事故が継続していた場合には再度 DGR により変電所で遮断される。この時に事故区間の開閉器が自動的にロックされることにより、再度変電所から送電されても、今度は事故区間の前区間までの送電に制限され事故区間には送電されない。

さらに、他系統との連系がなされていれば、他系統からの送電により停電区間の救済も可能となる。別添図 7-8 に自動区分開閉器、別添図 7-9 に配電線事故時の復旧概念図を示す。



別添図 7-8 自動区分開閉器と装柱状況



別添図 7-9 配電線事故時の開閉器動作

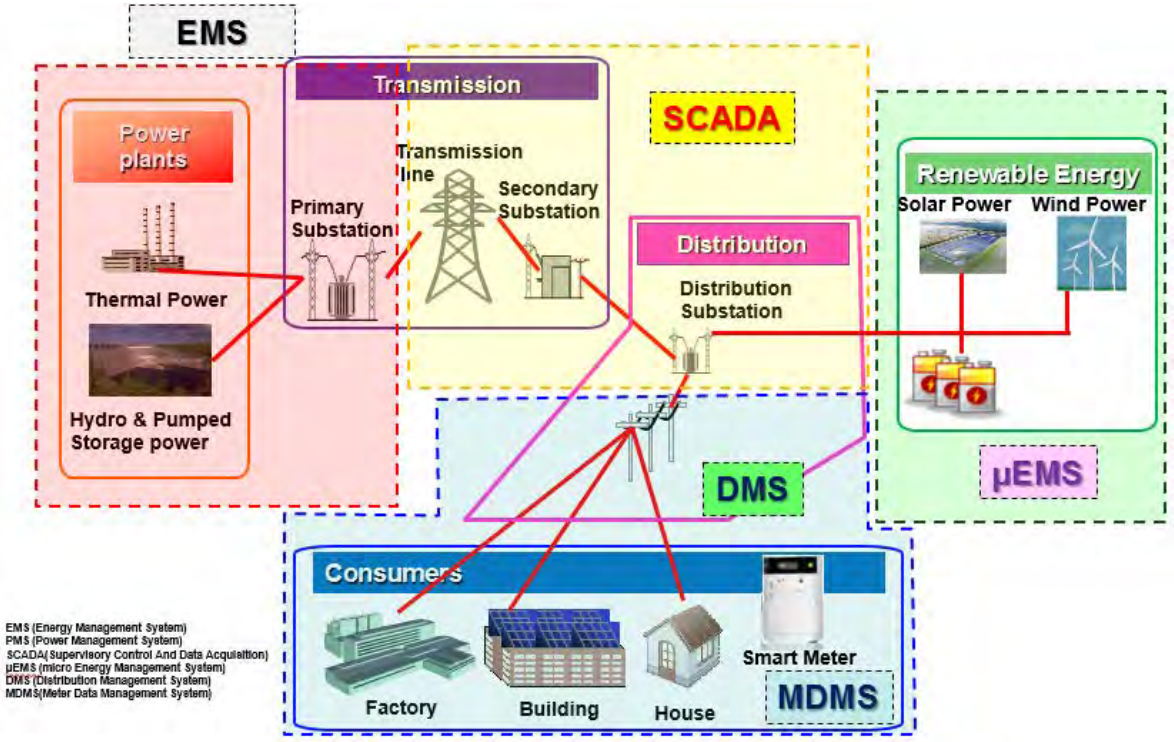
7-2-3 集中監視制御システム(SCADA)を用いた計画的な配電線の容量管理

スイッチギア 1 箱に 3 回線の配電線を接続している現状に鑑み、スイッチギア 1 箱に 1 配電線としたいとの要請があったが、多数のスイッチギアが必要であり、収納する建物容積

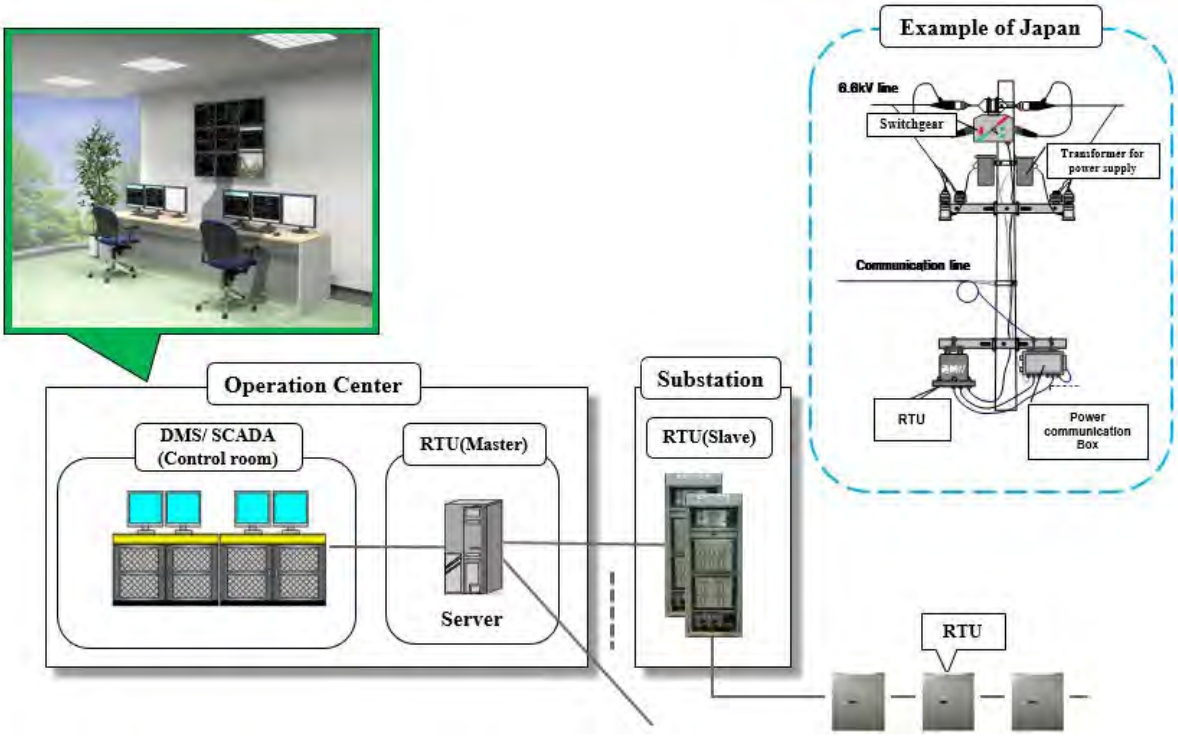
が非常に大きくなること、スイッチギアの容量を有効に活用できないことなど、コスト面で対応は難しい。SCADA による各配電線の潮流把握が可能となれば、配電線の適切な組み合わせを計画的にチェックすることができ、過負荷による停電を回避と、スイッチギアの有効活用が図れる。また、開閉器情報の収集を行うことで、上記の配電線の事故区間の確認が監視画面で行えるため、効率的な復旧が期待できる。

別添図 7-10・7-11 に示すとおり、電力系統の監視制御システムには電力系統全体の需給調整や系統運用を行うための EMS や送電線や変電所のデータ収集と監視制御を行う SCADA、配電線系統の監視制御を行う DMS 等がある。

箇所数が多い配電用変電所の業務の省力化を図るにあたっては、SCADA と DMS による負荷、電圧、潮流等のデータの自動収集を行い、逐次、新増設に合わせシステムを構築していくことが望ましいと考える。システムは遠隔制御の通信規格である IEC60870 規格に基づき構築することで段階的にメーカーを問わずに実施できる。



別添図 7-10 電力系統の監視制御システム概念図



別添図 7-11 SCADA による配電系統監視制図

7-2-4 電圧自動制御機能の導入

新設される変圧器において自動タップ調整器は当面不使用となる。その理由としては、上位系統の電圧変動が大きく、自動でタップ調整を行うと頻繁に動作してしまうとのことであった。しかしながら、今後の都市化や工業化などを考えると、電力系統全体としての電圧制御が必要となることは歴然としている。

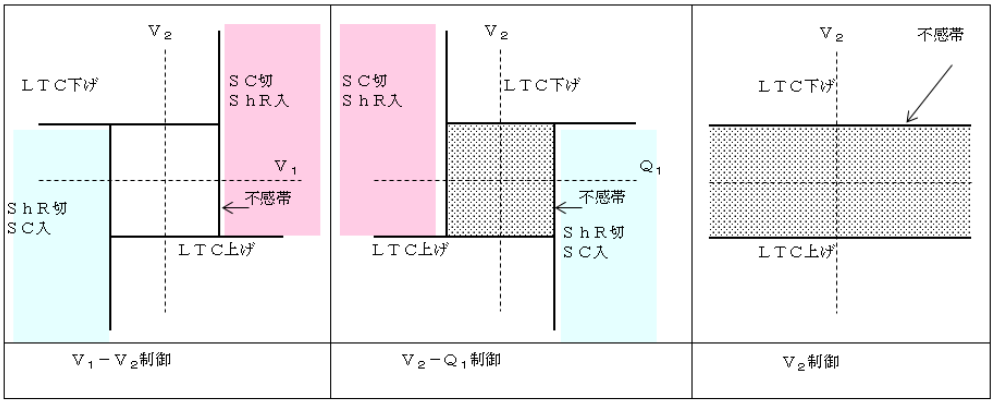
電圧制御の考え方としては別添図 7-12 に示すように、上位電圧の変電所の二次側電圧を一定の不感帯を持った基準電圧となるように、変圧器タップと調相設備を制御する、いわゆる電圧無効電力制御（VQC）を行うことが望ましい。配電系統においては、負荷量に合わせてタップを制御する方式の採用も考えられる。

いずれにしても、SCADA の拡充による各所のデータを用いた全系的な電圧解析によって、適正な調相設備を計画、設置して行くことが望ましい。

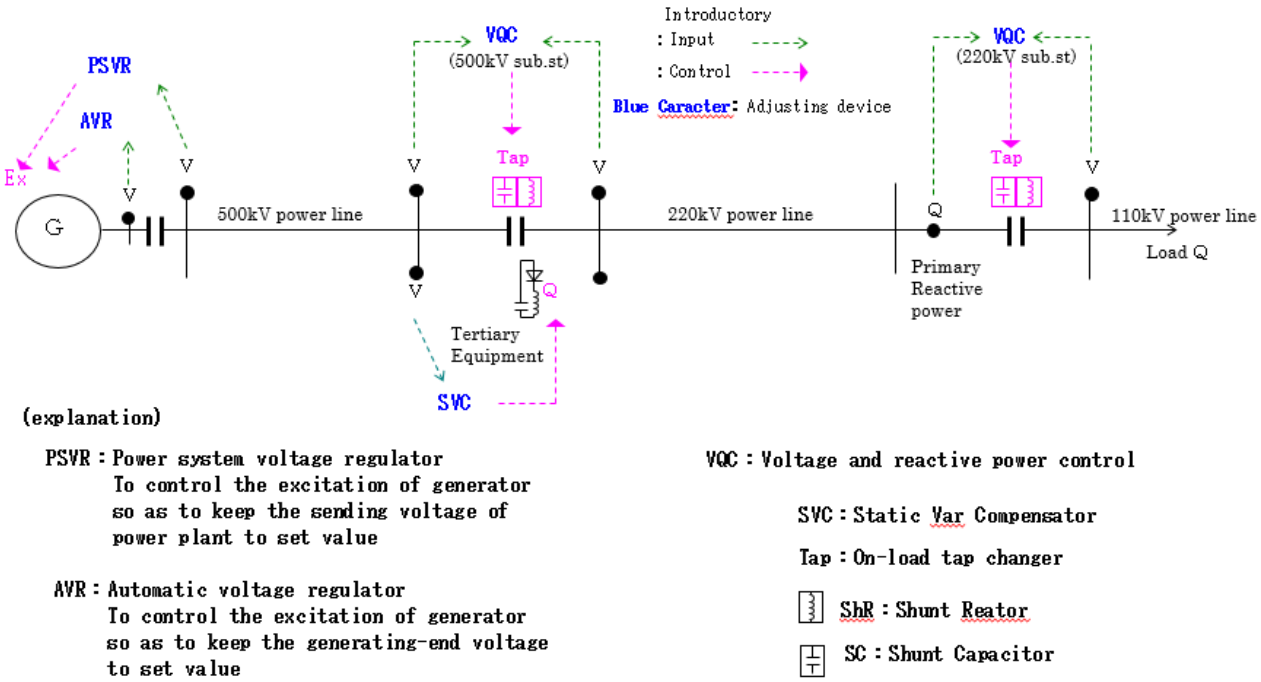
別添図 7-13 は電力系統の電圧制御の考え方の一例である。今回のドゥシャンベ内の系統においては 220/110kV 変電所の電圧制御方法として二次側電圧を 110kV±不感帯に収まるように、一次側無効電力の通過量を見ながら変圧器タップ或は調相設備を制御する方法が考えられる。また、配電用変電所では送り出し電圧が一定±不感帯となるよう変圧器のタップを調整する方式が考えられる。

なお、現地調査において負荷の変動による電圧変動が大きいとのことであるが、調相設備に電力用コンデンサと可変リアクトルを組み合わせた静止型無効電力補償装置（Static var

compensator: SVC）を用いることで高速制御が可能となる。



別添図 7-12 VQC の制御平面図



(explanation)

PSVR：Power system voltage regulator
To control the excitation of generator so as to keep the sending voltage of power plant to set value

AVR：Automatic voltage regulator
To control the excitation of generator so as to keep the generating-end voltage to set value

VQC：Voltage and reactive power control

SVC：Static Var Compensator

Tap：On-load tap changer

ShR：Shunt Reator

SC：Shunt Capacitor

別添図 7-13 系統の電圧調整の概要

別添資料－８　電力系統解析データ

別添資料8. 電力系統解析データ

8-1 発電機各種データ

Technical Parameters of Generating Units №1 and №2 of Hydropower Plant-2 (GES-2)

Технические параметры гидроагрегатов №1 и №2 ГЭС-2

№ № п/п	**Parameter** Параметр	**Value** Значение
1	**Installed Capacity of Generating Unit, MW** Установленная мощность агрегата, МВт	7.2
2	**Available Capacity of Generating Unit, MW** Располагаемая мощность агрегата, МВт	3
3	**Maximum Permissible Active Power of Generating Unit, MW** Максимально-допустимая активная мощность, МВт	7.2
4	**Minimum Permissible Active Power of Generating Unit, MW** Минимально-допустимая активная мощность, МВт	
5	**Maximum Reactive Power, MVAr** Максимальная реактивная мощность, МВт	
6	**Minimum Reactive Power, MVAr** Минимальная реактивная мощность, МВт	
7	**MWs/MVA Inertia Constant** p.u. постоянной инерции МВт сек/МВА	
8	**rap.u. MW/ Rate of Attenuation per unit. Attenuation Parameter Typical Range, 0.8-1.0, for Steam-Generating Unit. Measure of Inaccuracy = 1.** Коэффициент частоты затухания агрегата. Типовые диапазоны параметров затухания 0.8-1.0 для парогенераторной установки. Погрешность – 1.	
9	**Connection of Generating Unit to Automatic Load-Frequency Control (ALFC), Yes – No** Подключение агрегата к автоматическому регулированию частоты и мощности	

	(Да – Нет)	
10	**Connection of Generating Unit to Automatic Voltage Control (AVC), Yes – No** Подключение агрегата к автоматическому регулированию напряжения (Да – Нет)	
11	**Automatic Load-Frequency Control (ALFC) Range, MAX & MIN** Пределы регулирования АРЧМ (максимальный и минимальный)	
12	**Permissible Active Load Rate of Increase in Normal Operation, MW/min** Допустимая скорость увеличения активной нагрузки в нормальном режиме, МВт/мин	
13	**Permissible Active Load Rate of Decrease in Normal Operation, MW/min** Допустимая скорость уменьшения активной нагрузки в нормальном режиме, МВт/мин	
14	**Permissible Active Load Rate of Increase in Emergency Operation, MW/min** Допустимая скорость увеличения активной нагрузки в аварийных режимах, МВт/мин	
15	**Permissible Active Load Rate of Decrease in Emergency Operation, MW/min** Допустимая скорость уменьшения активной нагрузки в аварийных режимах, МВт/мин	
16	**Prohibited Ranges of Generating Unit Operation (MW $_{min}$ – MW $_{max}$)** Запретные зоны работы генераторов (МВт min – МВт max)	
17	**Transient Reactance used to calculate the Short-Circuit Current** Переходное реактивное сопротивление, используемое для расчёта тока к. з.	
18	**Sub-Transient Reactance used to calculate the Short-Circuit Current** Сверхпереходное реактивное сопротивление, используемое для расчёта тока к. з.	
19	**Zero Phase Sequence of Reactance** Нулевая последовательность реактивного сопротивления	
20	**Economic Operation Mode Range (MAX & MIN) – only for Turbo-Generating Units**	

	Диапазон экономичного режима работы (макс. и мин.) – только для турбогенераторов	

HYDROPOWER PLANT-2 (GES-2)

GENERATING UNIT №1

Type Тип	**Vertically Suspended** Вертикальный подвесной
Manufacturer's Plant Завод изготовителя	**England** Английский
Capacity Мощность	**9000 kVA** 9000 кВА
Power Factor Коэффициент мощности	**0.8** 0.8
Voltage Напряжение	**6300 V** 6300 В
Stator Current Ток статора	**825 A** 825 А
Number of Revolutions Число оборотов	**428 rev./min.** 428 об/мин
Rotor Current Ток ротора	**450 A** 450 А
Type of Exciter Тип возбудителя	**EG-342/8 Shunt Exciter** EG-342/8 Шунтовый
Capacity Мощность	**87.7 kW** 87.7 кВт
Voltage	**156 V**

Напряжение	156 В
Sub-Exciter Подвозбудитель	**EG-192** EG-192
Capacity Мощность	**3.8 kW** 3.8 кВт
Voltage Напряжение	**230 V** 230 В
Type of Regulator Тип регулятора	**VS-4** VS-4
Cooling System Система охлаждения	**Closed Cooling System** Замкнутая

Hydropower Plant-1 (GES-1)

Generators 1 and 2				**Hydro Turbines 1 and 2**		
1	**Type** Тип	BB-654		1	**Type** Тип	Francis Turbine, Vertical
2	**Capacity** Мощность	4.65 MVA	$X''_d = 0.274$ $X'_d = 0.3$	2	**Wheel Diameter** Диаметр колеса	1.034/1.256 m
3	**Power Factor** Коэффициент мощности	0.8	$X_d = 1.25$ $X_2 = 0.436$	3	**Wheel Height** Высота колеса	0.586 m
4	**Voltage** Напряжение	6.3 kV		4	**Number of Blades** Число лопаток	15
5	**Stator Current, I** **c** Ток статора	426 A		5	**Design Head** Расчётный напор	H = 49 m

6	**Rotor Current, I** **p** Ток ротора	250 A		6	**Design Flow Rate** Расчётный расход	Q = 9.5 m^3 /sec
7	**Number of Revolutions** Число оборотов	375 rev/min		7	**Rated Capacity** Номинальная мощность	3.9 MW
8	**Efficiency** К.п.д.	95.8%		8	**Available Capacity** Фактическая мощность	3.6 MW
				9	**Number of Revolutions** Число оборотов	375 rev/min
				10	**Efficiency** К.п.д.	87.6%
	EXCITER Возбудитель					
1	**Type** Тип	6-300				
2	**Capacity** Мощность	29 kW				
3	**Voltage** Напряжение	115 V				
4	**Excitation Control** Регулирование возбуждения	Compound Exciter				

Hydropower Plant-3 (GES-3)

Generators 1 and 2				**Hydro Turbines 1 and 2**		
1	**Type** Тип	ВСГ-325/29-24		1	**Type** Тип	РО-123-ВБ-140, Francis Turbine
2	**Capacity** Мощность	2.2 MVA	$X''_d = 0.36$ $X'_d = 0.3$	2	**Wheel Diameter** Диаметр колеса	1.4 m
3	**Power Factor** Коэффициент мощности	0.8	$X_d = 1.2$ $X_2 = 0.45$	3	**Number of Blades** Число лопаток	14
4	**Voltage** Напряжение	6.3 kV		4	**Design Head** Расчётный напор	H = 19.7 m
5	**Stator Current, I_c** Ток статора	202 A		5	**Max. Flow Rate** Макс. расход	Q = 12.6 m^3 /sec
6	**Rotor Current, I_p** Ток ротора	385 A		6	**Capacity** Мощность	2.02 MW
7	**Number of Revolutions** Число оборотов	250 rev/min		7	**Number of Revolutions** Число оборотов	250 rev/min
	EXCITER Возбудитель					
1	**Type** Тип	ВВС-74/19-6				
2	**Capacity** Мощность	47 kW				

3	**Voltage** Напряжение	115 V				
4	**Excitation Control** Регулирование возбуждения	Compound Exciter				

Dushanbe Thermal Power Plant (DTEC) – Phase 1

Generators 1, 2 and 3				**Turbines 1, 2 and 3**		
1	**Type** Тип	4H-5466/2		1	**Type** Тип	P-6-90, П-6-35.5; P-4,5-35/6
2	**Capacity** Мощность	7.5 MVA	$X''_d = 0.122$ $X'_d = 0.235$ – for G1 & G2 $X_d = 2.38$ $X_2 = 0.15$	2	**Capacity** Мощность	6 MW
3	**Power Factor** Коэффициент мощности	0.8		3	**Effective Pressure before Stop Valve** Рабочее давление перед стопорным клапаном	35 at
4	**Voltage** Напряжение	6.3 kV		4	**Condenser Backpressure** Давление в конденсаторе	0.05 at
5	**Stator Current, I c** Ток статора	688 A	$X''_d = 0.12$ $X'_d = 0.17$ $X_d = 1.65$ – for G3 $X_2 = 0.147$	5	**Operating T°C before Stop Valve** Рабочая T°C перед стопорным клапаном	435°C
6	**Rotor Current, I p** Ток ротора	158 A		6	**Specific Steam Consumption in Condensing Mode** Уд. расход пара в конденсационном	4.28 kg/kW x hour

					режиме	
7	**Number of Revolutions** Число оборотов	3000 rev/min		7	**The same, with Max. Take-Off & Rated Capacity** То же, при макс. отборе и номинальной мощности	8.85 kg/kW x hour
				8	**Max. Steam Rate** Макс. расход пара	98 tons/hour
	EXCITER Возбудитель					
1	**Type** Тип	E-3031/4				
2	**Capacity** Мощность	50 kW				
3	**Voltage** Напряжение	220 V				
4	**Current** Ток	227 A				

Dushanbe Thermal Power Plant (DTEC) – Phase 2

Generators 4 and 5				**Turbines 4 and 5**		
1	**Type** Тип	TBC-30		1	**Type** Тип	ПТ-35-90/10
2	**Capacity** Мощность	37.5 MVA	$X''_d = 0.152$ $X'_d = 0.257$	2	**Capacity** Мощность	35 MW
3	**Power Factor** Коэффициент	0.8	$X_d = 2.453$	3	**Overload Capacitance** Перегрузочная	20%

	мощности		$X_2 = 0.185$		способность	
4	**Voltage** Напряжение	6.3 kV		4	**Number of Revolutions** Число оборотов	3000 rev/min
5	**Stator Current, I c** Ток статора	3440 A		6	**Effective Pressure before Stop Valve** Рабочее давление перед стопорным клапаном	95 at
6	**Rotor Current, I p** Ток ротора	460 A		7	**Operating T°C before Stop Valve** Рабочая T°C перед стопорным клапаном	535°C
7	**Number of Revolutions** Число оборотов	3000 rev/min		8	**Condenser Backpressure** Давление в конденсаторе	0.05 at
8	**Efficiency** К.п.д.	98.2%		9	**Number of Turbine Stages** Число ступеней турбины	24
				10	**Number of Governed rev/min** Число регулируемых оборотов	2/8/13; 0,7/2,5
	EXCITER Возбудитель			11	**Critical Speed** Критическое число оборотов	1750 rev/min
1	**Type** Тип	ВТ-170-3000		12	**Number of Turbine Disks (integrally with shaft)** Число дисков (заодно с	16

					валом)	
2	**Capacity** Мощность	150 kW		13	**Number of Capped Turbine Disks** Число насадных дисков	8
3	**Voltage** Напряжение	250 V		14	**Specific Steam Consumption in Condensing Mode** Уд. расход пара в конденсационном режиме	3.96 kg/kW x hour
4	**Current** Ток	600 A		15	**Max. Steam Rate** Макс. расход пара	240 tons/hour
5	**Excitation** Возбуждение	Shunted Excitation				
6	**Excitation Control** Регулирование возбуждения	Compound Exciter				

Dushanbe Thermal Power Plant (DTEC) – Phase 2

Generator 6				**Turbine 6**		
1	**Type** Тип	TB-60-2		1	**Type** Тип	K-50-90
2	**Capacity** Мощность	60 MVA	$X''_d = 0.157$ $X'_d = 0.242$	2	**Capacity** Мощность	50 MW
3	**Power Factor** Коэффициент мощности	0.8	$X_d = 2.0$ $X_2 = 0.191$	3	**Overload Capacitance** Перегрузочная способность	10%

4	**Voltage** Напряжение	10.5 kV		4	**Number of Revolutions** Число оборотов	3000 rev/min
5	**Stator Current, I c** Ток статора	4125 A		5	**Effective Pressure before Stop Valve** Рабочее давление перед стопорным клапаном	90 at
6	**Rotor Current, I p** Ток ротора	700 A		6	**Operating T°C before Stop Valve** Рабочая T°C перед стопорным клапаном	535°C
7	**Cooling System** Система охлаждения	Hydrogen Cooling, 2 kg/cm^2		7	**Condenser Backpressure** Давление в конденсаторе	0.035 at
8	**Number of Revolutions** Число оборотов	3000 rev/min		8	**Critical Speed** Критическое число оборотов	1755 rev/min
				9	**Max. Steam Rate** Макс. расход пара	205 tons/hour
	EXCITER Возбудитель					
1	**Type** Тип	BT-170				
2	**Capacity** Мощность	190 kW				
3	**Voltage** Напряжение	250 V				
4	**Current**	760 A				

	Ток					

Dushanbe Thermal Power Plant (DTEC) – Phase 2

Generator 7				**Turbine 7**		
1	**Type** Тип	TBF-100-2		1	**Type** Тип	K-100-90-6M
2	**Capacity** Мощность	100 MVA	$X''_d = 0.18$ $X'_d = 0.28$	2	**Capacity** Мощность	100 MW
3	**Power Factor** Коэффициент мощности	0.85	$X_d = 1.81$ $X_2 = 0.22$	3	**Overload Capacitance** Перегрузочная способность	10%
4	**Voltage** Напряжение	10.5 kV		4	**Number of Revolutions** Число оборотов	3000 rev/min
5	**Stator Current, I_c** Ток статора	6880 A, T=20°C 6480 A, T=33°C		5	**Effective Pressure before Stop Valve** Рабочее давление перед стопорным клапаном	90 at
6	**Rotor Current, I_p** Ток ротора	1680 A		6	**Operating T°C before Stop Valve** Рабочая T°C перед стопорным клапаном	535°C
7	**Number of Revolutions** Число оборотов	3000 rev/min		7	**Condenser Backpressure** Давление в конденсаторе	0.035 at
8	**Cooling System** Система охлаждения	Hydrogen Cooling		8	**Max. Steam Rate** Макс. расход пара	408 tons/hour

	EXCITER Возбудитель					
1	**Type** Тип	BT-450				
2	**Capacity** Мощность	470 kW				
3	**Voltage** Напряжение	280 V				
4	**Current** Ток	-				

8-2 変電所各種データ

Document 2: Transformers Data

Please check Transformers Data as below

No.	Substation	Voltage (kV)	Cap (MVA)	Impedance	Tap	Winding Connection Scheme
①	ОРДЖ-АБАД-2	#1 220/110/10	125	10,00%	17	Y△
		#2 220/10	125	10,00%	13	Y△
②	ШУРСАЙ	#1 110/10	10	10,00%	13	Y△
③	ВАХДАТ	#1 110/6	32	10,00%	13	Y△
		#2 110/6	25	10,00%	13	Y△
		#3 110/6	25	10,00%	13	Y△
④	АНЗОБ	#1 110/6	16	10,00%	13	Y△
		#2 110/6	16	10,00%	13	Y△
⑤	АКАДЕМГОРОДОК	#1 110/35/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y△
		#2 110/35/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y△
⑥	ВОСТОЧНАЯ	#1 110/35/10?	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y△
		#2 110/35/10?	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y△
⑦	РОХАТИ	#1 35/10	1,6	10,00%	13	Y△
		#2 35/10	6,3	10,00%	13	Y△
⑧	ВИНЗАВОД	#1 35/6	10	10,00%	13	Y△
		#2 35/6	10	10,00%	13	Y△
⑨	ПУГУС	#1 110/35/10	10	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y△
⑩	ХОДЖА ОБИ ГАРМ	#1 35/6	6,3	10,00%		Y△

		#2 35/6	1,6	10,00%		Y Δ
		#3 6/10	1,6	10,00%		ΔΔ
⑪	ТАКОБ	#1 35/10	2,5	10,00%		Y Δ
		#2 35/6	2,5	10,00%		Y Δ
⑫	САФЕДОРАК	#1 35/10	2,5	10,00%	13	Y Δ
		#2 35/10	4	10,00%	13	Y Δ
⑬	КВЗ	#1 110/35/6	16	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
		#1 110/35/6	16	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
⑭	СЕВЕРНЫЙ ПОРТАЛ	#1 110/6	6,3	10,00%	13	Y Δ
⑮	ЮЖНЫЙ ПОРТАЛ	#1 110/6	6,3	10,00%	13	Y Δ
⑯	ВАРЗОБ	#1 110/10	2,5	10,00%		Y Δ
⑰	КОНДАРА	#1 10/6	1	10,00%		Y Δ
⑱	МАЙХУРА	#1 110/10	2,5	10,00%	13	Y Δ
⑲	УГЛОВАЯ	#1 35/0.4	0,56	10,00%		Y Δ
⑳	КОМИНТЕРН	#1 35/6	2,5	10,00%		Y Δ
㉑	ПРОХОДНАЯ	#1 35/0.4	0,56	10,00%		Y Δ
㉒	ГЭС-1 (РП-6)	#1 35/6	2.5?	10,00%		Y Δ
㉓	ТОЧИКИСТОН	#1 35/6	2.5?	10,00%		Y Δ
㉔	ПОГРУЗКА	#1 35/6	2,5	10,00%		Y Δ
		#2 35/6	1,6	10,00%		Y Δ
㉕	КАХОРОВ	#1 110/10	20	10,00%	13	Y Δ
㉖	ФИРДАВСИ	#1 110/10	16	10,00%	13	Y Δ
		#2 110/10	6,3	10,00%	13	Y Δ
㉗	СООРУЖЕНИЯ ОЧИСТНЫЕ	#1 35/6	10	10,00%	13	Y Δ
		#2 110/6/6	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y ΔΔ
㉘	ДЖАНГАЛ	#1 220/110/10	200	P-S 10.71% S-T 44.25%	13	YYΔ

				P-T 28.14%		
		#2 220/110/10	200	P-S 10.88% S-T 44.28% P-T 24.11%	13	YY△
㉙	ЖУКОВА	#1 110/35/10	6,3	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y △
		#2 110/35/10	16	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y △
㉚	НАВБАХОР	#1 110/10	16	10,00%	13	Y △
		#2 110/10	16	10,00%	13	Y △
㉛	ЮГО-ЗАПАДНЫЙ ВОДОЗАБОР	#1 110/6	10	10,00%	13	Y △
		#2 110/6	10	10,00%	13	Y △
㉜	ЗАВОДСКАЯ	#1 110/35/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y △
		#2 110/35/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y △
㉝	ПАМИР	#1 35/10	5,6	10,00%	13	Y △
		#2 35/10	5,6	10,00%		Y △
㉞	РЭЗ	#1 35/6	6,3	10,00%		Y △
㉟	ЗАПАДНАЯ КОТЕЛЬНАЯ	#1 35/10	10	10,00%	13	Y △
		#2 35/10	10	10,00%	13	Y △
㊱	ПРОМЫШЛЕННАЯ	T1 - 110/35/10	25	VN/SN RPN/PBV – see **Footnote**		Y/Y/□-0-11
		T2 - 110/35/10	25	VN/SN RPN/RPBV – see **Footnote**		Y/Y/ □-0-11
		T3 - 110/10	16	VN RPN – see **Footnote**		Y_N/ □-1
㊲	БУСТОН	#1 110/35?/10	16	10,00%	13	Y Y △
		#2 110/10	16	10,00%	13	Y △
㊳	БАХОР	#1 110/10?/10	25	P-S 10.00% S-T 44.00%	13	Y Y △

				P-T 28.00%		
		#2 110/10	16	10,00%	13	Y Δ
㊴	БОТАНИЧЕСКАЯ	#1 110/10	10	10,00%	13	Y Δ
		#2 110/10	6,3	10,00%	13	Y Δ
㊵	ШАХРИ	#1 110/10/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y ΔΔ
		#2 110/10	16	10,00%	13	Y Δ
㊶	НОВАЯ	＃1 220/110/10	200	P-S 10.62% S-T 44.34% P-T 28.18%	13	YYΔ
		＃2 220/110/10	200	P-S 10.66% S-T 44.17% P-T 28.02%	13	YYΔ
		110/6		P-S %	13	Y Δ
㊷	ДУШАНБИНСКАЯ ТЭЦ-2	#1 220/110/10?	200	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
		#2 220/110/10?	200	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
㊸	СЕВЕРНАЯ	#1 110/35/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
		#2 110/35/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
㊹	КОСАТАРОШ	#1 35/10	2,5	10,00%		Y Δ
㊺	ЗИРАКИ	#1 35/10	4	10,00%		Y Δ
		#2 35/10	4	10,00%		Y Δ
㊻	ВОДОНАСОСНАЯ	#1 35/10	10	10,00%		Y Δ
㊼	ЛУЧОБ	#1 110/10/10	40	P-S 10.00% S-T 30.00%? P-T 30.00%?	13	Y ΔΔ

		#2 110/10/10	40	P-S 10.00% S-T 30.00%? P-T 30.00%?	13	Y Δ Δ
㊽	КАРАМОВА	#1 110/35/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
		#2 110/35/6	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
㊾	ИСТИКЛОЛ	#1 35/6	10	10,00%		Y Δ
		#2 35/6	10	10,00%		Y Δ
㊿	АКВА	#1 35/0.4	2,5	10,00%		Y Δ
		#2 35/0.4	2,5	10,00%		Y Δ
51	ЦЕМЗАВОД	#1 35/6	15	10,00%	13	Y Δ
		#2 35/6	15	10,00%	13	Y Δ
52	СИМ-СИМ	#1 35/6?	2,5	10,00%		Y Δ
53	ЦЕНТРАЛЬНАЯ	#1 35/6	16	10,00%	13	Y Δ
		#2 35/6	16	10,00%	13	Y Δ
54	СПОРТИВНАЯ	#1 110/10/10	25	10,00%		Y Δ
		#2 110/10/10	25	10,00%		Y Δ
55	ГЛАВНАЯ	#1 110/35/6	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
		#2 110/35/6	40	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
56	КАРАМОВА	#2 35/6	10	10,00%		Y Δ
		#5 35/6	10	10,00%		Y Δ
57	ДТЭЦ	#1 110/35?/6	31,5	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
		#2 110/35?/6	40,5	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
58	ТТМ	#1 110/6/6	25	P-S 10.00%	13	Y Δ Δ

				S-T 44.00% P-T 28.00%		
		#2 110/6/6	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Δ Δ
59	АВИАТОР	#1 110/6	16	10,00%	13	Y Δ
60	ХБК-110	#1 110/35/10	40	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
		#2 110/35/10	20	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
61	ТОРГМАШ	#1 35/6	6,3	10,00%		Y Δ
		#2 35/6	6,3	10,00%		Y Δ
62	КАСРИ МИЛЛАТ	#1 110/10/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Δ Δ
		#2 110/10/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Δ Δ
63	ХБК-35	#1 35/6	16	10,00%		Y Δ
		#2 35/6	16	10,00%		Y Δ
64	СОХИЛИ	#1 110/10/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Δ Δ
		#2 110/10/10	25	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Δ Δ
65	СОВЕТСКАЯ	#1 110/10	20	10,00%	13	Y Δ
		#2 110/35?/10	40	P-S 10.00% S-T 44.00% P-T 28.00%	13	Y Y Δ
			3054,22			

Footnote:

VN/SN RPN/PBV	High-Voltage/Medium-Voltage On-Load Tap-Changer/Off-Circuit Tap-Changer
VN/SN RPN/RPBV	High-Voltage/Medium-Voltage On-Load Tap-Changer/? Off-Circuit Tap-Changer
VN RPN	High-Voltage On-Load Tap-Changer

8-3 各変電所での負荷潮流予想値

Document 3: Load Prediction for the Substations

Please show us Power Load at each Substation (with peak load 1800MW in winter

period of 2017 in Dushanbe)

LOAD	SUBSTATION	P（MW）	Q（Mvar）	SC Capacity (MVA）
English	Substation	Active Power	Reactive Power	Shunt Capacitor
		Активная мощность МВт	Реактивная мощность Мвар	Shunt Capacitor (SC) (There are no devices for compensation of Reactive Power at these substations)
Japan	変電所	有効電力	無効電力	分路コンデンサ
①	ОРДЖ-АБАД-2	156	40	
②	ШУРСАЙ	10,5	4,5	
③	ВАХДАТ	38,6	12	
④	АНЗОБ	18,8	4	
⑤	АКАДЕМГОРОДОК	22	7	
⑥	ВОСТОЧНАЯ	36	10	
⑦	РОХАТИ	2,6	1,1	Does not belong to substation of Dushanbe City
⑧	ВИНЗАВОД	19	5	
⑨	ПУГУС	4,2	2,2	Does not belong to substation of Dushanbe City
⑩	ХОДЖА ОБИ ГАРМ	4,6	1,2	Does not belong to substation of Dushanbe City
⑪	ТАКОБ	2,5	1,1	Does not belong to substation of Dushanbe City
⑫	САФЕДОРАК	2,2	1	Does not belong to substation of Dushanbe City
⑬	КВЗ	14	5	
⑭	СЕВЕРНЫЙ ПОРТАЛ	2,1	1	Does not belong to substation of Dushanbe City
⑮	ЮЖНЫЙ	2,0	1	Does not belong to substation of

	ПОРТАЛ			Dushanbe City
⑯	ВАРЗОБ	6,5	2	Does not belong to substation of Dushanbe City
⑰	КОНДАРА	0,8	0,2	Does not belong to substation of Dushanbe City
⑱	МАЙХУРА	1,2	0,5	Does not belong to substation of Dushanbe City
⑲	УГЛОВАЯ	0,3	0,1	Does not belong to substation of Dushanbe City
⑳	КОМИНТЕРН	4	2	
㉑	ПРОХОДНАЯ	0,5	0,1	Does not belong to substation of Dushanbe City
㉒	ГЭС-1 (РП-6)	5	2	
㉓	ТОЧИКИСТОН	2	1	
㉔	ПОГРУЗКА	3	1	
㉕	КАХОРОВ	6	2	
㉖	ФИРДАВСИ	21	5,5	
㉗	СООРУЖЕНИЯ ОЧИСТНЫЕ	21	7,4	
㉘	ДЖАНГАЛ	320	80	
㉙	ЖУКОВА	18	5	
㉚	НАВБАХОР	24,5	6,8	
㉛	ЮГО-ЗАПАДНЫЙ ВОДОЗАБОР	2	1	
㉜	ЗАВОДСКАЯ	42	11,5	
㉝	ПАМИР	2,5	1,2	
㉞	РЭЗ	5,2	1,6	
㉟	ЗАПАДНАЯ КОТЕЛЬНАЯ	12,2	3,2	
㊱	ПРОМЫШЛЕННАЯ	52,9	18,5	
㊲	БУСТОН	21,4	6,5	
㊳	БАХОР	29,5	7,4	
㊴	БОТАНИЧЕСКАЯ	18,2	3,6	
㊵	ШАХРИ	29,5	6,2	

㊶	НОВАЯ	336	85	
㊷	ДУШАНБИНСКАЯ ТЭЦ-2	-	-	
㊸	СЕВЕРНАЯ	38,4	8,1	
㊹	КОСАТАРОШ	2,1	1,0	Does not belong to substation of Dushanbe City
㊺	ЗИРАКИ	5,2	2,2	Does not belong to substation of Dushanbe City
㊻	ВОДОНАСОСНАЯ	5,4	2,1	
㊼	ЛУЧОБ	43,5	10,5	
㊽	КАРАМОВА	28,5	7,5	
㊾	ИСТИКЛОЛ	18,4	7,2	
㊿	АКВА	4,5	1,7	
51	ЦЕМЗАВОД	24,2	11,4	
52	СИМ-СИМ	1,6	0,2	
53	ЦЕНТРАЛЬНАЯ	26,5	7,2	
54	СПОРТИВНАЯ	36,1	10,9	
55	ГЛАВНАЯ	28,4	5,7	
56	КАРАМОВА	See above		
57	ДТЭЦ	15,2	6,1	
58	ТТМ	43,4	11,2	
59	АВИАТОР	12,5	6,4	
60	ХБК-110	26,5	9,4	
61	ТОРГМАШ	8,6	3,5	
62	КАСРИ МИЛЛАТ	32,5	7,2	
63	ХБК-35	20,1	7,6	
64	СОХИЛИ	38,8	10,1	
65	СОВЕТСКАЯ	36,9	12,7	

別添資料－９　輸送ルート

別添資料9. 輸送ルート

9-1 日本からタジキスタンへの輸送ルート

9-2 ドゥシャンベ内輸送ルート

別添資料－１０　グラブナヤ・グラポチタント

地中ケーブル検討結果

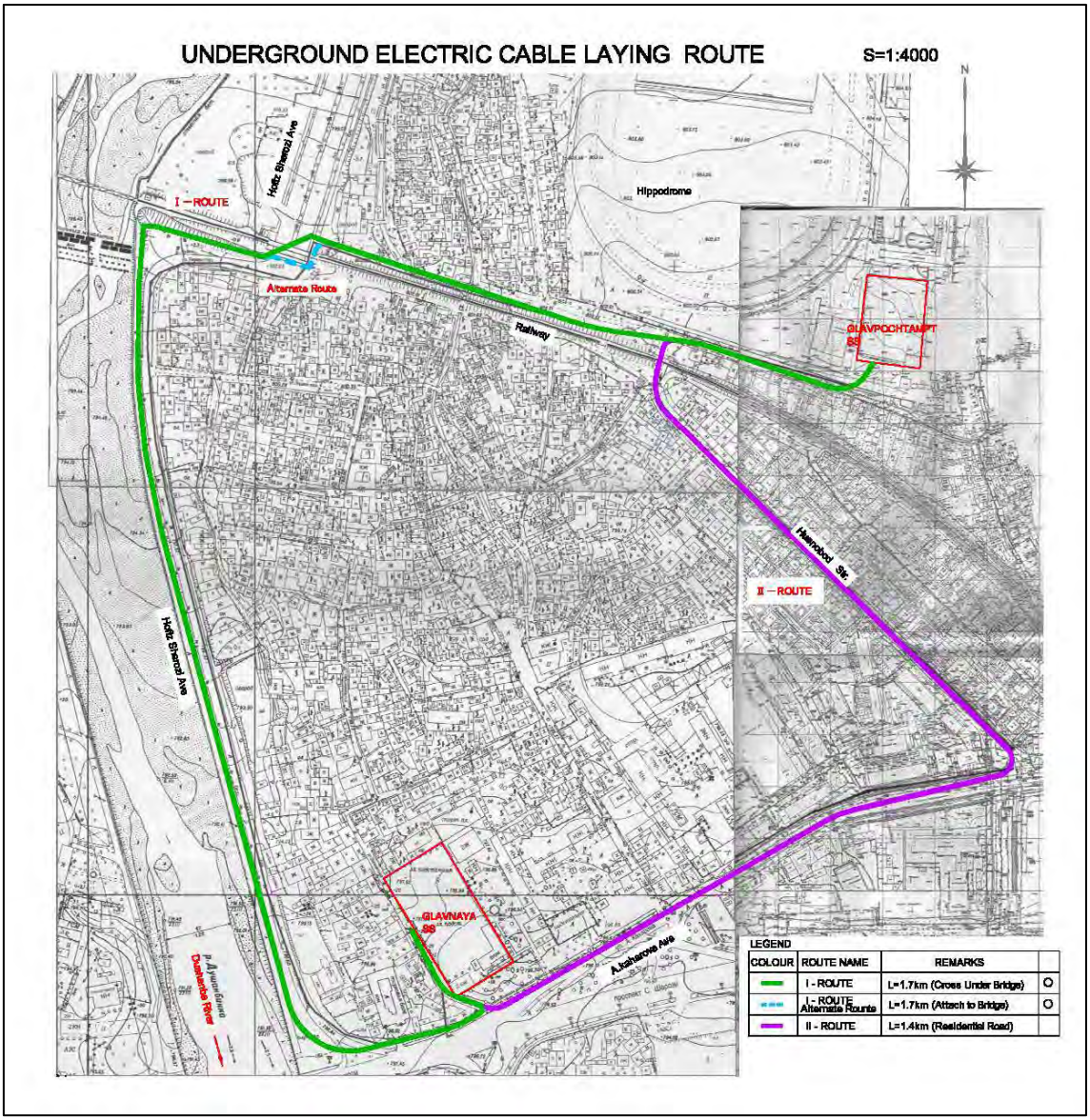
別添資料10. グラブナヤ・グラポチタント地中ケーブル検討結果

10-1 地中送電ルート

別添図 10-1 に示す 2 ルートについて、埋設物調査などを行い、実現性・経済性などからルートを選定した。各ルートの特徴は次のとおり。

・河川沿いのルート：埋設物調査済み。住居地域ルートに比べ亘長は長くなるが、道路脇の緑地帯の利用による他の埋設物の影響の軽減、工事に伴う道路規制が少なくなる可能性もあり工事の容易性が高い

・住居地域のルート：埋設物調査済み。亘長は短いが、下水・水道管など他の埋設物が多く、工事の難易度が高い



別添図 10-1 地中送電ルート

10-2 敷設形態と敷設方法

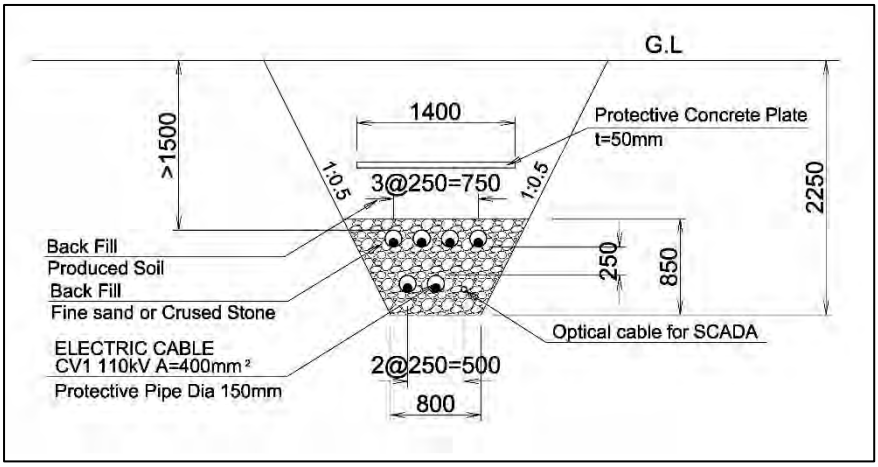
地中送電ケーブルの敷設形態と敷設方法の概略は別添図 10-2 のとおり。

・防護管は道路等を開削し土壌深部（1.5 m）に設置、土壌を埋め戻し埋設（直接埋設方式）

・ケーブル本体は、マンホールから 1 条ごとに防護管に引入れて収納（先方からの強い要請、大きなコスト増にはならない）

・ケーブルの引入れは、マンホール部で専用の引入れ装置を使い実施（ケーブルの引入れ方法は次頁参照）

・ケーブル接続部は、マンホール内で接続作業を行った後、余長を確保した上でケーブルラックに設置



別添図 10-2 埋設断面図

10-3 地中送電ケーブルの仕様・数量

地中送電ケーブルの仕様は別添図 10-3 のとおり。

・ケーブル本体：110kV、単芯 CV ケーブル、公称断面積 400mm^2、

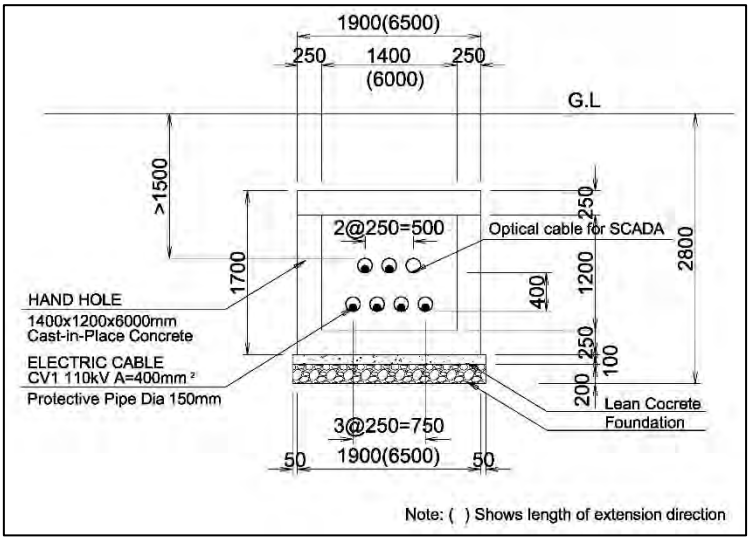
・防護管：硬質塩ビ電線管

別添図 10-3 硬質塩ビ電線管

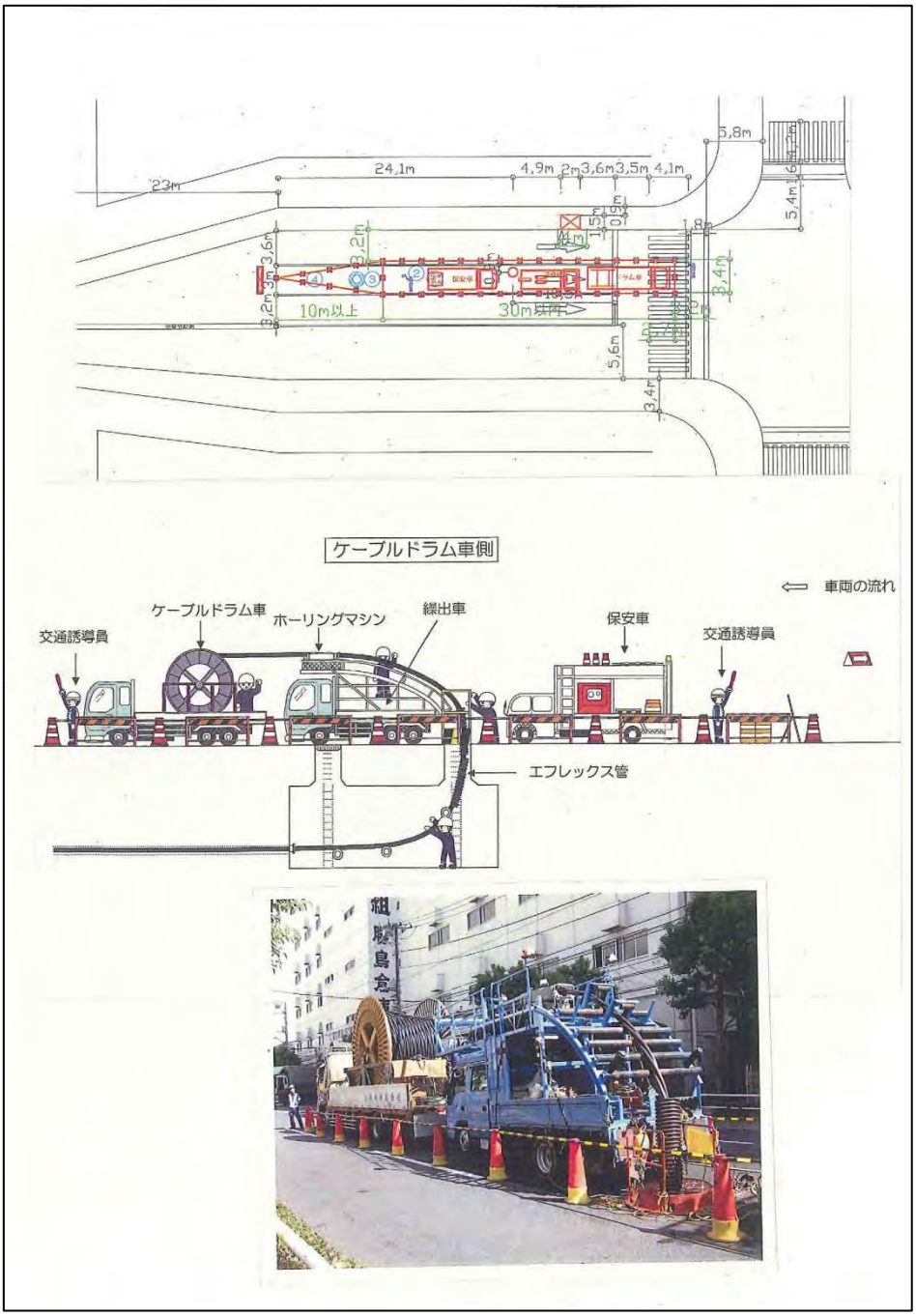
10-4 マンホール

マンホールは、採用するケーブルサイズ・長さに合わせ複数設置し、マンホールでケーブルの引入れ・引出し、接続を行う。マンホールの構造図を別添図 10-4 に、埋設ケーブル施工資料（日本での施工例）を別添図 10-5 示す。

・マンホール必要数：5 個



別添図 10-4 マンホール構造図



別添図 10-5 埋設ケーブル施工資料（日本での施工例）

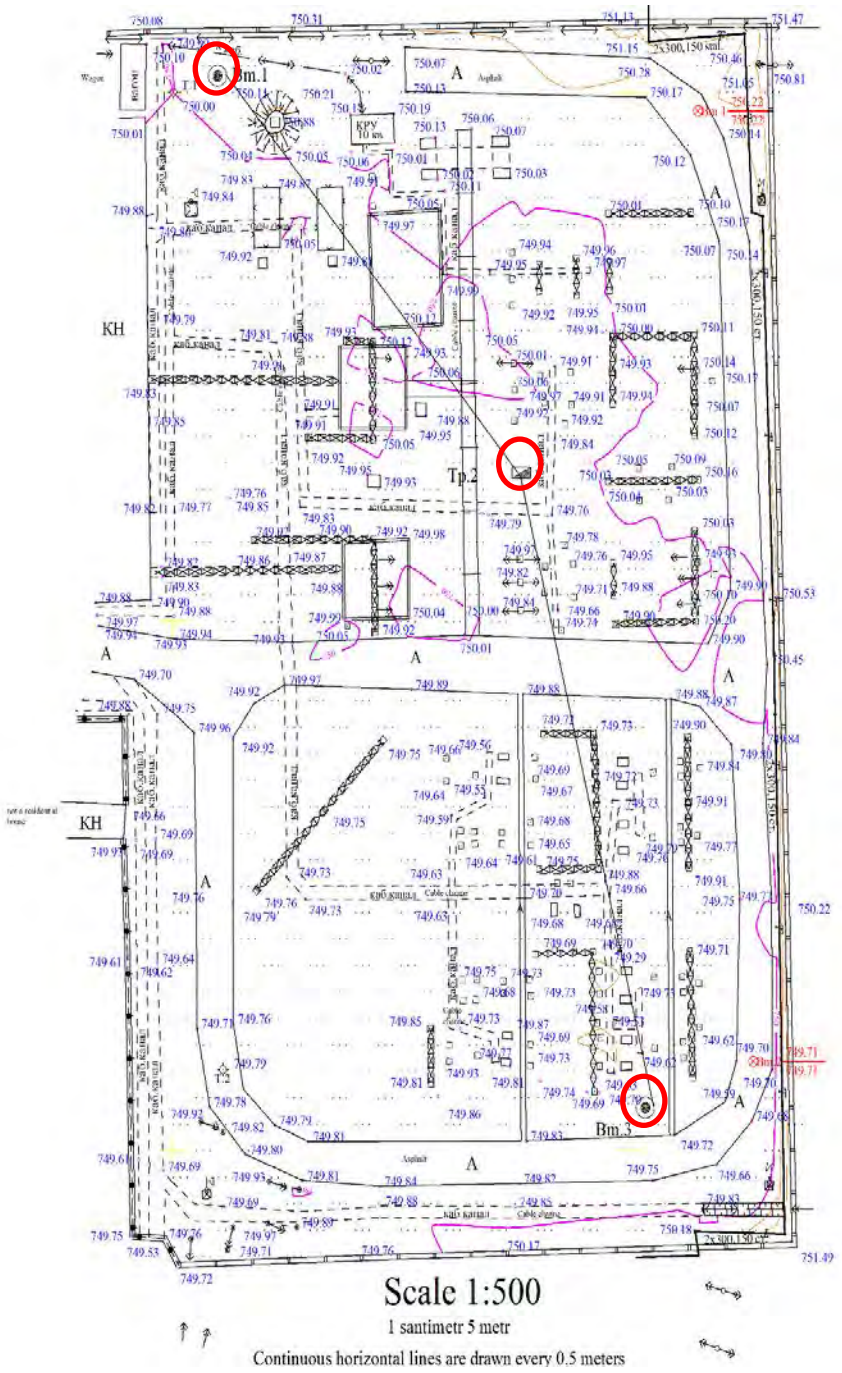
10-5 コストダウン

BT はケーブルの引入れ・引き出しがしやすいカルバートタイプを希望していたが、日本での実績が豊富な直接埋設した防護管にマンホールからケーブル引入れ・引出しする経済性に優れる方法を提案し、協議の結果、マンホールからの引入れ・引き出し方法の実現性に対する理解が得られ、経済性に優れる直接埋設方式で了解が得られた。

別添資料－１１　地形測量結果報告書

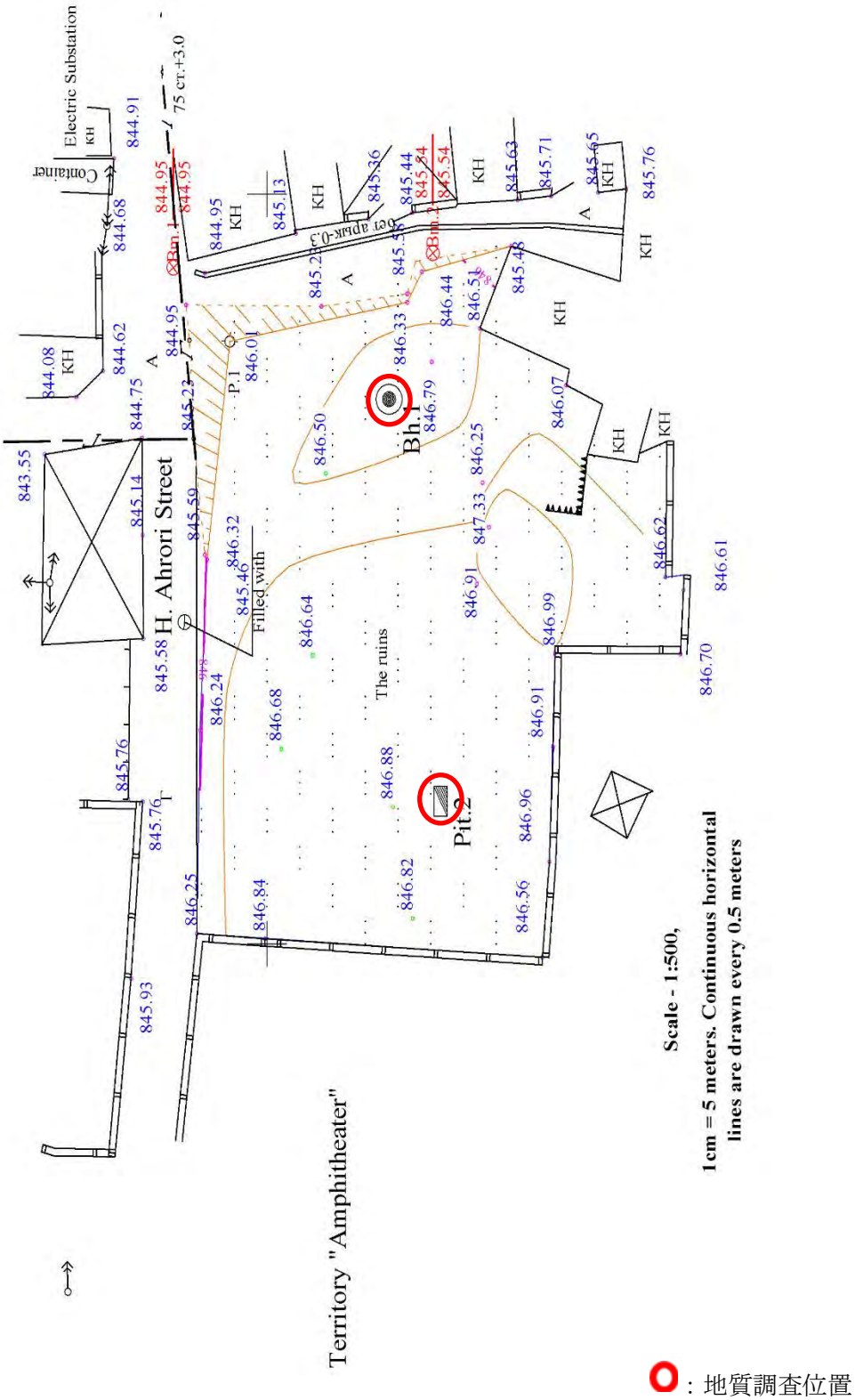
別添資料11. 地形測量結果報告書

11-1 プロミシレンナヤ地形測量結果



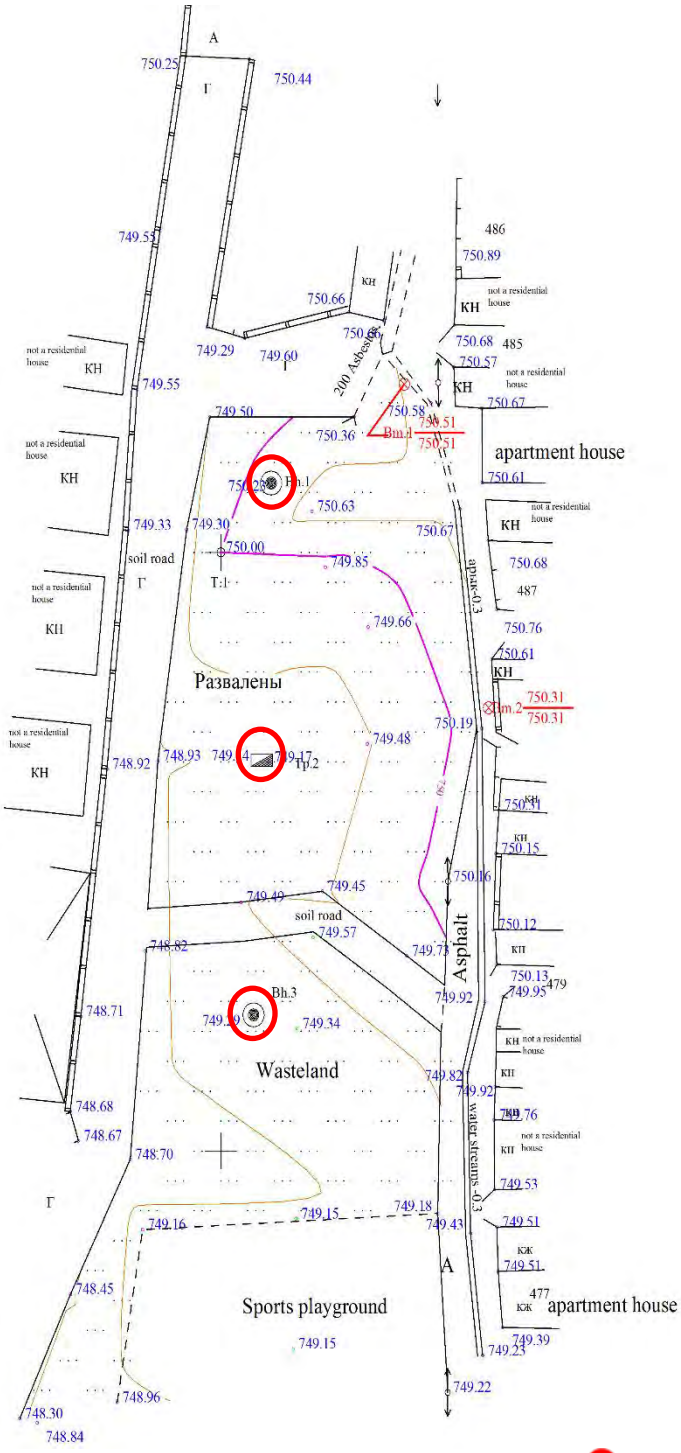
O：地質調査位置

11-2 ラディオスタンツィヤ地形測量結果



：地質調査位置

11-3 グラポチタント地形測量結果



●：地質調査位置

別添資料－１２　地質調査結果報告書

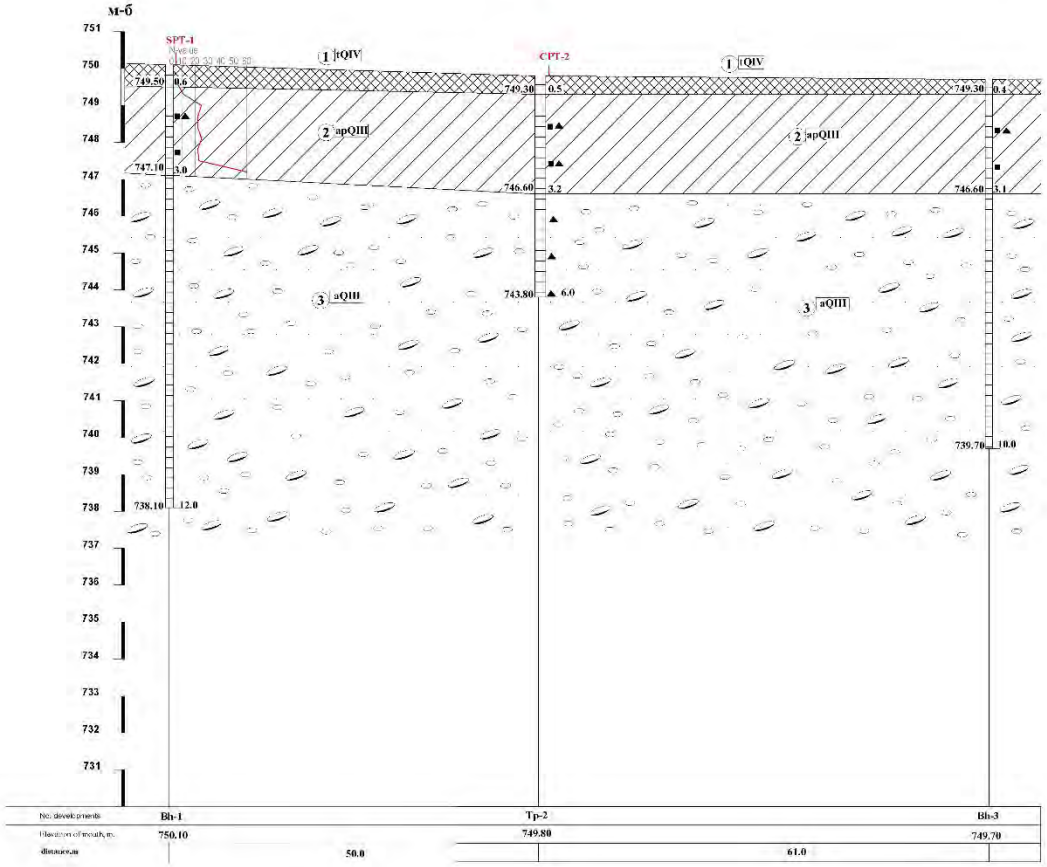
別添資料12.　　地質調査結果報告書

12-1 プロミシレンナヤ地質調査結果

"OPEN COMPANY GIINTIZ"

engineer and geology sections on lines I-I
scale: vert. 1:100
horiz. 1:500

appendix 7.2
Sheet 1
Arch. № 12311/2



"OPEN COMPANY GIINTIZ"

appendix 7.2
Sheet 2
Arch. № 12311/2

LEGENDS

MODERN SEDIMENTS

tQIV — Bulk-filled soil consisting from mechanical mixes of clay soil with inclusion of pebble, gravel and sand. Soil is dense, compacted and less moisture.

UPPER QUATERNARY DEPOSITS

apQIII — Loam from pale-yellow color, pelitic structures, lump, semi firm consistency.

aQIII — Pebble soil - the prevailing size of fragments of 8-12 cm, good rounding , the roundish and oval form, petro graphic structure - erupted rocks . Filler - sand of average size, grey color, less moisture. Soil with inclusion of boulders of 20 %.

1 — number of ingeeer-geological element

installed

the place of taken soil sample

■ PLACES OF COLLECTION OF THE MONOLITH SOIL

▲ PLACES OF COLLECTION OF THE SOIL SAMPLE

soil condition

Loam semi Hard

sand (filler) damp

CPT-2 place for test of CPT

Arh. № 12311/2, con.№ 9231/2

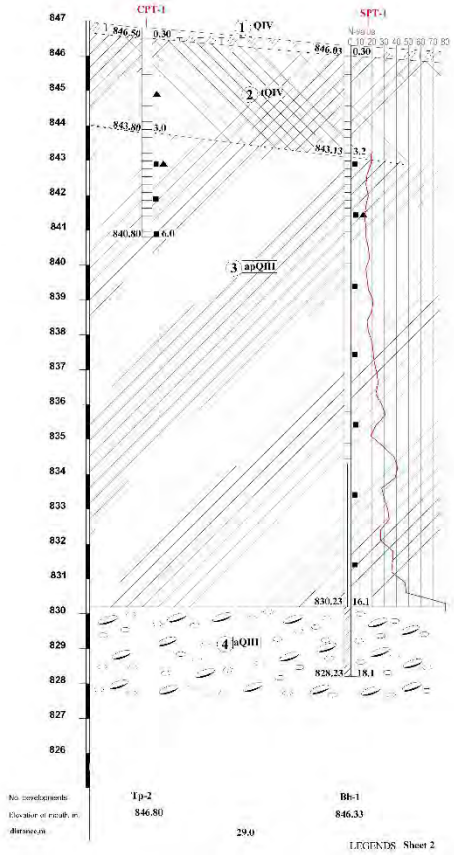
"OPEN COMPANY GIINTIZ"	*Site: "Eelectric Substations Rehabilitation Project in the city of Dushanbe, RT" (Elecric Substation "Industrial", street J. Rasulov)*		
	engineer and geology sections on lines I-I		
Head of Engineering geology section		Shohnazarov B.	Phase - Detailed design
Chief Geologist		Muinov R	
Prepared by		Morkel N.	Draw. № 5184, sheet 2

12-2 ラディオスタンツィヤ地質調査結果

"OPEN COMPANY GIINTIZ"

appendix 7.2
Sheet 1
Arch. № 12311

engineer and geology sections on lines I-I
scale: vert. 1:100
horiz. 1:500



"OPEN COMPANY GIINTIZ"

appendix 7.2
Sheet 2
Arch. № 12311

LEGENDS

MODERN SEDIMENTS

QIV — Soil-vegetative layer of loam structure with roots of plants

tQIV — Bulk-filled soil consisting from mechanical mixes of clay soil with inclusion of pebble, gravel, sand and construction garbage. Soil is dense, compacted and less moisture.

UPPER QUATERNARY DEPOSITS

apQIII — Loam from pale-yellow to brown color, pelitic structures, lump and massive structure, from semi firm to firm plastic consistences.

aQIII — Pebble soil - the prevailing size of fragments of 6-12 sm, good rounding , the roundish and oval form, petro graphic structure - erupted rocks ; Filler - sand of average size, grayish-grey color, damp. Soil with inclusion of boulders of 20-25 %.

1 — number of ingeeer-geological element border:
installed
expected

the place of taken soil sample
■ PLACES OF COLLECTION OF THE MONOLITH SOIL
▲ PLACES OF COLLECTION OF THE SOIL SAMPLE

soil condition
Loam semi Hard
Loam firm plastic
sand (filler) damp

CPT-1 — place for test of CPT

Arh. № 12311, con.№ 9231

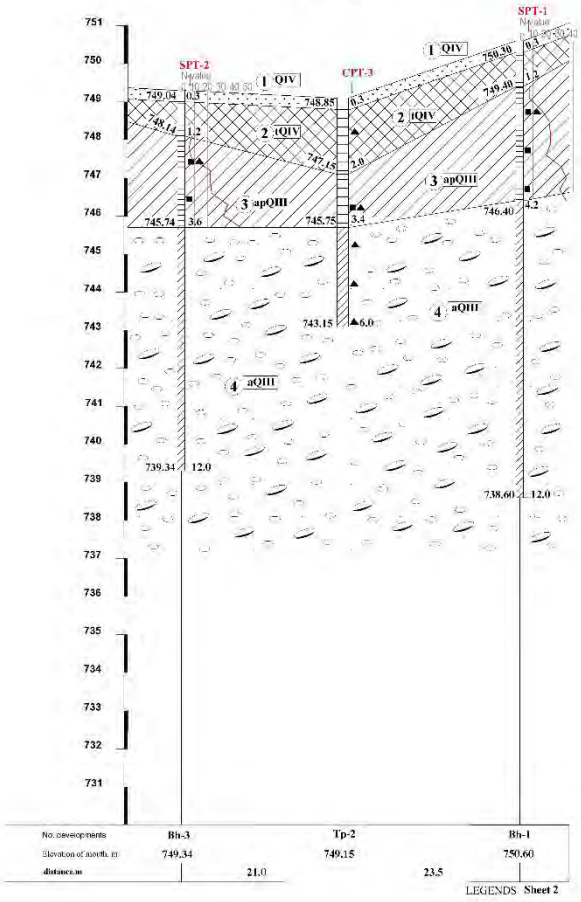
"OPEN COMPANY GIINTIZ"	**"Eelectric Substations Rehabilitation Project in the city of Dushanbe, RT"» (Electric Substation "Radio station", street IL Ahrori)**
	engineer and geology sections on lines I-I
Head of Engineering geology section	Shohnazarov B. — Phase - Detailed design
Chief Geologist	Muinov R
Prepared by	Morkel N. — Draw. № 5180, sheet 2

12-3 グラポチタント地質調査結果

"OPEN COMPANY GIINTIZ"

appendix 7.2
Sheet 1
Arch. № 12311/1

engineer and geology sections on lines I-I
scale: vert. 1:100
horiz. 1:500



"OPEN COMPANY GIINTIZ"

appendix 7.2
Sheet 2
Arch. № 12311/1

LEGENDS

MODERN SEDIMENTS

QIV Soil-vegetative layer of loam structure with roots of plants

tQIV Bulk-filled soil consisting from mechanical mixes of clay soil with inclusion of pebble, gravel, sand and construction garbage. Soil is dense, compacted and less moisture.

UPPER QUATERNARY DEPOSITS

apQIII Loam from pale-yellow color, pelitic structures, lump and massive structure, semi firm consistency.

aQIII Pebble soil - the prevailing size of fragments of 6-12 cm, good rounding , the roundish and oval form, petro graphic structure - erupted rocks . Filler - sand of average size, grayish-grey color, damp. Soil with inclusion of boulders of 20 %.

(1) number of ingeeer-geological element

installed

the place of taken soil sample

soil condition

Loam semi Hard

sand (filler) damp

SPT-1 the graphic chart of change of Rd on depth of immersing of a probe N

CPT-2 place for test of CPT

Arh. № 12311, con.№ 9231/1

"OPEN COMPANY GIINTIZ"	*"Eelectric Substations Rehabilitation Project in the city of Dushanbe. RT" (Electric Substation "Main Post Office", street H. Nazarov*
	engineer and geology sections on lines I-I
Head of Engineering geology section	Shohnazarov B. Phase - Detailed design
Chief Geologist	Muinov R.
Prepared by	Morkel N. Draw. № 5180, sheet 2

別添資料－１３　タジキスタンの税金種別

別添資料13. タジキスタンの税金種別

第 6 条 税金の種類

1. タジキスタン共和国では、国税と地方税がある。この税法で決められている状況等によって、納税者は特別な税制及び（又は）税額控除を利用することができる。

2. 国税

—所得税

—収益税

—付加価値税

—消費税

—社会税

—天然資源課税

—自動車道路利用者税

—一次アルミニウム並びに綿の売上税（タジキスタン共和国法 No.1367、2016 年 11 月 14 日改定）

3. この税法で決められた、又町村の政権地方機関の規則で有効された地方税

—自動車税

—財産税

4. この税法の第 16 条で決められている特別な税制により、納税者の一部が第 6 条 2 項及び 3 項に記載されている国税と地方税を簡素化した手順で支払うことができる。

5. 特別な税制

—特許又は証明書でビジネスを行っている個人の税制

—小企業の簡素化した税金手順

—農産生産者の簡素化した税金手順（単一税）

—ギャンブルビジネスの特別な税制

6. この税法の第 17 条で決められた税額控除により、高優先順位の経済分野への支援に関する付加給付が設ける。

7. タジキスタン共和国法で決められた国の手数料・関税とその他の通関料金・強制納付の金額と支払い手順は、記載された法律及びこの税法より定める。納金の税務管理に関する行政手続きは、この税法又その他の法律で決められた手順で検定機関及び税務署により行う。

8. タジキスタン共和国の予算案に従って、国税は国家予算と地方予算に分担する。地方税金の預金は地方予算に付く。

9. この税法で特別の定めがない限り、この税法の条に定められている徴税は税務署により行う。